START

U S
OFFICIAL GAZETTE
UNITED STATES
PATENT OFFICE
VOL. 971
JUNE
1978

MICRO PHOTO DIVISION

BELL & HOWELL

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

June 6, 1978 Volume 971 Number 1

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $300.00 per annum for first-class mailing, also available as fourth-class mail at $200.00; foreign first-class mailing rates will be furnished upon request; single copies each, $4.00 domestic, $5.00 foreign.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 75 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 95 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

May 2, 1978. LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Items Published in the Official Journal of the European Patent Office

The European Patent Office has requested that the following notices be published in the OFFICIAL GAZETTE since they are of interest to persons involved in the field of patent law in the United States. The notices relate to three topics:

1. The announcement concerning the filing and restrictions on the processing of European patent applications. In this notice, the Patent and Trademark Office has added the title of the areas of the International Patent Classification referred to.
2. The decision of the Administrative Council of the European Patent Organization concerning the restriction of the processing of European patent applications.
3. The announcement concerning the information service regarding the restriction of processing of applications—Preclassification Service and the Request form for the Preclassification Service.

The notices read as follows:

ANNOUNCEMENT CONCERNING THE FILING AND RESTRICTIONS ON THE PROCESSING OF EUROPEAN PATENT APPLICATION*

1. *Filing of European patent applications*

On the recommendation of the President of the European Patent Office, the Administrative Council of the European Patent Organisation decided at its first meeting (19–21 October 1977), pursuant to Article 162, paragraph 1, of the European Patent Convention (EPC), that European patent applications may be filed with the EPO from 1 June 1978.

Pursuant to this decision the EPO will be accepting European patent applications from 1 May 1978. However, the date of filing of applications received in May will be 1 June 1978. Applications may be filed with

(a) the branch of the European Patent Office at The Hague (Patentlaan 2, NL–2280 Rijswik) or
(b) the European Patent Office in Munich (Rosenheimer Str. 30, Motorama Haus, D–8000 München 80).

Wherever possible, applications should be filed with the branch at The Hague since it will be handling the first phase of the procedure.

The right to file European patent applications with the central industrial property office or other competent authority of a Contracting State, where the law of that State so permits, is not affected (see Article 75, paragraph 1 (b) EPC).

DECISION OF THE ADMINISTRATIVE COUNCIL OF THE EUROPEAN PATENT ORGANISATION OF 19 DECEMBER 1977 CONCERNING THE RESTRICTION OF THE PROCESSING OF EUROPEAN PATENT APPLICATIONS UNDER ARTICLE 162, PARAGRAPH 2, OF THE EUROPEAN PATENT CONVENTION*

The Administrative Council of the European Patent Organisation,

Having Regard to the European Patent Convention, and in particular Article 162, paragraph 2 thereof,

Having Regard to the proposal of the President of the European Patent Office,

Having Regard to the written procedure initiated pursuant to Article 7 of the Rules of Procedure of the Administrative Council on the basis of the letter dated 17 November 1977 to Council members and of document CA/2/77 annexed to that letter.

Has Decided as Follows:

ARTICLE 1

As from 1 June 1978 the processing of European patent applications in certain areas of technology shall be restricted.

ARTICLE 2

The restrictions shall apply solely in respect of substantive examination and subsequent proceedings.

ARTICLE 3

The areas of technology in which applications filed in the period from 1 June 1978 to 30 November 1978 will be fully processed shall be as listed in column 1 of the Annex to this Decision.

ARTICLE 4

The areas of technology in which applications filed in the period from 1 December 1978 to 31 May 1979 will be fully processed shall be as listed in column 2 of the Annex to this Decision.

ARTICLE 5

This decision shall enter into force on 19 December 1977.

DONE at Berne, 19 December 1977.

For the Administrative Council
The Vice-Chairman

Paul Braendli

Annex

AREAS OF TECHNOLOGY IN WHICH APPLICATIONS WILL BE FULLY PROCESSED

The areas of technology listed below are defined by the symbols of the International Patent Classification.

*This Decision of the Administrative Council of the European Patent Organisation confirms the announcement published in the Official Journal No. 1/1978 (page 31) concerning the filing and restrictions on the processing of European patent applications. The fields of technology listed in that announcement and annexed to this decision are identical.

The classification symbols to be taken into consideration in determining the technical field will be restricted to those classifying the invention.

If an invention is classified with more than one classification symbol and not all of these symbols are included in the areas of technology mentioned in the Annex to the decision of the Administrative Council then the application having as its subject this invention will be processed without restriction.

Column 1		Column 2	
		A 22	BUTCHERING; MEAT TREATMENT; PROCESSING POULTRY OR FISH
A 47	FURNITURE; DOMESTIC ARTICLES OR APPLIANCES; COFFEE MILLS; SPICE MILLS; SUCTION CLEANERS IN GENERAL	A 47	FURNITURE; DOMESTIC ARTICLES OR APPLIANCES; COFFEE MILLS; SPICE MILLS; SUCTION CLEANERS IN GENERAL
A 61	MEDICAL AND VETERINARY SCIENCE; HYGIENE	A 61	MEDICAL AND VETERINARY SCIENCE; HYGIENE
		A 62	LIFE-SAVING; FIRE-FIGHTING (Excluding A 62 D) Chemical means for extinguishing fires or for combating or protecting against harmful chemical agents; Chemical materials for use in breathing apparatus
B 21	MECHANICAL METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL; PUNCHING METAL	B 21	MECHANICAL METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL: PUNCHING METAL
B 23	MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR	B 23	MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR
B 24	GRINDING; POLISHING	B 24	GRINDING; POLISHING
		B 25	HAND TOOLS; PORTABLE POWER-DRIVEN TOOLS; MANIPULATORS
		B 26	HAND CUTTING TOOLS; CUTTING MACHINES OR DEVICES NOT SPECIALLY ADAPTED FOR PARTICULAR MATERIALS OR PURPOSES
		B 27	WORKING OR PRESERVING WOOD OR SIMILAR MATERIAL; NAILING OR STAPLING MACHINES IN GENERAL (Excluding B 27 K) Processes, apparatus or selection of substances for impregnating, staining, dyeing, bleaching of wood or similar materials, or treating of wood or similar materials with permeant liquids, not otherwise provided for; Chemical or physical treatment of cork, cane, reed, straw or similar material
		B 28	WORKING CEMENT, CLAY AND STONE
B 29	WORKING OF PLASTICS; WORKING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL; WORKING OF SUBSTANCES NOT OTHERWISE PROVIDED FOR	B 29	WORKING OF PLASTICS; WORKING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL; WORKING OF SUBSTANCES NOT OTHERWISE PROVIDED FOR
B 30	PRESSES	B 30	PRESSES
B 60	VEHICLES IN GENERAL	B 60	VEHICLES IN GENERAL
		B 61	RAILWAYS
B 62	LAND VEHICLES FOR TRAVELLING OTHERWISE THAN ON RAILS	B 62	LAND VEHICLES FOR TRAVELLING OTHERWISE THAN ON RAILS
B 65	CONVEYING; PACKING; STORING; HANDLING THIN OR FILAMENTARY MATERIAL	B 65	CONVEYING; PACKING; STORING; HANDLING THIN OR FILAMENTARY MATERIAL

C 01	INORGANIC CHEMISTRY
C 02	TREATING WATER, WASTE WATER AND SEWAGE
C 03	GLASS; MINERAL AND SLAG WOOL
C 04	CEMENTS; CERAMICS, etc.; SOUND OR THERMAL INSULATING MATERIALS
C 05	MANUFACTURE OF FERTILISERS
C 06	EXPLOSIVES; MATCHES
C 07	ORGANIC CHEMISTRY
C 08	ORGANIC MACROMOLECULAR COMPOUNDS; THEIR PREPARATION OR CHEMICAL WORKING-UP; COMPOSITIONS BASED THEREON
E 04	BUILDING
E 05	LOCKS; KEYS; WINDOW AND DOOR FITTINGS; SAFES
E 06	DOORS, WINDOWS, SHUTTERS OR ROLLER BLINDS, IN GENERAL; LADDERS
F 16	ENGINEERING ELEMENTS AND UNITS; GENERAL MEASURES FOR PRODUCING AND MAINTAINING EFFECTIVE FUNCTIONING OF MACHINES OR INSTALLATIONS
F 24	HEATING; RANGES; VENTILATING
F 25	REFRIGERATION OR COOLING; MANUFACTURE OR STORAGE OF ICE; LIQUEFACTION OR SOLIDIFICATION OF GASES
F 26	DRYING
F 28	HEAT EXCHANGE IN GENERAL

C 01	INORGANIC CHEMISTRY
C 02	TREATING WATER, WASTE WATER AND SEWAGE
C 03	GLASS; MINERAL AND SLAG WOOL
C 04	CEMENTS; CERAMICS, etc.; SOUND OR THERMAL INSULATING MATERIALS
C 05	MANUFACTURE OF FERTILISERS
C 06	EXPLOSIVES; MATCHES
C 07	ORGANIC CHEMISTRY
C 08	ORGANIC MACROMOLECULAR COMPOUNDS; THEIR PREPARATION OR CHEMICAL WORKING-UP; COMPOSITIONS BASED THEREON
C 21	METALLURGY OF IRON
C 22	METALLURGY; FERROUS OR NON-FERROUS ALLOYS; TREATMENT OF ALLOYS OR NON-FERROUS METALS
C 23	WORKING OR TREATMENT OF METALS, OTHER THAN BY MECHANICAL MEANS; COVERING MATERIALS WITH METALS; INHIBITING CORROSION OR INCRUSTATION IN GENERAL
C 25	ELECTROLYTIC OR ELECTROPHORETIC PROCESSES; APPARATUS THEREFOR
E 04	BUILDING
E 05	LOCKS; KEYS; WINDOW AND DOOR FITTINGS; SAFES
E 06	DOORS, WINDOWS, SHUTTERS OR ROLLER BLINDS, IN GENERAL; LADDERS
E 21	MINING
F 16	ENGINEERING ELEMENTS AND UNITS; GENERAL MEASURES FOR PRODUCING AND MAINTAINING EFFECTIVE FUNCTIONING OF MACHINES OR INSTALLATIONS
F 22	STEAM GENERATION
F 23	COMBUSTION APPARATUS; COMBUSTION PROCESSES
F 24	HEATING; RANGES; VENTILATING
F 25	REFRIGERATION OR COOLING; MANUFACTURE OR STORAGE OF ICE; LIQUEFACTION OR SOLIDIFICATION OF GASES
F 26	DRYING
F 28	HEAT EXCHANGE IN GENERAL

G 02	OPTICS
G 03	PHOTOGRAPHY; CINEMATOGRAPHY; ELECTROGRAPHY; HOLOGRAPHY (Excluding G 03 C) Photosensitive compositions or bases carrying them; Photographic processes, e.g. cine, X-ray, colour, stereo-photographic processes; Auxiliary processes in photography
G 05	CONTROLLING; REGULATING
G 07	CHECKING DEVICES
G 09	EDUCATION; CRYPTOGRAPHY; ADVERTISING; SEALS
H 01	BASIC ELECTRIC ELEMENTS
H 01 B	Cables; Conductors; Insulators; Selection of materials for their conductive, insulating or dielectric properties
H 01 C	Resistors
H 01 G	Capacitors; Capacitors, rectifiers, detectors, switching devices or light-sensitive devices, of the electrolytic type
H 01 H	Electric switches; Relays; Emergency protective devices
H 01 J	Electric discharge tubes or discharge lamps
H 01 K	Electric incandescent lamps
H 01 L	Semiconductor devices; Electric solid state devices not otherwise provided for
H 01 P	Waveguides; Resonators, lines, or other devices of the waveguide type
H 01 Q	Aerials
H 01 R	Line connectors; Current collectors
H 01 S	Devices using stimulated emission
H 01 T	Spark gaps; Other non-enclosed discharge apparatus
H 02	GENERATION, CONVERSION OR DISTRIBUTION OF ELECTRIC POWER
H 02 B	Switchboards, switchyards, or switchgear, for the distribution of electric power
H 02 G	Installation of electric cables or lines

G 02	OPTICS
G 03	PHOTOGRAPHY; CINEMATOGRAPHY; ELECTROGRAPHY; HOLOGRAPHY (Excluding G 03 C) Photosensitive compositions or bases carrying them; Photographic processes, e.g. cine, X-ray, colour, stereo-photographic processes; Auxiliary processes in photography
G 05	CONTROLLING; REGULATING
G 07	CHECKING DEVICES
G 08	SIGNALLING
G 09	EDUCATION; CRYPTOGRAPHY; ADVERTISING; SEALS
H 01	BASIC ELECTRIC ELEMENTS
H 01 B	Cables; Conductors; Insulators; Selection of materials for their conductive, insulating or dielectric properties
H 01 C	Resistors
H 01 G	Capacitors; Capacitors, rectifiers, detectors, switching devices or light-sensitive devices, of the electrolytic type
H 01 H	Electric switches; Relays; Emergency protective devices
H 01 J	Electric discharge tubes or discharge lamps
H 01 K	Electric incandescent lamps
H 01 L	Semiconductor devices; Electric solid state devices not otherwise provided for
H 01 P	Waveguides; Resonators, lines, or other devices of the waveguide type
H 01 Q	Aerials
H 01 R	Line connectors; Current collectors
H 01 S	Devices using stimulated emission
H 01 T	Spark gaps; Other non-enclosed discharge apparatus
H 02	GENERATION, CONVERSION OR DISTRIBUTION OF ELECTRIC POWER
H 02 B	Switchboards, switchyards, or switchgear, for the distribution of electric power
H 02 G	Installation of electric cables or lines
H 04	ELECTRIC COMMUNICATION TECHNIQUE

ANNOUNCEMENT—INFORMATION SERVICE REGARDING THE RESTRICTION OF PROCESSING OF APPLICATIONS (PRE-CLASSIFICATION SERVICE)

As long as the processing of European patent applications is restricted under Article 162, paragraph 2, the European Patent Office (EPO) will offer the following service to potential applicants:

The European Patent Office will determine provisionally in which sub-class or sub-classes of the International Patent Classification an invention which is likely to form the subject of a European patent application falls.

The EPO will also establish whether this sub-class or these sub-classes will be the areas of technology in respect of which processing is restricted at the envisaged time of filing of the prospective application.

The EPO will then communicate this information to the person making the request.

The EPO will perform this service in response to a written request. When making their request, users of the service are recommended to use the form in the Annex, which will be obtainable from the EPO (see addresses below), or to use the text of the form in their request.

If the form or text thereof is not used, the request should in any case be clearly identified as a request for the "pre-classification service." It should state that an indication is required of the sub-class or sub-classes of the International Patent Classification in which the invention falls, and whether this sub-class or one of these sub-classes will be on the list open for examination at the envisaged time of filing. The request should state in which month the prospective application is likely to be filed. The request and the documents accompanying it must be in an official language of the EPO, (English, French or German).

The pre-classification request must be accompanied by the following documents: either

a) the description, claims and drawings which will be filed if the invention becomes the subject of a European patent application; or
b) the claims which will be filed if the invention becomes the subject of a European patent application, and a copy of a previous application whose priority is to be claimed if it is already in English, French or German, or if it is not, a translation of it into one of these languages.

For the present, no fee will be charged for this service.

The pre-classification request and the documents accompanying it will not be returned to the user of the service. The EPO will however maintain confidentiality in respect of these documents. It should be noted that documents relating to an invention sent to the EPO in connection with this service cannot form a basis for a claim to priority under the Paris Convention for the Protection of Industrial Property.

Potential users of this service are reminded of their responsibility for complying with any national legislative or regulatory provisions governing inventions which, owing to the nature of their subject matter, may not be communicated abroad without the prior authorisation of the competent authorities of the State in question, (cf Article 75, paragraph 2, EPC).

No person, irrespective of his state of residence or principal place of business, is compelled to act through the intermediary of a representative in using the service. However, natural or legal persons may make their request for the service through the intermediary of a representative. In this case, it is not necessary for the representative to file with the EPO an authorisation to act in this capacity.

This service will commence on 1 February 1978. Requests for the service should preferably be sent directly to or filed at the European Patent Office, Branch at The Hague, where they will be dealt with.

Postal address:
European Patent Office
PO Box No. 5818
NL–2280 HV Rijswijk ZH

Address for deliveries by hand:
European Patent Office
Patentlaan 2
Rijswijk ZH

Requests will also be accepted at the European Patent Office, Munich:

Postal address:
European Patent Office
PO Box 20 20 20
D–8000 München 2

Address for deliveries by hand:
European Patent Office
Rosenheimer Strasse 30
Motorama-Haus
München

Every effort will be made to provide a reliable service and to ensure that if the EPO assigns a provisional classification which is open for examination when the ensuing application is filed, that this application will be examined. However, the EPO can give no guarantee to that effect and therefore assumes no liability.

Request for the Pre-classification Service

Name and address of person making request:

To
The European Patent Office
PO Box No. 5818

NL - 2280 HV Rijswijk ZH

Date :
Reference :

The undersigned requests the European Patent Office to determine provisionally and communicate to him:

(i) in which sub-class or sub-classes of the International Patent Classification the invention set out in the accompanying documents falls;

(ii) whether this sub-class or one of these sub-classes will be on the list open for examination at the envisaged time of filing of the prospective European Patent application.

The envisaged time of filing of the prospective application is:

Month ..... Year .....*

signed .....

Accompanying documents (please tick where applicable):

☐ description
☐ drawings
☐ copy of previous application whose priority is to be claimed
☐ translation of previous application into English, French or German
☐ claims

*If the envisaged time of filing is not indicated, the EPO will still perform the service, but will indicate whether the sub-class or one of the sub-classes is open for examination at the time of performing the service.

May 8, 1978.

RENE D. TEGTMEYER,
Assistant Commissioner for Patents.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,077,724, Stoddard and Seem, APPARATUS FOR PROCESSING; **3,091,912,** same, **filed** Jan. 25, 1978, D.C., W.D.N.C. (Charlotte) Doc. C-C078-0020, *Lex Tex Ltd., Inc.* v. *American Barmag Corporation.*

3,091,912. (See 3,077,724.)

3,237,438, P. A. Tesson, PIPE LINE LAYING APPARATUS, **filed** Oct. 7, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77-3778-RF, *Martech Int'l Inc.* v. *Sante Fe Int'l Corp.* Filed plaintiff's notice of dismissal and voluntary dismissal of complaint and order thereon, Jan. 24, 1978.

3,259,291, R. S. Batt, BEARING, **filed** Apr. 14, 1977, D.C., S.D.N.Y., Doc. 77-C-1802 *Bell & Howell Co.* v. *McGraw Hill Inc.* Dismissal pursuant to Rule 41 (A) (1), Dec. 2, 1974.

3,291,908, K. Ehrat, PROCESS FOR THE CODING OF MESSAGES, **filed** Dec. 13, 1977, D.C., N.D. Tex. (Dallas) Doc. CA3-77-1610C, *Gretag Aktiengesellschaft* v. *Datotek Inc.*

3,425,508, E. W. Faulstich, EXTENSION LADDER, **filed** Aug. 20, 1976, D.C., Ill. (Chicago), Doc. 76c3106, *Eugene W. Faulstich* v. *Motac, Inc.*

3,471,112, MacDonald and MacDonald, COMBINATION SHELF SUPPORT AND ANCHOR, **filed** Jan. 23, 1978, D.C. Conn. (Hartford), Doc. H78-38, *P.X. Industries, Inc.* v. *Plastiglide Manufacturing Corporation.*

3,509,833, R. L. Cook, HARD FACED CERAMIC AND PLASTIC ARMOR, **3,516,898,** same, HARD FACED PLASTIC ARMOR, **filed** Jan. 30, 1978, United States Court of Claims (District of Columbia), Doc. 37-78, *Goodyear Aerospace Corporation* v. *The United States.*

3,516,898. (See 3,509,833.)

3,547,811, J. R. McWhirter, CYCLIC OXYGENATION OF BOD-CONTAINING WATER, **3,547,812,** same, HIGH OXYGEN UTILIZATION IN BOD-CONTAINING WATER TREATMENT, **3,547,813,** Robinson and McWhirter, BIOCHEMICAL OXIDATION WITH LOW SLUDGE RECYCLE, **3,547,815,** J. R. McWhirter, STAGED OXYGENATION OF BOD-CONTAINING WATER, **filed** May 2, 1975, D.C., S.D.N.Y., Doc. 2098, *Air Products and Chemical, Inc.* v. *Union Carbide Corporation.*

3,547,812. (See 3,547,811.)

3,547,813. (See 3,547,811.)

3,547,815. (See 3,547,811.)

3,762,907, Quinn and Kwiatkowski, GLASS FORMING MACHINE HAVING AN AUTOMATIC CONTROL SYSTEM, **3,967,703,** Kwiatkowski and Wood, PROGRAMMABLE AUTOMATIC CONTROLLER, **filed** Sept. 23, 1977, D.C., S.D. Tex. (Houston), Doc. CA H-77-1586, *Ball Corp. and Ball Packaging Products, Inc.* v. *Anchor-Hocking Corp.*

3,774,056, Sample and Scheuer and Speheger and Cox, DIGITAL ELECTRONIC CONTROL CIRCUIT FOR CYCLICALLY OPERABLE APPLIANCES AND THE LIKE, **filed** Feb. 22, 1978, D.C., S.D. Ohio (Cincinnati), Doc. C-1-78-92, *Design & Manufacturing Corp.* v. *Amana Refrigeration, Inc. and Ohio-Kentucky-Indiana Distr. Inc.*

3,804,251, Farrell and Bianchi and Johanson, FLOATAGE COLLECTING APPARATUS AND METHOD, **filed** Jan. 27, 1978, D.C. Conn. (New Haven), Doc. N-78-34, *JBF Scientific Corporation* v. *Sealand Environmental Engineering, Inc.*

3,827,107, R. R. Moore, ADJUSTABLE STRAP ASSEMBLY, **filed** Feb. 10, 1978, D.C., N.D. Calif. (San Francisco), Doc. C-78-318 CBR *Robert R. Moore* v. *Orthopedic Technology, Inc.*

3,814,343, Bennett and Haller, AUTOMATIC TAPE LOADING APPARATUS FOR CASSETTES AND THE LIKE, **filed** May 19, 1975, D.C., Mass. (Boston), Doc. 75-1916-F, *Programming Technologies, Inc.* v. *King Instrument Corporation.*

3,867,806, Lancaster and Lancaster, PROCESS OF MAKING A STRETCHED WRAPPED PACKAGE, **filed** Dec. 20, 1977, D.C.N.J. (Newark), Doc. C-77-2596, *Lantech Inc.* v. *Packaging Sales & Development Corp.*

3,884,068, F. R. Dybel, LOAD SENSING DEVICE, **4,010,679,** same, PEIZOELECTRIC TRANSDUCER SENSOR FOR USE IN A PRESS, **4,048,848,** same, LOAD MONITORING SYSTEM, **filed** Nov. 28, 1977, D.C., S.D. Ohio (Cincinnati), Doc. C-1-77-710, *International Measurement & Control Company* v. *Pressco Inc.*

3,959,696, Lange and Peche, OVER VOLTAGE ARRESTER, **filed** Feb. 6, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c408, *Siemens Aktiengesellschaft* v. *Reliable Electric Company.*

3,969,703. (See 3,762,907.)

4,010,679. (See 3,884,068.)

4,011,431, M. L. Levin, ELECTRIC COOKING APPLIANCE WITH REVERSIBLE GRILL, **filed** Feb. 15, 1978, D.C., C.D. Calif. (Los Angeles), Doc. CV78-621-LTL(Sx), *Winnie Mae Manufacturing Co., Inc.* v. *Scovill Manufacturing Company.*

4,048,848. (See 3,884,068.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

Re. 29,169, Re. S.N. 882,821, Filed Mar. 2, 1978, Cl. 195/103.5 A, PROCESS FOR THE DEMONSTRATION AND DETERMINATION OF REACTION COMPONENTS HAVING SPECIFIC BINDING AFFINITY FOR EACH OTHER, Antonius Hermanus Wilhelmus Maria Schuurs, et al., Owner of Record: *by mesne assignments to Akzona Incorporated, Asheville, N.C.,* Attorney or Agent: Robert H. Falk, et al., Ex. Gp.: 172

3,543,949, Re. S.N. 897,298, Filed Apr. 17, 1978, Cl. 214/8.5, CONTAINER DEPALLETIZING APPARATUS, Roman J. Weier, Owner of Record: *Wyard Industries Inc., Forest Lake, Minn.,* Attorney or Agent: John C. Barnes, Ex. Gp.: 314

3,611,494, Re. S.N. 900,021, Filed Apr. 28, 1978, Cl. 425/376 R, EXTRUSION HEAD FOR EXTRUDING ANNULAR ARTICLES OF THERMOPLASTIC MATERIAL, Harald Feuerherm, Owner of Record: *Kautex-Werke Reinold Hagen, Rheinland, Germany,* Attorney or Agent: Edwin E. Greigg, et al., Ex. Gp.: 322

3,949,354, Re. S.N. 893,569, Filed Apr. 5, 1978, Cl. 340/18 LD, APPARATUS FOR TRANSMITTING WELL BORE DATA, Jackson R. Claycomb, Owner of Record: *Schlumberger Technology Corp., New York, N.Y.,* Attorney or Agent: David L. Moseley, et al., Ex. Gp.: 222

3,949,687, Re. S.N. 896,195, Filed Apr. 12, 1978, Cl. 112/77, DEVICE FOR USE WITH BOTTONHOLE ATTACHMENT, Howard B. Julien, Owner of Record: *Inventor,* Attorney or Agent: Manfred M. Warren, et al., Ex. Gp.: 353

3,962,602, Re. S.N. 897,299, Filed Apr. 17, 1978, Cl. 315/370, SIDE PINCUSHION CORRECTION SYSTEM, Wolfgang Friedrich Wilhelm Dietz, Owner of Record: *RCA Corporation, New York, N.Y.,* Attorney or Agent: Eugene M. Whitacre, et al., Ex. Gp.: 222

3,994,990, Re. S.N. 881,080, Filed Mar. 27, 1978, Cl. 260/857, OPTICALLY BRIGHTENED NYLON MONOFILAMENT FISHING LINE, Danny R. Foote, Owner of Record: *Berkley & Company, Inc., Spirit Lake, Iowa,* Attorney or Agent: Orrin M. Haugen, et al., Ex. Gp.: 142

4,001,850, Re. S.N. 896,074, Filed Apr. 13, 1978, Cl. 354/219, DATA RECORDING CAMERA, Susumu Fujita, Owner of Record: *Fuji Photo Film Co., Ltd., Kanagawa-Ken, Japan,* Attorney or Agent: Richard C. Sughrue, et al., Ex. Gp.: 211

4,024,979, Re. S.N. 885,696, Filed Mar. 13, 1978, Cl. 220/71, HANDLING RING FOR PLASTIC DRUM, Walter J. Craig, et al., Owner of Record: *Plastic Drum Inc., Lockpart, Ill.,* Attorney or Agent: Robert L. Lindgren, Ex. Gp.: 241

4,050,851, Re. S.N. 896,405, Filed Apr. 14, 1978, Cl. 417/68, LIQUID RING PUMPS AND COMPRESSORS USING A FERROFLUIDIC RING LIQUID, Harold K. Haavik, Owner of Record: *The Nash Engineering Company, Norwalk, Conn.,* Attorney or Agent: Albert C. Nolte, Jr., et al., Ex. Gp.: 343

4,053,648, Re. S.N. 886,197, Filed Apr. 7, 1978, Cl. 426/117, BOTTLE FOR STERILE DISPENSING OF FLOWABLE CONTENTS, Manfred Carl Schmid, et al., Owner of Record: *Inventor,* Attorney or Agent: Francis A. Utecht, et al., Ex. Gp.: 177

4,059,867, Re. S.N. 869,922, Filed Jan. 16, 1978, Cl. 16/110 A, HANDLE FOR UTENSILS, Robert J. Adamis, Owner of Record: *Inventor,* Attorney or Agent: George B. White, Ex. Gp.: 353

PATENT NOTICES

Certificates of Correction for the Week of June 6, 1978

P.P.4,165	4,045,933	4,066,304	4,072,656
D.246,544.	4,046,891	4,066,390	4,072,866
D.247,414	4,047,154	4,066,521	4,073,025
3,363,415	4,048,437	4,066,589	4,073,052
3,477,225	4,049,052	4,066,627	4,073,053
3,852,254	4,049,626	4,066,744	4,073,077
3,951,942	4,050,651	4,066,835	4,073,086
3,968,994	4,051,332	4,066,918	4,073,123
3,983,135	4,051,527	4,067,063	4,073,176
3,988,361	4,051,707	4,067,170	4,073,294
3,994,875	4,052,348	4,067,253	4,073,329
3,997,685	4,052,350	4,067,377	4,073,395
3,999,008	4,052,703	4,067,543	4,073,420
4,001,421	4,053,379	4,067,577	4,073,427
4,002,808	4,053,834	4,067,719	4,073,563
4,003,768	4,054,569	4,067,755	4,073,765
4,004,762	4,054,671	4,067,911	4,073,822
4,006,722	4,054,836	4,068,034	4,073,881
4,007,121	4,054,974	4,068,243	4,073,934
4,007,161	4,055,431	4,068,267	4,073,942
4,012,357	4,055,486	4,068,292	4,073,976
4,013,573	4,055,551	4,068,574	4,073,988
4,014,595	4,056,520	4,068,937	4,074,027
4,016,542	4,056,996	4,069,210	4,074,189
4,021,049	4,057,437	4,069,278	4,074,249
4,021,313	4,057,952	4,069,327	4,074,363
4,021,440	4,058,165	4,069,389	4,074,365
4,022,767	4,058,194	4,069,390	4,074,446
4,022,786	4,058,403	4,069,675	4,074,472
4,023,516	4,058,500	4,069,688	4,074,572
4,024,264	4,058,709	4,069,725	4,074,662
4,024,545	4,058,851	4,069,946	4,074,783
4,027,064	4,058,853	4,069,995	4,075,017
4,027,214	4,058,991	4,070,124	4,075,174
4,027,516	4,059,027	4,070,418	4,075,178
4,028,333	4,059,250	4,070,473	4,075,257
4,028,419	4,059,618	4,070,697	4,075,261
4,031,533	4,059,819	4,070,759	4,075,286
4,032,082	4,060,735	4,070,954	4,075,329
4,032,561	4,061,209	4,071,122	4,075,360
4,032,825	4,061,580	4,071,295	4,075,729
4,034,014	4,061,978	4,071,573	4,075,805
4,035,912	4,062,730	4,071,602	4,075,924
4,038,384	4,063,036	4,071,650	4,076,170
4,039,324	4,063,221	4,071,709	4,076,231
4,039,688	4,064,182	4,071,793	4,076,246
4,043,339	4,064,872	4,071,815	4,076,288
4,044,142	4,064,874	4,071,845	4,076,360
4,044,231	4,065,179	4,071,878	4,076,941
4,044,675	4,065,225	4,071,880	4,076,977
4,044,716	4,065,237	4,072,010	
4,044,804	4,065,242	4,072,302	
4,045,438	4,065,635	4,072,360	
4,045,496	4,065,788	4,072,370	
4,045,516	4,066,181	4,072,481	

Disclaimers

Reissue No. 29,016.—*George Raymond Peacock*, Louisville, Ky. WELDING AND FORMING METHOD. Patent dated Oct. 26, 1976. Disclaimer filed Apr. 4, 1978, by the assignee, *Thermatool Corp.*

Hereby enters this disclaimer to claims 7 and 13 through 18 of said patent.

3,676,158.—*Leonard G. Fischer*, College Point, N.Y., and *Philip Wong*, Bergenfield, N.J. METHOD OF FORMING AN ADHERENT COATING ON FOODS. Patent dated July 11, 1972. Disclaimer filed Mar. 15, 1978, by the assignee, *DCA Food Industries, Inc.*

Hereby enters this disclaimer to claims 1 to 11 of said patent.

4,071,941.—*La Vern E. Sweet*, Chino, Calif. METHOD FOR ASSEMBLYING IMPROVED TRUSS JOIST. Patent dated Feb. 7, 1978. Disclaimer filed Apr. 5, 1978, by the inventor.

The term subsequent to Feb. 7, 1995 has been disclaimed.

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator,
National Technical Information Service.

U.S. DEPARTMENT OF THE ARMY

Office of Judge Advocate General, Patent Division, Room 2C–455, Pentagon, Washington, D.C. 20314

Patent 3,995,792. Laser Missile Guidance Systems. Filed Oct. 15, 1974. Patented Dec. 7, 1976. Not available NTIS.

Patent 4,001,287. Reaction Product of Normal Lead Beta Resorcylate and Monobasic Cupric Salicylate. Filed Feb. 18, 1972. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,002,064. Rifled Soft Recovery System. Filed Feb. 19, 1976. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,002,123. Dual Channel Redundant Fuze. Filed July 11, 1975. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,003,659. Single Plane Corner Reflector Guidance System. Filed Nov. 15, 1974. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,003,953. Purification of TNT With Magnesium Sulfite-Bisulfite Mixtures. Filed Feb. 23, 1976. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,004,754. High-Speed, High-G Air Bearing Optical Mount for Rosette Scan Generator. Filed July 11, 1974. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,931. Sealed Cassette for Optical Sound Projection. Filed Jan. 15, 1974. Patented Feb. 1, 1977. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE

Research and Agreements and Patent Branch, General Services Div., Federal Building, Agricultural Research Service, Hyattsville, Md. 20782

Patent 4,056,354. Process for Rapid Dyeing of Textiles. Filed Feb. 10, 1976. Patented Nov. 1, 1977. Not available NTIS.

Patent 4,064,283. Preparation of Protein Concentrates From Whey and Seed Products. Filed June 14, 1976. Patented Dec. 20, 1977. Not available NTIS.

Patent 4,069,106. Immobilization of Enzymes on Keratin. Filed Jan. 13, 1977. Patented Jan. 17, 1978. Not available NTIS.

U.S. DEPARTMENT OF COMMERCE

National Technical Information Service
5285 Port Royal Road
Springfield, Va. 22161

Patent application 868,356. Inverse Fourth Power Photometric Calibrator. Filed Jan. 10, 1978.

U.S. DEPARTMENT OF ENERGY

Assistant General Counsel for Patents
Washington, D.C. 20545

Patent 4,016,242. Salts of the Iodine Oxyacids in the Impregnation of Adsorbent Charcoal for Trapping Radioactive Methyliodide. Filed Feb. 26, 1976. Patented Apr. 5, 1977. Not available NTIS.

Patent 4,016,304. Method for Applying Pyrolytic Carbon Coatings to Small Particles. Filed June 17, 1975. Patented Apr. 5, 1977. Not available NTIS.

Patent 4,017,253. Fluidized-Bed Calciner With Combustion Nozzle and Shroud. Filed Sept. 16, 1975. Patented Apr. 12, 1977. Not available NTIS.

Patent 4,017,417. Immobilization of Iodine in Concrete. Filed July 30, 1976. Patented Apr. 12, 1977. Not available NTIS.

Patent 4,020,004. Conversion of Radioactive Ferrocyanide Compounds to Immobile Glasses. Filed Nov. 21, 1975. Patented Apr. 26, 1977. Not available NTIS.

Patent 4,020,692. Ultrasonic Thermometer Isolation Standoffs. Filed Sept. 26, 1975. Patented May 3, 1977. Not available NTIS.

Patent 4,020,693. Acoustic Transducer for Nuclear Reactor Monitoring. Filed Apr. 12, 1976. Patented May 3, 1977. Not available NTIS.

Patent 4,021,300. Improved Nuclear Fuel Assembly Grid Spacer. Filed May 23, 1975. Patented May 3, 1977. Not available NTIS.

Patent 4,021,676. Waste Canister for Storage of Nuclear Wastes. Filed May 7, 1976. Patented May 3, 1977. Not available NTIS.

Patent 4,025,602. Recovery of Transplutonium Elements From Nuclear Reactor Waste. Filed May 25, 1976. Patented May 24, 1977. Not available NTIS.

Patent 4,026,763. Liquid-Metal Dip Seal With Pneumatic Spring. Filed Apr. 12, 1976. Patented May 31, 1977. Not available NTIS.

Patent 4,027,156. X-Ray Source Safety Shutter. Filed May 25, 1976. Patented May 31, 1977. Not available NTIS.

Patent 4,028,180. Support Grid for Fuel Elements in a Nuclear Reactor. Filed Mar. 16, 1976. Patented June 7, 1977. Not available NTIS.

Patent 4,028,265. Process for Converting Sodium Nitrate Containing, Caustic Liquid Radioactive Wastes to Solid Insoluble Products. Filed Aug. 25, 1975. Patented June 7, 1977. Not available NTIS.

Patent 4,028,545. Method of Simulating Spherical Voids for Use as a Radiographic Standard. Filed Feb. 17, 1976. Patented June 7, 1977. Not available NTIS.

Patent 4,028,811. Tubular Gage for a Liquid-Metal-Cooled Fast Breeder Reactor. Filed Mar. 2, 1976. Patented June 14, 1977. Not available NTIS.

Patent 4,029,123. Pump Tank Divider Plate for Sump Suction Sodium Pumps. Filed Aug. 20, 1975. Patented June 14, 1977. Not available NTIS.

Patent 4,031,387. Method of Determining Whether Radioactive Contaminants are Inside or Outside a Structure. Filed Aug. 5, 1076. Patented June 21, 1977. Not available NTIS.

Patent 4,032,400. Nuclear Reactor Fuel Element With Vanadium Getter on Cladding. Filed Feb. 17, 1976. Patented June 28, 1977. Not available NTIS.

Patent 4,032,614. Process for the Disposal of Alkali Metals. Filed Oct. 20, 1975. Patented June 28, 1977. Not available NTIS.

Patent 4,032,615. Method for the Safe Disposal of Alkali Metal. Filed Jan. 27, 1976. Patented June 28, 1977. Not available NTIS.

Patent 4,033,813. Method of Detecting Leakage of Reactor Core Components of Liquid Metal Cooled Fast Reactors. Filed Oct. 22, 1975. Patented July 5, 1977. Not available NTIS.

Patent 4,036,688. Apparatus for Controlling Molten Core Debris. Filed Apr. 9, 1975. Patented July 19, 1972. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

National Institutes of Health, Chief, Patent Branch, Westwood Building, Bethesda, Md. 20014

Patent application 817,377. Preparation of 2,4,5,6-Tetraaminopyrimidine From 2,4,6-Triaminopyrimidine. Filed July 20, 1977.

Patent application 823,142. Slide Valve. Filed Aug. 9, 1977.

U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research—Code 302, Arlington, Va. 22217

Patent 4,036,581. Igniter. Filed Sept. 3, 1976. Patented July 19, 1977. Not available NTIS.

Patent 4,042,814. Electro-Optic Binary Adder. Filed June 28, 1976. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,044,271. Monolithic NTDS Driver and Receiver. Filed Sept. 9, 1974. Patented Aug. 23, 1977. Not available NTIS.

Patent 4,046,993. Target for Torpedo Launch System. Filed June 28, 1976. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,047,148. Piston Type Underwater Sound Generator. Filed Feb. 29, 1956. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,047,380. Combustion System Using Dilute Hydrogen Peroxide. Filed Apr. 9, 1976. Patented Sept. 13, 1977. Not available NTIS.

Patent 4,048,942. Helicopter Towline Recovery Buoy System. Filed Feb. 22, 1977. Patented Sept. 20, 1977. Not available NTIS.

Patent 4,049,402. Gas Mixing Device. Filed Nov. 6, 1975. Patented Sept. 20, 1977. Not available NTIS.

Patent 4,050,243. Combination Solid Fuel Ramjet Injector/Port Cover. Filed May 17, 1976. Patented Sept. 27, 1977. Not available NTIS.

Patent 4,051,364. Photoparamp Array Multiplexer. Filed Aug. 6, 1976. Patented Sept. 27, 1977. Not available NTIS.

Patent 4,051,439. Short Pulse Magnetron Transmitter. Filed Nov. 2, 1972. Patented Sept. 27, 1977. Not available NTIS.

Patent 4,051,799. Radial Depressor. Filed June 28, 1976. Patented Oct. 4, 1977. Not available NTIS.

Patent 4,056,386. Method for Decomposing Iron Pentacarbonyl. Filed Apr. 19, 1977. Patented Nov. 1, 1977. Not available NTIS.

Patent 4,056,560. N,N'-Bis(3,4-Dicyanophenyl) Alkanediamides. Filed July 23, 1976. Patented Nov. 1, 1977. Not available NTIS.

Patent 4,056,802. Soner Alarm System. Filed Mar. 10, 1976. Patented Nov. 1, 1977. Not available NTIS.

Patent 4,057,000. Mechanism for Deep Ocean Instrumentation Remote Release. Filed Sept. 20, 1976. Patented Nov. 8, 1977. Not available NTIS.

Patent 4,057,569. Bisorthodinitriles. Filed Apr. 28, 1976. Patented Nov. 8, 1977. Not available NTIS.

Patent 4,057,719. Fiber Optics Electro-Mechanical Light Switch. Filed Aug. 27, 1976. Patented Nov. 8, 1977. Not available NTIS.

Patent 4,058,722. Electro-Optic Analog/Digital Converter. Filed Sept. 29, 1976. Patented Nov. 15, 1977. Not available NTIS.

Patent 4,060,798. Method for Increasing the Critical Velocity of Magnetic Bubble Propagation in Magnetic Materials. Filed May 12, 1976. Patented Nov. 29, 1977. Not available NTIS.

Patent 4,062,883. Polymer-Bound Metallocarborane Catalyst Product and Process. Filed Aug. 6, 1976. Patented Dec. 13, 1977. Not available NTIS.

Patent 4,063,006. High Power Battery With Liquid Depolarizer. Filed Feb. 28, 1977. Patented Dec. 13, 1977. Not available NTIS.

Patent 4,064,783. Pressure-Balanced Underwater Structural Release System. Filed Jan. 27, 1977. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,065,509. Synthesis of Beta-Methyl Derivatives of 2,4-Dicarba-Closo-Heptaborane-7. Filed May 25, 1976. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,066,965. RF GTWT Saturating Circuit. Filed Sept. 28, 1976. Patented Jan. 3, 1978. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters, NASA—Code GP–2, Washington, D.C. 20546

Patent 4,062,245. Motion Restraining Device. Filed Apr. 30, 1977. Not available NTIS.

Patent 4,062,347. Solar Heating System. Filed Aug. 24, 1976. Patented Aug. 24, 1976. Not available NTIS.

Patent 4,063,282. TV Fatigue Crack Monitoring System. Filed July 20, 1976. Patented Dec. 13, 1976. Not available NTIS.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 6, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-3-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-20-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	5-25-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	8-2-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	2-2-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordinance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	12-30-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	3-9-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-21-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-7-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-26-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-7-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GRAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction-Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission: Fluid Handling and Control; Lubrication.	3-21-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	6-13-77

Expiration of patents: The patents within the range of numbers indicated below expire during May 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,981,954 to 2,986,736, inclusive
Plant Patents..... Numbers 2,055 to 2,066, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED JUNE 6, 1978

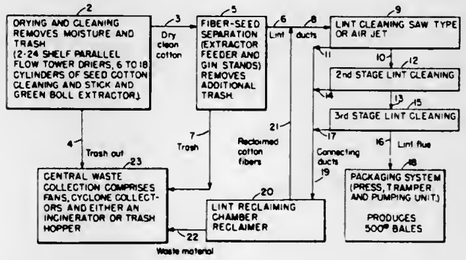
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T971,001
LINT-COTTON RECLAIMING APPARATUS FOR COTTON GINS

Gino J. Mangialardi, Jr., Greenville, Miss., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 14, 1977, Ser. No. 806,571
Int. Cl.[2] D01B *1/02*
U.S. Cl. 19—202
5 Sheets Drawing. 11 Pages Specification

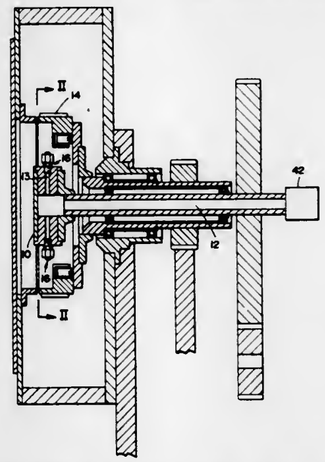


An apparatus to reclaim lint-cotton and return it to the ginning process is disclosed. The apparatus comprises in combination a unique arrangement of condensing cylinders, feed cylinders, saw cylinders, grid bars, and doffing brushes used to collect, reclaim, and feed back lint-cotton into the ginning system.

T971,002
ADJUSTABLE NOZZLE

Thomas L. Mitchell, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 15, 1976, Ser. No. 666,735
Int. Cl.[2] F01M *9/00*
U.S. Cl. 184—6.14
2 Sheets Drawing. 14 Pages Specification



In a system including a first member and a second member movable relative the first member, an adjustable nozzle element is included. The nozzle directs pressurized fluid such as a lubricant or coolant delivered to the first member outwardly in a range of possible directions to impact the second member.

T971,003
SYNTHESIS OF DIMALEIMIDES

Gus George Orphanides, Newark, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 29, 1975, Ser. No. 645,219
Int. Cl.[2] C07D *403/06, 403/02*
U.S. Cl. 260—326.26
No Drawing. 12 Pages Specification

Bifunctional maleimides can be prepared in high yield by reacting an organic diamine with maleic anhydride in a solvent composed of the azeotrope of hexamethylphosphoramide or 1-methyl-2-pyrrolidone and acetic acid, followed by dehydration of the intermediate with acetic anhydride in the presence of an alkali metal salt of a C_2–C_5 aliphatic acid. The solvent systems are recoverable by reduced pressure distillation and can be used in subsequent syntheses of maleimides.

T971,004
FOAM PLASTICS

Colin Malcolm Roy Dunn, Biggleswade, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 8, 1977, Ser. No. 822,910
Claims priority, application United Kingdom, Sep. 6, 1976, 36820/76
Int. Cl.[2] B29D *27/00*
U.S. Cl. 264—53
No Drawing. 12 Pages Specification

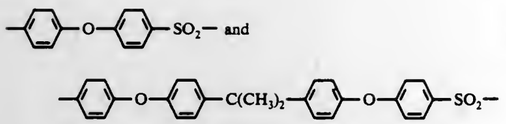
A process for the manufacture of a foamed thermoplastic aromatic polyethersulphone comprising heating a solid thermoplastic composition comprising an aromatic polyethersulphone which is not in admixture with another type of thermoplastic polymer, said composition containing 0.25 to 20% by weight of an absorbed volatile liquid selected from water, acetone, ethyl acetate, methyl ethyl ketone, methylene chloride and chloroform, to a temperature above (Tg-50)° C where Tg is the glass/rubber transition temperature of the thermoplastic polyethersulphone.

Preferably the thermoplastic composition contains 0.5 to 20% and particularly 1 to 20% by weight, of the absorbed volatile liquid.

The solid thermoplastic composition may be in the form of a powder or granules so as to produce a foamed puff-ball type of structure or it may be in the form of a shaped article such as a sheet, film, coating, moulding or extrusion so as to produce a foamed shaped article. The heating may be effected using an air oven, a microwave oven or by immersion of the composition in the form of a shaped article in a fluidized bed or bath of a suitable material heated to the desired temperature.

The volatile liquid may be incorporated into the composition by exposing the polyethersulphone to an atmosphere of the liquid and more particularly by immersing the polyethersulphone in the volatile liquid. Where the volatile liquid has a solvent affinity for the polyethersulphone, granules or powder soaked in the liquid may flow together to form a product which becomes a foamable solid after the excess volatile liquid has been allowed to evaporate.

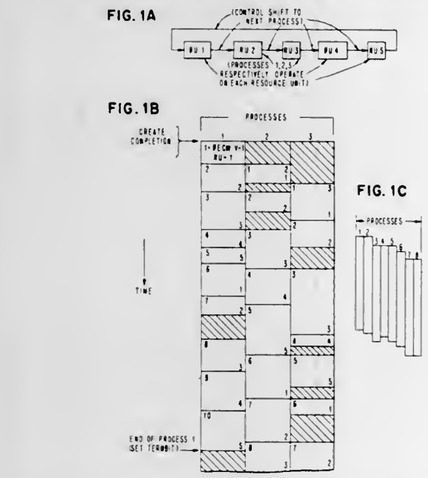
Examples of polyethersulphones employed in the foaming process have the repeat units



T971,005
METHOD FOR SYNCHRONIZING SETS OF INTERACTING PROCESSES

William Wilkinson Collier, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 425,358, Dec. 17, 1973, abandoned, which is a continuation of Ser. No. 212,282, Dec. 27, 1971, abandoned. This application May 13, 1977, Ser. No. 796,786
Int. Cl.[2] G06F *9/00*
U.S. Cl. 364—300
6 Sheets Drawing. 32 Pages Specification



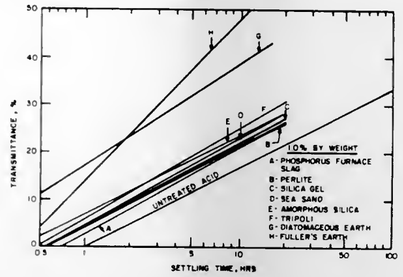
Allows a set of processes to operate cyclically on a set of shared resources (e.g. I/O buffers). Each process is allowed to proceed at its own speed, subject only to a synchronization condition that it does not operate simultaneously on a resource with any member of the next (cyclic) subset of processes.

T971,006
PURIFICATION OF PHOSPHORIC ACID SOLUTIONS

Anthony J. Smith, Florence, Ala., assignor to Tennessee Valley Authority

Filed Sep. 14, 1977, Ser. No. 833,191
Int. Cl.[2] C01B *25/16*
U.S. Cl. 423—321 R
1 Sheets Drawing. 20 Pages Specification

An improved method of purifying wet-process phosphoric acid by sedimentation, in which the crude acid is intimately mixed with an appropriate amount of finely divided silica or silicate. The result is that the absolute magnitude of the zeta potential of the suspended solids, particularly humus and gypsum, decreases to a value that allows them to aggregate, settle rapidly, and be removed by conventional methods. The Si:F ratio is increased, effecting a reduction of fluorine contamination. The rate of growth of gypsum crystals is increased, reducing the amount of post-precipitation of gypsum and other particulates. Because the rate of settlement is increased, the holding time prior to further processing, such as concentrating to merchant-grade acid, is decreased, reducing storage and space requirements and associated capital investment as well as investment in product inventory. The sedimentation of solids concentrates and purifies the acid, allowing production of



liquid and solid fertilizers containing fewer impurities. The removal of solids, particularly humus, allows the efficient separation and recovery of organic solvent when uranium is recovered from the impure acid by solvent-solvent extraction methods, minimizing the loss of solvent.

T971,007
MICROWAVE TREATMENT OF PACKAGE FOODS

James L. Hecht, Richmond, Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 616,834, Sep. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 500,497, Aug. 26, 1974, abandoned, which is a continuation of Ser. No. 375,048, Jun. 29, 1973, abandoned. This application Aug. 11, 1976, Ser. No. 713,353
Int. Cl.[2] A23L *3/00*
U.S. Cl. 426—234
1 Sheets Drawing. 16 Pages Specification

The shelf-life of food is improved by sterilizing such food by heating it in a container having oxygen barrier properties, by microwave energy, for a time and temperature necessary to product sterilization. Such container is formed of a laminate including an organic polymeric material coated with an inorganic glassy barrier material and with a heat-sealable topcoat. The coating is from 0.02 to 2 microns thick and includes over 50% metal phosphate selected from aluminum and iron phosphates. The atom ratio of metal to phosphorus is about from 2.2 to 0.5 and up to about 50% of the metal ions may be replaced by tin, titanium or zirconium ions.

T971,008
FOXING PRIMER

David R. Hansen, Houston, Tex., assignor to Shell Oil Company

Filed Jul. 18, 1977, Ser. No. 816,788
Int. Cl.[2] B32B *25/00*; D03D *1/00*
U.S. Cl. 428—266
No Drawing. 9 Pages Specification

An improved footwear assembly is disclosed comprising a textile upper, a polymeric soling and a foxing wherein the foxing comprises a monoalkenyl arene-conjugated diene block copolymer. The improvement lies in coating at least the area of the upper which is contacted with the foxing with a silane compound containing at least one functional group. These functional groups include halogens, alkoxy groups, alkyl amines, methacryloxypropyl groups, alkyl mercapto groups, alkyloxy epoxy radicals and mixtures thereof. Preferably, both the foxing and polymeric soling are formed from compositions containing styrene-butadiene block copolymers.

REISSUES

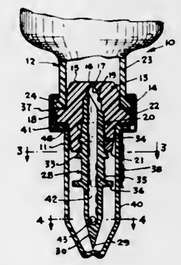
JUNE 6, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,656
ADDITIVE TRANSFER UNIT HAVING A SLIDABLE PIERCING MEMBER

Richard Marion Chittenden, Grayslake; Peter Lorin Bryant, Lake Bluff, and Charles Carlock Classen, Waukegan, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Original No. 3,987,791, dated Oct. 26, 1976, Ser. No. 600,665, Jul. 31, 1975. Continuation of Ser. No. 465,230 Mar. 29, 1974, abandoned. Application for reissue Mar. 21, 1977, Ser. No. 779,455
Int. Cl.[2] A61J *1/00*
U.S. Cl. 128—272.3 7 Claims



1. An additive transfer unit for storing and transferring of a medicament to a *solution* container having an exposed closure [and a vacuum therein];

said transfer unit comprising [a] *an additive* container for storing the medicament to be transferred, said *additive* container having a rigid neck portion defining a finish, the opening in said *additive* container being sealed by a closure affixed thereto;

said closure having a shoulder for resting against said finish of the rigid container neck, said closure including a puncturable stopper with a pierceable diaphragm portion positioned in sealing engagement with the opening in the *additive* container and in a substantially stationary manner;

a tubular member having a cylindrical portion, the cylindrical portion including a central opening therein for slidably receiving a piercing member;

said tubular member including an undercut in the outside surface of the cylindrical portion thereof, sealing means positioned in said undercut;

a hood engageable with the cylindrical portion of the tubular member and the sealing means to cover the piercing member and tubular member prior to use of the unit;

said tubular member being positioned and arranged so that the opening therein overlies the diaphragm portion of said stopper;

crimping means to affix the closure and tubular member to the *additive* container;

said piercing member being positioned within said central opening in said member and having a passageway therethrough for the flow of said medicament and a point on both ends thereof;

said piercing member having an integral stop and being movable from the first position for entry through the closure of the [vacuumized] *solution* container with said integral stop constructed and arranged to contact said exposed closure of [vacuumized] *said solution* container to a second position for puncturing of the stopper in the additive container to thereby provide a pathway between the containers and permit the medicament within the additive container to transfer into the [vacuumized] *solution* container.

Re. 29,657
POWER DRIVEN SKI

Royce H. Husted, Wheaton, Ill., assignor to Saroy Engineering, Wheaton, Ill.

Original No. 3,853,192, dated Dec. 10, 1974, Ser. No. 404,411, Oct. 9, 1973. Application for reissue Dec. 1, 1976, Ser. No. 746,821
Int. Cl.[2] B62M *27/00*
U.S. Cl. 180—5 R 9 Claims

1. In a power driven ski for [attachment to a skier's foot and for] slidingly negotiating snow as with a conventional ski, said power driven ski having in combination;

a. a ski with an aperture dividing it into an anterior ski portion having a longitudinally smooth anterior undersurface and a posterior ski portion,

b. a bridge holding said ski portions to each other,

[c. means for attaching said ski to a skier's foot,]

[d.] *c.* an endless tread circulateably supported around said posterior ski portion having at least one tension carrying member and a plurality of cleats attached to said tension carrying member for thrusting against the snow.

[e.] *d.* means for circulateably supporting said tread around said posterior ski portion, and

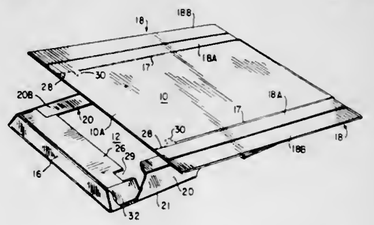
[f.] *e.* motor means coupled to said tread for circulating said tread around said posterior ski portion,

the improvement wherein the posterior ski portion has a longitudinally smooth, snow contacting stationary undersurface and said bridge holds said ski portions in position one relative to the other so that said undersurfaces jointly form a longitudinally smooth skiing undersurface substantially throughout the length of said ski.

Re. 29,658
BOOK CARTON WITH IMPROVED OPENER

Benjamin Rous, New York, N.Y., assignor to Stone Container Corporation, Chicago, Ill.

Original No. 3,989,141, dated Nov. 2, 1976, Ser. No. 662,962, Mar. 1, 1976. Application for reissue Feb. 7, 1977, Ser. No. 766,434
Int. Cl.[2] B65D *85/54*
U.S. Cl. 206—424 10 Claims



6. In a carton for packaging an article comprising a rectangularly shaped top wall, a rectangularly shaped bottom wall, a pair

of trapezoidally shaped side walls foldably connected to each side of said bottom wall, one of said pair of side walls also being foldably connected to one side of said top wall, a first pair of end flaps, each of said first end flaps being foldably connected to one end of said bottom wall along a first folding line, each of said first end flaps including an inner portion and an outer portion, said inner portion being foldably connected to said outer portion along a third folding line, said end flap inner portion being foldably connected to said bottom wall and being coextensive in length with said bottom wall, the improvement comprising said first end flap outer portion being a first predetermined amount (X) shorter in length than said end flap inner portion, said first end flap outer portion being equal to width to a second predetermined amount (L), a closure flap being hingedly connected to the other of said pair of side walls, said closure flap having a pair of end portions extending inwardly from the ends of said closure flap a distance equal to the second predetermined amount (L), said closure flap end portions being equal in width to the first predetermined amount (X), said closure flap and said first end flap outer portions being normally positioned parallel to said bottom wall and being coplanar with each other.

Re. 29,659

RADIAL SKI HAVING A PROFILED RUNNING SURFACE

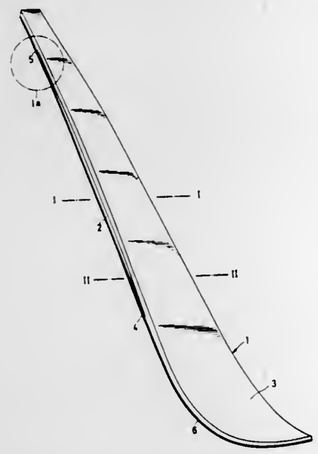
Heinz Helmut Bildner, Traunsteiner Strasse 57, 8221 Seebruck, Germany

Original No. 3,871,671, dated Mar. 18, 1975, Ser. No. 366,615, Jun. 4, 1973. Application for reissue Feb. 24, 1977, Ser. No. 771,836

Claims priority, application Germany, Jun. 8, 1972, 2227980; Feb. 27, 1973, 2309782

Int. Cl.² A63C *5/04*

U.S. Cl. 280—608 **10 Claims**



1. A ski having a profiled running surface which is symmetric to the longitudinal axis of the ski and defined at both sides by edges of wear-resistant material, characterized in that at least one guide strip is provided at each side of the ski forming a further edge projecting laterally over an edge of wear-resistant material, in that each said guide strip extends [in excess of one-half the longitudinal length] *approximately one-half the longitudinal length of the running surface* of the ski, and in that each said guide strip has its lateral projection diminished continuously from [the] *a* middle *region* of the ski towards the tip end and tail end thereof.

Re. 29,660

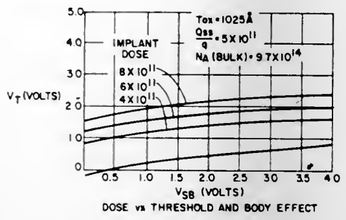
PROCESS AND PRODUCT FOR MAKING A SINGLE SUPPLY N-CHANNEL SILICON GATE DEVICE

William E. Armstrong, Mission Viejo, Calif., assignor to Motorola, Inc., Schaumburg, Ill.

Original No. 3,912,545, dated Oct. 14, 1975, Ser. No. 469,487, May 13, 1974. Application for reissue Mar. 7, 1977, Ser. No. 775,004

Int. Cl.² H01L *21/265*

U.S. Cl. 148—1.5 **16 Claims**



DOSE vs THRESHOLD AND BODY EFFECT

1. A process for [increasing the threshold voltage of an] *fabricating an inverter including serially* connected N-channel MOS devices *in a semiconductor substrate* comprising the step of:

implanting acceptor ions [of one conductivity type] into the channel *regions of both devices at the* surface portion of a *P-type* semiconductor body [having source and drain regions of the opposite type conductivity] at an energy level and in an amount sufficient to increase the threshold voltage of said MOS [device] *devices*.

Re. 29,661

SULFURIZED METAL PHENATES

Yngve Gust Hendrickson, El Cerrito, and John M. King, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Original No. 3,801,507, dated Apr. 2, 1974, Ser. No. 281,863, Aug. 18, 1972. Application for reissue Jul. 5, 1977, Ser. No. 812,940

Int. Cl.² C10M *1/54*

U.S. Cl. 252—42.7 **13 Claims**

1. A composition of matter prepared by reacting an alkyl phenol having from 8 to 35 carbon atoms in the alkyl group, sulfur and an alkaline earth metal base in the presence of a mutual solvent to form a sulfurized metal phenate having a sulfur to metal atom ratio between 1 and 4 *and an alkalinity value of 40 to 200 mg. KOH/gram.*

7. A process for producing a mixture of sulfurized metal phenates having a sulfur to metal atom ratio between 1 and 4 *and an alkalinity value of 40 to 200 mg. KOH/gram* which comprises:

a first contacting of 8.7 to 47 mol percent of an alkyl phenol having from 8 to 35 carbon atoms in the alkyl group, from 13 to 81 mol percent of sulfur, from 0.5 to 42 mol percent of an alkaline earth metal base and from 1.3 to 66 mol percent of a mutual solvent within a liquid reaction medium at a temperature of 250 to 450° F. and at a presence of 5 to 20 p.s.i.a. for a period of 1 to 6 hours, the mol ratio being maintained between 0.05 to 1.5 mols of metal base, 0.1 to 4 mols of mutual solvent and 1 to 5 mols of sulfur per mol of alkyl phenol; and

a second contacting of the reaction product obtained from said first contacting with 0 to 49 mol percent of said alkaline earth metal base, and from 17 to 80 mol percent of said mutual solvent at a temperature of 250 to 450° F. and a pressure of 2 to 15 p.s.i.a. for a period of 4 to 10 hours.

9. A process for producing a mixture of sulfurized metal phenates having a sulfur to metal atom ratio between 1 and 4 *and an alkalinity value of 40 to 200 mg. KOH/gram* which comprises:

contacting in a first step from 0.2 to 1 mol of an alkaline earth metal base, from 0.2 to 1 mol of a mutual solvent and from 1.5 to 3 mols of sulfur with each mol of an alkyl phenol having from 8 to 35 carbons; in the alkyl group said contacting being maintained at a temperature of 250 to 450° F. and a pressure of 5 to 20 p.s.i.a. for a period of 1 to 6 hours to produce a sulfurized intermediate reaction product; and

contacting in a second step said sulfurized intermediate reaction product with 0.2 to 0.6 mol of an alkaline earth metal base and from 0.5 to 2 mols of mutual solvent per mol of said alkyl phenol in said first step;

said contacting in the second step being maintained at a temperature of 250 to 450° F. and a pressure of 2 to 15 p.s.i.a. for a period of 2 to 10 hours to produce a sulfurized metal phenate mixture.

Re. 29,662

RARE EARTH ACTIVATED LANTHANUM AND LUTETIUM OXY-CHALCOGENIDE PHOSPHORS

Perry Niel Yocom, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Original No. 3,418,247, dated Dec. 24, 1968, Ser. No. 696,490, Jan. 9, 1968. Continuation-in-part of Ser. No. 442,518, Mar. 24, 1965, abandoned. Application for reissue Apr. 4, 1977, Ser. No. 784,366

Int. Cl.² C09K *11/46*

U.S. Cl. 252—301.4 S **12 Claims**

1. A phosphor consisting essentially of an oxy-chalcogenide of at least one member of the group consisting of lanthanum and lutetium wherein up to [25] *15* mol percent of said lanthanum and lutetium is replaced with yttrium or gadolinium, said phosphor containing, for each mol of said phosphor, between 0.0002 and 0.2 mol of a member of the group consisting of dysprosium, erbium, europium, holmium, neodymium, praseodymium, samarium, terbium, and thulium.

Re. 29,663

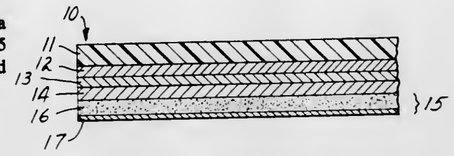
MOISTURE-RESISTANT SOLAR CONTROL FILM

Donald R. Theissen, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Original No. 3,681,179, dated Aug. 1, 1972, Ser. No. 56,379, Jun. 20, 1970. Continuation-in-part of Ser. No. 678,013, Oct. 25, 1967, abandoned. Application for reissue Jun. 24, 1977, Ser. No. 809,629

Int. Cl.² B44F *1/00*; A61L *15/06*

U.S. Cl. 428—336 **11 Claims**



1. Flexible adhesive-coated solar control film which is normally not tacky, can be wound on itself in roll form without the use of a protective liner, readily unwound and easily handled in large sheets but which is capable of being firmly, adherently but removably bonded to a glass sheet with a pressure-sensitive adhesive to provide a bubble-free transparent laminated structure, said solar control film comprising in combination:

a transparent film backing,

a thin transparent aluminum coating on one face of said backing,

a thin, transparent moisture-transmitting barrier layer coated over the aluminum,

a thin, transparent primer layer coated over said barrier layer, and

a water-activatable adhesive system comprising:

a uniform continuous layer of normally tacky water-insoluble pressure-sensitive adhesive coated over said primer layer and firmly adherently bonded thereto and

a thin, uniform continuous light-transmitting tack-free film-forming water-soluble material coated over and firmly bonded to said layer of pressure-sensitive adhesive,

whereby water may be applied to the water-soluble material to activate it and render its surface slippery, thus permitting the solar control film to be readily positioned on a glass windowpane in a desired location, after which excess water and water-soluble material can be expelled at the edges of said film and the remaining water evaporated through said film to permit the pressure-sensitive adhesive to bond firmly to said windowpane and form a laminated structure having excellent optical properties.

PLANT PATENTS

GRANTED JUNE 6, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,258

IMPATIENS PLANT MAYA

John J. Ryan, 39877 Sundale Dr., Fremont, Calif. 94538

Filed Mar. 28, 1977, Ser. No. 782,284
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct form of Impatiens plant as described and illustrated known by the cultivar name Maya and particularly characterized by its excellent floriferousness; good breaking action; making a full basket; giving good cutting production; red-green foliage like Mikkel Red Magic: fast growth habit; a light red-orange flower; and the ability to withstand adverse conditions.

4,259

IMPATIENS PLANT — NAVAJO

John J. Ryan, 39877 Sundale Dr., Fremont, Calif. 94538

Filed Mar. 28, 1977, Ser. No. 782,285
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct form of Impatiens plant as described and illustrated known by the cultivar name Navajo and particularly characterized by rich red-green foliage with a very distinct golden brown to off-yellow variegation; a medium size, rose-red flower with a light eye; a very erect, thick, stiff stem; and very good breaking action, making an excellent pot and/or bedding plant.

4,260

IMPATIENS PLANT — CHICKASAW

John J. Ryan, 39877 Sundale Dr., Fremont, Calif. 94538

Filed Mar. 28, 1977, Ser. No. 782,286
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct form of Impatiens plant as described and illustrated known by the cultivar name Chickasaw and particularly characterized by short internodes; many rose-pink flowers in the summer and salmon flowers in the winter; a bright yellow variegation on a moderately light green leaf under high light and increasing age of plants; and a stem and breaking action conducive to making a good basket.

4,261

IMPATIENS PLANT — CREEK

John J. Pyan, 39877 Sundale Dr., Fremont, Calif. 94538

Filed Mar. 28, 1977, Ser. No. 782,287
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct form of Impatiens plants as described and illustrated, known by the cultivar name Creek and particularly characterized by its bright red-green foliage that grows in richness under high light; bright pink flower color with slightly darker eye; moderate flower size and average number of flowers; average growth habit for a New Guinea pot variety; but the chief distinction is the good flower to foliar contrast.

PATENTS

GRANTED JUNE 6, 1978

ERRATA

For CLASS	See PATENT NO.
072–275	4,092,875
010–024	4,092,913
010–088	4,092,914
400–144.2	4,093,059
400–236.1	4,093,060
400–194	4,093,061
220–462	4,093,114
274–009 R	4,093,152
366–336	4,093,188
366–156	4,093,189
283–001 R	4,093,276
134–104	4,093,472
350–355	4,093,534
544–344	4,093,616
544–281	4,093,617
544–387	4,093,618
568–766	4,093,667
568–855	4,093,668
235–001 E	4,093,848
235–302.2	4,093,851
362–104	4,093,973
363–027	4,093,975
358–053	4,093,976

PATENTS

GRANTED JUNE 6, 1978

GENERAL AND MECHANICAL

4,092,739

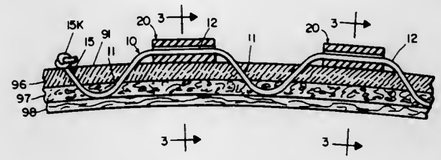
METHOD OF REPLACING HAIR

Richard P. Clemens, 1706 S. 91st Ave., Omaha, Nebr. 68124, and Robert Fuchs, 1908 Parkwild West, Council Bluffs, Iowa 51501

Continuation of Ser. No. 665,690, Mar. 10, 1976, abandoned. This application Aug. 29, 1977, Ser. No. 828,942

Int. Cl.² A61B *17/00*; A61F *1/00*

U.S. Cl. 3—1 **3 Claims**



1. A method for replacing hair in a delineated area of a living human scalp which has been surgically prepared, said method comprising the steps of:

A. Positioning a plurality of individual tubular resinous sleeves atop the scalp skin layer and arranged in an annular pattern within said delineated area;

B. Providing distinct spatial gaps between the ends of neighboring tubular sleeves;

C. Embedding a series of sutures in an annular pattern utilizing an elongate one-piece surgical thread, the lead-end of which is inserted in repeated alternating fashion as follows:

i. through the scalp skin layer and restricted to the spatial gap between neighboring sleeves whereby there is provided suturing infra-lengths lying buried within the subcutaceous scalp layer; and

ii. through the longitudinal bore of the sleeves as a suturing supra-length said bore being sufficiently larger cross-sectionally than said suturing whereby each sleeve remains entirely atop the scalp skin layer and is slidable therealong;

D. Buttressing the sutured elongate one-piece surgical thread at its lead-end and trail-end thereby preventing the buried infra-lengths thereof from sliding within the subcutaceous layer; and

E. Applying at least one connector means to the sleeves and to which connector replacement hair might be attached.

4,092,740

ARTICULATED JOINT PROSTHESIS

Salomao Eshriqui, Rua Pampeu Loureiro No. 32, Bloco B-Apt. 402, Rio de Janeiro, Brazil

Filed Oct. 4, 1976, Ser. No. 729,100

Claims priority, application Brazil, Oct. 3, 1975, 750646

Int. Cl.² A61F *1/24*

U.S. Cl. 3—1.911 **9 Claims**

1. An articulated joint prosthesis comprising in combination:

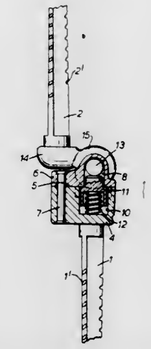
a first bone penetrating element for penetrating the marrow of a first bone associated with one side of said joint;

a second bone penetrating element for penetrating the marrow of a second bone associated with the other side of said joint;

articulation means having a normal plane of articulation comprising first hinge means on said first element and second hinge means on said second element, said first and second hinge means being operatively associated for articulation about a hinge axis; and

elastic bias means in operative relation with said first and second hinge means, permitting therebetween a limited rotational movement in a plane perpendicular to the normal plane of articulation of the articulation means;

said articulation means including a hinge pin defining said hinge axis and said bias means being positioned between said pin and said first hinge means;



said first hinge means including a bearing at each end of said pin and said bias means comprising separate elastic means forming part of each of said bearings.

4,092,741

PROSTHETIC DEVICE FOR USE AS A HIP JOINT

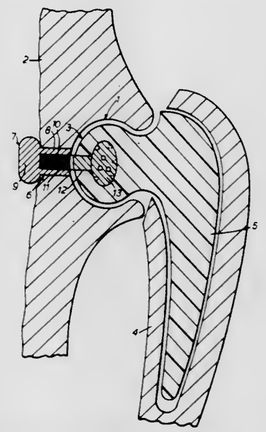
Thomas David, Vienna, Austria, assignor to Firma Ludwig Bertram GmbH & Co. KG, Hannover, Germany

Division of Ser. No. 699,841, Jun. 25, 1976, abandoned. This application Aug. 2, 1977, Ser. No. 821,174

Claims priority, application Austria, Jun. 26, 1975, 4941/75

Int. Cl.² A61F *1/24*

U.S. Cl. 3—1.913 **3 Claims**



1. A hip joint prosthesis comprising a substantially spherical portion capable of being anchored in the acetubular fossa of a pelvic bone, a shank portion capable of being anchored in a femur, the spherical portion and the shank portion being integral and being composed of an elastic material, fixing means associated with the spherical portion, and at least one holding member co-operable with the fixing means to anchor the spherical portion in the fossa, said holding member being anchorable in the pelvic bone by being inserted into a hole, previously made through the pelvic bone, from the side oppo-

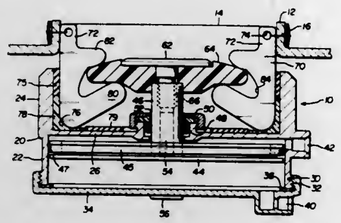
site the fossa and said holding member comprising a shaft for insertion into the hole in the pelvic bone, and a fixing head on the shaft engageable against the side of the pelvic bone opposite the fossa, the shaft of the holding member having a threaded hole and the fixing means comprising a fixing element having a threaded shaft extending from the spherical portion and engageable in the threaded hole.

4,092,742

DYNAMIC PROSTHETIC MYOCARDIUM

Adrian Kantrowitz, Pontiac, and Paul S. Freed, Oak Park, both of Mich., assignors to Sinai Hospital of Detroit, Detroit, Mich.

Filed Oct. 18, 1976, Ser. No. 733,677
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.7 **9 Claims**



1. A prosthetic myocardial device for replacing excised necrotic or scarred myocardial tissue to simulate contraction and relaxation during systole and diastole, comprising:

a plurality of essentially circumferentially arranged arms, with each of the arms being supported at one of its ends for pivotal movement and the other end of each arm being adapted for suture to the heart around the periphery of an opening formed by excising myocardial tissue; power means for effecting synchronous pivotal movement of said plurality of arms to simulate contraction and relaxation of the heart, including an hydraulic cylinder, a piston reciprocable within the cylinder, and a piston rod extending out of the cylinder and being essentially coaxial of the circumferentially arranged pivotal arms; and tilting means functionally interconnecting the piston rod and each of the pivotal arms for effecting reciprocal pivotal movement of the arms in response to the reciprocal axial movement of the piston rod.

4,092,743

INTRAOCULAR LENSES

Charles D. Kelman, 73 Bacon Rd., Old Westbury, N.Y. 12123
Continuation-in-part of Ser. No. 728,973, Oct. 4, 1976, abandoned. This application Apr. 28, 1977, Ser. No. 791,693
Int. Cl.² A61F *1/16, 1/24*
U.S. Cl. 3—13 **26 Claims**

1. An intraocular lens suitable for use as an artificial lens implant,

(A) the lens having

(1) a medial, light-focusing lens body, and

(2) a pair of lateral position fixation elements connected with said lens body,

(B) one of said position fixation elements having

(1) a first portion contiguous to and extending generally laterally outwardly from a first region of the periphery of said lens body, and

(2) a second portion extending from said first portion generally transversely thereto and at least partly peripherally of said lens body, said second portion having that part of its peripheral edge which faces said lens body spaced from the periphery of said lens body,

(C) and the other of said position fixation elements extending generally laterally outwardly

(1) from a second region of the periphery of said lens body spaced from and generally opposite said first region and

(2) in a direction generally opposite to that of said first portion of said one position fixation element,

(D) said pair of position fixation elements cooperating to effect proper positioning and immobilization of the lens with respect to the iris of an eye of a lens implant patient,

(E) the configurations of said position fixation elements and their location with respect to said lens body being such that

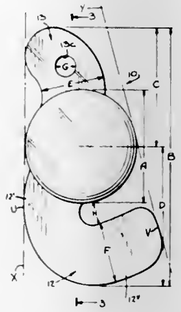
(1) the minimum length

(a) of a projection of the entire lens onto a plane parallel to the optical axis of said lens body in a direction perpendicular to a projection of said optical axis on such plane

(b) which can be achieved by rotating the lens 360° about said optical axis,

(2) is greater than the minimum length

(a) of a projection of said lens body onto said plane in a



direction perpendicular to a projection of said optical axis on such plane

(b) which can be achieved by rotating said lens body 360° about said optical axis,

(3) to an extent sufficient that insertion of the lens, through an incision in the eye, by a movement which is generally radial with respect to said optical axis would require the length of such incision to be greater than the minimum possible length of the incision which, as a function of the thickness and lateral dimensions of said lens body, would accommodate and permit passage therethrough of said lens body alone, and

(F) the maximum width of each of said position fixation elements at any part thereof for a given thickness thereof being such that that element can be accommodated in and pass longitudinally through said minimum length incision in the eye,

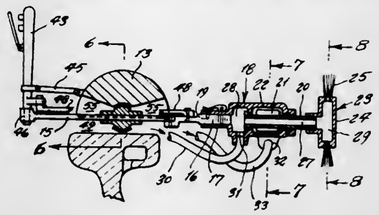
(G) whereby the entire lens is capable of being snaked into the eye of a lens implant patient through said minimum length incision.

4,092,744

AUTOMATIC HYGIENIC WASHING MACHINE

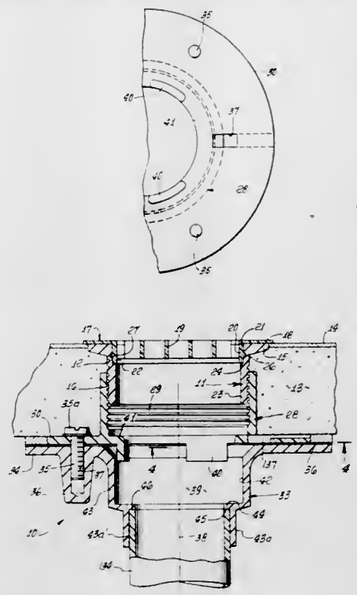
Aristotel Butoi, 689 Seneca Ave., Ridgewood, N.Y. 11227
Filed Feb. 22, 1977, Ser. No. 770,441
Int. Cl.² A61H *35/00;* A46B *13/06;* G05G *9/04*
U.S. Cl. 4—7 **2 Claims**

1. An automatic hygenic washing machine, comprising in combination, a bracket mounted under a toilet seat, spherical ball retained freely rotatable in said bracket, a rod slidable through said ball, one end of a shank being pivotally connected to one end of said rod, a power unit being detachably supported by one of opposite end of said shank, a rotating brush detachably being supported on said power unit; said brush comprising a hollow flat, circular base having bristle tufts on a periphery thereof and openings on said periphery communicating with an interior chamber of said base; said power unit including a case having a first chamber, a tubular shaft rotated in bearings of said case extending through said first chamber, a plurality of radials fins formed around an outer side of said shaft first chamber, an entry port and an outlet port from a cold water supply being connected to said entry port so that flow of said water through said first chamber cause said shaft to rotate, a second chamber inside said power unit case communicating with one end of a central opening through said shaft, said brush mounted upon an opposite end of said shaft, an interior of said base communicating with an opposite end of said shaft central



opening, a plurality of perforated openings through a peripheral wall of said extending brush bristle tufts around said base; an entry port on said second chamber, a flexible hose from a heated water supply being connected to said second chamber entry; a first link pivoted at one end to said toilet seat, a control lever adjacent a side of a toilet being tethered to an opposite end of said link, a lower end of said lever being rotatable in an opening on an opposite end of said rod, a sideward spur near a lower end of said lever, and a second link being pivotally connected to said spur, said second link being also connected to a sideward spur formed along an intermediate portion of said shank.

directly communicate with the space between the projections, said projections acting as stiffeners and centering



guides, said projections projecting closer to said axis than said thread.

4,092,745

DRAIN STRUCTURE

Robert A. Oropallo, Pasadena, Calif., assignor to American Brass & Aluminum Foundry Co., Inc., Los Angeles, Calif.
Filed Dec. 13, 1976, Ser. No. 749,827
Int. Cl.² E03C *1/26*
U.S. Cl. 4—288 **11 Claims**

1. In a drain assembly for a drain floor having an opening toward which a drain pipe projects, the combination comprising:

(a) a tubular plastic body sized to exteriorly fit the drain floor opening, the body having an external thread, and a nut threadably engaging the body thread and rotatable relative to the body, the nut defining an exterior flange, the body and nut consisting of molded plastic material, the body and nut having a common axis,

(b) a plate defining an upper flange overlapping the top of the body, and a grille bounded by the upper flange and overlapping the upper interior of the body,

(c) and a tubular base having a flange attached to the nut flange at the underside thereof, the base having a tubular portion projecting downwardly for reception of the upper extent of said pipe, said base consisting of molded plastic material,

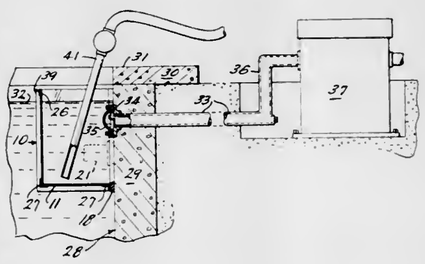
(d) said nut including circularly spaced downward projections extending into the upper interior of the base, the nut defining at least one weep hole extending through the side of the nut at approximately the level of the nut flange to

---

4,092,746

SWIMMING POOL APPARATUS

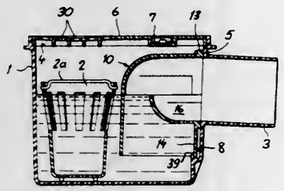
Richard Harris, Archbold, Ohio, assignor to Mack and Gooding, Archbold, Ohio, a part interest
Continuation-in-part of Ser. No. 472,214, Mar. 22, 1974, abandoned. This application Apr. 20, 1976, Ser. No. 678,473
Int. Cl.² E04H *3/20;* E03B *11/00*
U.S. Cl. 4—172.17 **6 Claims**



1. Swimming pool apparatus for use on a pool filled with water up to a predetermined maximum level and having a side outlet positioned below the normal surface of the water in the pool, such outlet normally being filled with water, comprising, in combination, chamber means including a rectangular watertight box having an opening in one side for positioning in alignment with a pool outlet, sealing means for effecting a liquid seal between said chamber means and the pool adjacent the pool outlet, said sealing means including a gasket mounted on said watertight box adjacent such side opening, said sealing means preventing the pool water from entering said chamber means and the pool outlet, said chamber means including an upper portion which extends above the predetermined maximum water surface level when said chamber means is sealed to

the pool, said upper portion defining an opening located above the predetermined maximum water surface level, said chamber means further including a lower portion which extends below the pool outlet when said watertight means is sealed to the pool whereby, when said chamber means is sealed to the pool with said sealing means and is drained to below the pool outlet, the pool outlet is drained without lowering the normal water surface level, and suction cup means mounted on opposed sides of said watertight box for removably mounting said watertight box in a surrounding relationship with the pool outlet.

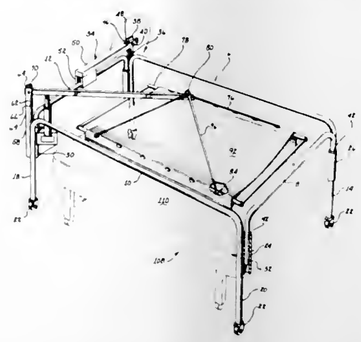
4,092,747
ODOR TRAP FOR DRAIN
Bernhard Kessel, Ingolstadter Str. 20, 8073 Kosching, Germany
Filed May 20, 1976, Ser. No. 688,309
Claims priority, application Germany, May 21, 1975, 2522425
Int. Cl.[2] E03C *1/282*
U.S. Cl. 4—286 **9 Claims**



1. An odor trap for a drain, comprising:
an upwardly open housing having a substantially flat sidewall provided with an exit port for entering waste water;
a tubular insert in said housing adjacent said sidewall, said insert having a peripheral wall forming a bottom inlet beneath the level of said exit port and a circular lateral outlet registering with said exit port;
mounting means securing said insert to said sidewall; and
an upwardly concave tongue in said insert spaced from said peripheral wall and extending inwardly from the lower periphery of said outlet, said tongue having a curved bottom hugging said outlet over substantially the lower third of its periphery and a pair of upstanding flanks on opposite sides of said curved bottom, said flanks rising to a level below a horizontal midplane of said outlet, said curved bottom rising to the same level and merging there gradually into said flanks along a generally U-shaped overflow edge whose bight is curved about a vertical axis disposed inwardly of said outlet and whose arms defined by said flanks are substantially perpendicular to said sidewall, said overflow edge being separated by a generally ring-segmental clearance from said peripheral wall, said clearance terminating at said sidewall and having a horizontal cross-sectional area at least equaling the cross-sectional area of the flow path of said outlet.

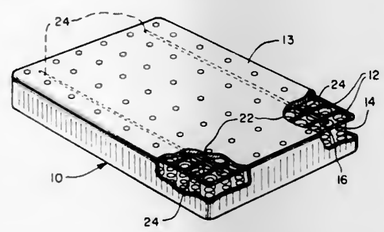
4,092,748
PATIENT HANDLING SYSTEM
Marion H. Ewers, Payson, Ariz., assignor to Air Rotor Development Company, Inc., Payson, Ariz.
Filed Jul. 16, 1976, Ser. No. 705,810
Int. Cl.[2] A61G *7/10*
U.S. Cl. 5—85 **8 Claims**

1. Apparatus for lifting and transporting bed patients from and to hospital beds comprising a stretcher a horizontally foldable rectangular frame having corner hinges, detent means to prevent folding of the frame from the rectangular position in use, hoist means carried by said frame and having means for engaging said stretcher a plurality of legs straddling the bed and supporting said frame above hospital bed height and means for moving the apparatus attached to said legs; whereby the frame may be positioned above the bed of a patient and the hoist means attached to the stretcher and the patient lifted up



and transported, and whereby the apparatus may be folded for storage.

4,092,749
MATTRESS SPRING UNIT CONSTRUCTION
Alvin R. Klancnik, Park Ridge, Ill., assignor to Sealy, Incorporated, Chicago, Ill.
Filed Jan. 6, 1977, Ser. No. 757,237
Int. Cl.[2] A47C *23/04*
U.S. Cl. 5—267 **37 Claims**

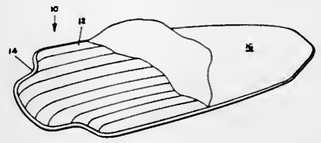


1. A retention and support strip for attachment to a mattress innerspring unit with cross helicals which extend transversely of the unit and lace together terminal convolutions of adjacent coil springs in the rows, to reduce spin-out of the cross helicals and increase firmness of the innerspring unit comprising:
a strip including leg members for extending about the cross helicals of the innerspring unit and for being crimped together with the cross helicals about the terminal convolutions of adjacent coil springs in a row when said strip overlies the terminal convolutions of the coil springs in a row.

4,092,750
INFLATABLE INSULATING APPARATUS
Donald G. Ellis, 2315 Broadway, No. 2, Boulder, Colo. 80302
Filed May 14, 1976, Ser. No. 686,653
Int. Cl.[2] A47G *9/00*
U.S. Cl. 5—343 **17 Claims**

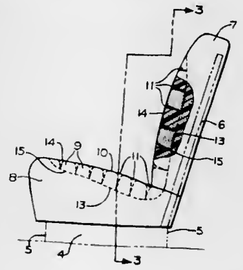
1. An inflatable insulating apparatus for use as or in a mattress inflatable with a fluid comprising a plurality of fluid-tight envelopes; means for inserting a fluid therewithin to inflate said envelopes; and reflective means included on at least two spaced portions of each of said envelopes for reflecting a significant portion of the thermal radiation incident thereon, said two spaced portions including said reflective means being in general alignment with and opposing one another across at least a portion of each of said fluid-tight envelopes, each spaced portion including said reflective means intersecting a

path extending between a first surface of each of said envelopes adapted to engage a first object, person or the like being insulated and a second surface of each of said envelopes adapted to engage a second object, surface or the like from which the first object, person or the like is being insulated, whereby said apparatus in an insulator with heat transfer through and across



said envelopes being reduced by said spaced reflective means; said envelopes located adjacent one another; said apparatus including additional insulation material covering at least a portion of the exterior of each of said envelopes to facilitate the reduction in heat transfer through said apparatus; and a cover retaining said envelopes and additional insulation material together.

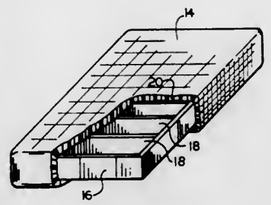
4,092,751
CONTOURED FOAM SEAT
Theodore B. Burkholder, Perrysburg, and Robert J. Stalter, Bowling Green, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed May 6, 1976, Ser. No. 683,975
Int. Cl.[2] A47C *23/00*
U.S. Cl. 5—345 R **6 Claims**



1. In an improved seat including a support means for a foamed body contact member, the improvement wherein the surface of the foamed body contact member has cored-out areas, said cored-out areas being positioned to give a geometric pattern of grooves that extend continuously in lengths no more than four inches before the grooves terminate or change direction to give raised portions, each portion being capable of being compressed independent of any other portion for at least 10 percent of its compression deflection.

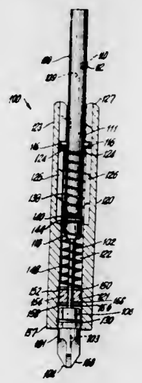
4,092,752
FIRE RETARDANT BOX SPRING AND MATTRESS
Thomas P. Dougan, Newport Beach, Calif., assignor to The Upjohn Company, Kalamazoo, Mich.
Filed Nov. 29, 1976, Ser. No. 745,690
Int. Cl.[2] A47C *23/00*; B29H *17/28*
U.S. Cl. 5—345 R **6 Claims**

1. An improved box spring and mattress combination, said mattress being supported on said box spring wherein said mattress consists essentially of
a homogeneous core of flame retarded flexible polyurethane foam which is the product of reaction, under foam producing conditions, of
(a) a polyisocyanate mixture which contains from 5 percent to 95 percent by weight of toluene diisocyanate and from 95 percent to 5 percent by weight of polymethylene polyphenyl polyisocyanate containing from about 40 percent to about 70 percent of methylenebis(-phenyl isocyanate), the remainder of said polymethylene polyphenyl polyisocyanates having a functionality higher than 2.0;
(b) a polyether polyol having an equivalent weight from about 500 to about 2500 and a functionality from about 2.0 to about 4.0;
(c) from about 2 to about 20 percent by weight, based on weight of final foam, of antimony oxide;
(d) from about 1 to about 15 percent by weight, based on weight of final foam, of a polyhalogenated member



selected from the class consisting of polyhalogenated aliphatic diols and polyhalogenated aromatic compounds; and
(e) from 0 to about 15 percent by weight, based on weight of final foam, of alumina trihydrate; and
(f) when the amount of alumina trihydrate is zero, a chlorinated hydrocarbon polymer in an amount such that the resultant foam contains from about 2 to about 8 percent by weight of chlorine;
said core of flame retarded polyurethane foam being enclosed in a covering of flame retardant ticking; and
said box spring comprising a non-combustible frame.

4,092,753
COMBINATION DRILL AND SCREWDRIVER
Manfred E. Fuhrmann, 115 West St., Mamaroneck, N.Y. 10543
Filed Apr. 5, 1976, Ser. No. 673,990
Int. Cl.[2] B25F *3/00*
U.S. Cl. 7—158 **2 Claims**



1. A combination screwdriver and drill tool comprising a hollow cylindrical outer sleeve having an upper end and a lower end, the internal walls of said outer sleeve having first longitudinal slots formed along a substantial length thereof and located diametrically opposed to each other, the internal diameter of said outer sleeve being less at the upper end thereof than that of the balance of said outer sleeve, a lateral downwardly facing shoulder formed at the point where said lesser and

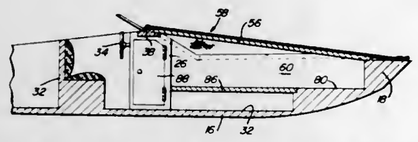
greater diameters of said outer sleeve join, a second slot formed in the outer walls of the upper end of said outer sleeve and extending completely therethrough and being oriented at a right angle to said first slots, a cylindrical shaft having a central passage therein and having a proximal end and a distal end located longitudinally within said outer sleeve, first spring means disposed on said shaft and engaging said downwardly facing shoulder to urge the distal end of said shaft extending to just below the central portion of said outer sleeve, a cutting drill bit extending through said central passage of said shaft and the length of said outer sleeve, said shaft and cutting drill bit being fixedly engaged with one another, second spring means urging said outer sleeve downwardly with respect to said cutting drill bit and shaft, transverse pin means extending from said shaft, engaging said first longitudinal slots in said outer sleeve, the base of said slots serving as a stop means engageable with said pins to limit downward movement of said shaft and cutting drill bit with respect to said outer sleeve, guide means in the lower portion of said outer sleeve for said cutting drill bit, and changeable screwdriver bit means secured in the lower portion of said outer sleeve and locked against rotation relative to said outer sleeve, and a longitudinal central passage within said changeable screwdriver bit means adaptable to permit said cutting drill bit to pass therethrough.

4,092,754

BOAT INTERIOR AND CABIN DESIGN

John V. Yost, 2233 Riverside Dr., Trenton, Mich. 48183

Filed Mar. 7, 1977, Ser. No. 775,058
Int. Cl.² B63B *17/00*
U.S. Cl. 9—1.1 **9 Claims**



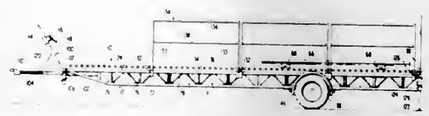
1. A boat including a hull defining longitudinal upstanding opposite sides interconnected by a bottom extending between lower marginal edges of said sides and by a bow structure at their forward ends and a transom structure at their rear ends, a pair of spaced apart midship opposite side compartments immediately inwardly of said sides and defining a center longitudinal aisle therebetween, said sides terminating upwardly in generally horizontal gunwales, said compartments projecting appreciably upwardly above said gunwales and including forward upper portions inclined forwardly and downwardly toward said gunwales, a lower walk deck extending longitudinally of said hull between said compartments and appreciably forwardly of the latter, a raised deck above and below said walk deck and gunwales, respectively, extending between said sides forwardly of said compartments and forwardly from the latter toward said bow structure, said raised deck including a rearwardly opening vertical extending recess formed therein opening into said aisle between said compartments and in vertical registry with the forward portion of said walk deck extending forwardly of said compartments, the portion of the interior of said hull disposed between said compartments and said bow and between said opposite sides defining a forward cockpit, and a cover removably secured over said cockpit including a top panel and depending opposite side panels, said top panel including front and rear marginal edges, said side panels including forwardly and downwardly inclined rear marginal edges extending downwardly from adjacent ends of said rear marginal edge of said top panel, said inclined marginal edges being anchored relative to the corresponding portions of said forwardly and downwardly inclined compartment upper portions, said side panels including lower marginal portions anchored relative to the corresponding gunwale portions forward of said compartments and the forward marginal edges of said top panel being anchored relative to said bow structure.

4,092,755

HIGHLY VERSATILE DOCK TRAILER

Gary W. Hughes, 33 Vista Dr., Little Rock, Ark. 72204

Filed Mar. 18, 1977, Ser. No. 779,109
Int. Cl.² B63C *13/00*
U.S. Cl. 9—1.2 **6 Claims**



1. An improved, combined trailer and dock unit, said unit comprising an elongated rectangular, open chassis frame, flotation members fixedly mounted within said frame opening and protected by said chassis frame, wood decking fixed to the upper surface of the chassis frame and overlying said flotation members, said chassis frame including horizontal bottom beams on each side thereof, a drop axle wheel assembly for detachably mounting to said frame, each wheel assembly comprising a pair of elongated slider bars, spring members shackled to said slider bars and depending therefrom, wheels mounted to the spring members and means for detachably mounting said slider bars to the bottom of said chassis frame side beams at longitudinally adjustable positions, demountable bunks carried by said chassis frame and projecting above said deck for guiding a boat longitudinally therebetween during loading of the boat onto said unit, at least one roller means demountably carried by said chassis frame adjacent the rear end of the unit and projecting above the deck for contact with the boat keel during movement of the boat longitudinally into overlying position with respect to the unit deck, a tow bar means, means for mounting said tow bar means to the front end of said chassis frame at the center thereof, winch means mounted to said towbar means for winching the boat over said roller means and onto said bunks, vertically adjustable anchor bars mounted to at least the rear corners of said chassis frame for vertical movement relative to said chassis frame for jacketing the rear of said trailer-dock unit above the water level to permit the unit to act as a fixed dock within the water, subsequent to unloading of a boat therefrom, means for removably mounting a winch including a winch line adjacent to each of said vertically adjustable anchor bars, and pulleys fixed to said chassis frame adjacent the vertically adjustable anchor bars; whereby, by attachment of the end of a winch line to the upper end of the vertical anchor bar and by leading said line through said pulley, operating said winch forcibly drives the vertically adjustable anchor bars vertically downward into the sea bottom to lift the rear end of said dock-trailer unit.

4,092,756

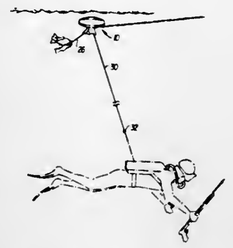
DIVER'S BUOYANT CADDY

Barry Robert Stier, P.O. Box 102, Ginowan, Okinawa, Japan

Filed Apr. 15, 1977, Ser. No. 787,987
Int. Cl.² B63B *21/52*
U.S. Cl. 9—8 R **1 Claim**

1. A buoyant vessel which is adapted to a marine diver's use as a diver attachable caddy in the suspension, transport and storage of marine equipment, game and the like comprising:

A. a flexible bladder which is fluid impermeable, said bladder being elongated in a horizontal direction and streamlined longitudinally for facile movement under the water, primarily in horizontal directions, said bladder defining a skirt at its bottom which said skirt comprises a streamlined continuation of the bladder in a downward, vertical direction, said skirt forming inner and outer apertures at vertical ends thereof and defining an inflatable facemask connection between the bladder and the sea, whereby upon application of outer aperture to the face of the diver his exhalant may inflate the bladder;



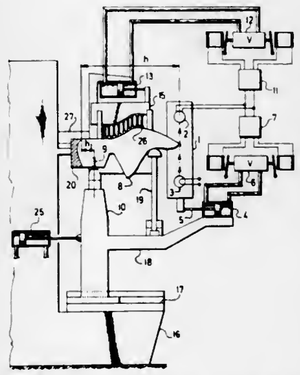
B. a flexible stringer which is secured interiorly to the skirt and shielded thereby, said stringer providing a connection for a restraint line, joining the diver to the vessel, per se.

4,092,757

APPARATUS FOR THE IDENTIFICATION OF SIZE NUMBERS OF RIGHT AND LEFT LASTS

Ludvik Dokoupil; Oldrich Hrouda, both of Gottwaldov, and Josef Zila, Otrokovice, all of Czechoslovakia, assignors to Zavody presneho strojirenstvi, narodni podnik, Gottwaldov, Czechoslovakia

Filed May 13, 1977, Ser. No. 798,562
Claims priority, application Czechoslovakia, May 13, 1976, 3183/76
Int. Cl.² A43D *3/00*
U.S. Cl. 12—127 **5 Claims**



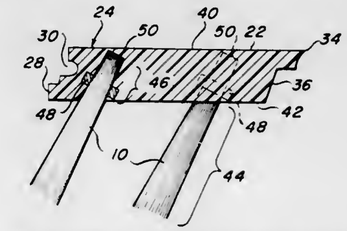
1. Apparatus for identifying the size numbers of right and left shoe lasts on a shoe making machine having a frame and shoe ironing devices, comprising a support for the heel part of a shoe last supported on the frame of the machine, the support having means cooperating with the heel part of the shoe last to locate the last with respect to the support, the heel part support having an extension, a support for the toe part of the shoe last slidingly supported on the extension for movement in a direction perpendicular to the longitudinal axis of the shoe last, a support for identification elements slidably mounted on said extension for movement in the direction of the longitudinal axis of the shoe last, a first power means for selectably sliding the support for the identification elements in reverse directions, the identification elements comprising two sets of light sources and cooperating photocells arranged side by side on the support for the identification elements and adapted to identify in the course of their movement the size number of a left or a right shoe last by the interruption of a light beam striking the photocell by the toe part of the shoe last, means to control the said first power means according to the response of one of said photocells, second power means fixedly mounted on the frame of the machine, means controlling the said second power means in response to said photocells, and form plates for adjustment of said ironing devices slidably supported on the frame of the machine for movement in reverse directions generally along the length of the shoe last, the second power means being connected with said form plates so as selectively to adjust the form plates in either direction generally longitudinally of the shoe last.

4,092,758

CAST POWER BRUSH

John P. Horton, Bernardsville, and Susan H. LeWand, Colonia, both of N.J., assignors to Newark Brush Company, Kenilworth, N.J.

Filed Aug. 14, 1975, Ser. No. 604,546
Int. Cl.² A46B *3/02, 3/16*
U.S. Cl. 15—180 **7 Claims**



1. In a rotary power driven high speed, heavy-duty municipal sweeping brush element having a working surface that is flat or disc shaped and provided with means for attaching the brush to a rotary heavy-duty source of power,

said brush element containing a multiplicity of bristles having medial bends therein formed into a plurality of tufts containing a plurality of bristles, each tuft being surrounded by a mechanical restraining means so that a bight is formed in each of the tufts above said restraining means and so that the major portion of the bristles extend below said restraining means to perform the sweeping function, and a back for said brush and a positioning means for said tufts comprising a body of a fiberglass filled and reinforced substantially inflexible high impact thermoset polyester resin having a notched izod impact strength greater than 2 foot-pounds per inch and a Shore D hardness greater than 50 cast around said tufts so that said bight is embedded in said resin with its upper end closer to the top surface of said brush back than to the bottom surface thereof and with said restraining means being closer to the bottom surface of said back than to the top surface thereof and at least substantially completely embedded in the body of said resin.

4,092,759

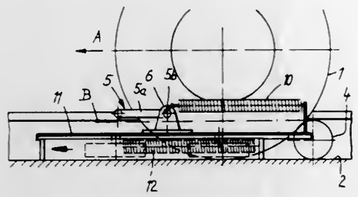
COUNTING MECHANISM FOR A MOTOR VEHICLE WASHING PLANT

Gebhard Weigele, Am Schönblick 1a, 8901 Tafertingen, Germany

Filed Jan. 26, 1977, Ser. No. 762,748
Claims priority, application Germany, Feb. 23, 1976, 7605361
Int. Cl.² B61L *1/16;* B60S *3/04*
U.S. Cl. 15—257 **5 Claims**

1. In a counting mechanism for a motor vehicle washing plant having a vehicle guiding track, comprising a vertically movable switching member adapted to be contacted by and operated by the wheels on one side of a vehicle, said switching member extending transversely with respect to the direction of movement of said vehicle and in the path of movement of said wheels on said one spacing (b) of said vehicle, a stroke counter connected to said switching member and a conveyor device for moving said vehicle through said washing plant, said conveyor device having plural spaced conveyor rollers mounted

on an endless tension member and moved in said vehicle guiding track, the path of which corresponds to said path of movement of said wheels on said one side of said vehicle, the improvement comprising wherein said switching member is arranged in said path of movement of said conveyor rollers, wherein the limits of vertical movability of said switching



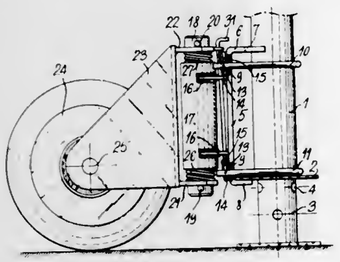
member is at least as great as a spacing between a path of movement (B) of the highest point of each conveyor roller above the bottom of said vehicle guiding track and wherein said switching member includes a loading device for returning said switching device, after being pressed down by a vehicle wheel, into an initial ready position above the conveyor roller.

4,092,760

TRAVELLING SUPPORT FOR SCAFFOLDING

Henri Loewe, Paris, France, assignor to Societe Francaise des Echafaudages Self-Lock, Aulnay-sous-Bois, France

Filed Sep. 1, 1976, Ser. No. 719,370
Claims priority, application France, Sep. 12, 1975, 75 28073
Int. Cl.[2] B60B *33/02*
U.S. Cl. 16—35 R **7 Claims**



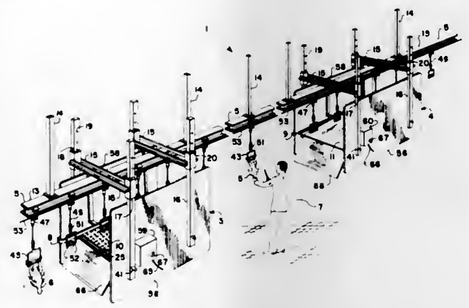
1. Travelling support for a scaffolding upright, said support comprising:
- a holder;
- means for releasably locking said holder in a multi-directionable way on the scaffolding upright;
- a shaft fixedly mounted on said holder;
- a spindle placed in said shaft; and
- a fork for supporting a wheel hingedly mounted on said spindle, the means for releasably locking the holder on the upright of the scaffolding comprising at least one wedge shaped key-bolt bearing against said holder and one U-shaped belt having ends passing through the bottom portion of said holder and cooperating therewith to form a stop for said wedge shaped key-bolt.

4,092,761

METHOD AND APPARATUS FOR ELECTRONICALLY RELAXING POULTRY

Garland G. McWhirter, deceased, late of Kansas City, Mo. (by Nell J. McWhirter, surviving spouse), assignor to Jerry McWhirter, Kansas City, Mo.

Continuation of Ser. No. 429,867, Jan. 2, 1974, abandoned. This application Jan. 2, 1991, Ser. No. 646,357
The portion of the term of this patent subsequent to Dec. 31, 1976, has been disclaimed.
Int. Cl.[2] A22B *3/00*
U.S. Cl. 17—1 E **11 Claims**



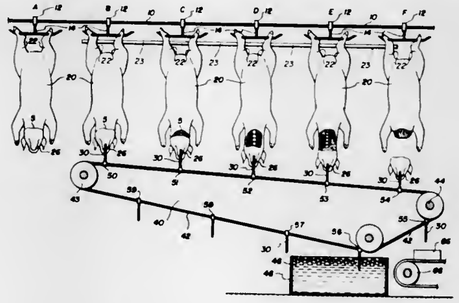
1. Apparatus for electrically shocking poultry in a poultry processing operation, said apparatus comprising:
(a) a poultry conveyor having a plurality of poultry supporting shackles spaced therealong and movable in a defined path, said shackles engaging legs of poultry to support same head down;
(b) a first shocking device positioned in said path along said conveyor, said first shocking device having upper and lower electrodes positioned in said path for electrical engagement with portions of said poultry as same moves thereby, said engagement being an electrical circuit making contact, said lower electrode being a laterally extending member having an inclined upper surface and an upper edge portion and a lower edge portion
(c) means on said lower electrode defining a channel extending between the upper edge portion and the lower edge portion thereof;
(d) means on said lower electrode and means extending along the upper edge portion of said lower electrode and operatively connected to a source of conductive liquid to provide a flow of liquid between the upper edge portion and the lower edge portion and having a substantially uniform depth across the channel;
(e) means including portions defining a liquid collecting channel extending along the lower edge portion of said lower electrode for collecting used liquid and poultry waste across the width of the channel for disposal of the liquid and waste;
(f) a jugulating area positioned in said path along said conveyor and spaced from said upper edge portion of said lower electrode;
(g) a second shocking device positioned in said path along said conveyor and having said jugulating area between said first and second shocking devices, said second shocking device having upper and lower electrodes positioned in said path for engagement with portions of said poultry as same moves thereby, said engagement being an electrical circuit making contact; and
(h) means electrically connected to said upper and lower electrodes of said first and second shocking devices for applying a first electrical potential difference to said upper and lower electrodes of said first shocking device and a second electrical potential difference to said upper and lower electrodes of said second shocking device whereby poultry moving along said path complete an electrical circuit between the electrodes in each of said first and second shocking devices and the poultry is shocked a first time in said first shocking device before moving into the jugulating area to stun and maintain the poultry in a stunned condition and the poultry is shocked a second time in said second shocking device with a lesser electrical potential difference after jugulation is performed on the poultry, said second shock being of a voltage to facilitate bleeding of the poultry.

4,092,762

HOG HEAD REMOVAL METHOD

Edward Ochylski, 9155 S. Pleasant, Chicago, Ill. 60620

Division of Ser. No. 477,781, Jun. 10, 1974, Pat. No. 3,990,126.
This application Apr. 12, 1976, Ser. No. 675,704
Int. Cl.[2] A22B *3/00*
U.S. Cl. 17—45 **11 Claims**



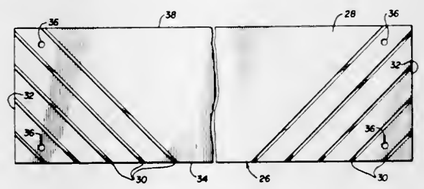
1. A method of removing a head from a hog carcass which has been stuck which method comprises:
- suspending said carcass in the head-down position;
- marking the skin of the carcass around the neck;
- engaging a hook in the stick wound or in the jaw of said carcass;
- thereafter applying a substantially longitudinal force to said carcass through said hook, wherein said longitudinal force is offset from vertical, whereby the carcass is positioned in a "bellydown" attitude while the force is applied, and whereby the head is rotated upwardly about a horizontal axis; and
- continuing said force until the atlas joint is disengaged and said head is substantially removed from said carcass.

4,092,763

AIR GUIDE PLATE

Thomas C. Poore, Mauldin, S.C., assignor to J.P. Stevens & Co., Inc., New York, N.Y.

Continuation of Ser. No. 728,655, Oct. 1, 1976, abandoned. This application Jul. 12, 1977, Ser. No. 814,824
Int. Cl.[2] D01G *15/34, 15/74*
U.S. Cl. 19—98 **15 Claims**



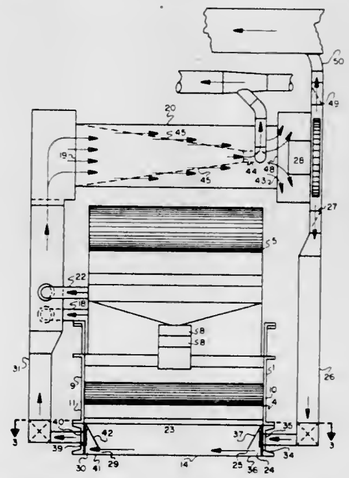
1. A card machine air guide plate comprising a surface having a plurality of grooves substantially adjacent a pair of opposed lateral edges of said plate, each of said grooves forming an angle relative to said lateral edges for directing air flow across said surface from each of said opposed lateral edges towards the portion of said surface between said opposed lateral edges.

4,092,764

CLEANING OF TEXTILE CARDING MACHINES INCLUDING AN AIR RECIRCULATING SYSTEM

Arthur E. Thomas, and E. Alan Pace, both of Winston-Salem, N.C., assignors to Envirotech Corporation, Menlo Park, Calif.

Filed Dec. 3, 1976, Ser. No. 747,138
Int. Cl.[2] D01G *15/76*
U.S. Cl. 19—107 **23 Claims**



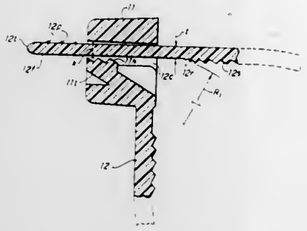
1. An apparatus for removing waste and trash from a carding machine including a supporting chassis set upon a carding room floor, the chassis having side walls which are parallel to the flow of fiber through the machine and end walls to define an enclosed bottom region in the machine beneath the carding components, comprising:
a. a first means attached to the machine to provide a flow of cleared air under positive pressure into the bottom region;
b. a pressure plenum mounted to the machine, said pressure plenum connected in communication with said first means to receive the flow of air under positive pressure and having an emitting orifice to emit the pressurized air into the bottom region;
c. a second means mounted to the machine to draw under negative pressure a flow of air entraining waste and trash from the bottom region;
d. a suction plenum connected to said second means, mounted to the machine and having a receiving orifice formed spaced from and opposite the emitting orifice through which is drawn a flow from the emitting orifice after the flow has crossed the floor and entrained waste and trash;
e. a waste concentrating means mounted to receive a flow from said suction plenum and separate this flow between a large volumetric flow of air clear of entrained waste and trash and a small volumetric flow of air in which the waste and trash is concentrated; and
f. a recirculating means delivering a part of the large portion of air to said first means so that this air is recirculated as a component of the flow provided by said first means.

4,092,765

MINIATURIZED HARNESSING DEVICE

Arthur W. Joyce, Framingham, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of Ser. No. 657,513, Feb. 12, 1976, abandoned. This application Aug. 25, 1977, Ser. No. 827,760
Int. Cl.² B65D *63/10*
U.S. Cl. 24—16 PB **4 Claims**



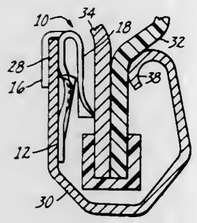
1. A harnessing device comprising
a head having a guide channel therein,
a locking tang within said head,
and a strap having a plurality of members for sequentially engaging said locking tang when said strap is inserted into said channel,
the end of said strap having a serrated ramp in an outer surface extending from one of said members over an interval of curvature greater than the distance between said members, said ramp extending towards said head on said strap from an end thereof having a thickness substantially equal to the unobstructed height of the channel in said head.

4,092,766

RETAINER CLIPS

Engelbert A. Meyer, Union Lake, Mich., assignor to USM Corporation, Farmington, Conn.

Continuation of Ser. No. 492,680, Jul. 29, 1974, abandoned. This application Jul. 17, 1975, Ser. No. 596,815
Int. Cl.² A44B *21/00*
U.S. Cl. 24—73 MF **6 Claims**



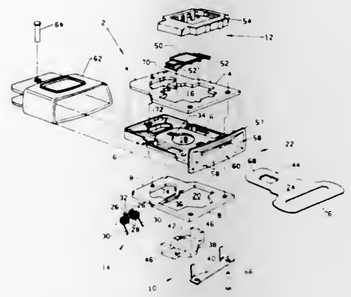
1. A sheet metal clip adapted for assembly on one flange of a U-shaped channel member for securing the margin of one or more workpieces in the space between the flanges of the channel member, the clip comprising:
an elongated body portion having along its upper edge a bight,
from which there downwardly extends on one side a transversely resilient suspension tab,
and downwardly on the opposite side there extends at least a pair of spaced resilient legs angularly related to the body portion and extending outwardly therefrom when unconfined,
a pair of prongs, located one on each side of said tab and projecting from said body portion toward said tab to define a space between said tab and said prongs for receiving the one flange of the channel in gripping engagement therebetween,
each of said legs being biased toward the opposite flange of said channel from said one flange when said clip is mounted on said channel, and extending from said body portion toward the opposite flange to define a space therebetween for receiving the one or more workpieces in gripping engagement therebetween,
and a prong disposed on each of said legs directed inwardly of said channel to retain the one or more workpieces in the so defined space in the channel.

4,092,767

LAMINATED BUCKLE WITH NO FALSE LATCH

Surendra D. Narayan, Warren, Mich., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Mar. 1, 1976, Ser. No. 662,990
Int. Cl.² A44B *11/26*
U.S. Cl. 24—230 AL **8 Claims**



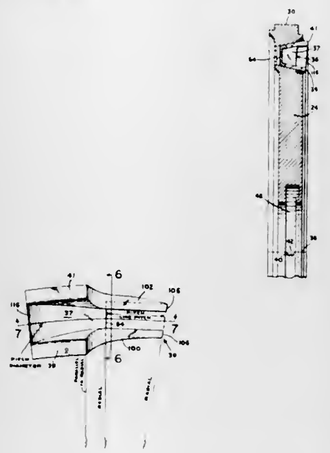
1. A buckle comprising:
a plurality of plates secured together, each of said plates having a cavity in the central portion thereof, said cavities being in substantial alignment with one another; at least one of said plates including guide means extending from an exterior forward end of said plate to its cavity for guiding a tongue into the buckle;
movable latch means for engaging the tongue, a portion of said latch means extending in and movable within said cavity of at least one of said plates;
manually operable actuation means for actuating said latch means, a portion of said actuation means extending in and movable in said cavity of at least one of said plates; and
a unitary biasing means disposed in said buckle near the fully inserted position of said tongue for moving said latch means into engagement with said tongue when said tongue is substantially fully inserted into said buckle and for ejecting said tongue upon movement of said latch means by said actuation means, said buckle offering low resistace to the insertion of said tongue until said tongue nears its fully inserted position in said buckle, said biasing means having a tongue engaging portion, an energy storage portion and a latch engaging portion; said tongue engaging portion, upon movement by said tongue, causing storage of energy in said energy storage portion, said energy storage portion, upon storage of a sufficient amount of energy, moving said latch means to engage said tongue in said buckle;
said tongue engaging portion comprising at least one upper arm extending through an opening in a second plate; said energy storage portion comprising at least one torsion spring attached to a third plate, said latch engaging portion comprising at least one lower arm, said lower arm extending under said latch means; said tongue, upon nearing its fully inserted position in said buckle, pushing said upper arm in a first direction substantially parallel to movement of said tongue as said tongue enters said buckle, said movement of said upper arm in said first direction developing tension in said torsion spring, said spring raising said lower arm and said latch means when sufficient tension develops in said spring.

4,092,768

METHOD FOR MAKING A DIAPHRAGM WITH CAST NOZZLE BLOCKS

William W. Browning, and Donald J. Legacy, both of Wellsville, N.Y., assignors to Turbodyne Corporation (Steam Turbine Division), Wellsville, N.Y.

Division of Ser. No. 631,891, Nov. 14, 1975, Pat. No. 4,025,229. This application May 19, 1976, Ser. No. 687,923
Int. Cl.² B23P *15/04*
U.S. Cl. 29—156.8 R **5 Claims**



1. A method for making a turbine diaphragm assembly wherein the cylindrical plate portion of the diaphragm assembly becomes the fixture for making the same which comprises the steps of:
a. forming and shaping in the front face of the cylindrical plate of the diaphragm assembly an arcuate generally V-shaped nozzle block mounting groove so that the respective inner and outer side surfaces of the arcuate nozzle block mounting groove have a predetermined slope relative the longitudinal axis of the cylindrical plate,
b. investement casting a plurality of substantially identically shaped and sized integral mounting blocks each having a nozzle blade of predetermined profile extending between an inner shroud segment and an outer shroud segment respectively formed to interfit with the inner shroud segment and outer shroud segment of any other of the nozzle blocks, and each of said nozzle blocks having an inner and outer surface which slopes in corresponding degree to the slope of the side surfaces of the arcuate nozzle blade mounting grooves,
c. disposing an arcuate array of said nozzle blocks in said groove in interfitted side by side relationship so that in assembled position the respective exit edges of the nozzle blades are substantially radially disposed relative to the longitudinal axis of the cylindrical plate,
d. bonding said inner surface and outer surface of the respective inner shroud segment and outer shroud segment of each of said nozzle blocks to the mating and matching slope of the respective inner and outer side surfaces of said nozzle block mounting groove,
e. removing material from the back face of said cylindrical plate in alignment with said nozzle block mounting groove to open a plurality of fluid flow passages through said cylindrical plate as defined by the nozzle blades on adjacent nozzle blocks,
f. electron beam welding the entrance end of said nozzle blocks to the front face of the cylindrical plate, and
g. finish machining the cylindrical plate and nozzle blocks to provide the completed diaphragm assembly.

4,092,769

FIBER BUNDLE ENCAPSULATING APPARATUS

Thomas David Dickson, Jr., San Jose, and Jeremy Corwin Wright, Palo Alto, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed Apr. 14, 1976, Ser. No. 676,752
Int. Cl.² B23P *19/04*
U.S. Cl. 29—234 **4 Claims**

1. An apparatus for encapsulating a bundle of fibers aligned generally parallel to each other axially within an elastomeric tube having an unexpanded diameter smaller than the normal diameter of the bundle comprising in combination:
(a) a casing defining a tubular inner channel of diameter at least about equal to the normal diameter of the bundle, said casing being openable to expose said channel so that the elastomeric tube may be placed therein;
(b) a nipple at each end of the channel onto which the respective ends of the elastomeric tube are adapted to be sealingly placed;
(c) reversible pressurizing means connected to the bore of one of the nipples for generating sufficient pressure within the tube to temporarily expand the segment of the elastomeric tube between the nipples radially outwardly against the inner surface of the casing that defines the channel;
(d) means for drawing the bundle of fibers through one of the nipples into the radially expanded tube while maintaining said pressure;
(e) a removable tubular member adapted to receive and hold the bundle before the latter is drawn into the tube;
(f) means for sealing one end of the tubular member against the exterior end of said one of the nipples with the bores of the tubular member and said one of the nipples aligned and open to each other; and
(g) means for sealing by closing the other end of the tubular member.

4,092,770

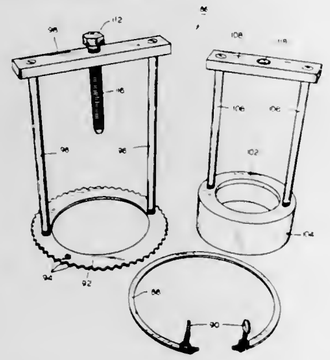
CLUTCH ASSEMBLY-DISASSEMBLY TOOL

Gerald L. Polashak, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Jun. 29, 1977, Ser. No. 811,332
Int. Cl.² B23P *19/04*
U.S. Cl. 29—263 **7 Claims**

1. A clutch assembly-disassembly tool in combination with a fluid-actuated type clutch having an internally splined drum affixed to a first rotatable transmission member, an externally splined hub affixed to a second rotatable transmission member, and a plurality of interleaved friction plates splined alternately to said hub and drum wherein said friction plates are confined

between an annular end plate located via a retainer ring in a retainer ring groove in the splined inner peripheral surface of said drum and a fluid pressure actuated piston which serves to press said friction plates together thereby connecting said hub and drum for conjoint rotation, said piston being biased in a direction away from said friction plates via a piston return spring confined between said piston and an annular spring retainer cup secured against axial movement via a snap ring located in a peripheral snap ring groove of said first rotatable transmission member, wherein said assembly-disassembly tool is utilized for compressing said piston return spring to permit the ready insertion or removal of said snap ring during the absence of said end plate and friction plates, said assembly-disassembly tool comprising:



a. an outer annular member being adapted to fit within said internally splined drum;
b. an externally expanding split retainer ring adapted to fit into said retainer ring groove and function to restrain said outer annular member against axial movement out of said drum;
c. an inner annular member fitting within said outer annular member and seating on said annular spring retainer cup; and
d. means for displacing said inner annular member axially inwardly within said drum, relative to said outer annular member, thereby compressing and axially displacing said spring so as to permit ready removal or insertion of said snap ring relative to said snap ring groove.

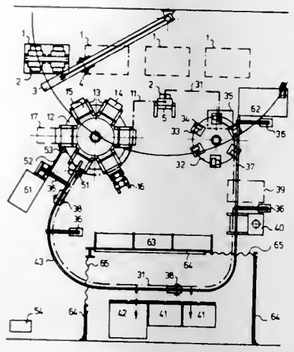
4,092,771

PROCESS AND APPARATUS FOR RENEWING SLIDING GATE VALVE UNITS FOR CASTING LADLES

Bernhard Tinnes, Zollikerberg, and Franz Ruckstuhl, Schwerzenbach, both of Switzerland, assignors to Metacon AG, Zurich, Switzerland

Continuation-in-part of Ser. No. 580,516, May 23, 1975, abandoned. This application Feb. 24, 1977, Ser. No. 771,692
Claims priority, application Switzerland, Mar. 27, 1974, 7215/74
Int. Cl.[2] B23P *7/00, 19/04, 25/00*
U.S. Cl. 29—401 F **8 Claims**

7. A method for renewing sliding gate valve units for casting ladles, comprising:
disassembling each unit into its slide housing, slide part and clamping lid;
shunting the slide housings and slide parts into two separate loops of work stations which rejoin at a final assembly station;
in the first of loops, clearing out worn-out refractory elements from the slide parts, setting new refractory elements in mortar in the slide parts, baking the slide parts to set the mortar and transferring the renewed slide parts to the final assembly station;
in the second of the loops, clearing out worn-out refractory bed stones from the slide housings, setting new refractory bed stones in mortar, heating the slide housings to set the mortar and transferring the renewed slide housings to the final assembly station; and



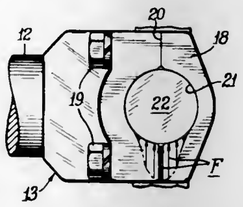
reassembling the renewed slide parts and slide housings at the final assembly station, clamping these parts together with the clamping lids and tightening the lids to a predetermined degree.

4,092,772

METHOD FOR MAKING A UNIVERSAL JOINT

Rodger L. Moring, Yorkville, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 462,379, Apr. 19, 1974, Pat. No. 3,958,431. This application Dec. 30, 1975, Ser. No. 645,149
Int. Cl.[2] B23P *19/00*
U.S. Cl. 29—434 **3 Claims**



1. A method for making a universal joint comprising the steps of
attaching an end cap to each support arm of a pair of yoke assemblies, at abutting bearing surfaces thereof,
machining and forming a cylindrical bore between each said end cap and support arm so that said bore intersects said bearing surfaces,
detaching a said end cap from each said support arm,
mounting a cylindrical bearing race on each journal of a journal cross,
closely fitting said cylindrical bearing race within each bore to maintain intimate bearing contact therebetween and
reattaching a said end cap to each support arm to retain a respective bearing race and journal thereon.

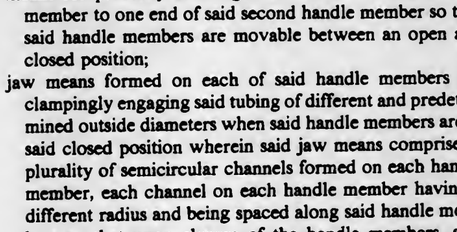
4,092,773

METHOD FOR FORMING A CLEVIS

Carroll F. Donahue, 1924 Russell, Dearborn, Mich. 48128

Division of Ser. No. 611,128, Sep. 8, 1975, Pat. No. 4,025,208. This application Jan. 3, 1977, Ser. No. 756,013
Int. Cl.[2] B21D *39/00;* **B23P** *11/00*
U.S. Cl. 29—512 **2 Claims**

1. A method of forming a clevis comprising a U-member and a shank with ends proximal and distal to said U-member, said shank having an annular shoulder spaced from its proximal end, said method comprising the steps of:
(a) forming a hole in a metal bar;
(b) inserting said proximal end of said shank through said hole so that said shoulder abuts against one side of the metal bar;



(c) rolling said proximal end outwardly to form a flange pressing against the surface of said bar whereby a portion of said bar is sandwiched between said shoulder and said flange; and
(d) thereafter forming said bar into said U-member.

4,092,774

PLASTIC TUBE CUTTER

Homer Watts, 8725 Continental, Warren, Mich. 48089

Filed Jan. 21, 1977, Ser. No. 761,223
Int. Cl.[2] B23D *21/06;* **B26B** *27/00;* **B26D** *3/16*
U.S. Cl. 30—92 **5 Claims**

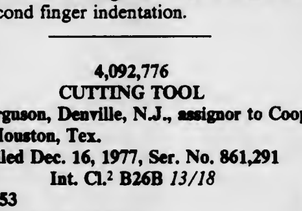
1. A device for cutting cylindrical plastic tubing comprising:
a first elongated handle member;
a second elongated handle member;
means for pivotally securing one end of said first handle member to one end of said second handle member so that said handle members are movable between an open and closed position;
jaw means formed on each of said handle members for clampingly engaging said tubing of different and predetermined outside diameters when said handle members are in said closed position wherein said jaw means comprises a plurality of semicircular channels formed on each handle member, each channel on each handle member having a different radius and being spaced along said handle members so that upon closure of the handle members, said channels of a like radius on opposite handle members register with and face each other so that with tubing positioned between channels having a radius equal to one half the diameter of the last mentioned tubing said last mentioned channels clampingly engage and support substantially the entire outer periphery of said tubing when said handle members are in said closed position; and
a cutting blade pivotally secured to said first handle member and adapted to move from an outer pivotal position, across said jaw means generally perpendicular to longitudinal axis of said channels and to an inner pivotal position to thereby cut said tubing.

4,092,775

MANUAL WINDOW SHADE ROLLER CUT OFF KNIFE

Paul J. Erpenbeck, Grand Rapids, Mich., assignor to Breneman, Inc., Cincinnati, Ohio

Filed Mar. 1, 1976, Ser. No. 662,341
Int. Cl.[2] B23D *21/06;* **B26B** *27/00;* **B26D** *3/16*
U.S. Cl. 30—95 **6 Claims**



1. A manual shade cutter including:
an elongated cutting member having a first extremity and a second extremity, said second extremity including a first finger indentation having a concave surface adapted to be engaged by a finger, said cutting member adapted for cutting a shade;
an elongated supporting member having a bed shaped to support a rolled shade during cutting by said cutting member, said supporting member also having a first extremity and a second extremity, said second extremity including a second finger indentation having a concave surface adapted to be engaged by a finger;
a pivot means rotationally coupling said first extremity of said cutting member to said first extremity of said supporting member;
a blade coupled to said cutting member and having a cutting edge generally aligned with a plane through the longitudinal axis of said cutting member and facing said supporting member;
said supporting member having a slotted portion intermediate said second finger indentation and said bed through which said cutting member extends generally intermediate said first finger indentation and said blade, so that applying pressure to either of said finger indentations causes rotation of both said supporting member and said cutting member about a shade supported on said bed; and
resilient biasing means coupled between said cutting member and said supporting member for urging such members toward one another so that said rotation of said cutting and supporting members about The shade results in a cutting action about the periphery of the shade due to the urging by said biasing means of said blade against the shade and less cutting action occurs when finger pressure is applied to said first finger indentation than when applied to said second finger indentation.

4,092,776

CUTTING TOOL

William C. Ferguson, Denville, N.J., assignor to Cooper Industries, Inc., Houston, Tex.

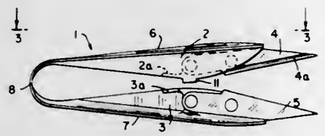
Filed Dec. 16, 1977, Ser. No. 861,291
Int. Cl.[2] B26B *13/18*
U.S. Cl. 30—253 **8 Claims**

1. A cutting tool, comprising:
(a) one-piece plastic tongs having a substantially U-shaped torsion spring portion and two integral leg portions extending therefrom and terminating in free ends, each said leg portion having a cutting blade mounting surface adjacent said free end;
(b) a pair of cooperating, flat, cutting blade members

mounted on said cutting blade mounting surfaces and having a cutting surface projecting beyond said free ends, said cutting blade members being oppositely angularly disposed along their length and width with respect to one another as to provide crossover and clearance of said cutting surfaces for a cutting operation; and

(c) disengageable stop means operable, when engaged, to limit relative movement of said legs;

(d) said tongs having a normal, fully open position in which said stop means is disengaged and said leg portions are urged by said torsion spring portion to their furthest separation, and second and third positions of lesser separation



in which said stop means is engaged and said legs are in side-by-side relationship with said mounting surfaces facing one another, the cutting surfaces being exposed for cutting in said second position and not exposed in said third position, the blade members being operable to perform said cutting operation as the legs are moved together from said second position to said third position; and

(e) said torsion spring portion being operable to apply torsion forces to said legs to urge said blade members together in cutting relationship as the cutting operation is performed and to return said tongs from said third position to said second position, said stop means, when engaged, stopping the returning legs at said second position.

4,092,777

CUTTING-OUT MACHINE FOR FLAT MATERIAL

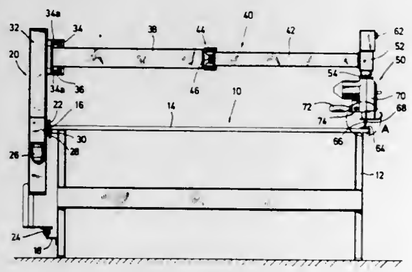
Rolf Jung, Waiblingen, Germany, assignor to Krauss u. Reichert GmbH & Co. KG Spezialmaschinenfabrik, Waiblingen, Germany

Filed Mar. 10, 1977, Ser. No. 776,355

Claims priority, application Germany, Jan. 26, 1977, 2703066; Mar. 16, 1976, 7608012[U]

Int. Cl.² B26B *7/00*

U.S. Cl. 30—273 **9 Claims**



1. A cutting-out machine for flat material, especially a cloth cutting machine, comprising in combination:

a support means for the flat material;

guide means mounted lengthwise of that support means;

a beam positioned above that support means and pivotable around a vertical axis being mounted on a carriage which is movable along the guide means lengthwise of that support means, that beam having at least two arms which are interconnected by a joint having a vertical joint axis, a first one of that arms being pivotable around the vertical beam axis and a second one of that arms having a free end opposite to its end interconnected with that first arm;

a cutting mechanism mounted at the free end of that second arm and being pivotable around a vertical axis being substantially coincident with a cutting edge of a cutter element of that cutting mechanism;

the length of that first and second arms being such that the entire length of that completely extended beam is substantially equal to the width of that support means in a direction perpendicular with respect to that guide means.

4,092,778

DENTAL APPLIANCE FOR INTRODUCING A FILLER MATERIAL INTO A TOOTH CAVITY

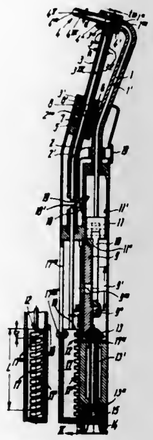
Rudiger Hirdes, Tippelsberger Str. 42, D - 4630 Bachum, Germany

Division of Ser. No. 535,312, Dec. 23, 1974, Pat. No. 3,990,152. This application Apr. 19, 1976, Ser. No. 677,886

Claims priority, application Germany, Dec. 24, 1973, 2364547

Int. Cl.² A61C *3/10*

U.S. Cl. 32—60 **7 Claims**



1. A dental appliance for introducing a filler material into a tooth cavity, comprising a support; a discharge nipple on said support and having an elongated interior channel formed with an inlet and an outlet; first means forming a first passage having an open end; second means forming a second passage which communicates with said inlet; a replaceable magazine on said support and having an elongated chamber for a quantity of said filler material, said chamber communicating with said open end and with said channel in direction transverse to the elongation of the channel; a first expelling element reciprocable in said first passage and chamber for expelling a portion of said filler material and charging it into said channel; a second expelling element reciprocable in said second passage and channel for expelling said portion through said outlet; and a single mechanical drive means for effecting coordinated reciprocation of both of said expelling elements, said drive means including a crank drive having a crank connected to said second expelling element by a crank rod and a cross-head to thereby reciprocate said second expelling element, and a rack drive having a rack connected to said first expelling element and driven by said crank to thereby reciprocate said first expelling element coordinately with said second expelling element, said crank being configurated as a bevel gear projecting beyond the path of travel of a pin on said crank rod and meshing with a bevel pinion which has a shaft aligned with the axis of said cross-head and said second expelling element, said shaft having a trailing end portion provided with a socket coupling and with a slip-clutch which is interposed between said coupling and said bevel pinion.

4,092,779

DEVICE FOR DETERMINING ANGLE RELATIONSHIPS OF OR BETWEEN PLANES

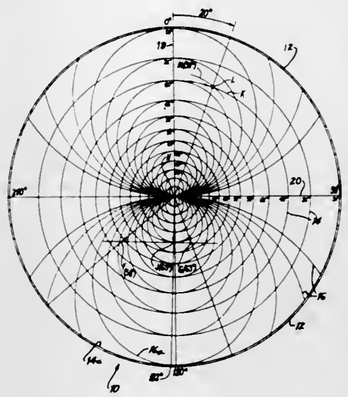
Bozidar M Stokic, 1/12 Woodstock Street, St. Kilda, Australia (3182)

Filed Jan. 25, 1977, Ser. No. 762,291

Claims priority, application Australia, Jan. 30, 1976, PC4676

Int. Cl.² G01C *21/20*

U.S. Cl. 33—1 SD **7 Claims**



1. A device for determining angle relationships between planes, such as in geological structures, comprising:

a disc member having two opposed planar surfaces;

a family of concentric circles on one of said planar surfaces each of said circles indicating an angle from at least part of the range from 0° to 90° which is the complement of the half angle of one of a family of notional right circular cones of equal height, each of said circles being the base of the cone of which the angle it indicates is the complement of the half angle;

a family of curved lines on one of said planar surfaces, each of the curved lines of said family passing through a common point coincident with the common center of said family of concentric circles and each of said curved lines being a portion of a circle each of which has its center on one common line extending radially from the common point;

each of said curved lines indicating an angle from at least part of the range from 0° to 90° which is the complement of the half angle of one of a family of notional right circular cones of equal height, each cone having a base with a radius equal to the diameter of the curved line which indicates the complement of the half angle for that cone;

a base member on which said disc member is rotatably mounted, said base member having thereon a horizontal bearing degree scale;

a ruler member extending across said disc member having a ruler edge thereon; and

means for mounting said ruler member on said base member, said mounting means including means for rotating said ruler member with respect to said planar surfaces of said disc member and said base member and said mounting means including means for lateral movement of said ruler member with respect to said planar surfaces of said disc member and said base member.

4,092,780

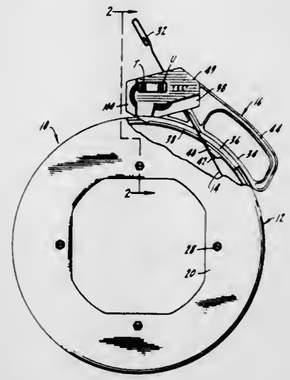
ELECTRICIAN'S FISH TAPE

Thomas E. Trethewey, and Peter M. Wells, Jr., both of Sycamore, Ill., assignors to Ideal Industries, Inc., Sycamore, Ill.

Continuation of Ser. No. 648,149, Jan. 12, 1976, abandoned, which is a continuation-in-part of Ser. No. 603,324, Aug. 11, 1975, abandoned. This application Jun. 13, 1977, Ser. No. 805,898

Int. Cl.² G01B *3/10*

U.S. Cl. 33—139 **12 Claims**



1. For use in an electrical fish tape reel assembly in which a reel includes a generally annular tape-receiving chamber peripherally bounded by a pair of axially opposed lips adapted to separate to permit winding and unwinding of a fish tape in the chamber, the improvement comprising a tape winder adapted to be mounted between the lips so as to project outside of the reel and constructed to be moved peripherally around the reel between the lips, a tape passage through the tape winder for passage of the tape therethrough, a counter chamber in the tape winder, a handle on the tape winder, the tape passage being directed outwardly through the winder at an oblique angle to the radius of the reel and extending through the counter chamber for passage of the tape therethrough, the tape passage including an inlet passage on the inside of the winder and an outlet passage on the outside thereof spaced from each other to provide an aligned rectilinear path for a free span of tape in the counter chamber, and a counter mechanism in the counter chamber mounted on one side of the tape passage including a rotary drive wheel in fixed position in the counter chamber, the radius of the drive wheel being greater than the distance between its axis and the rectilinear path for the free span of tape to provide a positive friction drive between the tape and the drive wheel so that the counter mechanism will indicate a linear measure for the tape fed to and from the reel.

4,092,781

CHAIN ELONGATION GAUGE

Eugene H. Blake, 874 Hollister St., Space 21-B, San Diego, Calif. 92154

Filed Apr. 1, 1977, Ser. No. 783,613

Int. Cl.² G01B *5/00*

U.S. Cl. 33—143 J **9 Claims**

1. A measuring apparatus which comprises: a first tubular element;

a second tubular element slidingly nested into the first tubular element;

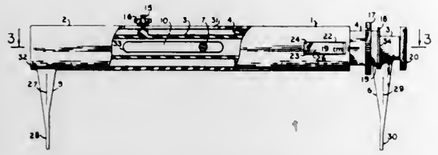
resilient means for forcing the tubular elements toward their maximum combined elongation;

means for limiting the longitudinal motion and for preventing the rotation of the second tubular element in relation to the first;

cylindrical indicator means for measuring the longitudinal

travel of the second tubular element in relation to the first comprising:

a third element slidingly inserted between the first and second tubular elements;



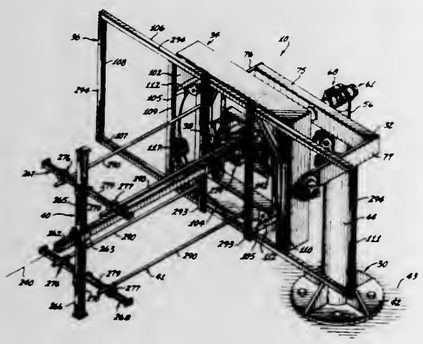
means for preventing the longitudinal motion of the third element in relation to the second tubular element; and helicoidal scale markings over the outside surface of the third tubular element cooperating with a reference point on the first tubular element, and a reference point on the first tubular element.

4,092,782

APPARATUS FOR SIMULATING INTERSECTING STRUCTURAL ELEMENTS

Charles L. Raybon, Phoenix, Ariz., assignor to Time Saver Industries, Inc., Phoenix, Ariz.

Filed Oct. 6, 1976, Ser. No. 730,030
Int. Cl.² G01B *3/00*
U.S. Cl. 33—174 N **50 Claims**



1. An apparatus for simulating the intersecting attitudes of an elongated primary member and an elongated secondary member for determining the configuration of those members at the intersection thereof, said apparatus comprising:

(a) primary member simulating means for simulating the attitude and at least a portion of the surface of the elongated primary member, said primary member simulating means including,

I. a frame of substantially open planar configuration,

II. means for supporting said planar frame in a horizontal plane, and

III. means supportingly positioned on said open planar frame for forming an arcuate surface of predetermined curvature with that arcuate surface simulating at least a portion of the surface of the elongated primary member when the primary member to be simulated is of a substantially circular cross sectional configuration,

(b) secondary member locating means mounted on said primary member simulating means for simulating the location and the attitude of the longitudinal axis of the elongated secondary member to be simulated;

(c) secondary member simulating means coupled to said secondary member locating means for simulating at least a portion of the surface of the elongated secondary member; and

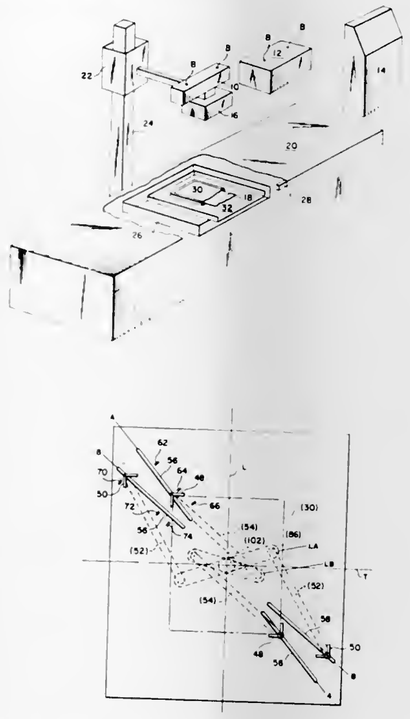
(d) pattern determining means mounted on said secondary member simulating means and in contact with the surface simulated thereby, said pattern determining means extending from said secondary member simulating means into contact with the surface simulated by said primary member simulating means for simulating the configurations of the simulated elongated primary and the simulated elongated secondary members at the intersection thereof.

4,092,783

FLAT PLANE HOLDING FIXTURE

James J. Hodges, 1127 S. 6th St., Louisville, Ky. 40203

Filed Aug. 10, 1976, Ser. No. 713,324
Int. Cl.² B25B *5/02, 5/14*
U.S. Cl. 33—180 R **6 Claims**



1. A flat plane holding fixture for objects having diametrically opposed corners comprising:

(A) a base plate including a first pair of aligned slots, defining selective orientation of the object being held upon a longitudinal axis and a second pair of similarly aligned slots defining selective orientation of the object being held upon a transverse axis;

(B) pairs of opposed clamps slideably mounted within said pairs of aligned slots, so as to abut opposed corners of said object being held;

(C) linkage pivoted at the center point intersection of longitudinal and transverse axes of said object being held and interconnecting said clamps beneath said base, so as to govern constant equidistant disposition of said clamps with respect to said center point; and

(D) an electrically energized sensing circuit having:

(i) at least one sensor adjacent a slot in each said pair;

(ii) switch means closable, as one of said clamps abuts said sensor; and

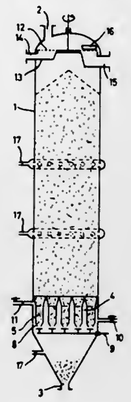
(iii) indicator means indicating closing of said switch and, thus, the size and orientation of said object.

4,092,784

PROCESS AND APPARATUS FOR DRYING AND HEATING NYLON GRANULES

Ernst Dietrich, Worms; Ernst Guenther, Ludwigshafen; Werner Hoerauf, Ludwigshafen; Ernst Kissel, Ludwigshafen; Hermann Linge, Carlsberg; Eckart Neumann, Frankenthal, and Eberhard Schaefer, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Germany

Filed Jun. 23, 1976, Ser. No. 698,855
Claims priority, application Germany, Jul. 8, 1975, 2530304
Int. Cl.² F26B *3/14*
U.S. Cl. 34—13 **10 Claims**



1. In a process for drying and heating nylon granules, in which the granules flow downwards through a vertical zone, hot inert gas, which is free from molecular oxygen, is passed in countercurrent through the granules and the granules are then cooled and intermittently discharged in part-streams, the improvement which comprises feeding the granules wetted with water, or a suspension of the granules in water, into the top of said vertical zone, initially depositing the granules as a layer in the upper part of said vertical zone where the water is separated off and discharged, then transferring the layer of granules substantially free of water into the next-lower part of said vertical zone wherein the granules are allowed to flow under gravity downwards through the zone while passing an inert gas which is free from molecular oxygen in countercurrent upwards through the granules at from 70° to 200° C, with the proviso that the inert gas, before leaving the zone, is passed through the initially deposited layer of granules, thereafter dividing the granules into part-streams in the lower part of the vertical zone over the entire cross-section of the zone, and cooling these part-streams as the granules are passed intermittently, but simultaneously, over the entire cross-section of the zone, into a common discharge zone, with the proviso that the common discharge zone is only partially filled at all times during the process.

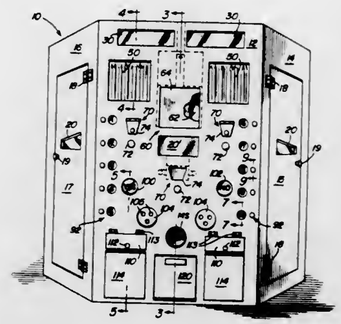
4,092,785

TEACHING AND DISPLAY APPARATUS

Edwin E. Forsman, P.O. Box 1524, Pocatello, Id. 83201

Filed Jan. 6, 1977, Ser. No. 760,134
Int. Cl.² G09B *1/02*
U.S. Cl. 35—1 **8 Claims**

1. A teaching and display apparatus comprising: first means for providing a portable support structure, second means associated with said first means for the display of various items for education and entertainment, and third means for providing associated audio messages along with the second means, the first means including a main support panel, at least one secondary support panel attachable to the main support panel by quick attach-detach means, and an access opening providing in said secondary support panel for an operator of the apparatus, the second means including at least one stage for puppet shows



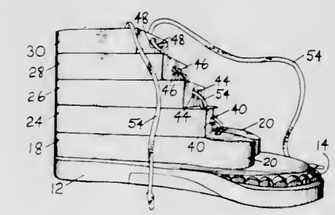
and the like, a rear view projection screen for films and the like, and at least one rotatable display panel for various objects.

4,092,786

EDUCATIONAL DEVICE

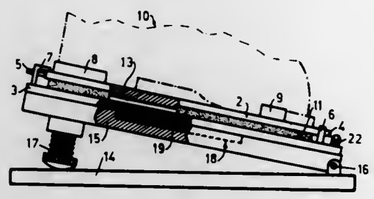
Susan Lynne Nirmaier Neese, 598 Angell St., Providence, R.I. 02906

Filed Apr. 19, 1976, Ser. No. 678,421
Int. Cl.² G09B *19/00*
U.S. Cl. 35—8 R **1 Claim**



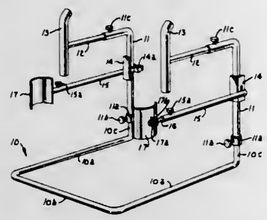
1. An educational device comprising a plurality of plates that are located one on top of the other in vertically stacked relation, the overall configuration of the stacked plates simulating a shoe, each of said plates being hingedly connected to an adjacent plate at an end thereof, wherein each of the plates is hingedly movable about a horizontal axis to selectively expose the interior surfaces of the plates as each is pivotally moved relative to the others, the bottommost of said plates defining a base and forming the sole of the simulated shoe, the forward portions of the plates above said base plate being located in stepped vertical relation to simulate the vamp of the shoe, each of the plates that define the vamp having pairs of spaced openings formed in the forward portion thereof through which a cord extends for simulating a shoestring, the plates located above the one in contact with the base plate having the openings formed in the forward edges thereof and in the uppermost face, wherein the cord is extendible therethrough for simulating the lacing of the shoestring when the plates are located in stacked relation.

4,092,787
APPARATUS FOR TEACHING THE EXECUTION OF A SKI TURN ON SKIS
Adolf Kaempfen, 3, chemin du Connetable, Cologny pres, Geneva, Switzerland
Filed May 6, 1977, Ser. No. 794,626
Claims priority, application Switzerland, May 13, 1976, 6007/76
Int. Cl.² A63B 69/18
U.S. Cl. 35—29 R 13 Claims



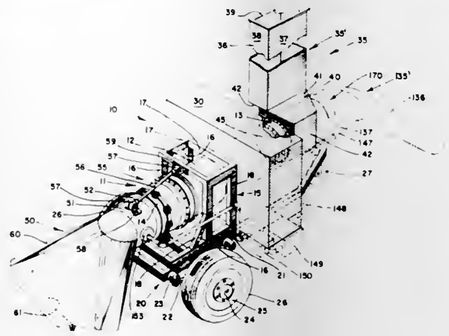
1. Apparatus for teaching the technique of turning a ski, comprising left and right plates placed side by side in parallel relation to one another, each plate including means for supporting a shoe without capability of sliding, means supporting each plate for resilient lifting and lowering movements in accordance with shift of weight on the plate and for inclination about a longitudinal axis through the plate, and means responsive to the movement of said plates for producing a signal each time that one of the plates is unweighted and occupies a raised position while the other plate is weighted and simultaneously lowered and inclined about its longitudinal axis in the direction of the first plate.

4,092,788
CARDIOPULMONARY RESUSCITATION TEACHING AID
Ellis Gowing, Topeka, Kans., assignor to St. Francis Hospital, Inc., Topeka, Kans.
Filed Jun. 23, 1977, Ser. No. 809,152
Int. Cl.² G09B 23/28
U.S. Cl. 35—17 9 Claims



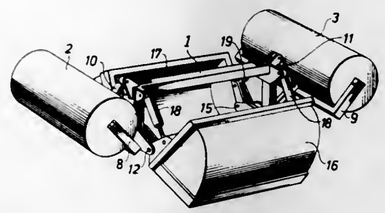
1. A cardiopulmonary resuscitation training aid comprising:
a planar base;
vertical support means connected to said base at the periphery thereof and extended upwardly therefrom;
a pair of spaced apart, shoulder contact members connected to said vertical support means and projected outwardly therefrom over the plane of said base; and
a pair of spaced apart, elbow brace members connected to said vertical support means and projected outwardly therefrom over the plane of said base intermediate said shoulder contact members and said base.

4,092,789
MOBILE DIRECTIONAL HIGH VELOCITY AIR MOVING APPARATUS
Jon Craig Arfons, 2999 Northview, Uniontown, Ohio 44685
Filed Dec. 20, 1976, Ser. No. 751,981
Int. Cl.² E01H 5/10
U.S. Cl. 37—12 17 Claims



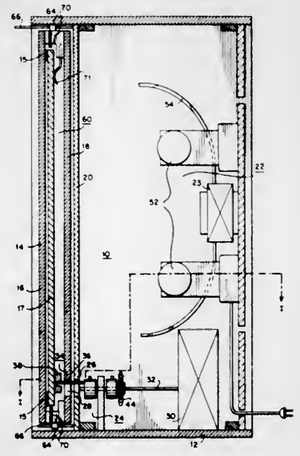
1. Apparatus for directionally controlling the movement of high velocity air in relation to a work surface comprising, mobile support frame means, jet engine means having an elongate tubular housing attached to said support frame means, air intake means at one axial extremity of said tubular housing, tail pipe means at the other axial extremity of said tubular housing, and exhaust duct means mounted proximate said tail pipe means and directing high velocity air into impingement with the work surface from a position proximate thereto, said exhaust duct means being firmly mounted proximate said tail pipe means by flexural mounts providing a limited resilient attachment protecting said tail pipe means.

4,092,790
FLOATABLE APPARATUS FOR EXCAVATING AND TRANSPORTING EXCAVATED MATERIAL
John Teodor Sonerud, Vintervagen 30, 82400 Hudiksvall, Sweden
Filed Dec. 8, 1976, Ser. No. 748,681
Claims priority, application Sweden, Dec. 9, 1975, 7513866
Int. Cl.² E02F 3/44
U.S. Cl. 37—71 8 Claims



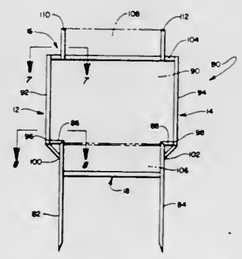
1. A floatable device for excavating and transporting excavated material, comprising:
a nonfloating frame structure;
a shovel comprising two shovel sections swingably supported directly on said frame structure for relative swinging movement toward and away from one another;
at least two buoyant bodies having a predetermined buoyancy and being movably connected to said nonfloating frame structure at opposite ends thereof;
operating means connected between said frame structure and said buoyant bodies for lowering said frame structure and said shovel as a unit relative to said buoyant bodies when an excavating operation is to be performed and for raising said unit relative to said buoyant bodies after the excavating operation has been completed and the shovel contains excavated material therein;
drive means connected between said frame structure and said shovel sections for swinging said shovel sections relative to said frame structure, said drive means and said operating means being independently operable in relation to one another, and said drive means causing swinging of said shovel sections when said unit is in said lowered position for performing an excavating operation; and
the buoyant capability of said buoyant bodies together being such that they carry the full load of the shovel and the frame structure in a stable floating condition.

4,092,791
STORED INFORMATION DISPLAY APPARATUS
Arthur A. Apissomian, 411 Westchester Ave., Mt. Vernon, N.Y. 10552
Continuation of Ser. No. 576,285, May 12, 1975, abandoned, which is a continuation of Ser. No. 392,564, Aug. 29, 1973, abandoned. This application May 3, 1976, Ser. No. 682,644
Int. Cl.² G09F 11/30, 7/00
U.S. Cl. 40—470 16 Claims



1. An intelligence display apparatus comprising:
(a) an envelope comprising a substantially transparent faceplate;
(b) illumination means for directing light toward said faceplate;
(c) an intelligence selection element disposed in said envelope and between said faceplate and said illumination means, said selection element comprising first regions substantially transparent to said light and second regions substantially opaque thereto, said first and second regions having respective widths in the ratio of about 6:7 to about 8:9;
(d) an intelligence storage element comprising a plurality of discrete and different sets of intelligence, said storage element being disposed in said envelope and between said selection element and said illumination means, said sets individually comprising a plurality of bits respectively embodying different portions of said intelligence, such that said bits of each set collectively comprises a composite of the intelligence of said set, each one of said bits being totally opaque, totally transparent, or both partially opaque and partially transparent to said light said bits of a certain said set of intelligence being substantially aligned with said first regions and the bits of the respective said sets including said certain set, of intelligence are sequentially substantially aligned with said first regions when at least one of said information selection element and said intelligence storage element is moved relative to the other, certain said sets being aligned with said said first regions at certain times and other said sets being not so aligned and another said set being so aligned at another time, said intelligence storage element and said intelligence selection element comprising a unitary structure; and
(e) means for moving at least one of said selection element and said storage element with respect to the other so that said bits of respective ones of said sets are sequentially observable through said first regions.

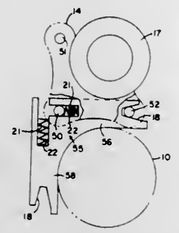
4,092,792
FRAME ASSEMBLY FOR SIGNS
Charles Vorhees, 3844 Riverside Dr., Columbus, Ohio 43220
Filed Jul. 26, 1976, Ser. No. 708,404
Int. Cl.² G09F 7/18
U.S. Cl. 40—607 2 Claims



1. A frame assembly for removably retaining a sheet material sign about peripheries thereof comprising:
first and second upright means each having one portion configured for removable insertion into supporting terrain, each having another portion disposed upwardly from said one portion formed of angle stock having elongate flanges mutually integrally associated to exhibit internally disposed surfaces defining an internal angle therebetween extending from an internal apex;
first and second mutually spaced and parallel cross-member assemblies each having termini rigidly connected with said first and second upright means, configured to retain said first and second upright means one and other portions in mutually spaced parallel relationship and retaining at least said other, upwardly disposed, portions in orientations wherein said internal angles thereof are arranged in mutually facing relationship symmetrically disposed about a plane extending in common between the said internal apexes of said spaced first and second upright means other portions, said first cross-member assembly being positioned between said first and second upright means respective other portions at or substantially near the upwardly disposed ends thereof and comprising a first bar member, the oppositely disposed ends of which are rigidly joined with corresponding mutually opposite said internally disposed surfaces at positions thereon spaced from corresponding said apexes;
said one portion being fashioned having a first tip configured for insertion within said terrain and extending along a given axis therefrom a select length to a base support portion extending normally to said axis a select distance to a second tip, said internally disposed surfaces of said base support portion being normally upwardly disposed when said first tip portion is inserted within said terrain;
said other portion associated with said one portion being coplanar with and parallel to said given axis and rigidly coupled with said one portion second tip; and
said second cross-member assembly comprising a bar member, the oppositely disposed ends of which are rigidly joined with the said one portion angle stock along the apexes of the internal angle exhibited by the internally

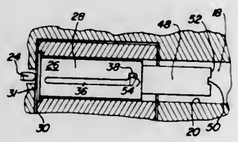
disposed surfaces thereof at respective locations spaced from said base support portion, said section cross-member bar member and that portion of each said one portion angle stock extending to a respective said base support portion providing a three-edge periheral support for at least a second said sheet material sign.

4,092,793
CLIP-ON SIGHT MOUNT
Earl C. Ricks, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Jan. 3, 1977, Ser. No. 756,318
Int. Cl.[2] F41G *1/38*
U.S. Cl. 42—1 ST **4 Claims**



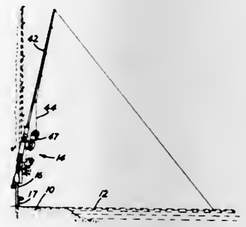
1. A clip-on sight assembly including a telescope sight, said assembly disposed for removable attachment to a barrel of a weapon comprising:
(a) a bracket for support of said telescope sight thereon, said bracket provided with a pair of normally extending portions having a pair of spaced members provided with first, second and third pins extending therebetween in substantially parallel relation, said first and second pins disposed at the distal ends of said normally extending portions, and said third pin disposed at the juncture of said normally extending portions;
(b) a support member for attachment to said barrel, said support member including a pair of portions in substantially normal relation, said first portion being horizontally disposed across said barrel and said second portion being vertically disposed on said barrel, each said portion having a v-groove along a first surface thereof to receive said first and second pins and a slot along a second surface thereof to receive said third pin, said second surface of each said portion being in adjacent relation; and,
(c) biasing means carried in each said portion of said support member for biased engagement with said third pin.

4,092,794
SAFETY DEVICE FOR GUNS
Robert D. Moren, 6411 W. Fremont Dr., Littleton, Colo. 80123
Filed Feb. 22, 1977, Ser. No. 770,838
Int. Cl.[2] F41C *27/00*
U.S. Cl. 42—1 LP **6 Claims**



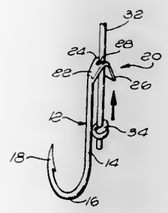
1. In a safety device for a gun having a firing pin, a barrel defining a bore, and a firing chamber for receiving ammunition in alignment with the bore of the barrel of the gun, said safety device including a generally cylindrical open ended shell element adapted to be placed in the firing chamber, a generally cylindrical slide member telescopically receivable in the shell element and resilient means for biasing the slide member outwardly of the shell element, the improvement comprising,
means operatively interconnecting the shell element and slide member for selectively allowing and preventing relative axial movement by rotating the shell element and slide member relative to each other, said interconnecting means including a generally L-shaped slot in the cylindrical wall of one of said shell element and slide member and a protrusion on the cylindrical wall of the other of said shell element and slide member with the protrusion adapted to protrude into said slot to control the relative rotative positions of the shell element and slide member.

4,092,795
FISHING POLE MOUNT AND SIGNAL
Ivan L. Bryant, 1196 N. Ross La., Medford, Oreg. 97501
Filed Jan. 3, 1977, Ser. No. 756,277
Int. Cl.[2] A01K *97/12*
U.S. Cl. 43—17 **2 Claims**



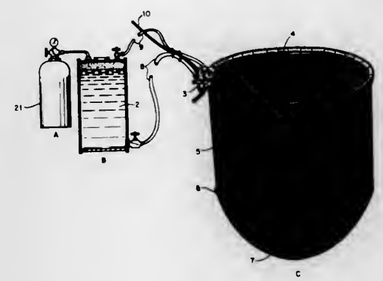
1. Fishing equipment comprising, in combination,
(a) a stake adapted to be driven firmly into the ground,
(b) a pole carrying socket pivotally mounted on the stake,
(c) yieldable spring means normally maintaining the socket in a datum position,
(d) an audible signalling device,
(e) means responsive to tilting of the socket by a tug on the line to sound the signalling device, and
(f) an alternative, silent socket mounted on the stake for holding the rod and the reeled-in line without capacity for producing an audible signal during the silent and clean removal of a fish from the line and hook re-baiting.

4,092,796
FISHING HOOK
George Adams, Box 297, Grover City, Calif. 93433
Filed Apr. 2, 1976, Ser. No. 673,209
Int. Cl.[2] A01K *91/04, 83/00*
U.S. Cl. 43—44.83 **2 Claims**



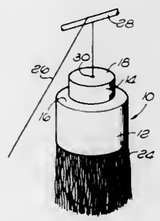
1. A fishing hook comprising:
a shank having a barbed point terminating at one end thereof and a fishing hook coupler terminating at the other end thereof, said coupler including:
a wire bent upon itself to define a leading stretch of arcuate contour and of sufficient width at its widest point so that a leader can pass therethrough, a flat inner side follower stretch interconnected at one end of said shank and at one end of said leading stretch, an outer side follower stretch connected at the other end of said leading stretch and terminating in a free end, the inner side follower stretch and said outer side follower stretch defining separate and spaced apart opposed flat adjacent surfaces, and an aperture formed in said leading stretch for enabling a leader to pass therethrough with a knot of said leader lodging in the adjacent surfaces of said inner side follower stretch and said outer side follower stretch.

4,092,797
FISH TRAPPING DEVICE
Salvador R. Azurin, Bigaa, Legaspi City, Philippines
Filed Sep. 20, 1976, Ser. No. 725,000
Int. Cl.[2] A01K *71/00*
U.S. Cl. 43—102 **3 Claims**



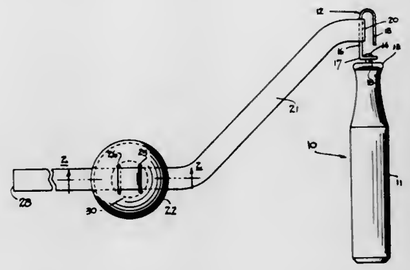
1. A fishing device comprising a fishing net having a closed bottom and an opened mouth; an inflatable flexible tube attached to the opened mouth of said net by means of a plurality of hooks and rings; a rope inserted into the plurality of rings that is adapted to close the mouth of said net as soon as a catch is made and said tube deflated; a tube coupler coupled to both ends of the inflatable tube having air and water intake and discharge ports that are adapted to inflate said inflatable tube and propel the inflated tube in order to float to the water surface and to be propelled sidewise; an air compressor attached to said coupler that is adapted to supply the necessary pressurized air to the flexing floatable tube; and a water pump attached to said coupler that is adapted to supply the necessary pressurized liquid in order to propel said floating tube in a sidewise direction.

4,092,798
BALLOON PINATA
Ramiro Oquita, 6014 Chandler Dr., San Diego, Calif. 92117
Continuation-in-part of Ser. No. 617,602, Sep. 29, 1975. This application Jan. 10, 1977, Ser. No. 758,215
Int. Cl.[2] A63H *35/00*
U.S. Cl. 46—11 **6 Claims**



1. A pinata, comprising:
a bottom wall having an extended surface;
side and top walls cooperating with said bottom wall to define a substantially enclosed chamber whereby a plurality of small items may be carried in said chamber on said bottom wall; said chamber including separable parts; and means for holding said separable parts in assembled relation including a balloon and means for suspending said pinata, said latter means being connected to said balloon whereby bursting of said balloon while the pinata is suspended causes said parts to separate thereby opening said chamber for release of the contents of said chamber.

4,092,799
TETHERED EXERCISE DEVICE
Paul R. Anderson, 23701 Surf Cove, Laguna Niguel, Calif. 92677
Filed Apr. 12, 1976, Ser. No. 675,920
Int. Cl.[2] A63H *33/18*
U.S. Cl. 46—52 **2 Claims**

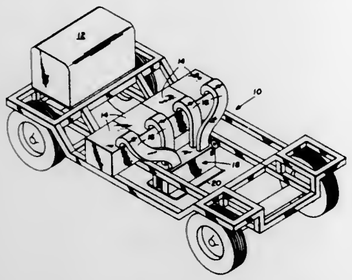


1. A tethered exercise device which comprises:
an elongate resilient strap having a closed loop end,
a ball mounted on the strap for reciprocal movement thereon, the ball being of resilient material and having a flexible wall and hollow core, the wall having a first opening in a side wall, a second and third opening in a top wall and a fourth opening substantially opposite the first opening, said openings being adapted to receive said strap therethrough,
a handle,
a pin fastened to the handle, and
a U-shaped hook having an open end leg and a second longer leg, the longer leg further having a closed end loop formed on the lower end thereof, the loop being rotatably mounted on the pin, and the closed loop end of said strap being mounted on said longer leg of the U-shaped hook.

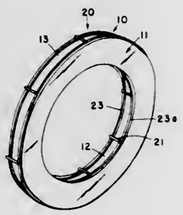
4,092,800
VEGETATION CONTROL
James Robert Wayland, Jr.; Frank S. Davis, and Morris Guy Merkle, all of College Station, Tex., assignors to Phytox Corporation, College Station, Tex.
Continuation of Ser. No. 400,139, Sep. 24, 1973, abandoned, which is a continuation of Ser. No. 225,109, Feb. 10, 1972, abandoned. This application Nov. 2, 1976, Ser. No. 737,909
Int. Cl.[2] A01G *1/00*
U.S. Cl. 47—1.3 **7 Claims**

1. A method of vegetation control, comprising the steps of:
generating an electromagnetic wave having a frequency in the range of from 300 MHz to 300 GHz for emission from an energy radiator;
subjecting an area within which vegetation is to be controlled to the electromagnetic wave emission from the energy radiator; and
reflecting the wave emission after it has passed through the area back into the area of vegetation control to achieve an energy density from approximately 150 Joules/cm^2 to

approximately 300 Joules/cm^2 sufficient to cause the death or debilitation of the vegetation without raising the temperature of the area sufficiently to cause death or debilitation solely by thermal effects.

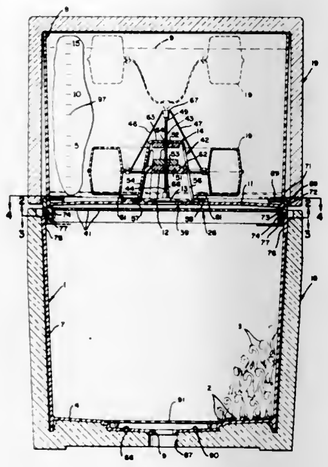


4,092,801
FRESH FLOWER SUPPORT
Leonard H. Schoenherr, and William J. Drablowski, both of Ludington, Mich., assignors to Leonard H. Schoenherr, Ludington, Mich.
Filed Mar. 16, 1977, Ser. No. 778,231
Int. Cl.^{2} A47G *7/00*
U.S. Cl. 47—41.12 **1 Claim**



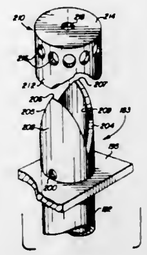
1. A holder for fresh flowers comprising a frame and a body of rigid, open-cell water permeable foam, said body being shaped to form the structural support and shape definition for a wreath, said body being of substantial thickness and having a generally rectangular cross section with front and rear surfaces and having a length substantially greater than either its width or depth; said frame having spaced first wire elements seated around and against the side faces of said body and spaced second wire elements seated against the rear face of said body and generally U-shaped third wire elements having end leg portions joined by web portions, said web portions extending across said rear surface of said body and said end leg portions extending in a rear to front direction across the side faces of said body, said first and third elements intersecting at a plurality of locations and at each intersection being welded together and said second and third elements intersecting at a plurality of locations and being welded together to form a rigid, structural frame of generally channel-like cross section and having an unobstructed front and being substantially open and unobstructed along its side faces between said first and second elements and capable of maintaining its geometric shape and integrity when supporting the foam body saturated with water and loaded with flowers; said frame forming an elongated, recessed pocket of a shape corresponding to that of the foam body and of a size to snugly receive and positively engage and clamp about said foam body and hold it against displacement or geometric reshaping resulting from extended periods of operation under fully loaded conditions with its front face in inclined to vertical position.

4,092,802
SPROUTER FOR HOME USE WITH AUTOMATIC IRRIGATOR
George Clement Oyama, 9, Shiba, Nishi-Kubo Shiroyama-cho, Minato-ku, Tokyo, Japan
Filed Feb. 7, 1977, Ser. No. 766,521
Int. Cl.^{2} A01G *31/00*
U.S. Cl. 47—16 **2 Claims**



1. An apparatus for growing sprouts comprising:
a. a first container for retaining a supply of seeds and for growing sprouts therein having a base formed with a drain opening for passing water and retaining said beans and sprouts and upstanding sidewalls for retaining said sprouts and an intermittent supply of water;
b. a second container removably mounted above said first container for retaining a supply of water having a base formed with a drain opening for discharging water into said first container;
c. a valve mounted in said second container selectively covering said discharge opening a first position and uncovering said discharge opening, in a second position;
d. valve operating means mounted in said second container operatively connected to said valve and including a float responsive to the water level in said second container for opening said valve at a pre-selected upper elevation and closing said valve at a lower pre-selected elevation;
e. water inlet regulating means for supplying water to said second container at a pre-selected rate;
f. means regulating the ingress and egress of air to and from said first container; and
g. said air regulating means includes;
1. the upper edge of said upstanding sidewalls of said first container is formed with repeating stepped lands positioned at a plurality of elevations; and
2. a ring member positioned between said first and second containers formed with mating repeating stepped lands positioned at a plurality of elevations for raising said second container above said first container at selected varying elevations depending upon selected relative rotational positions of said first container and said ring member.

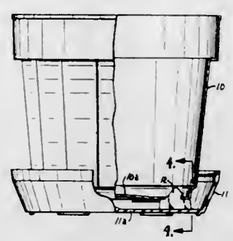
4,092,803
SELF-WATERING APPARATUS FOR PLANTS
Thomas H. Naylor, P.O. Box 370, Castle Rock, Colo. 80104
Filed Aug. 2, 1976, Ser. No. 710,436
Int. Cl.^{2} A01G *31/00*
U.S. Cl. 47—62 **18 Claims**



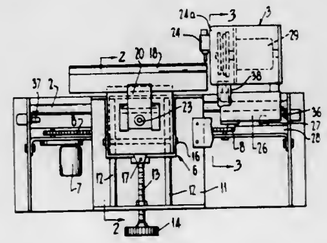
1. Watering and draining apparatus for plants, comprising, in combination:
a tank for holding a quantity of water;
tray means for holding plants;
supply conduit means extending from the tank to the tray means;
a valve in the supply conduit means for controlling the flow of water from the tank to the tray means;
means for providing a flow of water from the tank to the tray means through the supply conduit means;
return conduit means extending from the tray means to the tank for draining the water from the tray means to the tank, including
an interior upright drain conduit disposed within within the tray means,
drain aperture means in the interior upright drain conduit to provide a continual first flow of water from the tray means,
cap means, including a top and a skirt extending downwardly substantially perpendicular to the top, disposed on the interior upright drain conduit and movably adjustable thereon,
a plurality of apertures extending through the skirt of the cap means and communicating with the interior upright drain conduit to provide a selectively varied second flow of water from the tray means,
an aperture extending through the top of the cap means for admitting a flow of air into the return conduit means, and
a relieved portion on the interior upright drain conduit selectively communicating with the plurality of apertures extending through the skirt of the cap means for varying the second flow of water from the tray to the return conduit means.

4,092,804
FLOWER POT AND INTERLOCKING SAUCER
Donald A. Morris; Eddie A. Wilson, and Eric A. Little, all of Lawrence, South Korea, assignors to Packer Plastics, Inc., Lawrence, Kans.
Filed Feb. 16, 1977, Ser. No. 768,970
Int. Cl.^{2} A01G *9/02*
U.S. Cl. 47—66 **6 Claims**

1. An interlocking molded saucer for a container having a bottom with a plurality of spaced holes, each said hole having an edge substantially tangential to a radius R, said saucer comprising:
a saucer bottom portion;
a continuous side wall integrally molded to said bottom portion around the perimeter thereof; and
a plurality of fastener members integrally molded with said saucer bottom portion, each said member having a container abutting surface disposed from the center of said saucer bottom a distance substantially equal to said radius R and each said member further including an angled arm having an inclined outer end and further having a lower edge inclined from the horizontal at an angle α and an upper edge inclined from the horizontal at an angle β such that angle α is greater than angle β, said lower edge of said angled arm terminating at a point from the center of the saucer bottom equal to a radius S such that the absolute value of the difference between radius S and radius R falls in the range of 0.01 to 0.06 inches, whereby said saucer structure enables molding of said saucer by a fixed or stationary type mold;
said fastener members being aligned with said holes of the container so that said container and saucer may be pressed together in releasably interlocking fashion with a portion of each said angled arm penetrating a corresponding hole in said container.



4,092,805
APPARATUS FOR SHARPENING MICROTOME BLADES
Patrick Robert Williams, Cowes, Australia, assignor to Temtool Pty., Ltd., Australia
Filed Apr. 21, 1976, Ser. No. 678,916
Int. Cl.^{2} B24B *3/36*
U.S. Cl. 51—85 BS **2 Claims**



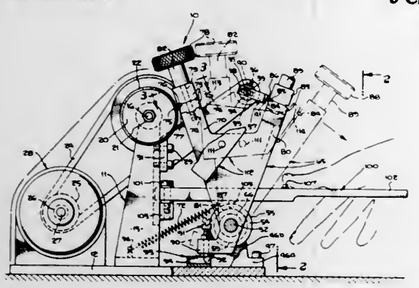
1. Apparatus for sharpening blades including a carrier for a blade, a carriage moveable in a direction spaced from the carrier, along the length thereof, the carriage carrying at least one pair of disc stops which are side by side and overlapping and which can be selectively driven at two speeds, the blade carrier having means whereby its angular position can be altered so that a blade in the carrier can be brought, selectively, into contact with one or other of the strops, wherein associated with each strop there is a wheel having a surface of a material having high frictional characteristics, the wheel interengaged to drive the strops in a contra-rotating manner, wherein each strop is associated with a motor, one of the motors being a high speed motor to enable forming of the blade and the other being a low speed motor to enable the blade to be polished.

4,092,806

KEY DUPLICATING MACHINE

Horst W. Wich, 816 Brent St., South Pasadena, Calif. 91030

Filed Nov. 17, 1976, Ser. No. 742,619
Int. Cl.[2] B24B *17/02*; B21K *13/00*
U.S. Cl. 51—100 R **3 Claims**



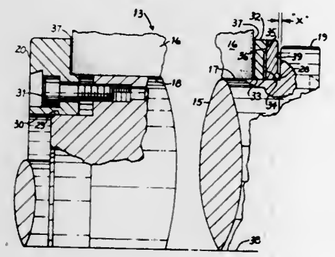
1. A key duplicating machine comprising:
a rotatable grinding wheel having a peripheral cutting edge;
a guide member having a reference edge supported at a fixed distance relative to the cutting edge of said grinding wheel;
a shaft disposed parallel to the axis of said grinding wheel;
mounting means for supporting said shaft for movement along and for rotating about the axis thereof;
a keyholder attached to said shaft, said keyholder providing for holding a key blank and an existing key having notches thereon;
biasing means for causing said existing key on said keyholder to bear against the reference edge of the guide member as the shaft is moved along its axis to thereby cause said key blank on said keyholder to be rocked about the axis of the shaft laterally into the cutting edge of the grinding wheel to remove material therefrom in accordance with the notches on the existing key;
a linear cam provided with a ramp thereon; and
projecting means on said keyholder operable upon contacting the ramp on said linear cam as said keyholder is moved along the axis of said shaft to rock said keyholder about the axis of said shaft away from the cutting edge of the grinding wheel into a normal rest position.

4,092,807

WHEEL CLAMPING DEVICE

George Luther Grove, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Dec. 10, 1976, Ser. No. 749,466
Int. Cl.[2] B24B *41/00*
U.S. Cl. 51—168 **3 Claims**



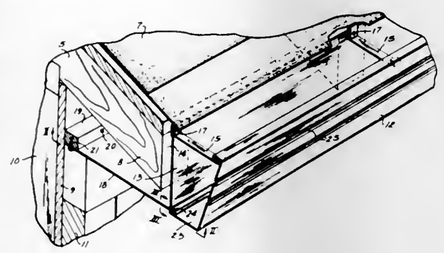
1. In a machine tool having a rotatable spindle with a spindle diameter adapted to support a cutting wheel, a spindle flange radially adjacent to the spindle diameter, and a clamping flange which is securable to the spindle so as to clamp a cutting wheel disposed between the flanges, an improved wheel clamping device comprising:
(a) a belleville-type spring disc interposed between said wheel and one of said flanges and coaxial therewith, adapted for compression to a working deflection, said spring disc thereby accommodating an interval of positive or negative spring deflection from the working deflection, yet maintaining a substantially constant working load throughout said interval;
(b) a plate adapted to be interposed between said spring disc and a side of a clamped wheel; and
(c) a face relief in said plate to accommodate spring disc movement.

4,092,808

COMBINATION EAVES TROUGH AND FASCIA WITH SOFFIT CONNECTION MEANS, AND METHOD OF MAKING SAME

John E. Maloney, Jr., Addison, and Richard F. Zaccagni, Lombard, both of Ill., assignors to ZMC, Inc., Addison, Ill.

Continuation-in-part of Ser. No. 506,359, Sep. 16, 1974, abandoned. This application Jul. 2, 1975, Ser. No. 592,388
Int. Cl.[2] E04D *13/00*
U.S. Cl. 52—11 **15 Claims**



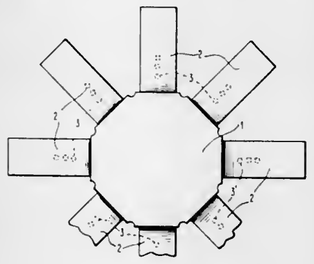
1. A combination eaves trough and fascia with soffit connection means, comprising:
an elongated, generally channel-shaped, upwardly opening gutter member roll-formed from one continuous strip of sheet metal and having a flat horizontal bottom wall and spaced apart upstanding front and back walls and adapted to be mounted directly on the ends of rafter tails of an overhanging eaves structure of a building roof;
said front and back walls having respective free upper portions and being integrally joined at their bottom portions to said bottom wall;
the vertical dimensions of said front and back walls and thereby the vertical dimensions of the gutter member being such that the upper portion of said back wall can lie adjacently under the roof drip line and the lower portion of the gutter member including the bottom wall will be located below the rafter tails whereby the gutter member will serve as combination gutter and fascia;
the upper portion of said back wall providing means for securing the gutter member to the rafter tail ends; and
an integral groove recessed reinforcing rib roll-formed directly in and integrally in one piece with the sheet metal material of the gutter member horizontally in and along the lower portion of the gutter member at the juncture between the bottom wall and one of said upstanding walls;
the groove recessed rib defining a horizontal socket groove opening toward the back of the gutter member to receive an edge of a soffit panel;
said groove recessed rib being of a reentrant socket groove formation and having a pair of vertically spaced horizontal socket groove wall flanges and a vertical spacer socket groove root wall coextensive with said horizontal flanges and defining the socket width of said groove, and stiffening junctures joining said horizontal socket groove wall flanges to said vertical spacer socket groove root wall flange and to said one upstanding wall of the gutter member, said junctures cooperating with said wall flanges in attaining reinforcing stiffness in said groove recessed rib and thereby in the lower portion of said one upstanding wall and the gutter member in general;
the lowermost of said horizontal socket groove wall flanges comprising a return bent folded face-to-face double thickness of material wherein one thickness of the fold is integral with the lower edge of said one upstanding wall and the other thickness is integral with said bottom wall;
said thicknesses of material being joined together along a simple return bend providing a thin edge integral connection facing toward the back of the gutter member;
whereby when the edge of a soffit panel is received in said groove the appearance will be afforded of the soffit panel being substantially a continuation of the bottom wall of the gutter member.

4,092,809

DOMED ROOF STRUCTURES FOR EASY ASSEMBLY AND DISMANTLING

Frederic Edward Bellas, 148 Zerbey Ave., Edwardsville, and Robert Anthony Decker, 204 Shoemaker St., Swoyersville, both of Pa. 18704

Filed Aug. 20, 1976, Ser. No. 716,143
Int. Cl.[2] E04B *1/347*
U.S. Cl. 52—63 **14 Claims**



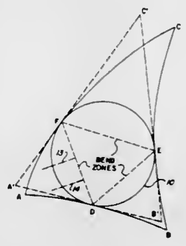
1. A domed roof structure to enclose an area, the outer periphery of said area defined by a base, comprising:
a. a dome plate having a central body and a plurality of dome tenons protruding radially therefrom, each dome tenon having a rectangular cross-section,
b. a plurality of rib sections, being generally rectangular in cross-section, each having a rib mortise on one end and a rib tenon on the other end,
c. means for coupling said dome tenons fixedly to said rib mortises comprising a series of longitudinally spaced notches defined in said dome tenons and a spring loaded coupler mounted on said rib section which comprises a locking bolt of a size accommodatingly smaller than said notches, a spring placed circumferentially around said locking bolt and a cartridge to accommodate said locking bolt and spring whereby said dome tenon is inserted into said rib mortise, said locking bolt is retracted, thereby compressing said spring, one of said notches is lined up with said locking bolt and said locking bolt is inserted into said notch to form a firm coupling,
d. a plurality of seat plates mounted on said base, each seat plate comprising an upturned top section having a seat mortise having a generally retangular cross section, lower horizontal section and a lower vertical section,
e. means for mounting said lower horizontal section of said seat plate on said base,
f. means for coupling said rib tenons to said seat mortises thereby forming a skeletal framework of the domed roof structure, comprising a series of longitudinally spaced notches defined in said rib tenon and a spring loaded coupler mounted on said seat mortise which comprises a locking bolt of a size accommodatingly smaller than said notches, a spring placed circumferentially around said locking bolt and a cartridge to accommodate said locking bolt and spring whereby said rib tenon is retracted thereby compressing said spring, one of said notches is lined up with said locking bolt and said locking bolt is inserted into said notch to form a firm coupling,
g. a cover drawn over said skeletal framework to enclose the area desired and,
h. means for anchoring said cover to said domed roof structure.

4,092,810

DOMICAL STRUCTURE

John S. Sumner, 728 N. Sawtelle, Tucson, Ariz. 85716

Filed Mar. 16, 1977, Ser. No. 778,032
Int. Cl.[2] E04B *1/32*
U.S. Cl. 52—81 **2 Claims**



1. A roof for a domical structure comprising:
a plurality of scalene triangular panels, interconnected along their peripheries to form a domically shaped roof,
each of said panels comprising three curved triangles formed in the corners of each curved triangular sector and interconnected by an interior plane triangle and bent in different directions along the interconnection of each curved triangle with the plane triangle to form a plurality of singly curved surfaces,
each of said panels positioned adjacent to the edge of an adjoining panel to form a mirror image of the other and comprising a pair,
each panel of each pair being interconnected with its mirror image of another panel of a juxtapositioned pair of said panels, and
the interconnection between adjacent panels lying substantially along arcs of great circles of the domical structure and forming the framework of the structure,
said panels overlapping to form said interconnection between adjacent panels,
said roof comprising a structure formed only from edge to edge connected planar panels, and being free of other supporting framework.

4,092,811

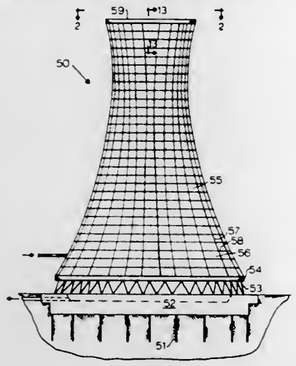
COOLING TOWER, CONSTRUCTION METHOD THEREFOR AND PRECAST PRESTRESSED CONCRETE BUILDING UNITS

Tung-Yen Lin, El Cerrito, and Yue-Chyou Yang, San Francisco, both of Calif., assignors to T. Y. Lin International, San Francisco, Calif.

Filed Feb. 14, 1977, Ser. No. 768,175
Int. Cl.[2] E04H *12/16*
U.S. Cl. 52—224 **11 Claims**

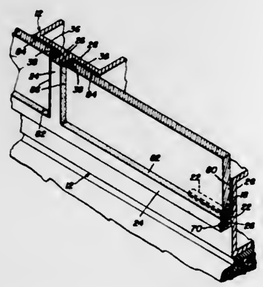
1. A cooling tower or the like, comprising:
a foundation having water collection means,
a series of angularly-extending columns secured to said foundation and leading upwardly therefrom,
a lower ring joining the upper ends of all said columns,
a ribbed, waffle-like reinforced concrete wall extending up

from said lower ring to provide a veil with a thin skin and ribs strengthening the structure and enabling the thickness of said skin to be relatively thin,
said wall including a series of post-tensioning tendons, and an upper ring at the top of said wall,
said wall being provided by:
a series of tiers of precast reinforced concrete panels, each panel having said ribs along edge portions thereof and defining a cavity where adjacent panels meet,



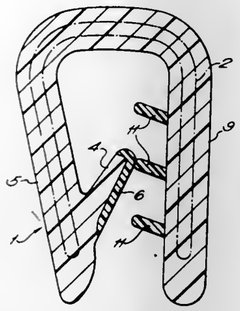
some of said post-tensioning tendons being horizontally disposed at some of said tiers of panels,
a series of upwardly-extending steel cages, one cage lying between each pair of adjacent penels of the same tier and enclosed by portions of said ribs, some of said post-tensioning tendons passing through said cages, and
poured-in-place concrete filling the remainder of said cavities and said cages.

4,092,812
SILICONE GLAZING SYSTEM
Richard F. Dashner, Wheaton, Ill., and George J. Bouchey, Millburn, N.J., assignors to General Electric Company, Waterford, N.Y.
Filed Aug. 5, 1976, Ser. No. 712,123
Int. Cl.² E04C *1/00*
U.S. Cl. 52—309.3 **16 Claims**



1. A window pane construction in which the window pane is substantially flush with the exterior wall of a building and in which there is no external abutment lip on the external surface of said window pane comprising a four-sided window frame which has supporting sides extending around said opening and perpendicular to the opening in said window frame and lip sides which are perpendicular to said supporting sides and extending from the interior from said supporting sides to the edge of the building exterior, spacer rods formed from a heat vulcanizable silicone rubber of at least 30 Durometer Hardness extending along all four of said supporting sides of said window frame and extending along all four of said lip sides, but such that said spacer rods on said lip sides do not cover all of the surfaces of said lip sides which are perpendicular to the opening in said window frame so as to leave a toe surface on said lip sides, said toe surface extending on all sides of said window frame and external-most from the interior of the building, a window pane resting on and against and supported by said spacer rods, and a layer of a room temperature vulcanizable silicone rubber sealant applied over the exposed external surfaces of said spacer rods and extending from the toe surface on said lip sides to the edge of said window pane such that when said sealant has cured, the cured sealant maintains said window pane in place in conjunction with said spacer rods.

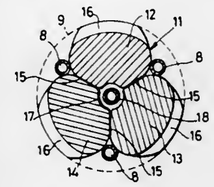
4,092,813
EDGE PROTECTOR TRIM STRIP
Frank Eggert, Hamburg, Germany, assignor to Schlegel (UK) Limited, Seacroft Leeds, England
Filed Nov. 1, 1976, Ser. No. 737,608
Int. Cl.² E04B *1/62*; E04F *15/14*
U.S. Cl. 52—397 **3 Claims**



1. A one-piece edge protector trim strip for application to an applied position on a metal flange or the like such as that found around door openings on motor vehicles, said strip having a body of generally U-shaped cross section, formed of polymeric material, and resiliently deformable gripper fins extending from the arms of said U-shaped body inwardly thereof throughout the length of said strip, wherein said gripper fins comprise a first single deformable gripper fin on one of the arms of said U-shaped body in which the major portion of said first fin is formed of a first deformable material of one hardness, and a plurality of gripper fins of a second deformable material softer than said first deformable material on the other arm of said U-shaped body whereby said plurality of gripper fins are collapsed when said trim strip is in its applied position for accommodating flanges of different thicknesses, preventing ingress of water into said trim strip, and presenting anti-sliding friction surfaces in engagement with the flange for resisting removal of said trim strip from the flange, and wherein a minor surface portion of said first gripper fin facing said plurality of gripper fins is of a third deformable material softer than said first deformable material and cooperates with said collapsed plurality of gripper fins to maximize the frictional forces resisting removal of said trim strip from the flange while minimizing the frictional forces resisting application of said trim strip on the flange.

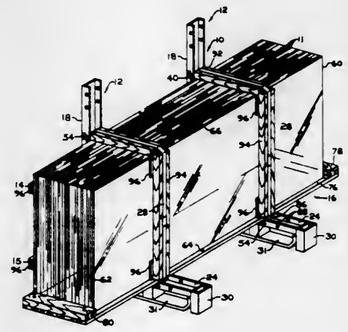
4,092,814
REINFORCING ROD
Georg Kern, Munich, Germany, assignor to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Germany
Filed Mar. 7, 1975, Ser. No. 556,465
Claims priority, application Germany, Mar. 15, 1974, 2412459
Int. Cl.² E04C *3/30*
U.S. Cl. 52—730 **2 Claims**

1. A steel reinforcing member especially suitable as a tensioning member, one end of which is embedded in a dead end type of borehole and having a continuous central passage therethrough suitable for injecting cementing material into, or for venting air from such a borehole, comprising at least two individual, continuous steel rods each having the approximate cross-sectional shape of a sector of a circle so that each rod comprises two radial flat longitudinal surfaces and a circumferential surface, said rods being assembled with the adjacent radial surfaces of the rods in contact to form the reinforcing



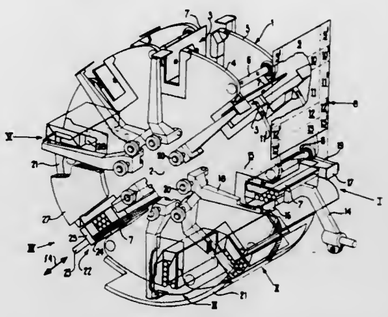
member with a cross-section which is substantially circular, the circumferential surfaces of each of said rods containing ribs thereon so constructed as to form a helical pattern on the assembled member, each of said rods having a recess extending the entire length thereof in the region where the two radial surfaces would meet to provide said continuous central passage, the outer edges of at least one pair of contacting radial surfaces of the assembled member being rounded off to form a recess in the circumferential portion of the assembled member, and a conduit tube positioned along said circumferential recess.

4,092,815
METHOD OF LOADING GLASS SHEETS ON A COLLAPSIBLE RACK FOR STORING OR SHIPPING
James R. Rowley, Freeport, and Paul D. Majesky, Upper St. Clair, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.
Division of Ser. No. 576,916, May 12, 1975, Pat. No. 4,014,435, which is a continuation-in-part of Ser. No. 493,440, Jul. 31, 1974, abandoned. This application Nov. 17, 1976, Ser. No. 742,382
Int. Cl.² B65B *13/02*
U.S. Cl. 53—3 **7 Claims**



1. A method of loading sheets on a collapsible rack, comprising the steps of:
providing a pair of rigid L-shaped supports each having (1) a vertical leg joined to a horizontal leg and (2) a rigid guideway therein positioning flexible banding in the guideway of each of the L-shaped supports;
inserting pins in the L-shaped supports to maintain the banding in the guideways;
providing a base having a pair of spaced ribs on a major surface, the ribs being sized for slideable insertion in the guideways of the L-shaped supports;
mounting the base on the horizontal leg of the L-shaped supports with the ribs of the base in the guideways of the L-shaped supports on top of the banding therein to prevent sideway motion of the L-shaped supports and to provide an assembly rack;
loading a plurality of sheets on the rack in a generally vertical position; and
securing the sheets on the rack.

4,092,816
INNER FOIL WRAPPING DEVICE
Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societá Per Azioni, Bologna, Italy
Filed Mar. 25, 1977, Ser. No. 781,525
Claims priority, application Italy, Mar. 31, 1976, 3389A/76
Int. Cl.² B65B *11/32*
U.S. Cl. 53—234 **2 Claims**

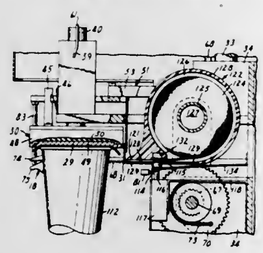


1. A device made for inner foil wrapping with the length's long ends over one of the larger faces of a bundle of cigarettes in very high speed soft packet cigarette packers, the device comprising a head or wheel turning at intervals and fitted with a number of radially positioned compartments equidistant from one another, each said compartment being capable of receiving a bundle of cigarettes for packeting laid long sides to the axis of rotation of said turning head or wheel; and a plurality of fixed and moving folder means in combination with said turning head or wheel for packeting operations with the length of foil, one of the said folder means being set at a tangent to the peripheral fascia of said turning head or wheel corresponding to a stay position occupied successively by said compartments of said turning head or wheel with alternating movement radial to said turning head or wheel, a wall of each compartment above that said one of said folder means with alternative movement in the sense of rotation of said turning head or wheel comprising a thin plate and said one folder means also having a thin plate facing said turning head or wheel so as during its forward movement to rebut the after ends of the length of foil onto the surface of the former plate external to the corresponding compartment, and wherein said folder means includes: a pair of radially oscillating arms with a platelet joined to an end of each said arm, said platelets contacting the two long ends of the outer side of the bundle of cigarettes; and a fixed guide concentric to said turning head.

4,092,817
FILM APPLYING DEVICE WITH A STRAW-HOLE PERFORATOR
Karl Frederick Rist, III, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Jan. 31, 1977, Ser. No. 763,991
Int. Cl.² B65B *7/28*; B67B *3/04*
U.S. Cl. 53—298 **8 Claims**

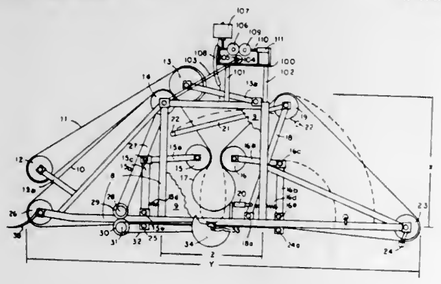
1. In a device for applying predetermined lengths of a heat

sealable film over the open ends of cups from a supply length of the film, said device comprising: means adapted for advancing an end of a said strip of heat sealable film along a path from a first position to a second position, said positions being spaced a distance equal to said predetermined length; means adapted for supporting a said cup in said device; means for providing relative movement between said means adapted for supporting and a said predetermined length of the film extending between said first and second positions, said means for providing relative movement being adapted to bring the lip of the cup into full circle engagement with one surface of the predetermined length of film; means for applying heat and pressure to fuse



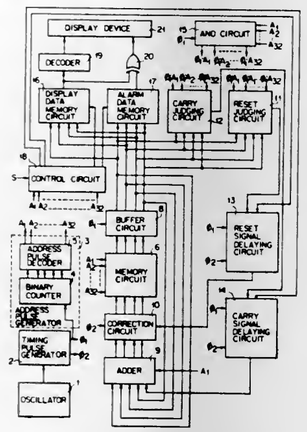
said predetermined length of film to the lip of said cup when the predetermined length of film is in engagement with the cup; and means for severing the applied predetermined length of film from the supply length of film, the improvement wherein said device further comprises means along said path in advance of said first position for perforating said film to provide a small area of the film which can be separated along the perforations and bent aside to provide a hole in the film adapted to receive a drinking straw, and means for operating said means for perforating before operation of said means for advancing to provide a said small area in each predetermined length of film applied to a cup.

4,092,818
HAY BALER
Donald H. Brewster, 2630 Creek Rd., Sandy, Utah 84070
Filed Feb. 17, 1976, Ser. No. 658,239
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 **8 Claims**



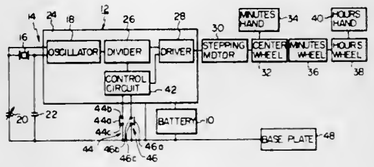
1. A hay baler for forming large cylindrical bales of hay comprising:
a. frame means for supporting said baler;
b. means for picking up loose hay from the ground;
c. endless belt transport means for transporting said loose hay to an elevated position;
d. a loop of an endless belt in said baling section to receive hay from said elevated position and form cylindrical bales of hay as said belt travels said endless belt being the same endless belt as the belt forming said transport means;
e. means for propelling said belt; and
f. discharge means to discharge said bale from the end of said baler opposite said hay pick-up means.

4,092,819
ELECTRONIC TIMEPIECE CIRCUIT
Tsuneo Takase, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan
Filed Jul. 2, 1976, Ser. No. 702,198
Claims priority, application Japan, Jul. 2, 1975, 50-80984
Int. Cl.² G04C *3/00, 21/00;* H03K *21/32*
U.S. Cl. 58—23 R **5 Claims**



1. An electronic timepiece which comprises a clock pulse oscillator; a timing pulse generator for dividing the frequency of a clock pulse produced by the clock pulse oscillator to issue a timing pulse; an address pulse generator for sending forth address pulses to designate a prescribed address being stored with a time data upon receipt of a timing pulse from the timing pulse generator; a memory circuit formed of a plurality of static random access memory cells arranged in the form of a matrix represented by a number of time data by a number of bits required to denote the code of each time data, and, when a word-selecting line connected to a memory cell is supplied with an address pulse designating said memory cell, sending forth a time data through a data line of the designated memory cell; a display device for displaying a time data read out from the memory circuit; a carry-judging circuit for deciding whether a time data issued from the memory cell should be carried up to an immediately following higher unit time level and generating a carry-instructing signal; a reset-judging circuit for generating a reset-judging circuit for generating a reset-instructing signal where carry is required, to clear the carried time data; a first delay circuit for holding a carry-instructing signal delivered from the carry-judging circuit until a time data being carried is received; a second delay circuit for holding a reset-instructing signal until a time data being cleared is received; an adder for adding a carry signal supplied from the first delay circuit and a minimum unit time signal to a time data read out from the memory circuit; and a correction circuit for correcting a time data delivered from said adder upon receipt of a reset signal from the second display circuit.

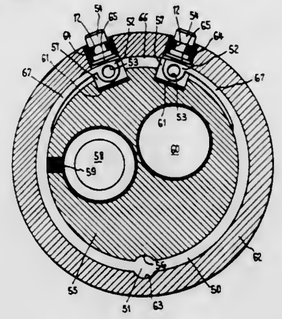
4,092,820
ELECTRONIC TIMEPIECE
Kazunari Kume; Minoru Watanabe, both of Tokorozawa; Hideshi Oono, Sayama, and Munetaka Tamaru, Tokyo, all of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan
Filed Feb. 26, 1976, Ser. No. 661,577
Claims priority, application Japan, Mar. 25, 1975, 50-035795; May 30, 1975, 50-064172
Int. Cl.² G04B *27/08;* G04C *3/00, 9/00*
U.S. Cl. 58—23 R **9 Claims**



1. An electronic timepiece comprising, in combination: a frequency standard providing a relatively high frequency signal;
a frequency converter dividing down the relatively high frequency signal;
to provide a first low frequency signal, a second low frequency signal lower in frequency than said first low frequency signal, and a third low frequency signal lower in frequency than said second low frequency signal;
first and second manually operable switches;
a control circuit including means for generating first and second outputs when said first and second manually operable switches are actuated, respectively, means for generating a first output signal in reponse to at least said first output and said first low frequency signal, and means for generating a second output signal in response to at least said second output and said second low frequency signal;
a driver circuit normally providing first driving current pulses in response to said third low frequency signal and responsive to said first and second output signals from said control circuit to provide second and third driving current pulses, respectively, at frequencies equal to those of said first and second low frequency signals; and
an electro-mechanical transducer normally driven by said first driving current pulses to advance rotatable time-representing members stepwise once per every one unit time and responsive to said second and third driving current pulses to advance said time-representing members at first and second speeds higher than a normal rotational speed in which said electromechanical transducer is driven by said first driving current pulses, whereby time correction can be performed at different speeds.

4,092,821
CONTROL DEVICE FOR AN ELECTRONIC WATCH
Carl A. Wirz, Weinbergstrasse 26, 6300 Zug, Switzerland
Filed Nov. 17, 1976, Ser. No. 742,457
Claims priority, application Switzerland, Dec. 2, 1975, 15615/75; Mar. 2, 1976, 2542/76
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 BA **8 Claims**

1. A watch comprising
a casing defining a chamber and including a peripheral wall having at least one through bore and a notch;
battery means in said chamber;
an electronic module in said chamber having at least one notch in its periphery and at least one terminal at its periphery; and
control means including
at least one push-button in said through bore and radially slidable therein;
a return spring means electrically connected to said battery means cooperating with said push-button and comprising a substantially circular return spring having two opposing ends and substantially encircling said module, said return spring having a middle portion thereof with a substantially rectangular cross-section and comprising,
a boss for engaging in said notch of said casing in order to locate said return spring with respect to the casing and also for engaging in said notch of said module in order to locate said module with respect to said return spring,

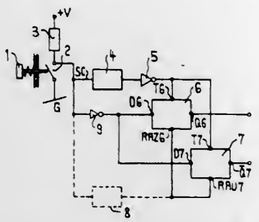


each of the ends of said return spring being terminated with a boss projecting inwardly toward the center of the casing, said end bosses including respective bores usable to facilitate the seizure of the return spring during its assembly in the watch,
the radial thickness of the return spring being reduced over a certain length between each of said terminating boss and the rectangular section of said spring in order to create a resilient part of the return spring which, when actuated by the push-button pushed radially inwardly in said through bore of said casing, will move inwardly so that the terminating boss establishes a good electrical contact with the terminal of the module, the resilience of said part of reduced section being sufficient to break such contact and return said push-button to its original rest position.

4,092,822
CONTROL DEVICE FOR AN ELECTRONIC WRIST-WATCH
Willy Droz, Hauterive, and Jean-Luc Béguin, Neuchatel, both of Switzerland, assignors to Ebauches SA, Neuchatel, Switzerland
Filed Nov. 25, 1975, Ser. No. 635,089
Claims priority, application Switzerland, Dec. 11, 1974, 16373/74
Int. Cl.² G04B *27/08*
U.S. Cl. 58—23 R **11 Claims**

1. A control device for electronic watches, comprising a push button switch for providing a control signal, delay means and first and second flip-flop circuits, inputs of each of said flip-flop circuits being connected to said push button switch by said delay means and by non-delayed circuit means, said control signal being applied to said inputs with and without delay respectively, one output of each of said flip-flop circuits being an output of said control device, and resetting means for said first and second flip-flop circuits adapted to reset said flip-flop circuits into complementary initial conditions, different combi-

nations of output information being thus obtained at the outputs of said flip-flop circuits and of the control device respectively at the end of a delay time according to the duration of actuation of said push button switch.

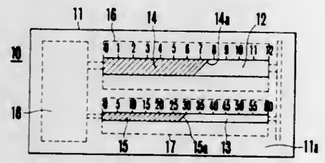


4,092,823

TIMEPIECE HAVING DISPLAY CYLINDERS

Sonobe Shiro, Tokyo, Japan, assignor to Sansho Co., Ltd., Tokyo, Japan

Filed Feb. 2, 1976, Ser. No. 654,118
Claims priority, application Japan, Feb. 10, 1975, 50-17720
Int. Cl.² G04B *45/00, 19/02, 19/02*
U.S. Cl. 58—125 C 5 Claims



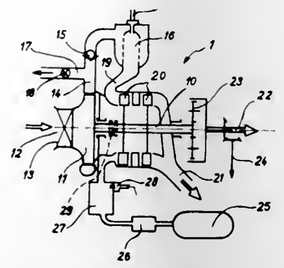
1. A timepiece comprising a casing, an hour cylinder and a minute cylinder contained in said housing, driving means for rotating said cylinder at a constant speed of one revolution every 12 hours for said hour cylinder and one revolution every 60 minutes for said minute cylinder, and a dial plate mounted on said casing, said dial plate being provided with hour and minute windows extending in the axial direction of said hour and minute cylinders, said hour window being parallel with said hour cylinder and being marked with a plurality of digits for displaying hours and said minute window being parallel with said minute cylinder and being marked with a plurality of digits for displaying minutes, the outer periphery of each of said cylinders being divided into two areas by a line inclined at a predetermined angle with respect to the axis of each said cylinders and said two area being colored by different colors, wherein said driving means comprises a first shaft driven at a constant speed by said driving means, a first pinion mounted on said first shaft for driving a second pinion mounted on a second shaft, a third pinion rotatably mounted on said second shaft, a pin and slot connection between said second and third pinions, spring means surrounding said second shaft for normally engaging said pin and slot, a fifth pinion meshing said third pinion for driving said minute cylinder, a third shaft continuously rotated by said first shaft, a first cam wheel mounted on said third shaft, a fourth shaft driven by said third shaft, a second cam wheel cooperating with said first cam wheel, a third cam wheel cooperating with said third pinion, said second and third cam wheels being rotatably mounted on said fourth shaft, spring means interposed between said fourth shaft and said second cam wheel, and means for driving said hour cylinder in accordance with the intermittent rotation of said second cam wheel.

4,092,824

METHOD OF OPERATING A TURBINE

Helmut Friedrich, Stuhr, Germany, assignor to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Germany

Filed May 28, 1974, Ser. No. 473,500
Int. Cl.² F02C *7/00, 7/32*
U.S. Cl. 60—39.02 8 Claims



1. Method of operating an auxiliary gas turbine which is used for starting an aircraft engine and for driving auxiliary onboard equipment comprising the steps of, generating externally to the turbine a pressurized gas without sustaining combustion, for driving the turbine;

mixing the pressurized gas after its generation with aircraft engine fuel; and

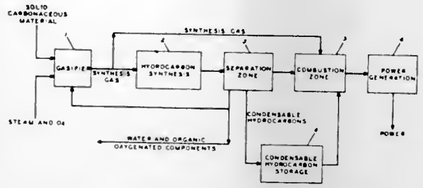
feeding the mixture to the turbine for driving the turbine, so that the turbine is driven by the mixture without undergoing or having undergone combustion.

4,092,825

PROCESS FOR BASE-LOAD AND PEAK-LOAD POWER GENERATION

Clark J. Egan, Piedmont, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 613,654, Sep. 15, 1975, Pat. No. 3,986,349. This application Sep. 16, 1976, Ser. No. 724,124
Int. Cl.² F02B *43/08*
U.S. Cl. 60—39.02 10 Claims



1. A process for the generation of power from a solid carbonaceous material which comprises:

(a) forming a combustible synthesis gas by reacting said carbonaceous material with steam and oxygen at an elevated temperature;

(b) contacting a first portion of said synthesis gas with a hydrocarbon synthesis catalyst, thereby forming a reaction product mixture containing water, H_2, CO, CO_2, oxygenated organic compounds and synthetic hydrocarbons;

(c) contacting said reaction product mixture prior to formation of an aqueous phase therein with a hydrogenation catalyst under hydrogenation conditions, thereby converting said organic compounds to water and combustible hydrocarbons;

(d) thereafter separating from said reaction product mixture C_3+ hydrocarbons;

(e) combusting a second portion of said synthesis gas and generating power from the resulting combusted synthesis gas; and

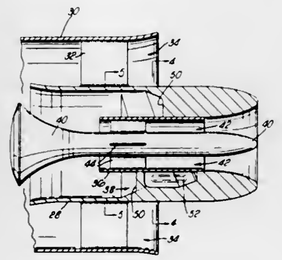
(f) combusting at least a portion of said C_3+ hydrocarbons and generating additional power from the resulting combusted hydrocarbons.

4,092,826

FUEL INJECTORS FOR GAS TURBINE ENGINES

George Pask, Stanton-by-Bridge, England, assignor to Rolls-Royce Limited, London, England

Filed Nov. 30, 1976, Ser. No. 746,016
Claims priority, application United Kingdom, Dec. 6, 1975, 50130/75
Int. Cl.² F02C *7/22*
U.S. Cl. 60—39.74 R 6 Claims



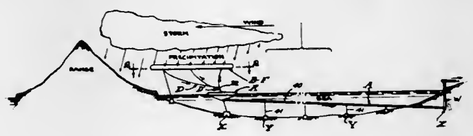
1. A fuel injector for a gas turbine engine comprising: an elongated cylindrical hollow body having a downstream end, an upstream end and an interior surface opening at least to said downstream end; means defining a passage through the fuel injector for flow of compressed air; an orifice extending through the side of said hollow body intermediate the downstream end and the upstream end thereof and opening through said interior surface to the interior of the hollow body; a fuel supply duct extending into said orifice from the exterior of the hollow body and communicating with the interior of said hollow body through said orifice to supply fuel tangentially onto the interior surface of said hollow body, and a continuous helical wall projecting radially inwardly from said interior surface from a position immediately upstream of said orifice and extending at least 360° around said interior surface to a position downstream of said orifice whereby fuel supplied through said fuel supply duct is prevented from returning outwardly through said orifice.

4,092,827

APPARATUS FOR AERIAL WATER ACQUISITION AND SUB-SEA AQUEDUCT

Gerald J. Schneider, 14923 Moorpark St., Sherman Oaks, Calif. 91403

Filed Apr. 21, 1977, Ser. No. 789,649
Int. Cl.² F15B *1/06;* B64B *1/50*
U.S. Cl. 60—398 37 Claims



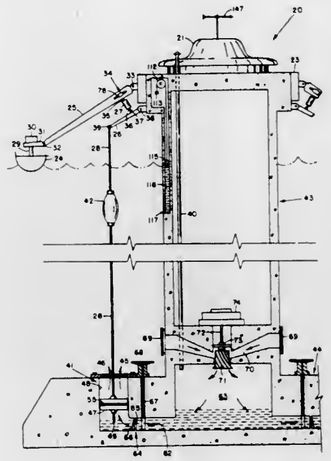
1. Apparatus for the acquisition of rain water and including, a funnel supported aerially by balloon means and together forming an elevated basin tethered at and over a reservoir and with a duct from said funnel to said reservoir for the immediate gravitation of acquired rain water into storage.

4,092,828

HYDROELECTRIC PLANT

Roberto M. Garza, P.O. Box 7036, San Antonio, Tex. 78207

Continuation-in-part of Ser. No. 684,796, May 10, 1976, abandoned. This application Jul. 18, 1977, Ser. No. 816,462
Int. Cl.² F03B *13/12*
U.S. Cl. 60—506 10 Claims



1. A hydroelectric plant for generating energy from wave action of a body of water comprising:

plant structure located in the body of water;

first lever means pivotally connected at a first end to and extending downward from said plant structure to a surface of said body of water;

float means attached to a second end of said first lever means for floating on said surface;

second lever means pivotally connected to said plant structure;

crosshead means pivotally connecting said first lever means to said second lever means;

cylinder means operatively connected to said second lever means to move a piston means therein in response to said wave action against said float means, said piston means reciprocating in said cylinder means to move a fluid therethrough;

first control means for generating a first control signal in response to height of said wave action, said first control signal adjusting said crosshead means to maintain relatively constant stroke length of said piston means regardless of said height;

means for generating power from said fluid movement from said piston means.

4,092,829

BALANCED COMPRESSOR

Peter Durenec, Annandale, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 6, 1975, Ser. No. 629,452
Int. Cl.² F01B *29/10;* F02G *1/04*
U.S. Cl. 60—517 7 Claims

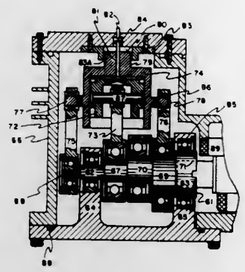
1. In a closed cryogenic cooling system comprising an electric motor driving a compressor which feeds a regenerator through a conduit, the system containing a low molecular weight gas at a minimum pressure orders of magnitude greater than atmospheric pressure; the improvement wherein said compressor comprises:

a crankshaft having at least first and second cylindrical sections with axes parallel to but displaced a short distance

in opposite directions from the axis of rotation in said crankshaft;

a piston and a first rod connected between said piston and said first cylindrical section to provide a displacement thereof equal to twice said short distance associated with said first section;

a hollow cylinder closed at one end snugly and coaxially fitted around said piston to provide a compression chamber therebetween, and at least a second rod connected to said cylinder and said second cylindrical section to produce a displacement of said cylinder which is opposite to that of said piston the weights and displacements of said piston and cylinder being balanced to produce minimum crankshaft vibration;



a housing surrounding said motor crankshaft, piston and cylinder, the walls of said housing being charged with said gas at said minimum pressure and having inward projections providing bearing supports for said crankshaft and a first guide recess to slideably engage the outer surface of said cylinder, thereby restricting it to axial translation only; and

said conduit being sealed through the wall of said housing into said recess and having a telescoping section within said housing communicating with said compression chamber, whereby said gas at high ambient pressure within said housing leaks into said chamber and is forced into said conduit at even higher pressure by the relative motion of said piston and cylinder and any gas leaking through said telescoping section into said recess passes freely back into said housing.

4,092,830

GAS DRIVEN MOTOR WITH BUFFER SPACE

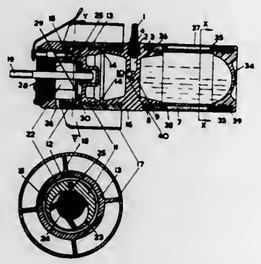
John Walter Rilett, 18 Links View, Stratton, Cirencester, England

Filed Jan. 13, 1977, Ser. No. 759,133

Claims priority, application United Kingdom, Jan. 16, 1976, 1689/76; Jun. 21, 1976, 25600/76

Int. Cl.² F01K *25/10*

U.S. Cl. 60—671 **10 Claims**



1. A motor having in combination therewith apparatus for supplying to the motor gas evaporated from liquefied gas, said apparatus comprising a vessel containing liquefied gas, a passage which affords communication between the vessel and the motor whereby gas evaporating from the liquefied gas is conducted into the motor, and in heat conductive relationship with the vessel, at least one container holding a buffer substance which during operation of the motor releases heat to the vessel and the liquefied gas therein, whereby the tendency of the evaporation of the liquefied gas to cool the remaining liquefied gas in the vessel is at least partly counteracted.

4,092,831

ROOF BAR FOR SURFACE SUPPORT ELEMENTS

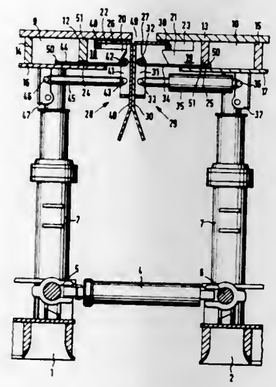
Walter Lubojatsky, Recklinghausen, and Wilhelm Wertelewski, Datteln, both of Germany, assignors to Becorit Grubenausbau GmbH, Recklinghausen, Germany

Filed Jun. 3, 1976, Ser. No. 692,248

Claims priority, application Germany, Jun. 5, 1975, 2525034

Int. Cl.² E21D *15/44*

U.S. Cl. 61—45 D **8 Claims**



1. In an improved roof bar for surface support elements of the type which includes a top plate, an L-shaped gap sealing plate having horizontally-disposed, upper section and a vertically-disposed, lower section which serves as a buffer plate, said gap sealing plate being coupled to at least one side of said roof bar and being displaceable generally toward an adjacent roof bar, a pivotable hydraulic cylinder coupled to said buffer plate and to said roof bar, the improvement comprising:

a first guide element rigidly mounted on said roof bar beneath said top plate thereof, said first guide element defining, in cooperation with said top plate, a horizontally-extending channel therebetween in which said upper horizontally-disposed section of said gap sealing plate is slidably mounted.

4,092,832

METHOD OF CORRECTING THE HEIGHT LEVEL OF A FOUNDATION

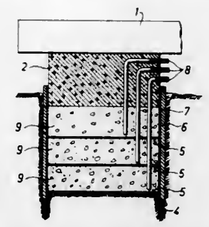
Arne J. Mattson, Vesteras, Sweden, assignor to Paul Anderson Industrier AB, Vesteras, Sweden

Filed Sep. 7, 1976, Ser. No. 721,030

Int. Cl.² E02D *27/48, 5/48*

U.S. Cl. 61—51 **4 Claims**

1. In a method of correcting the height level of a concrete foundation or the like which is supported on a loose soil material, the bearing capacity of which has been locally increased under the foundation by means of an oblong casing open at its opposite ends and driven down into the ground in order to isolate with respect to lateral movements in the soil masses a predetermined soil volume from the surrounding soil, the improvement comprising the steps of: providing at least one layer of a material having distribution passages beneath the



foundation, and injecting a moveable material mass into said layer at a pressure capable of rising the foundation.

4,092,833

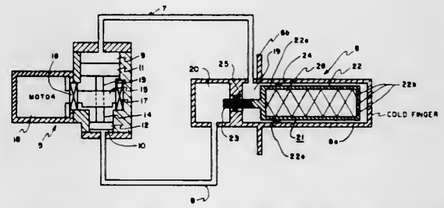
SPLIT-PHASE COOLER WITH EXPANSION PISTON MOTION ENHANCER

Peter Durenec, Annandale, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 28, 1977, Ser. No. 773,033

Int. Cl.² F25B *9/00*

U.S. Cl. 62—6 **3 Claims**



1. A split-cycle mechanical cooler having a compression portion, a distinct expansion portion, and conduit means between said portions: said compression portion including a first piston in a first cylinder and a second piston in a second cylinder, and means for reciprocally moving said pistons in said cylinders in phase opposition; said expansion portion including a third cylinder having distinct first and second spaces, a third piston in said third cylinder having opposite ends respectively in said first and second spaces, and a regenerator in said end of said third cylinder which is in said first space of said third cylinder; and said conduit means including first and second conduits respectively connecting said first cylinder to said first space and said second cylinder to said second space.

4,092,834

FREEZE SEPARATION PLANT

Albert Ivor Lloyd, Dorset, England, assignor to United Kingdom Atomic Energy Authority, London, England

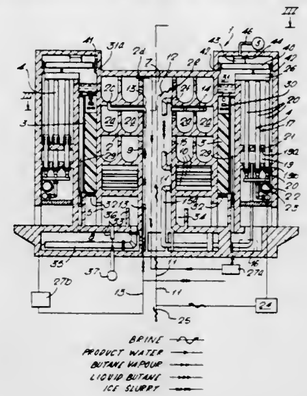
Filed Dec. 14, 1976, Ser. No. 750,351

Claims priority, application United Kingdom, Jan. 28, 1976, 3417/76

Int. Cl.² B01D *9/04;* C02B *1/12*

U.S. Cl. 62—123 **13 Claims**

1. In a plant for reducing the impurity content of impure water by an immiscible refrigerant-freeze process, the plant including a two stage crystallizer for producing ice crystals in the impure water by boiling the immiscible refrigerant in the impure water in the first stage and disentraining the vapor in the second stage, the improvement wherein the crystallizer first stage is arranged as a number of tiers of passageways and includes means for introducing refrigerant into impure water in the passageways defining each tier, conduit means for leading ice crystal slurry from the first stage to the second stage wherein disentrainment of vapor is effected, and means for



producing water having a reduced impurity content from the ice crystals.

4,092,835

ELECTRICAL APPLIANCE FOR MAKING SORBET

Pierre Tanguy, 30, rue de Dijon, 21000 Daix, and André Faivre, 14, rue Adolphe Dietrich, 21000 Dijon, both of France

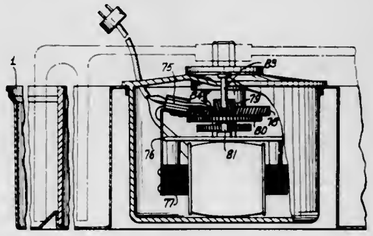
Division of Ser. No. 543,798, Jan. 24, 1975, Pat. No. 4,009,588.

This application Aug. 9, 1976, Ser. No. 713,211

Claims priority, application France, Jan. 30, 1974, 74 03045

Int. Cl.² G05D *24/02;* A23G *9/00*

U.S. Cl. 62—136 **4 Claims**



1. In an appliance for making sorbet or ice cream, wherein the appliance has a driving spindle projecting from a gear motor housing to which a rotating arm supporting mixing blades thereon is attached, and wherein said appliance includes means for preventing the mixer blades from becoming locked in ice by effecting a progressive withdrawal of the blades from a vertical orientation towards a horizontal orientation under the action of an opposing torque applied to the blades by the hardening of the ice during freezing, the improvement comprising:

an automatic stopping device including a projection means provided on one of the blades for contacting a lever mounted on the periphery of a cover for the gear motor housing and opposing continued rotation of said arm supporting the blades on completion of the withdrawal of the blades, said projection means causing said lever to pivot when the blade reaches its withdrawn position and a switching means for opening the motor supply circuit responsive to said projection means contacting said cooperating means wherein said switching means is activated by a cam rotated by a spindle mounting said lever on said cover.

4,092,836

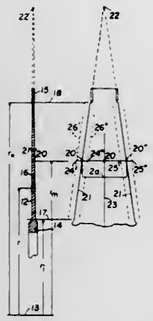
FLEXIBLE-DISK COUPLINGS

Ernest Wildhaber, 124 Summit Dr., Rochester, N.Y. 14620

Continuation-in-part of Ser. No. 739,255, Nov. 5, 1976, Pat. No. 4,079,598, and Ser. No. 695,205, Jun. 11, 1976, Pat. No. 4,044,571. This application May 20, 1977, Ser. No. 798,839

Int. Cl.[2] F16D *3/78*

U.S. Cl. 64—13 **6 Claims**



1. A flexible-disk coupling containing at least one disk decreasing in thickness towards the outside and connected at the inside to a rotary part and at the outside to a mating rotary part, whereby the straight lines that pass through the mean points of opposite disk profiles in the directions of said profiles, intersect at distances from the said points between $(1 + \frac{1}{4})$ and $(1 - \frac{1}{4})$ times the radial distance of said points from the disk axes.

4,092,837

TORSIONAL ISOLATOR COUPLING

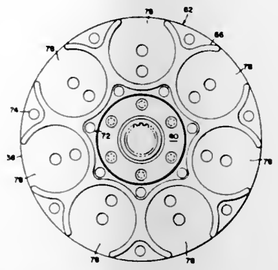
Thomas Edward Gebauer, and Larry Gene McMullen, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.

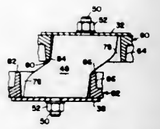
Filed Nov. 19, 1976, Ser. No. 743,397

Int. Cl.[2] F16D *3/64*; B16D *3/10*

U.S. Cl. 64—27 NM **8 Claims**

1. In a vehicle transmission drive including a flywheel, an input shaft adjacent to and coaxial with the flywheel and a torsional isolator coupling connected between the flywheel and the input shaft, the improvement comprising: said coupling including drive and driven members spaced axially in their entirety from each other and respectively fixed to the flywheel and input shaft for respective rotation therewith; a plurality of yieldable resilient isolator members; and first and second means respectively mounting opposite ends of the isolator members for rotation with the drive and driven members and for free deflection between said opposite ends for yieldably resisting, at a first spring rate, relative rotation between the drive and driven members induced by torque loads below a predetermined torque load; and isolator member snubber means mounted on the drive and driven members in operative association with the isolator members for engaging and supporting the latter between said opposite ends to thereby inhibit said free deflection for increasing the spring rate thereof above





said first rate to a second spring rate only when torque loads above said predetermined torque load are being transferred between the flywheel and input shaft.

4,092,838

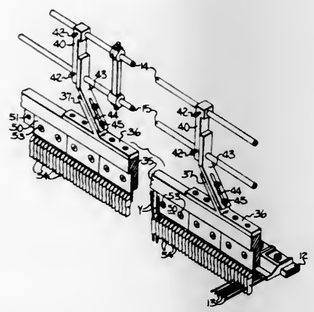
YARN GUIDE TUBES FOR WARP KNITTING MACHINES

Robert J. Gangi, Emerson, N.J., assignor to Joan Manufacturing Corporation, Waldwick, N.J.

Filed Jul. 22, 1977, Ser. No. 817,922

Int. Cl.[2] D04B *23/00*

U.S. Cl. 66—214 **6 Claims**



1. In a knitting machine including a row of needles supported for longitudinal reciprocation, carrier rod means supported for parallel movement relative to said needles, and means for imparting step-by-step racking movement to said carrier rod means, the combination therewith of improved means for feeding inlaying yarns to said needles, said inlaying yarn feeding means comprising

(a) a tube guide support bar extending parallel to said needles,

(b) spaced apart support means for said tube guide support bar, each of said support means including one end fixed on said carrier rod means and an opposite end fixed on said tube guide support bar,

(c) a plurality of profile plates including one face removably secured to said tube guide support bar, and

(d) a plurality of yarn guide tubes including upper end portions fixed to the other face of each of said profile plates and being circular in cross section, said yarn guide tubes including lower end portions extending downwardly from said profile plates to define free ends for directing inlaying yarns to said needles, the centers of the free ends of adjacent yarn guide tubes being spaced the same distance apart as the spacing of said needles said lower end portions being bent inwardly from opposite sides so that, the free lower ends of adjacent yarn guide tubes are elongated in cross-section and are sufficiently spaced apart to at times permit the needles to pass therebetween.

4,092,839

DEVICE FOR THE WET-TREATMENT OF MOVING WEBS

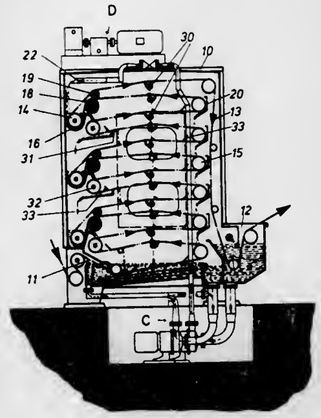
Gerhard Bähre, Bendestorf; Jürgen Brauns, Buchholz (Nordheide), and Willi Struck, Pinneberg, all of Germany, assignors to Artos Dr. Ing. Meier-Windhorst KG, Seevetal, Germany

Filed Aug. 6, 1976, Ser. No. 712,411

Claims priority, application Germany, Aug. 8, 1975, 2535464; Feb. 17, 1976, 2606217

Int. Cl.[2] D06B *3/02, 15/08*

U.S. Cl. 68—19 **9 Claims**



1. In a device for the continuous wet treatment of moving webs and, in particular, the washing and drying of textile webs, of the type including a chamber through which the web passes in a serpentine fashion along substantially horizontal travel paths supported by a plurality of horizontally spaced apart guiding rollers and reversing rollers between which are free, unsupported, horizontally-disposed stretches of the web said guiding rollers being disposed in a vertically-oriented column at one side of the chamber and said reversing rollers being disposed in a vertically oriented column at the other side of the chamber, the improvement comprising:

a first plurality of elongated wipers, each of which is mounted adjacent to one of the reversing rollers and is disposed to engage across the width of the upper surface of the horizontally disposed stretch of web so as to strip excess liquid therefrom and thereby prevent the web from floating on the reversing rollers;

a second plurality of elongated wipers, each of which is mounted adjacent to one of the guiding rollers and is disposed to engage across the width of the upper surface of the horizontally disposed stretch of web so as to strip excess liquid therefrom and thereby prevent the web from floating on the guiding rollers; and

a third plurality of elongated wipers, each of which is mounted adjacent to the middle of one of the free unsupported stretches of the web and is disposed to engage across the width of the lower surface thereof so as to strip liquid therefrom and so as to provide positive guidance and support for the unsupported horizontally-disposed stretch of the web.

4,092,840

DEVICE FOR FLANGING THE EDGES OF SHEET SECTIONS

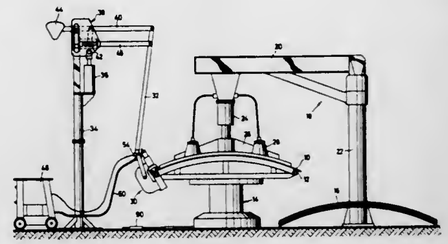
Gerd-Jürgen Eckold, St. Andreasberg, and Hans Maass, Bad Lauterberg, both of Germany, assignors to Paweck AG, Chur, Switzerland

Filed Dec. 10, 1976, Ser. No. 749,401

Claims priority, application Germany, Oct. 21, 1976, 2527225

Int. Cl.[2] B21D *19/08*

U.S. Cl. 72—312 **13 Claims**



1. Apparatus for bending the outer edge of sheet metal members into a predetermined form, comprising:

a yoke substantially having a C-shaped contour in the direction of said edge and extending substantially transverse to said edge on both sides thereof;

a support member for supporting said sheet metal member and being engaged with one of the legs of said yoke, and being adapted to the contour of a sheet metal member and including a tube;

said yoke further including a centering element for engagement with said support member;

a tool carrier mounted on said yoke and movable relative thereto;

tool means carried by said tool carrier and comprising a clamping member for retaining said sheet metal member against said support member, and a bending member adapted to engage the edge of said sheet metal member and bend it about said support member;

reciprocating drive means connected to said yoke for actuating said clamping member and said bending member and to move said tool carrier relative to said support member.

4,092,841

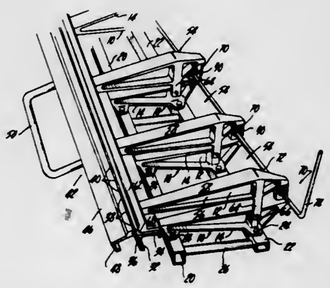
SHEET METAL BRAKE

Clarence G. Chambers, Jr., Birmingham, Mich., assignor to Jayson Corporation, Detroit, Mich.

Filed Dec. 20, 1976, Ser. No. 752,153

Int. Cl.[2] B21D *11/20*

U.S. Cl. 72—320 **6 Claims**



1. A sheet metal brake comprising: a base having an elongated, substantially horizontal, fixed, work clamping surface; a plurality of elongated arms each extending normally to the

length of said fixed work clamping surface; pivot sections fixed to each of the arms near a first end of each arm, extending normally to the arms and being pivotably connected to the base for motion about an axis extending parallel to said fixed work clamping surface and normally to the lengths of said arms; an elongated movable work clamping member fixed to the second end of each of said arms and extending normally to said arms and parallel to said work clamping surface, said clamping member having a flat surface adapted to cooperate with said fixed clamping surface to retain a sheet workpiece therebetween, and a flat anvil surface extending at an acute angle with respect to said workpiece clamp surface so as to form an elongated bending nose with said workpiece clamping surface; actuator means supported between the base and the first ends of at least certain of the arms, the actuator means being adapted to move the arms about their pivotal connections with the base between a closed position wherein the movable work clamp is in close spaced relationship to the fixed clamping surface so as to clamp a sheet workpiece therebetween, and an open position wherein the movable clamp is spaced from the fixed work clamping surface to allow insertion or removal of workpieces therebetween; and an elongated bending arm pivotably supported with respect to the base on an axis extending parallel to the fixed and movable work clamps.

4,092,842

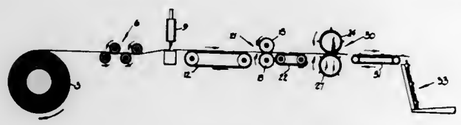
DEEPLY EMBOSSED SHEET PRODUCT AND METHOD AND APPARATUS FOR THE PRODUCTION THEREOF

Nathan Oser, Perrineville, and Edmund John Niedzinski, Somerville, both of N.J., assignors to Johns-Manville Corporation, Denver, Colo.

Continuation of Ser. No. 622,930, Oct. 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 521,829, Nov. 7, 1974, abandoned. This application Oct. 26, 1976, Ser. No. 735,646

Int. Cl.[2] B21D *13/04*

U.S. Cl. 72—379 **5 Claims**



1. A method for the deep embossment of a single layer of sheet material which comprises first embossing across said sheet material a small scale relief pattern of a plurality of directions across at least one of the surfaces of said sheet material, said hills and valleys extending outwardly from at least one of the surfaces of said sheet material not more than 1 cm, and thereafter embossing in superimposed relationship on said relief pattern a deep embossment pattern, said deep embossment pattern comprising a plurality of large protuberances, each of said protuberances being of a scale sufficiently large relative to the relief features of said small scale relief pattern to encompass at least portions of several of said hills and valleys, said large protuberances being present in a number sufficient to prevent adjacent sheets of said sheet material from touching except at the points of said protuberances when at least two sheets of said sheet material are stacked in vertical array.

4,092,843

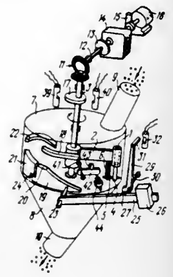
APPARATUS FOR TESTING THE READINESS OF HEAT-TREATED COAL FOR MOULDING

Danil Danilovich Matskevich, prospekt Gagarina, 6 mikroraion, 15, kv. 88; Nina Efimovna Ivashkova, ulitsa Sharikovaya, 51, kv. 2, and Viktor Vasilievich Gavrikov, ulitsa Otakara Yarosha, 15, kv. 49, all of Kharkov, U.S.S.R.

Filed July 19, 1977, Ser. No. 816,944

Int. Cl.[2] G01N *3/00*

U.S. Cl. 73—17 R **4 Claims**



1. An apparatus for testing the readiness of heat-treated coal for moulding, said readiness being assessed in terms of time as a span between the moment of exerting pressure on a sample of heated coal and the beginning of the coal-sample swelling, comprising: a casing, a vertical shaft placed in said casing and having an end extending outside the casing; a drive connected to said end of the shaft; a bracket placed in the casing and fixed by one of its end on said shaft; a receptacle for accommodating a coal sample, said receptacle being a sleeve open at both ends, fixed vertically on the other end of said bracket; a feed pipe for letting a stream of coal in the casing, said pipe being positioned on the top thereof over the path of rotation of the receptacle with the shaft; a slanted bottom of said casing; a disposal pipe for removing the coal from the casing, said pipe being located on the slanted bottom thereof; a plunger adapted to enter said receptacle and move therethrough; means for moving said plunger in said receptacle during rotation thereof with the shaft to compress the coal sample therein, said means having a first guide member, positioned in said casing along the path of rotation of the receptacle with the plunger so as to be in a horizontal plane at the level of the top end face of the receptacle and to close the entrance passage thereof on the corresponding portion of said path of rotation, said means having a second guide member, placed in said casing on the same portion of the receptacle path of rotation under the first guide member; a weight; a lever system which kinematically connects said second guide member with said weight whereby the second guide member is urged towards the first guide member; said second guide member having an ascending and horizontal parts of the profile of said second guide member used for interaction with the lower end of said plunger as it rotates with the receptacle, whereby the plunger is driven upwards and the coal sample is compressed in the receptacle between the plunger and said first guide member; said means having a third guide member, fixedly positioned in the casing along the subsequent portion of the receptacle path of rotation and having an ascending profile used for interaction with the plunger to cause a further upward movement thereof in the receptacle for the removal of the coal sample therefrom; said means having a fourth guide member fixedly positioned in the casing along the receptacle path of rotation in series with the third guide member and having a descending profile used to interact with said plunger for bringing it into its lowermost position; a means for indicating the beginning of a displacement of the plunger with said second guide member caused by the coal-sample swelling, said indicating means being kinematically connected with said second guide member through said lever system; means for stopping said drive of the shaft rotation when the receptacle comes to a position preceding the intersection of its path of rotation and the stream of coal, and to a position on the horizontal part of the profile of said second guide member; and a means for actuating said drive of the shaft rotation when the coal sample begins swelling.

4,092,844

HYDROGEN PROBE WITH LIMITED ACTIVE AREA

Donald H. Oertle; Richard M. Vennett; Burton M. Casad, and Fred J. Radd, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Aug. 20, 1976, Ser. No. 716,321

Int. Cl.[2] G01N *27/46, 27/62, 7/10*

U.S. Cl. 73—23 **4 Claims**

1. A hydrogen probe device comprising:

an elongated tubular member formed of a hydrogen-permeable metallic material, said member having a first closed end formed of said hydrogen-permeable metallic material and a second open end for connection to a hydrogen-sensing device;

an inner liner in said tubular member, said liner being formed of a hydrogen-impermeable material and extending a part of the length of said tubular member and being sealingly joined at each end to the interior of said tubular member whereby hydrogen permeating the portion of the length thereof between the sealed ends of said liner is prevented from entering the interior of said probe and passing out the open end thereof; and a

vent means through the wall of said tubular member between the ends of said liner whereby hydrogen which permeates said tubular member between the sealed ends of said liner may pass freely from between the outer surface of said liner and the lined inner surface of said tubular member thereby preventing a buildup of pressure between the interior of the lined portion of said tubular member and the exterior of said liner, the extent of said vent means being from the exterior to the interior of said tubular member.

4,092,845

LUNG SIMULATING AEROSOL SAMPLER

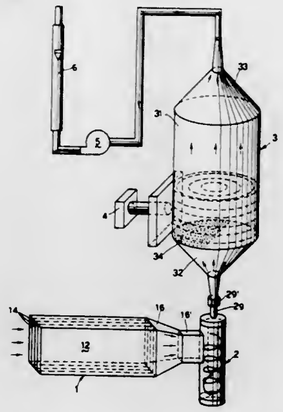
Vittorio Prodi; Carlo Melandri; Giuseppe Tarroni, all of Bologna; Massimo Formignani, Ferrara; Tonino De Zaiacomo, Bologna, and Gianfranco Bompane, San Lazzaro (Bo), all of Italy, assignors to Comitato Nazionale per l'Energia Nucleare — Cnen, Rome, Italy

Filed May 16, 1977, Ser. No. 797,365

Claims priority, application Italy, May 28, 1976, 49698 A/76

Int. Cl.[2] G01N *15/06*

U.S. Cl. 73—28 **8 Claims**



1. An apparatus for simulating the human respiratory tract with respect to the deposition of aerosol particles contained in the breathed air which apparatus comprises an enclosed duct along which the following means are included in the order: a humidifying and particle catching means; a cyclone; a bubbler and a vacuum pump.

4,092,846

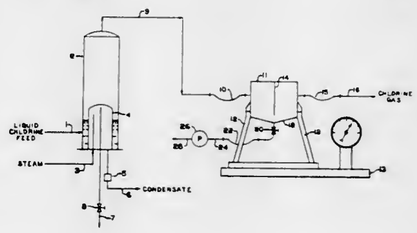
DETECTION OF LIQUID IN A GAS STREAM

Thomas C. Jeffery, Lake Charles, La., and Wilmer B. Graybill, Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 523,777, Nov. 14, 1974, abandoned, which is a continuation-in-part of Ser. No. 256,081, May 23, 1972, abandoned. This application Feb. 4, 1976, Ser. No. 655,187

Int. Cl.[2] G01N *33/00*

U.S. Cl. 73—29 **9 Claims**



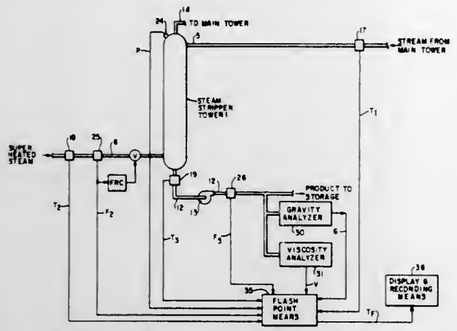
7. An apparatus for vaporizing a liquid comprising a vaporizer means to which that liquid is fed and means for supplying heat to said vaporizer means, the combination therewith of apparatus for producing a substantially liquid-free vapor stream comprising a vessel, a line feeding fluid to said vessel, a line for removing vapor from said vessel, means within said vessel for segregating liquid from vapor, and means for determining the weight for said vessel.

4,092,847

FLASH POINT ANALYZING MEANS AND METHOD

Charles R. Lynch, Port Neches, and Robert A. Wheeler, Beaumont, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Jun. 23, 1977, Ser. No. 809,513
Int. Cl.² G01N *25/52*
U.S. Cl. 73—36 **24 Claims**



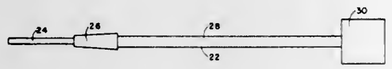
1. A flash point analyzer for use with a steam stripper having a bottom tray and receiving a stream of material and steam and providing a product, comprising means for sensing the temperatures of the material, the steam and the product and providing signals T_1, T_2 and T_3, respectively, corresponding thereto; means for sensing the flow rates of the steam and the product and providing corresponding signals F_2 and F_3, respectively, corresponding thereto; means for sensing a pressure in the stripper and providing a signal P representative thereof; means for sampling the product and providing signals corresponding to at least two predetermined parameters of the product; and means connected to all the sensing means and to the sampling means for providing a signal corresponding to the flash point temperature of the product in accordance with the temperature signals T_1, T_2 and T_3, the flow rate signals F_2 and F_3, the pressure signal P and the parameter signals.

4,092,848

METHOD AND APPARATUS FOR DETERMINING HYDROCYCLONE INTERIOR WEAR

David Charles Thomas, Oklahoma City, Okla., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.

Filed May 5, 1977, Ser. No. 794,213
Int. Cl.² G01N *17/00*
U.S. Cl. 73—86 **4 Claims**



1. An apparatus adapted for insertion in a hydrocyclone provided with an inlet, underflow outlet and overflow outlet for determining the extent of wear of the interior conical section of said hydrocyclone comprising:

(1) a first section comprising a cylindrical section of a diameter less than the diameter of the underflow outlet of the hydrocyclone;

(2) a second section connected to the first section comprising a truncated conical section possessing an angle of taper equal to the angle of the interior conical section of the hydrocyclone and of such a diameter as to contact the lower section of the interior conical section upon insertion therein;

(3) a third section connected to the second section comprising a cylindrical section of a diameter less than the largest diameter of the second section; and

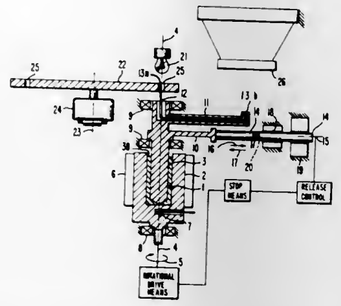
(4) a fourth section connected to the third section comprising a handle.

4,092,849

METHOD AND APPARATUS FOR MEASURING MELT ELASTICITY OF POLYMERS

Bryce Maxwell, 19 McCosh Cir., Princeton, N.J. 08540

Filed May 27, 1977, Ser. No. 801,189
Int. Cl.² G01N *3/24*
U.S. Cl. 73—101 **17 Claims**



1. An apparatus for measuring elastic properties of polymers comprising:

(a) a first member mounted for low friction rotation, said first member defining an axis of rotation;

(b) a second member mounted for low friction rotation about said axis of rotation and positioned adjacent said first member to define therebetween an intervening space to receive therein a specimen of polymer to be tested;

(c) means to rotationally drive said first member about said axis of rotation to allow relative rotational movement between said first member and said second member to cause shearing of the specimen positioned therebetween in said intervening space;

(d) releasable retaining means to selectively prevent rotation of said second member;

(e) stop means to selectively halt operation of said rotational drive means and to stop rotation of said first member;

(f) a light source directed along said axis of rotation;

(g) an optical fiber means within said second member to rotate therewith, said optical fiber means including a first end oriented along said axis of rotation and a second end distant from said axis of rotation and parallel with respect thereto, said optical fiber means adapted to transmit light from said first end to said second end;

(h) light interrupting means located in the light flow path between said light source and said first end of said optical fiber means to intermittently block at a known frequency the light from said light source from entering said first end of said optical fiber means; and

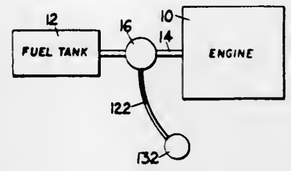
(i) recording means for recording the movement of said second end of said optical fiber means and, hence, the rotation of said second member by recording the light emitted from said second end of said optical fiber means.

4,092,850

FUEL MEASURING AND RECORDING SYSTEMS FOR COMBUSTION DEVICES AND METHOD FOR MONITORING FUEL FLOW

Curtis L. Erwin, Jr., 5805 SE. Gladstone, Portland, Oreg. 97206

Division of Ser. No. 456,264, March 29, 1974, Pat. No. 3,949,602. This application Mar. 2, 1976, Ser. No. 663,049
The portion of the term of this patent subsequent to Apr. 23, 1991, has been disclaimed.
Int. Cl.² G01F *9/00*
U.S. Cl. 73—113 **27 Claims**



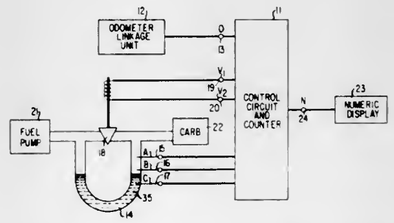
17. A fuel measuring system in combination with an engine, fuel supply means for said engine, slow flow type volumetric measuring means measuring fuel flow in said measuring system, compensating means in said system arranged to compensate the measurement of said measuring means due to variations in the specific gravity of the fuel, and recording means arranged to make a record of a compensated amount of fuel flowing through said measuring means.

4,092,851

APPARATUS FOR THE MEASUREMENT OF VEHICLE FUEL CONSUMPTION

Klaus Andres, 207 Dogwood La., Berkeley Heights, N.J. 07922

Filed Jun. 14, 1976, Ser. No. 695,839
Int. Cl.² G01L *3/00*
U.S. Cl. 73—114 **9 Claims**



1. Vehicle fuel consumption rate measurement apparatus comprising control circuitry, an odometer linkage unit, electrically connected to the control circuitry, a fuel flow sensor unit electrically connected to the control circuitry, and a numeric display electrically connected to the control circuitry wherein

(a) the odometer linkage unit includes means for producing an electrical pulse train, in which the number of pulses is related to the distance traveled by the vehicle, to drive a counter in the control circuitry;

(b) the fuel sensor unit includes a fuel input port and a fuel output port with an upper fuel path and a lower fuel path therebetween, the upper fuel path including an electrically actuated valve which is adapted for being switched by the control circuitry to an open position and a closed position, and the lower fuel path including an input column and an output column extending downward of the upper fuel path on either side of the valve, the output column including a lower electrical contact, a center electrical contact and an upper electrical contact, the lower fuel path containing a body of electrolyte, which electrolyte is denser than the fuel and not miscible with the fuel, which said electrolyte is included in sufficient quantity to fill the input and output columns to a level between the lower contact and the center contact;

(c) the numeric display is adapted for being activated by the control circuitry to indicate fuel consumption; and

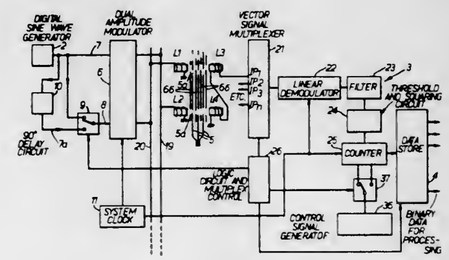
(d) the control circuitry includes a valve actuator, electrically connected to the upper contact and the lower contact, for opening the valve during a preselected recovery and readout time interval, which is initiated when the electrolyte bridges between the upper contact and the lower contact, a counter, a counter control electrically connected to the center contact and the lower contact and to the valve actuator by an actuator link and to the counter, which counter control includes means for resetting the counter to zero and enabling the counter to respond to the electrical signal from the odometer linkage unit when the electrolye bridges between the center contact and the lower contact, which counter control also includes means for disabling the counter from further response at the start of the recovery and readout time interval upon receiving a signal from the actuator link; in which said apparatus the number of pulses per unit distance travelled and the volume of the output column between the center electrical contact and the upper electrical contact are selected such that the count registered in the counter and displayed on the display is a direct reading of the fuel consumption rate.

4,092,852

MULTIPLEXED TRANSDUCER

Albert Lewis Fowler, Kirkcaldry; David Martin Walker, Frenchie; Alastair Kershaw Stevenson, Glenrothes, and Alan Graham Henderson, Markinch, all of Scotland, assignors to Hughes Microelectronics Limited, Glenrothes, Scotland

Filed Mar. 21, 1977, Ser. No. 779,587
Claims priority, application United Kingdom, Mar. 23, 1976, 11725/76; Apr. 30, 1976, 17857/76; Nov. 16, 1976, 47754/76
Int. Cl.² G01M *15/00*
U.S. Cl. 73—117.3 **29 Claims**



1. A transducer for producing electrical signals which are a function of a plurality of different parameters, comprising

(a) signal generating means for generating first and second signals having the same frequency characteristic;

(b) control means arranged to provide first and second phase relationships between said first and second signals during first and second periods respectively;

(c) a plurality of parameter sensing devices each for combining said first and second signals in relative proportions dependent upon the value of one of said parameters so as to derive a sum signal of said first and second signals;

(d) sum signal selecting means arranged to select sequentially sum signals from said plurality of parameter sensing devices, and

(e) means responsive to the sum signal from said selecting means and arranged to produce a phase measurement signal which is indicative of the difference in phase of the selected sum signal developed during said first and second

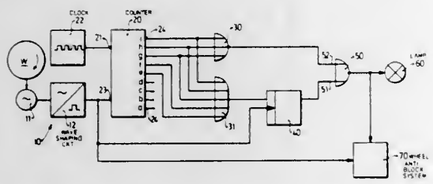
periods, whereby to derive sequentially a plurality of output signals each indicative of one of said parameters.

4,092,853

TESTING ROTARY MOVEMENT-ELECTRICAL SIGNAL TRANSDUCER SYSTEM, PARTICULARLY FOR VEHICLE WHEEL ANTI-BLOCK TRANSDUCER SYSTEMS

Erich Schneider, Kirchheim; Eberhard Schnaibel, Hemmingen, and Helmut Fleischer, Schwieberdingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 18, 1976, Ser. No. 733,125
Claims priority, application Germany, Oct. 25, 1975, 2547869
Int. Cl.² B60T *17/22*
U.S. Cl. 73—121 **7 Claims**



1. Method of testing a rotary movement — electrical signal transducer system providing pulses in synchronism with rotation of a rotary device having widely varying speeds, such as the wheel of an automotive vehicle, comprising the steps of

measuring the time duration of two successive pulses;

comparing the time duration of a first occurring pulse with a first predetermined time interval and having a first limited time duration with respect to a fixed longest time interval;

generating a first evaluation signal if the measured time duration of the first pulse exceeds said first limited time duration;

comparing the time duration of the second occurring pulse with a second predetermined time interval which is longer than said first predetermined time interval and having a second limited time duration with respect to said fixed longest time interval;

generating a second evaluation signal and forming a preliminary error, or malfunction signal if the measured time duration of the second occurring pulse exceeds said second limited time duration;

logically combining said first and second evaluation signals and

(a) inhibiting generation of the preliminary error signal if the first pulse is shorter than the first interval, and the second pulse is shorter than the second interval; (b) inhibiting transmission of the preliminary error signal if

the first pulse is longer than said first interval;

the first pulse is longer than the first interval and the second pulse is also longer than said second interval, indicative of deceleration of the wheel; and

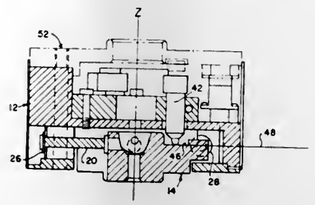
(c) transmitting said preliminary error signal if the first pulse is shorter than said first predetermined interval and the second pulse is longer than said second predetermined time interval.

4,092,854

MULTI-AXIS LOAD CELL

James L. Henry, and Carl F. Ruoff, Jr., both of Dayton, Ohio, assignors to The Bendix Corporation, Southfield, Mich.

Continuation of Ser. No. 615,852, Sep. 23, 1975, abandoned. This application Apr. 20, 1977, Ser. No. 789,032
Int. Cl.² G01L *5/16*
U.S. Cl. 73—133 R **8 Claims**



1. A multi-axis load cell comprising:

a housing assembly;

a hub member disposed in said housing assembly;

means for drivingly connecting said housing assembly and said hub member for relative displacement therebetween, said means including a plurality of flexure arms extending between said housing assembly and said hub member, said means including means fixing each of said flexure arms at one end to one of said housing assembly and said hub member;

said means drivingly connecting said housing assembly and said hub member also including flexure means mounting each of said flexure arms to the other of said housing assembly and said hub member, said flexure means readily deflecting to allow relative movement between each flexure arm and said other of said housing assembly or said hub member in a direction along the respective axis of each flexure arm while providing substantially greater resistance to relative movement in other directions; and

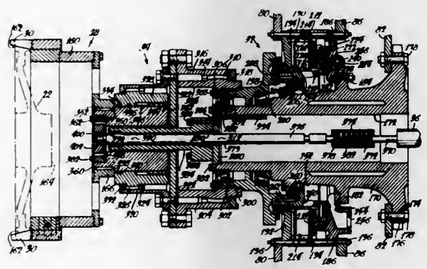
transducer means for measuring the relative displacement between said housing assembly and said hub member and generating signals corresponding thereto, said transducer means engaging one of said housing assembly and said hub member and fixed to the other, whereby the load exerted through the flexure arms may be determined.

4,092,855

DYNAMOMETER AND COUPLING FOR A TEST STAND

Lionel L. Kinney, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 28, 1977, Ser. No. 763,316
Int. Cl.² G01L *3/16*
U.S. Cl. 73—134 **15 Claims**



1. A dynamometer comprising:

a base;

a housing mounted on said base for rotation about an axis,

said housing including first and second parts relatively rotatable about said axis and defining a chamber;

interleaved brake discs defining a brake pack within said chamber, some of said discs carried by said first housing part and others carried by said second housing part;

a hydraulic piston within said chamber for compressing said pack;

axially directed coolant inlet and outlet ports in said housing and communicating with said chamber;

a transducer connected to one of said housing parts and to said base; and

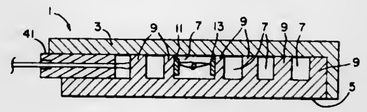
a rotatable chuck drivingly connected to the other of said housing parts.

4,092,856

KILOBAR RANGE STRESS GAUGE

Richard Kanda, Vicksburg, Miss., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 13, 1977, Ser. No. 796,649
Int. Cl.² G01L *7/02*
U.S. Cl. 73—141 A **9 Claims**



1. A free field stress gauge for use in stress fields up to and including the kilobar range, comprising:

an active disc having a plurality of elements, the density and modulus of said free field stress gauge being dependent upon the number of said plurality of elements and the material used to construct said free field stress gauge, said plurality of elements comprising a plurality of rings formed in one surface of said active disc, said plurality of rings being formed by cutting a plurality of grooves in one surface of said active disc;

a cover disc secured to said active disc to cover said active disc; and

means for sensing any stress applied to said free field stress gauge, said means for sensing any stress applied to said free field stress gauge being mounted on said active disc and comprising a plurality of strain sensors mounted on the inside of the innermost ring of said plurality of rings.

4,092,857

TENSIOMETER

John B. Lawson, Providence, R.I., assignor to Lawson-Hemphill, Inc., Central Falls, R.I.

Filed Jul. 5, 1977, Ser. No. 812,561
Int. Cl.² G01L *5/06*
U.S. Cl. 73—144 **1 Claim**

1. A rotating head tensiometer adapted for measurement of the tension on a running yarn, which comprises:

a handle,

a measuring head rotatably mounted on said handle and provided with walls surrounding an enclosure facing said handle;

a beam carried in said enclosure for rotation with said measuring head relative to said handle,

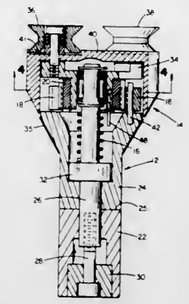
a pair of rollers rotatably mounted on said beam above said walls for rotation of said beam an amount proportional to yarn tension,

a toothed wheel carried by said beam therearound for rotation therewith, and

a plurality of escapements mounted therearound for oscillation about axes parallel to the axis of relative rotation of said handle and said measuring head,

each of the escapement axes being coincident with the center of inertia of the respective escapement,

each of said escapements being heavy, elongated, and having a pair of protuberances engaging the toothed surface of said toothed wheel, whereby moment of inertia is high even at low rates of head rotation and no



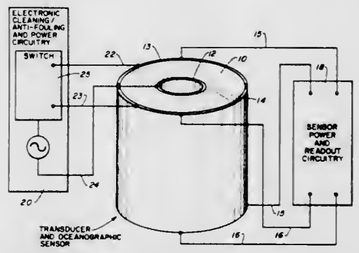
weight bias of the heavy escapements tend to change the tension reading at whatever angle said tensiometer is held.

4,092,858

OCEANOGRAPHIC SENSOR WITH IN-SITU CLEANING AND BIO-FOULING PREVENTION SYSTEM

Gene A. Edgerton, Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 635,552, Nov. 26, 1975, abandoned. This application Mar. 11, 1977, Ser. No. 776,578
Int. Cl.² G01R *3/00*
U.S. Cl. 73—170 A **17 Claims**



1. An oceanographic sensor system having the capability of both self-cleaning and bio-fouling prevention simultaneously while operating in a sensor mode while submerged, for removal of foreign materials thereon and the prevention of fouling thereof, comprising:

a. a transducer substrate element of suitable crystal substance and shape operable to be vibrated at or near a resonant frequency at various energy levels;

b. a plurality of separate sensor means fabricated on surfaces of said transducer substrate element as an integral part thereof;

c. at least two of said sensor means being on opposite sides of said transducer element;

d. said sensor means being electrically connected to sensor readout means;

e. an electrical means for providing an alternating electrical potential to vibrate said transducer element while said sensor means is operating in a sensor mode; means for connecting any of the sensor means on one side of the transducer element to one side of said electrical means and any of the conductive coatings on the opposite side of said transducer element to the opposite side of said power source for exciting the transducer substrate element to

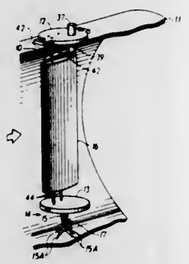
cause vibration thereof at desired frequencies to generate sonic energy which varies in energy intensity from levels which create acoustic streaming forces to intensities which cause cavitation forces to cause removal of any foreign fouling matter on the transducer element and integral sensor means by cavitation of the surrounding water and to prevent fouling due to marine organisms adhering to the sensor surface by acoustic streaming of water adjacent the surface thereof concurrently while oceanographic parameter measurements are being made by said sensor means.

4,092,859

OSCILLATING WING FLOWMETER

Joseph P. DeCarlo, Wrentham, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Filed May 31, 1977, Ser. No. 801,955
Int. Cl.² G01F *1/00*
U.S. Cl. 73—194 B **10 Claims**



1. A fluid flow meter comprising:
a first wing element;
a second wing element;
said wing elements extending longitudinally alongside each other;
said second wing element having an inner surface toward said first wing element, an opposite outer surface, a leading edge, and a trailing edge;
said second wing element being mounted for pivotal movement about an axis longitudinally thereof;
said axis being transversely nearer said leading edge than said trailing edge;
whereby said second wing oscillates at a frequency proportional to flow rate.

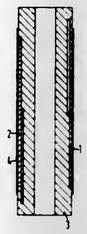
4,092,860

LEVEL MEASUREMENT AND CONTROL

Matheus Gijsbertus Jozef Arts, Burgemeester Mollaan 5, Waalre; Jozef Augustinus Elisabeth Spaan, Esdoornstraat 2, Nuenen; Antonius Gerardus Martinus v. Asseldonk, Outshoornstraat 33, and Johannes Augustinus Catharinus Maria de Maat, Cassandraplein 19, both of Eindhoven, all of Netherlands

Filed Oct. 14, 1975, Ser. No. 622,398
Claims priority, application Netherlands, Oct. 14, 1974, 7413475
Int. Cl.² G01F *23/24*
U.S. Cl. 73—304 R **10 Claims**

1. A method of measuring the level of a fluid or other suitable substance contained in a container, comprising the steps of: immersing a detector including at least two electrodes insulated from said fluid or substance in said fluid or substance, coupling said electrodes to a high-frequency voltage supply, and measuring the conductivity of said fluid or substance between said electrodes at a frequency such that the capacitance between each electrode and said fluid or substance is negligible, the impedance of said fluid or substance between said electrodes being indicative of the level of said fluid or



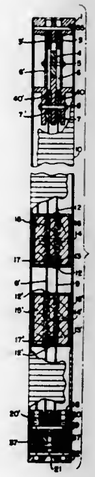
substance, the capacitive component of said impedance being negligible at the frequency of said voltage supply.

4,092,861

LIQUID LEVEL MEASURING DEVICE

William F. Fling, 351 S. Fuller Ave., Apt. 35, Los Angeles, Calif. 90036

Filed Feb. 14, 1977, Ser. No. 768,642
Int. Cl.² G01F *23/06*
U.S. Cl. 73—311 **11 Claims**



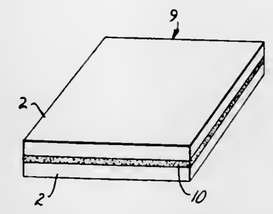
1. A liquid level measuring device for simultaneously measuring the liquid levels of two liquids in a container, said device comprising:
(a) an elongated frame insertable into the liquids in said container;
(b) two floats of different buoyancies;
(c) means for mounting said floats so that each float is movable along said frame by the buoyant forces of the respective liquids; said mounting means comprising two endless guide cables, means for mounting each guide cable on said frame for independent movement relative to said frame, and means for mounting each float on a respective endless guide cable;
(d) manually operable means for selectively holding said floats in a fixed position relative to said frame; said holding means being mounted adjacent one end of said frame for engaging each endless guide cable to hold the same in a fixed position relative to said frame.

4,092,862

THERMAL GRADIENT TEMPERATURE SENSOR

Allen L. Taylor, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing, St. Paul, Minn.

Continuation of Ser. No. 467,015, May 4, 1976, abandoned. This application May 24, 1976, Ser. No. 689,133
Int. Cl.² G01B *7/16*
U.S. Cl. 73—362 CP **10 Claims**



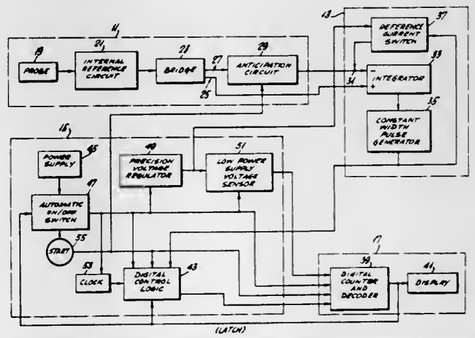
1. A temperature sensor for placement in thermal contact with an object for providing a detection of the thermal gradient of the object, which sensor comprises:
a layer of thermally sensitive, compliant, polymeric, poled, electrically nonconductive pyroelectric material comprising two uniformly poled pyroelectric sheets adhesively joined together in surface-to-surface contact to form a relatively stiff midsection in said layer about which the sheets of said layer bend; and
an electrically and thermally conductive layer carried on not more than one broad surface of said layer for placement in surface-to-surface contact with at least a portion of said object, said pyroelectric layer producing an electrostatic charge pattern on its surfaces which varies in accordance with the thermal gradient of the portion of the object that said conductive layer contacts.

4,092,863

ELECTRONIC THERMOMETER CIRCUIT

Robert B. Turner, Weymouth, Mass., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Jan. 12, 1977, Ser. No. 758,630
Int. Cl.² G01K *7/24*
U.S. Cl. 73—362 AR **8 Claims**



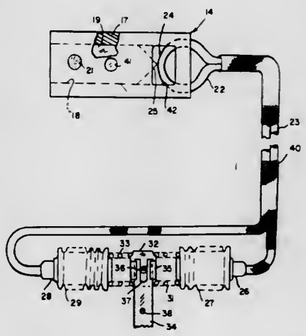
1. An electronic thermometer system comprising: a temperature sensing circuit for providing an analog signal representative of a temperature being sensed, said temperature sensing circuit including a temperature sensing probe, a bridge circuit connected thereto, and an anticipation circuit means connected to the output of said bridge circuit, said anticipation circuit means including (i) means for providing a first output signal representative of a reference temperature signal, and (ii) means for generating a second output signal having seriate first and second portions, said first portion being representative of said sensing probe heat transfer response curve, and said second portion being a further scaled representation of said first portion, said means for generating including means for developing said second portion by scaled combination of respective first and second components, said first component involving a first multiplication scale factor and said second component involving a second multiplication scale factor, said means for developing applying said scale factors to respectively associated representations of said response curve;
a voltage to rate converter circuit responsive to said first and second output signals from said anticipation circuit for providing constant width and amplitude pulses proportional to the temperature being sensed;
a power and control circuit connected to said temperature sensing circuit and to said voltage to rate converter so as to control their operation; and
a counting circuit having a display driven by a digital counter and decoder for displaying the temperature being sensed, said counting circuit being connected to said voltage to rate converter through said power and control circuit.

4,092,864

HOT SPOT THERMOMETER

Robert F. Romanowski, Rochester, N.Y., assignor to Qualitrol Corporation, Fairport, N.Y.

Filed Aug. 4, 1976, Ser. No. 711,538
Int. Cl.² G01K *5/48*
U.S. Cl. 73—363 **6 Claims**



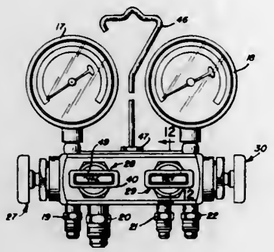
1. The combination comprising an electrical transformer apparatus having a tank containing cooling oil in which the coils of a transformer winding are immersed, and a hot spot thermometer unit having a ceramic body inserted into a space between the coils, a flexible tubing filled with fluid, a bellows connected to each of the ends of the tubing adapted to cause the fluid to oscillate about the tubing accordingly as one or the other of the bellows is actuated, a rocker arm cooperable with the bellows to alternately actuate one and then the other of the bellows, a loop formation in the tubing disposed in a recess in the body, a heat sensitive element arranged in the recess having a tapered end abutting the loop, the heat sensitive element adapted upon sensing a predetermined rise in temperature to expand its tapered end into squeezing relation with the tubing and causing as a consequence a restriction in the flow of the fluid in the tubing and a corresponding loading of the rocker arm.

4,092,865

FLUID-TEST APPARATUS

Richard V. Strybel, Elk Grove Village, Ill., assignor to Gould Inc., Cleveland, Ohio

Filed Jun. 24, 1976, Ser. No. 699,537
Int. Cl.[2] G01L 7/00
U.S. Cl. 73—756 **6 Claims**



1. In a fluid-test apparatus such as for use in testing a refrigeration system having a high pressure side and a low pressure side, said apparatus having a body defining a manifold chamber, the improvement comprising: first connector means having a first manually operable valve for selectively providing a first fluid communication through said body to said manifold chamber; second connector means having a second manually operable valve for selectively providing a second fluid communication through said body to said manifold chamber; third connector means having a third manually operable valve for selectively providing a third fluid communication through said body to said manifold chamber; fourth connector means having a fourth fluid communication through said body to said manifold chamber; and gauge means for indicating a fluid condition communicating with said manifold chamber, each of said connector means including a connector fitting secured to said body, means defining a passage in said body extending between the connector fitting and the manually operable valve to be closed by the valve when the valve is in a closed condition and to have communication with the manifold chamber when the valve is in an open condition, the connector fitting and passage of one of said connector means having a preselected flow capacity at least the cumulative flow capacity of the connector fitting and passage of at least two of the other connector means, the manually operable valves of each of said connector means comprising similar size diaphragm valves permitting flow of fluid serially through said one connector means and a parallel connection of at least two of the other connecting means with effectively maximum cumulative flow permitted by said at least two other connecting means whereby application of a vacuum to said one connector means permits concurrent full capacity evacuation of the low and high sides of the refrigeration system through two of the other connector means respectively.

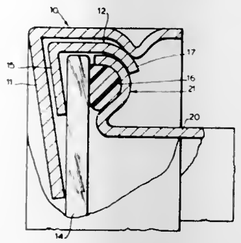
4,092,866

PRESSURE GAUGE CASE

Raymond D. Miele, Jr., Springfield, N.J., and Roy E. Watson, Marshalltown, Iowa, assignors to Eltra Corporation, Toledo, Ohio

Filed Mar. 14, 1977, Ser. No. 777,209
Int. Cl.[2] G01D 11/26; G04B 39/00
U.S. Cl. 73—431 **6 Claims**

1. An instrument case comprising:
a container having at least one open end,
a window,
an arcuately shaped flange on the peripheral edge of the open end
an expandable split collar having end portions formed to receive the peripheral edge of said flange and the peripheral edge of said window,
a ring which snaps in place around said collar and causes it to contract,
said end portion resiliently pressing said window against at least a portion of said flange when contracted, and



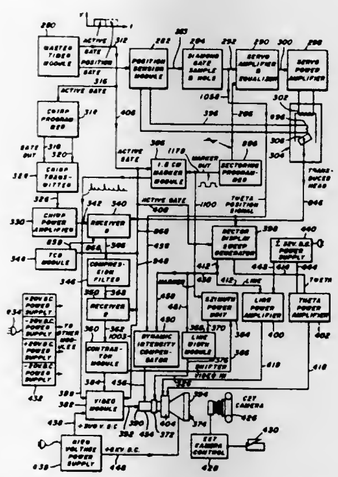
said ring and collar being removably locked in place on the container when said ring snaps in place.

4,092,867

ULTRASONIC SCANNING APPARATUS

Terrance Matzuk, 154 Eileen Dr., Pittsburgh, Pa. 15214

Filed Feb. 10, 1977, Ser. No. 767,376
Int. Cl.[2] G01N 29/04
U.S. Cl. 73—609 **46 Claims**



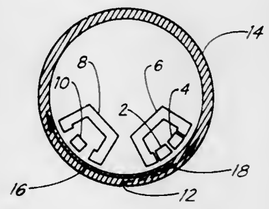
1. Ultrasonic scanning apparatus for insonifying a specimen comprising:
a housing,
an ultrasonic transducer disposed within said housing and mounted for movement in a predetermined path therewithin,
magnetic means for effecting movement of said transducer in said predetermined path,
electrical means for energizing said transducer and receiving signals therefrom,
said magnetic means including permanent magnet means and electromagnetic means,
energizing means for electrically energizing said electromagnetic means,
position sensing means for determining the position of said transducer within said predetermined path,
said position sensing means being disposed out of direct physical contact with said specimen, and
signal processing means for comparing a position signal from said position sensing means and another signal which indicates a desired position of said transducer and emitting a position correcting signal if a difference in said signals exists, whereby
said transducer may be moved in a continuously controlled manner in said predetermined path within said housing independently of the position or movement of said housing with automatic correction for departures of said transducer from a desired position on said predetermined path, by position sensing means disposed out of direct physical contact with said specimen and cooperating with said signal processing means.

4,092,868

ULTRASONIC INSPECTION OF PIPELINES

Robert B. Thompson; George A. Alers, both of Thousand Oaks, and Marion A. Tennison, Camarillo, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 12, 1976, Ser. No. 731,199
Int. Cl.[2] G01N 29/04
U.S. Cl. 73—638 **7 Claims**



1. An inspection station for a pipe comprising:
a moveable carriage positionable inside the pipe;
means for moving said carriage through the pipe;
a first magnet mounted on said carriage so that the poles of said magnet are spaced apart, close to the inside surface of the pipe when said carriage is positioned within the pipe;
an ultrasonic Lamb wave transmitter coil and a first receiver coil mounted between said poles;
a second magnet mounted on said carriage a predetermined distance from said first magnet;
a second receiver coil mounted between the poles of said second magnet;
electronic means for driving said transmitter carried by said carriage;
electronic means for receiving signals from said first and said second receivers carried by said carriage;
a recorder carried by said carriage and coupled to said electronic receiving means for recording said signals; and
a battery for powering said electronic driving and receiving means, and said recorder, whereby the portion of the pipe between said first and second magnets can be inspected by ultrasonic Lamb waves reflected by non-uniformities and ultrasonic Lamb waves transmitted past said non-uniformities as said carriage is moved through the pipe.

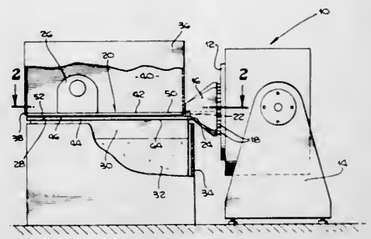
4,092,869

SLIP PLATE ASSEMBLY FOR VIBRATION TESTING THROUGH TEMPERATURE EXTREME THERMAL CYCLING

David V. Kimball, Claremont, Calif., assignor to Kimball Industries, Inc., Monrovia, Calif.

Filed May 9, 1977, Ser. No. 795,183
Int. Cl.[2] G01N 29/00
U.S. Cl. 73—665 **15 Claims**

1. A slip plate assembly for shaker-head generated vibration testing of a test piece being exposed to thermal cycling between preselected test temperature extremes in a closed environment, said assembly comprising: spaced, generally parallel and congruent plate elements including a first plate element beyond said closed environment for coupling of the assembly to said shaker head, and a test piece-carrying, test temperature dimensionally-responsive second plate element adapted to be exposed in said closed environment; and pin means defining a



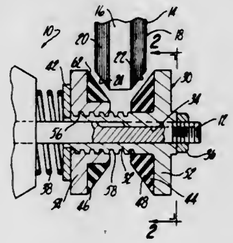
singular locus of vibration transmitting connection of said first plate element to said second plate element in dimensionally temperature responsive relation.

4,092,870

ENGINE STARTING MECHANISM

Paul Francis Giometti, Horseheads, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed Aug. 30, 1976, Ser. No. 718,510
Int. Cl.[2] F02N 11/00; F16D 13/28, 43/20
U.S. Cl. 74—7 R **6 Claims**



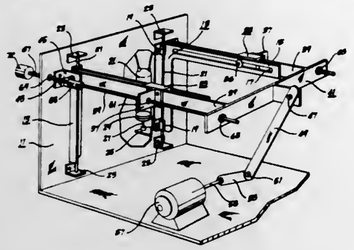
1. An engine starting mechanism for rotating an engine mounted disc having opposed faces, said starting mechanism comprising:
a starter motor;
a starter shaft selectively rotated by the starter motor;
a sleeve member surrounding the starter shaft;
means acting between the starter shaft and sleeve member to rotate the sleeve member with the starter shaft and permit axial movement of the sleeve member relative to the starter shaft;
an inertia member surrounding the sleeve member;
first and second annular frictional gripping members respectively mounted on the sleeve member and the inertia member and adapted for engagement with the opposed faces of the engine mounted disc;
and helical means mounting the inertia member on the sleeve member so that upon initiation of rotation of the starter shaft the inertia member is moved axially of the sleeve member to carry the second frictional gripping member toward the first frictional gripping member whereby the opposed faces of the disc are drivingly engaged by the frictional gripping members to rotate the disc with the starter shaft.

4,092,871

PRECISION DRIVE MECHANISM FOR CONVERTING FIXED RECIPROCATING MOTION TO ADJUSTABLE RECIPROCATING MOTION

Patrick J. Cunningham, Fullerton, Calif., assignor to Dyne Corporation, Anaheim,.Calif.

Filed Feb. 9, 1976, Ser. No. 656,406
Int. Cl.[2] F16H *21/32*
U.S. Cl. 74—40 6 Claims



1. Precision drive mechanism for converting fixed arcuate reciprocating motion into adjustable reciprocating rectilinear motion, comprising:

a base member adapted to receive a drive plate in slidable connection therewith;

a first drive plate having an elongated slot therein, said drive plate being slidably attached to said base member to provide rectilinear motion of said drive plate with respect to said base member;

a first pivot frame having an elongated arm of which one end is pivotally attached to said base member, the other end of said elongated arm being adapted to be connected to a source of fixed arcuate reciprocating motion;

a first bearing member slidably attached to said elongated arm of said pivot frame and substantially movable over the entire length thereof, said bearing member being adapted to threadably engage lead screw means;

first lead screw means for threadably engaging said bearing member and being rotatably attached to said pivot frame, said lead screw means moving said bearing member along said elongated arm of said pivot frame when said lead screw is rotated;

First turning means attached to said first lead screw means for adjustably rotating said first lead screw means, said first turning means having a projecting pin extending radially outward from said first lead screw means adjacent the end of said first lead screw means, a drive shaft rotatably mounted to said base member and having one end adapted to be turned with the other end thereof having a projecting pin extending radially outward therefrom, and a hollow cylindrical connector having two ends with each end having at least one longitudinal slot therein where one end of said hollow cylindrical connector is in sliding movable contact over the end of said first lead screw means with said at least one longitudinal slot engaging said projecting pin therein and the other end of said hollow cylindrical connector is in sliding movable contact over said other end of said drive shaft with said at least one longitudinal slot engaging said projecting pin of said drive shaft whereby said first lead screw means can pivot in reciprocating angular motion with respect to said drive shaft and said drive shaft can be turned to rotate said first lead screw means; and

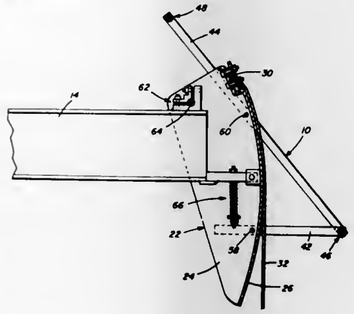
first connecting means fixedly attached to said first bearing member for slidably connecting said first drive plate through said elongated slot to said first bearing member whereby said first drive plate is moved in reciprocating rectilinear motion with respect to said base member by said first pivot frame when said other end of said elongated arm of said first pivot frame is connected to a source of fixed arcuate reciprocating motion, the magnitude of the reciprocating motion of said first drive plate being adjustable by moving said first bearing member along said elongated arm of said first pivot frame by rotating said first lead screw means.

4,092,872

SAFETY ATTACHMENT FOR THE HORSEHEAD OF AN OIL WELL PUMPING UNIT

L. C. McClure, P.O. Box 505, Midland, Tex. 79701

Filed Jul. 1, 1976, Ser. No. 703,551
Int. Cl.[2] F16H *21/32*
U.S. Cl. 74—41 4 Claims



1. In combination with an oil well pumping unit comprising a walking beam oscillatable in a vertical plane about substantially a horizontal axis, a horsehead on one end of the beam and including a pair of side plates and an arcuate plate defining the face of the horsehead, a wire line assembly connected to the upper end of the arcuate face of the horsehead and connected to a polished rod at the lower end thereof, that improvement comprising an attachment for retaining the wire line assembly in overlying relation to the arcuate face to prevent bending of the polished rod during an upward movement of the horsehead in the event the polished rod does not move to its lowest position during a previous downward movement, said attachment comprising a pair of laterally spaced strap assemblies with each strap assembly including a pair of angularly disposed components connected together by a transverse spacing and pivoting assembly oriented in spaced, generally parallel relation to the arcuate face of the horsehead, means securing the free end portions of the components to the side plates of the horsehead to prevent the wire line assembly from falling off the edges of the arcuate face of the horsehead.

4,092,873

CONVERTING CONTINUOUS ROTARY MOTION

Saburo Murakami, Sakai, Japan, assignor to Wataru Shimokawa, Japan

Filed Nov. 25, 1975, Ser. No. 635,209
Claims priority, application Japan, Nov. 29, 1974, 49-136319; Oct. 21, 1975, 50-125843
Int. Cl.[2] F16H *27/04*
U.S. Cl. 74—82 10 Claims

1. Apparatus for converting a continuous rotary motion of a drive shaft into a rocking motion of a driven shaft, comprising:

(i) a drive shaft

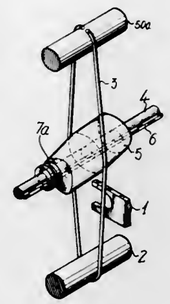
(ii) a profile cam member mounted on said drive shaft for rotation therewith, said cam member being axially slidable on said drive shaft, said cam member being circular at its axial center, said cam member having at each side of said axial center respective portions which have contours with a substantially triangular cross-section with rounded corners, each such portion of said cam member having opposed arcuate surfaces, the radius of one such opposed surface decreasing and the radius of the other of such opposed surfaces increasing considered in the direction from said axial center towards the other end of each portion,

(iii) a driven shaft having its axis of rotation parallel to the axis of rotation of the drive shaft

(iv) a structural member mounted in fixed spaced relationship with respect to the axes of the drive shaft and driven shaft

(v) a cam follower comprising a pair of inextensible strands secured at a first end to said structural member and coupled at their second end to the driven shaft at a radial spacing from said driven shaft, said strands lying in a plane normal to the axis of the cam member, said strands being respectively in continuous abutment each with a diametrically opposed portion of the cam surface,

whereby as said cam member rotates and causes radial movements of said strands the driven shaft is caused to rock about its axis, the rocking motion being variable by axial shifting of the cam member to bring different contours of the cam member into abutment with the strands.

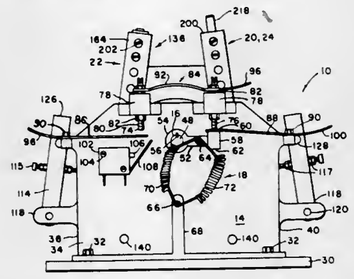


4,092,874

ACTUATOR MECHANISM

William C. Stange, Ellicott City, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 596,787, Jul. 17, 1975, Pat. No. 4,010,455. This application Dec. 6, 1976, Ser. No. 747,675
Int. Cl.[2] F16H *21/44*
U.S. Cl. 74—100 R 24 Claims



1. An actuator mechanism comprising:

frame means;

shaft means rotatably supported in said frame means;

means for positioning said shaft means in at least two rotary positions;

at least one pair of plunger means coupled to said shaft means, each of said plunger means being responsive to a control signal for applying bidirectional rotation to said shaft means respectively; and

coupling means joined between said shaft means and each of said plunger means, said coupling means including;

sleeve means surrounding said shaft means and in sliding engagement therewith, said sleeve means having an elongated aperture extending therethrough for exposing said shaft means, and

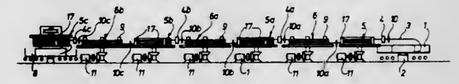
pin means connected to said shaft means and radially extending through said aperture, said pin and shaft means being slidable within said aperture and sleeve means respectively for a determinable angle before said pin means contacts said sleeve means.

4,092,875

TUBE DRAWING METHOD AND APPARATUS

Otto Uhlmann, Burgdorf, and Norbert Stephan, Hanover, both of Germany, assignors to Marshall Richards Barcro Limited, Crook, England

Filed Feb. 11, 1977, Ser. No. 767,761
Claims priority, application Germany, Feb. 20, 1976, 2606809
Int. Cl.[2] B21C *1/10*
U.S. Cl. 72—275 8 Claims



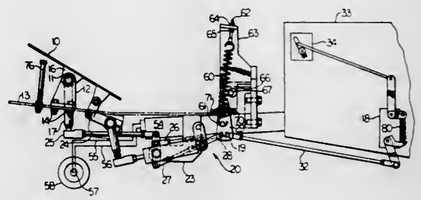
1. A method of continuously drawing a succession of tube lengths having a plurality of successive drawing steps at a plurality of successive drawing stages respectively, each comprising a tube drawing die, a floating plug within the tube upstream of the die, and a downstream rotatable draw block operable for drawing the tube through the die, comprising the steps of selectively accumulating the tube between successive drawing stages while temporarily and separately discontinuing the drawing step at either stage and continuing the drawing step at the other stage; separately inserting each stage floating plug into the leading end of each oncoming tube length and then threading the leading end of the oncoming tube length through the die and if the oncoming tube length is a succeeding tube length, joining the leading end thereof to the trailing end of the preceding tube length, and operating the respective draw block for drawing the oncoming tube length through the die; and temporarily and separately discontinuing each drawing step and removing each end joint of successive tube lengths between stages, for the said inserting, threading and joining steps.

4,092,876

THROTTLE CONTROL SLIDER

James Harrie Povejsil, Willoughby, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Feb. 7, 1977, Ser. No. 766,101
Int. Cl.[2] G05G *9/00*; B60K *41/00*
U.S. Cl. 74—478 8 Claims



1. A linkage assembly comprising:

a frame member;

a pivot shaft mounted relative said frame;

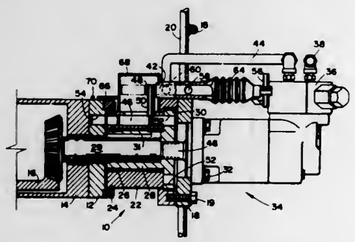
an operator responsive pedal member mounted on said pivot shaft and rotatable thereabout in a pivoting motion from a neutral position in first and second directions;
first link means connected with said pedal for translating pivoted motion of said pedal to rotational motion;
a control rod reciprocally mounted relative said frame and movable in third and fourth directions;
bias means for biasing said control rod in said fourth direction;
second link means operably connecting said pedal member with said control rod for causing said control rod to move only in said third direction while said pedal member is rotated from its neutral position in said first and said second direction;
said second link means comprising a first arm affixed to and rotatable with said pivot shaft, a second arm coupled with said first arm and extending at generally right angles therefrom, an elongated lever mounted generally at its midpoint for rotation on said frame with said second arm coupled at one end of said lever, first and second lost motion links coupled with said lever each on opposite sides of the mounting thereof and extending outwardly in the same general direction; and, coupling means for associating said lost motion links with said control rod.

4,092,877

SELECTIVE MODE HANDWHEEL VALVE OPERATOR

Howard L. Ledeen, Pasadena; Franz Schmon, Granada Hills, and Willem E. Tupker, Sylmar, all of Calif., assignors to Ledeen Flow Control Systems Inc., Sun Valley, Calif.

Filed Mar. 14, 1977, Ser. No. 777,134
Int. Cl.² F16K *31/05*
U.S. Cl. 74—625 **14 Claims**



1. A selective mode valve operator comprising:
a stationary member adapted to be mounted on a valve body;
an output sleeve rotatable on said stationary member;
means on said output sleeve adapting it for rotary driving connection to a valve operating input shaft;
a handwheel coaxial with said output sleeve;
a hub extension on said handwheel;
a rotary motor drive having an output shaft adapted when activated for driving engagement with said output sleeve;
shift means for selectively locking said handwheel to one of said stationary member and said output sleeve; and
means preventing driving operation of said rotary motor when said handwheel is locked to said output sleeve.

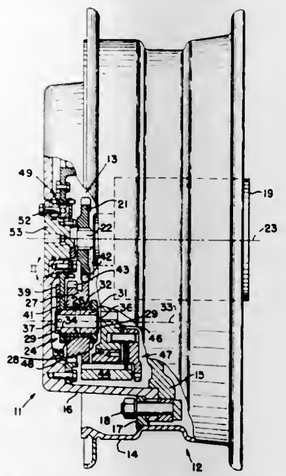
4,092,878

FLOATING CARRIER RETENTION FOR A PLANETARY GEARSET

John J. Campbell, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 19, 1976, Ser. No. 743,384
Int. Cl.² F16H *1/28, 3/44*
U.S. Cl. 74—801 **12 Claims**

1. In a planetary gearing system, the combination comprising:
at least one sun gear defining a primary rotational axis,
at least one ring gear disposed in coaxial relationship with said sun gear and being of greater diameter than said sun gear,
at least one planet gear disposed between said sun gear and said ring gear and being engaged with each thereof, said planet gear having a secondary rotational axis which moves along an orbital path around said primary rotational axis upon differential rotation between said sun gear and said ring gear,
positioner means having an annular groove which is coaxial with said sun gear and said ring gear and of smaller diameter than said orbital path, said groove having axially spaced-apart wall surfaces, and
an annular planet gear carrier carrying said planet gear and being disposed for rotation about said primary axis as said planet gear orbits therearound, said planet gear carrier being of the floating form capable of limited nonrotational movements relative to said sun gear and ring gear, said planet gear carrier having an annular inner edge extending into said groove of said positioner means whereby axial movement of said carrier and said planet gear is restricted.

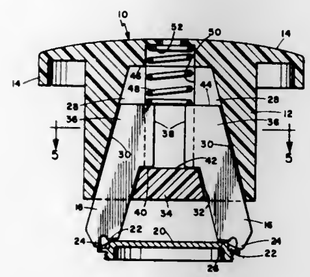


4,092,879

SCREW BACK REMOVAL TOOL

Gilbert Villanueva Hernandez, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 10, 1977, Ser. No. 767,300
Int. Cl.² G04D *3/00*; B25B *13/18*
U.S. Cl. 81—6 **12 Claims**



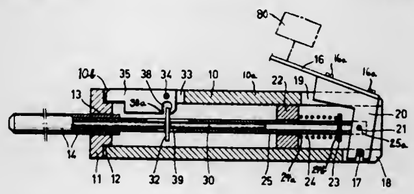
1. A self adjusting spanner wrench comprising:
a generally cylindrical body having a handle end and a gripper end,
a plurality of guide slots formed in said body and extending axially and radially thereof, and including cam means defined by each of said slots,
a gripper member slideably mounted in each of said slots and including a gripper prong extending from the gripper end of said body, said gripper member disposed in engagement with said cam means, for radial movement in response to said cam means upon axial movement within said slot, and
biasing means within said body for biasing said gripper members to the outermost position in said guide slots.

4,092,880

APPARATUS FOR STRIPPING INSULATION FROM AN ELECTRICAL CONDUCTOR OR THE LIKE

Kurt Kaufmann, Kloten, Switzerland, assignor to Contraves AG, Zurich, Switzerland

Filed Apr. 4, 1977, Ser. No. 784,261
Claims priority, application Switzerland, Apr. 22, 1976, 5042/76
Int. Cl.² H02G *1/12*
U.S. Cl. 81—9.5 A **12 Claims**



1. An insulation stripping apparatus for partially removing an end section of insulation sheathing of an electrical conductor or the like, comprising:
a housing;
a thrust rod;
a restoring spring for exerting a restoring force upon said thrust rod;
means mounting said thrust rod to be axially displaceable in said housing against the restoring force of said restoring spring;
a holder clamp;
means for operatively connecting the holder clamp with said thrust rod;
a stripper clamp arranged in said holder clamp;
a traction rod arranged in said thrust rod;
means for operatively connecting said stripper clamp with said traction rod;
a sleeve member fixed to said housing;
said holder clamp together with said thrust rod and said stripper clamp being guided to be axially displaceable in said sleeve member;
said holder clamp together with said thrust rod and said stripper clamp together with said traction rod conjointly being guided to be axially displaceable during a holding- and cutting operation at which time the conductor is held and its insulation cut, whereas said stripper clamp together with said traction rod is guided to be axially displaceable relative to said holder clamp during a removal operation when the cut-through insulation of the conductor is removed.

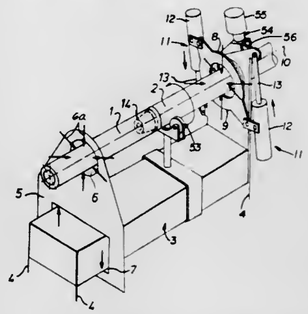
4,092,881

APPARATUS FOR MAKING-UP AND BREAKING THREADED PIPE CONNECTIONS

Rainer Jürgens, and Alfred Ostertag, both of Celle, Germany, assignors to Christensen, Inc., Salt Lake City, Utah

Filed Oct. 29, 1976, Ser. No. 736,728
Int. Cl.² B25B *13/50*
U.S. Cl. 81—57.34 **18 Claims**

1. Apparatus for the making-up and breaking of thread connections between tubular bodies and between drill strings and drilling tools for well bore drilling, comprising a supporting structure, a stationary bearing rack supported on said structure, a turnable fluid operated chuck seated on said bearing structure, a supporting rack mounted on said supporting structure for movement therealong towards and away from said bearing rack, a non-turnable fluid operated chuck mounted on said supporting rack in alignment with said turntable chuck to define a main axis therewith, said racks having coaxial openings through which the threaded tubular bodies can extend, a fluid operated torque producer for turning the



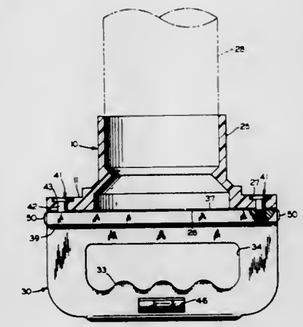
turnable chuck relative to the non-turnable chuck during clamping engagement between the chucks and threaded tubular bodies therein, said supporting structure being formed by an elongated distortion-free unitary support beam disposed parallel to said main axis and defining the path of movement of said supporting rack, said stationary bearing rack and supporting rack being mounted between the end portions of said support beam and on the exterior of said unitary support beam to be supported thereby.

4,092,882

WATER CLOSET FLANGE WRENCH AND PULLER

Floyd Evans Whitmore, Ellington, Conn., assignor to Whitmore Tool & Die Co., Inc., Vernon, Conn.

Filed Jan. 16, 1976, Ser. No. 649,734
Int. Cl.² B25B *13/02*
U.S. Cl. 81—90 C **6 Claims**



1. A tool for the installation, alignment and removal of the water closet flange comprising:
a. a base element having a length at least as long as the diameter of the water closet flange, and a width sufficient to push the water closet flange onto a soil pipe;
b. a pair of line-up studs engagable with a respective pair of bolt head receiving slots in said water closet flange, said studs having a cylindrical body with a diameter of such size as to be accommodated in the bolt head receiving slot

and fixedly attached at a first end to a bottom surface of the base element;

c. a head element attached to a second end of the cylindrical body having a diameter larger than the cylindrical body and slidably and fixedly engagable in the bolt head receiving slot in the water closet flange, said cylindrical body having a length such that the head element when engaged in the water closet flange does not extend beyond the bottom surface of the water closet flange;

d. a handle attached to a top surface of the base element in a perpendicular relation to the base element; and

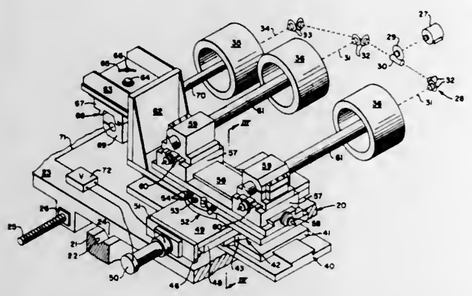
e. a spirit level mounted in a cavity in said tool for indicating the alignment of the water closet flange bolt head receiving slots for proper mating with a water closet.

4,092,883

LINEAR SLIDE AND SWIVEL ARRANGEMENT FOR A DIE MOLD LATHE

James J. Kindelan, Greensburg, Pa., assignor to Overmyer Mould Company of Pennsylvania, Greensburg, Pa.

Filed Jan. 14, 1977, Ser. No. 759,339
Int. Cl.² B23B *3/34, 3/28*
U.S. Cl. 82—3 **17 Claims**



1. In a machine tool having a saddle displaced by a driven feed member longitudinally along a bed for movement parallel to the rotational axis of chuck means adapted to support at least one workpiece at one end of the bed while the chuck is rotated by a drive in a predetermined relation to the rotation of a pattern at a laterally-displaced location where a tracer probe produces a signal corresponding to a desired movement of tool means to duplicate a surface contour of the pattern in the workpiece, the combination comprising:

a linear slide means including a linearly-displaced member to simultaneously reciprocate said tracer probe and said tool means along parallel directions of attack in response to said signal produced by the tracer probe to move the tool means for duplicating surface contours of the pattern in the workpiece,

a lower swivel means including a member rotatable about a generally vertical axis while supported by said saddle to adjustably select a desired angle between said directions of attack and the rotational axis of said chuck means,

an upper swivel means essentially consisting of a single upper swivel member rotatable about a single generally vertical axis upon a swivel support surface carried by the linearly-displaced member of said linear slide means, said single upper swivel member supporting and angularly positioning said tool means and said tracer probe means to always extend from the single upper swivel member in a generally parallel relation with the rotational axis of the chuck means,

tool holder means receiving said tool means for support by said single upper swivel member,

a carrier frame carrying said tracer probe for support by said single upper swivel member, and

fluid-actuator means coupled to said linear slide means to reciprocate said tracer probe and said tool means along said parallel directions of attack while the tracer probe and tool means extend from said single upper swivel member in the generally parallel relation with the rotational axis of the chuck means.

13. In a machine tool having drive spindles with chucks rotatable about parallel, horizontal axes while separately supporting a pair of die molds for machining by simultaneously movable tools carried by elongated bars that are controllably positioned in response to a tracer probe output signal corresponding to internal surface contours in a master mold while the mold is rotated about an axis parallel to said horizontal axes at a laterally-displaced location from said chucks, said machine tool including a saddle displaced by a driven feed member longitudinally of a bed along a course of travel toward and away from said chucks and generally parallel with said horizontal axes, the combination including:

linear displacement means carried by said saddle to simultaneously reciprocate said tools along parallel directions of attack to machine a design into the internal surfaces of said pair of die molds,

first swivel means supporting said linear displacement means upon said saddle to adjustably select a desired angle between said directions of attack and said horizontal axes,

second swivel means supporting said tools while carried by said linear displacement means to angularly position said bars while carrying said tools so that the bars extend in a generally-parallel relation with said horizontal axes,

a follower bar including a tracer probe at one end for movement along the internal surface contours in said master mold, and

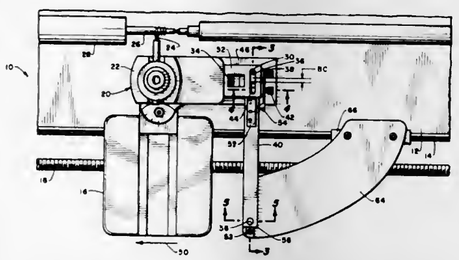
a swivel carrier frame supported by said second swivel means to angularly position said follower bar while carrying said tracer probe so that said follower bar extends in a generally-parallel relation with said horizontal axis while reciprocated by said linear displacement means.

4,092,884

LATHE ADAPTER FOR NON-STANDARD THREAD MACHINING

Ellwood J. King, 2750 Elmira St., Newbury Park, Calif. 91320

Filed May 19, 1977, Ser. No. 798,724
Int. Cl.² B23B *1/00*
U.S. Cl. 82—5 **25 Claims**



15. In a lathe having a carriage for driving a compound tool rest consisting of an upper block and a lower block, a lead screw for driving said carriage, and means for setting said lathe for cutting standard thread sizes, the improvement comprising:

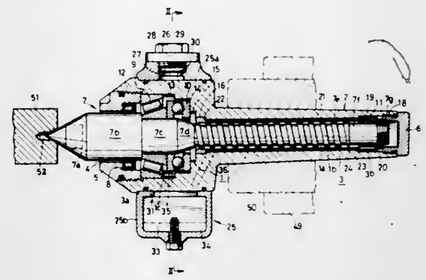
drive means for driving said upper block a predetermined incremental amount independent of and proportional to the movement of said carriage whereby said lathe may be set to cut threads any size between said standard settings.

4,092,885

CENTER FOR LATHES

Kiyotaka Kohori, 40-4 3-chome, Aoyamadai, Suita, Osaka, Japan

Filed Jun. 6, 1977, Ser. No. 803,857
Claims priority, application Japan, Jun. 9, 1976, 51-68115
Int. Cl.² B23B *23/04*
U.S. Cl. 82—33 R **11 Claims**



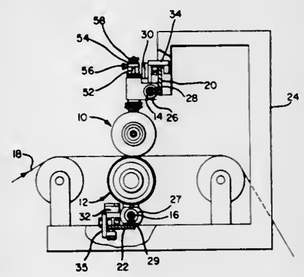
1. A center for lathes comprising a tubular casing with its interior serving as an oil chamber, a center rod fitting in the casing and having a conical front end projecting from the casing, front bearings and a rear bearing provided between the casing and the center rod, an oil feeding screw portion positioned between the front bearings and the rear bearing and formed on the center rod, and an oil reservior provided on the casing, forward and return oil channels extending between the oil reservoir and the oil chamber to permit the whole oil in the reservoir and the chamber to circulate within the center.

4,092,886

METHOD AND APPARATUS FOR SLITTING A CONTINUOUS WEB OF MATERIAL

Heinz K. Nowisch, Fulton, N.Y., assignor to The Black Clawson Company, Middletown, Ohio

Filed Jun. 13, 1977, Ser. No. 806,156
Int. Cl.² B26D *1/24*
U.S. Cl. 83—56 **7 Claims**



6. A method of lengthwise slitting a continuous web of material utilizing upper and lower disc-shaped web slitting members disposed on opposite sides of said web with their peripheral edge portions in engagement with one another where said web passes therebetween, said lower web slitting member being driven by a motor means having an armature mounted on a drive shaft also supporting said lower web slitting member, said method comprising the steps of:

activating said motor means for a sufficient time to bring said outer peripheral edge portion of said lower web slitting member up to substantially the same speed as movement of said web;

deactivating said motor means;

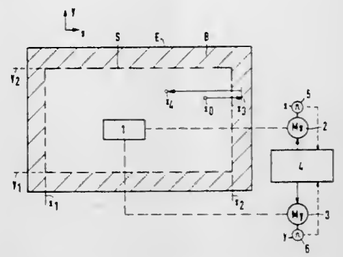
continuing to drive both said upper and lower web slitting members so as to slit said web by frictional engagement between said slitting members and said web.

4,092,887

METHOD FOR AUTOMATICALLY VARYING THE FEED RATE OF A WORKPIECE CARRIAGE IN A MACHINE TOOL

Günter Brömer, Spardorf, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Jun. 2, 1977, Ser. No. 802,968
Claims priority, application Germany, Jun. 28, 1976, 2628961
Int. Cl.² G05B *19/18*
U.S. Cl. 83—56 **1 Claim**



1. In a method for automatically varying the feed rate of a moving workpiece carriage in the proximity of permissible terminal positions for the carriage in a machine tool including a numerical control means for controlling the position of the workpiece carriage and means for determining the position of the workpiece carriage in the machine tool, the improvement comprising

storing signals corresponding to a plurality of safety positions of said workpiece carriage located within said terminal positions of said workpiece carriage in a memory device provided in said numerical control means, and

comparing said safety position signals with measured position signals generated by said workpiece carriage position determining means corresponding to the position of said workpiece carriage in said machine tool,

said feed rate of said workpiece carriage being automatically reduced by said numerical control means when said safety positions are passed by said workpiece carriage as said carriage moves in a direction towards said terminal positions, said feed rate reduction being cancelled by said numerical control means if a position signal is generated by said numerical control means for moving said workpiece carriage in a direction away from said terminal positions to a position within said safety positions in said machine tool.

4,092,888

SELF-STRIPPING PUNCH AND GUIDE ASSEMBLY

Kenneth J. Wilson, Roseville, Minn., assignor to Wilson Tool Company, St. Paul, Minn.

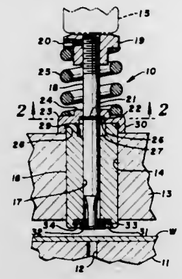
Filed Jul. 1, 1977, Ser. No. 812, 128
Int. Cl.² B26F *1/14*
U.S. Cl. 83—140 **4 Claims**

1. A punching device for use in a machine having a frame with a lower portion supporting a die and an upper portion having a vertical bore aligned therewith, said punching device comprising:

A. a guide sleeve adapted for slidable disposition in the bore in the upper portion of said machine frame, said sleeve having a circumferential groove adjacent its upper end, and a resilient retaining means in said groove,

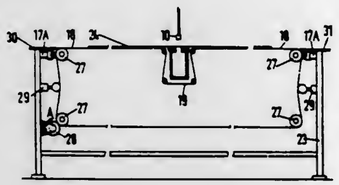
B. a punch having a head and a body slidably disposed in said sleeve, said body having a circumferential groove spaced from the ends of the body,

C. a retaining ring disposed in said punch body groove, the outside diameter of said ring being substantially greater than the diameter of the punch body whereby the periphery of the ring projects beyond the periphery of the body,
D. a spring support collar slidably disposed on said punch body in normal engagement with the projecting periphery



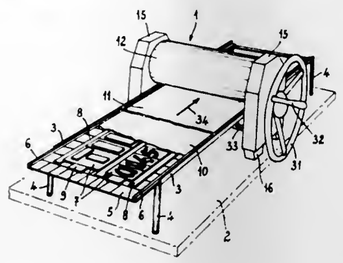
of the retaining ring, said collar having a downwardly extending annular flange in engagement with the upper end of the guide sleeve and the retaining means therein,
E. a stripping spring acting between said collar and punch head, and
F. stripper means disposed in the bottom end of the guide sleeve.

4,092,889
SLOTTED WORKTABLE
Martin John Fisher, Milton Keynes, England, assignor to The British Hydromechanics Research Association, Bedford, England
Division of Ser. No. 674,444, Apr. 7, 1976, Pat. No. 4,058,040.
This application Aug. 22, 1977, Ser. No. 826,897
Claims priority, application United Kingdom, Apr. 9, 1975, 14619/75
Int. Cl.² B26F *3/00*
U.S. Cl. 83—177 **16 Claims**



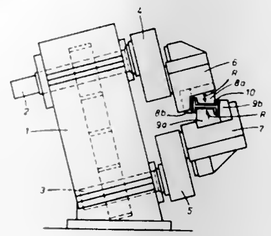
1. A slotted worktable, comprising, a first frame having two oppositely-facing sides, securing means disposed in a horizontal plane and arranged on said oppositely-facing sides of the first frame, a single length of flexible support material extending between said securing means, the single length of flexible support material being in the form of an endless band, a second frame situated between said sides of the first frame and movable in a horizontal plane towards and away from said sides, a first pair of parallel rollers carried by the second frame and spaced apart in a horizontal plane substantially coplanar with said plane of the securing means, further roller means carried by the second frame and extending parallel to the first pair of rollers, below said plane of the first pair of rollers, the flexible support material being trained over the first pair of rollers and the further roller means so that said material passes over the first pair of rollers and below the further roller means to define a slot between the first pair of rollers.

4,092,890
STENCIL-CUTTING MACHINE
Jacques Bousquet, Poncin, France, assignor to Etablissements Tiflex Société Anonyme, Poncin, France
Filed Mar. 29, 1977, Ser. No. 782,444
Int. Cl.² B26F *1/00*
U.S. Cl. 83—284 **7 Claims**



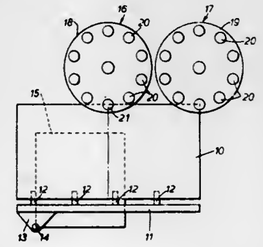
1. An apparatus for cutting stencils in a sheet, comprising a support, a press formed on said support and comprising a pair of superposed rollers separated by a gap, a plate, composed of ferromagnetic material slidably mounted on a support and shiftable between said rollers, alphanumeric - character cutting dies disposed on said plate and adapted to pierce said sheet upon said sheet being disposed on said dies, said dies lying on said plate and having upwardly turned cutting edges, means for rotatably displacing at least one of said rollers to advance said plate, said dies and said sheet between said rollers, whereby said rollers press said sheet against said dies, said support being provided with a pair of guide rails slidably receiving said plate and engaging opposite longitudinal edges thereof, said plate being provided with a pair of entrainment rails along its opposite longitudinal edges parallel to said guide rails and receivable between said support roller and said pressing roller for advancing said plate between said rollers; and at least one magnetic alignment rule overlying said plate and magnetically adherent thereto for lining up of said dies on said plate.

4,092,891
APPARATUS FOR CUTTING STEEL SECTIONS
Manfred W. Hansen, Dusseldorf, and Emil F. Kersting, Ratingen, both of Germany, assignors to Sack GmbH, Dusseldorf, Germany
Filed Apr. 11, 1977, Ser. No. 786,133
Claims priority, application Germany, Apr. 15, 1976, 2616809
Int. Cl.² B23D *35/00*
U.S. Cl. 83—341 **6 Claims**



1. Apparatus for cutting rolled steel sections with a web and one or more flanges extending at an angle to the web, said apparatus comprising profiled cutters movable relative to each other on a common axis and kept parallel to each other at the time of the cut, the cutter edges for cutting the web of the section extending in an inclined manner at an acute angle (α) with respect to a plane (N) at right-angles to said axis at the time of the cut, and extensions of the cutter edges following the shape of the flanges of the section at least as far as these extensions are located inside the projection of the section on said plane, such that the cutter edges associated with the flanges form an angle (β) with respect to said plane, whereby the flanges are cut over their full height from their outer surfaces.

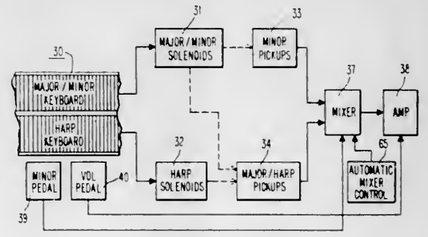
4,092,892
HOLE FORMING MACHINE
Ronald Moone, 11 Butts Hill Rd., Woodley, Reading, Berkshire, England
Filed Jun. 21, 1976, Ser. No. 698,295
Claims priority, application United Kingdom, Jun. 23, 1975, 26621/75; Jul. 9, 1975, 28939/75
Int. Cl.² B26D *7/06*
U.S. Cl. 83—413 **7 Claims**



1. A hole forming machine for producing a pattern of holes in a sheet of given material, comprising
(a) a machine frame,
(b) at least two spaced hole forming means connected with said frame, each of said hole forming means including
(1) a rotary turret;
(2) a plurality of punches mounted on said turret, said turret being rotatable to successively position said punches opposite a hole forming station on said machine frame; and
(3) means for operating that one of said punches which is positioned at said hole forming station at a given time;
(c) guide frame means connected with said frame for supporting said sheet for two-dimensional coplanar displacement relative to said hole forming stations, said guide frame means including two sets of orthogonally-arranged slidably connected pairs of parallel spaced bars, one set of said bars being connected with said frame for axial sliding movement, and sheet holding means for mounting the sheet of material on the other set of bars;
(d) a template mounted on said machine frame, said template containing a pattern indicative of the holes to be formed in said sheet by said hole forming means; and
(e) a stylus mounted on said guide frame means for cooperation with the template pattern for positioning said sheet at a desired location relative to said hole forming stations, whereby said hole forming means are operable to form on two separate areas of said sheet a two dimensional pattern of holes determined by the pattern on said template.

4,092,893
MULTIPLE SELECTIVE BELL CONSOLE AND INSTRUMENT
Ronald O. Beach, Doylestown, Pa., assignor to Schulmerich Carillons, Inc., Sellersville, Pa.
Filed Oct. 28, 1976, Ser. No. 736,405
Int. Cl.² G10H *3/00*; G10F *1/08*
U.S. Cl. 84—1.11 **14 Claims**

1. A carillon tone generator adapted for producing representations of a plurality of bell notes, comprising:
a. a first set of vibrators, each vibrator of said first set having a respective different characteristic;
b. first striker means positioned in operative relation to said first set of vibrators for controllably striking said first set vibrators to produce vibrations corresponding to respective tones, said first striker means comprising at least a first striker located in relation to each first set vibrator so as to cause said first set vibrator to produce a major tone when struck thereby and a second harp striker located at a respective different position relative to each of said first set vibrators so as to cause said first set vibrator to produce a harp tone when struck thereby;
c. first pickup means operatively associated with said first set of vibrators, for picking up a composite signal representative of the vibrations of said first set vibrators, said first pickup means comprising a transducer mounted in fixed operative relation with each of said first set vibrators;
d. a second set of vibrators, each vibrator of said second set having a respective minor characteristic, and said second set having a vibrator corresponding to each vibrator of said first set;
e. second striker means located in association with said second set of vibrators for controllably striking said second set vibrators, said second striker means comprising a striker positioned relative to each second set vibrator so as to cause said second set vibrator to produce a distinct minor tone when struck;



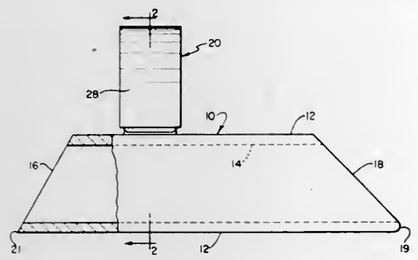
f. second pickup means operatively associated with said second set of vibrators for picking up a composite signal representative of the vibrations of said second set vibrators, said second pickup means comprising a transducer mounted in fixed operative relation with each of said second set vibrators;
g. means for selectively activating said first and second striker means, said activating means comprising control means for simultaneously activating corresponding strikers of said first and second sets;
h. mixer means connected to receive a major input from said first pickup means and a minor input from said second pickup means, for producing a mixed signal representative of a combination of said two inputs;
i. minor control means, in operative connection with said mixer means, for controlling the mixing operation of said mixer means; and
j. means for amplifying and transducing the output of said mixer means, thereby to provide a bell tone output.

4,092,894
MUSICAL SLIDE
Roy L. Clough, Jr., 1 N. Curtisville Rd., Concord, N.H. 03301
Filed Jul. 26, 1976, Ser. No. 708,718
Int. Cl.² G10D *3/00*
U.S. Cl. 84—319 **11 Claims**

1. A device for use in varying the pitch of one or more strings of a stringed musical instrument, said device comprising an elongated body adapted to be hand held and being beveled at its opposite ends so as to provide front and back mutually converging end surfaces, the length of said body being such that when said body is held in a user's hand, one beveled end

may be engaged by the palm of that hand while simultaneously a finger of that hand may be engaged with the other beveled end; and

a loop member having one end fixedly secured to a side of said elongated body and its other end free and further



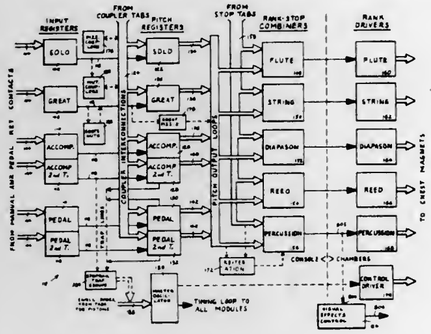
having a U-shaped portion spaced from said elongated body and formed to extend around the use's index finger so that the said index finger can be arched in order to exert, in a varied manner, pressure on the front end of said body.

4,092,895

ELECTRONIC PIPE ORGAN CONTROL SYSTEM

William P. Zabel, 8118 N. Sakaden Pkwy., Fort Wayne, Ind. 46825

Filed Dec. 6, 1976, Ser. No. 747,536
Int. Cl.² G10B *3/10*
U.S. Cl. 84—345 **40 Claims**



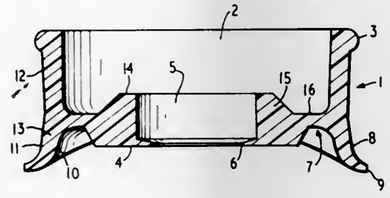
1. For use in a pipe organ which includes at least one manual having a plurality of manually operable keys disposed in chromatic spacial relationship, a plurality of stop tabs, and at least one rank of organ pipes individually operable by chest magnets, an electronic control system comprising: master oscillator means for generating a clock signal of predetermined frequency and control signals having predetermined time relationships to said clock signal; at least one input register means having control terminals connected to said master oscillator means to receive said clock and control signals therefrom, a plurality of input terminals connected to said manual, and an output terminal, for receiving note signals in parallel from said keys in response to operation thereof and repetitively generating a serial data signal at said output terminal, said serial data signal including a plurality of binary data bits, there being one said data bit for each key of said manual, said bits disposed in a chromatic sequential relationship corresponding to the spacial chromatic relationship of said keys; at least one pitch register means connected to said master oscillator means to receive said clock and control signals therefrom, and to said input register means to receive said serial data signal, said pitch register means including a plurality of pitch output terminals and pitch generating means for generating a plurality of pitch output signals in response to said serial data, clock, and control signals, each of said pitch output signals appearing at a particular pitch output terminal and including the binary data bits of said serial data signal inputted to said pitch register means, and transposed in time relationship, and thereby in representative chromatic musical relationship with respect to said binary data bits of said serial data signal; at least one combiner means connected to receive predetermined ones of said pitch output signals and to said stop tabs to receive stop tab signals and being responsive thereto to generate a composite data signal including selected combinations of said predetermined pitch output signals; at least one rank driver means connected to receive said composite data signal and said clock and control signals from said combiner means and said master oscillator means, respectively, for generating in response thereto a plurality of periodically updated parallel output signals corresponding in spacial chromatic relationship to individual ones of said binary data bits of said composite data signal, said rank driver means including amplifier means for amplifying said parallel output signals for operating individual ones of said chest magnets in response thereto for actuating corresponding individual ones of said organ pipes.

4,092,896

SEALING WASHER

David Peter William Puchy, 30 The Crescent, Cheltenham, New South Wales 2119, Australia

Filed Apr. 8, 1977, Ser. No. 785,815
Claims priority, application Australia, Apr. 30, 1976, PC5752
Int. Cl.² F16B *21/00*; A47G *3/00*
U.S. Cl. 85—50 R **7 Claims**



1. An annular washer to provide a seal between the upper surface of an object into which a fastening device, having a shank passing through said washer, is inserted; said annular washer having a substantially flat region on the underside of an annular boss surrounding the center aperture through said washer, and having a peripheral downwardly, outwardly extending resiliently deformable tapered annular skirt, said tapered skirt having its rim located below said flat region and being joined to the periphery of said boss by a deformable annular diaphram.

4,092,897

APPARATUS FOR WEAVING BRAIDED-WIRE SHEATHING INCLUDING MEANS FOR TWISTING BUNDLED STRANDS TO EQUALIZE TENSION

James M. Lalikos, Springfield, and Harold K. Waite, East Longmeadow, both of Mass., assignors to Titeflex, a division of Atlas Corporation, Springfield, Mass.

Filed Apr. 14, 1976, Ser. No. 676,940
Int. Cl.² D04C *3/12, 3/40*; F16L *11/02*
U.S. Cl. 87—29 **9 Claims**

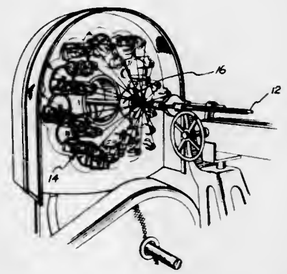
1. In apparatus for weaving a braided wire sheath around a tubular core which comprises, in combination, a plurality of bobbin-carriers each supplying a multi-strand bundle of wires, drive means for moving said carriers in opposing directions along sinuous paths as said tubular core is drawn longitudinally

whereby said bundles are interlaced in a woven pattern over the surface of said core;

the improvement comprising means for progressively twisting each of said multi-strand bundles in one direction about its length whereby strands under less tension tend to be wound helically about the strands under greater tension.

4. Apparatus for fabricating high-pressure hose composed of an inner tube reinforced by an outer braided sheath woven from high tensile-strength wire which comprises, in combination:

first and second sets of bobbin-carriers, each of said bobbin-carriers paying out a multi-strand bundle of wires under tension;



drive means for moving said first set of bobbin-carriers in a first direction along a sinuous track around said inner tube and for moving said second set of bobbin-carriers in the opposing direction along a different sinuous track around said tube whereby said bundles pass alternately over and under one another to form a predetermined woven pattern over the surface of said tube;

a feeding member mounted for rotary movement on each of said bobbin-carriers, said feeding member having an elongated slot therein forming a passageway for one of said bundles; and

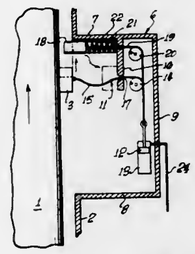
drive means for rotating said feeding member to twist said bundle and it is fed to the surface of said inner tube.

4,092,898

SHOCK-EXCURSION APPARATUS FOR RETRACTING THE UMBILICAL PLUG OF A MISSILE

John F. Witherspoon, Mountain View, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 25, 1977, Ser. No. 790,511
Int. Cl.² F41F *3/04*
U.S. Cl. 89—1.811 **6 Claims**



1. For use with a launch-gas powered missile having an umbilical plug separably coupled into its side wall and electrical power conduit coupled to the plug; apparatus for physically disengaging and retracting said plug during the initial launching movement of the missile from its launching tube comprising:

a plug-disengaging stop member carried by said launching tube in the path of travel of the plug for forcefully disengaging the plug during missile lift-off,

a flexible line secured at one end to said plug,

a launch-gas driven retract means having a driven member secured to the other end of the line, and

conduit means for applying said launch-gas pressure to said driven member for moving it in a line-pulling direction whereby said disengaged plug is retracted,

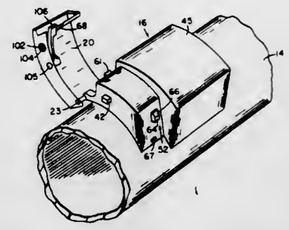
said flexible line being provided with a catenary for accomodating shock excursions of said launching tube relative to said missile and for assuring plug disengagement prior to said retraction.

4,092,899

REAR GATE PEEP SIGHT DEVICE

Jeffrey A. Lienau, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 4, 1977, Ser. No. 784,105
Int. Cl.² F41F *3/04*
U.S. Cl. 89—1.816 **6 Claims**



1. A rear gate peep sight device comprising a launcher; a front sight mounted adjacent one end of said launcher; a firing mechanism mounted on said launcher, said firing mechanism including a safety and a firing button for firing a rocket; and a cover mounted on said firing mechanism and inclosing said safety and said firing button when in a closed position, said cover being movable to an open position, said cover having a rear peep sight built therein and alignable with said front sight mounted on said launcher for aligning said launcher with a target.

4,092,900

WEAPON SYSTEM EQUIPPED WITH RELOADING CONTAINER

Conrad Hottinger; Bruno Ruppen, both of Zurich, and Kurt Schaffner, Worblaufen, all of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Mar. 17, 1977, Ser. No. 778,681
Claims priority, application Switzerland, Mar. 30, 1976, 3948/76
Int. Cl.² F41F *9/06*
U.S. Cl. 89—33 B **5 Claims**

1. A weapon system comprising:

a gun mount;

an automatic gun arranged at said gun mount;

an ammunition container provided for said automatic gun;

means for supporting said automatic gun together with said ammunition container to be pivotable about an elevation alignment axis;

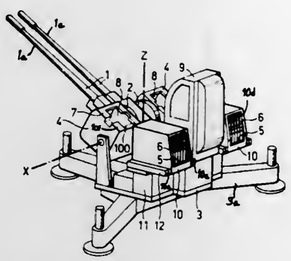
a reloading container for cartridges, said reloading container having an outlet opening and being arranged at said gun mount;

a conveyor device provided for the reloading container for forwardly displacing sets of cartridges located in the reloading container to said outlet opening, from which

location the cartridges can be filled into the ammunition container;

said ammunition container having an inlet opening for receiving the cartridges from the reloading container;

said supporting means mounting said ammunition container to be pivotable into a cartridge loading position;



means for displaceably mounting the reloading container at the gun mount in order to bring the outlet opening thereof into alignment with the inlet opening of the ammunition container when pivoted into its loading position; and

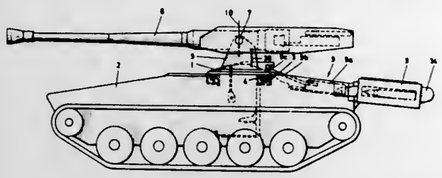
said conveyor device comprising transport elements which can be shifted together with the sets of cartridges out of the reloading container at least partially into the ammunition container.

4,092,901

DEVICE FOR FIREARM INTENDED FOR TANK WHICH HAS A BARREL SUPPORTED IN A RECOIL JACKET

Lars G. T. Gustavsson, and Sven-Håkan Svensson, both of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed Sep. 10, 1976, Ser. No. 722,185
Claims priority, application Sweden, Sep. 12, 1975, 7510205
Int. Cl.[2] F41F *9/04*
U.S. Cl. 89—46 **10 Claims**



1. A protective device for a firearm of the type having a barrel supported in a recoil jacket and located in a tank provided with loading members for the firearm intended to convey rounds to the firearm from a magazine separate from the firearm via the under side of the recoil jacket, characterized in that the recoil jacket in connection with said under side has an opening and covers which can be opened and closed, with at least one first cover supported in the recoil jacket and at least one second cover supported in the breech ring of the barrel; and in that the first and second covers are located at different levels so that at the recoiling of the firearm in the recoil jacket they will slide one over the other.

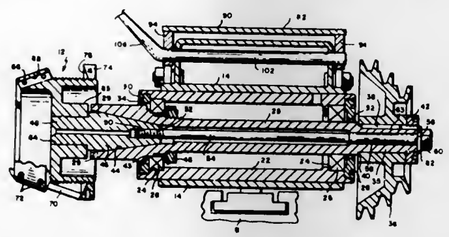
4,092,902

LATHE ATTACHMENT FOR GENERATING SPHERICAL SURFACES

Joseph W. Serafin, 222 Flat Hills Rd., Amherst, Mass. 01002

Filed Feb. 28, 1977, Ser. No. 772,544
Int. Cl.[2] B23B *3/22;* B23C *3/04*
U.S. Cl. 90—11 D **5 Claims**

1. An attachment for a lathe comprising a cutting head, a motor and mounting structure therefor, said mounting structure comprising a base plate for attachment to the cross slide of a lathe, a housing comprising an elongate, substantially cylindrical clamp, a shelf for mounting the motor, a bearing sleeve clamped in the housing, said bearing sleeve having at its opposite ends bearings, a drive sleeve rotatably mounted in said bearings with its ends extending from the ends of the housing, an internally conical opening in one of the projecting ends of the drive sleeve, an internally cylindrical opening in the other projecting end of the drive sleeve, said cutting head being of circular right section containing at one end peripherally spaced holes, the axes of which converge toward said one end of the head, cutters fixed in the holes and a conical neck at the other



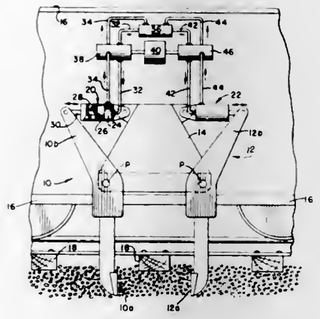
end concentric with the axis of the head, said head being mounted to the drive sleeve with said conical neck engaged within said conical opening, a spindle threaded at its opposite ends mounted in the drive sleeve with one of its threaded ends threaded into the conical neck and its other end extending through said cylindrical opening, a nut threaded onto said other threaded end of the spindle against the end of the drive sleeve, clamping the conical neck within the conical opening for rotation of the head with the drive sleeve, a pulley fixed to the drive sleeve, a motor bolted to the shelf and means drivably connecting the motor to the pulley.

4,092,903

VIBRATORY DRIVE MECHANISM

Franz Allmer, Sophia, N.C., assignor to Graystone Corporation, Monroeville, Pa.

Filed Nov. 17, 1975, Ser. No. 632,710
Int. Cl.[2] F15B *21/02*
U.S. Cl. 91—36 **13 Claims**



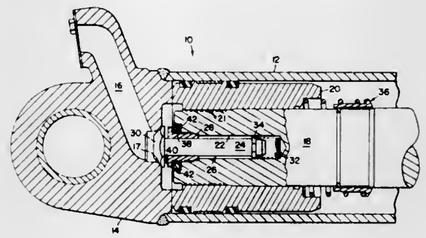
1. A vibratory drive mechanism for an oscillating tool, comprising: a single-acting hydraulic piston assembly having a ported pressure chamber and a reciprocating output member adapted to be operatively connected to vibrate the tool, a rotary distributing valve, fluid supply, and separate return line means connecting said piston pressure chamber via said rotary valve to a source of pressurized hydraulic fluid, said rotary valve including a ported cylindrical shell member having a first pair of openings connected with said supply line means and a second pair of openings connected with said return line means and axially displaced from said first pair of openings, a ported cylindrical spool member coaxially received in said shell for continuous sealing rotation therein having first and second axially displaced throughports positioned for alternate registration, respectively, with said first and second pairs of shell member openings, and drive means for imparting continuous rotation to said spool member in said shell member.

4,092,904

MEANS FOR RETAINING A PISTON ON A PISTON ROD

Larry Donald Schreiber, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Sep. 17, 1976, Ser. No. 724,396
Int. Cl.[2] F15B *15/22;* F16J *1/00*
U.S. Cl. 91—395 **1 Claim**



1. In a hydraulic actuator including a cylinder having a capped end and a piston and rod having respective threaded end portions with the piston being threaded on the rod and received in the cylinder, a fluid passage located in the capped end and including an inner end defining an axially centered valve seat, a blind bore extending into the piston rod from an extreme end of the latter in axial alignment with the valve seat, a valve element reciprocably received in the blind bore, and a spring biasing the valve element toward engagement with the valve seat, an improved means for preventing the piston from accidentally rotating relative to the piston rod, comprising: a diametrically extending recess located in the extreme end of the rod; said piston having an extreme end provided with a diametrically extending recess disposed in radial alignment with the recess in the rod; a locking member being received on the valve element and in the respective recesses of the rod and piston; and a guide member for the valve element having the latter reciprocably received therein and being threaded into said blind bore; and said guide member including a flange located adjacent to the locking member for retaining the latter in the respective recesses of the rod and piston.

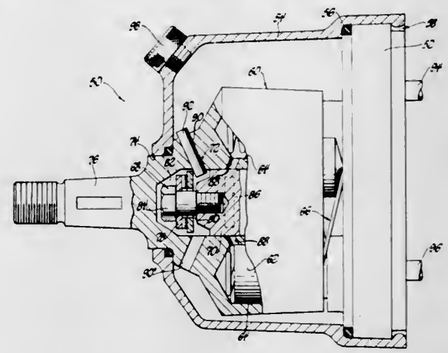
4,092,905

AXIAL PISTON PUMP

Robert A. R. Wood, West Vancouver, Canada, assignor to Teleflex Incorporated, Limerick, Pa.

Filed Feb. 17, 1976, Ser. No. 658,168
Int. Cl.[2] F01B *13/04*
U.S. Cl. 91—499 **12 Claims**

1. An axial piston pump assembly comprising; housing means including first and second interconnected housing portions, a cylinder barrel rotatably supported in said housing means, said cylinder barrel including a drive shaft extending therefrom and through and exteriorly of said second housing portion, a plurality of pistons reciprocatively supported in a plurality of piston cavities in said cylinder barrel for reciprocating movement parallel to an axis of rotation, cam means disposed between said pistons and said first housing portion for reacting with said pistons for causing said reciprocating movement thereof upon rotation of said cylinder barrel, shaft means extending from said first housing portion and into said cylinder barrel to a distal end for rotatably supporting said cylinder barrel, said cylinder barrel including fluid ports extending between each of said piston cavities and said shaft means, said shaft means including valving passages for successively communicating with said fluid ports during rotation of said cylinder barrel for directing fluid to and from said piston cavities, connecting means interconnecting said cylinder barrel and said distal end of said shaft means for transferring reaction forces resulting from said reciprocating movement of said pistons by said cam means through said shaft means to said first housing portion while freely allowing rotation of said cylinder barrel on said shaft means, said shaft means extending into said cylinder barrel to a distal end thereof, said cylinder barrel defining a cavity adjacent said distal end of said shaft means, said cylinder barrel including a plurality of holes extending therethrough from the exterior thereof to said cavity therein, said connecting means including a thrust bearing supported at said distal end of said shaft means and a plurality of pins secured in at least some of said holes and engaging said thrust bearing on the side thereof facing said distal end of said shaft means.

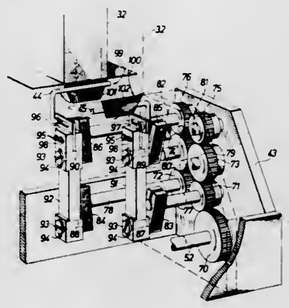


4,092,906

CARTON FLAP FOLDING MECHANISM

Hans Rolf Ingemar Linnér, Helsingborg, Sweden, assignor to AB Akerlund & Rausing, Lund, Sweden

Filed Mar. 15, 1977, Ser. No. 777,721
Claims priority, application Sweden, Nov. 12, 1976, 7612634
Int. Cl.[2] B31B *1/52*
U.S. Cl. 93—49 R **7 Claims**



1. A carton flap folding mechanism for use in a packaging machine in which a series of folding boxes having at least one open end, and at least one pair of sidewall flaps oppositely positioned at said open end of the folding box is folded inwards over the open end, said folding mechanism comprising:

a pair of folding pin members each adapted to be movable against a respective sidewall flap of adjacent boxes in the series of folding boxes, the path of movement of each of said pin members being a segment of a substantially circular path of travel, the center of said circular path of travel being between the plane of said open end and the opposite

end of the folding box, and wherein during a first phase of movement said folding pin members fold said respective flaps inwards over the open ends of respective folding boxes positioned adjacent each other; and

means for moving said folding pin members.

4,092,907

OUTLET NOZZLE FOR HEATING AND VENTING SYSTEMS OF AUTOMOBILES

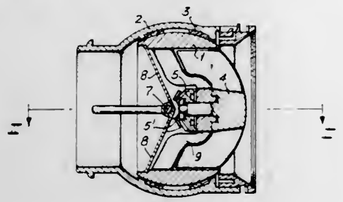
Ernst Meyer, Oberursel, Taunus; Hans Trube, Sindelfingen, and Hermann Grimm, Ostelsheim, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Unterturkheim, Germany

Continuation of Ser. No. 611,431, Sep. 8, 1975, abandoned. This application Jul. 25, 1977, Ser. No. 818,770

Claims priority, application Germany, Sep. 7, 1974, 2442946

Int. Cl.[2] F24F *13/06, 13/10*

U.S. Cl. 98—40 A **9 Claims**



1. An adjustable air outlet nozzle especially suited for heating and venting or air-conditioning systems of automotive vehicles and comprising: a generally tubular stationary connector housing attachable to the end of an air duct, the housing having an enlarged central length portion defining a lodgement with an inner guide surface of hollow-spherical contour; a spherical ring whose outer surface is shaped after a bilaterally truncated sphere and which is supported in a universally pivotable manner inside said connector housing lodgement; a double-wing butterfly valve arranged inside the spherical ring on the upstream side thereof, the valve having two wing flaps arranged on a common pivot shaft which extends transversely across the inner diameter of the ring, the two wing flaps carrying bevel gear segments cooperating with a common drive bevel gear arranged in the center axis of the nozzle and journalled for rotation inside a transverse supporting member of the spherical ring; and a manually operable control member arranged on the downstream side of the spherical ring and attached to the drive bevel gear so as to be carried by the ring and its transverse supporting member, the improvements therein being characterized in that:

the spherical ring is constituted of two halves which are joined in a radial plane near the equator of their spherical shape;

the two ring halves define between them a radially inwardly facing positioning groove;

the transverse supporting member of the spherical ring includes a peripheral mounting ring which is receivable and axially clampable in said positioning groove, and a narrow stem extending radially from side to side of the peripheral mounting ring and having an enlarged hub-like central portion with an axial bore inside which the drive bevel gear and the attached control member are journalled;

the control member has the shape of a cross handle defined by two perpendicularly crossed radial arms extending across the inner width of the spherical ring, said arms being shaped so as to serve as air flow guides, with an axial width several times greater than the circumferential width, the arms having on their upstream side an outline which generally matches the outline of the supporting member stem; and

the drive configuration between the control member and the butterfly valve, via said bevel gear drive, is such that the wing flaps of the valve, in their fully open position, are substantially aligned with a central axial plane through the valve pivot shaft and one radial arm of the control member is likewise aligned with said plane, while the stem of the supporting member is similarly axially aligned with one radial arm of the control member, whereby the valve and its pivot shaft define axially aligned air guide surfaces on the upstream side of the nozzle, while the supporting member stem and the radial arm of the control member define similarly aligned air guide surfaces on the downstream side of the nozzle.

4,092,908

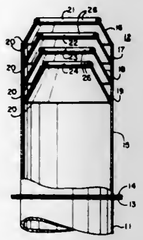
FLUIDIC SEAL

John F. Straitz, III, Meadowbrook, Pa., assignor to Combustion Unlimited Incorporated, Elkins Park, Pa.

Filed Jul. 15, 1977, Ser. No. 815,992

Int. Cl.[2] F23D *13/20*

U.S. Cl. 98—60 **6 Claims**



1. A vent stack for waste gas comprising, in said stack,

a fluidic diode permitting flow for discharge of combustible waste gas and obstructing return flow in the stack,

said fluidic diode comprising at least one axially aligned frustoconical baffle with a central opening, and means for inhibiting static electricity generation at said diode comprising a ring in surrounding relationship to a baffle central opening having a smooth surface curved in the direction of discharge gas flow.

4,092,909

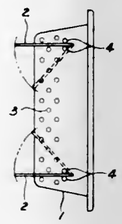
PERFORATED SELF-DRAINING MEATLOAF BAKING PAN

John M. Phillips, 2389A Carlton Pl., Costa Mesa, Calif. 92627

Filed Jul. 12, 1976, Ser. No. 704,734

Int. Cl.[2] A47J *37/12*

U.S. Cl. 99—444 **4 Claims**



1. A self-draining baking pan comprising:

a receptacle for receiving an item to be baked, said receptacle including a bottom wall and a peripheral wall, said peripheral wall being joined to the bottom wall and projecting outwardly therefrom;

at least one leg stand;

means for attaching said leg stand to said peripheral wall for pivotal movement, said leg stand being pivotable to an extended position in which it can engage a supporting surface to support said bottom wall above the supporting surface and in spaced relationship to the supporting surface;

means for releasably retaining the leg stand in the extended position; and

drain hole means in said bottom wall and in said peripheral wall whereby fat and juices from the item being baked can drain from said receptacle through said drain hole means.

4,092,910

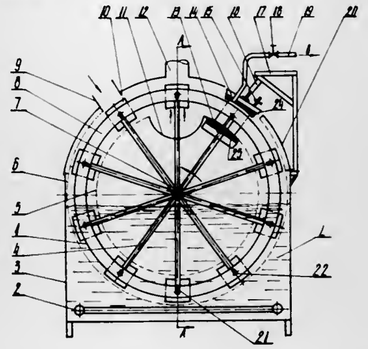
MACHINE FOR VACUUM PEELING FRUITS AND VEGETABLES

Lyubomir Nikolov Genchev; Iliya Chudomirov Kafedjiev, and Kostadin Spirov Klyamov, all of Plovdiv, Bulgaria, assignors to DSO "Bulgarplod", Sofia, Bulgaria

Filed Nov. 28, 1975, Ser. No. 636,073

Int. Cl.[2] A23N *7/01*

U.S. Cl. 99—472 **4 Claims**



1. In an apparatus for vacuum-peeling fruits and vegetables, a tank adapted to contain treating liquid, means associated with the tank for heating such liquid, a rotor mounted within the tank for rotation in a vertical plane about a horizontal axis, a plurality of buckets individually carried at circumferentially spaced portions of the rotor for receiving fruits and vegetables to be treated, means for rotating the rotor to advance the buckets through the treating liquid in succession, a vacuum-applying station cooperable with the successive buckets after they emerge from the treating liquid, a delivery chute for charging fruits and vegetables into the buckets, and a removal chute for discharging fruits and vegetables after they have been treated to vacuum in the vacuum-applying station, the improvement wherein the buckets have open radially inner and outer surfaces; in which the vacuum-applying station is disposed in the tank in the path of rotation of the successive buckets; and in which the vacuum-applying station comprises, in combination, a pair of radially opposed bucket seals individually engageable with the radially inner and outer surfaces of the bucket, means to sealingly engage said bucket seals with said inner and outer surfaces including means supporting a first one of the bucket seals for radial movement toward and away from one of the inner and outer surfaces of the bucket, and vacuum chamber means coupled to the movably supported first one of the bucket seals.

4,092,911

BLANCHING APPARATUS

Richard J. Goodale, P.O. Box 268, Watsonville, Calif. 95076

Filed Jan. 21, 1977, Ser. No. 761,977

Int. Cl.[2] A23C *3/02, 9/02, 13/04*

U.S. Cl. 99—483 **8 Claims**

1. Apparatus for blanching products such as vegetables by exposing the vegetables to steam from a steam source, said apparatus comprising in combination:

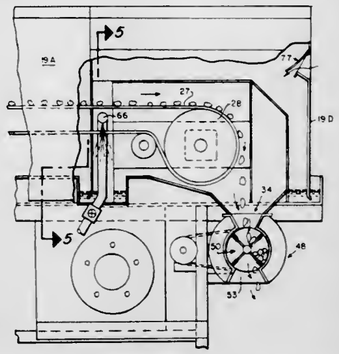
a container forming a blanching chamber;

a conveyor system for transporting vegetables from one end of said chamber to the other, said conveyor system comprising a conveyor belt fixed between two spaced drive rollers positioned at opposite ends of the chamber;

first valve means for introducing vegetable into one end of the chamber for deposit onto the receiving end of said conveyor belt;

second valve means for receiving vegetables from the conveyor belt at the other end of said chamber and for transporting said vegetables from said chamber;

said valve means for introducing and receiving vegetables including sealing means for preventing the escape of gas



from said chamber and allowing a buildup of pressure within the chamber;

a steam conducting manifold connecting with the steam source for the transport of steam to spaced points along said conveyor carrying the vegetables for exposing the vegetables to steam during their travel through the chamber; and

pressure relief means for permitting air to enter the chamber with the occurrence of a below atmospheric pressure condition within the chamber caused by the sudden condensing of steam therein while preventing the passage of air from the chamber.

4,092,912

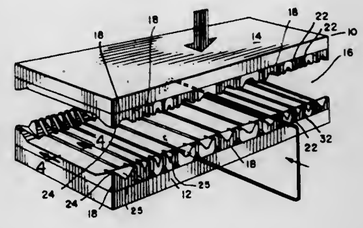
PRESS PLATEN WEDGES

Emil Simich, Chicago, Ill., assignor to A. J. Gerrard & Company, Des Plaines, Ill.

Filed Jun. 11, 1976, Ser. No. 695,065

Int. Cl.[2] B65B *13/02*

U.S. Cl. 100—3 **4 Claims**



4. A method of producing high density bales of a material comprising:

compressing the material to be baled between a pair of press platens defining a compression chamber therebetween, each of said platens having a plurality of contoured platen wedges mounted thereon in aligned relationship, with each of said contoured platen wedges further having two spaced corner end means at each end thereof extending into the compression chamber which provide bale tie

accommodating channels between adjacently mounted platen wedges to thereby provide a reduced girth on the bale where said corner end means on said wedges engage the corners of the bale,

inserting tie means into the bale tie accommodating channels to encircle the compressed bale of material having a reduced girth where said corner end means on said wedges engage the corners of the bale,

securing said tie means to said compressed bale of material, and

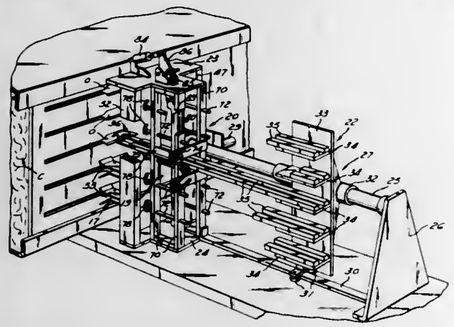
releasing the press platens to provide a high density bale of material.

4,092,913

BALE TYING APPARATUS

Frank C. Tea, Bellevue, Ohio, assignor to The American Baler Company, Bellevue, Ohio

Filed Apr. 23, 1974, Ser. No. 463,319
Int. Cl.² B65B *13/04*
U.S. Cl. 100—24 **10 Claims**



1. Bale tying apparatus for use with a baler, said baler including a baling chamber having sides, a feed hopper having an opening into said chamber for delivering to said chamber material to be baled, a baling head having open sided slots in its face and reciprocable within said chamber and past said feed hopper opening to a forward position of extension, and means to reciprocate said head, said tying apparatus comprising

wire dispensing means on opposite sides of said baler,

wire guide means on opposite sides of said baler for guiding wires dispensed from said dispensing means and extending through said chamber on the forward side of the feed hopper opening and along each side of said chamber and a bale formed therein,

a wire puller assembly mounted on one side of said chamber, including a longitudinal member long enough to reach across the baling chamber and between the wires extending along opposite sides of the baling chamber, means for extending and retracting said longitudinal member along a path through the slots in the baling head and across said chamber to and from said other side from and to said one side, and a nose on said longitudinal member for engaging said wire extending along said other side whereby retraction of said longitudinal member pulls wire from said dispensing means on said other side across said chamber and positions a length of wire drawn from said other side closely adjacent a corresponding length of wire on said one side, said nose on the front end of said longitudinal member having a downturned forward end extending lower than the level of the wires and a rear end standing higher than the level of the wires so that upon extension of said longitudinal member said downturned forward end of said nose lifts said wires and said longitudinal member passes under them without engagement, and upon retraction said rear end of said nose is engaged by said wires as encountered and pulled in the direction of retraction by said longitudinal member,

a pair of rotatable twister means spaced apart and supported for rotation on said one side of said chamber and on opposite sides of said path of extension and retraction of said longitudinal member each for engagement of each with said wires at a point spaced from the other along said adjacent lengths thereof, means to rotate said twister means whereby said wires are twisted together for a distance from the point of engagement of each of said twister means,

cutter means mounted on said one side of said chamber along said path of extension and retraction and between said spaced twister means for cutting both said wires in said adjacent lengths thereof and between the spaced points of engagement of said twister means,

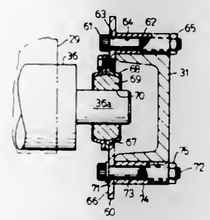
said wire guide means comprising guide arms positioned on each side of the path of extension and retraction of said longitudinal member and on each side of the baler for holding the wires at predetermined levels for the desired engagement by said longitudinal member, said arms pivotally connected to support means to permit said arms to swing and change the level of the wires guided by them as said longitudinal member is extended and said nose passes, resilient means urging said arms to swing back to their predetermined level after the passage of said nose and remain at said level as said longitudinal member is retracted.

4,092,914

BALING MACHINE INCLUDING MEANS FOR ADJUSTING ALIGNMENT OF CONVEYOR BELTS

Donald E. Burrough, and Dean E. Seefeld, both of West Bend, Wis., assignors to Gehl Company, West Bend, Wis.

Filed Nov. 26, 1976, Ser. No. 745,219
Int. Cl.² B30B *5/06*
U.S. Cl. 100—88 **3 Claims**



1. A crop handling machine for forming cylindrical bales and comprising:

a mobile frame including a pair of transversely spaced apart vertical support structures;

a plurality of transversely spaced apart conveyor belts between said support structures and forming at least a portion of an upper belt flight of a bale forming chamber;

means for supporting said conveyor belt including a plurality of horizontal spaced apart parallel rollers, each of said rollers being supported between said vertical support structures and being rotatable about an axis, said conveyor belts contacting each of said rollers and defining an angle of wrap around each of said rollers;

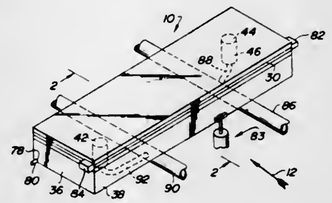
means for controlling the transverse position of said conveyor belts on said rollers including means for supporting at least one of the ends of said rollers on said upper belt flight for movement in an arcuate path generally perpendicular to the axis of said one of said rollers and perpendicular to a plane bisecting the angle of wrap defined by the conveyor belts contacting said one of said rollers, said means for supporting at least one of said ends of one of said rollers including skewing means having a spherical bearing whereby relative skewing of the roller during the arcuate movement of one of the ends of one of said rollers imparts a force on the belts in the direction of the longitudinal axis of one of said roller, wherein said means for supporting at least one of said ends includes a bracket having means for rotatably supporting said one of said ends and means for supporting said bracket for pivotable movement about a pivot axis, said pivot axis and the axis of said one of said rollers being spaced apart and defining a plane generally bisecting the angle of wrap defined by the conveyor belts contacting said one of said rollers.

4,092,915

OIL HEATED DOUBLE FACER PLATEN

Thomas R. Keeny, Lindenwold, N.J., assignor to Molins Machine Company, Inc., Cherry Hill, N.J.

Continuation-in-part of Ser. No. 614,050, Sep. 17, 1975, Pat. No. 4,023,481. This application Feb. 10, 1977, Ser. No. 767,610
Int. Cl.² B30B *15/34*
U.S. Cl. 100—93 P **11 Claims**



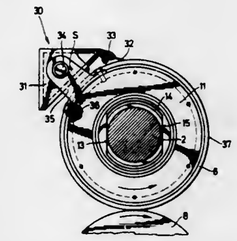
1. A platen for heating a web of corrugated board in a double facer and adapted for receiving a heated liquid transfer medium comprising a main plate having a planar outer surface for contact with the web, a second plate below said main plate, a peripheral spacer between said plates to define a shallow chamber for the heated medium, said chamber having an inlet and an outlet, beam means connected to said plate for stiffening said plates, means associated with said beam means for modulating the temperature of said beam means to compensate for a deflection in said main plate caused by a temperature difference between said main plate and said second plate.

4,092,916

CONTROLLED-DEFLECTION ROLL

Christoph Link, and Wolf-Gunter Stotz, both of Ravensburg, Germany, assignors to Escher Wyss Limited, Zürich, Switzerland

Filed Aug. 19, 1977, Ser. No. 826,159
Claims priority, application Switzerland, Sep. 22, 1976, 11989/76
Int. Cl.² B30B *3/04*
U.S. Cl. 100—174 **5 Claims**



1. A controlled-deflection roll comprising:

a stationary roll support;

a substantially tubular roll shell having an outer surface;

means mounting said tubular roll shell to be rotatable about said stationary roll support;

at least one bearing element by means of which the tubular roll shell bears on the roll support;

said roll shell having opposed ends;

said mounting means including guide members rotatably mounted in the roll shell and guided upon the roll support in the direction of the pressing or disengaging movement of the roll shell;

a scraper device having a scraper blade provided for the controlled-deflection roll;

said scraper blade, during operation of the controlled-deflection roll, being in contact with the outer surface of said roll shell; and

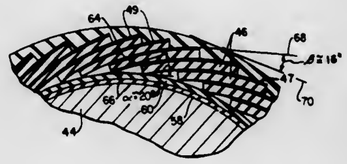
means for securing the scraper device to the guide members.

4,092,917

NIP ROLL FOR TREATING WEB MATERIALS

Ernest J. Groome, Covington, Va., assignor to Clupak, Inc., New York, N.Y.

Division of Ser. No. 582,105, May 30, 1975, Pat. No. 3,995,354. This application Apr. 14, 1976, Ser. No. 676,804
Int. Cl.² B30B *3/04*
U.S. Cl. 100—176 **1 Claim**



1. An apparatus for compacting web materials and the like which comprises:

a. a frame;

b. a substantially rigid roll member rotatably mounted on said frame;

c. a nip roll nipped in engaged rotational rotation with said substantially rigid roll having:

1. an inner substantially cylindrical member constructed of a substantially rigid material;

2. a cover member of a generally incompressible substantially resilient material positioned about said inner member and secured to the outer surface portions thereof; and

3. reinforcing members positioned within said cover member and forming a part thereof and having a tensile modulus of elasticity greater than the modulus of the generally incompressible resilient material, each of said reinforcing members being sloped at a generally acute angle with respect to an associated outer surface portion of the inner member, the direction of slope being such that rotating at least one of said rolls in a direction such that the reinforcing members approach the generally rigid roll in an orientation generally similar to the plane of a web material passing therebetween and the reinforcing members resist substantial displacement of the generally incompressible material, in a direction toward the entrance to the nip, but permit displacement of the generally imcompressible material toward the exit side of the nip such that upon leaving the nip zone the displaced incompressible material recoils opposite to the direction of movement of the web and the speed thereof is less than the speed of the material entering the nip thereby providing compacting forces substantially within the plane of the web material;

d. means to apply adjustably variable forces between said rolls for varying the nip between said nip roll and said substantially rigid roll; and

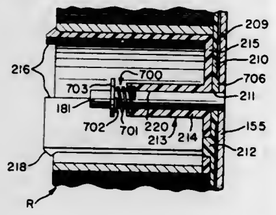
e. means for drivingly rotating at least one of the covered roll and generally rigid mating roll.

4,092,918

LABEL PRINTING AND APPLYING APPARATUS

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 476,744, Jun. 5, 1974, Pat. No. 3,957,562, which is a continuation-in-part of Ser. No. 380,445, Jul. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 312,454, Dec. 6, 1972, Pat. No. 3,968,745, which is a continuation-in-part of Ser. No. 208,035, Dec. 8, 1971, abandoned. This application Mar. 17, 1976, Ser. No. 667,761
Int. Cl.² B41F *1/08*
U.S. Cl. 101—288 22 Claims



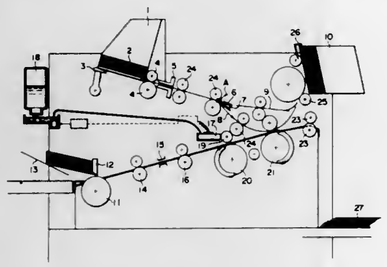
1. Apparatus for printing and applying pressure sensitive labels, comprising: means for mounting a roll of pressure sensitive labels carried on a web of supporting material, means for printing on the labels, means downstream of the printing means for delaminating the printed labels from the supporting material web, means defining a path for the label web from the supply roll to the delaminating means, means for advancing the web to the printing means and to the delaminating means, the roll mounting means comprising a reel and a shaft for rotatably mounting the reel, the reel having a disc, a hole in the disc for receiving the shaft, a hub rotatably mounted on the shaft but separate from the disc for mounting the roll, and means for keying the hub to the disc so that the hub and the disc rotate as a unit, the hub having outwardly extending spring fingers extending through a hole in the roll and exerting outward pressure on the inside of the roll.

4,092,919

CARD SELECTING AND ADDRESS PRINTING APPARATUS

Kenzo Araya, and Takashi Hashimoto, both of Tokyo, Japan, assignors to Tanaka Seiki Co., Ltd., Tokyo, Japan

Filed May 5, 1975, Ser. No. 574,251
Claims priority, application Japan, May 7, 1974, 49-50552
Int. Cl.² B41L *47/46*
U.S. Cl. 101—53 3 Claims



1. A card selecting and address printing apparatus for selecting a card having specified information from among a group of cards bearing thereon coded information and for transfer-printing said specified information from said card onto a sheet of paper comprising:

a card hopper to receive therein a group of cards including the cards to be selected and those not to be selected;

a card feeder for feeding the cards, from the card hopper, one at a time at a predetermined time interval;

an optical card reading and signal generating means, stored with specified information, which reads the coded information on a card fed by the card feeder, compares it with the stored specified information, and generates a first signal accordingly which will render said card either a selected or a non-selected card depending upon whether or not said card has information thereon which corresponds to the specified information of said optical means and which generates a second signal for actuating said card feeder at a shorter time interval than said predetermined time interval for feeding a subsequent card when said read card is a non-selected card, to ensure rapid feeding of the cards in such cases;

a card path selecting mechanism which selects a card path according to said first signal generated at the optical card reading and signal generating means so as to transport said selected card along a printing path or said non-selecting card along a non-printing path, respectively;

a workpiece hopper accommodating therein papers on which said specified information is to be transfer-printed;

a workpiece feeder for feeding said papers one at a time successively along a paper feeding path from the workpiece hopper to a waiting station provided adjacent to a printing station of the paper and for subsequently feeding the paper to the printing station in response to the third signal generated from the optical card reading and signal generating means when said read card is a selected card while simultaneously feeding the next paper to the waiting station;

said workpiece feeder including first and second paper feeding rollers along said paper feeding path, the first roller being mounted under the work piece hopper, the second roller being disposed at a distance from the first roller which is less than or equal to the length of said paper, and the circumferential velocity of the second roller being higher than that of the first roller, so as to maintain an appropriate distance between the papers fed along the paper feeding path;

a paper position sensing and timing device for generating a fourth signal for stopping said workpiece feeder in order to stop the workpiece at said waiting station at a preselected constant time interval after said paper is sensed by said paper position sensing and timing device;

printing means disposed at said printing station which pressedly transfer-prints said specified information on the selected card fed through the card path selecting mechanism and the printing path onto the paper fed from the workpiece feeder along said paper feeding path;

a card stacker; and

a card stacking roller which catches the cards fed through the printing path and through said non-printing path and stacks them in the card stacker in the same order as they were held in the card hopper.

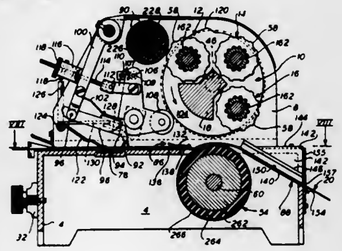
4,092,920

DOCUMENT IMPRINTER

John A. Barnak, Stamford, Conn., assignor to Litton Business Systems, Inc., Paramus, N.J.

Continuation of Ser. No. 522,955, Nov. 11, 1974, abandoned, and Ser. No. 522,956, Nov. 11, 1974, Pat. No. 4,027,585, and Ser. No. 522,957, Nov. 11, 1974, Pat. No. 4,008,663, and Ser. No. 522,958, Nov. 11, 1974, Pat. No. 4,018,156. This application Nov. 10, 1976, Ser. No. 740,562
Int. Cl.² B41U *1/44*
U.S. Cl. 101—77 9 Claims

1. In an imprinter having printing means comprising a rotary printing unit, said rotary printing unit including at least two banks of printing members, said banks being each respectively disposed at different angular locations about the axis of rotation of said rotary printing unit, each printing member having a plurality of type faces any one of which is adapted to be selected for printing; means for selecting any one of said type faces of each printing member for printing; a cylindrical platen cooperable with said banks of printing members and defining therewith a printing nip; means for feeding to said printing nip a web of label material to be printed on by said type faces, said web of label material comprising labels carrying a coating of pressure sensitive adhesive, said web of label material further comprising a carrier strip to which said labels are releasably secured by said pressure sensitive adhesive; said cylindrical platen comprising:



an exterior portion;

an underlying portion of elastomeric material;

said exterior portion being made of a synthetic resinous material, and being thinner and harder than said underlying elastomeric material portion, said synthetic resinous exterior portion presenting an outermost surface which is substantially smooth and glossy and substantially non-adherent to said pressure sensitive adhesive carried by said labels;

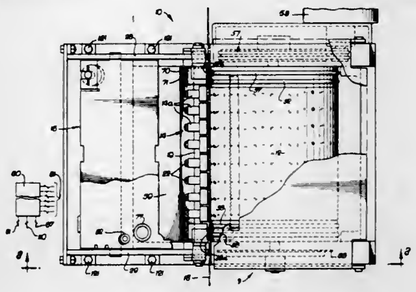
whereby said synthetic resinous exterior portion minimizes and retards deposition of the pressure sensitive adhesive from the labels onto the platen.

4,092,921

HIGH SPEED PRINTER MODULE

Andrew M. McInnis, Covina, and Robert A. Nielsen, Pasadena, both of Calif., assignors to Sheldon-Sodeco Printer, Inc., Elmsford, N.Y.

Filed May 27, 1976, Ser. No. 690,579
Int. Cl.² B41J *1/32*
U.S. Cl. 101—93.21 6 Claims



1. In impact printer apparatus operable to rapidly print characters on a print sheet in lines and columns, and including:

a first assembly including a continuously rotating rotary print drum having an axis of rotation, a second assembly including hammer means, a print transfer medium and carrier therefor, the improvement comprising:

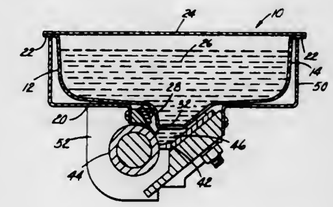
support means supporting said assemblies in spaced relation to provide a print sheet receiving slot between the drum at one side of the slot and local extent of said transfer medium and hammer means at the opposite side of the slot, said assemblies being generally spaced transverse to said axis or rotation, and said slot extending between the assemblies parallel to said axis of rotation and being open-ended, print sheet advancing means associated with said first assembly to advance an endwise feedable print sheet endwise beneath the drum and then upwardly in the slot, the support means including first and second side plates at opposite sides of the slot, the drum located between the first side plates, said print sheet advancing means including a pair of rotors rotatable about said drum axis at opposite ends of the drum and between the first side plates, and rotor drive means including ratchet means operable to rotatably index said rotors, said ratchet means includes a circular series of ratchet teeth on at least one of the rotors, said teeth projecting inwardly toward the drum axis, at least one actuator arm having rotatably reciprocating ratchet engagement with said teeth, and said drive means includes a motor operatively connected with said arm to rotatably reciprocate the arm.

4,092,922

LITHOGRAPHIC INK SUPPLY

Roy C. Schweitzer, Barrington, Ill., assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 599,158, Jul. 25, 1975, abandoned. This application Feb. 2, 1977, Ser. No. 765,059
Int. Cl.² B41L *25/12*
U.S. Cl. 101—363 1 Claim



1. A method of maintaining a substantially constant volume of ink on a fountain roller of a lithographic duplicating machine having an ink fountain including a fountain roller, and a support means above the fountain comprising the steps of:

(a) providing an ink package comprising a disposable container body containing a supply of operative lithographic low viscosity ink and including dispensing opening means to permit flow of ink when the dispensing opening means is exposed to the atmosphere, the dispensing opening means comprising a substantially linear opening array suited for disposition parallel to the fountain roller axis, the opening array including no opening smaller than one-half square inch in area or smaller than three-eighths inch in minimum dimension, and being so arranged as to present a portion of an opening within two inches measured axially from any portion of the fountain roller, a cover overlying the container body and sealed thereto, the container body and cover being made of nondeflectable, nonshiftable elements and being free of access passages other than said dispensing opening means, and readily removable closure means for sealing the dispensing opening means to prevent flow of ink during storage of the ink package;

(b) removing the closure means from the ink package and placing the ink package on the support means with the dispensing opening means facing downwardly and with the opening array parallel to the fountain roller axis and spaced above the ink support surfaces of the fountain by at least about one quarter inch such that the ink flows directly into the fountain and against the fountain roller forming an elongate bead of ink which increases in size until it blocks exposure of the dispensing opening means to

the atmosphere and shuts off flow of ink from the container body;

(c) maintaining substantially constant the volume of the bead of ink by spontaneous replenishment in response to exposure of the dispensing opening means to the atmosphere as the volume of the bead of ink is diminished during duplicating operation;

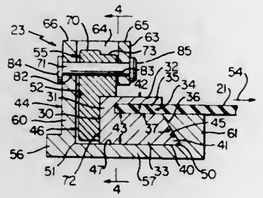
(d) removing and discarding the ink package from the machine when the supply of ink in the container body is exhausted.

4,092,923

PRINTING BLANKET HOLDING APPARATUS

Jacob A. Bollmer, Dayton, Ohio, assignor to Dayco Corporation, Dayton, Ohio

Filed Mar. 1, 1977, Ser. No. 773,239
Int. Cl.² B41F *27/12*
U.S. Cl. 101—415.1 **14 Claims**



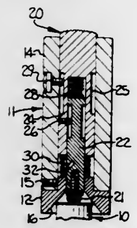
1. Apparatus for holding an end portion of a printing blanket on an associated cylinder comprising; an elongate holding bar of roughly U-shaped cross-sectional outline having a pair of legs defining a groove for receiving said end portion of said blanket therewithin and having an inclined cam surface comprising a terminal end portion of one of said legs; a bar support adapted to be installed on said cylinder and receiving said holding bar therewithin with said bar support having a cooperating supporting surface for receiving said cam surface thereagainst; and double eccentric means for attaching and detaching said holding bar relative to said bar support; said double eccentric means comprising, a support shaft carried by said bar support, a comparatively large first disc eccentrically mounted on said shaft providing locking action for retaining said cam surface against said supporting surface, and a second disc smaller than said first disc and being also eccentrically mounted on said shaft providing clamping action of said bar within said bar support perpendicular to said locking action, said discs being rotatable to enable attaching and detaching of said holding bar.

4,092,924

METHOD FOR IDENTIFYING THE LOAD CHARACTERISTICS OF A CENTERFIRE FIREARM CARTRIDGE

John H. Edmisten, P.O. Box 201, Boone, N.C. 28607

Division of Ser. No. 692,844, Jun. 4, 1976. This application Apr. 4, 1977, Ser. No. 784,578
Int. Cl.² B41F *17/00*
U.S. Cl. 101—426 **6 Claims**



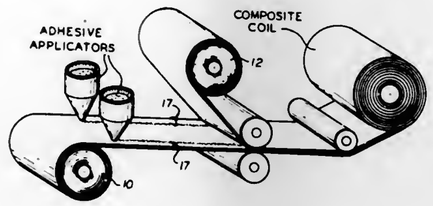
1. A method of loading a centerfire firearm cartridge while identifying the load characteristics thereof comprising inserting an unstruck primer into a primer pocket in the cartridge head, and thereafter imprinting onto the unstruck primer indicia identifying the load characteristics of the loaded cartridge.

4,092,925

LITHOGRAPHIC PRINTING PLATE SYSTEM

Howard A. Fromson, 15 Rogues Ridge Rd., Weston, Conn. 06066

Filed Aug. 5, 1976, Ser. No. 711,930
Int. Cl.² B41C *1/10*; B32B *7/14*
U.S. Cl. 101—467 **3 Claims**



1. Method for making composite lithographic substrates having an aluminum printing member which is recyclable, comprising:

providing a continuous web of carrier material having a given width;

providing a continuous aluminum web having the same width as the carrier web and a central longitudinal portion defining an image area;

continuously applying a releasable adhesive on at least one of the carrier web and the aluminum web along at least two longitudinal lines disposed outside of the image area;

releasably adhering the two webs along the longitudinal lines to form a composite web;

transversely cutting the composite web to form discrete printing plates wherein the carrier and aluminum portions for a plate have the same length;

applying a light sensitive coating on the aluminum member of the discrete plate and exposing and developing the light sensitive coating in the image area thereof;

mounting the discrete plate on a printing press; and

separating the aluminum member from the carrier after use on the printing press to effect the recycling of the aluminum members.

4,092,926

MECHANICAL ROLAMITE IMPACT SENSOR

Lon E. Bell, Altadena, Calif., assignor to Technar, Incorporated, Arcadia, Calif.

Filed Dec. 17, 1976, Ser. No. 751,859
Int. Cl.² G01P *15/02*; F42C *1/00*
U.S. Cl. 102—204 **12 Claims**

1. A mechanical sensor operable without any source of electrical energy comprising:

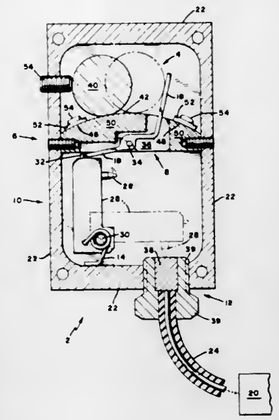
a rolamite means responsive to acceleration or deceleration above a predetermined amount;

a support means upon which said rolamite means is mounted for supporting said rolamite means and providing a path of movement for a portion of said rolamite means during said acceleration or deceleration above a predetermined amount;

a trigger means located adjacent to said support means, said trigger means comprising a first portion extending into said path of movement of a portion of said rolamite means, a second portion which extends to a hammer means and a pivot point located between said first and second portions, said trigger means being movable in response to movement of said rolamite means as a result of said acceleration or deceleration;

said hammer means located adjacent to said trigger means and releasable by said second portion of said trigger means upon movement of said trigger means;

a primer means activated by said hammer means;



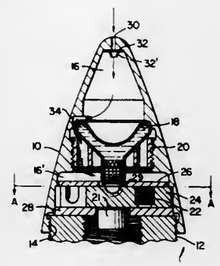
a biasing means for moving said hammer means towards said primer means, to activate said primer means as a result of said acceleration or deceleration; and a housing for enclosing said rolamite means, said support means, said trigger means, said hammer means, and said biasing means.

4,092,927

DELAY ARMING MECHANISM FOR FUZES

Roy E. Rayle, Richmond, Ind., assignor to Avco Corporation, Wilmington, Mass.

Filed Nov. 14, 1968, Ser. No. 775,809
Int. Cl.² F42C *15/26, 15/28*
U.S. Cl. 102—229 **4 Claims**



1. A fuze having controlled arming means to provide a preselected delay interval for use on either fin or spin stabilized projectiles comprising:

an ogive of generally conical configuration formed with an apex, said ogive defining a chamber therein;

an orifice formed at the apex of said ogive providing communication between the external fluid environment through which the projectile travels and the ogive chamber;

an initiator;

a support member mounting said initiator in said ogive chamber wherein said initiator divides said chamber into a first and second chamber, said first chamber being in communication with said orifice;

said support member defining a plurality of passageways providing communication between said first and second chamber;

a transversely extending carrier mounted for transverse displacement relative to said ogive in response to a transverse force, said carrier being mounted in the end opposite the apex;

a detonator mounted in said carrier for movement therewith;

pressure releasable locking means for normally locking said carrier in an unarmed state but responsive to pressure increases within the first and second chambers to release said locking means thereby permitting transverse movement of said carrier to an armed state,

said pressure releasable locking means including a locking member acting on each side of said carrier, each of said members comprising

a cylinder,

a piston mounted in said cylinder for telescopic movement therewith wherein the end of said piston is in communication with said second chamber, and

a spring coacting between said cylinder and piston urging said piston into locking engagement with said carrier wherein pressure increases in said first and second chamber due to fluid entering said chambers through said orifice will act on said piston whereby the controlled build-up of pressure acting on said piston to overcome the spring force provides a preselected delay interval causing the controlled

arming delay from the unarmed to the armed state;

second locking means mounted in said carrier for locking said carrier in the armed state and

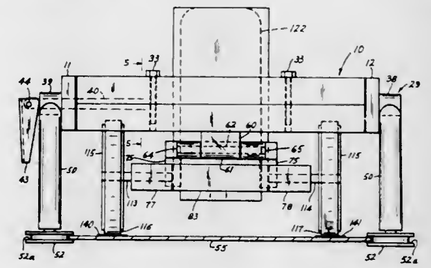
releasable seal means cooperatively associated with said orifice to separate said first chamber from the external environment prior to the firing of said projectile, thereby providing an additional operational delay for arming.

4,092,928

TRAVELING SUPPORT APPARATUS

Edward A. Clavin, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.

Filed Jan. 17, 1977, Ser. No. 759,781
Int. Cl.² B61B *13/04*; E01B *25/08*
U.S. Cl. 104—119 **9 Claims**



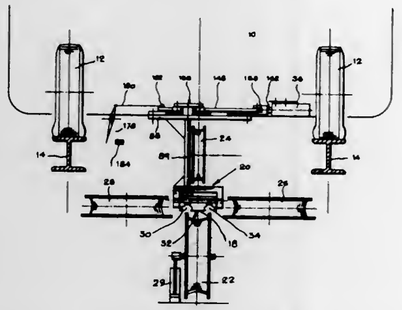
1. Traveling apparatus, comprising body means having oppositely disposed pairs of wheel means adapted to engage oppositely outwardly facing uniformly spaced edges of track means, and endless belt drive means supported by said body means adapted to engage said track means to propel said traveling apparatus along said track means, each of said oppositely disposed pairs of wheel means being supported by a cross shaft assembly having telescoped shaft elements biased to elongate by spring means disposed therebetween and including control means operable to compress said spring means to shorten said shaft assembly to move said wheel means against said opposite edges of said track means, said control means also being operable to relieve said compression of said spring means whereby said shaft assembly is lengthened to space said wheel means from said opposite edges of said track means.

4,092,929

TRANSPORT INSTALLATION WITH TRIPLE GRIP FOR COUPLING THE VEHICLES TO HAULAGE CABLES

Roger Laurent, Chambery, France, assignor to POMA 2000 S.A., France

Filed Dec. 13, 1976, Ser. No. 750,143
Claims priority, application France, Dec. 31, 1975, 75 40392
Int. Cl.[2] B61B 9/00
U.S. Cl. 104—173 R 9 Claims



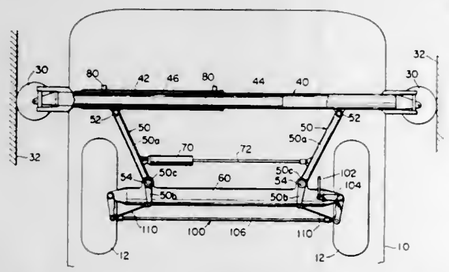
2. A transport installation comprising passive individual vehicles, a track on which the said vehicles run, haulage cables extending along the said track, a grip carried by each vehicle to couple the vehicle on to said cables, said grip having two cheeks mobile in relation to each other, and each having three jaws to form three pairs of jaws of which the jaws of each pair belong to different cheeks, a relative movement in one direction of the said cheeks resulting in the opening of one pair of jaws and the closing to the two others and a movement in the opposite direction resulting inversely in the closing of one pair of jaws and the opening of the two others.

4,092,930

GUIDE FOLLOWABLE AND MANUALLY STEERABLE VEHICLE OF A TRANSPORTATION SYSTEM

Tooji Takemura; Shigeru Saitoh, and Mitsuharu Hamada, all of Yokohama, Japan, assignors to Nissan Motor Company Limited, Japan

Filed May 13, 1976, Ser. No. 686,084
Claims priority, application Japan, May 19, 1975, 50-58739
Int. Cl.[2] B62D 1/26
U.S. Cl. 104—247 2 Claims



1. In combination, a vehicle having a steering mechanism driveable on highways and roads, an apparatus for converting the vehicle for use on a guide track system comprising,

a set of guide-follower wheels having vertical axes of rotation,

means for movably mounting said guide-follower wheels on said vehicle for selective travel on a guide track system having laterally spaced guide surfaces relative to a path the vehicle is to travel and for following the guide surfaces under automatic control of the guide-follower wheels,

means for selectively projecting the guide-follower wheels outwardly laterally of the vehicle for engagement in use on the guide surfaces laterally of a path of travel the vehicle is to travel and for retracting the guide-follower wheels to a retracted position under the vehicle, said means for projecting and retracting the guide-follower wheels including a plurality of relatively slidable, telescopically arranged tubes, pivotal toggle arms pivotally connected to said tubes for actuating said tubes to an extended position and to a retracted position, and a hydraulic cylinder for selectively actuating said toggle arms, and

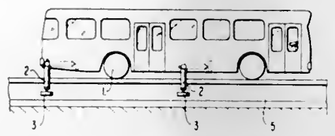
means for automatically transmitting guide movement of said guide-follower wheels to the manual steering mechanism of the vehicle on which said apparatus is mounted to effect guiding of the vehicle along said path, said means for transmitting movement comprising flexible control means connected to said pivotal toggle arms and connected in use to the vehicle steering mechanism and including means rendering said flexible means taut when said guide-follower wheels are projected to effectively operate the steering mechanism and for rendering said flexible means slack for rendering the control means ineffective when the guide-follower wheels are retracted.

4,092,931

POSITIVE GUIDE MECHANISM FOR ROAD VEHICLES WITH NON-TURNABLE WHEELS

Helmut Wulf, Nellingen, and Klaus Niemann, Weinstadt-Endersbach, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Mar. 5, 1976, Ser. No. 664,372
Claims priority, application Germany, Mar. 6, 1975, 2509713
Int. Cl.[2] B61F 9/00
U.S. Cl. 104—247 7 Claims



1. A system comprising an unarticulated road vehicle provided with a front axle having steerable front wheels and a rear axle having non-steerable rear wheels, characterized in that a first guide means is provided for defining a path or travel of the road vehicle, a single second guide means is arranged pairwise and mutually opposite within an area of a lateral periphery of the road vehicle at least approximately at the same distance in front and to the rear of the non-steerable rear wheels as viewed in the vehicle longitudinal direction, and in that the first guide means and said single second guide means are operatively associated with each other so as to positively guide said non-steerable rear wheels such that a rolling plane of the rear wheels is always disposed substantially at a right angle to radii of curvature of a curved path traversed by the non-steerable rear wheels whereby said rear wheels are free of oblique running and lateral forces.

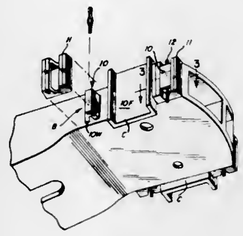
4,092,932

REPLACEABLE BOLSTER GIB ARRANGEMENT

Robert W. MacDonnell, Crete, Ill., assignor to R. W. Mac Company, Crete, Ill.

Filed Jul. 26, 1976, Ser. No. 708,900
Int. Cl.[2] B61F 5/04, 5/50; F16C 17/00, 25/02
U.S. Cl. 105—207 11 Claims

1. In a railway truck bolster structure having side wall structure adjacent each end region for controlled movement between confronting truck side column structures, an improved bolster guide arrangement comprising holder means fixed to and projecting from the bolster side wall structure in flanking spaced relation to the corresponding side column structure, wear shoe means seated on the holder means in force transmitting relation to cooperate with the side column structure in limiting relative horizontal movement between the bolster and side column structures, and interlocking means captively engaged between the holder means and wear shoe means for removably retaining the wear shoe means on the holder means



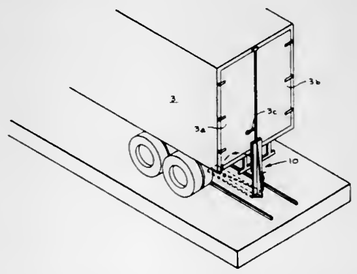
wherein said holder means is a vertically elongated generally U-shaped block defining a vertical passage, said wear shoe means is a generally rectangular trough-shaped hollow block embracing the U-shaped block and having vertical side wall means interconnecting upper and lower end wall portions to define a central pocket complementary to the U-shaped block, and said interlocking means projects through the passage of the U-shaped block and overlaps end wall portions of the trough-shaped block to hold the blocks in direct force transmitting relation.

4,092,933

BRACING DEVICE

Thomas Charlton, 13931 S. Stoneshire, Houston, Tex. 77037

Continuation-in-part of Ser. No. 585,083, Jun. 9, 1975, abandoned. This application Oct. 14, 1975, Ser. No. 622,125
Int. Cl.[2] B65J 1/22
U.S. Cl. 105—366 R 20 Claims



1. In a bracing means for wedging closed the door of a contained cargo on a transporting vehicle so as to preclude pilferage and spillage from the container comprising:

an upstanding member and a base member in unitary construction, the construction adapted to be hingedly affixed to the transporting vehicle proximate the base member so that the bracing means can be tipped to a stowed position on vehicle floor, and

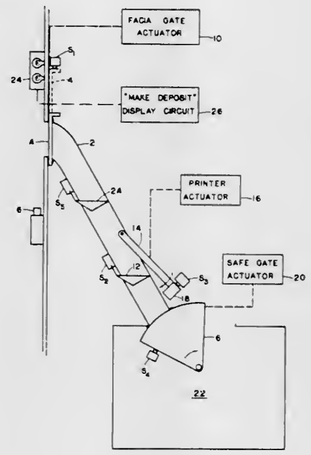
biasing means affixed to the base member of the bracing means for urging the upstanding member toward a contacting position with the door of the contained cargo, so as to exert pressure thereon when abutting contact is made.

4,092,934

APPARATUS FOR USE IN DEPOSITING ARTICLES IN A RECEPTACLE AND A SEQUENCE CONTROLLER UTILIZED THEREIN

Trevor Anthony Sayer, Croydon, England, assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 27, 1974, Ser. No. 527,897
Claims priority, application United Kingdom, Mar. 15, 1974, 11611/74
Int. Cl.[2] G07G 5/00
U.S. Cl. 109—24.1 11 Claims



1. Apparatus for use in depositing articles, such as bank deposit envelopes, in a receptacle, comprising:

a chute having an inlet through which the articles are inserted and an outlet through which the articles exit into the receptacle;

a mechanical gate at the inlet of the chute;

a mechanical gate at the outlet of the chute;

an actuator for each of the inlet and outlet gates for opening and closing same;

a recording device within the chute for recording information on the article therein;

an actuator for actuating the recording device;

cycle initiating means enabled when the inlet gate is closed for initiating a deposit cycle having a predetermined sequence of actions including opening the inlet gate to permit insertion of the article into the chute while the outlet gate is closed, closing the inlet gate, actuating the recording device to record information on the article, and opening the outlet gate to permit the article to pass into the receptacle;

a sequence controller controlling the actuators of the inlet gate, the recording device, and the outlet gate to enforce said predetermined sequence of actions in the deposit cycle within specified time periods;

and error detecting means terminating the deposit cycle at any stage thereof in which there occurs an action deviating from said predetermined sequence or not within a time period specified in the sequence.

4,092,935

PROCESS AND APPARATUS FOR THE INCINERATION OF SOLID FUEL MATERIAL

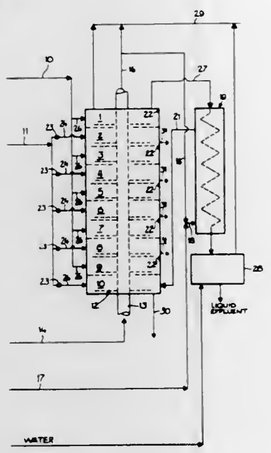
Charles E. Barnabe, Birmingham, Ala., assignor to Passavant Corporation, Birmingham, Ala.

Filed Mar. 28, 1977, Ser. No. 781,979
Int. Cl.[2] F23G 7/00
U.S. Cl. 110—186 11 Claims

1. A process for the combustion of solid waste material

containing combustibles in a gravity-type furnace having multiple groups of superimposed hearths, the improvement comprising:

(a) feeding solid waste material into the upper hearth of each said group of superimposed hearths so that said material is preheated, dried and burned within said group of superimposed hearths,



(b) selectively supplying controlled amounts of an auxiliary fuel to the lower hearth of each said group of superimposed hearths to maintain the discharge temperature of gases flowing from each said upper hearth above the ignition temperature of said gases, and

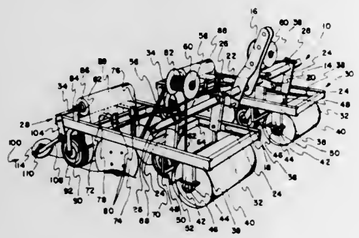
(c) removing ash from the lower hearth of at least the lowermost group of superimposed hearths.

4,092,936

METHOD AND APPARATUS FOR SEED TAPE PLANTING

J. Curtis Griffin, and Clyde C. Griffin, both of Branford, Fla., assignors to Harrington Manufacturing Co., Lewiston, N.C.

Filed Jun. 24, 1976, Ser. No. 699,585
Int. Cl.² A01C 7/00; A01G 13/02
U.S. Cl. 111—1 **14 Claims**



1. An automatic seed tape planter for field planting seed tape, comprising:

A. a mobile frame structure having connecting means associated therewith for connecting the frame structure thereof to a tractor such that said planter can be pulled through a field by said tractor during the planting operation;

B. means mounted about the front of said frame structure for forming a seed bed about a top portion of the soil within the field being traversed by said planter, said seed bed forming means including:

B1. roller means rotatively mounted forwardly within said frame structure about a transverse axis;

B2. said roller means including an outer cylindrical surface for engaging the underlying soil as said planter is pulled through the field by said tractor such that the engagement of said outer cylindrical surface with the underlying soil results in the formation of said seed bed; and

B3. cleaning blade means associated with said seed bed forming means and normally maintained in engagement with the outer cylindrical surface of said roller means for continuously cleaning said cylindrical surface during the planting operation;

C. means for dispensing seed tape from said planter to said formed seed bed where said seed tape is appropriately disposed generally on the surface of said seed bed or embedded within the seed bed in accordance with accepted planting practices for the particular type of seeds within said seed tape, said seed tape dispensing means including:

C1. means for supporting a spool having said seed tape wound therearound;

C2. guide means disposed generally below said spool having said seed tape wound therearound, said guide means being spaced vertically above said formed seed bed and having said seed tape threaded therethrough such that as the seed tape is dispensed in the planting operation the seed tape moves through said guide means; and

C3. wherein there is provided wheel means supported by said frame structure rearwardly of said guide means for passing over said seed tape once the same is engaged with the underlying soil and applying a downward force to generally hold the seed tape about the formed seed bed so as to allow the seed tape to freely unwind from the spool thereof as said planter moves through the field during the planting operation; and

D. means for laying a covering material over said formed seed bed and the dispensed seed tape for protecting the seeds and resulting seedlings for a time period after planting said seed tape, said means for laying said covering material including:

D1. means associated with said frame structure for supporting a spool of covering material about a transverse axis rearwardly of said seed tape dispensing means;

D2. means for engaging said covering material and pressing the same against the underlying soil during the seed tape planting operation so as to generally hold the covering material about said formed seed bed so as to allow the covering material to properly unwind from the spool thereof during the planting operation;

D3. furrow opening disc means supported by said planter frame structure forwardly of the area where said covering material is laid, for opening a furrow on each side of said formed seed bed;

D4. said means for engaging said covering material including a pair of laterally spaced wheels supported by said frame structure and particularly spaced to run in the furrows formed by said furrow opening disc means, said wheels operative to engage side portions of said covering material dispensed from said spool and to press the same into said furrows; and

D5. back filling means carried by said planter frame structure generally rearwardly of said pair of wheels for back filling portions of the soil displaced from said furrows back into said furrows and over the side portions of said covering material such that the back filled soil tends to hold down said covering material about said seed belt, said back filling means comprising a pair of laterally spaced floating disc assemblies carried by said frame structure about the rear thereof, each floating disc assembly engagable with a mound of dirt displaced from a respective furrow and disposed adjacent thereto so as to urge a portion of the displaced soil back into said furrow, each of said floating disc assemblies including:

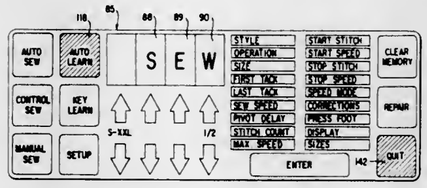
1. pivot plate means rotatably mounted about a transverse axis to said frame structure;
2. arm means secured to said pivot plate means and extending generally rearwardly therefrom; and
3. disc means secured to a remote end of said arm means opposite the end thereof which is connected to said pivot plate means, said disc means being angled so as to engage and urge soil disposed adjacent a respective furrow back into said furrow and generally over a respective side portion of said covering material disposed within said furrow.

4,092,937

AUTOMATIC STITCHING BY PROGRAMMABLE SEWING MACHINE

John Vernon Landau, Jr.; Barney Dean Hunts, both of Mountain Lakes; Frederick Alexander Rupinski, Lynhurst, and Alfred John Zenger, Montville, all of N.J., assignors to The Singer Company, New York, N.Y.

Filed Mar. 21, 1977, Ser. No. 779,890
Int. Cl.² D05B 19/00
U.S. Cl. 112—121.11 **28 Claims**



1. A programmable sewing system adapted to perform a sequence of operations on a work material, said programmable sewing system comprising:

a sewing machine having a frame;

a sewing needle supported within said frame for selectively repeated movement from a down position through a work material to an up position and returned to a down position;

a looptaker supported within said frame for cooperation with said sewing needle in the formation of stitches;

a reverable work material feed system supported within said frame and including feeding means for passing work material in a path between said needle and said looptaker;

continuously variable speed drive means for selectively actuating said sewing needle, said looptaker and said work material feed system in synchronism with each other;

a presser device selectively movable from a position urging said work material against said feeding means to a position out of contact with said work material;

manual control means for selectively moving said presser device out of contact with said work material;

treadle means for selectively actuating said drive means to a continuously variable sew speed;

means for stopping said drive means with said sewing needle in a selected one of said up and down positions;

a programmable computer coupled to said sewing machine and including means for counting said selectively repeated movement of said sewing needle in effecting stitches upon selective actuation of said treadle means, means for measuring the time duration of said presser device in a position out of contact with said work material while said sewing needle is in a selected down position after the completion of at least one stitch, means for obtaining a copy of said continuously variable sew speed actuated by said treadle means, and means for automatically recording in a first mode of operation upon reactuation of said treadle means the stitch count, any one time duration and variable sew speed copy of a segment in said sequence of operations on a work material;

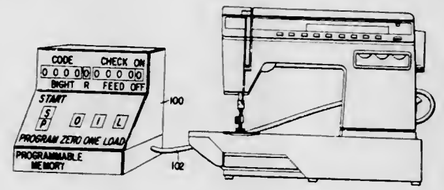
said programmable sewing system having a second mode of operation utilizing said treadle means as an ON/OFF switch to actuate in the ON position of said sewing machine in accordance with the record from said recording means obtained in said first mode of operation and in the OFF position permitting operation of selected components of said sewing machine.

4,092,938

SEWING MACHINE WITH PROGRAMMABLE MEMORY

Donald Jay Coughenour, Morristown, and John Addison Herr, Garwood, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed Jul. 27, 1976, Ser. No. 709,048
Int. Cl.² D05B 3/02
U.S. Cl. 112—158 E **14 Claims**



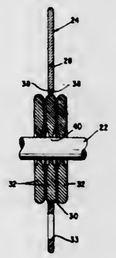
1. In a sewing machine having stitch forming means operative to form successive stitches including mechanism for influencing the stitch position coordinates of said successive stitches in the formation of a pattern of stitches, logic means responsive to input data representative of stitch position coordinates for producing stitch position coordinate electrical signals, actuating means responsive to signals from said logic means for controling the position of said stitch forming means in accordance with input data fed to said logic means, and re-programmable programming means operably connected to said sewing machine, said programming means including operator manipulating means for generating stitch by stitch digital input data corresponding to a stitch pattern selected by the operator and read-write static memory means continuously available for storing said digital input data while connected to said sewing machine and for transmitting electrical digital output signals corresponding to the stitch pattern selected by the operator to said logic means such that an operator may select a stitch pattern program for entry into the sewing machine for automatic reproduction of the stitch pattern by the sewing machine.

4,092,939

TENSION DISC ASSEMBLY

Warren Dean Knowles, Clark, N.J., assignor to The Singer Company, New York, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,291
Int. Cl.² D05B 47/00
U.S. Cl. 112—254 **6 Claims**



1. A tension disc assembly, for use in a tension device in

conjunction with individual, uniformly shaped tension discs, comprising:

one of said uniformly shaped tension discs;

a rigid flat plate having an aperture therethrough, said aperture having a shape congruent to the shape of said one tension disc; and,

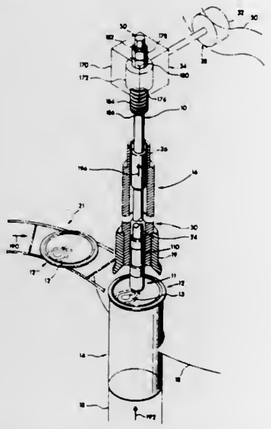
means for mounting said one tension disc within said aperture whereby said plate augments the size of said one tension disc enabling said plate with said one tension disc mounted therein to be used as an assembly both for guiding thread into said tension device and for tensioning thread therein.

4,092,940

SEAMER APPARATUS

Samuel Chinlun Wu, Lakewood, and Stephen Alan Holick, Aurora, both of Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Jun. 6, 1977, Ser. No. 803,605
Int. Cl.² B21D *19/00*
U.S. Cl. 113—29 **19 Claims**



1. In apparatus for seaming a can end member on a can body member and comprising:

end member transfer means for causing movement of an end member to a "make-up" station;

can body member transfer means for causing movement of a can body member to the "make-up" station and for effecting supportive engagement of the can body member with the can end member and for causing movement of the can body member and the end member supported thereby from the "make-up" station to a "seamer" station;

control rod means for applying a relatively light holding and stabilizing force on said end member during supportive association of the body member with the end member at the "make-up" station and during movement of the can body member and the end member supported thereby from the "make-up" station to the "seamer" station;

cam means operatively connected to said control rod means for causing movement of said control rod means between an extended position and a retracted position relative to the end member; and

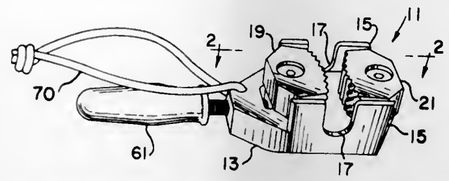
the improvement of resilient compressible force application controlling means mounted on said control rod means for engaging the upper surface of the end member and limiting the amount of force applied to the end member.

4,092,941

ADJUSTABLE TWO-WAY CAM CLEAT

Stephen Gryglas, 1874 Fenton La., Park Ridge, Ill. 60068

Filed Mar. 21, 1977, Ser. No. 779,308
Int. Cl.² B63B *21/08*
U.S. Cl. 114—218 **6 Claims**



1. An adjustable cam cleat particularly adapted for releasably holding lines of different diameters against axial tension exerted on said lines in opposite axial directions, comprising:

a base;

a first cam jaw having an arcuate periphery with first engaging means mounted thereon for engaging a line, said first cam jaw being pivotally mounted on said base about a first axis normal to said base;

adjustment means movably mounted on said base;

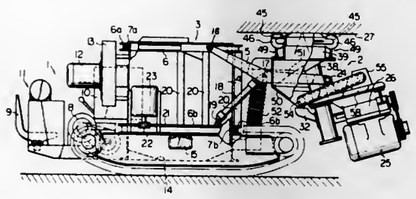
a second cam jaw having an arcuate periphery with second engaging means mounted thereon for engaging said line, said second cam jaw being pivotally mounted on said adjustment means about a second axis normal to said adjustment means, said second cam jaw being disposed a distance opposite said first axis, said second cam jaw being movable with said adjustment means linearly relative to said first axis to vary said distance therebetween for accommodating lines of different diameters between said first and second cam jaws, whereby said first and second engaging means engage said line disposed between said first and second cam jaws and cooperate to hold said line from movement in opposite axial directions.

4,092,942

MOBILE SHOT BLASTING APPARATUS FOR SHOT BLASTING THE BOTTOM OF A SHIP OR THE LIKE

Sinichi Kurohiji, Tanashi; Genshichi Shigyo, Mitaka, and Nobujiro Arai, Yokohama, all of Japan, assignors to Magster Company, Japan

Filed Jul. 5, 1977, Ser. No. 812,524
Int. Cl.² B60S *3/02*
U.S. Cl. 114—222 **19 Claims**



1. In a mobile shot blasting apparatus for the bottom surface of a ship;

a tractor;

dust collecting means disposed in the tractor;

support means operatively mounted on the tractor having an arm which is vertically pivotably and horizontally rotatable about the tractor;

shot blasting means pivotably mounted on the end of the arm and fluidly connected to the dust collecting means for transfer of dust and debris from the shot blasting means;

shot accelerating means operatively disposed in the shot blasting means for directing shot at a predetermined angle;

a hopper disposed in the shot blasting means and arranged to collect the shot and debris reflected and disloged from the surface;

separating means arranged in the hopper to separate the shot from the dust and debris and direct the dust and debris to the dust collecting means and the shot to the bottom of the hopper;

a first conveyor means disposed at the bottom of the hopper to convey the shot collected therein through an opening, closably by gate means, formed in the bottom of the hopper into a supply chute;

a second conveyor means operatively connected to the shot accelerating means, which communicates with the supply chute to convey shot therein into the shot accelerating means;

the improvement comprising:

box means disposed in the upper portion of the shot blasting means and provided with through holes in the upper and lower surfaces thereof to permit therethrough the passage of high velocity shot from the shot accelerating means;

casing means slidably disposed in the box means which has through holes formed in the upper and lower surfaces thereof to permit therethrough the passage of high velocity shot from the shot accelerating means;

urging means operatively connected to the box means and the casing means to urge the casing means upwardly against the weight of the casing means so that the casing means is slidable in the box means via the application of a small force;

magnetic means disposed on the upper portion of the casing means to attract and hold the casing means against the surface to be shot blasted and;

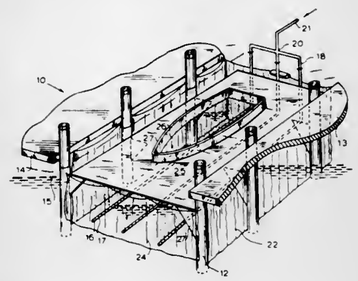
roller means mounted on the upper portion of the casing means to contact the surface and maintain a predetermined gap between the upper surface of the magnetic means and the surface to be shot blasted.

4,092,943

MARINE PROTECTION SYSTEM

Norman Lund, and George R. Young, both of 6525 New Haven, Melbourne, Fla. 32901

Filed Jul. 19, 1976, Ser. No. 706,299
Int. Cl.² B63C *1/00*; E02C *3/00*
U.S. Cl. 114—222 **2 Claims**



1. A marine growth retardation system comprising in combination:

a marine structure located at least partially in water and having pilings to form a boat slip for housing a boat therein;

gas diffuser means located adjacent said marine structure below the water level for feeding and dispersing gas fed thereto, said gas diffuser means being mounted to the sea bed in said boat slip directly beneath the mooring position of a boat;

ozone generator means coupled to said gas diffuser means for directing ozone therethrough and to the surrounding water;

skirt means set vertically in the water adjacent said marine structure to restrict the flow of water therepast, said skirt means having a plurality of skirts removably attached to the pilings for said boat slip whereby ozone treated water adjacent said skirt means will prevent marine growth from fouling marine structures; and

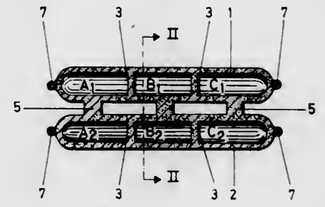
a removable cover adapted to fit over said boat slip and having an opening therein for a boat to fit thereinto in said boat slip, said opening in said top cover having a raised wall extending therearound for directing ozone gas passing therethrough.

4,092,944

UNDERWATER ANCHOR FOR THE MOORING OF FLOATING STRUCTURES AS WELL AS A METHOD FOR THE PLACING OF SUCH AN ANCHOR

Siemen Van der Wal, Lunteren, Netherlands, assignor to Verenigde Bedrijven Bredero N.V., Utrecht, Netherlands

Filed May 20, 1976, Ser. No. 688,486
Claims priority, application Netherlands, May 29, 1975, 7506376
Int. Cl.² B63B *21/24*
U.S. Cl. 114—297 **5 Claims**



2. A method for placing a floatable anchor having a body with a closed hollow interior and a fastening point for an anchor cable, into the bottom of an ocean, river, or other body of water, upon which a thick soft layer, such as mud, is present, comprising the steps of:

fastening one end of the body of the anchor to the lifting cable of a floating lifting device;

lifting the end of the body attached to the cable with respect to the other end;

supplying so much water to the interior of the body that the anchor assumes an upright position and the floating power of the anchor becomes negative, but not exceeding the required maximum lifting power of the lifting device;

paying out the lifting cable until the anchor reaches the bottom of the body of water and sinks therein; and

ballasting the anchor while sinking, until the required anchor weight is obtained.

4,092,945

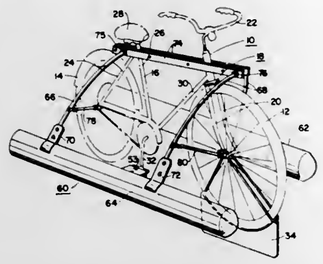
FLOAT APPARATUS FOR BICYCLE

Walter Ankert, and Ingrid Ankert, both of R.R. #1, Box 43, Ashburn, Ontario, Canada

Filed Sep. 27, 1976, Ser. No. 726,472
Int. Cl.² B60F *3/00*
U.S. Cl. 115—2 **5 Claims**

1. A float apparatus for a conventional bicycle, said bicycle having a frame including a front fork assembly terminating in a fork and mounting means for mounting a front wheel and a handlebar coupled thereto, a rear fork assembly and rear wheel mounting bolts, a seat, and pedals, said float apparatus comprising in combination, a rudder under said front wheel of said bicycle and coupled directly to said front fork assembly whereby movement of said handlebar causes movement of said rudder, a paddle mounted directly on each pedal by means of a mounting bracket, and a left side and a right side pontoon assembly, each assembly including a pontoon, each assembly

including a frame for securing said pontoon to said bicycle at the front and rear forks thereof having spaced essentially parallel transversely extending arcuate front and rear support bars mounted to said pontoon and extending to the upper portion of said bicycle frame where said bars are coupled to each other by a horizontal support member, a front essentially horizontal



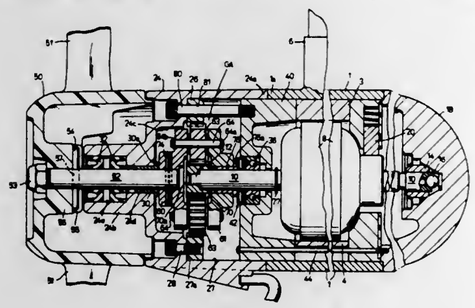
support bar extending from said arcuate transverse front support bar to said front fork of said bicycle and being pivotally mounted to said transverse front support bar and said fork, and means for coupling the left side and right side pontoon assemblies to each other along the upper portion of said bicycle frame.

4,092,946

ELECTRIC TROLLING MOTOR HAVING PLANETARY GEAR REDUCTION

Chris S. Kappas, 218-13th St., Racine, Wis. 53403

Filed Jul. 25, 1977, Ser. No. 818,310
Int. Cl.² B63H *5/13*
U.S. Cl. 115—18 E **8 Claims**



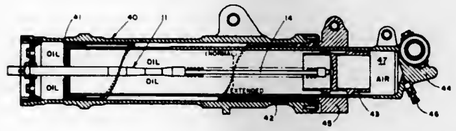
1. An electric trolling motor comprising, a cylindrical motor housing having an electric motor therein and a motor drive shaft extending rearwardly therefrom and terminating in a rear driving end, a cylindrical gear housing located rearwardly and abutting against said motor housing and having a complementary shape therewith, said gear housing having an axial bore therein and a transverse shoulder at the inner end of said bore, an internal gear ring mounted in said bore and abutting against said shoulder and means for removably but rigidly securing said gear ring in said bore and against said shoulder, said gear housing also including a rearwardly extending hub, a rear sleeve thrust bearing mounted centrally in said hub, a propeller shaft rotatably journalled in said rear sleeve thrust bearing and extending through said hub and rearwardly thereof; a bearing support located within said gear housing but axially spaced from said gear ring and extending into said motor housing, means removably securing said bearing support in said motor housing, said bearing support having a central and axially extending aperture therethrough and an anti-friction bearing assembly mounted in said aperture, a sun and planetary gear assembly mounted within said gear housing and comprising, a planet gear rear carrier and a planet gear front carrier axially spaced apart and in coaxial alignment with one another, a plurality of planet gears rotatably mounted between said carriers and in circumferentially spaced relationship therearound, means for rotatably mounting each of said planetary gears between said rear and front carriers, said gear assembly also including a centrally disposed sun gear in constant mesh with said planet gears, said planet gears also being in constant mesh with said internal gear ring, a front sleeve thrust bearing located in said front carrier and in which said motor shaft is journalled, said sun gear and said rear end of said motor shaft forming an axial releasable driving connection therebetween, said front sleeve thrust bearing abutting against said anti-friction bearing assembly, and a propeller shaft having a detachable connection with said rear carrier and extending through said rear sleeve thrust bearing.

4,092,947

OIL LEVEL INDICATOR FOR USE WITH DAMPING FLUID METERING PINS

Jean P. Labrecque, Stratford, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 6, 1977, Ser. No. 840,189
Int. Cl.² F16F *9/06*; G01F *23/00*
U.S. Cl. 116—118 R **7 Claims**



1. A hydraulic fluid level indicator for use in combination with a hydraulic fluid metering pin positioned in an extensible shock absorbing unit comprising:

a rod slidably received in a bore extending longitudinally through a metering pin;

means preventing the passage of oil through said bore; and

means urging said rod out one end of said metering pin into view upon the occurrence of selected conditions in said unit,

the exposed portion of said rod indicating extremely extended positions of said unit resulting from unusually low hydraulic fluid levels therein which levels normally would be concealed by increased air pressure in said unit.

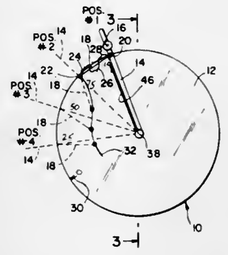
4,092,948

GAUGE FOR INDICATING AVAILABLE WATER SUPPLY

Thomas Bray, 1910 Bahama Dr., Miramar, Fla. 33023

Filed Jan. 5, 1977, Ser. No. 756,741
Int. Cl.² G01D *1/00*
U.S. Cl. 116—114 PV **8 Claims**

1. Apparatus for exponentially indicating the linear movement of a movable reference marker comprising base means for tracking the movement of a movable reference marker, a first point on said indicator means pivotally secured to a movable arm, said arm being movably secured to said base for positioning said indicator means on said base, said arm being movable to project into the path of a movable reference marker, a second point on said indicator means being slidably mounted on track means, said track means being secured to and positioned on said base at an angle to said arm so that when said indicator means is moved by said arm, the angle of alignment of said first point and said second point on said indicator means



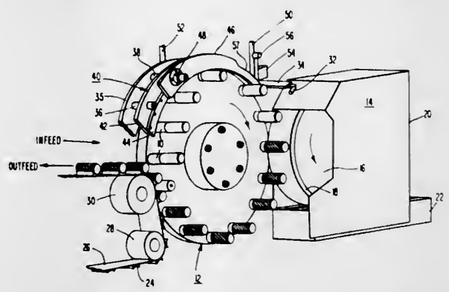
is changed with respect to said arm, said indicator means being positionable in the path of a movable reference marker.

4,092,949

CONTAINER ROLLBACK DETECTOR AND COATING APPARATUS

Romano Balordi, Millers, Md., assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa.

Filed Dec. 2, 1976, Ser. No. 746,941
Int. Cl.² B05C *1/02, 13/02*
U.S. Cl. 118—6 **14 Claims**



1. In a container handling apparatus for transporting metal cans along a predetermined path and having a series of moving mandrels for receiving cans and conveying them along the path, means for urging cans onto ones of said mandrels, and means for sensing the presence of a can which is not fully seated upon a mandrel, the improvement comprising:

a shoe disposed adjacent a segment of the path traversed by said mandrels for frictionally engaging said mandrels to cause said mandrels to rotate; and

a substantially rigid, elongate stripper arm disposed adjacent at least a portion of said segment and including an edge section extending generally parallel to said path, said edge section being sufficiently close to the mandrel surfaces to prevent cans having rolled-back edges from fitting between said stripper arm and said mandrel surfaces, but permitting the passageway therebetween of sidewalls of undeformed cans;

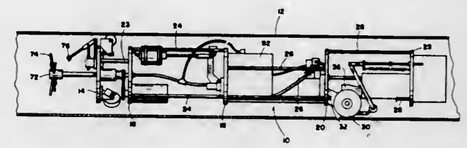
whereby cans having rolled back edges are prevented from fully seating upon said mandrels.

4,092,950

INTERNAL PIPE COATING APPARATUS

Robert J. Hart, Tulsa, Okla., assignor to Commercial Resins Company, Tulsa, Okla.

Filed Jun. 20, 1977, Ser. No. 808,200
Int. Cl.² B05C *7/02, 7/08, 19/00*
U.S. Cl. 118—8 **5 Claims**



1. An internal pipe coating apparatus for coating the interior surfaces of uncoated weld joints in an otherwise internally coated pipeline comprising a frame having wheels at the forward and rear ends thereof, the forward end being oriented towards an uncoated weld joint to be coated, a drive motor for driving one pair of wheels to move the coating apparatus within the pipeline towards the uncoated weld joint, a pivotal feeler mechanism located at the forward end of said frame, said feeler mechanism including a pair of electrically conductive arms adapted to bear against the internal surface of the pipeline and to create a completed circuit when the feeler arms engage the bare surface of the uncoated weld joint to stop the drive motor, means responsive to the actuation of said drive motor for pivoting said feeler mechanism into position where said feeler arms are in contacting position against the internal surface of the pipe, a rotatable hollow shaft located at the forward end of said frame, said hollow rotatable shaft being provided with a hollow hub and a plurality of hollow radiating arms adapted to spray powder on the uncoated weld joint, a spin motor mounted on said frame for rotating said shaft, means for actuating said spin motor, a powder suspension device mounted on said frame, means for conducting a suspension of powder from said powder suspension device to said hollow hub, a fan means mounted on said frame and actuated in subsequent timed relation to the actuation of the spin motor to provide air under pressure to the powder suspension device to suspend powder therein, a valve located on said conducting means, valve operating means actuated in timed relation with and subsequent to the actuation of said fan means for opening said valve to provide a stream of powder to the hollow hub so that a suspension of powder passes out of the hollow arms by centrifugal force to coat the heated weld joint.

4,092,951

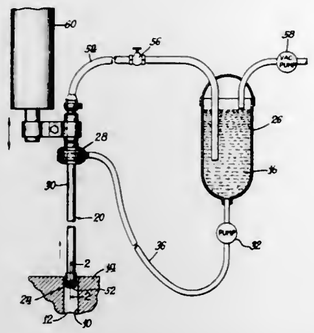
MENISCUS FORMING APPLICATOR INCLUDING VACUUM ANTI DRIP

Floyd B. Kopis, 330 Interstate Rd., Addison, Ill. 60101

Division of Ser. No. 506,355, Sep. 16, 1974, abandoned. This application May 9, 1977, Ser. No. 794,811
Int. Cl.² B05C *5/00, 7/06*
U.S. Cl. 118—50 **5 Claims**

1. For applying liquid to the interior surface of a bore within an object, an elongated applicator of generally cylindrical form defining a generally circular shoulder having an overflow periphery dimensioned diametrically to fit within the bore leaving a small but noncritical radial space between the overflow periphery and the bore, liquid supply means for supplying the liquid continuously to the applicator to flow onto the shoulder thereof and cling thereto to define a liquid bead which under the restraint of surface tension protrudes beyond the overflow periphery sufficiently to contact the bore surface when the applicator is positioned within the bore, said applicator defining an aspirating intake underlying the overflow periphery in circumferentially distributed relation to said shoulder, and suction means connected with said aspirating intake on the applicator to continuously apply suction thereto to

aspirate liquid from an annular zone immediately below the overflow periphery to prevent dripping and wastage of liquid from the applicator even when the applicator is removed from



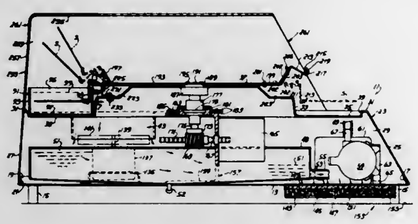
a bore and to remove a portion of the liquid deposited on a surrounding bore surface by the liquid bead on the shoulder as an incident to passage of the applicator through the bore.

4,092,952

AUTOMATIC SLIDE STAINER

Ronald N. Wilkie, and Arman Mooradian, both of 30076 Dequindre, Warren, Mich. 48092

Filed Aug. 19, 1977, Ser. No. 826,064
Int. Cl.² B05C *3/04, 3/09, 11/10, 13/00*
U.S. Cl. 118—58 **37 Claims**



1. In an automatic slide stainer, a hollow enclosed framework including a base and a cover with front, rear and side walls;

said cover including an outer annular platform;

a first dish of limited width having a flat bottom mounted upon said platform, adapted to contain a chemical solution;

a stain dish of increased width having a flat bottom mounted upon said platform at one side adjacent said first dish, adapted to contain a stain solution;

a reservoir tank mounted upon said base within said framework, having an outlet, and adapted to contain a rinse solution;

a rinse tank connected to and in communication with said reservoir tank, projected up through an aperture in said platform and adjacent the other side of said stain dish, and having an inlet above said reservoir tank;

a motor-operated pump mounted upon said base within said framework, and having an inlet and outlet;

conduits respectively interconnecting the reservoir outlet and pump inlet, and pump outlet and rinse tank inlet, for the continuous circulation of rinse liquid through said rinse tank;

a power rotated upright hub journalled and supported upon and within said framework centrally of said platform and projecting through and above said cover;

a drive means upon said framework connected to said hub;

a disc shaped slide retainer plate mounted upon and centrally secured to said hub for rotation radially inward of said dishes and tank;

a series of radially extending slide retainers pivotally mounted upon said plate around its periphery, each retainer having an outwardly directed spring clip adapted to supportably and frictionally receive one end of a slide to be stained;

said slide retainer and clip having a raised secured position, a raised slide clearance position and a lowered horizontal slide immersion position for translation within the fluids in the respective dishes and rinse tank;

said slide retainers, when supporting a slide, being normally biased to immersion position;

and a series of spaced cam means mounted upon said cover inwardly of said platform, normally in the path of rotative movement of said slide retainers and slides for movably camming the retainers successively to raised slide clearance position;

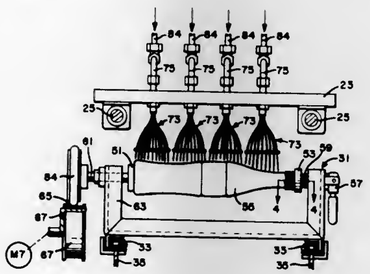
said cam means being located adjacent and in advance of the radial sides of each dish and tank so that said retainers and connected slide are temporarily cammed to raised clearance position to clear the dish and tank sides during continous rotation thereof.

4,092,953

APPARATUS FOR COATING GLASS CONTAINERS

Robert E. Waugh, Columbus, Ohio, assignor to The D. L. Auld Company, Columbus, Ohio

Filed Dec. 9, 1976, Ser. No. 748,946
Int. Cl.² B05B *13/04*
U.S. Cl. 118—642 **6 Claims**



1. Apparatus for coating a glass container with a layer of plastic comprising:

means for rotating a glass container about a horizontal axis and moving said container past a coating station,

a plurality of liquid applicator nozzle means, positioned above the coating station, each of said nozzle means, including a plurality of fluid carrying tubes distributed axially along said container, for supplying uncured plastic liquid to an associated area on the container as the container rotates,

means for supplying predetermined quantities of uncured plastic liquid to respective ones of said plurality of nozzle means, and

means for rotating said container about a horizontal axis after uncured liquid plastic is applied to said container at said coating station such that said container is rotated as said plastic cures,

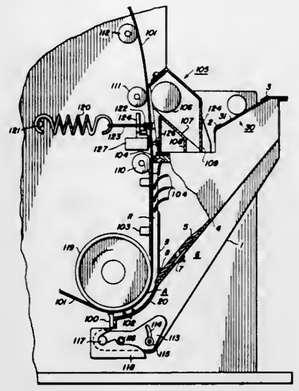
whereby each of said nozzle means provides a coating of desired thickness on its associated container area.

4,092,954

HIGH SPEED TANK DEVELOPMENT SYSTEM

Frederick W. Hudson, West Henrietta, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 31, 1977, Ser. No. 802,156
Int. Cl.² G03G *15/08*
U.S. Cl. 118—658 **8 Claims**



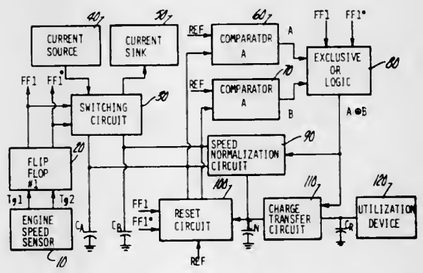
1. Apparatus for applying magnetic toner to a latent magnetic image on an imaging member moving at high speed, comprising: a housing having an upper magnetic toner supply chamber provided with an opening through which magnetic toner can flow under the influence of gravity; a bottom housing wall member below said opening and shaped to conform to a portion of the path of travel of said imaging member; a lip-seal affixed to said bottom housing wall member adapted to divert air flow away from and retain magnetic toner upon, said bottom housing wall member; means for magnetically salvaging airborne magnetic toner located above said toner supply chamber and adapted to deposit salvaged toner into said toner supply chamber; baffle means, located intermediate said magnetic salvaging means and said opening; adapted to divert airborne toner from the vicinity of said imaging member into said upper toner supply chamber; and low friction, resilient sealing means for confining toner between said imaging member, said lip-seal and said developer housing.

4,092,955

ROUGHNESS SENSOR

Junuthula N. Reddy, Troy, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Oct. 4, 1976, Ser. No. 729,317
Int. Cl.² F02B *3/04*
U.S. Cl. 123—32 EA **12 Claims**



1. Roughness sensor means for detecting and measuring the cycle-to-cycle changes in engine speed comprising:

(a) engine speed sensor means adapted to respond to an engine event recurring each engine cycle to produce therein an alternating signal comprising first and second transitions defining first and second contiguous intervals therebetween varying directly with the periods of each cycle;

(b) content storage means coupled to said engine speed sensor means operative to store contents representing the width of at least one of said first and second intervals;

(c) comparator means coupled to said content storage means operative to compare the widths of said first and second intervals to produce an output pulse having a magnitude determined by the difference between said first and second intervals; and,

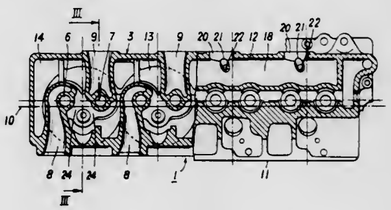
(d) speed normalization means coupled to said content storage means and said comparator means operative to modify said magnitude of said comparator output to produce a roughness signal varying directly with said comparator output and inversely with said contents.

4,092,956

WATER COOLED INTERNAL COMBUSTION ENGINE, PARTICULARLY A DIESEL ENGINE

Hans List, 126, Heinrichstrasse, Othmar Skatsche, Josef Greier, Bertram Obermayer, Gerhard Feichtinger, and Johann Wagner, all of Graz, Austria, assignors to Hans List, Graz, Austria

Filed Aug. 26, 1976, Ser. No. 717,894
Claims priority, application Austria, Sep. 4, 1975, 6849/75
Int. Cl.² F02F *1/36*
U.S. Cl. 123—41.74 **5 Claims**

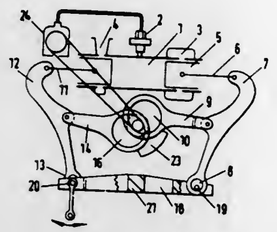


1. A water cooled internal combustion engine comprising a cylinder block, a cylinder head cast integrally with the cylinder block, an overhead camshaft housing cast integrally with the cylinder head and the cylinder block, an overhead camshaft located in said camshaft housing, intake and exhaust valves and fuel injection nozzles suspended in the cylinder head, means forming exhaust ducts which extend transversely of the engine to an exterior wall on the exhaust side of the engine, means forming a cooling water chamber extending over all cylinders of the engine, means forming a cooling water distributor channel extending in the longitudinal direction of the engine and positioned immediately above the exhaust ducts, said cooling water distributor channel communicating with the cylinder head cooling water chamber of each cylinder via means forming a bore directed towards a cylinder head wall area adjacent the intake and exhaust valves and the fuel injection nozzle of the associated cylinder.

4,092,957
COMPRESSION IGNITION INTERNAL COMBUSTION ENGINE

Donald Wilfred Tryhorn, Slough, England, assignor to Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd., Slough, England

Filed Oct. 15, 1975, Ser. No. 622,602
Claims priority, application United Kingdom, Oct. 16, 1974, 44869/74
Int. Cl.² F02B 75/04
U.S. Cl. 123—48 B **5 Claims**



1. A compression ignition engine having a crankshaft and cylinder means and comprising for each cylinder,
two opposed pistons reciprocable in each cylinder,
two rocker beams, one for each piston having fulcrums which are stationary and at ends of the beams and lie on a line parallel to the axis of the respective cylinder,
piston rods connecting the pistons to their respective rocker beams,
oppositely positioned cranks directly adjacent to one another on the crankshaft,
one connecting rod coupling one of said rocker beams to a respective crank,
connecting rods coupling the opposite rocker beam to respective cranks so that the rods connecting said opposite beam are directly adjacent to and on either side of the rod connecting said one of said beams,
the engine further comprising means for adjusting the positions of the stationary fulcrums to vary the compression ratio of the engine, and
fuel inlet means and exhaust means.

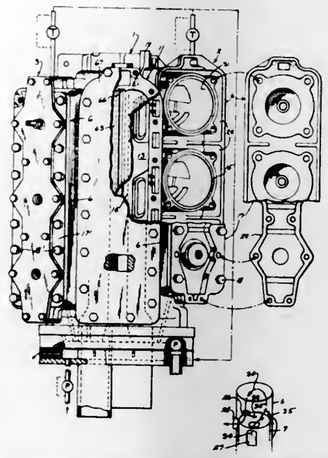
4,092,958
INTERNAL COMBUSTION ENGINE

David Jerry Hale, Pickett, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Sep. 4, 1975, Ser. No. 610,319
Int. Cl.² F02B 33/07
U.S. Cl. 123—73 PP **26 Claims**

1. A two-cycle V-engine having a plurality of in-line cylinders in a pair of angular oriented banks with an exhaust chamber located between said banks with a common wall between the cylinders and the exhaust chamber, each of said cylinders having a head located at a defined head end portion and having circumferentially spaced inlet and outlet port means, a reciprocating piston in each of said cylinders characterized by a loop charging and scavenging apparatus wherein said port means comprise an exhaust port unit located in said common wall and extending from the cylinder through said common wall into the exhaust chamber and extending longitudinally of the banks of cylinders toward one end of said banks of cylinders, said exhaust chamber exiting from said one end of the engine, a pair of oppositely located inlet port units for supplying of inlet gases to each cylinder, each of said inlet port units having an inlet port including essentially linear sidewalls which are substantially differently angularly oriented with a progressively converging angle of flow from the back of the port to the front and a discharge opening of the port unit to direct the inlet gases across the cylinder with an angle of impact adjacent the wall of the cylinder opposite said exhaust port unit and moving outwardly to the head of the cylinder and across the top of the piston toward said exhaust port unit and then moving from the head in the opposite direction and toward the exhaust port unit in the general form of a loop to define loop charging and scavenging of the cylinder.

20. In a two-cycle engine, an open-ended cylinder formed in an engine cylinder block and closed at one end by a head and having a piston reciprocally mounted in the cylinder, said cylinder block having circumferentially spaced inlet and outlet port means arranged to create a loop charging and scavenging of the cylinder from a pressurized chamber at the end of the cylinder opposite said head, characterized by an exhaust port unit located in the block for exhausting gases from the cylinder, said port unit having an exhaust port terminating in the cylinder and located to be completely uncovered with the piston at maximum spacing from the head and to be progressively covered during the movement of the piston from said position, a finger port in the cylinder diametrically opposite the exhaust port, a pair of inlet port units located one each to the opposite sides of the finger port, each of said inlet port units



having a passageway extending through the block parallel to the cylinder and coupling the pressurized chamber to the cylinder, said inlet port units being located on diametrically opposite sides of the cylinder and essentially equicircumferentially spaced from the exhaust port and the finger port, said inlet port units each having an inlet port having essentially straight sidewalls which are substantially differently angularly oriented with a progressively converging angle of flow directing the charge from said ports toward the finger port with an angle creating impact adjacent the finger port said finger port introducing a charge merging with the flow from the inlet ports and moving from the ports to the head of the cylinder and then from the head of the cylinder to said exhaust opening in the general form of a loop to define loop charging, wherein said passageway of each of said inlet port units has a large inlet opening adjacent the crankcase and is connected to said inlet port by a sharply curved front wall and a slowly curved back wall, said walls being joined by sidewalls and defining a progressively restricted opening to said inlet port.

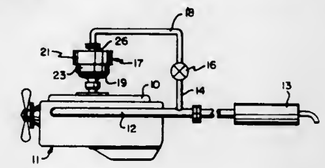
4,092,959
INLET GAS MIXER FOR INTERNAL COMBUSTION ENGINE

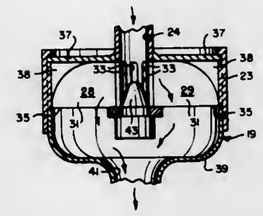
Edward A. Mayer, Newburgh, and Frank V. Sassi, Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 265,107, Jun. 21, 1972, abandoned. This application Mar. 13, 1974, Ser. No. 450,911
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A **1 Claim**

1. In combination with an internal combustion engine having

intake and exhaust manifolds, an exhaust gas recycling system incorporated in said engine to recycle a portion of exhaust gas from said exhaust manifold whereby to intermix with air to form a homogeneous preliminary gaseous mixture for introduction to said engine intake manifold,
a gas mixer (17) in said gas recycling system adapted to receive flows of said exhaust gas and air respectively, and to form said preliminary gaseous mixture, said gas mixer comprising,
an elongated casing defining a circular gas mixing compartment (19) having opposed ends,
inlet means for exhaust gas and air disposed transversely on one end of said elongated casing, an impinging wall (39) positioned at the casing opposed end against which air and exhaust gas streams impinge prior to leaving said mixing compartment (19),





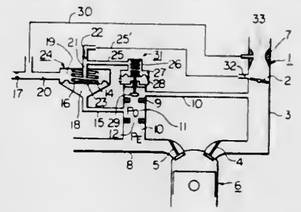
means forming a discharge port (41) opening into said gas mixing compartment (19) and communicated with said engine intake manifold to conduct said preliminary gaseous mixture to the latter,
said inlet means for exhaust gas including a conduit (24) communicated with said mixing compartment (19) and with said engine exhaust manifold respectively to conduct a stream of exhaust gas from the latter and,
a plurality of nozzles (27) communicated with said conduit (24), being circularly arranged about the latter and having discharge slots (35) extending from said conduit (24) radially outward to the wall of said casing, whereby to define between adjacent nozzles, intermediate passages communicated with a source of air, said conduit (24) includes an internal deflecting surface (43) at the conduit end, and openings (33) formed in the conduit wall adjacent to said deflecting surface to communicate said nozzles (27) with said conduit.

4,092,960
EXHAUST GAS RECIRCULATION SYSTEM IN AN INTERNAL COMBUSTION ENGINE

Hidetaka Nohira, and Masaaki Tanaka, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 18, 1976, Ser. No. 743,145
Claims priority, application Japan, Jun. 18, 1976, 51-78896[U]
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A **2 Claims**

1. A back pressure-controlled exhaust gas recirculation system (EGR system) in an internal combustion engine comprising a pressure-operated EGR valve means with a pressure control chamber disposed in an EGR conduit connecting an exhaust pipe to an intake pipe of the engine, said EGR valve means being provided with a pressure sensing pipe extending therefrom to a pressure source, and a back pressure transducer having an atmospheric pressure chamber connected to said pressure sensing pipe and having a pressure operation chamber

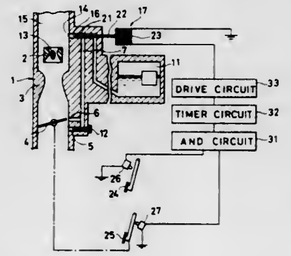


connected to said pressure control chamber, wherein the improvement comprises an air bleed passage connected, at one end, to said atmospheric pressure chamber of said back pressure transducer and the other end of said air bleed passage opening into the atmospheric air, said air bleed passage being provided with a branch passage diverging therefrom and being connected to a venturi portion of a carburetor.

4,092,961
CARBURETION SYSTEM FOR PREVENTING ENGINE MISFIRES DURING GEAR CHANGES

Minoru Yamada, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 31, 1977, Ser. No. 801,798
Claims priority, application Japan, Mar. 10, 1977, 52-25450
Int. Cl.² F02B 33/00
U.S. Cl. 123—119 EC **7 Claims**



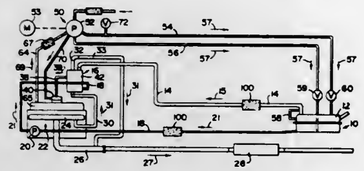
1. A carburetion system for use in an internal combustion engine of a vehicle comprising:
an intake passage for said engine;
a throttle valve located in said intake passage;
an idle port open in said intake passage;
means for providing a first signal when a clutch pedal of said vehicle is depressed;
means for providing a second signal when said throttle valve is at an idle opening position;
a coincidence detecting circuit for detecting the simultaneous occurrence of said first and second signals and providing an output signal when coincidence is detected, said output signal representing a gear changing condition;
a fuel passage for directing fuel to said idle port;
valve means for opening a communication path between the atmosphere and said fuel passage in response to said output signal, whereby air is introduced into said fuel passage at the time of changing gears; and
timing means for closing said valve means a predetermined period of time after said coincidence detecting circuit provides said output.

4,092,962

PRECARBURETOR IGNITION SYSTEM

Arthur L. Beaton, and Nelson E. Weygant, both of St. Petersburg, Fla., assignors to Steven P. Corrigan, Omaha, Nebr.

Continuation-in-part of Ser. No. 508,273, Sep. 23, 1974, abandoned. This application Apr. 1, 1976, Ser. No. 672,723
Int. Cl.² F02M *31/00*
U.S. Cl. 123—133 **5 Claims**



1. A precarburetor ignition system for use in combination with an internal combustion engine said system comprising: thermerator means interconnected to the intake manifold of the internal combustion engine, fuel source means, fuel supply means interconnected in fluid communication between said thermerator means and said fuel source means; said fuel supply means comprising, at least in part, supply conduit means; said thermerator means comprising heat source means disposed in direct engagement with exhaust gases from the internal combustion engine; fuel vapor separator means disposed in fluid communication between said fuel supply means and said thermerator means, spray orifice means having a predetermined configuration and connected in fluid delivery position to the interior of said fluid vapor separator means, said spray orifice means dimensioned to deliver fuel from said supply means to the interior of said fuel vapor separator means in at least a partial vapor state, said fuel vapor separator means further comprising reservoir means disposed in spaced relation to the point of connection of said spray orifice means, return conduit means interconnected between said reservoir means and said fuel supply means, said fuel vapor separator means comprising, at least in part, a substantially curvilinear longitudinal configuration, said spray orifice means connected in interconnecting relation to the interior of said fuel vapor separator means and disposed in direct fuel delivery relation to an interior curved surface of said fuel vapor separator means, whereby fluid is directed into the interior of said fuel vapor separator means toward the interior curved surface, said reservoir means disposed below the interior curved surface in fluid communication with the fuel supply, whereby excess fuel collected in said reservoir is returned to said fuel supply means; said fuel vapor separator means further comprising an air intake means disposed in fluid communication with the interior of said fuel vapor separator means, whereby air is mixed with partially vaporized fuel from said spray orifice means and delivered to said thermerator for complete vaporization upon receiving heat therefrom.

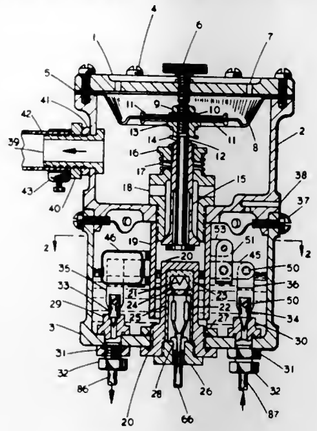
4,092,963

VAPORIZER-REGULATOR, LIQUID FUEL

Richard A. Vrooman, 22628-87th West, Edmonds, Wash. 98020

Filed Feb. 24, 1977, Ser. No. 771,638
Int. Cl.² F02M *31/00*
U.S. Cl. 123—133 **6 Claims**

4. In a liquid fuel vaporizer-regulator device, a lower housing fuel reservoir chamber means, an upper housing expansion chamber means with an outlet fitting means to distribute fuel vapor to an engine, a smaller diameter vapor chamber duct means connecting the upper and lower housing means, hydrostatic pressure means suppling liquid fuel from the lower housing means into the vapor chamber duct means lower end, an electrically energized heating element and housing means placed inside the vapor chamber duct means lower end and immersed in the liquid fuel, a float operated inlet and outlet valve and linkage means placed around the vapor chamber duct means and controlling fluid level hydrostatic pressure means and the electrically energized heating element means operation, high and low speed valve means mounted in a valve housing means to regulate fuel vapor flow from the vapor



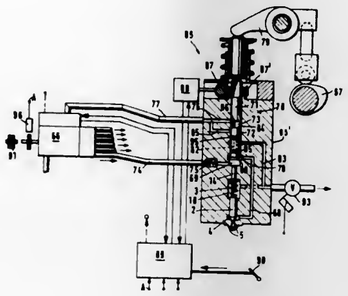
chamber duct means upper end into the upper housing expansion chamber means, a mechanical means to displace the high speed valve means and an adjusting screw means to displace the low speed valve means to operate an internal combustion engine.

4,092,964

PUMP NOZZLE FOR FUEL INJECTION IN INTERNAL COMBUSTION ENGINES

Gerald Höfer, Weissach-Flacht; Franz Eheim, and Odon Kopse, both of Stuttgart, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Dec. 16, 1976, Ser. No. 751,853
Claims priority, application Germany, Dec. 24, 1975, 2558699
Int. Cl.² F02M *39/00*
U.S. Cl. 123—139 AT **10 Claims**



1. A fuel pump nozzle for injecting fuel into an internal combustion engine, comprising:

a housing within which a pump cylinder, a spring chamber, a pressure chamber, a working chamber, and an equalizing chamber are defined;

a transport piston;

a slave piston, said transport piston and said slave piston being coaxially disposed within the pump cylinder, and defining the equalizing chamber with the pump cylinder, said slave piston also defining the working chamber with the pump cylinder, said transport piston defining a control portion formed as part of its terminal edge facing the equalizing chamber;

mechanical means engageable with the transport piston for mechanically driving the transport piston;

means defining a supply bore connected to the housing for supplying a low pressure fluid to the equalizing chamber, said supply bore being closeable by the control portion of the transport piston terminal edge;

means defining a relief bore connected to the housing for relieving the pressure in the equalizing chamber under the control of the slave piston;

means defining a pre-load fuel quantity line connected to the housing for delivering a pre-load fuel quantity to the working chamber;

a check valve located in the pre-load fuel quantity line, opening in the direction of fuel flow; and

means defining a pressure line connecting the working chamber and the pressure chamber, wherein:

(i) fuel serves as the fluid delivered to the equalizing chamber by the supply bore; and

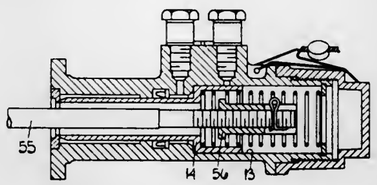
(ii) the pre-load fuel quantity is delivered to the pressure chamber through the pressure line by the slave piston.

4,092,965

PUMP CONTROL DEVICES

Edward Robert Lintott, London, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Sep. 13, 1976, Ser. No. 722,432
Claims priority, application United Kingdom, Sep. 27, 1975, 39666/75
Int. Cl.² F02D *1/04, 1/06*
U.S. Cl. 123—140 FG **12 Claims**



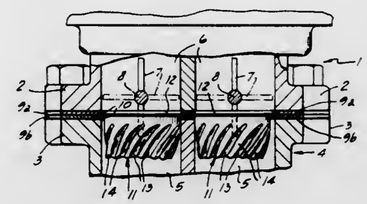
1. A control device for the fuel pump of an internal combustion engine, the pump being of the kind including a control member movable to influence the supply of fuel to the engine, the device including a fluid pressure operable piston arranged when fluid under pressure is applied thereto, to move said control member to a position in which no fuel is supplied to the engine and a solenoid operable valve controlled by a manually operable switch, said valve when said switch is opened, serving to allow fluid under pressure to be applied to said piston, a cylinder in which said piston is located, an inlet for fluid under pressure in said cylinder, said inlet being controlled by said solenoid operable valve, a port formed in the wall of the cylinder said port being uncovered by said piston when the latter has moved a predetermined extent under the action of fluid under pressure supplied through said inlet, and a further solenoid operable valve for controlling flow through said port, the arrangement being such that when said further solenoid operable valve is closed the piston can move its maximum extent in the cylinder under the action of fluid pressure but when said further solenoid operable valve is open the piston will move only so far as to uncover said port.

4,092,966

FUEL VAPORIZING AND MIXING DEVICE FOR GASOLINE ENGINES

Gildo Prosen, Chicago, Ill., assignor to Vortac, Inc., Glenview, Ill.

Filed Nov. 3, 1976, Ser. No. 738,623
Int. Cl.² F02M *29/06*
U.S. Cl. 123—141 **4 Claims**



1. A carburetor attachment for insertion between a carburetor and a cooperable engine intake manifold, comprising a sleeve-like tubular member, formed from relatively thin formable sheet material of tubular configuration, adapted to be inserted in the intake bore of such a manifold, said tubular member having at its inlet end a radially outwardly extending annular flange, of greater diameter than that of such an intake bore for supporting the same therein with such flange disposed between the cooperable mating faces of the carburetor and intake manifold, said tubular member having an external diameter at such end slightly less than that of such a bore, the side walls of said tubular member having a plurality of inwardly directed protuberances forming alternate lands and grooves in the internal surface of said tubular member, the inlet ends of the lands being rounded and merging into the sidewalls of said tubular member adjacent the inlet end thereof, the bottom edges of said grooves being arranged for close disposition to the sidewalls of such an intake bore whereby the effective area at the discharge end is only slightly smaller than that of the intake end, as compared with the total area of such an intake bore, said lands being uniformly spaced and having their respective inlet ends circumferentially offset with respect to their associated outlet ends, forming generally spirally arranged lands with the internal surface of the intermediate portion of said sleeve having a relatively smoothly curved serpentine configuration in transverse cross section, whereby each land is of a generally triangular configuration in transverse cross section, having inwardly converging sidewall portions connected by a convex rounded portion.

4,092,967

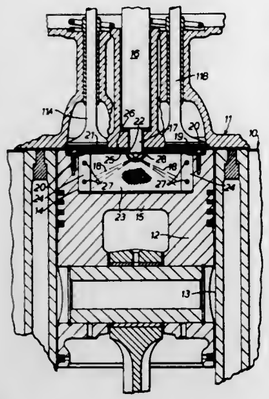
I.C. ENGINES

Robert Alan Haslett, Shoreham-by-Sea, England, assignor to Ricardo & Co., Engineers (1927) Limited, England

Filed Oct. 6, 1976, Ser. No. 730,071
Claims priority, application United Kingdom, Jun. 10, 1976, 24156/76
Int. Cl.² F02B *75/12*
U.S. Cl. 123—143 B **14 Claims**

1. An internal combustion engine of reciprocating-piston type having a cylinder with a combustion chamber, and a piston with a crown in the cylinder, the major portion of the volume of said combustion chamber being afforded by a recess formed in the crown of the piston, the recess having a bottom, a catalytic element in the cylinder carried by the piston and mounted in a position overlying the bottom of said recess, and

means for injecting fuel into said recess, when the piston is at about its top-dead-centre position, in a direction such that



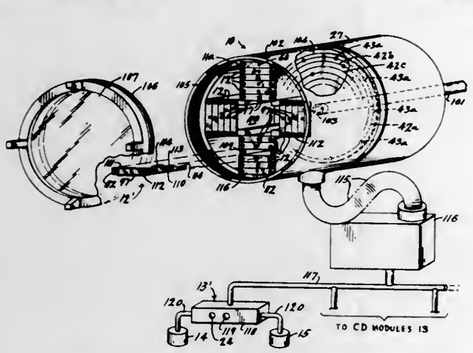
substantially the whole of the injected fuel will contact the surface of the catalytic element to initiate its combustion.

4,092,968

ENGINE IGNITION SYSTEM

Fred Douglas Stover, Mt. Vernon, and George Carl Thatcher, Centerburg, both of Ohio, assignors to Cooper Industries, Inc., Houston, Tex.

Filed Feb. 9, 1977, Ser. No. 766,883
Int. Cl.² F02P *1/00, 7/02, 9/00*
U.S. Cl. 123—148 E **11 Claims**



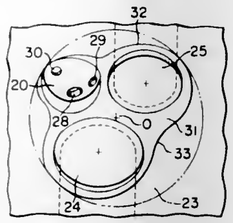
1. An ignition system for a multiple combustion chamber internal combustion engine comprising, in combination, a timing disc, means for rotating said timing disc in synchronism with the engine, first sensor means scanning a predetermined track on said timing disc as said timing disc is rotated for generating first signals in response to predetermined portions of said track, a separate second sensor means and a separate capacitive discharge circuit means associated with each combustion chamber in the engine, said second sensor means scanning predetermined tracks on said timing disc as said timing disc is rotated for selectively generating second signals in response to the sensing of predetermined portions of such scanned tracts during the occurrence of such first signal, each of said capacitive discharge circuit means including a storage capacitor, an ignition coil having a primary winding and electronic switch means for discharging said capacitor through said primary winding, means for charging said capacitor, and means responsive to a second signal from a second sensor means for triggering the electronic switch means in said capacitive discharge circuit means associated with such second sensor means.

4,092,969

GASOLINE ENGINE FED WITH LEAN MIXTURE ONLY

Junichi Ono; Akira Shimoura, both of Toyonaka, and Yukiyasu Tanaka, Okazaki, all of Japan, assignors to Daihatsu Kogyo Kabushiki Kaisha, Ikeda, Japan

Filed Apr. 26, 1976, Ser. No. 680,085
Claims priority, application Japan, Aug. 16, 1975, 50-99720
Int. Cl.² F02B *3/00, 23/00*
U.S. Cl. 123—191 S **9 Claims**



1. A gasoline engine fed with lead mixture only, said engine having a cylinder, a piston therein and a cylinder head provided with a torch chamber having a spark plug therein for emitting a plurality of flames into the combustion chamber, and a suction valve and an exhaust valve, characterized in that;
(a) the cylinder head is provided with a combustion chamber recess with a periphery which enters toward the center line of the cylinder in a maximum amount between the suction valve and the exhaust valve to provide an area to create an intense turbulence of a lean mixture in cooperation with the top surface of the piston;
(b) the torch chamber is located on the cylinder head at a position spaced from the center line of the cylinder; and
(c) the torch chamber is provided with at least two openings, the center line of one of said openings being directed to pass through a portion of the combustion chamber just below the center of the head of the suction valve, and the center line of the other of said openings being directed to pass through a portion of the combustion chamber just below the center of the exhaust valve;
the torch flames emitted from the said two openings being directed toward the top surface of the piston.

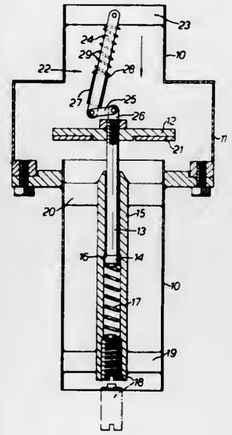
4,092,970

CONTROLLING INTERNAL COMBUSTION ENGINES

Gerald Stuart Morris Ball, Didcot, and Anthony Walter Andrews, Southampton, both of England, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 405,861, Oct. 12, 1973, abandoned, which is a continuation of Ser. No. 184,624, Jun. 1, 1971, abandoned. This application Nov. 3, 1975, Ser. No. 628,510
Claims priority, application United Kingdom, Jun. 5, 1970, 27316/75; May 17, 1971, 15261/71
Int. Cl.² F02B *77/00;* F02D *11/08*
U.S. Cl. 123—198 D **20 Claims**

1. A valve in combination with an internal combustion engine for automatically controlling the maximum speed of said engine, a first conduit portion forning at least part of the intake passageway of said engine and having at least a first valve seat, the maximum internal diameter of the said first conduit portion and the said first valve seat being D, movably mounted valve means having at least a first sealing surface and operable as a function of pressure differential, support means for mounting said valve means for movement between a normally open position and a closed position, said first sealing surface disposed in operable contact with said first valve seat for substantially sealing off said first conduit portion and preventing flow therethrough when said valve means is in its closed position, spring means biasing said valve means into said open position away from said first valve seat, adjusting means for adjusting the amount of bias supplied by said spring means to said valve means and being substantially inaccessible when operatively assembled with said engine, said first sealing surface and said first valve seat being spaced apart by a distance L when said valve means is biased to its normally open position, wherein L is at least equal to 0.25D, said spring means and said valve means being so constructed and arranged and the bias of said spring means being so adjusted that when the rate of flow past said valve means is at least equal to a predetermined maximum



desired flow rate corresponding to a maximum desired engine speed said valve means automatically moves under influence of the resulting pressure drop thereacross into said closed position in sealed contact with said first valve seat in opposition to the bias applied by said spring means for stopping said engine, said spring means returning said valve means to said normally open position when the engine is stationary and the pressure drop across said valve means is substantially zero.

4,092,971

SELF-CONTAINED, MULTI-BLADE PACKAGE FOR SLURRY SAWS AND THE LIKE

Kenneth W. Viscount, 321 Cherry St., Carlisle, Pa. 17013

Filed Oct. 29, 1976, Ser. No. 737,128
Int. Cl.² B28D *1/06*
U.S. Cl. 125—16 R **5 Claims**

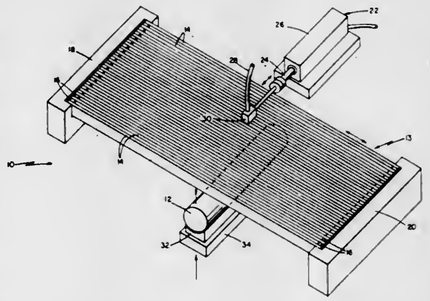
1. A self-contained, multi-blade package for use in the blade head assembly of a slurry saw or the like, comprising:
a plurality of elongated, thin blades in spaced, parallel array,
first and second pluralities of thin, flat spacers inserted at either end between said blades and having aligned holes therein,
at least a first connecting rod extending through aligned holes in said first plurality of spacers,
at least a second connecting rod extending through aligned holes in said second plurality of spacers,
two pairs of relatively thick end caps, at least one end cap of each pair having at least one through drilled hole and being counter bored on one face with one end of a connecting rod extending through the through drilled hole into the counter bore, said relatively thick end caps each having a thickness which approximates one-half the width dimension of the end cap, and
at least first and second nuts threaded, respectively, onto the ends of said first and second connecting rods extending into the counter bores of the end caps and being fully received within the recesses formed by said counter bores, said relatively thick end caps preventing distortion of the blade package when said nuts are tightened on said connecting rods thereby ensuring the rigidity and parallelism of the package and serving the function of clamping blocks in the blade head assembly of a slurry saw or the like.

4,092,972

PROCESS OF CUTTING WAFERS

Frederick Schmid, Marblehead, Mass., assignor to Crystal Systems, Inc., Salem, Mass.

Filed Feb. 11, 1977, Ser. No. 767,809
Int. Cl.² B28D *1/08*
U.S. Cl. 125—16 R **23 Claims**



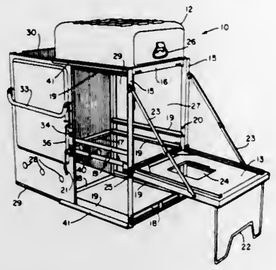
1. In the process of cutting a workpiece with abrasive particles in which longitudinally-extending blades are moved relative to the workpiece, that improvement comprising:
providing a blade including a longitudinally-extending abrasive-holding portion of metallic material having a hardness less than that of said abrasive particles overlying a blade core of greater tensile strength, said abrasive-holding portion defining a cutting surface extending between the opposite sides of said blade and defining less than one half the total outer surface of said blade
placing said blade under tension adjacent a charging element with said cutting surface of said abrasive-holding portion facing towards and closely adjacent said charging element;
charging said blade by embedding abrasive particles partially into said abrasive-holding portion by moving said blade under tension relative to said element while forcing said cutting surface of said blade and element towards each other and introducing abrasive particles into the interface between said abrasive-holding portion of said blade and said element,
the thickness of said abrasive-holding portion being not less than about one-half the nominal size of said particles, and said particles being embedded into a longitudinally-extending segment of said cutting surface of said abrasive-holding portion but not into said sides of said blade.

4,092,973

FIELD RANGE CABINET

Richard J. Bernazzani, Roslindale, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 19, 1976, Ser. No. 678,503
Int. Cl.² F24C *15/10*; A47B *77/01*; A47F *3/04*
U.S. Cl. 126—37 B **1 Claim**



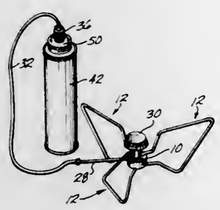
1. In a cooking range for use in the field which comprises a cabinet frame, a hinged front door, a hinged lid, and cabinet outer shell side and rear walls, the improvements which comprise a unitary, U-shaped, outer shell, said outer shell being removable from said cabinet frame, said cabinet frame having flanged upper and lower edges on both sides thereof forming upper and lower runners along the upper and lower edges of both sides of said cabinet frame, said outer shell comprising two side walls separated from each other and being joined by a rear wall and having flanged upper and lower edges on both sides thereof, said flanged upper and lower edges of both sides of said outer shell cooperating with said upper and lower runners formed by said flanged upper and lower edges of the sides of said cabinet frame for slidably engaging said outer shell with said cabinet frame to permit operation of said cooking range and for slidably disengaging said outer shell from said cabinet frame to facilitate cleaning all of the surfaces exposed to food and vapors from food inside of said cooking range during operation thereof, said outer shell comprising means on both sides thereof for locking said outer shell side walls to said cabinet frame during operation of said cooking range and for unlocking said outer shell side walls from said cabinet frame, whereby said outer shell becomes slidably disengageable from said cabinet frame.

4,092,974

POCKET CAMP STOVE

Iwamoto Zenzaburo, Yokohama, Japan, assignor to International Business Development Company, Bellevue, Wash.

Filed Jul. 12, 1976, Ser. No. 704,119
Int. Cl.² F24C *5/20*
U.S. Cl. 126—38 **5 Claims**



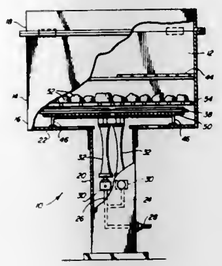
1. A portable gas stove comprising:
a gas burner unit including a burner head; and
a gas supply conduit having an outlet end connected to said burner unit, and an inlet end connected to gas control means which are adapted for connection to a can of gaseous fuel under pressure of a type having a protruding depressable member controlled outlet valve built into the can, and in which gas flows out from said can via an axial passageway, in said depressable member, said gas control means being operable for moving the depressable member selectively variable amounts for both turning the gas flow on and off and regulating its flow rate, and said gas control means including an inlet port which is in alignment with the axial passageway in the depressable member when said gas control means is connected to the gaseous fuel can.

4,092,975

PLURAL CHAMBER SHEET METAL GAS BURNER AND METHOD OF MANUFACTURE

Nick G. Grammatopoulos, Bloomingdale, Ill., assignor to Groman Corporation, Chicago, Ill.

Filed Oct. 6, 1976, Ser. No. 730,133
Int. Cl.² A47J *37/07*
U.S. Cl. 126—41 R **3 Claims**



1. A gas burner for use in a gas fired cooking grill of the type adapted to carry a horizontally disposed rack for supporting food and having gas supply inlets, the improvement comprising, in combination, a pair of generally H-shaped stamped sheet metal shells generally U-shaped in cross-section, one comprising a top shell and the other comprising a bottom shell, said top and bottom shells being secured together by a peripheral lip on one of said shells being bent over a peripheral edge on the other of said shells so as to form a permanent seal around substantially the entire periphery of said H-shaped shells and thereby form a gas chamber therein, said top and bottom shells each being formed with a depressed planar portion which extends transversely across the width of the shell approximately midway between the ends thereof so as to divide each top and bottom shell into a pair of generally U-shaped shell sections, said transverse planar portions being arranged to abut one another when said top and bottom shells are interconnected so as to form a gas-tight seal thereby defining two separate generally U-shaped hollow burner chambers for connection to separate gas inlets, a plurality of gas outlet apertures formed in a wall of said bottom shell around substantially the entirety of its H-shaped configuration for directing a gas flame upwardly over said peripheral lip on said top shell, and a pair of gas inlet apertures formed in said bottom shell on opposite sides of said transverse planar portions for connection to respective gas inlets.

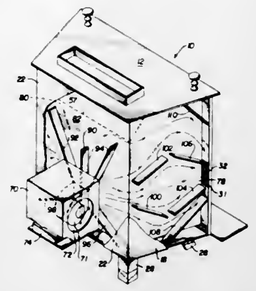
4,092,976

AIR CONDITIONER

Carrol E. Buckner, Asheville, N.C., assignor to Buck Stove Marketing, Corp., Asheville, N.C.

Filed Jun. 7, 1976, Ser. No. 693,805
Int. Cl.² F24C *1/14*
U.S. Cl. 126—63 **19 Claims**

1. An air conditioning unit comprising:
a housing having a top, a bottom, a front, a back, and two side walls;
a back and two side interior walls adjacent to said back and two side walls of said housing for forming a substantially U-shaped forced air channel;
an opening in said front wall for providing access to a chamber defined by the interior of said interior walls;
vent means in a front wall of said side air channels adjacent the side edges of said opening;
a rim mounted to said front wall of each of said side air channels and extending across said vent means from the outer lateral edge thereof;



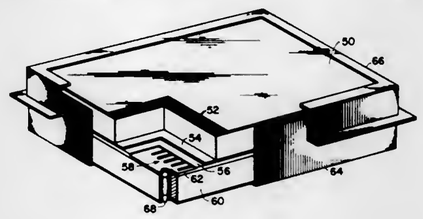
the side exterior walls of said forced air channel forming an angle less than ninety degrees with the front wall of said side forced air channels;
means mounted to said housing for forcibly introducing air into the back portion of said channel through a port to traverse said air channel and to exit said vent means creating an exiting forced air pattern adjacent said side edges of said opening; and
directing means interior said air channel for directing said forced air from said port over a substantial portion of said back and two side interior walls to said vent means.

4,092,977

FLAT PLATE SOLAR COLLECTOR

Richard Warren Gurtler, Mesa; Robert Maxwell Handy, Phoenix; Michael Chancey Keeling, Tempe, and Israel Arnold Lesk, Scottsdale, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 12, 1976, Ser. No. 704,145
Int. Cl.² F24J *3/02*
U.S. Cl. 126—270 **8 Claims**



1. An efficient solar collector, comprising: a thin base; insulating means placed on top of the thin base; a fluid flow plate having a plurality of passages for conducting a fluid to be heated by the solar collector, the fluid flow plate being on top of the insulating means; an absorber having a layer of black chrome deposited over a layer of a metal foil, the absorber being bonded to the top of the fluid flow plate; a convection suppressor placed on top of the absorber for reducing heat losses from the absorber; a transparent cover for allowing solar radiation to pass placed on top of the convection suppressor; means to form a frame around the outer periphery of the thin base, insulating means, fluid flow plate, absorber, convection suppressor, and transparent cover all in a stacked relationship, the means to form a frame being easily removable from the stacked elements thereby providing a solar collector that is lightweight, efficient, and easily assembled and disassembled.

4,092,978

SOLAR ENERGY COLLECTOR

Richard S. Levine, R.R. No. 5, Kidville La., Lexington, Ky. 40511

Filed Aug. 11, 1976, Ser. No. 713,624
Int. Cl.² F24J *3/02*; F28F *13/00*
U.S. Cl. 126—270 **14 Claims**

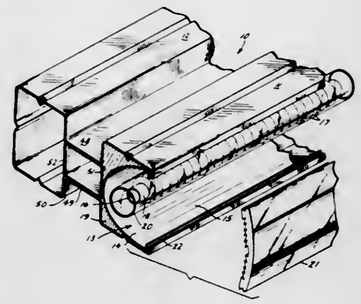
1. A solar energy collector comprising:
A. an elongated open channel exposed to solar energy;
B. a transparent cover assembly disposed over said channel to admit said solar energy and to define an elongated passage having an input end into which cold air is admitted and an output end from which warm air is discharged, said channel being effectively divided into a series of stages;
C. heat exchange means disposed within each stage of the channel to absorb heat from solar energy transmitted through the cover assembly and to transfer the heat to the air passing through the channel, said means having an effective surface area which increases progressively in the successive stages so that as the temperature difference between the air and the heat exchange means is reduced as the air passes through the successive stages, the surface area of the exchange means increases to maintain a rapid rate of transfer whereby each stage operates at close to optimum efficiency.

4,092,979

COMBINED SOLAR ENERGY CONVERSION AND STRUCTURAL AND MECHANICAL BEAM AND STRUCTURES BUILT THEREFROM

Joseph C. Kotlarz, 109 W. Woodlawn Dr., Mundelein, Ill. 60060

Filed Nov. 4, 1976, Ser. No. 738,845
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **10 Claims**



1. A combined solar collector and structural and mechanical beam, said beam comprising; spaced, longitudinally extending, adjacent channel-shaped portions, at least one of said channel-

shaped portions having an open side, said beam also including a longitudinally extending recessed portion between the channel-shaped portions;

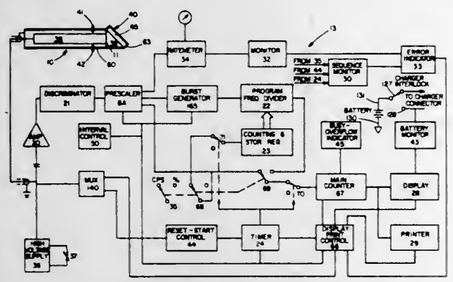
a solar collector assembly disposed within the channel-shaped portion having the open side, said solar collector assembly comprising a highly polished reflector arranged within the channel-shaped portion; an absorber tube disposed within the reflector and spaced therefrom to absorb the sun's energy; and

a transparent cover positioned over the open end of said channel portion.

4,092,980
FIBRINOGEN MONITOR

Donald H. Frank, Deerfield; J. Fred Jeffries, Waukegan; Mary C. Swanson, Lincolnwood, all of Ill.; Thomas L. Erb, and James D. Hall, both of Austin, Tex., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Jan. 12, 1976, Ser. No. 648,254
Int. Cl.² A61B 6/00
U.S. Cl. 128—2 A **27 Claims**



1. A portable instrument for use in detecting the formation of blood clots in a patient in whom a quantity of fibrinogen tracer-labelled with a radioisotope has been administered, said portable instrument comprising:

an axially elongated hand-held radiation monitoring probe having a radiation detecting member at one end thereof disposed at an angle to the longitudinal probe axis to thereby enable use of said probe in areas of small clearance on the patient's body such as the anterior and posterior sides of the patient's legs;

switch means disposed on said probe and manually actuatable by the user thereof with the same hand holding said probe to selectively generate a start count signal and a record count signal;

pulse processing means located remotely from said monitoring probe for counting, processing and recording the electrical pulses from said radiation detecting member upon receipt of said start count signal;

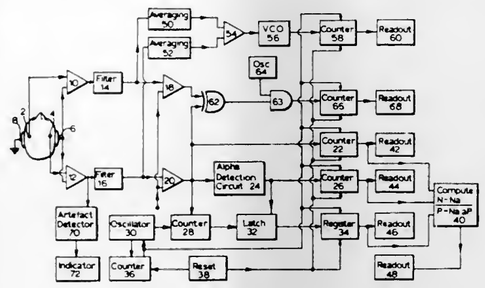
record means connected to the output of said pulse processing means for recording the processed pulse count upon receipt of said record count signal; and

means to automatically disable said record means upon the receipt of a statistically insignificant number of pulses from said radiation detecting member, whereby a safeguard is provided against the measurement and recordation of statistically insignificant data due to an extremely low level of fibrinogen concentration or because of mispositioning of the radiation monitoring tube.

4,092,981
METHOD AND APPARATUS FOR BRAIN WAVEFORM EXAMINATION

John Paul Ertl, 42 Halford Ave., Toronto, Ontario, Canada

Filed Jul. 15, 1976, Ser. No. 705,400
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.1 B **13 Claims**



1. A method of determining the average frequency of a sample of a band-limited EEG waveform in the presence of an intermittent interfering unwanted alpha rhythm waveform of relatively greater amplitude than the components of the wanted waveform and of a defined frequency range within said band limits, comprising sensing a subject's brain waveform, limiting said waveform to frequencies within said band limits, detecting in a sample of said waveform at least every alternate zero crossing point in the waveform, counting the events defined by adjacent alternate crossing points, identifying events having durations respectively within and outside a range corresponding to the duration of a cycle of a waveform within the defined frequency range of the unwanted waveform, determining the number and the sum of the durations of the events having durations outside said range during said sample, and calculating from said number and said sum the average frequency of these latter events.

4,092,982
THERAPEUTIC WRAP

Nazih M. N. Salem, 1312 Raintree Cir., Culver City, Calif. 90230

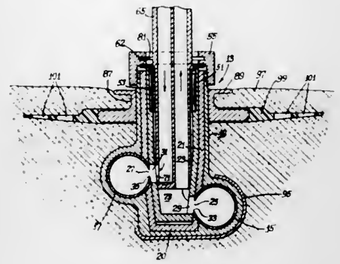
Filed Apr. 16, 1976, Ser. No. 677,832
Int. Cl.² A61N 15/00
U.S. Cl. 128—82.1 **4 Claims**

1. A therapeutic wrap consisting of an inner strip and an outer strip attached to each other along one end, the outer strip being an elongated resilient elastic compression bandage material, the inner strip being of flexible material formed into at least one pocket for receiving prepackaged coolants of manufacture, and running nominally coincidental with the outer strip, wherein at least one loop of flexible material is attached to the backside of the inner strip at intervals along its length; said at least one loop freely encircling the outer strip.

4,092,983
BLOOD ACCESS DEVICE

Victor Slivenko, San Diego, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Jan. 31, 1977, Ser. No. 764,207
Int. Cl.² A61M 5/00
U.S. Cl. 128—214 R **16 Claims**



1. A device to provide access to the circulatory system of a living body for simultaneous withdrawal from and return of blood to the system comprising a pair of parallel tubular conduits of generally circular cross section, either one being insertable in a living blood vessel and the other being connectable to a by-pass graft of that same blood vessel; a generally cylindrical housing having one end closed and extending transversely of and adjoining said conduits near the closed end, the points of adjoining both conduits being spaced apart from each other longitudinally with respect to the axis of the housing and being spaced away from the axis, said housing having fluid communication with each of said conduits through an aperture in the conduit walls at each of said points of adjoining, the perimeter defining each of said apertures being formed of a sharp edge of the conduit wall, said housing having a length sufficient to extend from the blood vessel to a point outside the living body; a valve body in said housing, said valve body having therein a pair of spaced apart ports that are located to be alignable with the apertures at one given rotative position of said valve body, said valve body being adapted to receive a dual-conduit catheter in fluid communication with said ports, one conduit to one port, and said valve body being coaxially rotatable in said housing between positions of alignment and nonalignment of said apertures and said ports to selectively establish fluid communication between the circulatory system and the catheter when inserted in said valve body; at least all blood and skin tissue contacting surfaces of said device being made of a biologically compatible material.

4,092,984
UNDULATING RECTAL FLUSHING APPARATUS

Paul Bindel, 3946 W. North Ave., Chicago, Ill. 60647

Filed Feb. 14, 1977, Ser. No. 768,086
Int. Cl.² A61M 3/00
U.S. Cl. 128—229 **2 Claims**

1. A portable apparatus for irrigation of the colon and intestines removably positioned on the rim of a toliet bowl and held in position by the usual toilet seat comprising:

(a) a base plate,

(1) having a semicircular cutout portion, and

(2) a pair of spaced slots therein positioned opposite the cutout;

(b) an enclosed housing anchored on the upper side and on one end of said plate;

(c) a motor in said housing operatively connected to:

(1) a reduction gearing,

(2) a shaft extending from said reduction gearing;

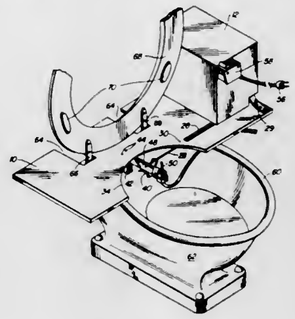
(d) a circular cam fixedly mounted to said shaft,

(1) said cam having a plurality of lobes, each lobe having a curved rising work face and a falling work face;

(e) an elongated rod shaft extending through said plate to medially of said cutout portion;

(f) an elongated cam follower having one end positionable on said cam, and its other end fixedly mounted to one end of said rod shaft;

(g) an adjustable crank arm secured to the other end of said rod shaft, having a right angled arm at its free end and supporting one end of a curved wide arm extending at right angles thereto;



(h) a vertically extending guideway secured to and depending from said plate;

(i) a slide bar supported in said guideway,

(1) a cross arm secured at one end to said slide bar and extending at right angles to said guideway and having a portion thereof lying on said curved arm,

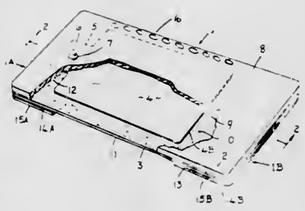
(2) a support bracket anchored to the free end of said rod;

(j) an enema tip removably mounted in said bracket and directed to jet warm fluid vertically for vertically reciprocative motion relative to said base plate.

4,092,985
BODY ELECTRODE FOR ELECTRO-MEDICAL USE

John George Kaufman, 858 Condor Drive, Burlington, Ontario, Canada

Continuation-in-part of Ser. No. 526,681, Nov. 25, 1974, Pat. No. 3,972,329. This application Aug. 2, 1976, Ser. No. 710,535
Int. Cl.² A61N 3/06
U.S. Cl. 128—303.13 **8 Claims**



1. A body electrode useful as the return electrode in electrosurgical procedures, comprising: an elastically, resiliently stretchable cover sheet member having an inner surface for facing towards the body and an outer surface for facing away therefrom;

a flexible, electrically conductive metal sheet member connected to said cover sheet member having an outer surface presented towards the inner surface of said cover sheet member, and an inner surface for facing towards the body;

terminal means in electrically conductive relation to said metal sheet member;

means for attaching the body electrode to a patient's body;

a layer of water permeable woven fibrous webbing covering in its entirety the inner surface of said metal sheet member and extending beyond the peripheral edge thereof, and

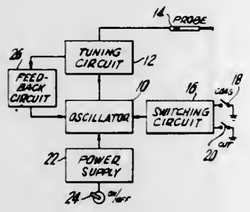
adapted to receive and restrain the flow of electrically conductive medium of thin semi-solid or fluid consistency applied thereto, said layer having a thickness of from about 1/50 to about ⅛ inch, the fibres of said webbing being of low water absorbency and being interwoven together into said webbing in interlocking fashion, said layer being secured to the cover sheet member at locations beyond the peripheral edge of said metal sheet member, and said layer being elastically resiliently stretchable along with the cover sheet member.

4,092,986

CONSTANT OUTPUT ELECTROSURGICAL UNIT

Max Schneiderman, Clifton, N.J., assignor to Ipco Hospital Supply Corporation (Whaledent International Division), New York, N.Y.

Filed Jun. 14, 1976, Ser. No. 695,525
Int. Cl.² A61B 17/36; A61N 3/00
U.S. Cl. 128—303.14 **17 Claims**



1. An electrosurgical unit providing an output voltage to a load, comprising an oscillator producing an output signal of a given frequency, a control circuit means coupled to the oscillator for providing an output voltage from the oscillator for use in surgical procedures, a feedback circuit means coupled from the output to the input of the oscillator to maintain the output voltage level from the unit as a substantially constant value independent of the load, and wherein said oscillator includes a control electrode, and said control circuit means includes a switching transistor having its collector-emitter circuit connected between said control electrode and ground, and having a fixed voltage on its base, capacitor means, and means for selectively connecting said means to said base.

4,092,987

CIGAR-LIKE PRODUCT

Pierre Imbert, Paris, France, assignor to Service D'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France

Continuation-in-part of Ser. No. 432,060, Jan. 9, 1974, abandoned. This application Aug. 26, 1976, Ser. No. 717,569
Claims priority, application France, Jan. 12, 1973, 73.00987
Int. Cl.² A24D 1/00; A24C 5/18
U.S. Cl. 131—8 R **2 Claims**

1. A smokable cigar-like product comprising a plurality of prepared fragments of natural or manufactured tobacco leaves having irregularly contoured main surfaces whose dimensions of length and breadth are substantially greater than the thickness of the leaves, said fragments being compressed axially at constant cross-section into a rod-like shape with an orientation in said rod such that the major proportion of those fragments lying in a line parallel to the main axis of the product are encountered by said line at an angle of incidence relative to said main surface greater than zero with at least 30 percent of those fragments constituting said major proportion being encountered at a substantially perpendicular angle of incidence so as to be intersected by said line substantially through the direction of their initial thickness, and a smokable outer wrapping around said rod operable to coherently maintain the fragments in said orientation.

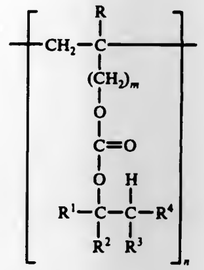
4,092,988

SMOKING TOBACCO COMPOSITIONS

Thomas V. Van Auken, Richmond; Harvey J. Grubbs, Mechanicsville, and William R. Johnson, Jr., Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Nov. 5, 1976, Ser. No. 739,291
Int. Cl.² A24B 3/12
U.S. Cl. 131—17 R **8 Claims**

1. A smoking composition comprising an admixture of natural or reconstituted tobacco and between about 0.0005 and 10 weight percent, based on the weight of tobacco, of a polymeric carbonate ester composition having a molecular weight in the range between about 500 and 2,000,000 and consisting essentially of recurring monomer units corresponding to the formula:



wherein R is a member selected from the group consisting of hydrogen and aliphatic, alicyclic and aromatic hydrocarbon radicals containing between 1 and about 10 carbon atoms, with the proviso that R is hydrogen when m is zero; R^1, R^2, R^3 and R^4 are members independently selected from the group consisting of hydrogen and aliphatic, alicyclic and aromatic hydrocarbon radicals, and R^1 and R^3 when taken together with connecting elements form an alicyclic structure, and wherein the total number of carbon atoms in R^1, R^2, R^3 and R^4 collectively does not exceed about 20; *m* is an integer between 0 and about 8; and *n* is an integer between 2 and about 10,000.

4,092,989

AROMATIC COMPOSITIONS

Edouard P. Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 482,776, Jun. 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application Jun. 12, 1975, Ser. No. 586,368
Claims priority, application Switzerland, Jan. 19, 1971, 773/71; Jun. 23, 1971, 9156/71; Jan. 11, 1972, 380/72
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² A24B 15/04
U.S. Cl. 131—17 R **2 Claims**

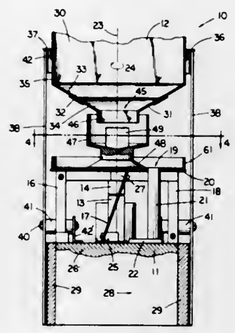
2. A tobacco or tobacco product having added thereto about 1 to about 1000 parts per million based on the weight of tobacco of epoxy-β-ionone.

4,092,990

VIBRATORY COIN FEEDER

Robert T. Bayne, Carmel, Ind., assignor to Standard Changemakers, Inc., Indianapolis, Ind.

Filed Sep. 15, 1975, Ser. No. 613,074
Int. Cl.² G07D 1/00
U.S. Cl. 133—1 R **3 Claims**



1. A vibratory coin feeder comprising:
a frame;
a hopper mounted to said frame to receive jumbled coins;
a platform positioned beneath said hopper to receive coins therefrom, said platform having an outer circumferentially extending wall with a coin outlet located inwardly next to said wall;
drive means operable to vibrate said hopper and platform moving said coins from said hopper onto said platform and outwardly to said outlet;
dispensing means adapted to receive coins from said outlet and being operable to dispense coins thereform in a controlled predetermined amount;
said hopper includes a lower portion with a hopper coin outlet and an upper portion connected together both of which support said jumbled coins; and further comprising:
isolation means connecting said lower portion to said upper portion but vibration isolating said upper portion from said lower portion;
supporting means mounted to said frame and supporting said upper portion of said hopper, said supporting means being vibration isolated from said frame;
spring means mounting said platform and said lower portion of said hopper on said frame and allowing said platform and said lower portion of said hopper to vertically move in response to said drive means;
both said upper portion and said lower portion of said hopper have downwardly slanting parallel walls to support said jumbled coins with said upper portion of said hopper supported by said supporting means reducing the load of coins supported by said spring means.

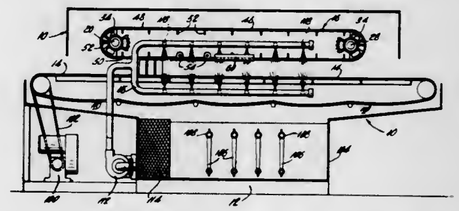
4,092,991

CLEANING MACHINE

Marvin K. Rohrs, Fanwood, N.J., assignor to Metalwash Machinery Corporation, Elizabeth, N.J.

Division of Ser. No. 623,210, Oct. 16, 1975, abandoned, which is a continuation of Ser. No. 481,072, Jun. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 458,635, Apr. 8, 1974, abandoned. This application Apr. 16, 1976, Ser. No. 687,078
Int. Cl.² B08B 9/08
U.S. Cl. 134—127 **4 Claims**

1. A machine for washing beverage cans comprising a transport conveyor including a reticulate belt member upon an upper course of which cans to be washed are carried and a hold-down conveyor including a reticulate belt member having a lower course space above the upper course of said transport conveyor, spray means disposed to direct liquid through said belt members and onto said cans, said belt member of said hold-down conveyor being trained around conveyor drums, a surface of the hold-down belt member contacting said drums having a plurality of longitudinally spaced and transversely extending stiffener members projecting therefrom and said conveyor drums having recesses on belt member contacting surfaces thereof, said recesses being circumferentially spaced around said surface whereby said stiffener members, during the passage of the hold-down conveyor belt around said drums, extend into said recesses and opposite surfaces of said belt member of said hold-down conveyor being adapted for engagement with said cans and being substantially free of projections, said stiffener members each consisting only of a single flat strip disposed substantially normal to adjacent portions of said belt member of said hold-down conveyor and each being secured thereto at an edge region of said strip to leave the regions of the belt member between the planes of said strips substantially free of restriction to the passage of said sprays therethrough, said belt member being provided with a plurality of roller means projecting laterally from the edges thereof, said roller means cooperating with track means disposed adjacent longitudinal edges of the lower course of said hold-down conveyor to guide said lower course and prevent sagging of said longitudinal edge regions of said belt member.

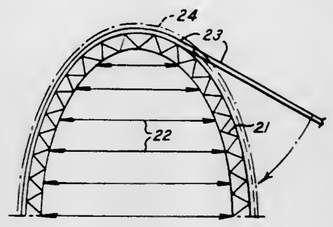


4,092,992

LAMINATED ARCH MEMBERS AND METHOD OF CONSTRUCTING THEM

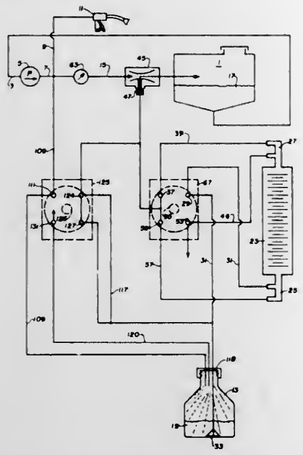
Carl F. Huddle, Pleasant Ridge, Mich., assignor to Tension Structures Co., Pleasant Ridge, Mich. and Jon D. Vredevoogd, Lansing, Mich.

Filed Feb. 23, 1976, Ser. No. 660,450
The portion of the term of this patent subsequent to May 21, 1991, has been disclaimed.
Int. Cl.² A45F 1/16
U.S. Cl. 135—3 R **30 Claims**



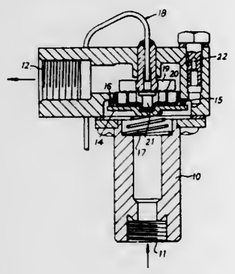
1. A substantially, hollow structural encompass or beam member having at least one predetermined curved bight, comprising multiple layers of comparitively twice longitufinal structural components aligned in an assembled layer upon layer to encompas at least one continuous longitudinal tubular cavity having a cross sectional area of at least wice the cross sectional area of the wall material encompassing said tubular cavity, and means for fixing said layers together to attain a high stiffness to weight ratio in said structural member.

4,092,993
METHOD AND APPARATUS FOR PREPARING CHEMICAL SOLUTIONS
James Santon Stevenson, Oakland, Calif., assignor to Terminator Products, Inc., Oakland, Calif.
Filed Jun. 19, 1975, Ser. No. 588,417
Int. Cl.² B05B *9/00*; F16K *11/18*
U.S. Cl. 137—15 **18 Claims**



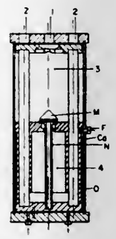
1. A system for producing a solution of a base liquid and a chemical without exposing one to risks of handling hazardous chemicals, comprising a tank for holding a predetermined quantity of base liquid, a pump having a suction end and a discharge end, a circulating system including said tank and said pump for circulating the base liquid of said tank, a Venturi in said circulating system between said pump and said tank, means including said Venturi for withdrawing from a source container of chemical a desired quantity of chemical to be mixed with such base liquid, means also including said Venturi for gradually introducing said desired quantity of chemical into said closed system while said base liquid is circulating therein, and means for selectively switching said Venturi from said chemical withdrawing means to said chemical introducing means and vice versa.

4,092,994
VALVES
Eric McGowan, St. Austell, England, assignor to United Gas Industries Limited, London, England
Filed Mar. 19, 1976, Ser. No. 668,725
Claims priority, application United Kingdom, Apr. 14, 1975, 15151/75
Int. Cl.² F16K *1/46*
U.S. Cl. 137—65 **3 Claims**



1. A valve having a valve plate and an annular valve seat, said valve plate being movable axially toward and away from said seat, an annular sealing member lying freely between said plate and seat, guide means comprising a disc with a single ring of spaced fingers extending normally therefrom around the periphery thereof, said disc abutting the valve plate and said spaced fingers extending loosely within the annular sealing member to prevent lateral movement thereof such as would take it out of alignment with the seat but allowing the sealing member freedom to move axially with respect to the fingers and means for operating said valve by abutting the disc and thereby moving the valve plate.

4,092,995
MULTIPLE VALVE WITH AUTOMATIC SEQUENTIAL OPERATION
Paul Stubenruss, Kostlanerweg, 4, Brixen, Prov. Bozen, Italy
Filed Jul. 19, 1976, Ser. No. 706,863
Int. Cl.² F16K *21/06*
U.S. Cl. 137—119 **11 Claims**



1. A valve for controlling the flow of fluid under pressure from an inlet to a plurality of outlets in sequence, said valve comprising:

a tubular casing having an internal opening about an axis and having two axial ends;

actuator means within said opening and dividing said opening into two chambers;

means bearing on the actuator means and urging it to a first position adjacent one of said ends whereby one of said chambers, the one at said one end, is normally small and the other chamber is normally large;

bleed valve means communicating with said other chamber to permit fluid to be slowly discharged from said other chamber;

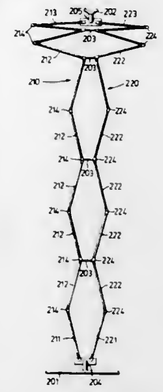
means communicating with said inlet and said one chamber to permit said pressurized fluid to flow into said one chamber whereby the pressurized fluid acts on said actuator means and moves it against the urging of said second mentioned means from said first position and toward the other of said ends to a second position;

cycle control valve means connected to the actuator means to open said two chambers into communication with each other when said actuator means arrives at said second position and to close said communication between said two chambers when said actuator means returns to said first position, whereby when said two chambers are in communication said second mentioned means will return said actuator means to said first position;

rotatable sequencing valve means and connected to said inlet and said outlets for placing said outlets sequentially in communication with said inlet depending on the position of the valve means; and

indexing means for rotating the sequencing valve means as said actuator means moves from said second to said first position.

4,092,996
WATER DISPENSING APPARATUS
Arne Karl Kock, Swedenborgsgatan 5B, Stockholm, Sweden
Filed Mar. 18, 1976, Ser. No. 668,243
Claims priority, application Sweden, Mar. 21, 1975, 7503242
Int. Cl.² B05B *3/18*
U.S. Cl. 137—344 **4 Claims**



1. An apparatus for conducting water from a water source to a water-consumer which is movable over a surface in relation to the water source and which comprises:

a. two substantially identical, extendible and collapsible pipe-systems each of which has a plurality of substantially rigid pipes and a plurality of pipe-coupling devices, said pipe-coupling devices being arranged to pivotally connect the ends of the pipes together so that water may flow from pipe to pipe through the pipe-coupling devices;

b. a plurality of holding means each arranged to hold a specific portion of a pipe in one pipe-system in a pivotally spaced apart relationship to a corresponding portion of a pipe in the other pipe-system, said distance being small in relation to the lengths of the pipes;

c. first water-supply means adapted to supply water from the water source to a pipe at one end of a respective pipe-system;

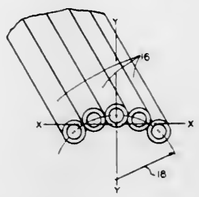
d. second water-supply means effective to pass water from a pipe at the other end of respective pipe-systems to the water-consumer;

e. a plurality of supporting means each arranged for carrying the pipe-systems above the surface at a holding means and comprising structures for engaging the surface; and

f. each of said holding means is arranged at each alternate pipe-coupling device of respective pipe-systems, said holding means being adapted to hold a pipe-coupling device of one pipe-system spaced at a distance from a corresponding pipe-coupling device of the other pipe-system, said distance being of the same magnitude as the cross-sectional dimensions of the pipes.

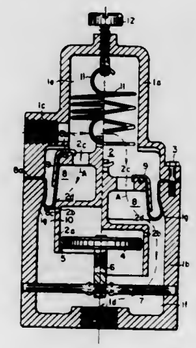
4,092,997
CONSTRAINT MEANS FOR FLEXIBLE ELEMENTS
Howard C. Hansen, Battle Creek, Mich., assignor to Clark Equipment Company, Buchanan, Mich.
Filed Jan. 26, 1977, Ser. No. 762,540
Int. Cl.² F16L *33/00*
U.S. Cl. 137—351 **11 Claims**

1. An assembly of at least three flexible elongated hydraulic conduits flexibly bonded together lengthwise thereof in such a manner that in a cross-section of said conduits an arc having a determinate curvature may be connected between the axes of said conduits, said conduits in themselves having such mechanical properties that bending the conduit assembly lengthwise and intermediate the ends thereof effects in the bend of the assembly a substantial flattening of said arc, the radius of said bend being substantially uniform and being a function of the radius of said arc, said conduits being mutually supportive and



having a substantial section modulus about a transverse axis as a function of the configuration of said arc.

4,092,998
AUTOMATIC PRESSURE REGULATOR
John F. Taplin, 15 Sewall St., West Newton, Mass. 02165
Continuation-in-part of Ser. No. 692,811, Jun. 4, 1976, abandoned. This application Jul. 12, 1977, Ser. No. 815,042
Int. Cl.² G05D *16/06*
U.S. Cl. 137—471 **14 Claims**



1. An automatic pressure regulator including in combination

(a) housing means defining an inlet passageway and an outlet passageway and an inlet area adjacent said inlet passageway and an outlet area adjacent said outlet passageway;

(b) a piston body arranged and movable inside said housing means, said piston body defining an additional passageway through said piston body allowing the flow of fluid from said inlet area to said outlet area of said housing means;

(c) a deep convolution rolling diaphragm having a radially outer portion affixed to said housing means, a radially inner portion affixed to said piston body and a rolling wall interposed between said housing means and said piston body, one side of said rolling wall being acted upon by the pressure prevailing in said inlet area and the other side of said rolling wall being acted upon by the pressure prevailing in said outlet area, and said rolling wall being arranged to control the effective cross-sectional area of said additional passageway so as to control the flow of fluid from said inlet area through said piston body to said outlet area;

(d) spring means interposed between said housing means and said piston body biasing said piston body to move in a direction tending to cause said rolling wall of said rolling diaphragm to reduce said effective cross-sectional area of said additional passageway; and

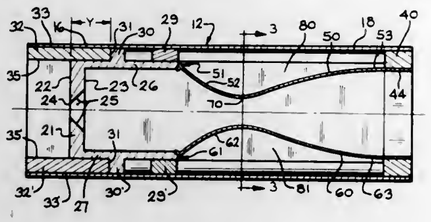
(e) means for increasing the effective area of said rolling wall of said rolling diaphragm as said piston body moves against the action of said spring means.

4,092,999

FLUID CONTROL VALVE

Lawrence M. Rubrich, Camden, Mich., assignor to Dana Corporation, Toledo, Ohio

Filed Apr. 25, 1977, Ser. No. 790,714
Int. Cl.² G05D *7/01*
U.S. Cl. 137—504 **12 Claims**



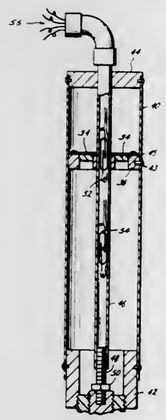
1. A fluid flow control valve comprising:
a housing having a fluid passageway extending axially therethrough from an upstream location to a downstream location;
an axially slidable piston received within said housing, said piston having a first surface for exposure to upstream fluid and a second surface for exposure to downstream fluid;
a first buckleable plate affixed to said piston and extending downstream therefrom; and
means for affixing said first buckleable plate to said housing at a location downstream of said piston,
whereby axial movement of said piston is affected by fluid flow through said valve and therefore affects the degree of buckling of said first buckleable plate which in turn stabilizes fluid flow through said valve.

4,093,000

RISING STEM VALVE POSITION INDICATOR

James S. Poff, 17310 Heritage Bay Dr., Webster, Tex. 77095

Filed May 20, 1977, Ser. No. 798,812
Int. Cl.² F16K *37/00, 31/528*
U.S. Cl. 137—554 **4 Claims**



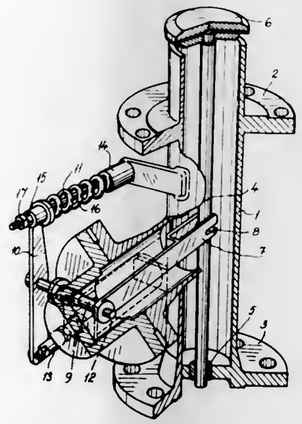
1. A position indicator adapted for use with a valve having a body, a ball core positioned within a flow passage of the valve body and movable between an opened and a closed position by rotation through an angle of 90°, a stem positioned within a stem passage of the valve body to engage the ball core, said stem having a groove provided in the surface thereof to coact with a pin extending from the body to cause a camming action which rotates the core between opened and closed positions as the stem is raised, lowered and rotated, and a handwheel mechanism to raise and lower the stem by rotating a handwheel through a series of turns about the stem, including a sleeve adapted for attachment to said handwheel mechanism for rotation thereby through the series of turns with the handwheel, a tubular shell of non-magnetic material adapted for attachment to the stem and being disposed within said sleeve and adapted to be raised, lowered and rotated by the stem, at least one magnet supported within said sleeve at a distance from the handwheel mechanism and rotatable with said sleeve about said shell, and a first and a second reed switch with associated wiring supported within said shell separated by at least a distance necessary to raise and lower the stem when opening and closing the valve which in turn raises and lowers the switches relative to the magnet for activating the respective switch at the opened and closed valve positions while limiting any twisting of the wiring to the angle of rotation of the stem.

4,093,001

EXCESS FLOW VALVE

Billy F. E. Sandin, Kumla, Sweden, assignor to AB Kalle-Regulatorer, Saffle, Sweden

Filed Mar. 29, 1976, Ser. No. 671,552
Int. Cl.² F16K *31/12*
U.S. Cl. 137—495 **2 Claims**



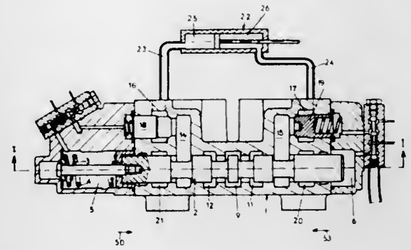
1. An excess flow valve, comprising:
(a) an elongate valve housing having a flow passage extending therethrough, an upstream portion of said housing defining a valve seat;
(b) a valve stem disposed in said housing and extending through said flow passage for reciprocal movement therein, said valve stem being provided with a substantially flat valve disc at its upstream end for cooperating with said valve seat to open and close said flow passage;
(c) a lever pivotally mounted to said valve stem and extending outwardly therefrom for reciprocally driving said valve stem, said pivot being of the lost motion type;
(d) a two-arm lever pivotally mounted with respect to said housing, said two-arm lever being rigidly affixed to said first mentioned lever and disposed perpendicularly thereto;
(e) a spring carried by said valve housing and engaging one end of said two-arm lever to bias said two-arm lever in a first direction to open said flow passage, and means carried by said valve housing for adjusting the tension of said spring;
(f) selectively actuable means for applying a motive force connected to the other end of said two-arm lever to move said two arm lever in a second direction to close said flow passage; and
(g) wherein said adjusting means is adapted for adjusting the distance of said valve disc to said valve seat in a quiescent state by adjusting the tension of said spring, wherein said spring serves to bias said valve disc to an open position unless and until there is a drop in pressure on the downstream side of said disc and whereas said motive force applying means is utilized for closure of the flow passage.

4,093,002

CONTROL DEVICE OF A LARGE HYDRAULIC DISTRIBUTOR, IN PARTICULAR FOR PUBLIC WORKS APPLIANCES

Maurice Tardy, Saint Etienne, France, assignor to Bennes Marrel, Andrezieux Boutheon, France

Filed Jun. 1, 1976, Ser. No. 691,649
Claims priority, application France, May 29, 1975, 75 17503
Int. Cl.² F15B *11/08, 13/042*
U.S. Cl. 137—596.2 **6 Claims**



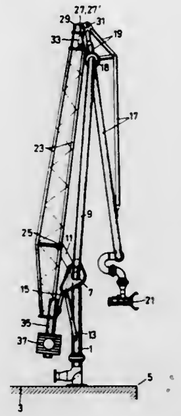
1. A directional control valve comprising:
a. housing having an inlet and an outlet;
a pressure responsive spool means disposed in said housing, said spool means being movable between a first position for communicating said inlet to said outlet and a second position terminating communications between said inlet and said outlet said spool means having a pressure chamber which when communicated to pressure is operative to shift said spool means to said second position;
a reservoir port;
a pressure responsive valve means disposed in said outlet dividing said outlet into first and second pressure chambers, said valve means being normally biased to prevent fluid communication between said pressure chambers when said spool means is in said second position, said valve means further adapted to open in response to a predetermined pressure in said first pressure chamber when said spool means is in said first position and said valve means is adapted to open in response to a predetermined pressure in said second pressure chamber when said spool means is in said first position;
a third pressure chamber disposed within said housing adjacent said pressure responsive valve means;
pilot valve means operable upon activation for communicating a control pressure to said spool means to move said spool means to said second position, said pilot valve means further adapted to communicate said second pressure chamber to said third pressure chamber when said spool means is in said second position; and
said pilot valve means closing communcation between said second and third pressure chambers when said spool means is in said second position and said pilot valve means connecting said third pressure chamber to said reservoir port, said pilot valve means having a pressure port which when communicated to pressure is operable to actuate said pilot valve means, said spool means chamber and said pressure port being connected in series by said pilot valve means.

4,093,003

APPARATUS FOR LOADING AND UNLOADING SHIPS

Hermann Miller, Krefeld, and Heinz Keltjens, Grevenbroich, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Apr. 29, 1976, Ser. No. 681,864
Claims priority, application Germany, May 15, 1975, 2522004
Int. Cl.² F16L *3/00*
U.S. Cl. 137—615 **4 Claims**



1. In apparatus for loading and unloading ships, a stand pipe on a dock, an inner jib pipe, bearing means at one end of the inner jib pipe connecting and pivotally mounting the inner jib pipe upon said stand pipe for movement in a vertical plane, an outer jib pipe, bearing means connecting and pivotally mounting one end of said outer jib pipe upon the other end of said inner jib pipe for pivotal movement in the same plane, an extension on said outer jib pipe extending rearward of said latter pivotal connection, a beam extending approximately parallel to the inner jib pipe, the beam adjacent one end pivotally connected through a link to said stand pipe at a bearing coaxial with the pivot bearing means of said inner jib pipe, and counter-weights on said beam for providing weight compensation for the mobile parts of the pivot bearing means on the stand pipe, hydraulic cylinders respectively connected for independent adjustment of the jib pipes; the improvement for position both said inner and outer jib pipes in a generally vertical rest position behind the dock edge comprising linkage means between said beam and the rearward extension of said outer jib pipe at its ends pivotally connected thereto respectively, and movable power means on said beam connected to said linkage means whereby the length of the beam between the pivot bearings (25) and the link (11) and the pivot bearings (31) with the extension 19 of the outer jib pipe (17) may be extended, for retracting said outer jib pipe to said rest position.

4,093,004

ARMORED CONDUIT

Stephen A. Kile, and Rufus V. Jones, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 23, 1970, Ser. No. 57,808
Int. Cl.² F16L *9/14*
U.S. Cl. 138—140 **4 Claims**

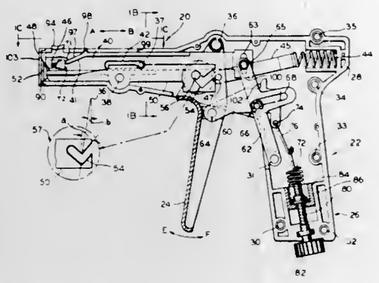
1. An article of manufacture comprising a conduit structure comprised of a plurality of layers of oriented polyolefin material wherein said polyolefin material is positioned such that the orientation direction of adjacent layers are at angles one to the other and wherein said plurality of layers of oriented polyolefin material has established on the outer periphery thereof a covering material for the protection of said polyolefin.

4,093,005

CABLE TIE GUN

Robert M. Eberhardt, Park Ridge; James Arthur McNana, Burbank, and Dennis M. Heuer, Chicago, all of Ill., assignors to All States Plastic Manufacturing Co. Inc., Chicago, Ill.

Filed Feb. 28, 1977, Ser. No. 772,569
Int. Cl.² B21F *9/02*
U.S. Cl. 140—123.6 **17 Claims**



1. A cable tie gun comprising an actuator, mounted for an excursion over a predetermined arc, cable tie tensioning slide bar means mounted for reciprocal motion responsive to operation of said actuator in order to tension a strap of a cable tie, force transmitting means comprising a pair of members connected in series between said actuator and said tension slide bar, said pair of members being interconnected by a stud on one member held in a cove on another member under a preselected spring tension, means responsive to a movement of said actuator means through a limited excursion which is less than said predetermined arc for causing an interference between said tensioning slide bar and said pair of members, said interference preventing a full actuator excursion through the full swing of said predetermined arc and further preventing said stud from leaving said cove, means responsive to a tension in the strap of a cable tie for holding and immobilizing said slide bar means with a force which is greater than said predetermined spring tension, whereby said stud may slip out of said cove if said interference does not occur before the end of the limited excursion permitted by the interference, and thereby enable the actuator to take its full excursion, and means responsive to said full excursion of said actuator and effecting the range extending beyond said limited excursion where said interference normally occurs for severing the strap of a cable tie whereby said strap severing means operates only at the end of said full excursion and independently of the point in said excursion where the force of the strap tension exceeds the predetermined spring tension to immobilize the tensioning means.

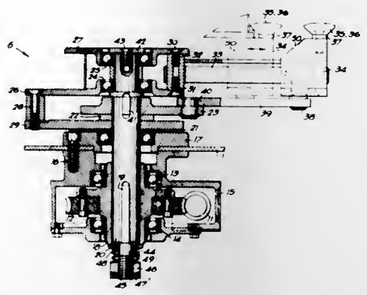
4,093,006

DEVICES FOR GRIPPING WHEELS

Eleutheer A. Hessels, Europark Noord 39, 2700 Sint Niklaas, Belgium

Filed Apr. 4, 1977, Ser. No. 784,510
Claims priority, application Belgium, Apr. 7, 1976, 840441; Mar. 21, 1977, 255755
Int. Cl.² B25H *5/00*
U.S. Cl. 144—288 A **4 Claims**

1. An apparatus for gripping a wheel to permit removal of a tire fitted onto the wheel, comprising: a vertical drive shaft (20), means (7, 8) for rotating said drive shaft, a first horizontal support (26, 27, 29) rotatably mounted around said drive shaft, at least three radial guide arms (33) circumferentially spaced at equal angles around said drive shaft (20) and each having one end fixedly secured to said first horizontal support, at least three slidable members (34) each slidably mounted on a respective one of said guide arms and each having at least one claw member (50) adapted to grip on the rim of a wheel, a second horizontal support fixed on said drive shaft, at least three link members (39) each pivoted at one end (40) on said second horizontal support (23) and each pivoted at the other end (38) on a respective one of said slidable members (33), braking means arranged between said first horizontal support and a



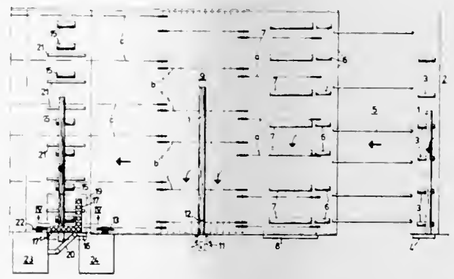
fixedly mounted frame member, and means for adjusting the pressure between said braking means, said first horizontal support and said frame member.

4,093,007

METHOD FOR ROOT END CUTTING OF LUMBER AND A DEVICE FOR PERFORMING SAID METHOD

Nils Erik Hellström, Nyland, Sweden, assignor to AB Hammars Mekaniska Verkstad, Nyland, Sweden

Filed Jun. 12, 1975, Ser. No. 586,256
Claims priority, application Sweden, Jul. 10, 1974, 74090671
Int. Cl.² B27C *9/00*; B27B *31/00*
U.S. Cl. 144—326 R **3 Claims**



1. A root end cutting device for cutting ends of pieces of lumber, each piece having a longitudinal or transverse mark, said device having spaced first and second ends and comprising:

conveying means for transversely conveying the pieces of lumber through the device;

a stop;

first means for moving said pieces of lumber against said stop;

first cutter means for making a first end cut on each piece of lumber as the same is being conveyed through said device;

second cutter means longitudinally spaced from said first cutter means;

sensing means for sensing said marks;

means responsive to sensing a transverse mark for longitudinally moving said pieces to align said transverse mark with said second root cutting means for making a second cut substantially at said transverse mark; and

means for stopping said longitudinal movement with said mark and said second cutter in alignment.

4,093,008

SCREW DRIVER HAVING CAPPED HANDLE WITH ROTABLE CAP

Lino Martin, 2659 W. Okeechobe Rd., Hialeah, Fla. 33010

Continuation of Ser. No. 625,364, Oct. 24, 1975, abandoned. This application Mar. 21, 1977, Ser. No. 779,594
Int. Cl.² B25G *1/00*
U.S. Cl. 145—61 EA **2 Claims**

1. A tool comprising:

A. an elongate cylindrical handle with an axial through bore and having a first end zone and a second end zone, said handle being sized to fit the hand of a user,

B. a shaft having a first end zone, a second end zone and an intermediate zone, said intermediate zone being between the end zones, and said second end zone comprising a working end of the tool,

C. means to fix the intermediate zone of the shaft in the bore of the handle for rotation of said handle and said shaft as a unit about the longitudinal centerline of the handle and shaft,

D. said first end zone extending from said handle,

E. an end cap on said extending first end zone including means to captivate said end cap on said extending end zone in a fixed axial position in which it is rotatable on said first end zone and means rotatably journalling said end cap on said first end zone,

F. said end cap having a bearing therewithin with an axial face facing said handle and said handle having a bearing therewithin with an axial face facing said end cap and ball bearing means captivated between said bearing faces;

G. said means to captivate said end cap on said extending shaft portion comprising a headed end on the first end zone of said shaft, said headed end being of a larger diameter than the remainder of the shaft and defining an axially facing abutment shoulder when viewed from the working end of the tool and a flat bearing surface when viewed from the end cap end of the tool, said end cap bearing having an axial bore for accommodating said first end zone of said shaft and being shaped with two end portions of larger diameter than the middle portion, one large diameter portion defining said axial face facing said handle, the other opposite large diameter portion having a cylindrical recess surrounding said headed end of said shaft, the bottom of the recess defining a shoulder for bearing against said abutment shoulder of said headed end of said shaft, an end plate between said end cap and said headed end of said shaft and bearing against said flat bearing surface of said headed end, and pin means fixing said end plate to the said other opposite large diameter portion of said end cap bearing, the end cap filling in the area between the two larger diameter end portions of the end cap bearing and being held to said bearing by said pin means.

4,093,009

VACUUM PACKING DEVICE

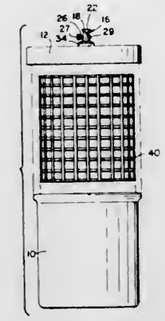
Anthony Iavarone, and Richard Anthony Iavarone, both of 20-61 St. Raymond Ave., Bronx, N.Y. 10462

Filed Mar. 4, 1977, Ser. No. 774,465
Int. Cl.² B65D *81/20*
U.S. Cl. 150—.5 **5 Claims**

1. A vacuum packing device comprising a resiliently flexible container, a resilient cover, said cover having a valve aperture therein, said cover being releaseably engageable with the top of said container,

valve means connectable to said cover through said valve aperture and selectively openable and closable when said cover is engaged to said container permitting the withdrawal of air from said container and to therefor prevent air from entering said container

support means insertable in said container before engagement of said cover to prevent the collapse of said con-



tainer when air is withdrawn therefrom, said valve means including cover grasping means for grasping opposed lateral surfaces of said cover and providing a pair of pluralities of ribbed-like protrusions extending outwardly from each of said opposed lateral surfaces for manually releaseably securing said valve means to said cover.

4,093,010

CAMERA CASE

Benjamin L. Hunley, and James C. Packard, both of Clinton, Tenn., assignors to Hunley and Packard, Clinton, Tenn.

Filed May 4, 1977, Ser. No. 793,719
Int. Cl.² A45C *11/38*
U.S. Cl. 150—52 J **5 Claims**

1. A case for fragile articles comprising a rigid container including a generally rectangular bottom member, upstanding walls including a pair of end walls including upper edges and a pair of side walls including upper edges attached to the periphery of said bottom member, said bottom member and said walls defining an open topped main compartment, a lid proportioned to unite with the upper edges of said walls to close the main compartment, resilient cushioning means having a smooth continuous surface on the interior of said compartment covering and attached to the lid, the bottom member, said end walls and said side walls, first elongated partition means for dividing said main compartment into smaller first compartments, said first partition means having a rigid, generally planar, elongated support member, said support member extending between opposed side walls of said container and extending generally perpendicular to the bottom member, cushioning means having a smooth continuous surface on the planar sides and top edge of said first partition support member, the length of said first partition rigid support member being such that it extends into and compresses the cushioning means on said opposed side walls without penetrating the

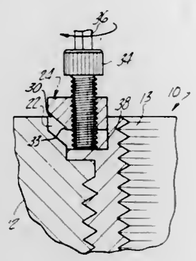
surface of said cushioning means so that the deformation of the cushioning means at least in part holds the first support member in position, and second elongated partition means for dividing one of said first compartments into smaller second compartments, said second partition means having a rigid, generally planar, elongated support member, said support member extending between said first partition means and one of said upstanding walls other than said opposed walls, generally perpendicularly to the bottom member, cushioning means on the planar sides and top edge of said second partition support member, the length of said second partition support member being such that it extends into and compresses the cushioning means on one of said walls other than said opposed side walls and the cushioning means on said first partition support member without penetrating the surface of said cushioning means, so that the deformation of the cushioning means at least in part holds the second support member in position.

4,093,011

REMOVABLE THREADED INSERT

James L. Bucknavich, 8503 Sherman, Warren, Mich. 48089

Filed Dec. 10, 1976, Ser. No. 749,461
Int. Cl.² F16B *39/02*
U.S. Cl. 151—57 **6 Claims**



1. In combination a threaded insert secured to an anchoring structure, each having portions thereof contiguous to each other and a locking element for locking said insert to said anchoring structure, comprising:

an axially extending pocket open at one side and having an axially inner end defining a reaction surface, said pocket formed in said insert along said portion thereof contiguous to said anchoring structure;

said locking element configured to be disposed in said pocket and seated against said reaction surface formed in said pocket and having a portion thereof extending out of said pocket and having a configuration adapted to be forced into said anchoring structure material to secure said locking element to said anchoring structure and prevent relative shearing movement between said contiguous portions of said insert and said anchoring structure; and

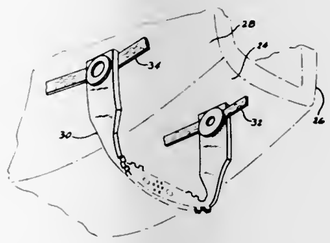
means for engaging said locking element and said reaction surface and forcing said locking element out of said pocket whereby said insert may be released from said anchoring structure.

4,093,012

SKID PREVENTIVE TIRE ASSEMBLY

John H. Detwiler, Manhasset, N.Y., assignor to Detwiler Corporation, Westbury, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,492
Int. Cl.² B60C *27/10*
U.S. Cl. 152—226 **20 Claims**



19. Anti-skid strap adapted to be removably mounted on a tire having a pair of opposed side walls and a peripheral road contacting outer circumferential surface comprising:

the strap having a greater width than thickness and having a length sufficient to permit the central portion of the strap to extend transverse to the circumferential surface of the tire across the entire surface and the end portions of the strap to extend beyond in adjacent relationship to at least a portion of the opposed side walls of the tire;

attachment means on the strap for cooperation with anchor means to removably attach the strap to the tire;

the central portion of the strap adapted to be normally positioned on the circumference of the tire with the dimensional width sides being substantially parallel with the circumferential surface of the tire so that when the tire is rotating in normal engagement with a road surface the strap will remain in the normal position and offer minimum resistance to driving engagement between tire and road and when the tire is subjected to surfaces tending to cause slippage, engagement between the strap and the road will cause the strap to automatically deform so that at least a portion of the dimensional width of the underside of the strap is brought into a position that is approximately perpendicular to the circumferential surface of the tire thereby increasing frictional and mechanical engagement with the road surface and assisting in stopping the slippage and returning the tire to normal engagement with the road surface at which time the strap will automatically return to its normal configuration and position;

at least the road contacting portion of the strap having a configuration permitting its shifting to the approximate perpendicular position and the automatic return to the normal configuration and position;

the strap being designed to operate to provide anti-skid action on soft surfaces, on semi-hard surfaces and on hard surfaces and the strap shifting between the normal and approximate perpendicular position a predetermined amount depending upon the hardness of the road surface with which it is in engagement to provide the necessary anti-skid action;

at least one stud extending through the central portion of the strap and projecting upward from the side of the strap distal from the tire surface to provide additional road engaging contact when the strap is in the normal position and the stud being of a predetermined height above the surface of the strap so that it does not interfere with the shifting of the strap to the approximate perpendicular position; and

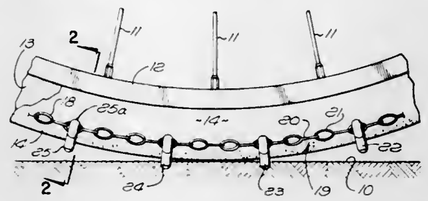
each stud being positioned on the strap and dimension so that on soft surfaces the stud and strap improve traction and prevent skidding, on semi-hard surfaces the stud assists in initiating the shifting of the strap to the approximately perpendicular position without interfering with the shifting movement, and on hard surfaces on occasion when the strap does not rotate fully to the approximate perpendicular position the stud will dig in to provide anti-skid action.

4,093,013

BIKE TRACTION ATTACHMENT

Nathanial H. Lewis, Box No. 20424, Pasadena, Calif. 90006

Filed May 23, 1975, Ser. No. 580,320
Int. Cl.² B60C *27/20*
U.S. Cl. 152—240 **2 Claims**



1. An improved traction attachment of the type having a plurality of cleats around the circumference of a tire, said cleats at some interval are held in place by a pair of side bands, a said cleat having a U-shape transverse cross-section and conforming to said tire, and having a longitudinal cross-section, that of a closed geometrical figure, wherein the improvement comprises:

(a) the said cleat is a single unit throughout; and

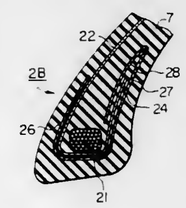
(b) U-shaped ends of said cleat, having said geometrical figure longitudinally cross-section throughout, said ends fastened around said side bands, each tip of each said end extends downward, a portion of each said tip is in contact with a horizontal plane through the lower curved portion of said cleat, thereby, each said tip prevents lateral skidding.

4,093,014

RADIAL PLY PNEUMATIC TIRE HAVING WOVEN MULTIFILAMENT FABRIC REINFORCING PLY

Hajime Tomoda, Atsugi; Kenhachi Mitsuhashi, and Tuneo Morikawa, both of Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed May 20, 1976, Ser. No. 688,425
Claims priority, application Japan, May 27, 1975, 50-62529
Int. Cl.² B60C *15/06*
U.S. Cl. 152—362 CS **27 Claims**



1. A radial ply pneumatic tire having a bead portion having an inside portion and an outside portion thereof comprising, embedded in a rubber matrix,

(a) a bead wire bundle;

(b) a carcass ply of a metal tire cord fabric located in the inside surface layer of the bead portion and having an end portion thereof being turned around said bead wire bundle and extending to the outside surface layer of the bead portion,

(c) one or more reinforcing plies arranged between a portion of said carcass ply extending to the outside surface layer of the bead portion and the outer surface of the outside surface layer of the bead portion, and

(d) an additional reinforcing ply having an outside end portion thereof located between the portion of said carcass ply extending to the outside surface layer of the bead portion and said reinforcing ply and the other portion thereof being turned around the turned portion of the carcass ply and extending to the inside surface layer of the bead portion along the carcass ply,

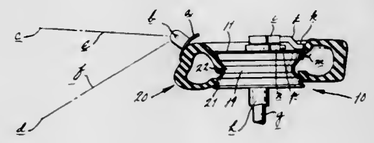
characterized in that one of said reinforcing plies, which is located closest to the outer surface of the outside surface layer of the bead portion, comprises a woven multifilament fabric consisting of multifilament warps in a density of 20 to 65 yarns/50mm and multifilament wefts in a density of 20 to 65 yarns/50mm, and has an endmost point thereof located farther from the bead wire bundle than the endmost point of the outside end portion of said carcass ply.

4,093,015

METHOD OF MOUNTING LARGE PNEUMATIC TIRES

S. W. Malinski, P.O. Box 161, Tamaroa, Ill. 62888

Filed Jun. 23, 1977, Ser. No. 809,278
Int. Cl.² B60C *25/06*
U.S. Cl. 157—1.1 **2 Claims**



1. In the use of that type of tire mounting machine which mounts a tire casing on a horizontally secured rim having upper and lower flanges, annular bead seating areas inwardly adjacent to said flanges, and a sloping-walled drop center portion therebetween, the machine being of the type in which two counter-rotating bead deflectors, rotated from within the rim about such upper flange, commence adjacent to each other and rotate through nearly semi-circular arcs of travel in opposite senses,

the method, utilized when the tire lower bead is at least partially in the drop center portion, of mounting the tire upper bead over the rim upper flange, comprising the steps of

(a) positioning said bead deflectors adjacent to each other at a selected point along the circumference of the rim;

(b) applying, radially outward of said point against a localized area of the tread of the tire adjacent to its upper sidewall, a thrust force having a radial horizontal component and a downward component, whereby to thrust a portion of the upper bead, inward of such localized tread area, downward below the upper flange of the rim and at least partly adjacent to the lower bead part therein into its drop center;

(c) commencing the counter-rotation of said bead deflectors to deflect the upper bead from above to below the upper rim flange in an arc widening progressively from said selected point during substantially the first one-third of their said arcs of travel;

(d) then increasing the horizontal component of the thrust force sufficiently to so buckle the said upper sidewall portion between said localized area and bead as to displace and thereby shift a greater part of the upper sidewall to the other side of center of the rim;

(e) causing said bead deflectors to progressively deflect said bead over the upper rim flange during substantially the second one-third of their said arcs of travel; and then

(f) elevating the point of application of said thrust force and moving same radially further inward, whereby to cause the tire casing to twist downward and inward at the section at which the thrust force is applied, sufficiently to draw out of the drop center the lower bead part theretofore therein and press the upper bead portion fully into the

drop center thereat, thus to permit the upper sidewall to shift farther beyond center; and

(g) continuing the progression of the bead deflectors during the final portion of their arcs of travel, whereby to complete the bead deflection over the upper flange of the rim.

4,093,016

CURTAIN COATING METHOD AND APPARATUS AND THE MANUFACTURE OF PAPERBOARD

John Douglas Coleman, Surrey Hills, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Division of Ser. No. 477,380, Jun. 7, 1974, Pat. No. 3,992,252.
This application Jul. 27, 1976, Ser. No. 709,068
Claims priority, application Australia, Jun. 7, 1973, 3579/73
The portion of the term of this patent subsequent to Feb. 15, 1994, has been disclaimed.
Int. Cl.[2] D21F *11/00*
U.S. Cl. 162—124 **2 Claims**

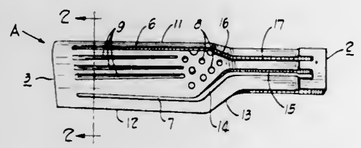
1. A method of making multi-ply paperboard comprising the steps of depositing paper pulp onto a forwardly travelling carrier web at locations spaced along the carrier web to form successive superimposed paper plies and applying starch solution to the upper surface of at least one of the plies onto which a succeeding ply is superimposed and before said succeeding ply is formed; the starch solution being applied to said ply surface by the technique of introducing a forced flow of starch solution into a chamber which is disposed above the carrier web in advance of the location at which said succeeding ply is to be formed and which has an upright side wall with a horizontal slot outlet of vertical width in the range of 1/16 inch to ¼ inch, maintaining the forced flow of starch solution into the chamber whereby in the vicinity of the slot outlet the starch solution is maintained within the chamber at a level above the upper edge of the slot outlet such that the starch solution is extruded horizontally from the slot outlet as a horizontal stream contacting both the upper and lower edges of the slot outlet and of thickness determined by the vertical width of the slot outlet, allowing the stream issuing from the slot outlet to fall downwardly under gravity across an upright surface which terminates at a bottom blade edge at a distance below said horizontal slot outlet such that the falling starch solution forms a continuous curtain which is attenuated as it flows down said upright surface to a thickness less than that of the horizontal stream extruded from said slot outlet, and allowing the attenuated continuous curtain to fall away from said upright surface at the blade edge and to drop onto said ply surface.

4,093,017

CORES FOR INVESTMENT CASTING PROCESS

John J. Miller, Jr., South Euclid; Donald L. Eppink, and Ted A. Loxley, both of Mentor, all of Ohio, assignors to Sherwood Refractories, Inc., Cleveland, Ohio

Filed Dec. 29, 1975, Ser. No. 644,939
Int. Cl.[2] B22C *1/02, 9/04, 9/10, 9/12*
U.S. Cl. 164—28 **12 Claims**



1. In a directional solidification casting process for precision casting of superalloys wherein a molten metal alloy at a temperature above 1500° C. is caused to flow into a preheated multi-layer refractory shell mold containing a preformed porous leachable vitreous silica core body and is caused to solidify progressively from the bottom of the mold over a period of time, said shell mold and said core body being preheated to a temperature of from 1300° to 1600° C., the improvement which comprises providing the preformed core body with a mineralizer containing devitrifying metallic ions which promote formation of cristobalite, a silica content of at least 90 percent by weight, and a limited amount of impurities so that the core body retains rigidity at high temperatures in excess of 1600° C. and converting at least 80 percent of the silica of said body to cristobalite before the molten metal is allowed to flow into the shell mold, the preformed core body containing from 35 to 55 percent by weight of cristobalite before being located in said shell mold.

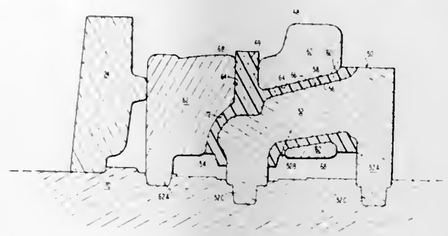
12. A precision porous leachable refractory core for hight-emperature precision investment shell mold casting of aircraft turbine engine airfoils from superalloys comprising at least 95 percent by weight of silica and no more than 55 percent by weight of cristobalite, said core containing at least 35 percent by weight of cristobalite and from 0.04 to 0.2 percent by weight of alkali metal ions that promote the formation of cristobalite, said alkali metal ions being present in an amount such that preheating of said core for ½ hour at a temperature of about 1400° C. will convert at least 60 percent by weight of the silica to cristobalite, said core being formed from a refractory composition containing finely divided refractory particles and a binder, said refractory particles comprising at least 75 percent by weight of high-purity silica particles with a purity of at least 99.5 percent by weight and up to 25 percent by weight of added mineralizer particles with a particle size not in excess of 50 microns containing at least 0.2 percent by weight of alkali metal ions, said mineralizer particles being treated with a sodium compound to provide said devitrifying metallic ions and to cause sodium ions to be concentrated at the outer surfaces of said mineralizer particles, the percentage by weight of said metallic ions in said mineralizer particles being at least several times that in said high-purity vitreous silica particles, said core having a modulus of rupture of at least 700 pounds per square inch and a porosity of from 20 to 40 volume percent.

4,093,018

CASTING METHODS WITH COMPOSITE MOLDED CORE ASSEMBLY

David V. Trumbauer, Bremer, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Oct. 19, 1976, Ser. No. 733,958
Int. Cl.[2] B22C *9/04, 9/24, 9/10*
U.S. Cl. 164—32 **9 Claims**



1. A method of casting metal castings comprising the steps of:

forming a composite core assembly by:

fabricating a first core having an irregular outer surface portion;

molding a destructible layer of cellular plastic material around said irregular outer surface portion of said first core, such that an inner surface of said layer intimately contacts and conforms to the configuration of said irregular outer surface portion of said first core to interlock said first core and said plastic layer together, and such that the outer surface of said plastic layer includes an irregular surface portion; and

molding a second core in encompassing relation around said irregular outer surface portion of said plastic layer, such that an inner surface of said second core intimately contacts and conforms to the configuration of the irregular outer surface portion of said plastic layer to interlock said second core and said plastic layer together, and such that the outer surface of said second core is of nonconforming shape relative to the outer surface of said plastic layer;

forming a mold cavity within a pair of mold halves;

inserting said core assembly as an integral unit within one of said mold halves;

securing said mold halves together; and

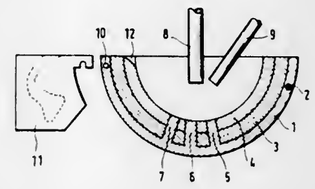
introducing molten metal into said cavity to destroy said plastic layer and form said casting.

4,093,019

METHOD OF PRODUCING SMALL SHAPED PARTS BY CASTING FROM METAL AND APPARATUS FOR PERFORMING THE METHOD

Rolf Seybold, and Gerd Gross, both of Solingen, Germany, assignors to Firm Piel & Adey, Solingen, Germany

Filed Jul. 16, 1976, Ser. No. 705,784
Claims priority, application Germany, Jul. 19, 1975, 2532402
Int. Cl.[2] B22D *27/04*
U.S. Cl. 164—52 **7 Claims**



1. A process for the production of small molded components by casting high alloy steel, and metal alloys similar to said alloy steels with respect to their melting temperatures and melting heat, in a crucible, and particularly, in a gravity die, comprising the steps of:

limiting the maximum amount of metal to be melted down in the crucible at any given time to the charge weight necessary for casting into a single die plus an amount of the metal sufficient to form a metal heel for heat retention;

supplying heat electrically to the charge being heated to casting temperature;

casting the metal into a die;

interrupting the heating of the charge during the casting step; and

retaining in the crucible a metal heel during the casting step, the heat content thereof compensating for at least a portion of the heat loss occurring from the metal during the heat interrupting step to maintain the pourability and castability of the metal in the crucible.

4,093,020

VAPOR-TYPE HEAT EXCHANGER

John R. Schieber, Holland, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Mar. 26, 1976, Ser. No. 670,787
Int. Cl.[2] F28B *5/00*; F28F *21/00*; G01N *25/00*
U.S. Cl. 165—1 **23 Claims**

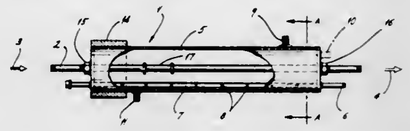
1. A method of exchanging thermal energy between cooling fluid and hot fluid comprising the steps of:

conducting the cooling fluid through thermally conductive conduit means surrounded by shell means,

injecting the hot fluid in the vapor phase into the shell means,

drawing the hot fluid from the shell means in the liquid phase,

maintaining the conduit means submersed in the liquid phase of the hot fluid, and directing the vapor phase of the hot



fluid into the liquid phase thereof not directly against said conduit means and not directly against said shell means to provide

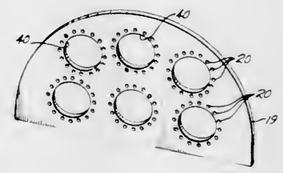
jet mixing the liquid phase of the hot fluid with the vapor phase thereof.

4,093,021

INSTRUMENT AND PANEL COOLING APPARATUS

Kenneth Dale Groom, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 29, 1975, Ser. No. 645,140
Int. Cl.[2] F28F *9/22, 13/12*
U.S. Cl. 165—1 **11 Claims**



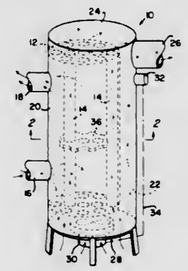
1. A method of cooling an enclosed instrument panel and an instrument in an aperture in said panel comprising: inducing flow of a plurality of individual jets of cooling air near the face end of said instrument; providing spacing for and directing each of said individual jets of cooling air in a direction perpendicular to the face of said instrument in a manner for forming a cooling air flow path comprising a sheet a short distance from said panel and close enough to said aperture so that said sheet attaches to a surface of said instrument; and exhausting said cooling air from said enclosed instrument panel.

4,093,022

HEAT EXCHANGER

George Polyak, Jr., R.D. #1, Box 131B, Mt. Hope, Wharton, N.J. 07885

Filed May 2, 1977, Ser. No. 792,780
Int. Cl.[2] F28D *7/00*
U.S. Cl. 165—39 **9 Claims**



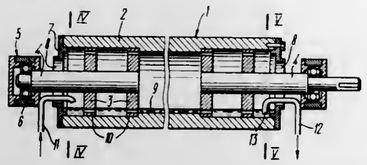
1. A heat exchanger, comprising:

a cylindrical chamber having a vertical, elongate axis;
said chamber being closed at opposite axial ends thereof;
first means for admitting a heated fluid into said chamber, in a first direction transverse to said axis, adjacent one end of said chamber;
second means, adjacent an end of said chamber which is opposite said one end, for discharging such fluid from said chamber in a second direction transverse to said axis;
conduit means fixed in and substantially uniformly distributed within said chamber and extending axially thereof;
said conduit means opening only outwardly of said one and opposite ends of said chamber;
third means for admitting ambient air into said conduit means; and
fourth means for discharging air from said conduit means; wherein
said third and fourth means comprise a housing which substantially envelops said chamber;
said housing having a substantially cylindrical wall which terminates in a closed end wall;
said end wall being adjacent to, but spaced apart from, said one end of said chamber; and
said wall has a portion thereof which defines a compartment means cooperative with said fluid admitting and discharging means and said air admitting and discharging means to cause ambient air repetitively to cycle or pumpingly circulate through said conduit means and said compartment means;
said portion of said wall is eccentric relative to said chamber and cooperates with said chamber to define said compartment means of a uniform, crescent-shaped cross-section; and wherein
said air discharging means communicates with said compartment means, and comprises means for discharging air from said compartment means in said first direction from a side of said heat exchanger which is opposite said first and second means.

4,093,023
SHEET MILL TABLE ROLL

Ivan Vasilievich Frantsenjuk, ulitsa Parkovaya, 3, kv. 15; Andrei Dmitrievich Belyansky, ulitsa Parkovaya, 3, kv. 16; Leonid Semenovich Bobylev, prospekt Mira, 11, kv. 22; Zinovy Petrovich Karetny, prospekt Mira, 27, kv. 7, all of Lipetsk; Nikolai Nikitievich Alexandrov, Sharikopodshipnikovskaya ulitsa, 2, kv. 147, Moscow; Vasily Ivanovich Kulikov, Krasnodarskaya ulitsa, 12, kv. 113, Moscow; Evgeny Vladimirovich Kovalevich, Frunzenskaya naberezhnaya, 24, kv. 38, Moscow; Viktor Gurievich Tinyakov, Juzhno-Portovaya ulitsa, 16, kv. 23, Moscow; Alexandr Vladimirovich Bolotnov, Kavkazsky bulvar, 47, kv. 37, Moscow; Jury Alexandrovich Chernov, prospekt Lenina, 30, kv. 50, Alma-Ata; Vladimir Mikhailovich Kolesov, ulitsa Kirova, 89, kv. 10, Alma-Ata; Nikolai Matveevich Svetlakov, 6 Mikroraion, 10a, kv. 50, Alma-Ata; Gennady Nikolaevich Burmistrov, mikroraion "Orbita-I", 25, kv. 74, Alma-Ata, and Jury Grigorievich Kuzenko, ulitsa 12 Linia, 67, Alma-Ata, all of U.S.S.R.

Filed Jun. 24, 1976, Ser. No. 699,438
Int. Cl.[2] F28D *11/02*
U.S. Cl. 165—89 **4 Claims**

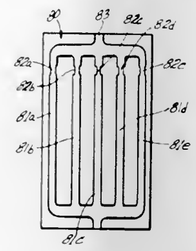


1. A sheet mill table roll, comprising: a cylindrical hollow body; half-axles accommodated within said cylindrical hollow body and mounted on table bearing supports; said cylindrical hollow body having hubs fixed on said half-axles; through channels provided at the periphery of said hubs; covers mounted on each end face of said hollow body; a central port provided in each said cover and having a diameter essentially smaller than the outside diameter of said hub and; annular slots formed by said covers and said half-axles.

4,093,024
HEAT EXCHANGER EXHIBITING IMPROVED FLUID DISTRIBUTION

Verne L. Middleton, East Alton, Ill., assignor to Olin Corporation, New Haven, Conn.

Filed Jun. 15, 1976, Ser. No. 696,203
Int. Cl.[2] F28F *3/12, 9/22, 27/02*; F24J *3/02*
U.S. Cl. 165—170 **17 Claims**

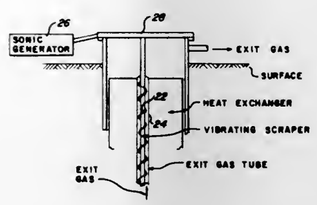


1. A heat exchange system for use in a solar energy collector system comprising a plurality of passageways for a heat exchange medium defining opposed header structures connected by a plurality of spaced, parallel individual connecting portions of said passageways extending therebetween, said passageways having entry and exit portions extending from said header structures to provide ingress and egress openings for said heat exchange medium, wherein said connecting portions are provided with a plurality of constrictions in internal diameter extending along at least a portion of the length thereof wherein at least some of said constrictions have differing internal diameter so that the constriction adjacent the area of greatest turbulence and fluid flow has the smallest internal diameter over at least a portion of its length and the constriction on individual connecting portions have gradually increasing internal diameter in relation to increased distance from said area of greatest turbulence, said constrictions serving to divert fluid away from the connecting portion receiving the primary amount of flow and to regulate the rate of flow of said heat exchange medium between all of said connecting portions.

4,093,025
METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU

Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Division of Ser. No. 595,335, Jul. 14, 1975, Pat. No. 4,069,868. This application Nov. 23, 1976, Ser. No. 744,258
Int. Cl.[2] E21B *43/24, 45/62*
U.S. Cl. 166—251 **2 Claims**



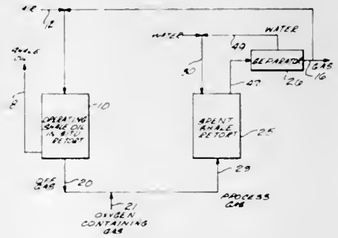
1. A method of producing coal in situ comprising the steps of

drilling wells into a coal formation,
taking oriented cores in the coal formation,
testing the coal formation for water content,
completing the wells so that they are hermetically sealed,
installing facilities at the surface to inject fluids into the coal formation and to remove fluids from the coal formation,
removing water from the coal formation,
igniting the coal formation,
removing the products of combustion from the coal formation,
installing a heat exchanger in the wells used to withdraw fluids from the coal formation,
extracting and recovering sensible heat from withdrawn fluids, and
producing sonic vibrations in the withdrawal wells to prevent the build-up of particulate matter in the wells.

4,093,026
REMOVAL OF SULFUR DIOXIDE FROM PROCESS GAS USING TREATED OIL SHALE AND WATER

Richard D. Ridley, Grand Junction, Colo., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.

Continuation-in-part of Ser. No. 760,038, Jan. 17, 1977, abandoned, which is a continuation-in-part of Ser. No. 593,622, Jul. 7, 1975, abandoned, which is a continuation of Ser. No. 492,822, Jul. 29, 1974, abandoned. This application Apr. 15, 1977, Ser. No. 787,887
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—256 **21 Claims**



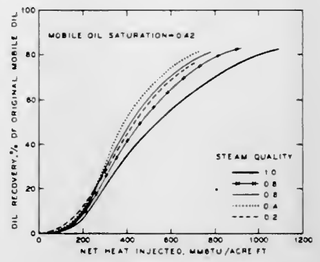
2. A method for removing sulfur dioxide from a process gas comprising the steps of:
passing a process gas containing sulfur dioxide through a fragmented permeable mass of particles containing treated oil shale and including alkaline earth metal oxides, said mass including water for combining with alkaline earth metal oxides in the fragmented mass and sulfur dioxide in the process gas for removal of sulfur dioxide from the process gas.

4,093,027
METHOD OF ASSISTING THE RECOVERY OF OIL USING STEAM

Ezzat E. Gomaa, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 1, 1976, Ser. No. 746,564
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—272 **3 Claims**

1. In a method of assisting the recovery of hydrocarbons from a hydrocarbon-bearing formation wherein steam is injected through an injection well into a hydrocarbon-bearing formation to promote a flow of hydrocarbons to a production well for production therefrom, the improvement comprising

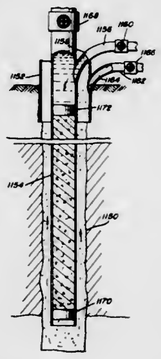


maintaining the quality of the steam injected into the formation within a range of from 35 to 45%.

4,093,028
METHODS OF USE OF CEMENTITIOUS MATERIALS AND SONIC OR ENERGY-CARRYING WAVES WITHIN SUBSURFACE FORMATIONS

Clarence W. Brandon, Nashville, Tenn., assignor to Orpha B. Brandon, Nashville, Tenn., a part interest

Continuation-in-part of Ser. No. 406,045, Oct. 12, 1973, Pat. No. 3,981,624, which is a continuation-in-part of Ser. No. 611,082, Jan. 23, 1967, Pat. No. 3,765,804, which is a continuation-in-part of Ser. No. 665,995, Jun. 17, 1957, Pat. No. 3,302,720, This application Sep. 7, 1976, Ser. No. 721,605
Int. Cl.[2] E21B *33/138, 33/14*
U.S. Cl. 166—281 **51 Claims**



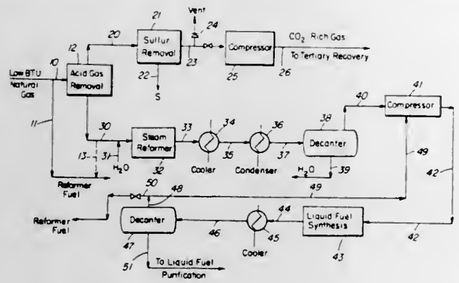
1. A method of cementing casing, liner or tubing in a well bore comprising the steps of
introducing into a well casing, liner or tubing a charge of cement under pressure of the compression portion of a sonic or energy-carrying wave, and
displacing drilling mud or other debris in said well bore below or between said casing, liner or tubing and the walls of said well bore by said charge of cement,
including introducing a fluid composed of or containing a gas, foam, emulsion or solvent into said casing, liner or tubing prior to the introduction of cement under pressure of said compression portion of said sonic or energy-carrying wave,
wherein said fluid becomes gaseous or vaporous during at least a rarefied portion of said sonic or energy-carrying wave.

4,093,029

UTILIZATION OF LOW BTU NATURAL GAS

Paul Burg Weisz, Yardley, Pa., and John Clarence Zahner, Princeton, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 698,449, Jun. 21, 1976, abandoned. This application Mar. 24, 1977, Ser. No. 780,743
Int. Cl.² E21B *43/16*
U.S. Cl. 166—305 R **5 Claims**



1. A process for economic utilization of natural gas, having low heating value by reason of containing carbon dioxide in admixture with the methane content thereof, which process comprises subjecting a natural gas having substantial methane content in admixture with at least 50 volume percent of carbon dioxide based on total volume of said gas to the following steps in the sequence recited:

(a) removing a substantial portion of the acid gases from said natural gas to leave a reformer feed gas containing 20–40 mol percent carbon dioxide;

(b) mixing said reformer feed gas with water and reacting the mixture in contact with a catalyst to promote the reforming reaction of methane and water to produce carbon monoxide and hydrogen under temperature and pressure conditions conducive to said reforming reaction; and

(c) reacting the product of step (b) in contact with a carbon monoxide reduction catalyst for promotion of synthesis reaction between carbon dioxide, carbon monoxide and hydrogen to produce methanol or hydrocarbons, which are liquid at normal temperature of 21° C (70° F) and atmospheric pressure, under conditions of temperature and pressure conducive of said synthesis.

4,093,030

RUN-IN AND TIE BACK APPARATUS

James Vaull Bonds, Houston, Tex., assignor to McEvoy Oilfield Equipment Company, Houston, Tex.

Division of Ser. No. 543,123, Jan. 22, 1975, Pat. No. 4,646,405, which is a continuation of Ser. No. 253,516, May 15, 1972, abandoned. This application Jan. 24, 1977, Ser. No. 762,181
Int. Cl.² E21B *23/00, 43/10*
U.S. Cl. 166—315 **6 Claims**

1. A method of completing a well comprising:

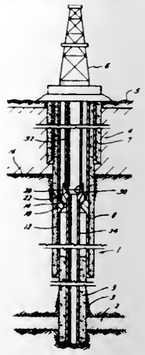
lowering a casing hanger suspending a casing string into the well by means of handling pipe until the casing hanger lands on a support affixed within the well;

securing the casing string in the well;

disconnecting the handling pipe from the casing hanger by a rotation of the handling pipe;

removing the handling pipe from the well;

lowering riser casing into the well;



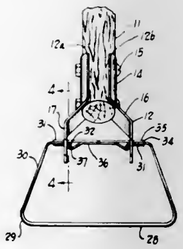
connecting the riser casing to the casing hanger by rotating the riser casing in the same direction as used for disconnecting the handling pipe.

4,093,031

PENDULUM TYPE HOE

William E. Portz, North Madison, Ohio, assignor to True Temper Corporation, Cleveland, Ohio

Filed Jun. 24, 1977, Ser. No. 809,901
Int. Cl.² A01B *1/10, 1/22*
U.S. Cl. 172—372 **14 Claims**



1. A pendulum type hoe comprising a handle;

a fork secured to one end of said handle and comprising a pair of laterally spaced, parallel leg portions extending beyond said one end;

said leg portions having elongated slots therein disposed at an angle relative to said leg portions whereby the longer axes of said slots are generally horizontal when said handle is disposed at a normal working angle;

a blade having a pair of upwardly angled arms;

the upper ends of said arms having inwardly turned flanges projecting inwardly through said slots toward each other;

a reinforcing member having bifurcated end portions projecting through said slots and affording laterally directed openings receiving said flanges;

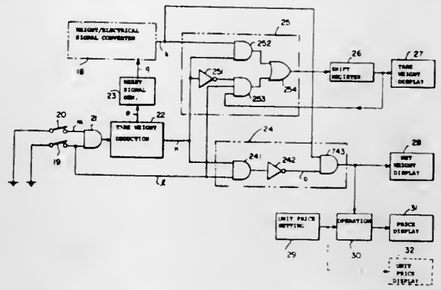
said flanges and said bifurcated end portions having a combined thickness smaller than the vertical width of said slots whereby to allow limited articulation of said blade with respect to said fork.

4,093,032

ELECTRONIC WEIGHING APPARATUS

Noboru Uyama, Osaka, and Katsuaki Hara, Tondabayashi, both of Japan, assignors to Kubota Ltd., Osaka, Japan

Filed Dec. 6, 1976, Ser. No. 747,783
Claims priority, application Japan, Dec. 8, 1975, 50-147147
Int. Cl.² G01G *13/14, 23/22*
U.S. Cl. 177—165 **8 Claims**



1. An electronic weighing apparatus for weighing an article in a packing, which packing constitutes a tare weight, comprising: displacement means responsive to the weight of an article being weighed for causing a displacement associated with the weight of said article, said displacement means comprising means for placing said article thereon, electrical signal providing means responsive to the displacement of said displacement means for providing an electrical signal associated with the displacement of said displacement means and thus with the weight of said article, weight display means responsive to said electrical signal providing means, for displaying the weight of said article, means for setting the unit price data of said article, multiplying means responsive to said unit price setting means and to said electrical signal providing means for multiplying said unit price data by said weight associated electrical signal for evaluating the price of said article, price display means responsive to said multiplying means for displaying the price of said article, resetting means coupled to said electrical signal providing means for resetting said electrical signal providing means into an initial state, said resetting means being enabled when only a tare weight is placed on said article placing means of said displacement means, an article without the packing being further placed on said article placing means of said displacement means after said resetting means is enabled, disabling means responsive to said resetting means for disabling said price display means before said resetting means is enabled, wherein said disabling means if further responsive to said resetting means for also disabling said weight display means before said resetting means is enabled, said apparatus further comprising shift register memory means responsive to said resetting means for storing said weight associated electrical signal representative of tare weight before said resetting means is enabled, means responsive to said memory means for displaying said tare weight, and means responsive to said resetting means for selectively applying said weight associated electrical signal to said shift register means only before said resetting means is enabled.

4,093,033

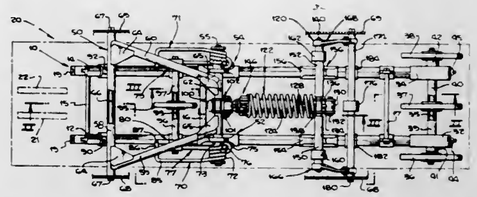
SNOWMOBILE SUSPENSION SYSTEM

Hubert J. Rosch, Plymouth, Minn., assignor to Kawasaki Motors Corp., U.S.A., Santa Ana, Calif.

Filed Feb. 24, 1977, Ser. No. 771,800
Int. Cl.² B62M *27/02*
U.S. Cl. 180—5 R **8 Claims**

1. In a suspension system for the body of a track driven vehicle having a suspension frame slidably supported on a ground-engaging track and a suspension assembly mounted on the frame for yieldably supporting one end of the body, the provision of a suspension assembly for the other body end comprising:

a longitudinally resilient member having one end connected to said frame, the other end being normally located at a rest point and movable to a limit point against restorative force produced in the member;



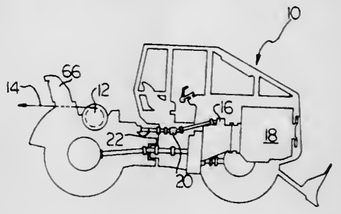
and linkage means connected between said rest point and said other body end for translating downward displacement of said other body end relative to the frame into longitudinal movement of said rest point toward said limit point, including means for increasing the ratio of said movement relative to said displacement as the other end of the resilient member approaches the limit point.

4,093,034

VEHICLE SUPPORTED WINCH

Francis M. Curley, Metamora, and James L. Schmitt, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 15, 1975, Ser. No. 640,515
Int. Cl.² B60K *17/28*
U.S. Cl. 180—53 R **3 Claims**



1. In a vehicle having an engine and a supported winch which comprises a supported rotatable drum for receiving and releasing a cable, means for selectively transmitting rotary motion to said drum having clutch and brake means, said clutch and brake means including a normally disengaged input clutch which drivingly engages on application of fluid pressure thereto, a normally engaged brake for stopping rotation of said transmitting means in a reel-out direction which releases on application of fluid pressure thereto, a normally engaged disconnect clutch which disengages said drum from said transmitting means on application of fluid pressure thereto and a normally disengage viscous drag brake which engages on application of fluid pressure thereto to create a drag on said drum opposing loosening of said cable, pump means serving as a source of pressurized fluid and means communicating said pump means for selectively controlling application of said pressurized fluid to said input clutch, said normally engaged brake, said disconnect clutch and said drag brake, an improvement comprising:

an accumulator communicating with said pump means for storing said pressurized fluid under pressure produced by said pump means when it functions and for supplying said pressurized fluid when functioning of said pump means is retarded;

a change speed transmission driven by said engine;

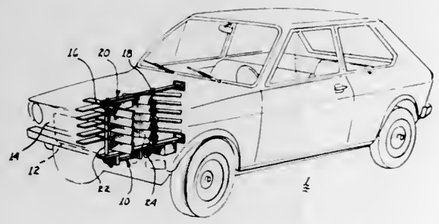
rotary means driven by said transmission for imparting ro-

tary motion to said means for selectively transmitting rotary motion to said drum; and

drive means driven by said rotary means, said drive means driving said pump, functioning of said pump being retarded as said transmission stalls whereby said accumulator supplies said pressurized fluid, said rotary means including a shaft extending from said transmission drivingly connected with said drive means; and

control valve means providing selective application of fluid pressure to said input clutch, said brake, said disconnect clutch and said drag brake, said control valve means serving as said means for selectively controlling application of said pressurized fluid and comprising: a control body which includes means for continuously routing a first portion of said fluid to lubricate said winch and means for intermittently routing a second portion of said fluid away from said accumulator to lubricate said winch responsive to said accumulator fluid pressure reaching a preselected value, said body having (1) a fluid passage receiving fluid from said pump means, (2) a first branch passage as part of said continuous routing means and through which said first portion of said fluid flows via a restricted orifice, (3) a second branch passage in flow communication with a control spool which directs said second portion of said fluid to said intermittent routing means when accumulator pressure reaches said preselected value, (4) a third branch passage communicating via check valve means with said accumulator, (5) a logic slug receiving fluid pressure from said accumulator, delivering fluid pressure to move said control spool when said accumulator pressure reaches said preselected value into position for routing said second portion of said fluid to lubricate said whinch and providing path means for the fluid delivered to move said control spool when said accumulator pressure reaches said preselected value, and (6) a control shift spool operator positionable to a Reel-In position wherein said brake, input clutch, and disconnect clutch are engaged and said drage brake is disengaged, a Brake-On position in which said brake, disconnect clutch and drag brake are engaged and said input clutch is disengaged, a Brake-Off position in which only said disconnect clutch is engaged and a Free-Spool position in which said brake, said input clutch, said disconnect clutch, and said drag brake are all disengaged.

4,093,035
FLUID MILL POWERED VEHICLE
Orval K. Fletcher, Rte. 2, Bruce, Wis. 54819
Filed Jun. 3, 1977, Ser. No. 803,220
Int. Cl.² B60K *1/00*
U.S. Cl. 180—65 DD **7 Claims**



1. In an electric powered vehicle having a source of electric power supplying power to at least one electric motor operatively connected to a wheel of the vehicle, the improvement comprising in combination:

a. a fluid mill for developing power in response to an air stream flowing therepast, said fluid mill comprising in combination:

i. frame members secured to the vehicle for supporting said fluid mill;

ii. at least one pair of axles journalled in said frame members normal to the flow of the air stream;

iii. a plurality of spaced levers journalled in each axle of said pair of axles and having opposite arms extending from said axle, each of said levers being axially spaced along the respective one of said axles;

iv. a first set of vanes disposed about one of said axles and a second set of vanes disposed about another of said axles, each said set of vanes comprising: a first and a second group of vanes fixedly projecting from said opposite arms, the plane of said first group of vanes being normal to the plane of said second group of vanes, said vanes being sized to engage the axially adjacent ones of said levers, said vanes having a driving position wherein said vanes engage adjacent levers and present their broad surfaces to the force of the air stream and a feathered position wherein said vanes present their respective cantilevered journalled arm to the force of the air stream, said driving and feathered positions being reversible as said axle rotates, whereby the force of the air stream bearing on each group of vanes simultaneously causes one group of vanes to assume the driving position and the other group of vanes to assume the feathered position, the functions of the groups of vanes alternating as the force of the air stream against the group of vanes in the driving position turns said levers which in turn rotate the said axle;

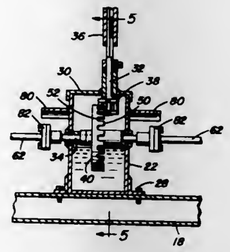
b. means for taking power off of each said pair of axles for transmission to a point of use;

c. means for producing electrical power in response to said power take off means; and

d. means for transmitting the electrical power to charge the electric power source;

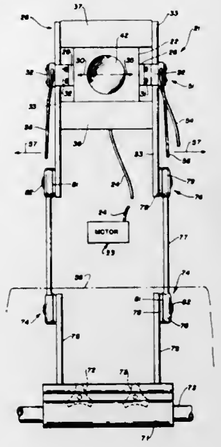
whereby, motion of the vehicle produces an air stream to operate said fluid mill and charge the electric power source.

4,093,036
IRRIGATION TOWER DRIVE
Glenn C. Knutson, Rte. 1, Box 141, Centerville, S. Dak. 57014
Filed Sep. 7, 1976, Ser. No. 721,322
Int. Cl.² B60K *17/04*
U.S. Cl. 180—70 R **3 Claims**



1. In combination with an irrigation tower including support and driven wheel means for supporting and driving said tower from and over ground to be irrigated, said tower including a first pair of generally right angularly disposed driven and drive shafts journalled therefrom, compact numerically high ratio drive means drivingly connecting said drive shaft to said wheel means, said drive means including first driven means driving said drive shaft from said driven shaft, said first drive means including a pair of gear wheels consisting of a first small diameter gear wheel on said driven shaft having a plurality of rollers generally paralleling, supported from and spaced equally about and radially outwardly from said driven shaft and journalled from the latter and a second large diameter gear wheel mounted on said drive shaft, said second gear wheel including an outer peripheral cylindrical portion having a plurality of axially outwardly opening notches formed in and spaced about one axial end of said outer peripheral portion, said first gear wheel being disposed in meshed engagement with said second gear wheel with successive rollers of said first gear wheel engageable in the notches spaced about said outer peripheral portion, said notches being generally U-shaped in configuration, said drive means including second drive means including a second pair of right angularly disposed driven and drive shafts having first and second small and large diameter gear wheels thereon including rollers and notches, respectively, corresponding to the first mentioned rollers and notches and meshed with each other, the drive shaft of the first pair of shafts driving the driven shaft of said second pair of shafts, said driven shaft of said second pair of shafts being driven from and coaxial with the drive shaft of said first pair of shafts, said drive means including third drive means including a third pair of driven and drive shafts also having first and second small and large diameter gear wheels thereon including rollers and notches, respectively, corresponding to the first mentioned rollers and notches, the drive shaft of said second pair of shafts comprising the drive shaft of said third pair of shafts, said driven and drive shafts of said third pair of shafts paralleling each other and the peripheral notches on said second gear wheel of the drive shaft of said third pair of shafts opening radially outwardly of that drive shaft.

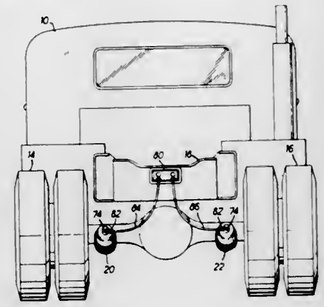
4,093,037
HEAD ACTUATED CONTROL APPARATUS FOR BATTERY-POWERED WHEELCHAIR
William Wanet Miller, III, 2533 Hillegass St. Apt. 101, Berkeley, Calif. 94704
Filed May 10, 1976, Ser. No. 684,759
Int. Cl.² B60K *26/00*
U.S. Cl. 180—77 R **4 Claims**



1. Control apparatus for use in controlling the position of a reclinable back on a battery-powered wheelchair having a headrest and an electrically powered back reclining mechanism, said apparatus including a first switch and a second switch formed for mounting proximate said headrest, said first switch being formed for electrical connection to said back reclining mechanism to effect reclining of said back and said second switch being formed for electrical connection to said back reclining mechanism to effect raising of said back, said first switch and said second switch each including actuating elements formed for engagement by the head of the user of said wheelchair, wherein the improvement in said control apparatus comprises:

said actuating elements being formed for mounting proximate said headrest to extend in a direction generally parallel to the back of the wheelchair over a distance enabling engagement thereof by the head of the user when the back of the wheelchair is in the fully reclined position.

4,093,038
SPRING BRAKE ASSEMBLY
Neil Leroy Molin, New Brighton, Minn., assignor to Danfoss A/S, Nordborg, Denmark
Filed Nov. 12, 1976, Ser. No. 741,243
Int. Cl.² B60T *7/00*
U.S. Cl. 180—82 R **2 Claims**

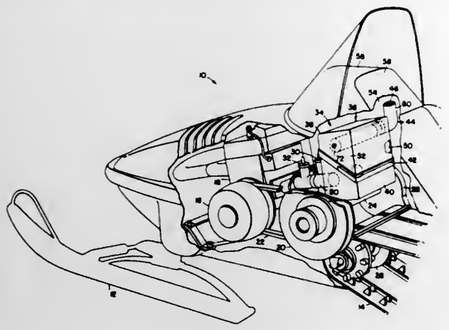


1. A spring brake assembly for a truck tractor of the type having a chassis and a cab, said spring brake assembly, comprising, a chassis frame portion disposed immediately behind said cab and a rear axle unit at the rear of said chassis, a spring brake actuator mounted on said rear axle, a filter unit mounted on said chassis frame portion and hose means connecting said actuator and said filter unit; said actuator including casing means defining a chamber, a flexible diaphragm dividing said chamber into first and second chamber sections, push rod means in said first chamber section engaging said diaphragm and being movable away therefrom in a brake applying direction and towards thereto in a brake releasing direction, return spring means biasing said diaphragm in a brake releasing direction, first port means through which said first chamber is alternately pressurized and depressurized, emergency spring means in said second chamber for moving said diaphragm and said push rod in a brake applying direction when said first chamber is depressurized, second port means through which air is admitted to and exhausted from said second chamber in accordance with the movement of said diaphragm; said filter unit comprising a rectangularly shaped box-member having front and rear spaced apart walls and being mounted on said chassis frame portion, fitting means on said rear facing wall, a sponge rubber filter in said filter unit adjacent said rear wall and spaced from said front wall to form a filter chamber, filter box port means at the lower part of said box member providing fluid communication between said filter chamber and the surrounding atmosphere; and hose means connecting said spring brake actuator second port means to said filter unit fitting means.

4,093,039
AIR INTAKE SILENCER
James Walter Moore, and Stephen Alphonse Braun, both of Horicon, Wis., assignors to Deere & Company, Moline, Ill.
Filed May 10, 1976, Ser. No. 684,593
Int. Cl.² F01N *1/00*; F02M *35/00*
U.S. Cl. 181—229 **6 Claims**

1. An expansion chamber for an air intake silencer, comprising: upper and lower identically dimensional and configured chamber halves; said upper chamber half including a closed top wall joined to a depending wall means having a lower end defined by a first flange and terminating in first plane inclined upwardly from a rear location to a front location of the lower end; said lower chamber half including a closed bottom wall joined to an upright wall means having an upper end defined by a second flange and terminating in a second plane which is parallel to the first plane; said first and second flanges defining

respective connection surface means which cooperate to form a telescopic joint whereby the lower and upper ends respectively of the depending and upright wall means are releasably joined together; an air inlet opening means being provided in the depending wall means of the upper chamber for connection to a tubular inlet member; and an air outlet opening means, for connection to carburetor intake means, being provided at a



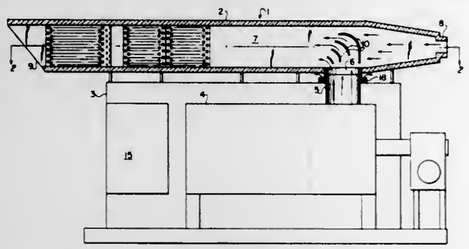
forward location in the upright wall means of the lower chamber at a level which places at least a portion of the outlet opening means at a level above a rear location of the second flange whereby easy access may be had to the air outlet opening means, when the upper chamber half has been disconnected from the lower chamber half, so that carburetor adjustments may be made by inserting a tool through the outlet opening means.

4,093,040

SILENCER AND COOLER FOR PUMP UNIT

Kenneth L. Treiber, 1103 Villamay Blvd., Alexandria, Va. 22307

Filed Dec. 21, 1976, Ser. No. 753,149
Int. Cl.[2] F01N *7/00, 7/14*
U.S. Cl. 181—252 **3 Claims**



1. An exhaust silencing and cooling system for engines comprising:

a silencing and cooling unit having a axial passage therethrough, said passage having a first inlet for cooling air at one end, an outlet for cooled exhaust gases at the opposite end, and a second laterally directed exhaust gas inlet disposed between said first inlet and said outlet;

means for connecting said first inlet to a source of cooling air, and means for connecting said second inlet to the exhaust line of an engine;

first gas deflector means for directing laterally entering exhaust gases axially along said passage;

at least one pair of oppositely directed wedge-shaped barriers spaced so as to create an obliquely directed flow path located downstream of said first gas deflector;

a second deflector means located at the downstream end of said flow path for redirecting gases leaving said flow path into a generally axial direction; and

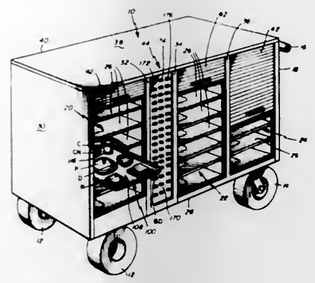
axially directed sound dampening guide vanes downstream of said second deflector means.

4,093,041

FOOD SERVING SYSTEM

Paul Davis, Swampscott, and David Schneider, Lexington, both of Mass., assignors to Sweetheart Plastics, Inc., Wilmington, Mass.

Filed Apr. 19, 1976, Ser. No. 677,972
Int. Cl.[2] E04H *3/04*
U.S. Cl. 186—1 D **7 Claims**



1. A food serving system comprising

a mobile cart constructed and arranged to be rolled about the floor of an institution such as a hospital.

a low voltage rechargeable power pack on the cart,

an array of racks for food serving trays arranged in the cart,

a plurality of substantially identical food serving trays constructed and arranged to fit on and be removed from the racks,

at least one localized food container supporting area in each tray for orienting a container in a prescribed position on the trays,

electric heaters fixed to the cart and positioned to be in heat exchange relation with containers on the food container supporting areas on the trays when the trays are on the racks,

and an opening in each tray at the container supporting area for enabling the container on the area to directly engage the heater.

7. A food serving tray comprising a body of heat insulating material defining a lower surface and an upper surface for carrying hot and cold food in serving containers,

said body having a first food supporting area on said upper surface and carrying means for positioning a food serving container thereon and a second food supporting area on said upper surface laterally spaced from said first area,

said first food supporting area comprising a metallic insert extending from said upper to said lower surface and having high thermal conductivity properties to enable direct heat transfer through said body by conduction.

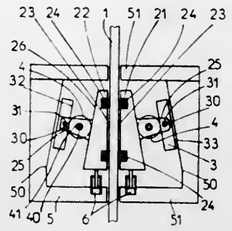
4,093,042

LOCKING GRIPPER

Jacques Pradon, 19, avenue de la Tourelle, 94100 - Saint-Maur-des Fosses, France

Filed Oct. 18, 1976, Ser. No. 733,361
Claims priority, application France, Oct. 20, 1975, 75 32025
Int. Cl.[2] F16D *63/00*
U.S. Cl. 188—67 **18 Claims**

1. In a gripper for locking against an elongated body and subject to a relative displacement along the length of the body and capable of locking at any place therealong, said gripper comprising a rigid member, at least two jaws provided with surfaces for locking against the body and means for locking the jaws transversely on the body by wedge effect comprising, for each jaw, a pair of substantially parallel bearing surfaces inclined relative to the elongated body, one surface being arranged on the corresponding jaw, the other on said rigid member, and at least one rolling member interposed between said bearing surfaces for transmission of the locking force of the associated jaw to the rigid body, the improvement comprising at least one shoe associated with each pair of bearing surfaces,



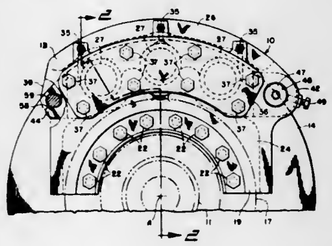
said shoe being provided with a surface for application against one of the bearing surfaces and elastic means connecting said shoe with the second bearing surface for maintaining the rolling member between said second bearing surface and a rolling surface provided on the shoe whereby force is transmitted between said bearing surfaces through said jaw, said roller and said shoe in succession.

4,093,043

CALIPER TYPE DISC BRAKE

Philip A. Smith, Troy, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Mar. 17, 1977, Ser. No. 778,533
Int. Cl.[2] F16D *55/228, 65/04*
U.S. Cl. 188—73.6 **8 Claims**



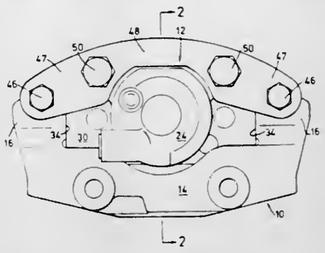
1. A caliper brake having a brake disc rotatable about an axis, a supporting body, a lining carrier positioned in a direction at one side of said disc, said lining carrier having ends spaced generally circumferentially of said disc, a first one of said ends having an opening for receiving a cylindrical torque pin mounted on said supporting body and extending axially of said disc to support said lining carrier and permit axial sliding movement of said lining carrier into and out of braking engagement with said disc, said opening comprising a round hole with the diametral clearance between said pin and the wall of said hole being the minumum required for sliding of said lining carrier axially of said disc, retention means between a second one of said ends and said supporting body for supporting said lining carrier in position, said retention means supporting said lining carrier while permitting sliding movement axially of said disc as well as circumferential movement toward and away from said torque pin to accommodate expansion and contraction of said lining carrier due to changes in temperature caused by the heat generated during braking and brake actuating means in engagement with said lining carrier moving said lining carrier axially into braking engagement with said disc.

4,093,044

SLIDING CALIPER DISC BRAKE

Hartmut Unterberg, Koblenz-Metternich, Germany, assignor to Girling Limited, Birmingham, England

Filed Feb. 15, 1977, Ser. No. 768,722
Claims priority, application United Kingdom, Feb. 18, 1976, 6310/76
Int. Cl.[2] F16D *55/224*
U.S. Cl. 188—73.3 **20 Claims**



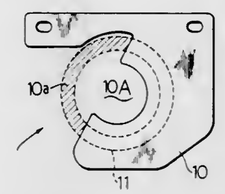
1. A sliding caliper disc brake comprising a carrier member for fixing to a vehicle; a caliper member adapted to straddle a minor portion of the periphery of a rotatable disc; guide means guiding said caliper member for sliding relative to said carrier member, said guide means including first and second receiving means containing openings, first connecting means joining said first and second receiving means to one of said caliper and carrier members, first and second pins which are snug sliding fits within said openings, and second connecting means joining said first and second pins to the other of said caliper and carrier members, one at least of said first and second connecting means including a resilient element; and an actuator for directly urging a friction pad onto one side of said disc to cause said caliper member to slide relative to said carrier member to apply by reaction an opposite friction pad to the other side of said disc.

4,093,045

NOISE PREVENTING MEANS FOR DISC BRAKES

Kouji Kawamura, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jan. 5, 1977, Ser. No. 756,978
Claims priority, application Japan, May 19, 1976, 51-63806[U]
Int. Cl.[2] F16D *65/02*
U.S. Cl. 188—73.5 **8 Claims**



1. A brake noise or squeal preventing means for use in disc brakes of a type in which a rotatable disc in rotation is decelerated or stopped by a friction pad being urged via a piston having a thrust giving end and working in a hydraulic cylinder having an axis, the preventing means comprising a shim or plate member unfixedly interposed between said piston and said friction pad, said shim or plate member having a cut out portion thereof at a location where the same confronts with said thrust giving end of said piston on that side of said axis of said cylinder with which any given point on said disc first comes into alignment; and a coating of friction reducing material on at least one side of said shim or plate member confront-

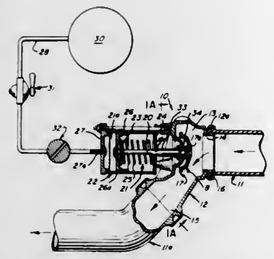
ing with said friction pad, in order to slide easily against said friction pad.

4,093,046

EXHAUST BRAKING APPARATUS

Julius P. Perr, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Dec. 30, 1976, Ser. No. 755,970
Int. Cl.² F02D *9/06*
U.S. Cl. 188—273 **6 Claims**



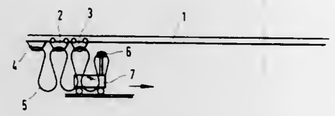
1. A modulating exhaust braking apparatus for a motor vehicle engine, comprising a first chamber disposed between a pair of complemental sections of an exhaust duct for the engine, said first chamber being provided with an inlet connected to one complemental duct section and an outlet connected to a second complemental duct section; closure means adjustably mounted within said first chamber for movement between first and second positions and, when in the first position, closing off exhaust gas flow through the first chamber and, when in the second position, permitting substantially unrestricted exhaust gas flow through the first chamber, said closure means being biased to normally assume said second position; a second elongated chamber separated from said first chamber and having one end wall thereof connected to a source of regulated pneumatic pressure; and a pneumatic pressure responsive means movably mounted within said second chamber, said responsive means having a surface portion remote from the second chamber end wall and operatively connected to said closure means, said responsive means effecting movement of said closure means from said second position to said first position and retaining same in said first position only when said responsive means is subjected to pneumatic pressure above a predetermined amount.

4,093,047

TRAVELLING CABLE SUPPORT SYSTEM

Manfred Wampfler, Markter Weg 5, D-7858 Weil am Rhein-Markt, Germany

Filed Mar. 16, 1977, Ser. No. 778,199
Claims priority, application Germany, Jun. 23, 1978, 2628112
Int. Cl.² H02G *11/06*
U.S. Cl. 191—12 R **10 Claims**



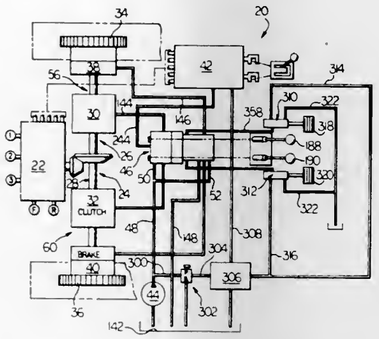
1. A travelling cable support system comprising:
a guide rail;
a plurality of conductor sleds slidably mounted upon said guide rail for movement therealong wherein the first conductor sled is adapted to pull the remaining conductor sleds;
a plurality of non-elastic traction cords respectively interposed between said conductor sleds;
at least one conductor carried by said conductor sleds; and
a plurality of elastomeric cords connecting together adjacent conductor sleds,
the length of said elastomeric cords being less than the length of said traction cords when said elastomeric cords are not tensioned and being capable of obtaining a greater length than the length of said traction cords when said traction cords are tensioned, and the length of said traction cords being less than the length of said conductor.

4,093,048

VEHICLE STEERING BRAKE AND CLUTCH CONTROL

Gary A. Hakes, North Brunswick, N.J.; Norma G. Shook, Morton; George W. Cackley, Hanna City, both of Ill.; Stephen D. Burdette, Edina, Minn., and Hugh C. Morris, Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 21, 1976, Ser. No. 688,798
Int. Cl.² F16D *67/04*; B60K *29/00*
U.S. Cl. 192—13 R **32 Claims**



1. In a vehicle in which driving force is applied to both sides thereof, including clutch and brake systems associated respectively with both sides thereof and responsive to fluid pressure from a source thereof for steering of the vehicle, each clutch and brake system associated with a side of the vehicle comprising clutch means disengageable to disconnect the driving force applied to that side of the vehicle and engageable to connect the driving force to that side of the vehicle and brake means actuatable to brake that side of the vehicle, and releasable to release that side of the vehicle, a control apparatus for each clutch and brake system comprising:
a valve comprising a valve body defining a bore, and first and second valving spools movably disposed within and along said bore;
first means for providing fluid communication between said source and said valve body bore;
second means for providing fluid communication between said valve body bore and said clutch means;
third means for providing fluid communication between said valve body bore and said brake means;
fourth means for providing fluid communication from said valve body bore and through which fluid pressure may be released from said valve body bore;
the first valving spool being movable within said bore to first and second positions relative to said valve body, the first valving spool in one of said first and second positions allowing release of fluid pressure from said clutch means through said second fluid communication means and said fourth fluid communication means, the first valving spool in the other of said first and second positions providing communication of fluid pressure from said source through said first fluid communication means, through said second fluid communication means, to the clutch means;

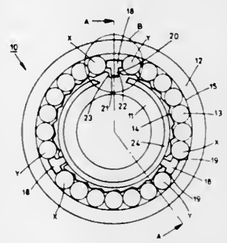
the second valving spool being movable within said bore to first and second positions relative to said valve body, the second valving spool in one of said first and second positions providing communication of fluid pressure from said source through said first fluid communication means, through said third fluid communication means, to said brake means, the second valving spool in the other of said first and second positions allowing release of fluid pressure from said brake means through said third fluid communication means, and said fourth fluid communication means, and
actuator means operatively coupled with said first and second valving spools so that movement of said actuator means in one direction provides movement of the first and second valving spools to their respective first positions, and movement of the actuator means in another direction provides movement of said first and second valving spools to their respective second positions;
wherein said release of fluid pressure from said clutch means is allowed with said first valving spool in said first position, and wherein said communication of fluid pressure from said source to said brake means is provided with the second valving spool in said first position, wherein the first and second valving spools are movable in the same, first direction relative to the valve body from the first to the second positions thereof, and the first and second valving spools are movable in the opposite, second direction relative to the valve body from the second to the first position thereof, and wherein the brake means are applied upon release of fluid pressure therefrom, and released upon application of fluid pressure thereto, and further wherein the clutch means are applied upon release of fluid pressure therefrom, and released upon application of fluid pressure thereto.

4,093,049

FREEWHEEL DEVICES

Kenneth Watson, Yeovil, and James Edwin Saunders, Sherborne, both of England, assignors to Westland Aircraft Limited, Yeovil, England

Filed Feb. 3, 1977, Ser. No. 765,119
Claims priority, application United Kingdom, Feb. 3, 1976, 4252/76
Int. Cl.² F16D *41/00*
U.S. Cl. 192—47 **16 Claims**



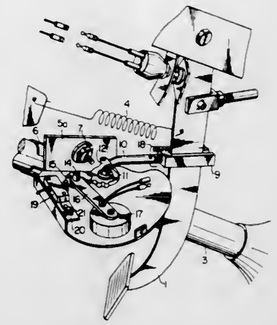
1. A cageless freewheel comprising a plurality of rollers interposed between inner and outer races formed respectively on a pair of driving and driven members, one of said races having wedge-shaped portions equal in number to the rollers, at least one axially extending actuating lever being interposed in the plurality of rollers and being arranged for limited circumferential movement between a first position in which the rollers assume an engaged position on rotation of the driving member so as to transmit rotation to the driven member, and a second position in which the rollers are retained in a disengaged position, and means for moving the or each lever between the said first and second positions.

4,093,050

CLUTCH AND ACCELERATOR CONTROLLED BRAKE LOCK FOR VEHICLES

Akira Mizuno, Kariya, Japan, assignor to Goshi Kaisha Mizuno Kogeisha, Japan

Filed Mar. 24, 1976, Ser. No. 669,752
Claims priority, application Japan, Mar. 27, 1975, 50-37361
Int. Cl.² F16D *67/04*; B60T *11/10*
U.S. Cl. 192—0.049 **6 Claims**



1. A control device for a braking system of a vehicle comprising:
means for retaining a brake in braking condition and
electrical control means for said retaining means, said electrical control means including
means for energizing said retaining means upon stopping of the vehicle,
first switch means adapted to be actuated when an accelerator pedal is depressed beyond a predetermined extent,
second switch means adapted to be actuated when a clutch pedal is depressed to a predetermined position, and
circuit means for deenergizing said retaining means when both of said first and second switch means are actuated,
wherein said retaining means comprises ferromagnetic plate means provided stationarily, lever means pivotally mounted on said plate means and operationally connected to said brake pedal so that said lever means rotates in accordance with the movement of said brake pedal, and electromagnetic means mounted on said lever means so as to face said plate means so that when energized, said electromagnetic means is fixed on the plate means by magnetic attractive force.

4,093,051

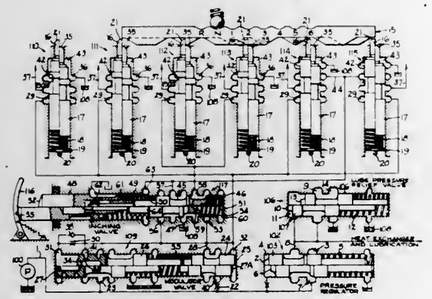
HYDRAULIC CONTROL SYSTEM FOR POWER SHIFT TRANSMISSION

Ernest A. Kreitzberg, Mukwonago, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Aug. 2, 1976, Ser. No. 710,908
Int. Cl.² B60K *29/02*
U.S. Cl. 192—87.13 **10 Claims**

1. A hydraulic system for a power shift transmission comprising, a source of pressurized fluid, a plurality of hydraulic actuators for actuating clutches in said power shift transmission, a pressure modulating valve connected to said source of pressurized fluid, conduit means connecting said modulating valve to each of said hydraulic actuators, a clutch valve connected between each of said hydraulic actuators and said modulator valve for selectively operating a mating of said hydraulic actuators, an inching valve connected to said source of pressurized fluid, means connecting said inching valve to at least two of said clutch valves for modulating pressure applied to said hydraulic actuators, means for selectively and alternatively operating and releasing each of said clutch valves, resilient means in each of said clutch valves for returning said

clutch valve to its return position, fluid throttling means in each of said clutch valves for regulating the rate of return of each of said clutch valves to its return position for controlling fluid flow from its mating hydraulic actuator and controlling the rate of pressure decay of pressurized fluid in the mating hydraulic actuator of the disengaged clutch, said modulating valve including a flow control valve with a piston for modulating the flow through the modulating valve to the actuated clutch valve, a pressure accumulator in said modulating valve having a plunger and resilient means between said piston and plunger operating said flow control valve in response to pressure build-up in said accumulator thereby throttling fluid flowing through said modulating valve and controlling the rate of pressure rise in said actuated clutch valve and mating hydraulic actuator of the engaged clutch.



4,093,052

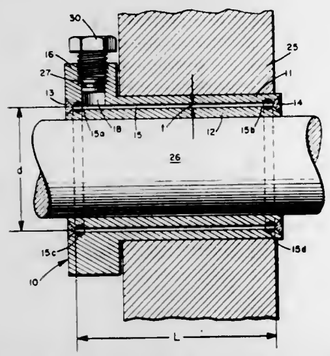
FLUID ACTUATED COUPLING ASSEMBLY

Curt Gunnar Falk, Sollentuna, Sweden, assignor to Forenade Fabriksverken, Sweden

Continuation-in-part of Ser. No. 435,728, Jan. 23, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,682

Int. Cl.² F16D *1/06*

U.S. Cl. 192—88 B **9 Claims**



1. A fluid actuated coupling assembly for releasably coupling at least two elements together preferably for transmitting torque therebetween comprising an outer metal sleeve, an inner metal sleeve concentrically mounted within the outer sleeve and secured thereto at least at one end and defining a recess or gap between the two sleeves which is closed at said one end of the sleeves, means for introducing a pressure fluid in said recess and means for preventing exhaust of said pressure fluid, said secured sleeves and said means for preventing exhaust of said pressure fluid defining a volume which includes said recess volume and which is slightly larger than said recess volume, the radial dimension of the sleeve walls of both sleeves being variable by changing the pressure on the pressure fluid on the said recess, the thickness of the recess in the non-pressurized state being determined by the following formula:

$$t/d = 2 \times 10^{-2}$$

where t equals the width of the recess and d equals the average diameter of the recess.

4,093,053

SLIDING COLLAR

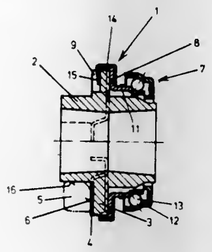
Horst Manfred Ernst, Eltingshausen; Armin Olschewski, Schweinfurt; Rainer Schürger, Schwanfeld; Lothar Walter, Schweinfurt; Manfred Brandenstein, Aschfeld, and Erich Burkl, Stammheim, all of Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Germany

Filed Mar. 30, 1977, Ser. No. 783,064

Claims priority, application Germany, Mar. 31, 1976, 7609872[U]

Int. Cl.² F16D *19/00, 13/60*

U.S. Cl. 192—98 **8 Claims**



1. In a sliding collar for a fork-activated coupling clutch release bearing, including a collar body with a cast-in wear-resistant disc formed on a radial flange of said collar, the improvement comprising a plurality of contact zones on said wear-resistant disc on the fork side of said disc for contacting said fork and on the bearing side of said disc for contacting the nonrotating bearing ring of the bearing, a plurality of guide zones essentially axially running along the edge of said disc, and means securing said bearing to said collar having guide zones for holding said bearing ring on said sliding collar against rotation on the sliding collar.

4,093,054

BELLEVILLE DAMPER FOR TORQUE TRANSMITTING COUPLING DEVICE

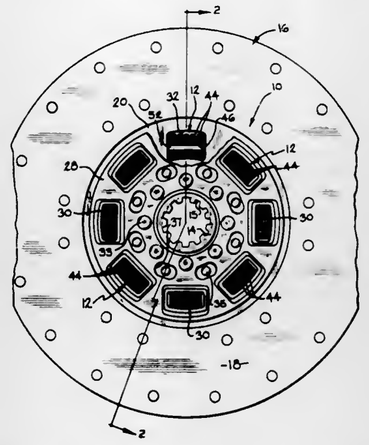
Marvin D. Johns, Fort Wayne, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Mar. 28, 1977, Ser. No. 781,813

Int. Cl.² F16D *3/14*

U.S. Cl. 192—106.1 **12 Claims**

1. In a coupling device, a rotatable hub assembly, a rotatable disc assembly rotatable relative to said hub assembly, aligned pockets in said hub and disc assembly having spaced side walls, resilient means in said aligned pockets adapted to establish a yieldable drive connection between said hub and disc assembly, said resilient means comprising, a Belleville stack having end portions engaging said side walls in said aligned pockets,



and guide means engaging said Belleville stack to retain the same in assembled relation within said aligned pockets.

4,093,055

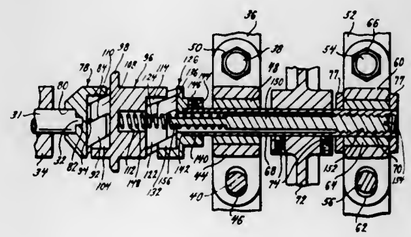
TORQUE-TRANSMITTING, TORQUE SENSING SYSTEM

James R. Blackburn, and Dudley C. Smith, both of Dallas, Tex., assignors to John E. Mitchell Company, Dallas, Tex.

Filed Nov. 15, 1976, Ser. No. 742,002

Int. Cl.² F16D *67/00*

U.S. Cl. 192—116.5 **18 Claims**



1. A torque-transmitting, torque-sensing control, which is usable to transmit torque between two rotatable members that are held against appreciable axial movement, and which comprises a first coupling element that is connectable to one of said rotatable members to rotate with, while not experiencing appreciable movement relative to, said one rotatable member, a second coupling element that rotates when said other rotatable member rotates but that can experience appreciable movement relative to said other rotatable member, a surface on said first coupling element that is engageable with a confronting surface on said second coupling element to force said coupling elements to rotate together while permitting appreciable relative movement between said coupling elements and also between said second coupling element and said other rotatable member, means urging said coupling elements for relative movement in one direction but yielding to permit relative movement of said coupling elements in the opposite direction, said means continuously holding said surfaces on said coupling elements in rotation-inducing engagement with each other, said surfaces on said coupling elements responding to a predetermined increase in rotation resistance of one of said coupling elements to cause relative movement of said coupling elements in said opposite direction, said means thereafter responding to a predetermined decrease in said rotation resistance of said one coupling element to cause relative movement of said coupling elements in said one direction, and a position sensor which senses said relative movement of said coupling elements.

4,093,056

SINGLE REVOLUTION MECHANISM

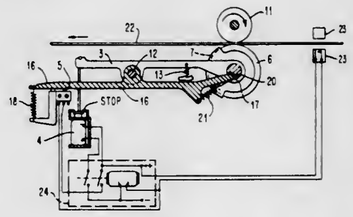
Gerrit Burgers, Amstelveen, Netherlands, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 10, 1976, Ser. No. 748,865

Claims priority, application Netherlands, Jun. 30, 1976, 7607249

Int. Cl.² F16D *71/00*

U.S. Cl. 192—127 **6 Claims**



1. A single revolution mechanism, wherein a coupling between a shaft to be driven and a continuously rotating shaft is effected and latched, and after performing a predetermined rotation of the shaft to be driven, the latching and the coupling with said continuously rotating shaft are automatically interrupted, comprising: a feed roll (6) rotatably mounted at one end of a first lever (3); means (4) for bringing said first lever from the rest position to an operative position in which operative position said feed roll is in a proper position to be driven by frictional contact with a continuously rotating shaft (11); and, further means for mechanically latching said lever and feed roll in the operative position independently of said means (4) and means for eliminating this mechanical latching after a predetermined rotation of said feed roll.

4,093,057

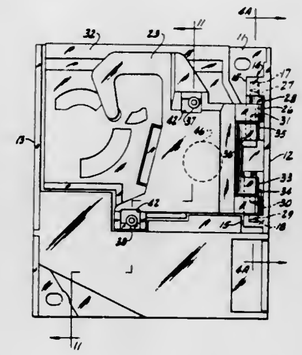
GATE ASSEMBLY FOR A COIN SELECTING AND SEPARATING DEVICE

Kristen H. Dietz, Florissant, Mo., assignor to Coin Acceptors, Inc., St. Louis, Mo.

Filed Mar. 4, 1977, Ser. No. 774,252

Int. Cl.² G07F *1/00*

U.S. Cl. 194—1 R **10 Claims**



1. A gate assembly for a coin selecting and separating device, comprising:

(a) a mainplate means,

(b) a first hinge socket means on the mainplate means,

(c) a first gate including:

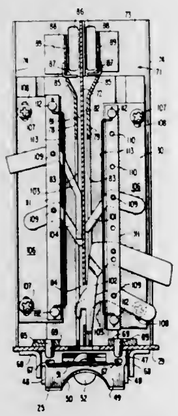
(1) a first pin inserted into the first hinge socket means,
(2) a second pin aligned but operatively disconnected from the first hinge socket means in an open position of the gate relative to the mainplate means, and
(3) key means for precluding angular movement of the first gate from the open position,
(d) a second hinge socket means on the first gate,
(e) a second gate including pin means disposed in the second hinge socket means, and
(f) the first and second gates being shiftable as a unit in the open position to operatively disengage the key means and to insert the second pin of the first gate into the first hinge socket means for hingedly connecting the first gate for angular movement of the gates to a closed position relative to the mainplate means.

4,093,058

COIN OPERATED NEWSPAPER VENDING MACHINE

Charles D. Terry, Palestine, Tex., assignor to Terry Manufacturing Company, Palestine, Tex.

Filed Mar. 30, 1977, Ser. No. 782,960
Int. Cl.² G07F 5/08
U.S. Cl. 194—71 **16 Claims**



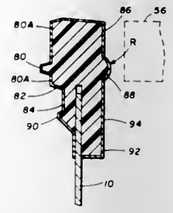
1. In a coin operated newspaper vending machine, a main mounting bracket adapted for attachment to the interior of a coin mechanism housing wall, a unitized coin operated mechanism assembly, positioning and supporting means for said assembly on said main mounting bracket, a vending machine access door latch, means to pivotally mount said latch on the interior of a part of an access door, spring means biasing said latch upwardly relative to said main mounting bracket, lateral guide means for said latch on said mounting bracket, positive keeper means for the latch on said mounting bracket engageable within keeper opening means of the latch, cooperative camming parts on the mounting bracket and latch forcing said latch downwardly in opposition to the force of said spring means when the vending machine access door is closed, the latch then being held in a release position out of engagement with the positive keeper means on said mounting bracket, said main mounting bracket including a vertical plate body for attachment to said housing wall, a lower end horizontal plate extension projecting from said plate body and forming a base seat for said unitized coin operated mechanism assembly, a pair of side vertical positioning flanges for said mechanism assembly projecting from said plate body, a pair of pivoted keeper elements for said mechanism assembly on said plate body near the top thereof and adapted to releasably engage over a web of said mechanism assembly to retain the assembly releasably against said plate body, said positive keeper means for said latch comprising a pair of spaced keeper pins depending from said horizontal plate extension for entry into a pair of spaced openings in said latch near opposite sides of the latch, and replaceable mounting plates for said keeper pins fixed to the top of said horizontal plate extension and forming a positive retainer means for the lower end of said mechanism assembly so that the latter is positioned at the top and bottom and at both sides of the mounting bracket.

4,093,059

CHARACTER SLUG CONSTRUCTION

Gordon Sohl, Richardson, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 6, 1976, Ser. No. 747,844
Int. Cl.² B41J 1/30
U.S. Cl. 400—144.2 **4 Claims**



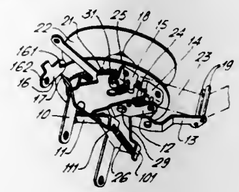
1. A character slug coupled to the end of a beam extending from the base of a print element for an impact printer, comprising:
a front surface having a raised character extending therefrom, and
a rear surface engageable by an impacting means for moving the slug in a print operation,
said rear surface including a projection extending therefrom to directly receive the strike from the impacting means and uniformly distribute impact forces therefrom over the character area,
said projection positioned on the rear surface at the centroid of the raised character and having a substantially spherical configuration with an area substantially less than the strike area of the impacting means.

4,093,060

TYPEWRITER RIBBON FEED DEVICE

Peter Muntschick, Dresden, Germany, assignor to VEB Kombinat Zentronik, Dresden, Germany

Filed Dec. 2, 1976, Ser. No. 746,787
Claims priority, application Germany, Dec. 4, 1975, 189879
Int. Cl.² B41J 33/14
U.S. Cl. 400—236.1 **3 Claims**



1. An ink ribbon feed device for a typewriter comprising:
a support, a toothed transport wheel mounted for rotation on said support about a first axis;
a ribbon spool carried by said support;
a transport lever pivotally mounted on said support for pivotal movement about a second axis;
a transport pawl rotatably carried by said transport lever;
a spring mounted between said transport pawl and said transport lever to urge said transport pawl into engagement with the toothed transport wheel;

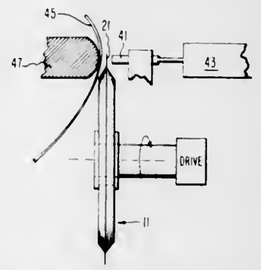
a forked end on said transport lever remote from said transport pawl;
a driving lever pivotally mounted on said support for pivotal movement about a third axis, said first, second and third axes being positioned substantially along a straight connecting line;
a pin carried by said driving lever;
means for operatively interconnecting said driving lever and said transport lever whereby pivotal movement of said driving lever causes pivotal movement of said transport lever, said means being constituted by the engagement of said pin in said forked end of said transport lever;
a traction bar connected to said driving lever;
a universal bar of the typewriter connected to said traction bar; and
a restoring spring mounted between said driving lever and said support, wherein said pin includes an enlarged head portion which rests against said support.

4,093,061

DISC INK RIBBON

Anthony Horak, Detroit, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Feb. 23, 1977, Ser. No. 771,341
Int. Cl.² B41J 31/14, 27/04
U.S. Cl. 400—194 **5 Claims**



1. A rotatable integral ribbon disc for use with a dot matrix or solid character impact printer comprising:
a circular ribbon film;
an ink supply housing concentric at a reduced diameter with said circular ribbon film, said housing having first and second complementary members disposed on opposite sides of said ribbon film for forming an ink supply chamber fully enclosing a portion of said ribbon film; and
porous ink storage means within said ink supply chamber and surrounding said enclosed portion of the ribbon film for centrifugally replenishing the portion of the ribbon film outside of said housing with ink through said enclosed portion upon rotation of said ribbon disc.

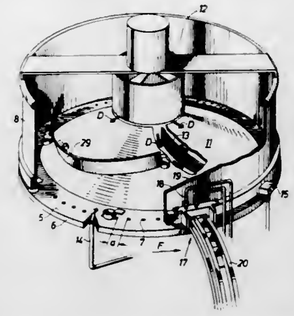
4,093,062

METHOD OF AND APPARATUS FOR FEEDING ARTICLES

Börje Lennart Sjögren, Huddinge, Sweden, assignor to AB Wicanders Korkfabriker, Alvangen, Sweden

Filed May 3, 1976, Ser. No. 682,761
Claims priority, application Sweden, May 7, 1975, 7505342
Int. Cl.² B65G 47/24
U.S. Cl. 198—380 **8 Claims**

1. Apparatus for orienting and entraining open ended closure caps having a flat top opposite the open end and which are randomly deposited on a work surface defining a peripheral feed path for conveying the caps one by one in top-down orientation to an ouput opening, the improvement comprising:
a deflector element overlying and spaced from a portion of the work surface so as to define a gap therebetween, means for injecting air between the deflector and the work surface to force air through the gap to tranverse the work surface laterally outwardly to carry the caps thereon outwardly toward the feed path, and
means surrounding the work surface for flowing air



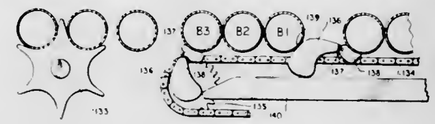
obliquely thereto between the feed path and said deflector such that the force imposed upon each cap thereby is greater on top-up than on top-down oriented caps thereby to force only the former away from the feed path.

4,093,063

ARTICLE HANDLING MEANS FOR A PACKAGING MACHINE

Rodney K. Calvert, Dunwoody, and Dale K. Scott, Jonesboro, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Division of Ser. No. 650,805, Jan. 20, 1976, Pat. No. 4,023,328.
This application Mar. 17, 1977, Ser. No. 778,624
Int. Cl.² B65G 47/26
U.S. Cl. 198—425 **2 Claims**



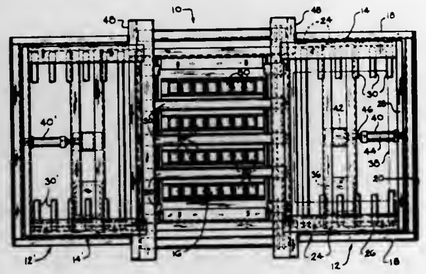
1. Article handling means for arranging continuously moving articles in spaced groups, said article handling means comprising conveyor means including metering means for continuously moving a row of articles along a predetermined path at a controlled and substantially constant velocity, an endless feed element having a working reach movable alongside said path, a plurality of article engaging pusher projections mounted in a spaced relation on said endless element and arranged respectively to move behind the rearmost article of a group of moving articles to impart movement to such group of articles in the direction of movement of the articles in such manner as to establish a gradually increasing space between such rearmost article and an immediately succeeding continuously moving article, a plurality of elongated smoothly contoured spacer elements pivotally mounted at one end thereof with said pusher projections and each spacer element having an article engaging restraining portion thereon, and spacer control means for sequentially engaging and imparting controlled swinging movement to said spacer elements relative to said endless feed element so as to swing the restraining portions thereof into the path of movement of the articles and into said spaces respectively only after the length thereof is sufficiently great to receive and portions thereby to grip a group of articles between each of said restraining portions and each of the immediately succeeding pusher projections respectively.

4,093,064

CONVEYOR PACKING STATION

Robert H. Crane, Union Lake, Mich., assignor to Sparton Corporation, Jackson, Mich.

Filed Nov. 17, 1976, Ser. No. 742,618
Int. Cl.[2] B65G 25/04, 37/00
U.S. Cl. 198—485 1 Claim



1. A conveyor packing station for use with a primary conveyor having a longitudinal length defined by lateral side rails and a plurality of transversely disposed, spaced, parallel rollers defining a primary conveyor plane, comprising, in combination, a packing station frame disposed adjacent a primary conveyor side rail, a packing conveyor movably mounted on said packing station frame above said primary conveyor plane for movement between an extended position positioning an end of said packing conveyor adjacent and over the primary conveyor and plane thereof and a retracted position away from the primary conveyor, a plurality of rollers rotatably mounted upon said packing conveyor defining a support surface for an article to be packed, said rollers being substantially parallel to the length of the primary conveyor, motor means mounted on said packing station frame operatively connected to said packing conveyor for moving said packing conveyor between said extended and retracted positions, a transfer conveyor disposed below the primary conveyor in alignment with the direction of movement of said packing conveyor, said transfer conveyor including a base vertically movable between raised and lowered positions, a plurality of article supporting elements mounted on said base extending upwardly and located between the rollers of the primary conveyor, said elements including an upper article supporting portion which is located above and below the primary conveyor rollers at said raised and lowered positions of said transfer conveyor, respectively, said packing conveyor at said extended position being disposed adjacent said transfer conveyor at said raised position thereof, and second motor means operatively connected to said base for selectively translating said base between its raised and lowered positions, and third motor means mounted on said packing conveyor drivingly connected to at least some of said rollers thereof to move an article supported thereon toward the primary conveyor upon energizing of said third motor means.

4,093,065

MACHINE FRAME ASSEMBLIES FOR SCRAPER-CHAIN CONVEYORS

Helmut Temme, Waltrop, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Germany

Filed Jun 1, 1976, Ser. No. 691,236
Claims priority, application Germany, Jun 6, 1975, 2525343
Int. Cl.[2] B65G 19/28
U.S. Cl. 198—735 10 Claims

1. In a machine assembly for a scraper-chain conveyor which has a frame composed of side walls and means for driving a scraper-chain assembly mounted between the side walls; the improvement comprising first uppermost and second lowermost inclined plates disposed one above another between the side walls, each plate having an upper surface which can form part of a conveying surface leading to said drive means, the uppermost plate being detachable to permit the lowermost plate to become operative as part of the conveying surface in dependence on the size of the drive means and the scraper-chain assembly, wherein an intermediate channel structure is disposed between the frame and a further channel structure, said further channel structure having side walls and an inclined plate between the side walls which aligns with the lowermost

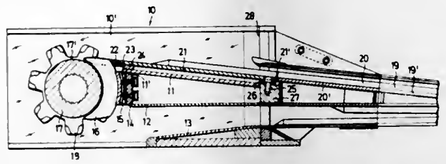


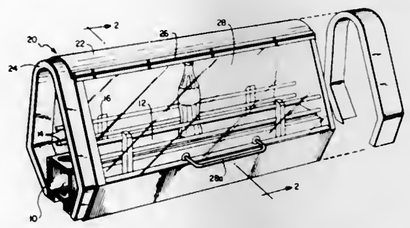
plate of the frame, said intermediate channel structure having side walls and an inclined plate between the side walls which aligns with the uppermost plate of the frame, and wherein the removal of the uppermost plate in converting the assembly for use with a smaller drive means is accompanied by the removal of the intermediate structure and the connection of the frame with the further structure.

4,093,066

ACOUSTICAL CONVEYOR COVER

Charles Ronald Mitchell, Marietta, and Jason K. Sedam, Dunwoody, both of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Filed Feb. 28, 1977, Ser. No. 772,900
Int. Cl.[2] B65G 21/00
U.S. Cl. 198—861 2 Claims



1. In combination with a conveyor, which transports articles between an article washing station and an article filling station, the improvement comprising:

a conveyor cover including a top portion, the inside surface of said top portion forming a substantially continuous curve with the inside surfaces of a pair of sidewalls which extend downwardly from said top portion to a support structure for said conveyor;

means for attenuating noise internally generated within said cover including acoustically absorbent material, said material being a compressible resilient material;

door means connected in an opening in said conveyor cover for providing access to said conveyor, said door having a transparent portion to facilitate viewing of said articles on said conveyor within said cover;

drain means provided between said support structure for the conveyor and the lower portion of said sidewalls for permitting drainage of any moisture within said cover; and

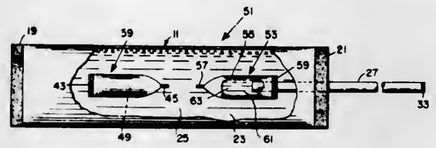
means for releasably retaining said acoustically absorbent material including a pair of retaining clips mounted on the inside surface of a sidewall of said cover opposite to said door means, said retaining clips of said pair being so spaced as to retain said acoustically absorbent material therebetween in a compressed state, whereby said acoustically absorbent material conforms to the shape of the adjacent sidewall and holds itself between said clips with a self-biasing action.

4,093,067

MIXING PACKAGE

Edward F. Hollander, Jr., Broomall, Pa., assignor to John P. Glass, Essington, Pa.

Filed Nov. 8, 1976, Ser. No. 739,476
Int. Cl.[2] B65D 25/08
U.S. Cl. 206—219 6 Claims



1. A package comprising

a tube of flexible material having a first and second end,

a first seal extending transversely across the tube and closing said first end,

a second seal extending transversely across the tube and closing said second end,

a chamber formed by said tube and said end seals for containing contents,

hollow stem dispensing means extending through and supported by said second seal with an inner end inside the tube and an outer end outside the tube,

means closing the outer end of the stem,

a second package contained within said chamber to form an inner package while the first-said package forms an outer package,

said inner package comprising a tube of flexible material closed at its ends by seals that form a second chamber containing second contents,

with the seals of the inner package being weaker than the seals of the outer package,

a third package contained within the first-said chamber,

said third package comprising a tube of flexible material closed at its ends with seals that form a third chamber containing third contents,

with the seals of the third package being stronger than the seals of the second package,

with the inner end of said stem extending into the chamber of the third package,

the contents of the first and second packages forming a temperature-changing reaction when mixed together,

whereby the outer package may be squeezed to rupture a seal of the second package and mix its contents with the contents of the outer package to form a reaction which changes the temperature of the contents of the third package,

and whereby the stem closing means may be opened and the outer package may be squeezed to dispense the temperature-changed contents of the third package.

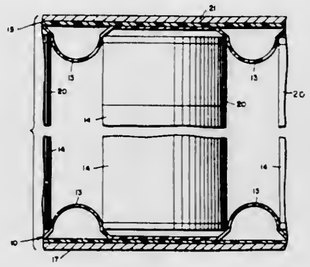
4,093,068

PACKING SHEET AND PACKAGES FORMED THEREBY

Thomas J. Smrt, Bartlett, Ill., assignor to Fox Valley Marking Systems, Inc., Cary, Ill.

Filed Sep. 13, 1976, Ser. No. 722,703
Int. Cl.[2] B65D 81/02
U.S. Cl. 206—443 3 Claims

1. A package comprising a plurality of elongated articles, each article having a top and a bottom, a bottom cushioning sheet supporting the bottoms of the articles, a top cushioning sheet positioned over the tops of the articles, and a carton enclosing the cushioning sheets and the articles, each of the top and bottom cushioning sheets including a plastic sheet having air-tight air-filled compressible bubbles formed therein contacting the articles, each bubble comprising radially outwardly extending projections and being generally positioned in a space between adjacent articles, the spacing between adjacent bubbles of a sheet being less than the width of the articles so that the top and bottom of each article contacts and partially compresses a projection of at least two bubbles whereby the top and bottom of each article is protected within the carton by a



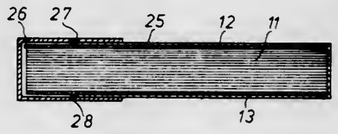
cushion of air within the bubbles, the compressing of said projections by the articles causing the height of the bubbles between adjacent articles to be greater than the height of the bubbles before the articles contact the bubbles and the pressure of the air within the bubbles to be greater than the pressure of the air within the bubbles before the articles contact the bubbles.

4,093,069

PACKAGE FOR A STACK OF SHEET MATERIALS

Albert Emiel Smolderen, Aartselaar, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

Continuation of Ser. No. 530,028, Dec. 4, 1974, abandoned. This application Apr. 6, 1976, Ser. No. 674,150
Claims priority, application United Kingdom, Dec. 7, 1973, 56848/73
Int. Cl.[2] B65D 65/16, 75/28
U.S. Cl. 206—455 2 Claims



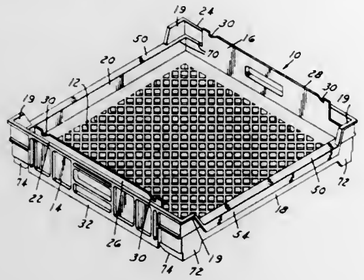
1. A package for a stack of generally quadrangular sheet materials whic is adapted to be opened at one end to leave a defined edge around said opening, which package comprises a composite wrapper of flexible wrapping material having a width slightly exceeding the width plus twice the thickness of said stack and an overall length exceeding twice the length and twice the thickness of said stack, said wrapper including at least one body sheet extending around one end and the major lengthwise portion of the opposite exterior surfaces of said stack but terminating at both end edges short of the other stack end, at least one end sheet extending around said other stack end and over the remaining lengthwise portions of said exterior surfaces with its edge margins in overlapping relation with the edge margins of said body sheet, a seal detachably adhering each end of said body sheet in the vicinity of the edge threof to a locus of the contiguous face of the end sheet spaced from the corresponding end edge of said end sheet, said composite wrapper being uniformly tensioned around the stack periphery in its lengthwise direction, whereby said stack is tightly contained within a tube defined by the thus sealed composite wrapper, and means for sealing the opposite ends of said tube along the sides of said stack.

4,093,070

STACKING AND NESTING CONTAINER

Edward L. Stahl, Richmond, Mich., assignor to Pinckney Molded Plastics, Inc., Pinckney, Mich.

Filed Mar. 9, 1977, Ser. No. 775,727
Int. Cl.[2] B65D *21/04*
U.S. Cl. 206—507 12 Claims



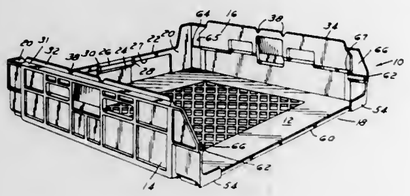
1. An upwardly open container having a rectangular bottom wall, side walls extending upwardly from opposite side edges of said bottom wall, said side walls having stacking supports adjacent the upper edge portions thereof, said container having on opposite sides thereof first rests directly under said supports so that said container can be stacked at an upper level with respect to another similarly or reversely oriented container of identical construction by engaging the first rests of the upper container with the stacking supports of the lower container, end walls extending upwardly from the front and rear edges of said bottom wall, said end walls throughout at least a major portion of their length being of less height than said side walls and having second rests disposed below the level of said stacking supports and above the level of said first rests, said second rests being spaced apart the same distance as said stacking supports so that said container can be nested at a lower level with a 90° turned lower container of identical construction by engaging the second rests of the end walls of the upper container with the stacking supports of the side walls of the lower container.

4,093,071

NESTING AND STACKING CONTAINER

Edward L. Stahl, Richmond, Mich., and Ellsworth E. Sanders, Sanibel Island, Fla., assignors to Pinckney Molded Plastics, Inc., Pinckney, Mich.

Filed Apr. 4, 1977, Ser. No. 784,145
Int. Cl.[2] B65D *21/04*
U.S. Cl. 206—507 8 Claims



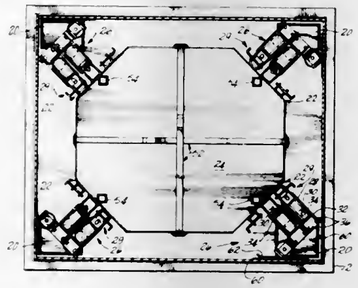
1. An upwardly open container comprising a substantially square horizontal bottom wall, side walls extending upwardly from opposite side edges of said bottom wall, first seating means adjacent the upper edge portion of one of said side walls, second seating means on the other of said side walls, a horizontal nesting support member extending across the rear of said container, rest means at the front of said container, said container being adapted to nest with a 90° turned lower container of identical construction by engaging said support member of the upper container with said first seating means of the lower container and engaging said rest means of the upper container with said second seating means of the lower container, said support member being disposed at a level above said bottom wall and below said first seating means, said second seating means being disposed at a level below said first seating means in a position to maintain the bottom wall of an upper nested container parallel with the bottom wall of the lower container.

4,093,072

VARIABLE ATTENUATION SUPPORT SYSTEM

Robert R. Black, Jr., Newport Beach, Calif., assignor to Plastics Research Corporation, Cerritos, Calif.

Filed Feb. 17, 1976, Ser. No. 658,190
Int. Cl.[2] F16M *13/00*
U.S. Cl. 206—521 11 Claims



1. A variable attenuation support system for a payload comprising:
a base support;
a payload support separated from the base support;
a plurality of mounting pads affixed to said base support;
a plurality of mounting pads affixed to said payload support, a plurality of pairs of said pads being formed in which one pad of said pair is on said base support and one on said payload support; and
an adjustable shock mount for each said pair of pads, each adjustable shock mount comprising a plurality of resilient shock absorbers, means for connecting a first one of said shock absorbers between the corresponding pair of pads, and means for locking and unlocking at least a second one of said shock absorbers between the corresponding pair of pads, said locking and unlocking means comprising means for pivotally mounting one end of the corresponding shock absorber to one of the pads in the corresponding pair of pads and a manually operable lock for locking and unlocking the other end of the same shock absorber to the other pad in the corresponding pair of pads.

4,093,073

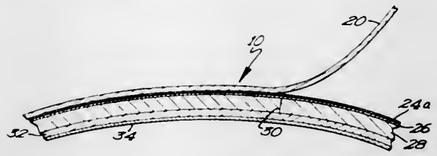
FIBER CAN DOUGH PACKAGE WITH KRAFT PAPER BODY AND PEELABLE LABEL

James R. Leezer, Minneapolis, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Continuation-in-part of Ser. No. 561,132, Mar. 24, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,913
Int. Cl.[2] B65D *5/54*
U.S. Cl. 206—606 7 Claims

1. A fresh dough package comprising:
(a) a generally cylindrical can having a cylindrical body wall comprising a kraft paper body stock layer in strip form wound into a helix with its mating side edges defining a helically extending butt joint,
(b) a liner formed from flexible sheet material against the inside surface of the body stock layer and overlapping the inner edge of the butt joint in the body stock layer,

(c) a removable label layer peelably bonded to the outside surface of the kraft body stock layer,
(d) said label layer having means therein defining a lifting tab, said lifting tab providing a means for withdrawing the label from the surface of the kraft body stock layer,
(e) a peelable particulate mineral coating layer bonded between the label and the kraft body stock layer,
(f) the removal of the label causing at least a portion of the particulate mineral layer to peel away from the adjacent body stock layer and at least a portion thereof to remain adhered to the label layer thereby facilitating the removal of the label without the surface of the body stock layer adhering to the label,



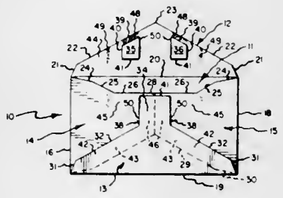
(g) the peel strength of the bond between the label and the kraft body layer being between about 0.1 and 0.5 pounds per inch width of the label and also being less than the tensile strength of the label, thereby allowing removal of the label intact at least from the area of the butt joint to weaken the butt joint by an amount which is uniform throughout its length whereby the butt joint will have uniform opening characteristics throughout its length to facilitate opening the container at the butt joint, and
(h) a circular end closure member sealed to at least one end of the tubular body wall of the container.

4,093,074

ENVELOPES

William E. Bielawski, 19 James Pl., Fredonia, N.Y. 14063

Filed Jun. 24, 1977, Ser. No. 809,631
Int. Cl.[2] B65D *27/34*
U.S. Cl. 206—629 5 Claims



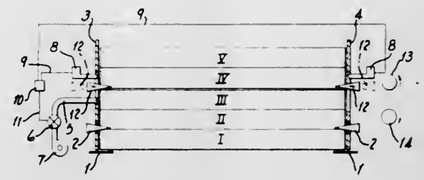
1. An envelope having a front panel, a bottom flap, a top flap, and two side flaps, and wherein said bottom flap is folded to have first marginal portions thereof overlap first marginal portions of said side flaps and is glued to said side flap first marginal portions to form a back panel, and wherein said top flap may be selectively folded to have first marginal portions thereof overlap second marginal portions of said side flaps, the improvement which comprises:
an improved bottom flap adapted to reinforce said back panel and adapted to facilitate opening of said envelope, said improved bottom flap including a substantially T-shaped portion having a leg and two wings extending laterally from said leg in opposite directions, said leg being glued to third marginal portions of said side flaps with said wings being unattached to said side flaps; and
spaced glue portions provided on said top flap first marginal portions and adapted to adhere to said wings but not said leg;
whereby said envelope may be opened by grasping such unglued portion of said top flap overlapping said leg and pulling the same to tear said wings from said leg.

4,093,075

EJECTION DEVICES

Desmond Walter Molins, London, England, assignor to Molins Limited, London, England

Filed Mar. 22, 1977, Ser. No. 780,131
Claims priority, application United Kingdom, Mar. 27, 1976, 12410/76
Int. Cl.[2] B07C *5/344*
U.S. Cl. 209—73 6 Claims



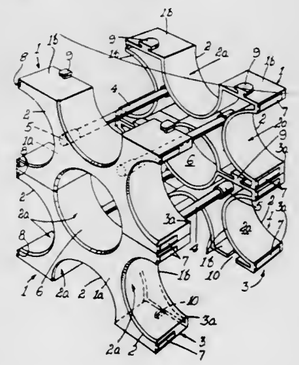
1. An ejection mechanism for cigarettes or like articles for association with means defining a vertical channel through which cigarettes may be stacked one above the other and descend intermittently, comprising a pair of support members at a support level higher than the bottom of said channel, said support members being arranged so as to support end portions of a cigarette in said channel and being movable out of said channel to allow said cigarette to fall below said support level, sensing means at a sensing level above said support level, an air nozzle disposed at a level below said support level to produce a horizontally-directed air-blast against one end of a cigarette to displace such cigarette from the channel, and a valve arranged to control air supply to said nozzle, said sensing means being connected to control said valve so that said valve is opened to allow said air-blast to operate when the cigarette at the level of the nozzle has a bad end detected by the sensing means.

4,093,076

BOTTLE RACKS, PARTICULARLY RACKS FOR WINE BOTTLES

Brian R. Newton, Johannesburg, South Africa, assignor to Newton & Taylor (Proprietary) Limited, South Africa

Filed Jan. 16, 1975, Ser. No. 541,503
Claims priority, application South Africa, Jan. 22, 1974, 74/0450; Sep. 4, 1974, 74/5616
Int. Cl.[2] A47B *73/00*
U.S. Cl. 211—74 9 Claims



1. A rack for bottles, or the like, comprising:

a plurality of basic rack forming elements arranged in two spaced apart substantially coplanar sets; each of said basic elements having a periphery defined by edges; at least one concave formation defined in a said edge, thereby to define at least part of a supporting surface for a bottle, or the like;

said basic elements of said sets thereof are oriented and positioned such that each concave formation defined in the basic elements making up one of said sets is generally aligned with a concave formation defined in the basic elements making up the other of said sets, thereby to provide and define at least part of two cooperating supporting surfaces for support of a bottle, or the like, that extends between two aligned said formations on the two said sets;

means for joining said sets of basic elements and for supporting them in their said orientations;

the edges of the outermost basic elements of each set defining the free edge portions of the sets said free edge portions being aligned;

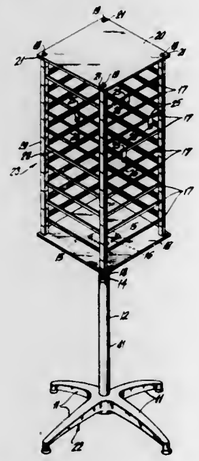
a terminal rack forming element extending between said sets at a free edge portion thereof; said terminal element being in engagement with a said aligned free edge portion of both said sets; thereby closing off said free edge portion of both said sets and to close off the space between said sets.

4,093,077

JEWELRY DISPLAY RACK

Thomas Strasser, 1500 Palisades Ave., Apt. 24B, Fort Lee, N.J. 07024

Filed Apr. 15, 1977, Ser. No. 787,868
Int. Cl.² A47F 7/02
U.S. Cl. 211—194 **3 Claims**



1. A novel jewelry rack providing a variable capacity storage and ease of assembly comprising:

a base for supporting the jewelry rack in the display area;

said base having a plurality of mounting rods extending generally upwardly from and attached to said base to support said jewelry rack;

a plurality of vertically stacked modular display frames adapted for display of jewelry and supported by said mounting rods; each of said modular display frames having a plurality of corner posts and jewelry mounting frame members connecting said corner posts, each of said corner posts having a substantially vertical channel each adapted to receive one of said mounting rods, so that said modular display frames are supported in a vertical stack of variable capacity upon which jewelry is displayed

and wherein the bottom of each corner post is substantially horizontal and has a recessed area, the top of each of said corner post being substantially horizontal, having an upwardly projecting area conforming with the upper adjacent recessed area in the bottom of the corner post of the modular display frame stacked above so as to provide for easier assembly of the jewelry rack by improving the stability of the vertical stack of modular display frames

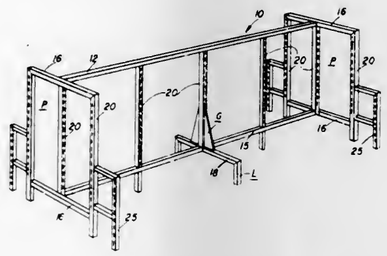
and wherein said jewelry mounting frame member is a straight beam having a substantially vertically disposed L-shaped cross section, the horizontal protion of said L-shaped cross section being directed toward the interior of said modular display frame so as to form an interior lip on said beam to facilitate attachment of jewelry mounting means to said jewelry mounting frame member.

4,093,078

TANDEM MERCHANDISE DISPLAY EQUIPMENT

John R. Radek, Hinsdale, Ill., assignor to Ready Metal Manufacturing Company, Chicago, Ill.

Filed Jul. 15, 1976, Ser. No. 701,071
Int. Cl.² A47F 5/10
U.S. Cl. 211—189 **5 Claims**



1. A knockdown frame for supporting merchandise display and housing equipment, comprising

(a) a pair of laterally spaced transverse beams of channel cross-section on the same level adjacent the lower end of the frame, with the flanges of said channels extending downwardly,

(b) a vertical strut of channel form affixed to the downwardly facing flanges of each of said beams with the flanges of the channel of said strut extending outwardly,

(c) a second pair of laterally transverse beams of channel cross-section on the same level at the upper end of the frame and overlying said first pair of transverse beams, the flanges of the second pair of channels extending downwardly,

(d) means for joining the upper end of said vertical strut to the downwardly facing flanges of said second pair of beams,

(e) a channeled lug welded to the lower end of each strut and projecting in a longitudinal direction from each of said first-mentioned downwardly facing flanges, with the web of the lug uppermost and its inner portion having a rectangular recess adapted to embrace said strut, and the inner edges of said web welded to the respective flanges of said first-mentioned transverse beams, and

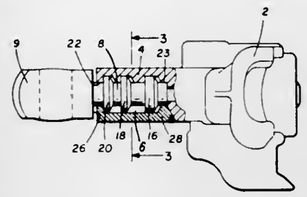
(f) a longitudinal beam of channel cross-section with the flanges extending downwardly between said channeled lugs and with the ends thereof disposed in superposed relation to said lugs and having a rectangular recess in the outer ends for embracing each vertical strut as well as openings in proximity thereto in alignment with corresponding openings in the webs of the lugs for receiving detachable interconnecting fastening means therebetween.

4,093,079

ROTARY COUPLER

Geoffrey Wilton Cope, Williamsville, N.Y., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Mar. 18, 1977, Ser. No. 778,901
Int. Cl.² B61G 1/38
U.S. Cl. 213—62 A **7 Claims**



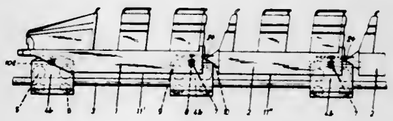
1. A rotary coupler for a railway car comprising a coupler head having a shank extending rearwardly therefrom, said shank having an opening therein with a plurality of bearing surfaces, a coupler butt contiguous with the end of the shank, said butt having a forwardly extending cylindrical member attached thereto which extends into the opening in the shank wherein the cylindrical member may rotate within said shank and a plurality of spaced bosses on said cylindrical member cooperating with the bearing surfaces for sustaining draft and buff forces.

4,093,080

VEHICULAR TRAIN

Anton Schwarzkopf, Munsterhausen, Germany, assignor to Anton Schwarzkopf, Stahl- und Fahrzeuqbau, Munsterhausen, Germany

Filed Feb. 25, 1977, Ser. No. 772,265
Claims priority, application Germany, Mar. 1, 1976, 2608424
Int. Cl.² B61G 1/00
U.S. Cl. 213—75 R **14 Claims**



10. In a vehicular train including a lead vehicle and a follower vehicle hitched to said lead vehicle by a universal coupling, each of said vehicles being provided with a wheeled body, the improvement wherein said coupling comprises:

a pair of wheel mountings pivoted to the body of said lead vehicle on opposite sides thereof for swinging about a common axis transverse to the direction of vehicular motion;

a bolt centered on said axis interconnecting said wheel mountings with freedom of relative rotation about said axis; and

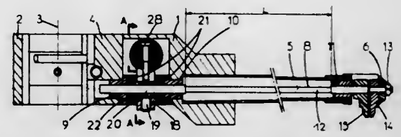
a pair of generally horizontal arms rigid with the bodies of said vehicles extending in said direction, one of said arms terminating in an annular inner knuckle traversed by said bolt and provided with a spherically curved outer surface, the other of said arms terminating in an outer knuckle with a spherically curved inner surface surrounding said inner knuckle.

4,093,081

TRANSFER ARM FOR TRANSFERRING SMALL OR MEDIUM SIZED PARTS

Jacques Yver, Grenoble, France, assignor to Metallurgie Francaise des Poudres-Metafram, Paris, France

Filed Jan. 17, 1977, Ser. No. 759,743
Claims priority, application France, Feb. 27, 1976, 76 05588
Int. Cl.² B66C 1/54
U.S. Cl. 214—1 BB **5 Claims**



1. A low inertia transfer arm for rapid operation and for manipulation of small or medium sized parts, said transfer arm comprising:

a supporting arm adapted for connection at one end to a device for movement of said arm having at least two degrees of freedom;

a pair of tongs comprising a pair of jaws for gripping a part;

means mounting said tongs at the other end of said supporting arm, one of said jaws being rigidly attached to said supporting arm and the other of said jaws being movable relative thereto between open and closed relative positions of said jaws; and

means for controlling opening and closing of said jaws, said controlling means including;

a rocker lever comprising a pair of arms;

means mounting said rocker lever for movement between two stable positions, said rocker lever being arranged to be movable between said stable positions by contact between a respective one of said arms and a fixed stop;

a torsion bar extending along said support arm fixed at one end to said movable tong jaw and at the other end to said rocker lever for rotation therewith about its longitudinal axis to cause opening an closing of said jaws; and

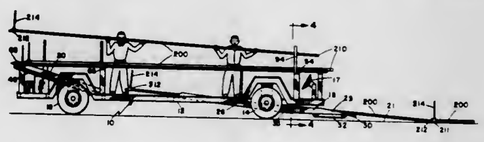
means mounting said torsion bar for rotation about its axis in said supporting arm.

4,093,082

IRRIGATION PIPE LAYING AND PICK UP VEHICLE

Melton Archie Goodsell, 2325 Olive Rd., Holtville, Calif. 92250

Filed Jul. 30, 1976, Ser. No. 710,191
Int. Cl.² A01G 25/02; F16L 1/00
U.S. Cl. 214—1 PA **19 Claims**



1. A vehicle for picking up and laying irrigation pipe of the type consisting of a plurality of rigid sections and couplings between the sections forming a line of pipe, said vehicle comprising:

a vehicular frame having a raised platform,

inclined guide means mounted on said frame at a first end of said vehicle for guiding the end of a section of irrigation pipe being picked up from the ground level to above the level of said platform as said vehicle is operated toward said line of pipe and for guiding the pipe section down said guide means as said vehicle is operated away from said line of pipe,

rack means adjacent said platform for supporting a plurality of said sections of irrigation pipe in stacked relationship,

uncoupling means for uncoupling a section of said pipe being picked up from the subsequent pipe section,

said uncoupling means comprising angulation guide means for guiding the free end of the leading pipe section and elevating said end relative to the longitudinal axis of the adjacent section.

4,093,083

APPARATUS FOR STACKING AND UNSTACKING SHEET MATERIAL, MORE PARTICULARLY GLASS SHEETS

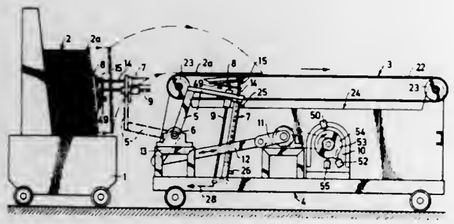
Karl-Heinz Klaus, Cologne, Germany, assignor to Spiegelglaswerke Germania, Zweigniederlassung der Glaceries de Saint-.Roch S.A., Cologne, Germany

Continuation of Ser. No. 676,334, Apr. 12, 1976, abandoned. This application Aug. 9, 1977, Ser. No. 823,125

Claims priority, application Germany, Apr. 17, 1975, 2516884; Mar. 29, 1976, 2613322

Int. Cl.[2] B65G *57/28*

U.S. Cl. 214—7 **6 Claims**



1. In an apparatus for adding to and removing glass sheets from a stack of glass sheets arranged in vertically inclined position, one upon another, the apparatus having a pivotally mounted arm with a free end, means for reciprocating said arm between advanced and retracted positions, a pneumatic cylinder mounted on said arm adjacent said free end and having a telescoping piston rod and a vacuum plate mounted on said rod, means for supplying air under pressure to said cylinder to thereby shift said piston rod and means for evacuating said vacuum plate, means for accommodating variations in spacing between the face of the stack of sheets and the limit of travel of said arm toward the face of said stack, the spacing between said arm and the face of said stack changing from sheet to sheet; said accommodating means including a first pressure sensitive sensor means communicating with said vacuum plate for reading the magnitude of the vacuum established therein when said vacuum plate engages a sheet; a second pressure sensitive sensor means communicating with said pneumatic cylinder for reading the change in pressure when forward movement of the piston encounters resistance of a magnitude in excess of a predetermined value; said first and second sensor means limiting the outward extension travel of said piston rod and preventing said piston rod from exerting excessive pressure against the glass sheets.

4,093,084

FREIGHT-TRANSPORTATION SYSTEM WITH ROAD/RAIL TRANSSHIPMENT

Karl Ringer, Frauenbergstrasse 30, Bad Waldsee, Germany (D-7967)

Filed Aug. 25, 1975, Ser. No. 607,509

Claims priority, application Germany, Aug. 24, 1974, 2440682

Int. Cl.[2] B65G *43/00*

U.S. Cl. 214—11 R **26 Claims**

1. A freight-transportation system serving a given territory, comprising:

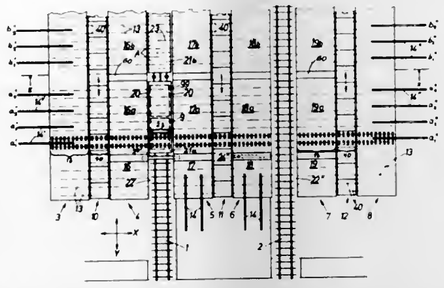
a rail network having a multiplicity of transfer stations each forming a junction between at least one railroad track and a local road;

loading and unloading bays at said stations accommodating road vehicles adapted to carry modular loads of predetermined dimensions;

conveyor means at each of said stations for transferring loads between said bays and respective spaces on flatcars of trains halting at said stations; and

a computer at each of said stations controlling the operation of said conveyor means thereof in response to destination and available-space information fed in, the computers of adjacent stations being interconnected for exchanging said information;

said conveyor means forming a multiplicity of straight-line transfer paths extending each between a respective bay and an assigned unit area on any of said trains halting in a predetermined position on said track, each of said transfer paths including a set of rollers arrayed in at least one row transverse to said track and drive means controlled by said computer for displacing said rollers to advance a load resting thereon, said track being disposed in a well flanked by at least two raised platforms in line with load-carrying surfaces of said flatcars, said platforms being each traversed by a multiplicity of said transfer paths, said flatcars being provided with rows of further rollers forming extensions of said transfer paths in said predetermined position, the platforms proximal to said track being longitudinally divided into sections each substantially coextensive in length with a flatcar of any of said trains, each of said sections being individually transversely shiftable toward an aligned stationary flatcar of any of said trains and being further shiftable across said well in the absence of a train on said track.



4,093,085

APPARATUS FOR MAKING READY-MIXED CONCRETE

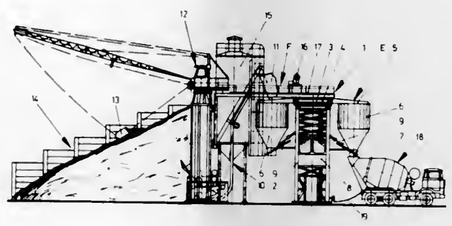
Gerhard Hudelmaier, Ulm, Donau, and Anton Rudolf, Neu-Ulm, both of Germany, assignors to Ingrid Hudelmaier, Ulm, Donau, Germany

Filed Mar. 11, 1977, Ser. No. 776,585

Claims priority, application Germany, Mar. 16, 1976, 2611055

Int. Cl.[2] B65G *3/20*

U.S. Cl. 214—16 R **9 Claims**



1. Apparatus for delivering batches of ready-mixed concrete materials from a bunker to concrete mixer trucks comprising:

a carrier structure including a central tower having a vertical axis and an elevated cross arm structure,

said cross arm structure including a plurality of arms extending radially outwardly from said axis of said central tower and angularly spaced apart from each other and said axis at regular angular intervals;

a plurality of transfer containers, at least one transfer container mounted on each of said arms, each transfer container comprising a plurality of separate material storage compartments therein and each container having a closeable outlet at the bottom thereof;

actuating means on said apparatus for operating said outlets;

drive means for effecting rotation of said cross arm structure relative to said axis to move said transfer containers along a closed circular path of movement around said axis between a filling station and a plurality of other stations along said path, including at least one emptying station above a position whereat a concrete mixer truck having positive mixing tools therein can be accommodated,

said drive means including indexing means for effecting rotation of said cross arm structure in indexed incremental amounts corresponding to the distance between each adjacent pair of stations;

conveyor means located clear of said circular path of movement of said transfer container and clear of said cross arm structure for conveying material from said bunker to a position above said filling station for delivery to a transfer container thereat;

and an operator's control station including operator-actuated controls connected for operating said conveyor and said drive means.

4,093,086

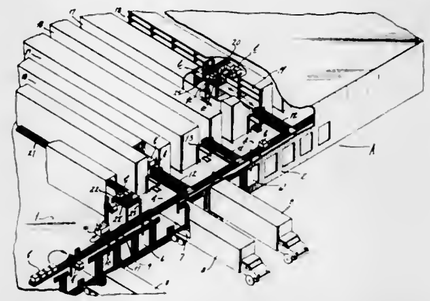
WAREHOUSING SYSTEM

Lester Wade Lucas, and William Marion Albers, both of St. Louis County, Mo., assignors to Wetterau Incorporated, St. Louis, Mo.

Filed Feb. 9, 1976, Ser. No. 656,315

Int. Cl.[2] B65G *47/00*

U.S. Cl. 214—16.4 A **7 Claims**



1. A merchandise warehousing arrangement comprising a support surface, a plurality of rows of a multiplicity of storage racks in aligned side by side relationship, adjacent ones of said rows being parallel and spaced apart a distance sufficient to define therebetween an access aisle, a plurality of loading vehicles adapted to move therein, a merchandise outbound conveyor elevated above said support surface and having its path of travel in axially perpendicular relationship to the longitudinal axis of the storage racks rows, conveyor spurs elevated above said support surface connecting the proximate ends of preselected access aisles and said outbound conveyor, a first inbound conveyor elevated above said support surface and having its direction of travel in axially parallel relationship to the longitudinal axis of said rows of storage racks, said first inbound conveyor presented along the length of and parallel to at least one of said rows of storage racks and extending substantially between first and second load handling zones, said load handling zones being at opposite ends of said rows of storage racks, said first and second load handling zones respectively providing first and second vehicle loading docks each having a respective boundary spaced from the ends of said rows of storage racks and extending in perpendicular relationship to the longitudinal axis of said rows of storage racks, a second merchandise inbound conveyor elevated above said support surface and overlying a portion of said second load handling zone, said second merchandise inbound conveyor being positioned above said second loading dock and adjacent said second loading dock boundary and having its travel path along said boundary in axially perpendicular relationship to the longitudinal axis of said rows of storage racks and disposed in spaced apart relationship to the ends of said storage rack rows remote from said outbound conveyor, a railway siding presented upon the side of said load handling zone remote from said storage racks and in axially perpendicular relationship to said storage racks, said second inbound conveyor means presented in overlying relationship to the portion of said load handling zone immediately proximate said railway siding, said first inbound conveyor being spaced at its ends from said outbound conveyor and said second inbound conveyor, said merchandise outbound conveyor being positioned above said first loading dock and adjacent said loading dock boundary and having its travel path along the last said boundary, said merchandise outbound conveyor overlying a portion of said first load handling zone, said first and second inbound conveyors permitting inbound merchandise handling at both said first and second load handling zones without interference with outbound merchandise handling at said first load handling zone, the extent of elevation of said merchandise outbound conveyor, said conveyor spurs and said first and second inbound conveyors being sufficient to permit movement of fork trucks or other mobile loading units therebeneath and to allow of facile load handling therebeneath by personnel with respect to vehicles adjacent each of said first and second loading dock boundaries.

4,093,087

UNLOADING TUBE ARRANGEMENT FOR COMBINE HARVESTER GRAIN TANK

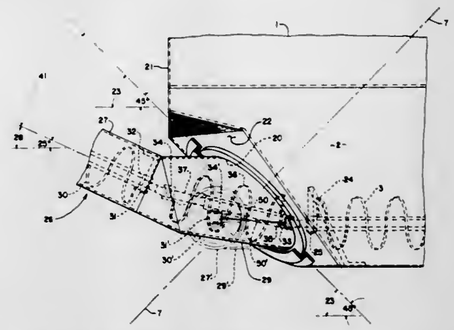
Frans J. G. C. DeCoene, Zedelgem, Belgium, assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Jun. 27, 1977, Ser. No. 810,546

Claims priority, application United Kingdom, Jun. 29, 1976, 26947/76

Int. Cl.[2] B60P *1/42*

U.S. Cl. 214—83.26 **15 Claims**



1. A combine harvester comprising:

a grain tank with a discharge opening at one side of the harvester,

an unloading tube having a main portion and an end portion angled with respect to the main portion, the angled portion being pivotally mounted on the grain tank with the unloading tube in communication with the discharge opening, the pivot axis between the tube and the grain tank being inclined so as to extend upwardly in a direction towards the central vertical fore-and-aft plane of the combine harvester and the unloading tube being pivotally

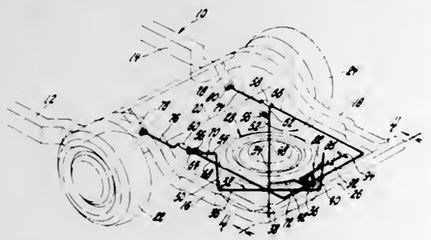
movable throughout a range of unloading positions in all of which the main portion of the tube extends substantially laterally with respect to the central fore-and-aft plane,
an unloading auger disposed in the main portion of the unloading tube and having a receiving end spaced from the pivotal connection between the tube and the tank,
a grain tank auger extending within the grain tank and having a discharge end spaced from the pivotal connection between the tube and the tank,
an intermediate shaft extending between the discharge end of the grain tank auger and the receiving end of the unloading auger, the intermediate shaft being telescopic, and
a pair of universal joints, respectively disposed at the ends of the intermediate shaft and at opposite sides of the pivotal connection between the tank and the tube, the universal joints respectively connecting the discharge end of the grain tank auger to one end of the intermediate shaft, and the receiving end of the unloading auger to the other end of the intermediate shaft.

4,093,088

UNDERFLOOR TIRE STORAGE

William V. Hildebrandt, and Allan G. Miller, both of Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 12, 1977, Ser. No. 796,127
Int. Cl.² B62D *43/04*
U.S. Cl. 214—451 **3 Claims**



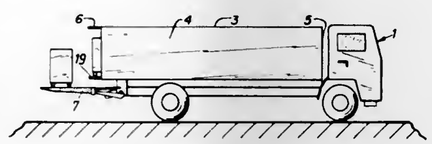
1. In a vehicle, an assembly to support a spare tire in a generally horizontal orientation beneath the vehicle floor and forward of the rear of the vehicle, comprising: a tire cradle of lightweight construction formed of bent rod members and including lower portions adapted to extend beneath the tire for vertical support thereof, upwardly angled portions integrally connected to the lower portions extending beneath the tire to locate said tire in a horizontal plane and a rearward portion extending adjacent the rear edge of the tire; a tire cradle support assembly having a generally U-shaped configuration also formed of lightweight bent rod construction including a pair of leg portions, each extending in fore and aft orientation with respect to the vehicle and in spaced parallelism to one another, the forward ends of said leg portions being attached to the vehicle in a manner permitting pivotal movement of the tire cradle support, the rearward end portions of the cradle support leg portions being integrally joined by an intermediate portion spaced above the rearward portion of said tire cradle; a slidable guide member supported on each of said leg portions; means attaching each of the forward ends of said tire cradle to one of said guide members for permitting limited rotation of said cradle with respect to said cradle support; elongated actuating means for supporting said tire cradle and cradle support in an upward stowed position and extending through opening in the vehicle floor for selective raising and lowering of the rear portion of said tire cradle and cradle support from above, the engagement between the lower end of the elongated actuating means and the tire cradle and support being selectively detachable once the tire is lowered to rest on the ground for permitting subsequent rearward sliding movement of the guide members along said leg portions and corresponding rearward movement of the tire and tire cradle with respect to said cradle support and the vehicle to clear the tire of the vehicle rear overhang.

4,093,089

ARRANGEMENT PARTICULARLY IN GOODS VEHICLE FOR CONVEYANCE OF LOAD CARRIERS POSITIONED IN DOUBLE OR MULTIPLE ROWS

Gote Hubert Bohman, Hudiksvall, Sweden, assignor to B.V. Foco Nederland, Meppel, Netherlands

Continuation of Ser. No. 609,519, Sep. 2, 1975, abandoned. This application June 13, 1977, Ser. No. 805,892
Claims priority, application Sweden, Sept. 3, 1974, 7411111
Int. Cl.² B60P *1/38*
U.S. Cl. 214—516 **4 Claims**



1. An arrangement particularly in goods vehicles provided with a loading platform of the kind comprising a continuous conveyor means, two pulleys, one positioned at the rear end of said platform and the other one at the front end of said platform, said continuous conveyor means running over said two pulleys, equidistantly spaced driving carriages provided on said conveyor means, at least two load-carrier means in the form of a transport container arranged to be coupled to each one of said driving carriages, the arrangement comprising an outwardly projecting driving arm on each one of said driving carriages, members mounted on said arm at various distances from the respective carriage, each one of said members arranged to connect a load carrier to an associated driving carriage, guide rails provided on the lower face of each one of said load-carrier means in a position so as to diverge towards one end of said load-carrier means, the arrangement comprising guide means matching said rails, said guide means provided on said driving arms, a blocking means arranged on said driving arm at each one of said guide means, and a catch shoulder formed on each load-carrier means, said guide means arranged to cooperate with said catch shoulders, and wherein said blocking means on said driving arms is a two-arm lever one arm of which, the blocking arm, is arranged to cooperate with said catch shoulder formed on said load-carrier means, the arrangement comprising a piston slidably arranged in a cylinder at the rear end of said loading platform, said piston arranged when displaced upwards, to abut against the opposite arm of the respective one of said levers in order to pivot said blocking arm against the action of a spring means out of engagement with said catch shoulder formed on that one of said load-carrier means which at that moment is positioned immediately above.

4,093,090

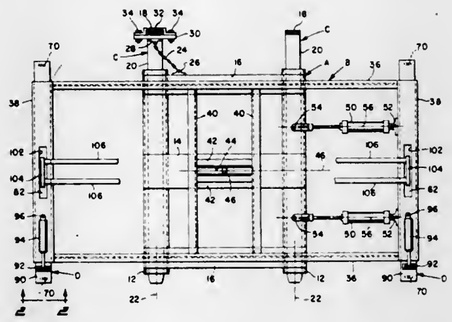
SPREADER FOR LIFTING CONTAINERS

Donald R. Whiteman, Roxboro, N.C., assignor to RPC Corporation, Roxboro, N.C.

Filed Nov. 29, 1974, Ser. No. 528,167
Int. Cl.² B66F *9/14*
U.S. Cl. 214—620 **14 Claims**

10. In a generally rectangular container lifting spreader frame having a longitudinal axis and container lifting devices at the corners thereof, the improvement comprising; said container engaging devices being slidably movably mounted

on said frame for movement in unison in the same direction generally perpendicular to said longitudinal axis without moving upwardly or downwardly relative to said frame, and power means for so moving said container engaging devices.

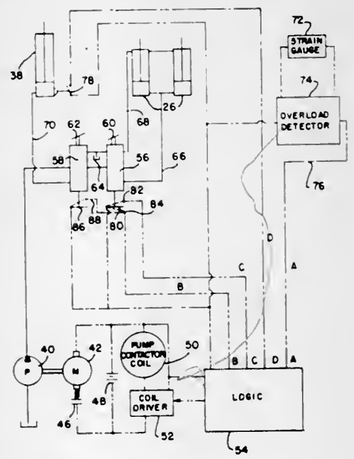


4,093,091

LOAD MOMENT SENSING SYSTEM FOR LIFT TRUCKS

Edmund Gregg, Willowick, and Grant C. Melocik, Chardon, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed Jun. 30, 1976, Ser. No. 701,336
Int. Cl.² B65G *47/00*
U.S. Cl. 214—673 **5 Claims**



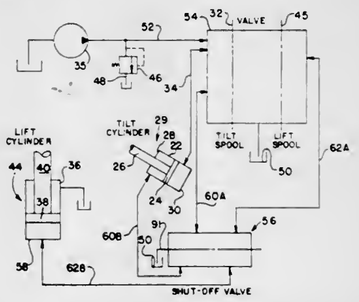
1. A lift truck comprising:
a vehicle frame;
ground engaging means on said frame whereby said truck may traverse the underlying terrain;
an upright mast adjacent an end thereof and pivoted to said frame about a substantially horizontal axis;
a lift carriage mounted on said mast for up and down movement thereon;
first motor means for tilting said mast toward and away from said end about said axis;
second motor means for moving said lift carriage up and down on said mast;
manually operable control means for selectively energizing said first and second motor means;
overload sensing means on said frame;
means for sensing when said carriage is above a predetermined position on said mast;
signal producing means operatively connected to said manually operable control means for providing signals representing tilt toward, tilt away, up and down carriage commands; and
a logic system connected to and responsive to both said sensing means and said signal producing means for
(a) preventing energization of said first motor means for tilting in either direction and said second motor for lifting when an overload has been sensed and when said signal producing means are issuing an up carriage command signal;
(b) allowing energization of said first motor means for tilting toward said frame only when an overload has been sensed and when said carriage is above said predetermined position and when said signal producing means are not issuing an up carriage command signal; and
(c) allowing energization of said first motor means for tilting in either direction when an overload has been sensed and said carriage is not above said predetermined position.

4,093,092

LOAD LIMITING DEVICE

Cyril W. Habiger, Joliet, and Tom E. Robinson, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 24, 1976, Ser. No. 669,936
Int. Cl.² B66F *9/20*
U.S. Cl. 214—674 **12 Claims**



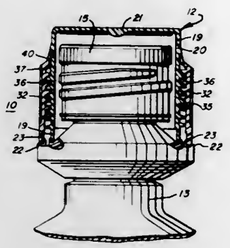
1. In a load lifting apparatus which comprises a primary load member pivotally mounted about a generally horizontal axis on a frame, a tilt cylinder and a tilt piston movable relative to one another pivotally connected to the frame and the primary load member to provide impetus for pivotal movement therebetween, a secondary load member movable relative to the primary load member, a lift cylinder and a lift piston movable relative to one another connected to the primary load member and the secondary load member to provide impetus for linear relative movement therebetween, tilt cylinder valve means for controlling flow of pressurized fluid from pump means to said tilt cylinder and lift cylinder valve means for controlling flow of pressurized fluid from said pump means to said lift cylinder, an improvement for protecting said apparatus from overbalancing by sensing a moment created by a load on said apparatus, comprising:
a valve sensing simultaneously a lift pressure force proportional to a lift pressure in a head end of said lift cylinder and a tilt pressure force proportional to a tilt pressure in a rod end of said tilt cylinder, said valve blocking flow of pressurized fluid from the rod end of said tilt cylinder to said tilt cylinder valve means and from said lift cylinder valve means to the head end of said lift cylinder responsive to the greater of said lift pressure force and said tilt pressure force exceeding a predetermined value,

4,093,093

ANTIBACKOFF CLOSURE

Thomas A. Fowles, McHenry, Ill., and David A. Winchell, Twin Lakes, Wis., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Mar. 14, 1977, Ser. No. 777,750
Int. Cl.² B65D *41/62*
U.S. Cl. 215—251 **6 Claims**



1. An improvement in a hermetically sealed container for storing and dispensing sterile liquids, said container including a bottle with a neck defining a dispensing outlet, said bottle having a transverse abutment means on the neck surrounding the outlet, said improvement comprising, in combination:

an overcap having a cylindrical side wall and a top wall fitted on said bottle neck over said dispensing outlet, said overcap being hermetically sealed to said bottle neck;

an outer ring threadedly interfitted over said overcap and adapted for downward rotation to abut said abutment means and jack said overcap off said bottle neck; and

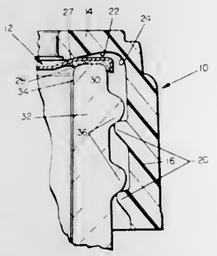
axially interlocking means on said overcap and said outer ring limiting upward displacement of said outer ring with respect to said overcap.

4,093,094

HOME CANNING SYSTEM

Ned J. Smalley, Perrysburg, and Ralph H. Whitney, Whitehouse, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 28, 1977, Ser. No. 782,272
Int. Cl.² B65D *45/10*
U.S. Cl. 215—276 **1 Claim**



1. An improved home canning closure system for a container having a threaded neck portion terminating in an annular rim defining the periphery of an open mouth, said closure system including:

a metal lid covering and closing the open mouth of said container and having a sealant means positioned around the periphery of its lower surface and adapted to sealingly engage the annular rim defining the open mouth of said container, said metal lid including an upwardly and outwardly tapered portion positioned radially inwardly from said sealant means; and

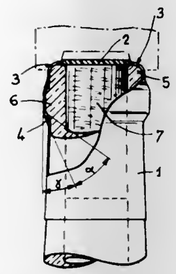
a plastic ring adapted to be placed over the metal lid and including an annular top panel portion and a skirt portion depending therefrom, the skirt portion incorporating buttress style threads adapted to engage the threaded neck portion on said container, the annular top panel portion including an upwardly and outwardly inclined ramp portion on the interior surface adapted to engage the tapered portion on said metal lid, and a reduced thickness section formed at the junction of said annular top panel portion and said skirt portion adapted to cooperate with said threaded engagement between the plastic ring and container to form a spring means to maintain a uniform force on said metal lid to bias the metal lid into sealing engagement with said container, said tapered portion on said metal lid and said inclined ramp portion on said plastic ring cooperating to allow flexing of the metal lid out of sealing engagement with said container when the force on said metal lid due to the pressure within said container exceeds the uniform force of said spring means on said metal lid to thereby vent said excess pressure from said container.

4,093,095

STOPPER-COVERING CAPSULE FOR A BOTTLE

Pierre Babiol, Villefranche-sur-Saone, France, assignor to Societe Nouvelle de Bouchons Plastiques S.N.B.P., Paris, France

Filed Feb. 23, 1977, Ser. No. 771,129
Claims priority, application France, Feb. 27, 1976, 76 06230; Jul. 13, 1976, 76 22021
Int. Cl.² B65D *41/18*
U.S. Cl. 215—307 **10 Claims**



1. A deformable plastic capsule in combination with a bottle having a neck and having a bore extending into the bottle through an upper rim and having below the rim an enlarged annular collar which is trapezoidal in cross-sectional shape, the lower periphery of the collar being stepped inwardly at a first angle to the vertical to form an annular anchor surface, the capsule comprising:

a base portion shaped to overlie the rim of the bottle and cover its bore;

a thin-wall cylindrical skirt portion integrally joining the base portion, the skirt portion being of lesser diameter than the diameter of the bottle neck and conforming approximately with the shape of the bottle neck and collar when fitted thereon, and the skirt portion being of axial length greater than the distance between the rim and the anchor surface of the collar; and

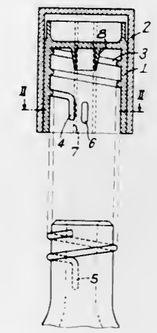
the skirt portion having an annular inwardly-extending retaining rib which is triangular in cross-section and extends around the inner surface of the skirt wall, the retaining rib being spaced from the base portion of the capsule and located to fit below the lower periphery of the collar against the anchor surface, the retaining rib having an upper-oblique surface which before the capsule is fitted to a bottle forms with the axial sidewall of the skirt portion a second angle, and the rib being so formed that after the capsule is fitted to a bottle the outer surface of the skirt will be inclined inwardly in the vicinity of the lower periphery of the collar at a third angle, the sum of the second and third angles equalling the first angle.

4,093,096

REMOVABLE STOPPER FOR A SCREW-NECK BOTTLE

Jacques Julien Augros, Villiers le Bel, France, assignor to Societe Anonyme dite: Arts et Techniques Nouvelles, France

Filed May 19, 1977, Ser. No. 798,455
Int. Cl.² B65D *41/04*
U.S. Cl. 215—330 **4 Claims**



1. A removable stopper for a screw-neck bottle wherein the bottle neck is formed with a radial projection arranged transverse to the thread at the lower end of the external surface thereof, said stopper comprising:

a generally cylindrical closure having a closed upper end and a lower open skirt portion, the internal surface of said skirt being formed with a thread configured to mate with the thread on the bottle neck;

a first radial projection at the lower end of said internal thread and arranged transverse thereto; and

a second radial projection parallel to and spaced from said first projection, said second projection being surrounded by a zone of the material of said skirt, said zone bearing said second projection being weakened whereby when said bottle neck is engaged by said stopper, said weakened zone flexes to permit said second projection to move radially upon abutting the projection on said bottle neck to pass thereover when moving in either direction, said first and second projections being arranged and configured to closely confine the projection on said bottle neck.

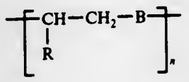
4,093,097

PLASTISOL COMPOSITION AND CONTAINER CLOSURE GASKET MADE THEREFROM

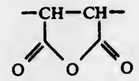
Walter Robert Wszolek, Sykesville, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 563,018, Mar. 28, 1975, Pat. No. 4,020,966. This application Jan. 10, 1977, Ser. No. 758,093
Int. Cl.² B65D *53/04, 53/06;* C08K *5/17;* C08L *23/00*
U.S. Cl. 215—349 **5 Claims**

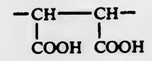
1. A plastisol composition comprising (a) a copolymer resin of a normal α-olefin and maleic anhydride (1:1 mole ratio) having a particle size in the range from about 0.1 to about 1500 microns and having the structure



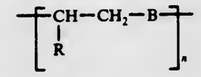
wherein B is a member of the group consisting of



and



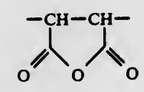
R is H or C_xH_{2x+1}, x is 1 to 16 and n is 2–300, and (b) 65–600 parts/100 parts copolymer of an amine plasticizer having the formula



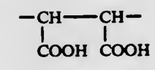
wherein x is at least one and R′ is an organic moiety having an aromatic, aliphatic, cycloaliphatic, heterocyclic or a combination of aromatic and aliphatic groups therein.

2. A container closure comprising a cap having deposited therein a resinous mass functioning as a gasket to seal the container when the closure is in sealing relationship with the container, said resinous mass comprising a fluxed plastisol of a composition comprising (a) a copolymer resin of a normal α-olefin and maleic anhydride (1:1 mole ratio) having a particle size in the range from about 0.1 to about 1500 microns and having the structure

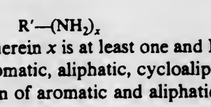
wherein B is a member of the group consisting of



and



R is H or C_xH_{2x+1}, x is 1 to 16 and n is 2–300, and (b) 65–600 parts/100 parts copolymer of an amine plasticizer having the formula



wherein x is at least one and R′ is an organic moiety having an aromatic, aliphatic, cycloaliphatic, heterocyclic or a combination of aromatic and aliphatic groups therein.

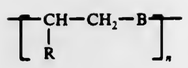
4,093,098

PLASTISOL COMPOSITION AND CONTAINER CLOSURE GASKET MADE THEREFROM

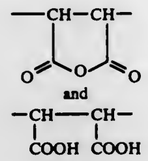
Walter Robert Wszolek, Sykesville, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 563,018, Mar. 28, 1975, Pat. No. 4,020,966. This application Jan. 10, 1977, Ser. No. 758,232
Int. Cl.² B65D *53/04, 53/06;* C08K *5/16;* C08L *23/00*
U.S. Cl. 215—349 **5 Claims**

1. A plastisol composition comprising (a) a compolymer resin of a normal α-olefin and maleic anhydride (1:1 mole ratio) having a particle size in the range from about 0.1 to about 1500 microns and having the structure



wherein B is a member of the group consisting of

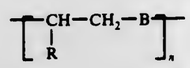


R is H or C_xH_{2x+1}, x is 1 to 16 and n is 2-300, and (b) 65-600 parts/100 parts copolymer of an isocyanate plasticizer having the formula

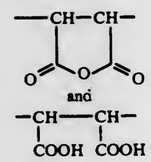
R'—(NCO)$_x$ ps

wherein x is at least one and R' is a C_1 to C_{36} organic moiety selected from the group consisting essentially of aryl, aralkyl, cycloalkyl, alkyl, substituted aryl, substituted aralky, substituted cycloalkyl, substituted alkyl and mixtures thereof.

2. A container closure comprising a cap having deposited therein a resinous mass functioning as a gasket to seal the container when the closure is in sealing relationship with the container, said resinous mass comprising a fluxed plastisol of a composition comprising (a) a copolymer resin of a normal α-olefin and maleic anhydride (1:1 mole ratio) having a particle size in the range from about 0.1 to about 1500 microns and having the structure



wherein B is a member of the group consisting of



R is H or C_xH_{2x+1}, x is 1 to 16 and n is 2-300, and (b) 65-600 parts/100 parts copolymer of an isocyanate plasticizer having the formula

R'—(NCO)$_x$ wherein x is at least one, and R' is a C_1 to C_{36} organic moiety selected from the group consisting essentially of aryl, aralkyl, cycloalkyl, alkyl, substituted aryl, substituted aralkyl, substituted cycloalkyl, substituted alkyl and mixtures thereof.

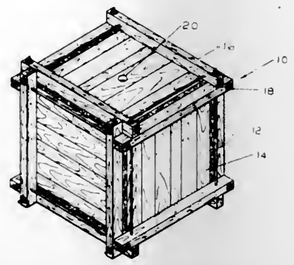
4,093,099

RECTANGULAR CONTAINER FOR THE AGING OF ALCOHOLIC BEVERAGES

James E. Spooner, 2360 A 46th St., Los Alamos, N. Mex. 87544

Filed Sep. 11, 1975, Ser. No. 612,342
Int. Cl.[2] B65D *9/12, 25/00, 61/00*
U.S. Cl. 217—72 **3 Claims**

1. A box-like container for the aging of alcoholic beverages and the like, said container being comprised of six rectangular planar panels, any three mutually adjacent panels being mutually perpendicular to each other and defining a corner of said container, any one panel contacting an adjacent panel in face to edge relation and the third panel of any three mutually adjacent panels in edge to face relation, the rectangular panels meeting at each corner in overlapping face to edge relation and leaving a cubical gap at said corner and a plug means provided at said gap to prevent leakage at said corner all of said panels and the plug means being held in tight box-like form by a



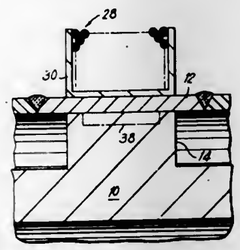
prestressing means to provide liquid tight contact at the face to edge and edge to face juncture of said panels.

4,093,100

PRESSURE VESSEL CONSTRUCTION AND METHOD

Hugh Ford, London, England; George J. Mraz, Warren, Pa., and Jean Noel Simier, Lillebonne, France, assignors to National Force Company, Irvine, Pa. and Societe Chimique des Charbonnages-CDF Chimie, Paris, France

Filed Oct. 28, 1975, Ser. No. 626,084
Int. Cl.[2] B65D *7/22, 7/44*
U.S. Cl. 220—3 **7 Claims**



1. An improved vessel which comprises:
(a) a pressure vessel having a unitary, high strength alloy steel side wall;
(b) at least one flange integral with and extending radially outwardly from said side wall;
(c) at least one ring extending entirely around but not welded to said flange, said ring being comprised of a weldable material having a tensile strength which is less than the tensile strength of the wall of said pressure vessel;
(d) a temperature control jacket surrounding and radially spaced outwardly from the wall of said pressure vessel, at least one end of said temperature control jacket being welded to said at least one weldable ring; and
(e) ring compressing means extending entirely around and in contact with said at least one weldable ring, said ring compressing means being tensilely stressed and said at least one weldable ring being compressively stressed against said flange by said ring compressing means.

4,093,101

PARTITIONED PLASTIC CASE

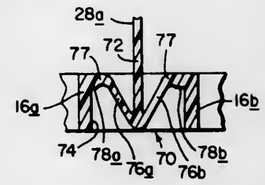
Bernard Braun, 834 Moore St., Woodmere, N.Y. 11598

Filed Aug. 25, 1977, Ser. No. 827,468
Int. Cl.[2] B65D *1/36, 25/04, 25/06*
U.S. Cl. 220—22 **16 Claims**

1. In a molded plastic case having a pair of spaced-apart side walls, a pair of spaced-apart end walls and a bottom wall

connected together to form a generally rectangular shell, the improvement comprising a partition structure molded in situ in the shell at the time the shell is formed, said partition structure including

A. one or more partition sections extending generally perpendicular to the case bottom wall, and
B. means formed integrally with each partition section and the case bottom wall connecting the partition section to the case bottom wall, said connecting means comprising
1. means defining an opening in the case bottom wall,
2. a tab projecting from the bottom edge of the partition section into said opening,



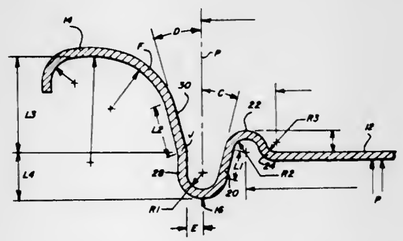
3. a pair of webs extending in opposite directions from the lower edge of said tab to the opposite edges of said opening near the top thereof, and
4. a pair of projecting surfaces located in the bottom wall just below the junctions of the webs and the adjacent opening edges, said surfaces extending toward one another and being substantially coextensive with said webs so that after the juntions between the webs and the opening edges are broken to free the partition section from the shell, the webs can be flexed so that their free ends resiliently engage under the projecting surfaces and re-anchor the partition section to the bottom wall.

4,093,102

END PANEL FOR CONTAINERS

John L. Kraska, Riverside, Ill., assignor to National Can Corporation, Chicago, Ill.

Filed Aug. 26, 1974, Ser. No. 500,706
Int. Cl.[2] B65D *7/44*
U.S. Cl. 220—67 **6 Claims**



1. An end panel for containers consisting of a panel having a substantially flat central panel portion, a first bead surrounding said central panel portion and comprising an inverted U-shaped arcuate portion extending from and raised above said central panel and extending downwardly into a first flat wall portion, said first bead having a first radius and said first flat wall portion defining an angle greater than 10° and less than 16° with respect to a plane extending perpendicular to said flat central portion, a second bead extending from the outer end of said first flat wall portion and comprising a U-shaped portion, said first flat wall portion having a length sufficient to locate said second bead entirely below the level of said central panel, a second flat wall portion extending upwardly from said second bead, said second flat wall portion defining an angle less than 4° with respect to said plane, a third flat wall portion integral with an outer edge of said second flat wall portion, said third flat wall portion defining an angle in the range of 14 to 16° with respect to said plane, said second bead and said second flat wall portion being dimensioned so that the distance along said plane between the juncture of said second and third flat wall portions and the peripheral edge of said second bead is in the range of 0.080 0.094 inches, and a peripheral curl on the periphery of said third flat wall portion adapted to be seamed to a container body so that pressure applied to said central panel portion will vary said angles and thereby increase the resistance of said end to buckling. --

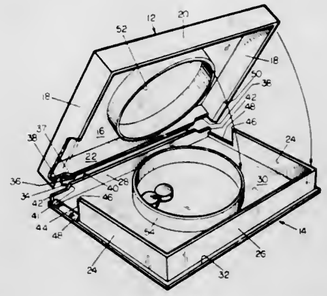
---

4,093,103

TABLET CONTAINER

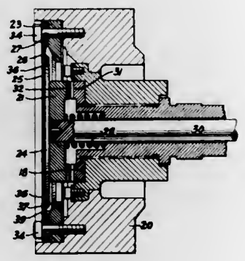
George V. Mumford, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 22, 1977, Ser. No. 770,555
Int. Cl.[2] B65D *43/16*
U.S. Cl. 220—283 **9 Claims**



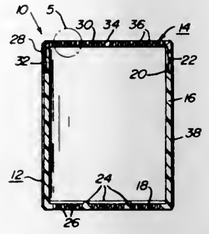
1. A selectively openable, telescopically closeable tablet container molded as a single piece, said container comprising: a lid with a top panel having a peripheral skirt depending downwardly from said top panel; a base having a bottom panel and a skirt extending upwardly from said bottom panel, said base skirt having at least one downwardly extending surface which merges with an upper surface of said base skirt to define a fulcrum; hinge means joining said lid and base and allowing for said lid and base to be brought into telescopic relation; motion limiting means disposed inwardly of said hinge means for limiting relative closer approaching movement of said top panel and said bottom panel, when said lid and base are in closed telescopic relation, to a non-opening position; first wall means integral with top panel and second wall means integral with said bottom panel, said first and second wall means being inter-engageable to define a sealed, internally disposed tablet chamber upon relative telescopic positioning of said lid and base; displaced surface means generally disposed along the periphery of said container, at a location intermediate said motion limiting means and said fulcrum, so arranged and constructed that upon compression of adjacent portions of said top panel and bottom panel said surface means are brought into closer proximity to each so as to produce, along with contact of an internal surface portion of said top panel with said fulcrum, a lever-like action which disengages said first and second wall means to open said container and tablet chamber; and cam means, generally disposed along the periphery of said container intermediate said fulcrum and said displaces surface means, so arranged and constructed that upon said compression of said top and bottom panels a portion of said peripheral skirt of said lid is forced outwardly.

4,093,104
RUBBER DIAPHRAGM TYPE DOOR LOCKING MECHANISM
John W. Hutchinson, Erie, Pa., assignor to American Sterilizer Company, Erie, Pa.
Filed Aug. 26, 1976, Ser. No. 717,918
Int. Cl.² B65D *45/00*
U.S. Cl. 220—316 **2 Claims**



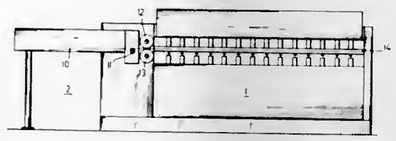
1. A door locking mechanism for a pressure vessel having a door (10), to prevent opening of the door (10) when gas in said chamber (41) is under pressure on a pressure side of said door comprising,
a lock body (20) received in an opening in said door (10) and fixed to said door (10),
a shaft (30) extending through said opening in said door (10) and adapted to engage a lock on the outside of said door (10),
first teeth (31) on said lock body (20),
means (21) supporting second teeth (32) on said shaft (30) overlying said first teeth (31) on said lock body (20),
a pressure plate (24),
said means on said shaft engaging said pressure plate (21),
an annular seat (23) supported on said lock body (20) and having a first flat surface on the side remote from said lock body (20),
said annular seat (23) having a bore therethrough and a counterbore of said bore terminating in a second flat surface (37) surrounding said bore, said second flat surface being spaced outwardly relative to said vessel from said first flat surface,
said pressure plate (24) being disposed in said counterbore and adapted to rest on said second flat surface (37),
a diaphragm (25) overlying said counterbore and resting on said pressure plate (24) and on said first flat surface (23),
means sealing said diaphragm (25) to said first flat surface of said seat (23) providing a closure for said bore and said counterbore,
said counterbore in said seat (23) being defined by an annular contoured surface (39) inclined from said first flat surface and terminating at said second flat surface (37) and said contoured surface and said pressure plate being adapted to provide a smooth, continuous surface for supporting said diaphragm (25) when a gas under pressure in said vessel forces said diaphragm and in turn said pressure plate outwardly towards said second flat surface to in turn force said second teeth into engagement with said first teeth whereby said shaft is restrained against rotation, thereby preventing said lock from being opened when a pressure exists in said chamber.

4,093,105
PLASTIC CONTAINER WITH VENT MEANS
Walter W. Russell, Philadelphia, Pa., and Richard P. Stoetzer, Cinnaminson, N.J., assignors to N. T. Gates Company, Pennsauken, N.J.
Filed Oct. 19, 1977, Ser. No. 843,631
Int. Cl.² B65D *51/16*
U.S. Cl. 220—373 **10 Claims**



1. A container comprising a plastic cup-shaped body, and a plastic cap removably fitting on said body, each of said body and cap having a plurality of small holes therethrough with said holes being larger in area at the inner surface of the container than at the outer surface thereof.

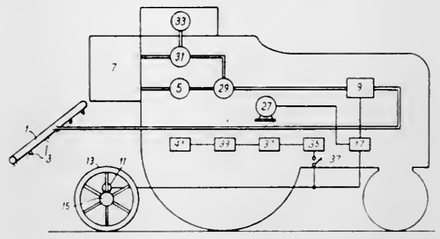
4,093,106
APPARATUS FOR DETACHING WIRES CUT TO LENGTH FROM A DISORDERED BUNDLE OF WIRE
Hans Gött; Josef Ritter; Klaus Ritter, and Gerhard Ritter, all of Graz,, Austria, assignors to EVG Entwicklungs-u. Verwertungs Gesellschaft mbH, Graz, Austria
Filed Mar. 31, 1976, Ser. No. 672,059
Claims priority, application Austria, Apr. 2, 1975, 2506/75
Int. Cl.² B65G *61/00*
U.S. Cl. 221—224 **8 Claims**



1. An apparatus for detaching wires cut to length from a disordered bundle of wire, the apparatus comprising a container for said bundle of wire, an advancing device for advancing said wires one at a time, said device being mounted adjacent an end of said container and being arranged to move said wires one at a time in a direction transverse to their longitudinal axis against a stop, a pair of conveyor rollers, said conveyor rollers having a variable spacing between their axes and being mounted adjacent said stop, said rollers being arranged to grasp the end of each wire one at a time as it is brought against said stop by said device, and to pull said wire out of said bundle in a substantially axial direction.

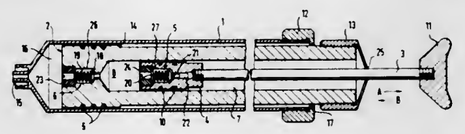
4,093,107
SPRAYING EQUIPMENT
Denis John Allman, Chichester, and Lionel Ivor Alfred Taylor, Southampton, both of England, assignors to E. Allman and Company Limited, England
Filed May 14, 1976, Ser. No. 686,593
Claims priority, application United Kingdom, May 16, 1975, 21028/75
Int. Cl.² B05B *9/06*
U.S. Cl. 222—23 **9 Claims**

1. A device for determining the volume of spraying liquid which is applied per unit area of ground by spraying equipment comprising means for generating a first electrical signal representing the rate of supply of spraying liquid to the ground, means for generating a second electrical signal representing the speed at which the equipment is traversing the ground, function generating means, means for applying said first and said second electrical signals to said function generating means for generating in response thereto an output signal equal to the product of a predetermined factor and the ratio between the



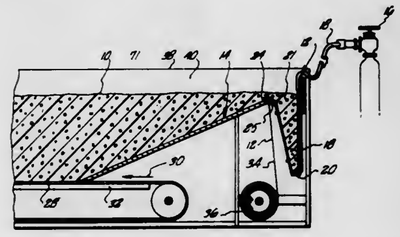
first and second signals, the said predetermined factor representing the ratio between the distance travelled by the equipment and the area of ground to which spraying liquid is applied during travel over that distance so that the output signal represents the volume of spraying liquid applied to unit area of the ground, and means for applying said output signal to a visual indicator means, which provides a visual indication of said volume applied to unit area of ground.

4,093,108
SYRINGE ADAPTED TO OVERCOME A PRESSURE RESISTANCE
Wolfgang Hein, Dassel, and Peter Grundmann, Konigswinter, both of Germany, assignors to Carl Schleicher & Schull, Einbeck, Germany
Continuation of Ser. No. 594,633, Jul. 10, 1975, abandoned.
This application Dec. 14, 1976, Ser. No. 750,427
Claims priority, application Germany, Nov. 7, 1974, 2433399
Int. Cl.² B65D *83/14*
U.S. Cl. 222—401 **2 Claims**



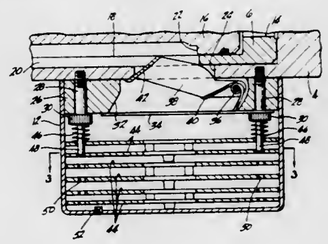
1. A syringe for expelling a liquid medium for filtration, said syringe comprising:
a first cylinder cooperating with a first piston having a first hollow piston rod and defining a first pressure chamber, the hollow portion of said hollow piston rod defining a second cylinder having a smaller cross section than said first cylinder and cooperating with a second piston having a second piston rod and defining in said second cylinder a second pressure chamber;
a bore formed within said first piston connecting said first and second pressure chambers;
a valve in said bore having a valve closure element and means biasing said valve closure element to open the valve upon an over-pressure in said second pressure chamber;
an inlet/outlet attachment for the liquid medium opening into said first pressure chamber;
an air inlet duct formed in said second piston opening into said second pressure chamber;
a second valve that opens in response to an underpressure in said second pressure chamber during an air intake stroke of said second piston and closes in response to an air over-pressure in said second pressure chamber during an air pressurizing stroke of said second piston, said second valve being in communication with said air inlet duct;
a cover for said first cylinder;
a stop on said first piston which is able to abut said cover in the extreme intake stroke position of the first piston; and
with said liquid medium charged into said first pressure chamber by means of an intake stroke of the first piston being expelled by means of an air over-pressure provided upon said liquid medium within said first pressure chamber by means of a pumping action of said second piston.

4,093,109
EXPANSIBLE TROUGH APPARATUS FOR USE IN PRODUCING POLYURETHANE FOAM
Milford J. Schrader, 525 Cinderella Dr., Claremont, Calif. 91711
Filed Sep. 20, 1976, Ser. No. 725,108
Int. Cl.² B29D *27/00, 27/04*
U.S. Cl. 222—527 **8 Claims**



8. In an apparatus for use in the production of continuous buns of polymeric foam from a mixture of liquid foam reactants, an improvement comprising a pair of open ended trough sections, one of said sections being slidably mounted within the other to define an expansible trough, a pair of detachable end sections, one of said sections being disposed at the extended end of each of said trough sections, means for securing each of said end sections to said extended ends of said trough sections, guide means carried by said end sections and said trough sections, said means carried by said end sections cooperating with said means carried by said trough sections for aligning said end sections with said trough sections and a protective lining disposed within the interior of said trough sections to prevent contact between said trough sections and said liquid foam reactants.

4,093,110
NOISE AND FOULING REDUCER FOR POWDER-ACTUATED TOOL
Peter Walton Johnson, Toronto, Canada, assignor to Olin Corporation, New Haven, Conn.
Filed Mar. 11, 1977, Ser. No. 776,570
Int. Cl.² B25C *1/18*
U.S. Cl. 227—9 **12 Claims**



1. A powder-actuated tool for driving fasteners into support-

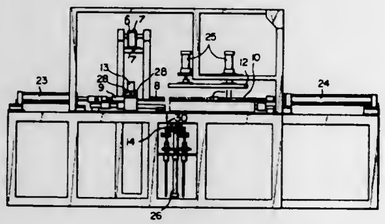
ing structures, said tool comprising: a firing chamber for receiving a powder charge; a barrel having a bore into which combustion gases from the powder charge are directed to power the tool; gas passage means extending from said barrel bore into a chamber on the tool for receiving the combustion gases; and a plurality of baffle plates mounted in said chamber to provide increased surface area therein for deposition of fouling deposits from the combustion gases and for muffling the sound of the expanding combustion gases; said baffle plates being arranged in a stack within said chamber with passages being formed in the individual baffle plates to allow the combustion gases to infiltrate said stack; each of said baffle plates being identical to the others in construction, and said baffle plates being loosely stacked within said chamber so as to be removable therefrom for cleaning; and spring means for biasing said baffle plates into engagement with each other to retain the composition of said stack.

4,093,111

AUTOMATED APPARATUS FOR JOINING WOOD PLATES IN SIDE-BY-SIDE RELATION

Sadahiko Katoh, Ikeda, Japan, assignor to Suntory Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 557,117, Mar. 10, 1975, abandoned. This application Jan. 6, 1977, Ser. No. 757,152
Claims priority, application Japan, Jul. 4, 1974, 49-76715
Int. Cl.² B27F 7/02
U.S. Cl. 227—26 **16 Claims**



1. In an automated apparatus for joining a set of a plurality of wooden plates with adjoining surfaces in a side-by-side relation, including:

conveyor means for transporting said wooden plates in sequence to a given position;

joining means at said given position for receiving thereon said plurality of wooden plates thus transported one-by-one by said conveyor means, said joining means including:

nail driving means including a nail driver which is reciprocable over a given distance in a direction substantially perpendicular to the surfaces of said wooden plates which are to be joined; platen means, on which adjacent wooden plates are supported in substantially parallel abutting relation;

a hold-down plate positioned above said platen means and being movable upwards and downwards relative to said platen means to hold said wooden plates fast or release same;

wooden plate holding means which is movable back and forth in a direction substantially perpendicular to the surfaces of said wooden plates which are to be joined to hold and retain at least one wooden plate in a fixed position when said nail driving means is operated to drive nails into said wooden plates; and

means for removing joined wooden plates from said platen means after operation of said nail driving means to clear said wooden plates from said platen means;

the improvement wherein said nail driving means comprises:

a hopper containing a plurality of nails which are aligned substantially in a given direction, said hopper having a bottom opening for passing said nails out of said hopper;

a sliding plate having a given number of slits which are adapted to admit nails therethrough and spaced given distances apart, said sliding plate being disposed under but in contact with said bottom opening of said hopper and slidably movable relative to said hopper between at least a first position and a second position;

nail guide means located below said sliding plate, between the platen means and said nail driver means, said nail guide means having nail guide channels therein, a first plurality of said nail guide channels being brought in registration with a first given number of said slits of said sliding plate for receiving nails in said first plurality of channels thereof which are in registration with said first given number of slits when said sliding plate is in said first position, and a second plurality of nail guide channels being brought into registration with a second given number of said slits of said sliding plate for receiving nails in said second plurality of channels thereof when said sliding plate is in said second position, said nail driver driving the nails in said channels into a wooden plate to be joined; and

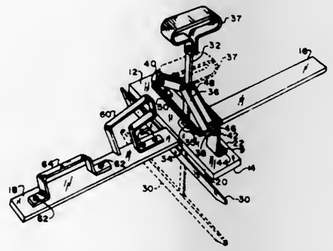
a plurality of upright nail-direction aligning members mounted in said hopper in the positions over said channels for maintaining said nails in alignment.

4,093,112

FLAP POSITIONING ASSEMBLY

Clifford Henry Faulkingham, 3500 Heatherington Rd., Orlando, Fla. 32804

Filed Apr. 4, 1977, Ser. No. 784,061
Int. Cl.² B25C 7/00
U.S. Cl. 227—150 **9 Claims**



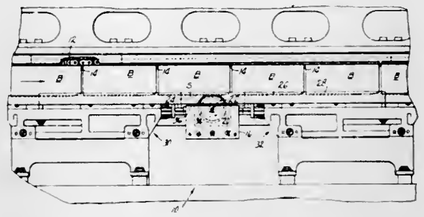
1. A flap positioning assembly of the type primarily used to facilitate stapling of a container, said flap positioning assembly comprising: support frame means positionable at least in part on the exterior of the container and including a base plate, support means extending outwardly from said base plate; positioning means movably attached to said support frame means and including clamp means movably positionable in spaced apart relation to said base plate and comprising at least in part an elongated configuration, said clamp means further disposed in corresponding relation to said support frame means so as to securely engage a flap portion of the container between said support frame means and said clamp means; and connecting means movably interconnected between said positioning means and said support frame means and including a plurality of linkage elements pivotally connected between said positioning means and said base plate and disposed to at least partially define movement of said positioning means between a clamped and non-clamped position.

4,093,113

SEAM SOLDERING MECHANISM

Frederick Stirling Sillars, Beverly, Mass., assignor to USM Corporation, Farmington, Conn.

Filed Feb. 8, 1977, Ser. No. 766,779
Int. Cl.² B23K 1/16, 3/06
U.S. Cl. 228—36 **2 Claims**



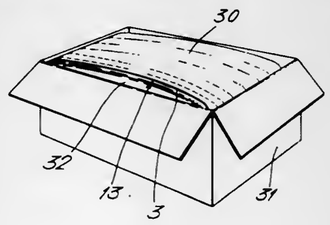
1. Mechanism for soldering seams of cans and the like comprising, in combination with means for guiding and moving the cans in one direction along a path with their seams in predetermined orientation, an applicator roll movable in the path of seam travel counter to said one direction and having one portion which, during operation of the mechanism, is arranged to pass through a bath of molten solder and thence through an anti-oxidation or de-oxidizing atmosphere to present another previously solder-wetted applicator roll portion in substantially continuous tangential relation progressively along the length of the joint of each seam, the roll being disc-like and having a rim formed to substantially correspond in width with the openings of the respective seam joints, a single means for enshrouding the bath and the wetted portion in said atmosphere, and a drive shaft for the roll driven independently of the can moving means and extending transversely of and beneath said path, the shaft being substantially horizontal and journaled heightwise between said can guiding means and the surface level of the solder bath to cause an upper portion of the roll rim to engage and wipe opposite entrance edges of the seam joints progressively and thereby apply a positive pressure causing the solder being transferred by the rim to penetrate into each seam joint.

4,093,114

PLASTICS BAG

Norman Edward Lawes, Yarm, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 21, 1976, Ser. No. 698,219
Claims priority, application United Kingdom, Jul. 3, 1975, 28046/75; Aug. 6, 1975, 32851/75
The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.
Int. Cl.² B65D 5/60
U.S. Cl. 220—46.2 **10 Claims**



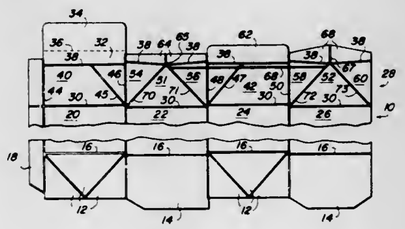
1. A packaging container comprising a stiff outer casing and a plastics-film liner, the improvement consisting in that the liner is a valved bag formed from a length comprising two plies of plastics film, the length being folded and joined to provide a bag having one wall formed by overlapping panels, the ends of the bag being closed and the overlapping panels being joined together by a longitudinal seal located along the edge region of the outer panel, the longitudinal seal being interrupted to provide a valve opening with transverse seals at each side of the valve opening defining a passageway constituting a filling valve between the panels, the outer panel comprising the two plies with their edges coextensive and the inner panel comprising the two plies together with at least one layer of flexible material in addition to said two plies at least throughout the valve region, the two plies and the additional layer which comprise the inner panel being arranged with their edges staggered such that all three edges may contact the inner ply of the outer panel, the additional layer being joined to the two plies of the inner panel at least by the transverse seals and being located with at least one of the plies of the inner panel lying between the additional layer and the outer panel in the area of overlap.

4,093,115

LIQUID-TIGHT FLAT TOP CONTAINER

George L. Bachner, and Jerry G. Bachner, both of Barrington, Ill., assignors to NIMCO Corporation, Crystal Lake, Ill.

Continuation of Ser. No. 488,852, Jul. 15, 1974, abandoned. This application Feb. 11, 1977, Ser. No. 767,683
Int. Cl.² B65D 5/74
U.S. Cl. 229—17 G **30 Claims**



1. In a blank of foldable sheet material for a container having conventional bottom closure panels, tabs, and fold lines for creating a liquid tight bottom closure and first, second, third, and fourth wall panels, said wall panels being joined by fold lines along their respective bottom edges to said bottom closure panels and tabs and said wall panels being arranged side by side each joined along a fold line to the panels adjacent to it, said wall panels being joined along fold lines at their respective top edges to an improved roof panel arrangement comprising in combination:

first and second rectangular roof panels each having first, second, third, and fourth edges, said first and second rectangular roof panels connected along their first edges respectively to the top edges of said first and said third wall panels;

first and second rectangular sealing tabs connected along fold lines respectively to the third edges of said first and second rectangular roof panels as extensions thereof;

first and second rectangular end panels having first, second, third, and fourth edges, connected along their first edges respectively to the top edges of said second and fourth wall panels, said first rectangular end panel connected along its fourth edge to said second edge of said first rectangular roof panel and along its second edge to said fourth edges of said second rectangular roof panel, said second rectangular end panel connected along its fourth edge to the second edges of said second rectangular roof panel and having its seconed edge free for closing engagement with the fourth edge of said first rectangular roof panel, each of said first and second rectangular end panels having a triangular end tab and first and second triangular fold-in tabs, said first and second triangular fold-in tabs being connected to said triangular end tab along fold lines,

said second triangular fold-in tab of said first rectangular end panel and said first triangular fold-in tab of said second rectangular end panel being scored for folding along a line substantially parallel to the third edge of said second rectangular roof panel and extending across said second triangular fold-in tab of said first rectangular end panel, said second rectangular roof panel and said first triangular fold-in tab of said second rectangular end panel;

first and second lip tabs connected along a fold line to the third edge of said first rectangular end panel as extensions thereof, said first lip tab connected along a fold line to said first rectangular sealing tab and said second lip tab connected along a fold line to said second rectangular sealing tab, said first and said second lip tabs being joined together along a fold line at their common edge;

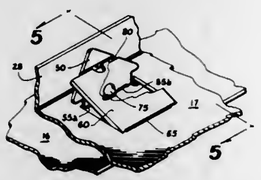
first and second shim tabs connected along a fold line to the third edge of said second rectangular end panel as extensions thereof, said first shim tab connected along a fold line to said second rectangular sealing tab, said second shim tab free for closing engagement with said first rectangular shim tab, said first and said second shim tabs joined together along a fold line at their common edge.

4,093,116

PANEL INTERLOCKING MEANS

Richard Kenneth Watkins, Lithonia, and Leo Benatar, Atlanta, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Jan. 13, 1977, Ser. No. 759,116
The portion of the term of this patent subsequent to Mar. 7, 1995, has been disclaimed.
Int. Cl.[2] B65D *75/08*
U.S. Cl. 229—40 **7 Claims**



1. An arrangement for interlocking a pair of panels in overlapping relation, said arrangement comprising a locking tab struck from one of said panels and joined thereto at its base and having generally parallel side edges and a shoulder portion at the end thereof remote from said base, said shoulder portion comprising tapered side edges, a retaining tab struck from the other of said panels and joined thereto at its base and defining a locking aperture in said other panel for receiving said locking tab and being oriented so that the base of said retaining tab is remote from the base of said locking tab, and a transverse holding groove formed in said shoulder portion of said locking tab and extending partially through said shoulder portion and to the tapered edges thereof, for receiving the free end of said retaining tab when said locking tab is driven through said locking aperture whereby said locking and retaining tabs are maintained in angular mutually braced relation to each other.

4,093,117

MAILER

Henry Clifton Morse, 345 Fullerton Pkwy., Chicago, Ill. 60614

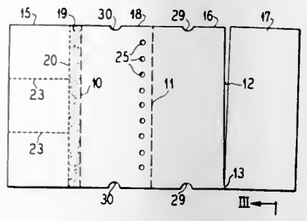
Filed Jun. 1, 1976, Ser. No. 691,853
Int. Cl.[2] B65D *27/00*
U.S. Cl. 229—70 **10 Claims**

1. For use as a mailer and communications device,

a one-piece stiff cardboard strip having parallel end edges extending from the length thereof and side edges connecting said end edges together and including four connected sections, three defined by fold lines, and a fourth defined by a slit extending for substantially the length of the fourth section,

a first section having an inner and an outer side and forming a mailing flap and having an adhesive strip extending along said inner side one of said fold line defining an inner side edge of said first section,

a second section comprising a back for the mailer,



a third section comprising a front for the mailer and folded over the back, and glued to the mailing flap by the adhesive strip,

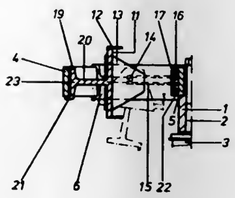
and a fourth section comprising a slide connected with the third section by a tab and folded over the third section and slide relative to the envelope as the mailer is in its completed form as said tab is broken by a pushing or pulling action on the slide, when the mailer reaches its destination, and forming a communication carrying device.

4,093,118

CENTRIFUGE, PARTICULARLY FOR USE WITH AUTOMATIC ANALYSIS APPARATUS, ESPECIALLY FOR CHEMICAL, BIOLOGICAL, OR MEDICAL USE

Hartmut Sinn; Dieter Schroder, and Hans Stallmann, all of Osterode am Harz, Germany, assignors to Heraeus Christ GmbH, Osterode am Harz, Germany

Filed Jun. 2, 1977, Ser. No. 802,372
Claims priority, application Germany, Jun. 16, 1976, 2626910
Int. Cl.[2] B04B *5/02, 9/12*
U.S. Cl. 233—26 **12 Claims**



1. Centrifuge for substance analysis and for use with essentially flat sample carriers, each of which is adapted to carry a plurality of sample probes, comprising

a rotor having an outer circumferential sleeve (4) of material including at least partly fiber-reinforced plastic;

a pivotably suspended and radially movable holder (11) for said sample carriers so that, when the centrifuge is stopped,

the holders hang downwardly with their outer portion bottommost; and

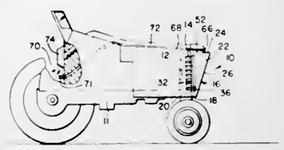
guide means (15) guiding said holders for radially outward movement toward said outer sleeve (4), said holders (11) being radially outwardly movable toward said outer sleeve, and, in operation of the centrifuge, the holders swinging into horizontal position due to centrifugal force, the outer portion thereof bearing against and being supported by said circumferential sleeve (4) when the holders are forced to pivot from the downward hanging position to extend radially outwardly due to centrifugal force arising in operation of the centrifuge.

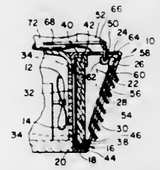
4,093,119

ACCESSORY HEATING DEVICE FOR TRACTORS AND SIMILAR EQUIPMENT

Edmund Swisher, 670 Upper River Rd., Gallipolis, Ohio 45631

Filed May 9, 1977, Ser. No. 794,835
Int. Cl.[2] B60H *3/00, 1/02*
U.S. Cl. 237—12.3 A **6 Claims**





1. An accessory heating device for a tractor and similar equipment mounted onto a forward wall of a radiator housing having a radiator assembly and a fan, which comprises:

(a) a heater housing having a base, a rear wall with a large opening therethrough, a pair of sidewalls, a front wall with a large opening therethrough, a top with a hole therethrough, and a chamber therein, wherein one of said sidewalls has a vertically aligned slotted opening therethrough;

(b) means for mounting said rear wall of said heater housing against said forward wall of said radiator housing;

(c) a filter member insertable through said slotted opening into said chamber;

(d) a plurality of vane elements transversely disposed across said opening of said front wall, each said vane elements rotatably disposed within said opening, said plurality of said vane elements extending from a bottom to a top of said opening;

(e) means for maintaining said filter element in a vertical alignment within said chamber;

(f) means for opening and closing said vane elements within said opening;

(g) an annularly shaped sleeve affixed to an upper surface of said top of said heater housing around said hole in said top; and

(h) one end of a flexible conduit mounted onto said sleeve member, another end of said flexible conduit adapted to be mounted in a serial fluid connection to an air register disposed in an operator's compartment of said tractor.

4,093,120

RAILROAD CROSSING STRUCTURE

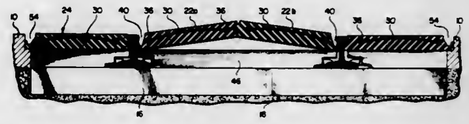
David L. Canfield, Libertyville, Ill., assignor to Park Rubber Company, Lake Zurich, Ill.

Filed Jan. 24, 1977, Ser. No. 761,703
Int. Cl.[2] E01C *9/04*
U.S. Cl. 238—8 **12 Claims**

1. A railroad crossing structure for use with a highway railroad crossing having a pair of spaced, substantially parallel rails, a plurality of elongated ties subtending and supporting said rails and being disposed transversely thereof, and means for securing said rails to said ties, said railroad crossing structure comprising:

(a) an elongated elastomeric pad of a width proportioned to span the distance between said pair of spaced, substantially parallel rails, and having along at least one edge thereof a channel for receiving therein the flange portion of a wheel of a railroad car and for providing a drainage channel for water and the like;

(b) a flexible plate of a generally concave cross-section imbedded within said elastomeric pad, said flexible plate having a deflecting action as vehicles drive over said railroad crossing structure which functions as a shock



absorber to provide a vehicle smoother transition over said railroad crossing structure and to force the edge of said flexible plate towards said channel to break up foreign objects such as snow, ice and the like which may form or collect in said channel; and

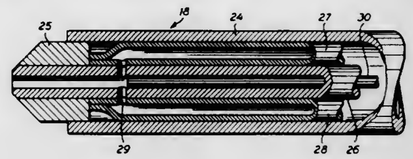
(c) tie down means for securing said elastomeric pad atop said plurality of ties, said tie down means comprising anchor means, the opposite ends of said flexible plate being coupled and secured to the respective ones of said anchor means.

4,093,121

NOZZLE

Torsten Erik Theodor Strom, Fristad, Sweden, assignor to N. Lundbergs Fabriks AB, Fristad, Sweden

Filed Nov. 17, 1976, Ser. No. 742,613
Claims priority, application Sweden, Nov. 18, 1975, 7512927
Int. Cl.[2] B05B *15/02*
U.S. Cl. 239—117 **4 Claims**



1. A nozzle for supplying two components for the production of an expanded plastic layer in a cavity defined by a surrounding wall which is being advanced continuously, comprising an outer casing closed at one end, a central nozzle tube arranged coaxially in said casing and extending through the closed end of the casing to form the mouth opening of the nozzle, two supply tubes arranged along diametrically opposed sides of the central tube, which form together with the central tube a partition extending across and longitudinally along the length of the casing, said supply tubes communicating with the central tube near the mouth end thereof, and means for connecting said supply tubes to a supply of their respective components.

4,093,122

INTEGRATED DIVERGENT EXHAUST NOZZLE THRUST REVERSER

Duane L. Linderman, Chula Vista, and Felix Hom, La Mesa, both of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.

Filed Nov. 3, 1976, Ser. No. 738,578
Int. Cl.[2] B64C *15/06;* **B64D** *33/04*
U.S. Cl. 239—127.3 **15 Claims**

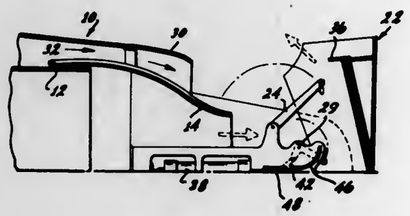
1. An integrated low drag afterbody, divergent nozzle and thrust reverser system for use on high performance aircraft with subsonic cruise and supersonic flight capabilities having

at least one jet engine with a rearwardly discharging nozzle adapted to produce reaction thrust comprising:

a variable divergent nozzle and a low drag afterbody for connection to the aircraft for receiving and controlling rearward flow of the exhaust gas stream from said variable convergent nozzle;

said system comprising at least two fixedly mounted laterally spaced sidewalls having parallel planar opposing faces;

at least two nozzle-reverser sections positioned between said sidewalls with forward and aft pivotal connections thereto and having inner walls forming continuations of said convergent nozzle for further controlling said rearward flow of said exhaust gas stream, said nozzle-reverser sections have outer marginal sides in slideable sealing engagement with said opposing faces of said sidewalls, and move



in a first direction about said forward pivotal connection toward and away from the engine longitudinal axis to vary the cross-sectional area of the divergent nozzle exit through a plurality of intermediate positions from a minimum area cruise position to a maximum divergent reheat augmented thrust position to effect the proper coordination and match with the position of the variable convergent nozzle for substantially optimum expansion of said exhaust gas streams while maintaining a low drag external afterbody and move in a second direction about said aft pivotal connection outward and aft until their rearmost surfaces meet at the engine longitudinal axis to form a thrust reverser for redirecting said exhaust gas laterally and forward to effect reverse thrust; and

actuation means for moving said nozzle-reverser sections.

4,093,123

AIRLESS SPRAYER AND PRESSURIZING SYSTEM

Victor J. Maran, Playa del Rey, Calif., assignor to Dispenser Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 567,307, Apr. 11, 1975, abandoned. This application Dec. 8, 1975, Ser. No. 638,763

Int. Cl.[2] B05S *9/047*

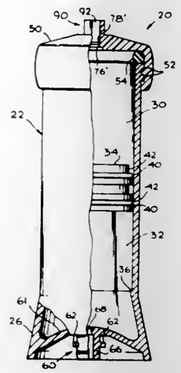
U.S. Cl. 239—322 **16 Claims**

1. A self-contained dispensing unit for dispensing liquid contents under pressure comprising:

a container;

a free-floating piston dividing the container into a first chamber for storing liquid to be dispensed and a second chamber for containing a pressurized gas; and

a manually operable liquid release valve communicating with the first chamber for controllably releasing liquid therefrom under pressure from the second chamber, the valve comprising a valve body with a cylindrical bore having a projecting interior ledge for engaging a resilient sealing member, an insert member receivable through the bore of the valve member and having a cylindrical section of reduced diameter defining an outwardly projecting ledge for engaging a resilient sealing member, the insert member further having an axial bore extending within the cylindrical section and terminating adjacent the outwardly projecting ledge and at least one radial opening extending from the axial bore to outside the cylindrical section, a resilient sealing member mountable on the insert member to seal the cylindrical section to the cylindrical bore of the valve body upon assembly and to releasably seal the radial opening upon engagement between said ledges, and a biasing spring for urging the insert member



ledge toward the projecting interior ledge of the cylindrical bore to compress the resilient sealing member therebetween.

4,093,124

ATOMIZER WITH AIR INLET VALVE

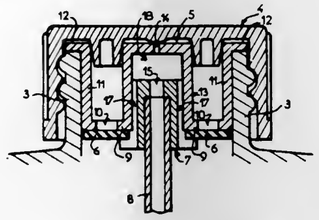
Bruno Morane, Paris; Yves Hardouin, Survilliers, and Jean-Louis Gueret, Paris, all of France, assignors to L'Oreal, Paris, France

Continuation-in-part of Ser. No. 708,367, Jul. 26, 1976, abandoned. This application Jan. 17, 1977, Ser. No. 759,657

Claims priority, application France, Oct. 20, 1976, 76 31523

Int. Cl.[2] B65D *1/32*

U.S. Cl. 239—327 **19 Claims**



1. In an atomizer for spraying a liquid product, said atomizer comprising a container having flexible walls and a neck, a spray head mounted on said neck, an atomization chamber inside said spray head, a depending tube inside said container opening into said atomization chamber, at least one valveless ejection orifice leading from said chamber to the exterior of said container, and at least one duct connecting the spray chamber to the interior of the container so that the liquid product can be sprayed in atomized form both in an upright and an inverted position of the container, said spray head comprising an annular bottom the edges of which are connected to a peripheral mounting skirt fitted inside said neck and a hollow central shaft encircled by the mounting skirt, said hollow shaft being closed at its upper end by a wall pierced by said at least one ejection orifice, at least one air intake orifice in the annular bottom of the spray head cooperating with a valve member, the improvement according to which the depending tube terminates in a tip seated inside the hollow central shaft and cooperating with said spray head to define said atomization chamber, and the valve member is a flexible washer which covers said at least one air intake orifice when urged thereagainst by pressure within said container, said washer being centered around said tip and gripped between a collar formed

on said tip and the corresponding area on the inner surface of said annular bottom.

4,093,125

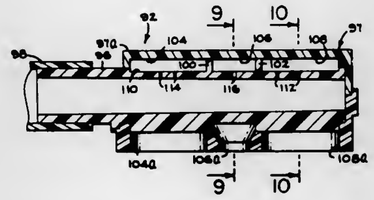
WATER NOZZLE FOR DOUGH FORMING APPARATUS

Mounir A. Shatila; William H. VonDerLieth, both of Blackfoot; John L. Veeneman, and Marion E. Thomas, both of Idaho Falls, all of Id., assignors to Ampco Foods, Inc., San Francisco, Calif.

Division of Ser. No. 507,602, Sep. 19, 1974, abandoned. This application Nov. 24, 1976, Ser. No. 744,529

Int. Cl.[2] B05B *1/14*

U.S. Cl. 239—553.3 **5 Claims**



1. A nozzle for dispensing water at substantially zero velocity comprising inner and outer elongate hollow cylindric walls, said walls being concentric so that there is defined therebetween a chamber having an annular cross-sectional shape, first and second radially extending impervious discs in said annular chamber, said discs supporting said inner and outer walls in concentric relation and dividing the upper regions of said chamber into a central sub-chamber and two end sub-chambers disposed on opposite longitudinal ends of said central sub-chamber, said end sub-chambers having a substantially larger longitudinal extent than said central sub-chamber, there being a central outlet opening and two end outlet openings communicating with the lower regions of respective said sub-chambers, means for supporting said walls on a substantially horizontal axis, one end of said inner cylindric wall constituting the inlet to said nozzle, the upper region of said inner wall defining a plurality of substantially vertically extending passages for admitting water from interior of said inner cylindric wall to respective said sub-chambers, said outlet openings each having a longitudinal extent corresponding to the respective longitudinal length of said sub-chambers and an area substantially greater than the combined area of said passages so that water egressing from said outlet openings is without significant kinetic energy or velocity except that caused by the force of gravity acting on the water.

4,093,126

PULVERIZER

Marcel A. Castiaux, rue de Gosselies 58, Roux, Belgium (B-6160)

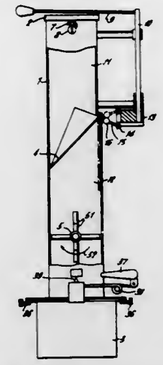
Filed Apr. 11, 1977, Ser. No. 786,212

Claims priority, application Belgium, Apr. 16, 1976, 0166241

Int. Cl.[2] B02C *13/31, 13/286*

U.S. Cl. 241—37.5 **7 Claims**

1. A pulveriser for glass containers, comprising a barrel, a lid closing an upper end of said barrel, a flap mounted in said barrel and movable between a closed position and an open position, said flap dividing the interior of said barrel when in a closed position into a first compartment above said flap defining a filling chamber and a second compartment below said flap defining a pulveriser chamber, a pulverising rotor having blades mounted in said second compartment, and a mechanism comprising an arm moveable between a first position in which it locks said lid and another position in which said arm disengages said lid and comprising a cam integral with said arm, said cam having two rolling tracks, a lever pivotally mounted on said barrel adjacent said flap having one end connected to said flap and an opposite end, and a roller attached to said opposite



end of said lever engageable successively on said two rolling tracks of said cam.

4,093,127

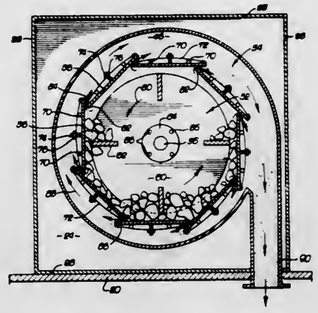
DISINTEGRATOR AND SEPARATOR APPARATUS

Albert K. Alberts, Bountiful, Utah, and Weldon B. Jolley, Redlands, Calif., assignors to Life Resources Incorporated, Colton, Calif.

Filed Oct. 21, 1975, Ser. No. 624,477

Int. Cl.[2] B02C *23/28*

U.S. Cl. 241—55 **3 Claims**



1. A device for disintegrating and separating raw materials including in combination:

a processing chamber formed by back and front parallel panels spaced apart from each other and joined together at their outer edges;

an impact wall within said processing chamber displaced inwardly from said outer edges of said panels, to divide said processing chamber into a central compartment with an external compartment including deflection means comprising the longitudinal face portion of a plurality of plates for deflecting material back into the central compartment to achieve inter-partical impacts, including passage means between opposite ends of said plates for connecting said central compartment with said external compartment;

a drive shaft passing through said back panel into said central compartment;

a casing member surrounding said processing chamber to form an insulation space between said casing member and said processing chamber, including bearing means for journaling said drive shaft;

a rotary impeller for accelerating both air and raw material inside said central compartment, and having back and front discs connected by a plurality of transverse blades normal to the direction of rotation of said impeller and

extending between the periphery of said disks, said blades extending inwardly less than half the radial dimension of said disks and extending outwardly without projecting beyond the periphery of said discs, with said drive shaft attached to and terminating with said back disk leaving the middle of said central compartment open and wherein said longitudinal face portion of said plates is aligned with the direction of rotation of said impeller as well as perpendicular to the respective adjacent blades;

motor means located outside of said processing chamber and outside of said casing member, which motor means is attached to said drive shaft which passes through said insulation space into said central compartment for rotating said impeller;

inlet means communicating through said casing member, said front panel and said front disk with said middle of said central compartment for receiving a supply of air and of the raw material; and

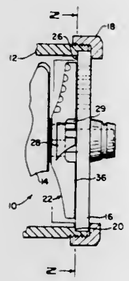
outlet means communicating through said casing member with said external compartment for discharging the air along with the disintegrated and separated material.

4,093,128

MEAT EXTRUDER HAVING DOUBLE BLADE CUTTER BAR

J. Haywood Barnes, Wadsworth, Ohio, assignor to Edwin W. Oldham and Vern L. Oldham, both of Akron, Ohio, a part interest to each

Continuation-in-part of Ser. No. 635,403, Nov. 26, 1975, Pat. No. 4,036,442. This application Feb. 7, 1977, Ser. No. 765,920
Int. Cl.² B02C *18/36*
U.S. Cl. 241—82.5 **13 Claims**



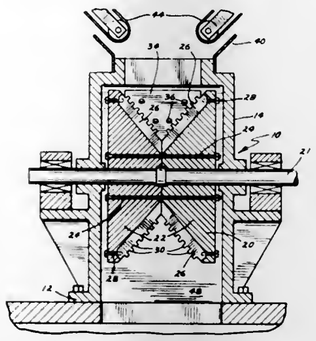
1. In a meat cutting and/or extrusion device including a frame having a tubular portion in which a driven screw extruding means is positioned for forcing meat along the axis of such frame portion, the combination of an apertured discharge means carried by said frame at an end thereof and positioned normal to said axis, a rotatable cutter means secured to said extruding means immediately adjacent said discharge means for cutting the meat into pieces, said discharge means comprising an apertured flat surface disc, said cutter means including a plurality of substantially radially extending cutting blades and a hub portion engaged with an end portion of said screw extruding means, the cutting blades each having an overhanging leading edge connected to a cutting edge of the cutting blades by an inclined surface that aids in moving material being processed towards said discharge means, said cutting blades each having a plurality of radially spaced, substantially circumferentially extending recesses formed in their leading edges.

4,093,129

MACHINE TO COMMINUTE REFUSE

Henry J. Polansky, Buffalo, Minn., assignor to Tire Recycling of Minnesota, Inc., Shoreview, Minn.

Filed Jan. 19, 1977, Ser. No. 760,365
Int. Cl.² B02C *13/06*
U.S. Cl. 241—186 R **4 Claims**



1. A machine to comminute refuse includes:

A. a housing;

B. a rotor rotatably mounted in said housing, said rotor being constituted as two integrally connected, face-to-face, outwardly diverging, part-conical discs;

C. a plurality of shear plates extending generally radially outwardly from each of said part-conical discs of said rotor, said shear plates each having a plurality of outwardly extending teeth lying in a radial plane which includes the axis of the rotor and said teeth extending from end to end of the longitudinal dimension of the rotor;

D. power means for causing the rotor to rotate in a first direction;

E. an intake hopper at an upper part of said housing, there being aligned openings provided between a lower portion of the hopper and an upper portion of said housing in position to permit refuse in said intake hopper to pass into said housing;

F. an anvil fixedly positioned in said housing, said anvil having a plurality of teeth situated to intermesh with the shear plate teeth as the shear plates and rotor revolve and rotate in the housing, said anvil teeth extending from end to end of the longitudinal dimension of the rotor, said anvil being below said intake hopper and at a side thereof to receive refuse carried toward it by said shear plate teeth; and

G. said housing being provided with a discharge passageway in position to receive comminuted refuse passing between said rotor and said anvil.

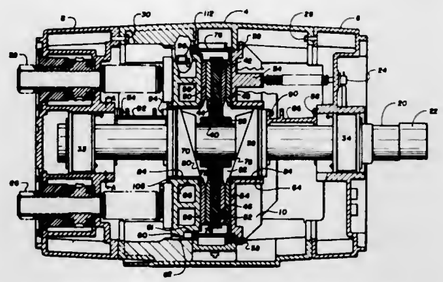
4,093,130

TWIN REFINER APPARATUS

Stanley Robert Prew, Montoursville, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Mar. 24, 1977, Ser. No. 780,827
Int. Cl.² B02C *7/14*
U.S. Cl. 241—245 **3 Claims**

1. A disc type refiner comprising a base with an integral central housing, a first channel shaped housing attached to one end of the central housing, a second channel shaped housing attached to the other end of the central housing, a drive shaft extending through the first channel shaped housing, the central housing and into the second channel shaped housing, means in the first and second channel shaped housing for rotatably supporting the drive shaft, a non rotating plate holder mounted within a first movable housing located between the central housing and the first channel shaped housing, a second non rotating plate holder mounted within a second movable housing located between the central housing and the second channel shaped housing, the pair of non rotating plate holders being in spaced opposed relation and having refiner plates disposed on each opposed face of the non rotating plate holders, a rotating disc mounted on the drive shaft between the non rotating refiner plates, refiner plates disposed on each side of the rotating disc in parallel juxtaposed relation to the refiner plates disposed on the opposed non rotating plate holders, means connecting the drive shaft and rotating disc to provide rotation of the disc with the shaft, means for axially adjusting the spacing between the rotating refiner plates and non rotating refiner plates during refining to insure that equal and opposite thrusts are produced on opposite sides of the rotating refiner plates, inlet means for conveying material to be refined into the central housing and directing the material between the juxtaposed refining plates, outlet means for removing the refined material from the central housing, means for changing all refiner plates without moving the rotating center disc, the changing means comprising means for axially retracting the first movable housing with non rotating plate holder and plates away from the rotating center disc and means for axially retracting the second movable housing with non rotating plate holder and plates away fron the rotating center disc.



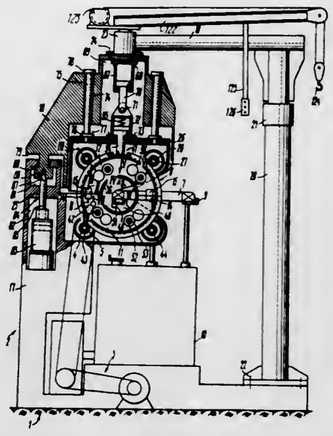
4,093,131

MACHINE FOR WINDING TAPE BODY INSULATION ON POLE COILS OF ELECTRIC MACHINES

Georgy Semenovich Balyko, ulitsa Sharikovskaya, 47, kv. 37, and Nikolai Stepanovich Bubela, ulitsa Mira, 114, kv. 69, both of Kharkov, U.S.S.R.

Filed Sep. 15, 1976, Ser. No. 723,651
Claims priority, application U.S.S.R., Dec. 8, 1975, 2198844; Dec. 15, 1975, 2302883; Mar. 15, 1975, 2331578
Int. Cl.² H01F *41/12*
U.S. Cl. 242—6 **8 Claims**

1. A machine for winding tape body insulation on the pole coils of electric machines, comprising: a frame mounted on a foundation and consisting of a stationary part and a movable part, the stationary part of the frame being rigidly fixed to the foundation; a support fastened on said stationary part of the frame; an overhang hinged on said support, the movable part of the frame being rigidly fixed to said overhang so as to be movable relative to said stationary part of the frame; an electric drive mounted on the stationary part of the frame; a winding device for applying insulation to a pole coil made in the form of two toothed half-rings detachable from each other, the first of said half-rings being placed on said movable part of the frame, and the second being placed on said stationary part of the frame; a driving gear to drive said winding device, a shaft on which said driving gear is mounted being kinematically interconnected with said electric drive; a unit for holding the pole coil to be wound in position mounted on said stationary part of the frame; a unit for rotation of the pole coil mounted on said stationary part of the frame; a locking device for holding said stationary and movable parts of the frame together while the winding of the insulating tape is in progress, said locking device being placed on one of said parts of the frame and interacting with the other part of the frame; a yoke-shaped traverse mounted on said movable part of the frame and adapted to be displaced thereon; a first pair of rollers mounted on said yoke-shaped traverse, the first toothed half-ring being mounted on said traverse and interacting with said first pair of rollers; a device for locking said first half-ring once the winding of insulating tape on the pole coil is completed, said device being placed on the movable part of the frame; a device for locking said second toothed half-ring upon the completion of winding, said device being placed on the stationary part of the frame; a second pair of rollers mounted on said stationary part of the frame, one roller of said second pair of rollers being mounted on the shaft of said driving gear, said second toothed half-ring being rotatable on said pair of rollers; at least one pin fastened on the face surface of at least one of said toothed half-rings; and a bobbin with insulating tape rotatably mounted on each of said pins.

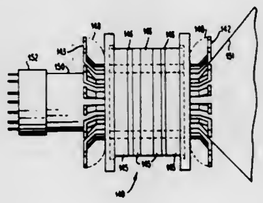


4,093,132

METHOD OF WINDING A MAGNETIC DEFLECTION YOKE

William R. Christiana, Saugerties, and Joseph F. Hevesi, Hurley, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 392,847, Aug. 29, 1973, abandoned, which is a continuation of Ser. No. 134,901, Apr. 16, 1971, abandoned, which is a division of Ser. No. 7,275, Jan. 30, 1970, Pat. No. 3,601,731. This application Jul. 18, 1975, Ser. No. 597,266
Int. Cl.² H01F *41/08*
U.S. Cl. 242—7.03 **1 Claim**



1. A method of winding a cathode ray tube magnetic deflection yoke with winding end turns produced in situ in defined bundles located radially outwardly from the axial portion of the winding, comprising the steps of:

(a) providing a subassembly comprising an annular core portion and first and second end caps at each end of said core portion forming permanent operative parts of said yoke, said end caps being of non-electrically conductive

non-magnetic material and comprising a plurality of hook members separated by a plurality of slots, said plurality of slots being aligned to form longitudinal troughs along the axis of said core portion and said hooks being radially directed and spaced around the perimeter of said end caps to define corresponding first and second annular channels displaced radially outwardly from said longitudinal troughs,

and using said subassembly as a wire forming and retaining tool by:

(b) feeding wire:

under tension along one of said troughs toward said first end cap,

through the slot in said first end cap defining the end of said one trough,

radially outwardly between and behind the hook members flanking said slot and then under tension along said annular channel to another of the hooks in said first end cap,

then under tension in the reverse axial direction through the slot and trough immediately beyond said other of the hooks,

(c) hooking said wire in like manner behind the corresponding one of the hook members in said second end cap and feeding said wire in like manner but in the opposite direction along said second annular channel, and

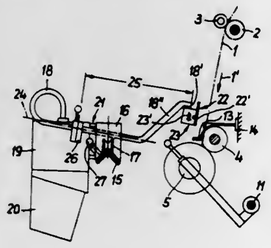
(d) continuing feeding said wire back and forth between said end caps to form coil loops having axially directed longitudinal portions and annularly directed end turns portions, said end turns being formed and held in defined bundles located radially outwardly from said longitudinal portions by said annular channels formed by said hook members.

4,093,133

FORMATION OF A RESERVE WINDING THREAD OF DEFINED LENGTH ON BOBBINS OF A TEXTILE MACHINE

Herbert Hoffmann, Bremen, and Friedrich Wachendorf, Eggestedt, both of Germany, assignors to Fried. Krupp Gesellschaft mit beschraenkter Haftung, Essen, Germany

Filed Sep. 15, 1976, Ser. No. 723,492
Claims priority, application Germany, Sep. 20, 1975, 2542000
Int. Cl.² B65H *54/02*
U.S. Cl. 242—18 PW **11 Claims**



4. In apparatus for winding a bobbin in a textile machine including: a bobbin holder composed of two arms, two bobbin holding discs each rotatably mounted on a respective arm and arranged to support a bobbin at a predetermined position for rotation, and a yarn catch element mounted on the periphery of one of the discs; a yarn supply device for delivering yarn to a bobbin mounted in the holder; a yarn collector; and a suction device having an outlet end connected to the yarn collector and an inlet opening in the vicinity of the location in which a bobbin is supported by the holder, the suction device having an inlet region extending from the inlet opening toward the outlet end, the improvement comprising:

a guide member and a yarn severing device carried by said suction device in the vicinity of its said inlet opening;

means supporting said inlet region for pivotal movement between a first position in which the inlet opening is in front of the bobbin position and a second position which is located at the opposite side of the bobbin position from said yarn supply device;

a yarn cutting device located in said suction device at a variable distance from said inlet opening for cutting yarn in said suction device at a selected distance from said inlet opening;

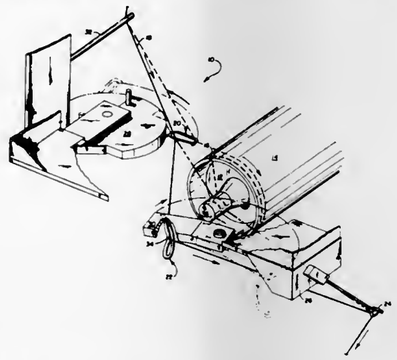
and cutting control means connected to said cutting device for causing it to cut the yarn at such preselected distance from said inlet opening in response to movement of said inlet region of said suction device to said second position.

4,093,134

METHOD AND APPARATUS TO REDUCE WASTE YARN DURING TIE-UP OF YARN WINDERS

Alfons F. Schmitz, and Douglas L. Dixon, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 23, 1977, Ser. No. 799,796
Int. Cl.² B65H *54/02*
U.S. Cl. 242—18 PW **8 Claims**



1. In a yarn winder having

a mandrel for rotatably supporting a yarn package tube that has in the outer axial end of the yarn package tube a notch for snagging a yarn moving from a source of supply and into an air doffer, and

a transfer tail apparatus for guiding the moving yarn into engagement with the outer axial end of a rotating supported yarn package tube for subsequent snagging of the yarn by the notch and severing of the yarn between the notch and in or near the air doffer and subsequent formation on the yarn package tube of a yarn transfer tail prior to release of the moving yarn from the transfer tail apparatus to a yarn traverse guide on the yarn winder for guiding of the yarn onto the package portion of the yarn package tube as the yarn package tube rotates, the improvement comprising:

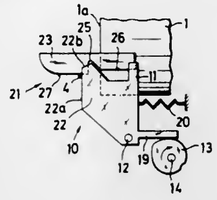
means on the mandrel operative upon the yarn becoming snagged in the notch and severed for trapping the loose portion of the severed yarn that extends between the notch where the moving yarn becomes snagged and a point in or near the air doffer where the yarn becomes severed.

4,093,135

DEVICE FOR CONTROLLING A RESERVE WINDING WHEN WINDING THREAD ON A SPOOL OR CORE

Peter Hermanns, Stommeln, Germany, assignor to FMN Schuster & Co., Hurth-Efferen, Germany

Filed Jan. 26, 1976, Ser. No. 652,337
Claims priority, application Germany, Jan. 28, 1975, 2503299
Int. Cl.² B65H *54/02, 54/34*
U.S. Cl. 242—18 PW **18 Claims**



1. A device for controlling a reserve winding during winding of a thread onto a spool or core, in which the thread is fed to the spool by a delivery mechanism via a traversing device, said device comprising:

a. means for applying an end of the thread to the spool at an intermediate point approximately midway of the length of a reserve winding zone defined adjacent the end of the spool,

b. means for moving the thread in a to-and-fro movement first in an outward axial direction toward the end of the spool to fix said thread end by a plurality of crossing thread windings forming a first layer of windings and then in an inward axial direction away from the end of the spool to form a plurality of reserve windings over the first layer of windings,

c. means for maintaining the speed of the to-and-fro movement of the thread within the reserve winding zone at a predetermined amount,

d. said moving means includes a stationary member having a straight edge portion and a movably disposed thread guide contact means, and

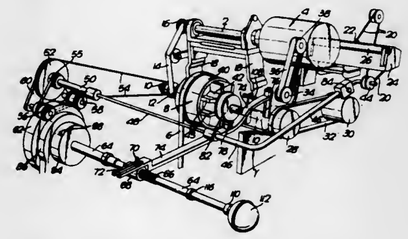
e. said thread guide contact means being effective to cause the thread to move to-and-fro along the straight edge portion.

4,093,136

TEXTILE, YARN OR TAPE WINDING MACHINES

Gordon Mackie, Ladyhill, Ireland, assignor to James Mackie & Sons Limited, Belfast, Ireland

Filed May 27, 1976, Ser. No. 690,746
Claims priority, application United Kingdom, Jun. 2, 1975, 23800/75
Int. Cl.² B65H *59/00*
U.S. Cl. 242—45 **8 Claims**



1. A yarn or tape winding machine comprising:

a take up spindle for winding said yarn or tape,

drive means for rotating a member at a controlled speed,

torque transmitting variator means including said member for transmitting a controlled torque to said take up spindle,

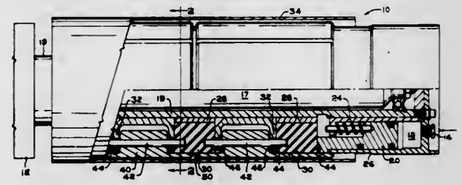
control means for controlling the torque transmitted by said torque transmitting variator means, said control means including a second member connected to said torque transmitting variator means, power means connected to said second member for driving said second member, and sensing means connected to said power means for sensing said yarn or tape tension and adjusting said torque transmitting variator means by controlling said power means to move said second member when said yarn or tape tension varies beyond predetermined limits.

4,093,137

EXPANDABLE COLLET

Thomas J. Briar, Trafford, and Walter J. Reese, North Huntington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 19, 1977, Ser. No. 798,555
Int. Cl.² B65H *75/24*
U.S. Cl. 242—46.4 **6 Claims**



1. In a collet for collecting strand material on a tube comprising:

a fluid inlet, a sealed fluid chamber, a piston, a plurality of expandable rings, a plurality of unexpandable spacers between said rings and at the end of said rings opposite said piston, a shaft slideably carrying said piston, rings, and spacers and means for rotating said collet, said piston, rings, and spacers being arranged such that upon passing a fluid into said chamber and pressurizing said chamber said pressure is transferred by said piston and said spacers to said rings to expand said rings and upon release of said fluid pressure said piston and said spacers release the pressure from said expandable rings to return said rings to their unexpanded state, the improvement comprising a plurality of fingers surrounding said rings and spacers and means connecting said fingers to said rings, said fingers being capable of firmly holding said tube in place during winding of said strand material and said means connecting said fingers to said rings being capable of acting with said rings to retract said fingers when the fluid pressure is released to thereby release said tube.

4,093,138

PORTABLE HOLDER FOR RIBBON-LIKE MATERIAL

Robert E. Shafer, 185 Shady Lake Dr., Hurst, Tex. 76053

Filed Jun. 14, 1976, Ser. No. 696,122
Int. Cl.² B65H *75/02, 75/26, 19/02*
U.S. Cl. 242—55.2 **5 Claims**

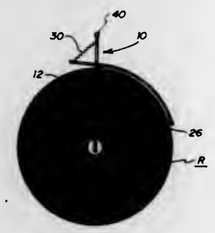
1. Portable apparatus for holding and dispensing a coiled strip of ribbon-like material, with the initial radius of a full coil having a given size which is substantially larger than the width of said coiled material, comprising:

(a) a pair of parallel rods rigidly connected at the first ends thereof, with the length of said rods being substantially longer than the radius of a full coil of the strip of ribbon-like material, and the separation of the pair of rods being only slightly greater than the width of the ribbon-like

material, such that the rods serve to restrain the sides of the coil of material against movement in an axial direction;

(b) an arm pivotably connected to the pair of parallel rods at a point intermediate the length of said arm and relatively near one end thereof, so as to divide the arm into longer and shorter portions, with the arm being mounted between the pair of rods, and the pivot location on said pair of rods being relatively near their rigidly connected ends, and the longer portion of the arm being curved inwardly to the extent that its distal end lies near the periphery of a coil of the ribbon-like material when said coil is mounted in the apparatus, and the distal end of said longer portion of the pivoted arm defining an arc as the material is progressively removed from the coil at the periphery thereof, and the length of said longer arm portion is such as to cause said arc to extend approximately through the center of the coiled material;

(c) means for releasably and rotatably holding a coil of ribbon-like material between the two parallel rods, with said means including a rigid core having a diameter of at least two inches and being so thin as to permit the parallel rods to bear directly against the sides of the coiled mate-



rial, and further including a removable fastener for holding the rigid core between the second ends of the two parallel rods, such that the apparatus may be rotated about any axis and turned through any angle without causing the coil of ribbon-like material to fall out of the apparatus;

(d) a spring mounted for biasing the arm toward general longitudinal alignment with the two parallel rods; and

(e) a generally U-shaped foot secured to the dital end of the longer portion of the pivoted arm, with the open part of the foot being oriented inwardly toward the rods, and the gap between the two legs of the U-shaped foot being just slightly wider than the width of the coiled material, such that the U-shaped foot can both encompass and bear radially against a peripheral portion of the coil of ribbon-like material which is held between the two parallel rods, and the length of the two legs of the U-shaped foot being substantially less than the radius of the rigid core, whereby interference between the two rods and a projecting leg of the U-shaped foot is precluded, and the base of said foot will therefore press radially against the periphery of the coiled material until the very last increment of said material is dispensed from the apparatus.

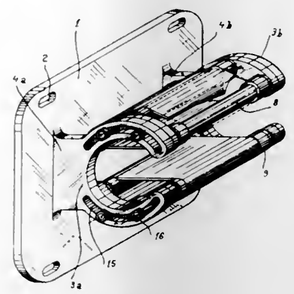
4,093,139

SUPPORT FOR LONG ROLLS OF SHEET MATERIAL

Alfred P. Amoretti, 5 ruelle St. Roch, Nice, France

Filed Jan. 5, 1977, Ser. No. 756,860
Int. Cl.[2] B65H *75/12*
U.S. Cl. 242—55.2 **8 Claims**

1. A support for a roll of sheet material having a base, comprising an upper series of rollers and a lower series of rollers, an upper endless band of flexible elastic material disposed about said upper rollers, and a lower endless flexible band of elastic material disposed about said lower rollers, said support being adapted to receive a roll of sheet material between said bands with said bands in contact with upper and lower por-



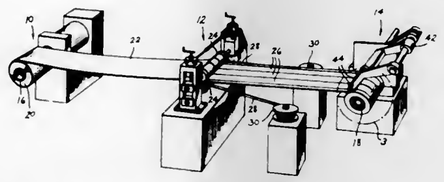
tions of the periphery of the roll, said bands being driven by the roll of sheet material upon rotation of the roll of sheet material.

4,093,140

METHOD OF RECOILING SLIT MATERIAL

Douglas S. Matsunaga, Chicago, Ill., assignor to Braner Enterprises, Inc., Schiller Park, Ill.

Filed Feb. 22, 1977, Ser. No. 770,804
Int. Cl.[2] B65H *35/02, 23/10*
U.S. Cl. 242—56.2 **4 Claims**



1. In a slitting line including an uncoiler, a slitter and a recoiler having a rotatable drum, a coil of metal material carried by said uncoiler, said material extending through said slitter and being cut thereby into multile strands, and strands varying in thickness, the method of coiling said strands comprising the steps:

(a) securing the ends of each strand to said recoiler drum;

(b) rotating said recoiler drum to coil at least one turn of each strand around said drum;

(c) releasing the end of each strand from said drum with said first turns of the strands remaining in contact with the drum; and

(d) rotating said drum in frictional contact with said strand first turns to impart winding rotation to the strands with said drum rotating relative to at least one of said strands to cause each of the strands to be wound upon said drum at substantially the same linear speed as said sheet material is uncoiled during rotation of said uncoiler and passes through said slitter.

4,093,141

RECOILER SPACER SHOOTER

Richard H. Garrett, Sr., and Yale M. Feniger, both of Toledo, Ohio, assignors to Coil Tite, Inc., Toledo, Ohio

Filed Jun. 2, 1977, Ser. No. 802,721
Int. Cl.[2] B65H *19/04*
U.S. Cl. 242—56.9 **16 Claims**

1. In a coil slitter having a recoiling mandrel for a plurality of strips slit from a coil, a spacer shooter removably positioned between said slitter and said mandrel, comprising:

(A) a vertical post-type base located before said mandrel and adjacent one side of the plurality of strips slit from the coil,

(B) a horizontal boom extending from said base under said strips,

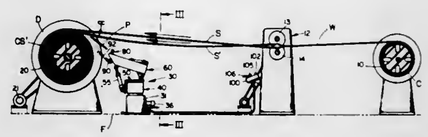
(C) means for oscillating said boom on said post base to a position away from under said strips,

(D) carriage means movable on and along said boom,

(E) means for moving said carriage along said boom,

(F) a spacer shooter device pivotally mounting on said carriage,

(G) means for raising and lowering said device about its pivot to direct its free end toward said winding coil on said mandrel,



(H) beam means projecting outwardly from said device for indicating the coil strip and its periphery toward which said device is aimed,

(I) storage means for a plurality of spacers in said device, and

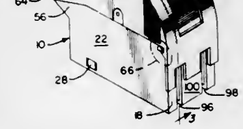
(J) means for shooting one spacer at a time from said storage means out of said device in the direction of said beam for insertion in the coil of the selected winding strip for taking up the slack in said strip between the slitter and the mandrel.

4,093,142

FILMSTRIP CARTRIDGE

Marvin I. Mindell, Pittsford, N.Y., assignor to The Singer Company, New York, N.Y.

Filed Sep. 20, 1976, Ser. No. 724,875
Int. Cl.[2] G03B *23/02*
U.S. Cl. 242—71.1 **24 Claims**



1. An improved filmstrip cartridge comprising:

a filmstrip cartridge having a film guide channel:

whereby filmstrip may be guided along its longitudinal axis into and out of said filmstrip cartridge;

said film guide channel terminating with a film opening through which said filmstrip may be guided along its longitudinal axis into and out of said filmstrip cartridge;

said film guide channel having a first surface portion opposite a second surface portion;

a pair of laterally spaced apart first film guide surfaces on said first surface portion of said film guide channel;

a pair of laterally spaced apart second film guide surfaces on said second surface portion of said film guide channel;

said first and said second film guide surfaces providing support for the lateral margins of said filmstrip; and

the space between said second film guide surfaces having a finger opening formed therein and

means providing a reduced area of film contact on said first surface in the space between said first film guide surfaces to reduce the friction between said film and said first surface;

said reduced area of film contact in registration with said opening;

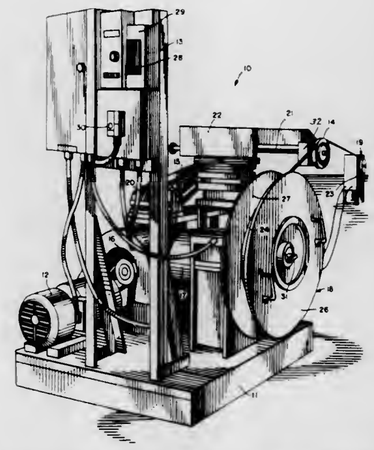
whereby said filmstrip may be manually advanced along said film guide channel by pushing said filmstrip accessible through said finger opening with a finger.

4,093,143

STOCK WINDING APPARATUS

Jesse W. Escue, 314 Nicholson, Joliet, Ill. 60435

Filed Apr. 11, 1977, Ser. No. 786,149
Int. Cl.[2] B65H *59/00*
U.S. Cl. 242—75.51 **15 Claims**



1. An apparatus for winding stock in coil fashion comprising a base, a variable speed motor mounted on said base, said motor operatively joined through a first gear box to a drive shaft equipped with a reel for taking up said stock, a speed selection control unit for regulating the speed of said motor having monitoring means responsive to movement of said stock at a point remote from said reel, said monitoring means instantaneously signalling said motor to reduce its speed in response to momentary slight increases in the speed of said stock at said remote point as the diameter of said stock on said reel builds to maintain the speed of said stock at the selected speed on said control unit, a coil guide operatively joined through a second gear box to said first gear box for rotation and reciprocation to direct said stock onto said reel, said coil guide being carried on a support shaft linked to said second gear box through reciprocal camming means, and clutch means for selectively engaging and disengaging said motor and said first gear box whereby said apparatus is adapted to direct said stock onto said reel in side-by-side coil fashion at the selected speed.

4,093,144

FISHING REEL BRAKE

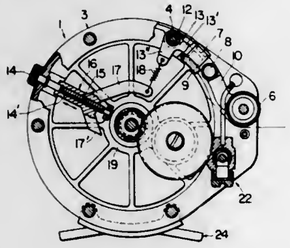
Yasomatsu Morishita, Kure, Japan, assignor to Ryobi, Ltd., Fuchu, Japan

Filed Aug. 25, 1976, Ser. No. 717,782
Claims priority, application Japan, Aug. 29, 1975, 50-120020[U]
Int. Cl.[2] A01K *89/02*
U.S. Cl. 242—84.52 A **1 Claim**

1. In a bearing type fishing reel having a reel body with side plates rotatably supporting a spool around which a fishing line is controllably wound and unwound through a traverse cam device, the improvement characterized by,

a shaft extending between said side plates and positioned radially outwardly from said spool, a pair of arms pivotally mounted at one end to said shaft, said arms extending substantially along the outer circumference of said spool when in a braking position and rotatable away from the outer circumference of said spool to a non-braking posi-

tion, a line guide roller rotatably connected between second ends of said arms at a position whereby said line will ride on said guide roller as said line is unwound or rewound, and said guide roller being positioned such that tension on said line provides a rotating force on said arms in the direction of said non-braking position, said arms having brake pads connected thereto at positions closer to said shaft than said roller and on the side of said arms facing said spool to frictionally engage said outer circumference of said spool, the force of said frictional engagement being greater as said arms are rotated towards the circumference of said spool to said braking position, a lever attached to one of said arms and rotatable with said arm about said shaft, said lever being inside one of said



side plates and extending radially inwardly, a control screw substantially entirely located within said side plate except for a manually rotatable head portion, a control member threaded onto said control screw for sliding axially thereon upon rotation of said screw, said control member having an arm extending towards said lever, spring means connected between said control member arm and said radially extending lever, said spring means and the weight of said line guide roller providing a biasing force on said arms to rotate said arms to said braking position, whereby the value of said braking force can be manually adjusted by rotating said control screw which causes the physical relationship between said spring means and radially extending lever to be altered.

4,093,145

SELF-LOCKING BELT WINDING DEVICE

Wolf-Dieter Klink, Schw.-Gmund-Lindach, Germany, assignor to REPA GmbH Feinstanzwerk, Schw.-Gmund-Lindach, Germany

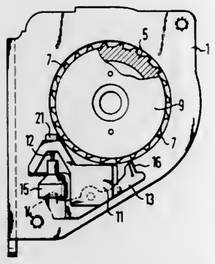
Filed Dec. 17, 1973, Ser. No. 426,341

Claims priority, application Germany, Dec. 18, 1972, 2261890

The portion of the term of this patent subsequent to Jun. 6, 1993, has been disclaimed.

Int. Cl.² B65H *75/48*

U.S. Cl. 242—107.4 A **4 Claims**



1. Self-locking belt wind-up device for safety belts comprising rotatable cylinder means whereon a safety belt is windable, and a unitary assembly of a bearing block, a pendulum pendulously supported by said bearing block, and a locking lever pivotally supported independently of said pendulum on said bearing block, said pendulum having a mass on the normally lower end thereof, said locking lever being engageable by said mass and being pivotable thereby into a position wherein it is in engagement with said cylinder means and locks the latter against rotation.

4,093,146

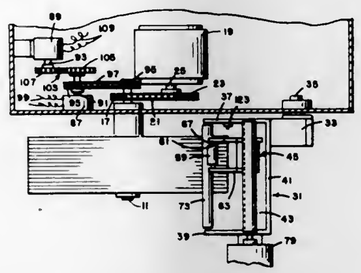
WINDING METHOD AND APPARATUS FOR STRAPPING AND STRAPPING PACKAGE

Harold A. Haley, Media, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 561,133, Mar. 24, 1975, abandoned. This application Aug. 24, 1976, Ser. No. 717,432

Int. Cl.² B65H *54/28, 55/04*

U.S. Cl. 242—158.2 **22 Claims**



1. A method of winding a continuous strapping as a roll comprised of a plurality of overlying layers each having a like number of strapping convolutions, said method including the steps of continuously advancing the strapping relative to a strapping traverse carriage toward and onto a continuously rotating shaft to wind the strapping thereon, moving the carriage linearly like distances in each of opposite directions relative and parallel to the rotating shaft and correlating the movement of the traverse carriage with the rotation of the winding shaft by generating a like number of electrical pulses during each revolution of the winding shaft, employing a train of electrical pulses related to those generated during rotation of the winding shaft for moving the carriage in each of its opposite directions of traverse for a period during which I + F convolutions of strapping are wound about the shaft as a roll layer, where I is an interger and F ranges from zero to less than one complete convolution, and between successive movements of the carriage in the opposite directions of traverse maintaining the carriage in a dwell position for a period during which a selected number of such electrical pulses are generated by the rotation of the winding shaft and strapping portions B are wound on the roll which bridge overlying roll layers and define nodes at each of the roll ends, with the duration of each such dwell period being such that the strapping portions F and B together range essentially 1 minus $\frac{1}{8}$ of a strapping convolution to 1 plus $\frac{1}{8}$ strapping convolutions and the nodes defined by the bridging portions B at the respective ends of the wound roll are arranged in overlying relationships and form not less than 2 and not more than 4 groups of nodes at each of such roil ends.

4,093,147

FLAT NYLON 66 YARN HAVING A SOFT HAND, AND PROCESS FOR MAKING SAME

James E. Bromley, Pensacola, Fla.; Michael M. McNamara, Gaffney, S.C., and Wayne T. Mowe, Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 482,962, Jun. 25, 1974, abandoned. This application Nov. 4, 1975, Ser. No. 628,721

Int. Cl.² B65H *55/02;* D01D *5/16;* D02J *1/22;* D02G *3/22*

U.S. Cl. 242—159 **22 Claims**

1. A bobbin having wound thereon a flat nylon 66 yarn having a substantially constant cross sectional configuration along its length, a shrinkage S less than 8.5%, an initial modulus greater than 15 g/d, a positive stress index α, and a retraction less than 1%.

4,093,148

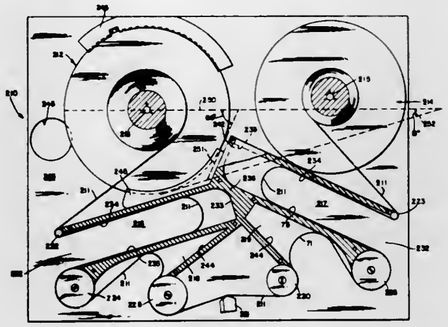
TAPE PATH FOR A MAGNETIC TAPE TRANSPORT SYSTEM

James P. Urynowicz, Los Angeles; Daniel R. O'Neill, Santa Monica; Hale M. Jones, Playa Del Rey, and Alan Painter, Los Angeles, all of Calif., assignors to Telex Computer Products, Inc., Tulsa, Okla.

Filed Nov. 5, 1975, Ser. No. 623,469

Int. Cl.² G11B *15/58*

U.S. Cl. 242—182 **3 Claims**



1. Within a magnetic tape transport system, which includes:
a. a file reel disposed in a particular plane, the file reel storing a magnetic tape;
b. a machine reel disposed in the same plane as the file reel and adjacent to the file reel;
c. a file reel drive motor for driving the file reel;
d. a machine reel drive motor for driving the machine reel;
e. a magnetic head disposed approximately on a center-line drawn between the file reel and the machine reel;
f. a capstan for driving the magnetic tape bidirectionally between the file reel and the machine reel;
g. a control system for controlling the file reel drive motor, the machine reel drive motor and the capstan, a tape path comprising:
1. a first vacuum chamber and a second vacuum chamber, each of said vacuum chambers being disposed in the same plane as the file reel and the machine reel and having a front plate, a back plate, a base plate and a pair of parallel sidewalls, one sidewall of said first vacuum chamber is adjacent to the file reel and one sidewall of the second vacuum chamber; is adjacent to the machine reel, said first and second vacuum chambers being disposed in such a manner that said parallel sidewall plates of said first vacuum chamber form a V with said parallel sidewall plates of said second vacuum chamber with both of said base plates at the vertex of said V, said first vacuum chamber is disposed parallel and adjacent to a line tangent to said file reel, said tangent line intersecting the horizontal line of said file reel at an angle in the range of 10° to 20° and said second vacuum chamber is disposed perpendicular and adjacent to a line tangent to said file reel, said tangent line intersecting the horizontal line of said file reel at an angle in the range of 60° to 70°, the horizontal line being drawn through the center of said file reel and parallel to the ground;
2. means for guiding said magnetic tape along said tape path; and
3. a first auxiliary vacuum chamber and a second auxiliary vacuum chamber, each of said auxiliary vacuum chambers disposed adjacent to one of said first and second vacuum chambers and having a front plate, a back plate, a pair of sidewall plates, one sidewall plate of said first auxiliary vacuum chamber being common to a sidewall of said first vacuum chamber and one sidewall plate of said second auxiliary vacuum chamber being common to a sidewall of said second vacuum chamber.

4,093,149

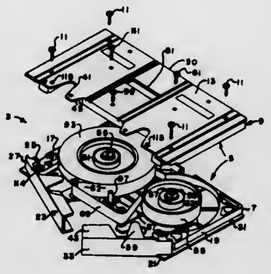
CARTRIDGE TAPE RECORDER SYSTEM AND CARTRIDGE THEREFOR

Bansi K. Shroff, Irvine; Frank Dekker, Santa Ana, and John Nordrehaug, Laguna Niguel, all of Calif., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 28, 1975, Ser. No. 635,939

Int. Cl.² G11B *23/10, 15/32*

U.S. Cl. 242—198 **14 Claims**



1. A cartridge-type tape transport system comprising in combination: (A) a cartridge enclosing a pair of coplanar hubs rotatable about fixed axes orthogonal to the plane of said hubs and a length of pliable tape carried in rolls on said hubs, with a span of said tape intermediate said rolls extending generally across a front face of said cartridge and (B) a transport comprising (1) a transducer cooperative with said span of tape intermediate said rolls, and (2) drive means for driving said tape across said transducer onto a first said tape roll from the second said tape roll, characterized by positioning means for positioning said cartridge along said orthogonal axes with respect to said transducer, said positioning means comprising: (i) a plurality of slots on a broad face of said cartridge, said slots extending from front to rear of said face, (ii) a plurality of ribs on said transport, said ribs extending into said slots and engaging the bottom surfaces of said slots to establish the position along said orthogonal axes of said cartridge, said ribs having a height greater than the depth of said slots and (iii) cartridge biasing means for biasing the bottom surfaces of said slots into engagement with said ribs.

4,093,150

METHOD AND APPARATUS FOR PROVIDING CONSTANT MAGNETIC TAPE TENSION

Donald L. Burdorf, Newport Beach, and James Bjordahl, Arcadia, both of Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Jun. 13, 1977, Ser. No. 805,654

Int. Cl.² G03B *1/04;* G11B *15/32*

U.S. Cl. 242—192 **14 Claims**

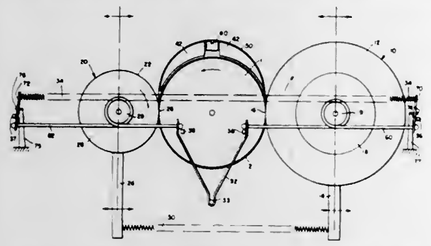
1. An apparatus for generating constant tape tension in a tape

transport system of the type wherein the supply and take-up reels are simultaneously driven by surface engagement with a capstan having a resiliently deformable peripheral surface, said apparatus comprising:

means for urging the supply and take-up reels against the peripheral surface of the capstan thereby causing the peripheral velocity of said supply and take-up reels to increase above that of said capstan;

means for imparting a constant braking force on said supply reel, said braking means generating bias and torque effects upon the periphery of said supply reel;

said bias effect uniformly reducing the peripheral velocity of the supply reel throughout the tape transport operation



thereby creating a first tensioning component in the span of tape between said supply and take-up reels;

said torque effect reducing the peripheral velocity of the supply reel throughout the tape transport operation in direct proportion to the decreasing diameter of the tape wound thereon thereby creating a second tensioning component in the span of tape between said supply and take-up reels; and

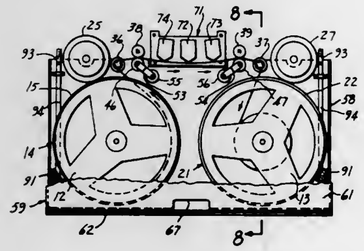
a means for balancing said first and second tensioning components of said constant braking means so as to match the supply reel peripheral velocity rate of change occuring during the tape transport operation to the greater, but correspondingly sloped, take-up reel peripheral velocity rate of change.

4,093,151

WEB TRANSPORTING APPARATUS AND WEB CARTRIDGES

Irving Karsh, Los Angeles, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Aug. 16, 1976, Ser. No. 714,739
Int. Cl.² G11B *23/10*
U.S. Cl. 242—198 **20 Claims**



1. Apparatus for transporting a web from a first reel to a distinct second reel, comprising in combination:

means for rotating said first reel including a first turntable structure for removably receiving, supporting and rotating said first reel, and first means for engaging a peripheral portion of said first turntable structure and for rotating said first turntable structure via said peripheral portion;

means for rotating said second reel including a distinct second turntable structure for removably receiving, supporting and rotating said second reel, and second means for engaging a peripheral portion of said second turntable structure and for rotating said second turntable structure via said peripheral portion of the second turntable structure;

means including a web capstan for driving said web between said first and second reels;

a base for jointly supporting and rotatably mounting said first and second turntable structures;

means for forming a first web loop between said first turntable structure and said web capstan, said first loop forming means including a first web loop feeler, means for yieldably mounting said first web loop feeler on said base adjacent said first turntable structure, and first means releasably coupled to said first web loop feeler and connected to said first turntable rotating means for controlling said first turntable rotating means to maintain said first web loop;

means for forming a second web loop between said second turntable structure and said web capstan, said second loop forming means including a second web loop feeler, means for yieldably mounting said second web loop feeler on said base adjacent said second turntable structure, and second means releasably coupled to said second web loop feeler and connected to said second turntable rotating means for controlling said second turntable rotating means to maintain said second web loop; and

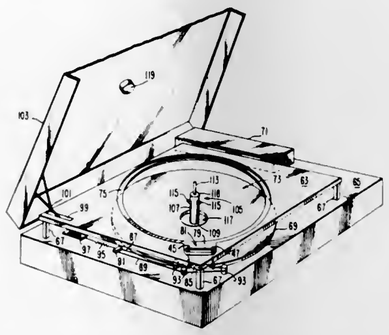
means for mounting said base for manual removal relative to said first and second peripheral portion engaging means, web capstan and first and second means for controlling said first and second turntable rotating means.

4,093,152

DISC CADDY AND DISC PLAYER SYSTEM THEREFOR

Kenneth Donald Peters, Cranbury, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 4, 1977, Ser. No. 793,639
Int. Cl.² G11B *25/04*
U.S. Cl. 274—9 R **6 Claims**



1. In a disc record player, including a turntable rotatably mounted on a base, for use with a record-enclosing caddy having a pair of substantially flat covers, with peripheries releasably held by an expandable ring in respective channels in the inner rim of said ring which are disposed on opposite sides of an inwardly-projecting central land of the ring; apparatus comprising the combination:

means, mounted on said base and including a ring-engaging platform, for supporting a caddy in a position over said turntable whereat the covers thereof are substantially parallel to said turntable;

first selectively actuated means for expanding the circumference of a platform-engaged caddy ring to an expanded shape permitting channel release of the lowermost of the covers held by said platform-engaged ring, while maintaining support of the uppermost of said covers on the central land of said ring; and

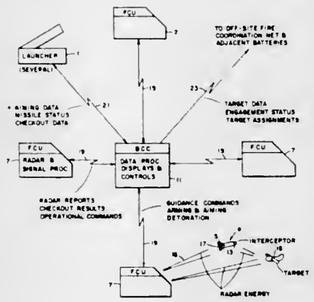
second selectively actuated means, subject to engagement with the released cover, for lifting said released cover off said turntable and returning it to plaftform level.

4,093,153

GROUND-CONTROLLED GUIDED-MISSILE SYSTEM

Manuel L. Bardash, Willingboro; Carl P. Clasen, Cherry Hill; Robert M. Scudder, Haddonfield; Lawrence H. Simon, Cherry Hill; Charles S. Sorkin, Cherry Hill; Raphael O. Yavne, Cherry Hill, all of N.J.; Robert W. Ekis, Athens, Ala., and Alfred I. Mintzer, Lexington, Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 18, 1965, Ser. No. 508,605
Int. Cl.² F41G *7/14*
U.S. Cl. 244—3.14 **17 Claims**



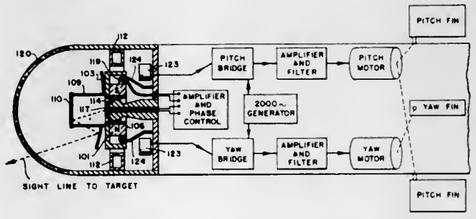
1. A missile system for defense against ground targets and clouds of incoming targets and decoys, comprising: launchers with missiles mounted thereon and disposed for positioning on locations for launching said missiles; and a time-sharing radar installation disposed for performing the functions of acquisition, tracking and discrimination of the targets, simultaneous tracking of discrete units of the targets, transmission of command signals to said launchers for launching said missiles, and command control of said missiles after the launch, all on the same time-sharing basis.

4,093,154

TARGET SEEKING GYRO FOR A MISSILE

William B. McLean, China Lake, Calif., assignor to Walter G. Finch, Baltimore, Md., a part interest

Continuation of Ser. No. 337,899, Feb. 19, 1953, abandoned. This application May 7, 1956, Ser. No. 583,337
Int. Cl.² F42B *13/28;* F41G *7/10;* G01C *19/28, 19/53*
U.S. Cl. 244—3.16 **38 Claims**



37. In combination in a missile guidance system, a target seeking apparatus having radiation responsive means including a scanner, a gyroscope having a rotor, said scanner being mounted on said rotor for picking up radiation from a target, means for precessing said gyroscope rotor to align its axis with the sight line to said target, said radiation responsive means producing a signal when the gyroscope rotor axis deviates from alignment with the sight line to said target, said signal having a time phase dependent on the radial direction of departure of said target from the gyro rotor axis, the precessing means embodying mechanism responsive to the phase of said signal whereby said gyro is precessed in the proper sense to align its axis with the line of sight to said target, a position sensing means included in said target seeking apparatus and mounted adjacent said gyro rotor for sensing the position of said gyro rotor, and servo means responsive to signals from said gyro rotor position sensing means for guiding said missile.

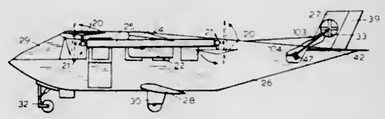
38. A target seeking device for a guided missile comprising a gyroscopically stabilized means for optically scanning a limited region about a first coordinate axis for electromagnetic radiations emanating from a target source, said means including a permanent magnet rotor rotatable with said gyroscopic means about said first axis, the magnetic poles of said permanent magnet defining a second coordinate axis transverse to said first coordinate axis, a radiation sensitive means for producing electrical signal variations in response to variations in radiation incident on said radiation sensitive means, said radiation sensitive means being fixedly positioned relative to said scanning means for receiving said radiations from said scanning means to cause said electrical signals generated thereby to vary in magnitude with the directional displacement of said target with respect to said first coordinate axis and in time phase with the polar angular position of said target with respect to the second coordinate axis, and means interacting with said permanent magnet rotor responsive to said signal for applying a magnetic force to said gyroscopically stabilized means having a component normal to said second axis and in a direction causing said gyroscopically stabilized means to precess through an angle and in a direction to bring said first coordinate axis into directional alignment with said target source.

4,093,155

STEAM POWERED TILTING ENGINE VTOL AIRPLANE

Elmo Kincaid, Jr., 1660 Ashley Dr., Clarkston, Wash. 99403

Filed Feb. 14, 1977, Ser. No. 770,086
Int. Cl.² B64C *29/00*
U.S. Cl. 244—12.4 **10 Claims**



1. A VTOL airplane having fixed wings with a plurality of propulsion units supported on struts distributed about the center of gravity of the airplane, and having multi-bladed rotors interconnected to and driven by each propulsion unit in a manner for generating thrust when the propulsion units are operated, the propulsion units being mounted rotatably to the wings of the airplane for movement between forward flight positions and hover positions, including means for rotating said propulsion units between the forward flight position and the hover position, at least one working fluid generator fixedly attached to the airplane, and means for distributing the working fluid from the said generator to each of the propulsion units, each propulsion unit comprising:

(a) two cylinders horizontally opposed, said cylinders being mounted on opposite sides of a crankcase,

(b) a plurality of bosses surrounding said crankcase,

(c) radial bearings received by said bosses, to surround and support the propulsion unit, said bearings having an axis of rotation substantially parallel to said cylinders, and

(d) each of said cylinders having a cylinder head and a

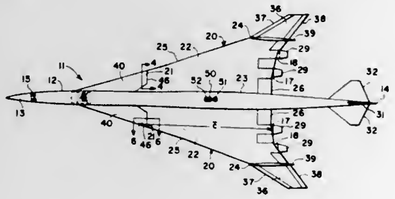
working fluid supply pipe connected thereto by means of a rotary joint which is coaxial with said radial bearings.

4,093,156

SUPERSONIC TRANSPORT

Paul L. Coe, Jr., Yorktown, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 27, 1976, Ser. No. 718,244
Int. Cl.² B64C *3/08, 5/04*
U.S. Cl. 244—45 A **5 Claims**



1. An aircraft having supersonic flight capabilities comprising:

a fuselage having a fineness ratio suitable for supersonic flight;

a wing connected to each side of said fuselage and projecting outwardly therefrom, each said wing including:

(a) a main wing panel having a relatively thick swept leading edge and a relatively thin trailing edge, said main wing panel having notched leading edge means for receiving a movable wing apex segment in its stowed position;

the wing apex segment forming a forward extension of the swept leading edge of said main wing panel in the stowed position for efficient supersonic cruise, said wing apex segment being separable from said wing and both pivotal and rotatable to a deployed position such that said wing apex segment acts as an independent aerodynamic surface providing a lift component to said aircraft forward of said main wing panel, said wing apex segment being further segmented into members to obtain desired sectional configurations; the wing apex segment providing a substantially linear variation in aircraft pitching moment with respect to aircraft angle of attack by suppressing the formation of wing apex vertices when the wing apex is in a deployed position;

at least one engine nacelle affixed beneath each said wing and terminating substantially at the trailing edge thereof; an engine contained in each said nacelle for producing thrust; and jet exit nozzles hingedly attached to substantially the rearmost extremity of each said nacelle so constructed and arranged as to direct thrust;

means for selectively positioning said jet exit nozzles such that their angle of declination increases the positive lift component of the thrust vector during reductions in flight speed from supersonic to subsonic; and

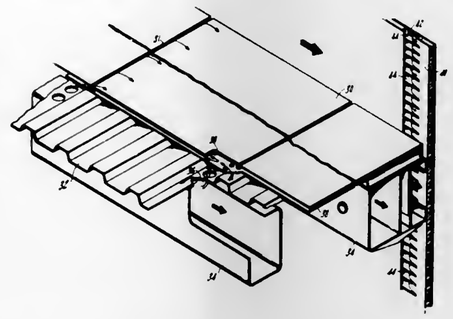
means for selectively positioning said wing apex segments and segmented members so that their angle of incidence produces a variable forward lift component providing artificial longitudinal stability to said aircraft in its initial trim condition.

4,093,157

SEAL FOR VARIABLE PLUG TWO DIMENSIONAL NOZZLE

Robert B. Cavanagh, Jr., and David K. Jan, both of Rockville, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 751,802, Dec. 16, 1976, abandoned. This application Aug. 16, 1977, Ser. No. 825,127
Int. Cl.² F02K *11/04*
U.S. Cl. 244—53 R **4 Claims**



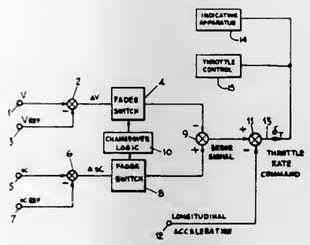
1. A two dimensional nozzle for exhausting products of combustion emanating from a gas turbine engine, a centerbody in said nozzle having side edges in sliding relation with side walls of said nozzle, cooling means for said side walls and said centerbody wherein, said cooling means for said side walls includes flat surfaced side wall panels having inner passages conducting cooling air in indirect heat exchange with said exhausting products of combustion and discharging in the exhaust gas flow path through vertical slots in said side wall panels, said slots being in communication with a cavity in said centerbody such that cooling air leaks therefrom, means to prevent said leaks including spaced dam-like elements disposed in said vertical slots such that when said side edges wipe over said spaced dam-like elements at least one of said elements extends between said cavity and the exhaust stream minimizing said leaks.

4,093,158

AIRPLANE INSTRUMENT WITH THROTTLE CONTROL SELECTIVELY REGULATED BY AIR SPEED OR LIFT

David George Clews, and David Sweeting, both of Maidstone, England, assignors to Elliott Brothers (London) Limited, Chelmsford, England

Filed Dec. 23, 1976, Ser. No. 753,711
Claims priority, application United Kingdom, Feb. 11, 1976, 5381/76
Int. Cl.² G05D *1/08*
U.S. Cl. 244—182 **13 Claims**



1. An aircraft instrument comprising:

(a) means for providing a first signal which is a function of airspeed and suitable for use in controlling an aircraft by variation of the airspeed to a predetermined value;

(b) means for providing a second signal which is a function of lift and suitable for use in controlling the aircraft by variation of the airspeed to adjust the lift to a predetermined value;

(c) selecting means arranged to apply the second signal to signal utilization means for controlling the aircraft in accordance with said second signal except when said second signal falls below a predetermined datum level, which represents a safe margin above stall, whereupon the first signal is applied to the signal utilization means; and

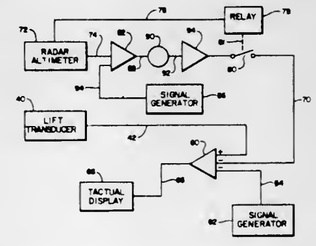
(d) the selecting means being arranged to provide a transition between control by the first signal and control by the second signal which is shorter than a transition between control by the second signal and control by the first signal.

4,093,159

SEMI-AUTOMATIC AIRCRAFT CONTROL SYSTEM

Richard D. Gilson, Columbus, Ohio, assignor to The Ohio State University Research Foundation, Columbus, Ohio

Filed Mar. 7, 1977, Ser. No. 775,384
Int. Cl.² G05D *1/12*
U.S. Cl. 244—187 **25 Claims**



1. A flight control system for providing a command perceptible to a pilot representing control correction required to derive an optimum attitude for an aircraft, comprising:

transducer means responsive to the instantaneous aerodynamic status of the airfoil exhibited by said aircraft for deriving an output signal, V_A, corresponding with the instantaneous coefficient of lift exhibited by said airfoil;

first signal generator means for deriving a signal of fixed value, V_D, proportional with a coefficient of lift for said airfoil predetermined to be desired for performance of said aircraft during approach to flare-out and departure maneuvers;

altimeter means having an output signal of value, *h*, variable in correspondence with the absolute altitude of said aircraft;

second signal generator means for deriving a predetermined signal of fixed value, A, corresponding with a said altitude selected for commencing flare-out performance of said aircraft;

first summing network means coupled to receive said predetermined signal of value, A, and said altimeter output signal of value, *h*, for deriving an altitude responsive output signal of value corresponding with the expression, A-*h*, only when said aircraft is at or below said altitude corresponding with said signal of value, A,

second summing network means responsive to said transducer means output signal value, V_A, and said first signal generator means signal of value, V_D, when said aircraft is above a said altitude corresponding with said signal of value, A, and for deriving a control error signal therefrom of value, V_C, in correspondence with the expression:

$$V_C = V_D - V_A,$$

said second summing network means additionally being responsive to said first summing network output signal of value, A-*h*, when said aircraft is at or below said altitude corresponding with said signal of value, A, for deriving said control error signal in correspondence with the expression:

$$V_C = V_D - V_A + (A-h)\beta,$$

where, β, is an empirically determined calibrating constant; and

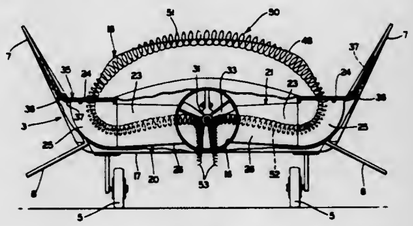
display means responsive to said control error signal to provide a perceptible indication of correction required for establishing an optimum attitude for said aircraft.

4,093,160

FREE VORTEX AIRCRAFT

Ray R. Reighart, II, 4778 Hillcrest North, Hilliard, Ohio 43026

Filed Oct. 15, 1976, Ser. No. 732,996
Int. Cl.² B64C *23/06*
U.S. Cl. 244—199 **19 Claims**



1. Improved free vortex aircraft construction including:

(a) frame means;

(b) shield means mounted on the frame means to generate and shed a substantial amount of vorticity into the air when the aircraft moves forwardly through the air, with said shield means and frame means providing an upper vortex forming zone downwind of the shield means;

(c) vortex duct means located within the frame means, generally beneath the upper vortex forming zone, and extending transversely across the frame means providing a lower vortex zone, with said duct means being provided with a pair of spaced inlet openings communicating with the ends of the upper vortex forming zone;

(d) thruster air duct means located within and extending longitudinally along the frame means and communicating with the vortex duct means intermediate the spaced inlet openings; and

(e) engine means mounted centrally on the frame means and communicating with the thruster duct means to provide thrust for moving the aircraft forwardly through the air and for pumping air from the upper vortex forming zone through the inlet duct openings and vortex duct means to retain and concentrate the vorticity within said upper vortex zone to form a free vortex of low pressure air extending in a generally circular manner across the frame means and through the vortex duct means, with said free vortex acting on the frame means and vortex duct means to produce lift on the aircraft.

4,093,161

CONTROL SYSTEM WITH IMPROVED COMMUNICATION FOR CENTRALIZED CONTROL OF VEHICLES

John H. Auer, Jr., Fairport, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

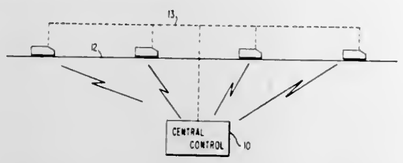
Filed Apr. 25, 1977, Ser. No. 790,737
Int. Cl.² B61L *27/00*
U.S. Cl. 246—5 **8 Claims**

1. A method of operating a plurality of vehicles controlled by a central controlling authority and communicating with the vehicles over a communication facility including the steps of:

(a) manifesting to all vehicles within a common zone of control a permissive GO indication;

(b) communicating information from a plurality of vehicles to a central controlling authority and determining, at said central controlling authority, whether said vehicles or any of them should continue in motion;

(c) for each vehicle it is determined should not continue in motion, formulating and communicating to such specific vehicle a STOP command;



(d) receiving said STOP command aboard said specific vehicle and transmitting to said central controlling authority a manifestation that said STOP command has been received; and,

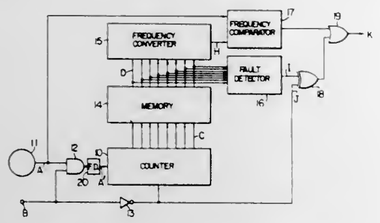
(e) removing said permissive GO indication from each of the vehicles if said central controlling authority does not receive said acknowledgement that said stop command has been received from each vehicle to which a STOP command was transmitted.

4,093,162

TRAIN OPERATION CONTROL APPARATUS

Tadashi Takaoka, Ibaraki, and Eiichi Toyota, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 15, 1977, Ser. No. 768,753
Claims priority, application Japan, Feb. 20, 1976, 51-17054
Int. Cl.² B61L *3/00*
U.S. Cl. 246—182 B **6 Claims**



1. A train operation control apparatus comprising:

a counter which starts to count an input signal having a frequency proportional to a running speed of the train in response to an operation signal which is produced when the train passes a predetermined point, the content of the counter being indicative of the distance which the train has travelled after passing the predetermined point,

a memory having locations for storing speed instructions predetermined according to the distance which the train has travelled after passing the predetermined point, said instructions being selectively read out according to the content of said counter,

means for setting the content of said counter at a predetermined value before said operation signal is produced,

a fault detection circuit for detecting a failure of said counter according to the content of said memory which is read out in response to said operation signal, and

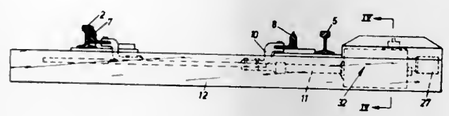
a brake instruction circuit for producing a brake instruction applied to the train upon detection of the failure of said counter, said brake instruction circuit including an exclusive OR circuit which exclusively ORs the output of said fault detection circuit and said operation instruction signal.

4,093,163

SWITCH FOR RAIL POINTS

Bertil Ivar Larsson, Bredaryd, Sweden, assignor to Elektromekano i Bredaryd AB, Bredaryd, Sweden

Filed Jan. 11, 1977, Ser. No. 758,416
Claims priority, application Sweden, Jan. 19, 1976, 7600466
Int. Cl.² B61L *9/04, 5/06*
U.S. Cl. 246—476 **7 Claims**



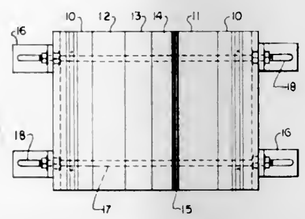
1. An improved switch for rail points arranged to shift a switch blade consisting of two rails interconnected at corresponding free ends to end positions, alternately in engagement with the inner face of one of two railroad track rails, said railroad track rails resting on substantially equidistantly spaced sleepers, the improvement comprising a hollow box girder forming a housing and having substantially the external dimensions of one of said sleepers and positioned in the location of a sleeper in spaced relation to a pair of adjacent sleepers, an electrically powered mechanism positioned within said housing and connected with said switch blade to shift the switch blade to said end positions, and an associated switch blade end position indicator mechanism within said housing and having a connection with said electrically powered mechanism, the arrangement being such that the railroad bed areas between said housing and the adjacent pair of sleepers is unobstructed.

4,093,164

PRECAST ADJUSTABLE FOUNDATION FOR SMALL EQUIPMENT

Edgar L. Borreson, 6133 N. Newburg Ave., Chicago, Ill. 60631

Filed Mar. 25, 1977, Ser. No. 781,500
Int. Cl.² F16F *15/00*
U.S. Cl. 248—20 **2 Claims**



1. A precast equipment installation foundation for levelling and holding down of equipment having particular base dimensions and absorption of equipment vibration, comprising

two precast concrete end blocks of substantially the same standardized width, each of said end blocks being provided with at least two aligned compression rod holes, and each of said blocks being provided with a continuous channel insert rail on its equipment-mounting face for mounting of equipment,

a plurality of precast concrete blocks of different, standardized widths, positioned between said end blocks, each of said plurality of intermediate blocks being provided with at least two aligned compression rod holes aligned with the holes of said end blocks, and having widths selected to provide a distance between said channel rails approximating the equipment base dimensions,

a plurality of shims having slots aligned with said compression rod holes for fine adjustment of the distance between the channel rails to the equipment mounting dimension,

at least two compression rods and bolts positioned through said compression rod holes to hold said end blocks, shims and intermediate blocks in compressive relationship, and

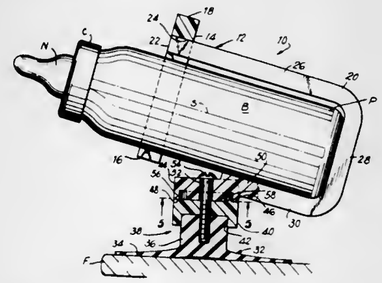
at least four angle-iron legs mounted to said end blocks by means of said compression rods and at each respective end thereof, said angle-iron legs being provided with mounting slots for individual height adjustment of each leg to provide for levelling capability for the compression-loaded foundation assembly.

4,093,165

DEVICE FOR HOLDING BABY BOTTLES

Edward Sussman, 166-25 Powells Cove Blvd., Beechhurst, Queens, N.Y. 11415

Filed Jan. 27, 1977, Ser. No. 762,882
Int. Cl.² A47D *15/00*
U.S. Cl. 248—106 **1 Claim**



1. A device for holding a baby bottle, especially a bottle of the type containing an internal sucking straw, the device comprising a flexible suction cup adapted to grip any flat horizontal surface, a collar encircling the bottle about its circumference, a rod fixed to the collar and encircling the bottle about its lower length, the collar and the rod forming a bottle cage removably retaining the bottle, a swivel mechanism comprising upper and lower bearing members, the rod being fixed to the upper bearing member so as to orient the rod and thereby the cage along an upward slant in the range of 15° to the horizontal, and the suction cup being fixed to the lower bearing member, the flexibility of the suction cup enabling limited manual variation of the upward slant of the cage, and a substantially vertically-oriented pin member passing through and joining the bearing members for rotation about a substantially vertical axis, the lower bearing member carrying a stud and the upper bearing member having an arcuate slot extending through an arc in the range of 180° for receiving the stud, thereby limiting the rotation of one bearing member with respect to the other bearing member.

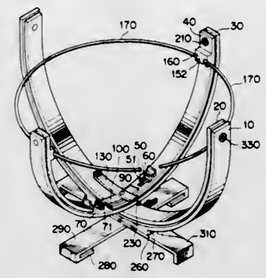
4,093,166

HORIZONTAL POSTURE MAINTENANCE STRUCTURE

Shonosuke Iida, 759 Nishikubo, Chigasaki-shi, Kanagawa-ken, Japan

Filed Jun. 13, 1977, Ser. No. 806,214
Claims priority, application Japan, Aug. 21, 1976, 51-111874[U]
Int. Cl.² A47C *7/70*
U.S. Cl. 248—126 **7 Claims**

1. The horizontal posture maintenance structure comprising: an outer member consists of a slinger and a dangler which curve and are shaped of similar figure and long narrow strip pieces and are pivoted at both ends, and an inner member consists of a rotator and a rocker which curve and are shaped of similar figure long narrow strip pieces by same manner of the foregoing outer member and are pivoted at both ends, and the dangler and the rotator are rotatably engaged at the bottom with each other, and the rocker restores and keeps horizontal



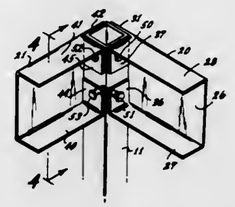
posture and condition against inclination when the both outer and inner member are spread to crossed condition.

4,093,167

CONSTRUCTION OF METAL ARTICLES

Jack Rooklyn, 19339 Citronia, Northridge, Calif. 91324

Filed Aug. 26, 1976, Ser. No. 717,598
Int. Cl.² F16B *12/46*
U.S. Cl. 248—188 **5 Claims**



1. In the construction of metal articles having polygonal upright members and channel shaped transverse members, in combination, an upright member having an end part having flat side portions lying in mutually perpendicular transverse planes, channel shaped transverse members constructed to be secured to the end portion of the said upright member by way of joints, each channel shaped transverse member having side flanges and end parts including portions having surfaces lying in mutually perpendicular transverse planes, configurated to fit against surfaces of the sides of the end part adjacent to but not beyond the end of the upright member, certain of said portions comprising opposed tabs formed by inwardly bent parts of the terminal ends of said side flanges, said tabs nesting on the outside of said upright member and securing means securing the said juxtaposed surfaces to each other, and the bottom of said channel shaped member devoid of its side flanges by the formation of said tabs resting on one of said surfaces of the sides of the end part but not extending beyond the side edge thereof.

4,093,168

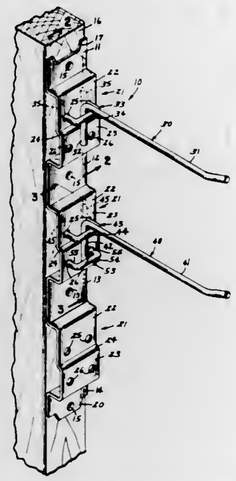
HANGER BRACKET

Robert T. Buril, 1753 James Rd., St. Paul, Minn. 55105

Filed Aug. 19, 1977, Ser. No. 825,919
Int. Cl.² A47F *7/28*
U.S. Cl. 248—220.4 **7 Claims**

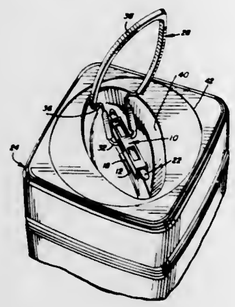
1. As a substitute for a perforated mounting board of known thickness and known hole spacing and sizing, a strip of substantially rigid sheet material having at least two mounting flanges to jointly define a reference surface, and having bracket means connected to and located between said flanges with a stepped configuration defining first and second mounting surfaces joined at a step and spaced at lesser and greater distances respectively from said reference surface, the difference be-

tween said distances being substantially said known thickness less the thickness of the sheet material, said first mounting



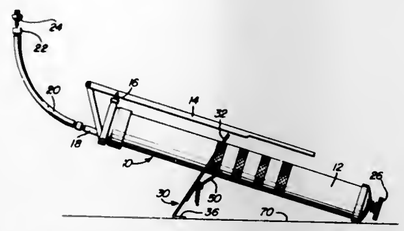
surface being formed with a set of holes, spaced and sized to agree with said known hole spacing and sizing, at locations spaced from said step.

4,093,169
ATTACHABLE HANGER FOR CONTAINERS
David A. Winchell, Twin Lakes, Wis., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.
Filed Dec. 20, 1976, Ser. No. 752,643
Int. Cl.² B65D *23/10*
U.S. Cl. 248—311.3 **8 Claims**



1. A one-piece hanger for a container which comprises:
means for attaching said hanger member to a container, an elongated, flexible hanger member, secured at both ends thereof to said attaching means to define a closed loop, and positioned in generally coplanar relationship to said attaching means, said elongated hanger member defining a pair of first flex sections positioned respectively adjacent the ends of said hanger member said first flex sections being adapted to bend to permit said hanger member to be pulled into a more transverse relationship with said attaching means, said elongated hanger member also defining a pair of curved, spaced, second flex sections positioned in spaced relation with the ends of said elongated flexible hanger member, said second flex sections being also adapted to bend, to facilitate the moving of said elongated hanger member into said more transverse relationship.

4,093,170
SUPPORT FOR HAND GREASE GUN
Claude Spray, 6008 Arlington Blvd., Richmond, Calif. 94805
Filed Jan. 31, 1977, Ser. No. 764,460
Int. Cl.² A47G *29/00*
U.S. Cl. 248—359 **3 Claims**



1. A support for a hand grease gun of the type including an elongated cylindrical body and an oscillatable pump actuating lever swingable toward and away from one side of said body, said support comprising an upstanding inclined panel member having an opening formed through an upper portion thereof and including upstanding opposite side marginal portions and upper and lower marginal portions, said opening being of a size to snugly, but slidingly receive the rear end portion of a cylindrical grease gun body therethrough, an elongated upstanding lever hingedly supported, intermediate its opposite ends, from the downwardly facing side of said panel member for oscillation about a horizontal axis spaced below said opening and extending transversely of said lever outwardly of said side, the upper end portion of said lever extending toward and having its free end projecting slightly into the adjacent lower portion of said opening when said upper end portion is disposed at least generally normal to the center line of said opening, the other lower end of said lever being displaceable toward said panel member in order to effect swinging of said one end portion away from said panel member and retraction of said free end outwardly of said opening, the upper extremity of said opening being spaced but slightly from the upper marginal portion of said panel member, spring means operatively connected between said lever and said panel member yieldingly biasing said lever toward a position with said one end portion thereof disposed generally normal to the center line of said opening and the free terminal end thereof projecting into said opening, the lower marginal edge of said panel member including an integral laterally directed integral horizontal support flange for support from a horizontal support surface, said support flange projecting outwardly of said downwardly facing side of said panel member and the included angle defined between said panel member and support flange being less than 90°.

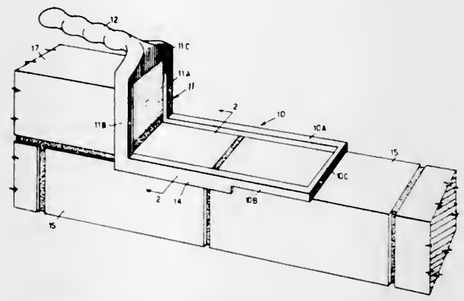
4,093,171
FISHING-ROD HOLDER
Alfred Mengo, Sr., 4302-83rd St., Kenosha, Wis. 53140
Filed Oct. 21, 1976, Ser. No. 734,619
Int. Cl.² A01K *97/10*
U.S. Cl. 248—515 **1 Claim**

1. A holder for supporting a fishing rod, comprising a base, a bracket having a panel pivotally secured to said base, and upwardly-extending spaced walls integral with said panel, a tubular member intermediate said walls, pivot means to support said tubular member relative to said walls, said tubular member conforming at the lower end thereof to a plane angularly directed relative to the axis of said tubular member, and a

stop member slidably-secured to said panel, said stop member being slidably guided intermediate said walls and having an

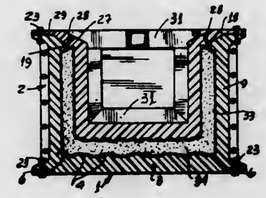
upwardly-directed tongue to engage said plane of said tubular member.

4,093,172
TOOL FOR BRICKLAYING
Kenneth Frank Johnson, 22 Station Road, Deagon. Q. 4017, Australia
Filed Apr. 12, 1977, Ser. No. 786,890
Int. Cl.² E04G *9/00*
U.S. Cl. 249—19 **9 Claims**



1. A hand tool to aid in laying an upper course of bricks on a lower course of similar bricks, said hand tool comprising a frame and a handle connected to the frame, said frame including: a pair of similar L-shaped side members each having a long leg and a short leg and spaced laterally apart in lateral alignment with one another by a frame end member;
said long and short legs being provided with outer side flanges projecting laterally of said long and short legs respectively such that said long legs are adapted to be placed on a lower course of bricks with their respective side flanges overlaying side faces of that lower course whereby to define a gauge cavity to receive mortar on which a brick of an upper course is to be bedded and said short legs are adapted to engage an end face of an already laid immediately preceding brick of the upper course to define a gauge cavity to receive mortar which is to be sandwiched between the two said bricks of the upper course.

4,093,173
MOLD FOR MANUFACTURE OF BODIES FOR TRANSPORTING UNITS
Tadahisa Kawamata, Rua Pirassununga, 484; Carlos Jorge Freire Antunes, Rua Bento de Matos, 133/33, and Carlos de Brito Antunes, Rua Augusta, 2110/11, all of Sao Paulo, Brazil
Division of Ser. No. 642,237, Dec. 18, 1975, abandoned. This application May 23, 1977, Ser. No. 799,145
Claims priority, application Brazil, Dec. 23, 1974, 010738
Int. Cl.² B29C *5/00, 1/14*; B29F *1/00*
U.S. Cl. 249—105 **10 Claims**



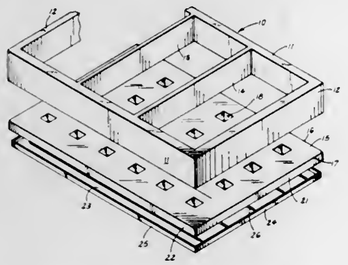
1. Apparatus for the manufacture of a body having a bottom, at least four side walls, at least one door, and a roof for isothermal transport units, such as refrigerated or heated trucks, trailers, railway cars and the like, comprising
a single pair of molds consisting of an internal mold and an external mold for molding a main structure comprising the bottom, the side walls, and at least one door opening of the body in a single monocoque part, the main structure external mold comprising:
a bottom panel;
side wall panels;
plates for the bottom and the side wall panels having an internal face with relief corresponding to the desired external configuration of the body, and external faces having reinforcing ribs;
means for securing the bottom panel plates to each of the side wall panel plates;
a double rim on the upper edge of the side panel plates comprising (i) an inner rim having an upper section inclined to the plate and a lower stepped section and (ii) an external flat horizontal rim;
orifices through the lower stepped section of the inner rim of the double rim of the side panel plates for injection of molding material;
spaced apart bolt holes through the extended horizontal rim of the double rim of the side panel plates for securing the external mold to the internal mold; and
at least one rectangular door opening through the side panel plates having a size, configuration and location desired for a door of the body;
the main structure internal mold comprising
a substantially prismatic box having an open top for the internal mold, wherein the box comprises:
an outer surface with relief corresponding to the desired internal configuration of the body;
sides having rectangular openings extending to and through the bottom of the box, the openings corresponding to openings in the side panels of the external mold;
an inclined flat circumferential ribbon around the top of the box;
spaced apart orifices through the circumferential ribbon for injection of molding materials located so the injection orifices of the main body external mold and the main body internal mold are aligned when the main body external and internal molds are assembled;
a horizontal peripheral rim extending from the circumferential ribbon for suspending the internal mold on the extended horizontal rim of the double rim of the external mold; and
spaced apart holes through the horizontal peripheral rim for

securing the internal mold to the external rim of the side panel of the external mold so that the walls and bottom of the prismatic box are suspended away from the bottom and side panels of the main body external mold when the main body external and internal molds are assembled.

4,093,174
COMBINATION DIE AND PALLET

Wayne L. Mullins, 5001 E. Cactus, Scottsdale, Ariz. 85254

Continuation-in-part of Ser. No. 681,419, Apr. 29, 1976, Pat. No. 3,998,423. This application Oct. 6, 1976, Ser. No. 730,138
The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed.
Int. Cl.² B28B *7/24, 7/26*
U.S. Cl. 249—120 **10 Claims**



1. In a combination die and pallet of honeycomb construction;

(a) a die plate of rectangular shape presenting end and side edges and formed with a plurality of depressions arranged in longitudinal rows,

(b) each of said depressions being defined by a frusto pyramidal wall and a flat bottom,

(c) end flanges depending from said end edges and side flanges depending from said side edges, said flanges being integral with said die plate, having lower edges, and of a height slightly less than the depth of said depressions,

(d) a rectangular base plate of the same size and shape as said die plate and presenting end and side flanges,

(e) fused joints between those portions of the side and end flanges on the die plate which overlap portions of the side and end flanges of the base plate,

(f) spot fusions between said base plate and the bottoms of said depressions, and

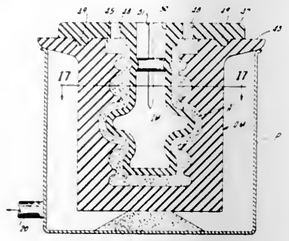
(g) a plurality of longitudinal ribs upstanding from said base plate and pressed therefrom leaving grooves opening onto the lower face of said base plate, said ribs being parallel to the side edges of said plates and alternately disposed between said side edges and said longitudinal rows of depressions.

4,093,175
DISTENSIBLE ELASTOMERIC MOLDS

Raymond M. Putzer, Racine, and William J. Maurino, Kenosha, both of Wis., assignors to Precision Flexmold, Inc., Racine, Wis.

Continuation of Ser. No. 403,197, Oct. 3, 1973, abandoned, which is a division of Ser. No. 222,141, Jan. 31, 1972, Pat. No. 3,776,683. This application Jul. 8, 1974, Ser. No. 486,330
Int. Cl.² B28B *7/16, 7/28, 7/30*
U.S. Cl. 249—153 **7 Claims**

1. A male and female distensible elastomeric mold including an outer female portion having an integral radially extending annular flange adjacent its upper portion for being supported on a supporting edge, said female portion having an internal cavity containing considerable undercut back draft portions, said mold also including an inner male portion in said cavity and forming an annular space with said female portion that defines the shape of an article to be produced in said mold, said outer mold portion being expandable when vacuum is applied thereto so as to withdraw from an article produced in said

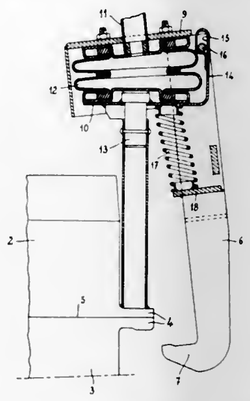


mold and said inner mold portion collapses inwardly when vacuum is applied thereto so as to be withdrawn from the interior of said article produced in said mold.

4,093,176
MOLD-LOCKING DEVICE

Andre Contastin, Severac-le-Chateau, France, assignor to Industries et Techniques d'Ameublement, Severac-le-Chateau, France

Filed Mar. 2, 1977, Ser. No. 773,780
Claims priority, application France, Mar. 3, 1976, 76 06603
Int. Cl.² B29C *1/16;* **B22C** *21/08;* **B65D** *45/00*
U.S. Cl. 249—167 **4 Claims**



1. The combination of a two part mold having engaging rims and a locking device for said mold, said locking device comprising:

a support means fixed at one end to one of said rims;

a flexible bellows mounted at the other end on said support means;

a movable plate member secured to the opposite end of the bellows;

air inlet means passing through said movable plate member to the interior of the bellows;

a hook-like member rigidly secured to the movable plate member; and

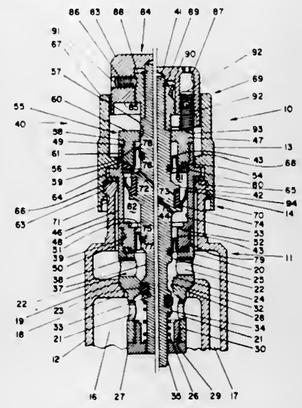
compression spring means extending between the hook-like member and the fixed support means; and

means on said hook-like member and said support means for limiting movement by the spring means of the movable plate member towards the fixed support member in the absence of pressure in the bellows to pivot said hook-like member relative to said mold to engage the other of said rims.

4,093,177
DASHPOT MECHANISM FOR SELF-CLOSING PLUMBING VALVES

Earl L. Morris, Whittier, and Larry D. Fields, La Puente, both of Calif., assignors to Acorn Engineering Company, City of Industry, Calif.

Filed Mar. 18, 1976, Ser. No. 668,285
Int. Cl.² F16K *31/48;* **F16F** *9/10*
U.S. Cl. 251—54 **3 Claims**



1. A fluid-filled dashpot mechanism comprising:

(a) housing means having a passageway therein;

(b) stem means reciprocally disposed in said passageway;

(c) pushbutton means secured to one end of said stem means for operably displacing said stem means;

(d) a pair of rolling diaphragms disposed in face-to-face relationship in said passageway and operably coupled in fluid sealing relationship to said housing means and said stem means so as to form an enclosed chamber within said housing means for containing said fluid therein;

(e) piston means dividing said chamber into two portions and reciprocally operable therein for displacement of said fluid in said chamber;

(f) means for operably associating said stem means with said piston means for reciprocation therewith;

(g) fluid communication means for providing continuous fluid communication between said chamber portions;

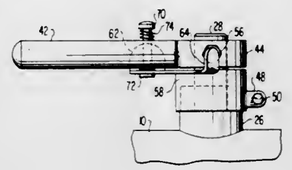
(h) check valve means operably associated with said stem means so that when said stem means is operably displaced in one direction said fluid flows from one chamber portion to the other through said check valve means and said fluid communication means, thereby allowing a reltively rapid displacement of said fluid between said chamber portions and effectuating relatively rapid displacement of said piston means and said stem means, and when said stem means is operably displaced in the opposite direction said fluid flows from said other portion to said one chamber portion through said fluid communication means thereby allowing a relatively slow displacement of said fluid between said chamber portions and effectuating relatively slow displacement of said piston means and said stem means; and

(i) stop means for limiting the stroke of said stem means, wherein said stop means for operably limiting the stroke of said stem means includes threaded rod means one end of which is threadably disposed in said pushbutton means and the other end extending beyond said pushbutton means towards said housing means, the distance between said other end of said rod and said housing means determining the stroke of said piston means by limiting the axial displacement of said stem means.

4,093,178
VALVE

Robert T. Hughes, Columbia, and R. Hurley Matthews, Bel Aire, both of Md., assignors to Humat, Inc., Washington, D.C.

Filed Mar. 16, 1976, Ser. No. 667,312
Int. Cl.² F16K *35/02*
U.S. Cl. 251—104 **3 Claims**

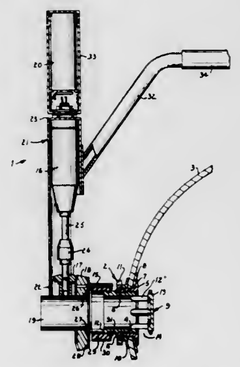


1. A valve for use in a conduit having a smooth cylindrical internal surface comprising shaft means extending diametrically of said conduit, a circular valve disc, means for securing said valve disc to said shaft, said circular disc having oppositely bevelled surfaces on opposite sides of said shaft, an annular groove extending about the entire periphery of said disc, sealing means secured in said groove for sealing engagement with the internal surface of said conduit, adjustable locking means for locking said valve disc at a selected angle relative to a transverse plane through said conduit comprising handle means secured to said shaft means, a locking member movably mounted on said handle means, locking plate means having a plurality of locking apertures for said locking member and means for adjustably securing said locking plate to said conduit for infinite adjustment of said locking plate relative to said conduit.

4,093,179
POWER WRENCH

Charles F. Schmidt, P.O. Box 126, Junction City, Kans. 66441

Filed Dec. 30, 1976, Ser. No. 755,677
Int. Cl.² F16K *31/04;* **F16L** *55/10*
U.S. Cl. 251—133 **7 Claims**



1. A power wrench for operating gate valves on irrigation water pipe, said gate valve including a tubular discharge portion on the valve and extending outwardly of said pipe, said wrench comprising:

(a) a gripping member having a bore with an interior surface for separably and frictionally engaging a tubular discharge member, said bore forming a flow passage therethrough aligned with the tubular discharge member;

(b) power means for imparting reversible rotary motion; and

(c) speed reduction means operatively connecting said power means with said gripping member for selectively rotating same for opening and closing the gate valve and

permitting unobstructed water flow therethrough during opening and closing movement thereof.

4,093,180

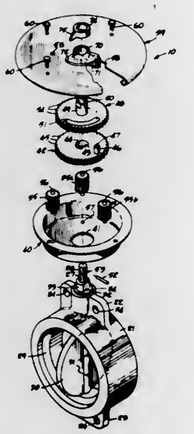
GEARED HAND WHEEL FOR BUTTERFLY VALVES

Joseph Lawrence Strabala, Orinda, Calif., assignor to James M. Carroll Company, Orinda, Calif.

Continuation of Ser. No. 513,093, Oct. 8, 1974, abandoned. This application Aug. 23, 1976, Ser. No. 717,055

Int. Cl. F16k *31/53*

U.S. Cl. 251—248 **8 Claims**



1. For a butterfly valve having a projecting valve shaft for turning its control disc to open and closed positions, a disc-shaped geared handle comprising:

a first circular gear means having attaching means for connecting it to a valve shaft of a butterfly valve;

a second circular gear means having anchor means for securing it to a butterfly valve in a non-rotating relationship therewith, said first and second circular gear means arranged concentrically and in adjacent relationship with said second circular means having at least one tooth difference with respect to said first circular gear means;

a carrier means arranged to rotate concentrically with said first and second gear means;

at least one pinion gear means journalled in said carrier means to mesh with both said first and second circular gear means;

circular hand wheel means associated with said carrier means whereby manual rotation of said hand wheel is operable to rotate said carrier means so that said pinion gear means meshing with said first and second circular gear means will track therewith in a planetary manner and cause them to rotate slowly relative to one another, in a direction related to the direction of rotation of the carrier and

stop means arranged between the first and second circular gear means so that it is operable to limit the relative rotation thereof to a predetermined amount.

4,093,181

POWERED VEHICLE JACK

Raymond W. Ivins, 1901 SE. Minter Bridge Rd., #69, Hillsboro, Oreg. 97123

Filed May 9, 1977, Ser. No. 795,393

Int. Cl.² B66F *3/02*

U.S. Cl. 254—97 **5 Claims**

1. An automotive jack comprising in combination,

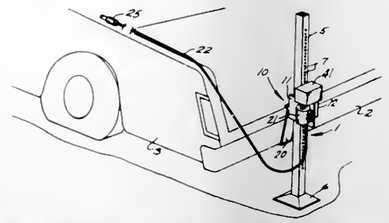
a jack standard supported in a stationary manner by a ground engaging base and having recesses spaced therealong, and

a carriage for powered travel along said standard and including,

a roller equipped frame for rolling travel along said standard,

a bumper engaging arm mounted on said frame,

rotatable means on said frame engageable with said standard recesses,



a gear reduction drive coupled to said rotatable means,

a motor mounted on said frame and coupled to said reduction drive, and

switch means in circuit with said motor and with a power source to control carriage movement along said jack standard.

4,093,182

VEHICLE JACK

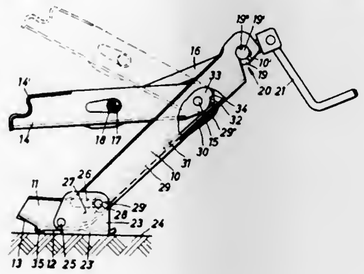
Hugo Rutenbeck, Breckerfeld, Germany, assignor to Firma August Bilstein, Ennepetal, Germany

Filed May 23, 1977, Ser. No. 799,763

Claims priority, application Germany, Jun. 4, 1976, 2625085

Int. Cl.² B66F *3/12*

U.S. Cl. 254—126 **15 Claims**



1. In a vehicle jack having a support leg with a bearer foot, a manually operable adjusting member, in particular a screw spindle, coupled to the support leg, a lifting arm capable of being raised and lowered by the adjusting member and having at its free end a support head engaging the vehicle frame, and an auxiliary foot movably carried upon the support leg, the improvement which comprises a coupling member arranged to act upon the auxiliary foot and operatively displace upon operation of said adjusting member, which coupling member, upon the raising of the lifting arm brings into effect an additional support provided by the auxiliary foot and prevents inadvertent release of the jack.

4,093,183

UNITARY GROUNDING ASSEMBLY FOR BUNDLE CONDUCTOR STRINGING BLOCKS

Keith E. Lindsey, Pasadena, and Hoyt W. Bozeman, Jr., Glendora, both of Calif., assignors to Lindsey Manufacturing Company, Azusa, Calif.

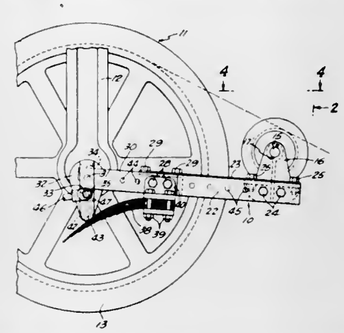
Filed Jun. 23, 1977, Ser. No. 809,409

Int. Cl.² B66D *1/36*

U.S. Cl. 254—134.3 PA **6 Claims**

1. A grounding assembly adapted to be pivotally mounted

astride the frame of a bundle conductor stringing block comprising: a U-shaped main body having a pair of generally parallel legs interconnected crosswise of one end thereof by a shaft supporting a separate conductive roller for each conductor of a bundle conductor, the other ends of said legs including means for pivotally mounting said assembly on the opposite lateral sides of the frame of a bundle conductor stringing block, means



for biasing said assembly to pivot in a direction to maintain said rollers in pressurized contact with the underside of a respective conductor of a bundle conductor supported by a stringing block, and said legs including resilient flexible portions permitting the roller-supporting ends of said legs to twist generally about the length thereof and said roller-supporting shaft to tilt away from the normally prevailing plane thereof to accommodate differential conductor sag conditions.

4,093,184

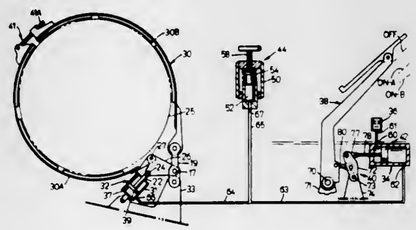
HYDRAULIC BRAKE SYSTEM FOR CRANE HOIST DRUM

John E. Wieschel, Hartland, Wis., assignor to Harnischfeger Corporation, Milwaukee, Wis.

Filed Mar. 7, 1977, Ser. No. 774,962

Int. Cl.² B66C *23/60*

U.S. Cl. 254—139.1 **3 Claims**



1. In a hydraulic brake system for the hoist drum of a lifting crane having an operator's station having a floor, in combination:

a hoist drum shaft to be braked;

a brake band for exerting a braking force on said hoist drum shaft;

a brake cylinder operatively connected to said brake band, said brake cylinder comprising a cylinder and piston defining a chamber for accommodating brake fluid therein;

a brake valve located near said floor of said operator's station for controlling the supply of fluid to said brake cylinder, said brake valve comprising a cylinder and a piston defining a chamber for accommodating brake fluid therein;

a source of fluid;

means for supplying fluid from said source to said chamber in said brake valve;

a supply line for supplying fluid from said brake valve chamber to said brake cylinder chamber;

a branch line having one end connected to said supply line and having its other end near said operator's station;

a brake pedal mounted near said floor of said operator's station and movable between a brake release position and a brake applied position;

a valve toggle linkage connected between said foot pedal and said piston of said brake valve, said valve toggle linkage causing said brake valve to supply fluid at a predetermined pressure when said pedal is moved to a first brake applied position and a greater pressure when said pedal is moved to a second brake applied position;

and a hydraulic simulator located near said operator's station for adjusting the position to which said foot pedal can be moved when depressed, said hydraulic simulator comprising a cylinder, a piston slideable in said cylinder and cooperating therewith to define a fluid receiving chamber, said fluid receiving chamber being connected to said other end of said branch line, biasing means for biasing said piston to a position wherein all fluid is expelled from said fluid receiving chamber, a manually adjustable stop means for limiting the travel of said piston, said stop means being manually adjustable to limit the amount of fluid that can be supplied from said brake valve to said hydraulic simulator when said pedal is depressed to thereby control the extent to which said pedal can be depressed said hydraulic simulator further comprising a hollow housing having a pair of end walls spaced apart axially along an axis through said housing, each of said end walls having an opening therethrough along said axis, wherein said cylinder is mounted in the opening in one of said end walls and along said axis, said cylinder having openings at its opposite ends, one of said openings being threaded for receiving said other end of said branch line, wherein said piston is slideable in said cylinder along said axis and has a portion extending into said housing,

wherein said manually adjustable stop means has a threaded portion which threadedly engages threads in said opening in the other of said end walls, said stop means extending into said housing and being engagable with said piston,

wherein said biasing means is disposed between said other end wall and said piston,

and wherein said fluid receiving chamber communicated directly with said threaded opening in said cylinder.

4,093,185

DRIVE MECHANISM FOR A LINE-PULLING APPARATUS

E. Strohm Newell, 2350 6th Ave., San Diego, Calif. 92101

Filed Jun. 28, 1976, Ser. No. 700,154

Int. Cl.² B66D *1/30*

U.S. Cl. 254—154 **36 Claims**

1. An apparatus for pulling a line comprising:

(a) a capstan mounted to rotate about stationary centerpost means,

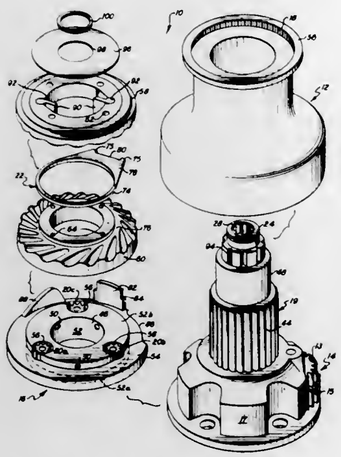
(b) pulley means mounted to rotate about said centerpost means,

(c) means for rotating said capstan and pulley means in unison about said centerpost means, and

(d) stationary bearing surface means including a stationary coupling bearing portion fixedly mounted with respect to said centerpost means,

(e) said means for rotating including coupling means con-

tained within the confines of said stationary coupling bearing portion and mounted to dynamically engage said



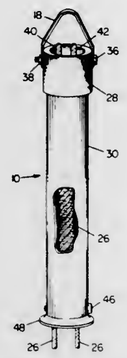
capstan and pulley means while moving juxtaposed said coupling bearing portion.

4,093,186

LINE BRAKE DEVICE USEFUL FOR FIRE ESCAPE

Steven T. Golden, 822 Teague, Santa Paula, Calif. 93060

Filed Nov. 22, 1976, Ser. No. 743,754
Int. Cl.[2] B65H *59/16*
U.S. Cl. 254—156 **6 Claims**



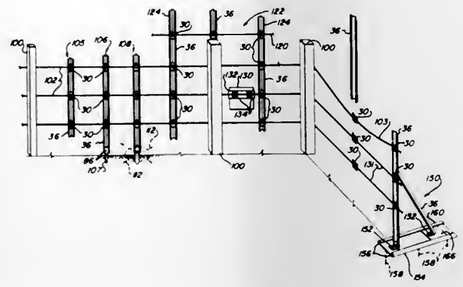
1. A manually operated line braking mechanism comprising:
two pulley assemblies;
means for holding said pulley assemblies apart from each other, including a cylindrical frame holding one of said pulley assemblies and a cylindrical head piece holding the other of said pulley assemblies;
a line;
means for guiding said line through said pulley assemblies so that different sections of said line extend between said pulley assemblies with said line sections close to each other as said line runs through said pulley assemblies; and
means for rotating one of said two pulley assemblies with respect to the other including a rotatable connection between said frame and head piece whereby the sections of line between said assemblies frictionally engage one another to provide braking action without significantly increasing the temperature of said braking mechanism.

4,093,187

FENCING STAY SYSTEM

Charles Elbert Robinson, Livermore, Colo. 80536

Filed Dec. 22, 1975, Ser. No. 643,074
Int. Cl.[2] E04H *17/10*
U.S. Cl. 256—49 **1 Claim**



1. A fencing system for supporting a plurality of barriers comprising:
a plurality of anchors for connecting to said barriers, each of said anchors comprising:
a. a mid-section portion of rectangular configuration,
b. substantially vertical side members on opposing longitudinal sides of said mid-section portion extending downwardly from said sides,
c. means disposed on the upper surface of said mid-section portion for connecting said anchor to one of said barriers, and
d. substantially horizontal opposing edges in parallel spaced relation extending outwardly from the bottom of each of said side members; and
a plurality of stays for providing support to said barriers, each of said stays comprising:
a. a longitudinal member having a mid-section portion of angular cross-section, said aforesaid member having downwardly extending sides convergent into a center rib,
b. each of said convergent sides terminating at the end opposite said rib into a reverse bend,
c. substantially vertical side members extending downwardly from each of said reverse bends toward said rib, and
d. inwardly directed substantially horizontal open channels extending from the bottom end of said vertical side members, said open channels being receptive of said edges for engaging said anchor.

4,093,188

STATIC MIXER AND METHOD OF MIXING FLUIDS

Terry A. Horner, c/o TAH Industries, P.O. Box 178, Imlaystown, N.J. 08526

Filed Jan. 21, 1977, Ser. No. 760,876
Int. Cl.[2] B01F *15/00*
U.S. Cl. 366—336 **20 Claims**

1. An element for a static mixer for mixing fluids comprising:
at least two banks of stationary baffle plates arranged around an axis which is parallel to the overall direction of flow of the fluids to be mixed,
each bank abutting each adjacent bank along an interface extending from said axis so as to form interfacial apertures through which fluids may flow from one bank to an adjacent bank,
the plane of each baffle plate being inclined at an angle to said axis and being inclined at an angle to the planes of the baffle plates of each adjacent bank,
each bank having a first set comprising a plurality of baffle plates spaced along said axis with their planes substantially parallel to each other,

at least one of said banks having a second set comprising a plurality of baffle plates with their planes substantially parallel to each other spaced along said axis and being similarly inclined to said axis as the baffle plates of said first set but at an angle different from the angle at which the baffle plates of said first set are inclined to the axis,

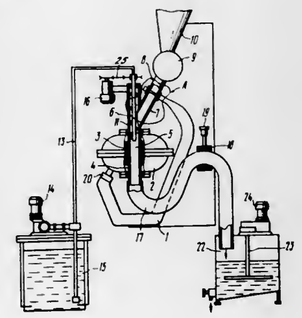
the baffle plates of said second set in said at least one bank being interspersed with the baffle plates of the first set in that bank, and
the plane of each plate in said second set intersecting the plane of at least one plate in said first set in the same bank at an intersection near the outer edges of said plates.

4,093,189

APPARATUS FOR CONTINUOUS PREPARATION OF A SUSPENSION

Iosif Borisovich Sokol, bulvar matrosa Zheleznyaka, 11[a], kv. 79; Nina Vladimirovna Katysheva, Angarskaya ulitsa, 49, korpus 2, kv. 167; Vladimir Mikhailovich Belyaev, Angarskaya ulitsa, 59, kv. 23, all of Moscow; Dmitry Danilovich Logvinenko, ulitsa Kalinina, 5, kv. 5; Ekaterina Alexandrovna Morozko, ulitsa K.Libknekhta, 22, both of Poltava; Boris Alexeevich Pepelin, Bulatnikovsky proezd, 10, kv. 746, and Viktor Alexeevich Prudovoi, Snaiperskaya ulitsa, 6, korpus 3, kv. 40, both of Moscow, all of U.S.S.R.

Filed Oct. 18, 1976, Ser. No. 733,383
Int. Cl.[2] B01F *7/00, 15/00*
U.S. Cl. 366/156 **3 Claims**



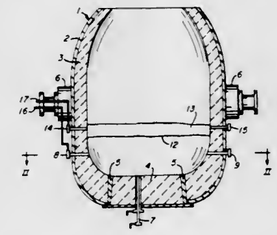
1. An apparatus for continuous preparation of a suspension, comprising: a framework; a housing mounted on said framework; an inductor for producing a rotating electromagnetic field having a generally annular shape and being accommodated within said housing; a mixing chamber having a body receiving therein ferromagnetic particles and encircled by said inductor; a flexible conduit; a rotatable hollow shaft, one end of which communicates via said flexible conduit with a supply of a liquid component of the suspension to be prepared and the other end of which communicates with said body of said mixing chamber; a feed line; a tube having a branch pipe, one end of said branch pipe communicating via said feed line with a supply of a solid component of the suspension to be prepared, the other end of said branch pipe communicating via said tube with said body of said mixing chamber, said hollow shaft being accommodated inside said tube; a feed screw mounted on said hollow shaft and being inside said tube; means for effecting rotation of the feed screw mounted on said housing; a discharge device including an S-shaped conduit having one end connected to a bottom of said body of the mixing chamber.

4,093,190

PROCESS FOR THE PROTECTION OF A REFRACTORY WALL IN SERVICE

Emile Sprunck, Moyeuvre, and Pierre Jean Leroy, St. Germain en Laye, both of France, assignors to Creusot-Loire, Paris, France

Continuation-in-part of Ser. No. 590,054, Jun. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 234,727, Mar. 15, 1972, abandoned. This application Jan. 24, 1977, Ser. No. 761,967
Int. Cl.[2] C21B *7/16*
U.S. Cl. 266—47 **2 Claims**



1. In a process for treating a bath of molten metal in a refractory-lined metallurgical furnace by introducing oxygen into said bath, the improvement comprising:
controllably injecting liquid hydrocarbons through at least one single tube tuyere in said refractory lining located beneath the dynamic level of said bath, said tuyere being sufficiently spaced away from the source of said oxygen introduction to prevent free gaseous oxygen from contacting said hydrocarbons and said liquid hydrocarbons being injected in sufficient quantity so as to direct said hydrocarbons toward selected portions of said refractory lining and thereby to retard the wear of said selected portions.

4,093,191

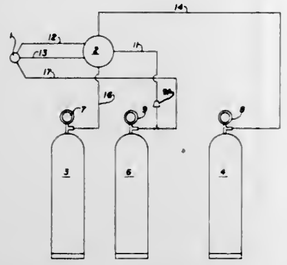
SAFETY DEVICE FOR WELDING TORCH

Charles L. Ferguson, 4303 Fluhr Dr., Louisville, Ky. 40216

Filed Nov. 19, 1976, Ser. No. 743,094
Int. Cl.[2] B23K *7/00*
U.S. Cl. 266—48 **4 Claims**

1. A fire extinguishing/fuel-oxidizer burning torch arrangement including: torch means for combining fuel and oxidizer; fuel supply means to supply selected fluid fuel to said torch means; oxidizer supply means to supply selected fluid oxidizer to said torch means; fire extinguishing material supply means to supply selected fluid fire extinguishing material; valve means including:
(a) first passageway means communicating with said fuel supply means and said torch means with valve member operable from first position;
(b) second passageway means communicating with said oxidizer supply means and said torch means;
(c) valve member means operable from first position to initiate flow of fuel through said first passageway means

and flow of said oxidizer through said second passageway means to second position to terminate flow of fuel through said first passageway means and terminate flow of said oxidizer through said second passageway means;



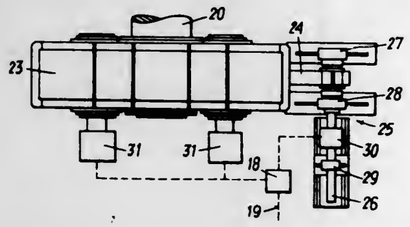
(d) valve member control means responsive to pressure of said fire extinguishing material supply means to operate said valve member means from said first position to said second position upon selected decrease in pressure of said fire extinguishing material.

4,093,192

TILTING DRIVE ARRANGEMENT FOR A CONVERTER

Ernst Riegler, Enns, and Manfred Schmidt, Linz, both of Austria, assignors to Vereinigte Osterreichische Eisen-und Stahlwerke - Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Dec. 1, 1976, Ser. No. 746,236
Claims priority, application Austria, Dec. 12, 1975, 9449/75
Int. Cl.² C21C *5/46*
U.S. Cl. 266—78 **6 Claims**



1. In a tilting drive arrangement for a converter having a gear within a gear housing arranged on a tilting trunnion of the converter and a torque support for supporting the gear housing on a base, the torque support including a guide rod hinged to the gear housing, a torque rod supported on the base in bearings, and a lever arranged to connect the guide rod to the torque rod so as to produce a torsional moment in the torque rod, the improvement comprising a torsion measuring means located on the torque rod for measuring the torque in the torque rod and hence the tilting moments.

4,093,193

COMPOSITE HIGH TEMPERATURE PROTECTION TUBE

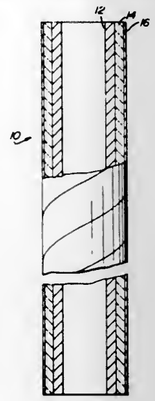
John E. Cassidy, Churchville, and Max H. Kraus, Huntingdon Valley, both of Pa., assignors to Electro-Nite Co., Philadelphia, Pa.

Filed Jun. 7, 1977, Ser. No. 804,417
Int. Cl.² C21C *7/00*; F16L *9/14*; B65N *81/00*
U.S. Cl. 266—87 **13 Claims**

1. A composite high temperature protection tube, comprising:

(a) an inner core of a first material,

(b) an intermediate zone surrounding said core and being of a different material, said intermediate zone being supported by said core, said intermediate zone being spirally wound layers of ceramic paper bonded together, said ceramic paper being inorganic and having an organic binder in amounts sufficient to increase the tear strength thereof so that said ceramic paper may be unwound from



a roll by pulling on an unwound portion thereof, said ceramic paper having a thermal conductivity less than 2 BTU-in./hr.Ft.²° F. at a mean temperature of 2000° F,

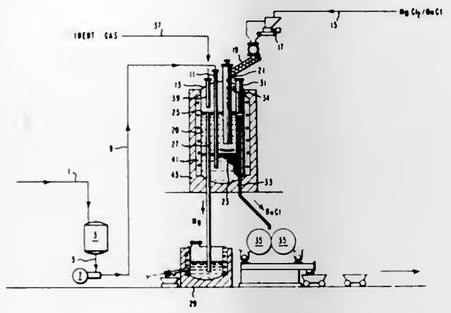
(c) an outer wrap bonded to itself along overlapping side edges and spirally wound around and confining said intermediate zone.

4,093,194

PROCESS AND REACTOR FOR MAKING MAGNESIUM METAL

Norval D. Clare, Niagara Falls, N.Y., and Charles H. Lemke, Newark, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 648,761, Jan. 13, 1976, Pat. No. 4,014,687.
This application Dec. 28, 1976, Ser. No. 755,124
Int. Cl.² C22B *3/02*
U.S. Cl. 266—122 **4 Claims**



1. A reactor for carrying out the continuous production of magnesium metal by reaction of $MgCl_2$ and sodium in an anhydrous liquid phase comprising

(a) an enclosed upright shell;

(b) an upper outlet pipe for withdrawing molten materials through the bottom of the reactor by overflow as the level of such materials exceeds a preselected upper liquid operating level within the reactor;

(c) an inert gas inlet pipe for blanketing the zone above the preselected upper liquid operating level with inert gas;

(d) inlet means for injecting granular solids containing $MgCl_2$ below a preselected lower liquid operating level within the reactor;

(e) an inlet pipe for injecting molten sodium metal below the granular solids inlet; and

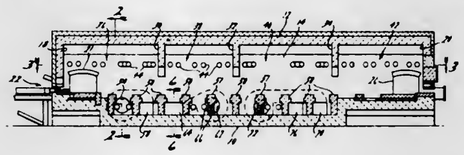
(f) a lower outlet pipe for receiving molten material and withdrawing it from the reactor by overflow as the level of such materials exceeds a preselected lower liquid operating level, the L/D ratio of the reactor below the preselected lower liquid operating level being at least about 1:1.

4,093,195

CARBURIZING FURNACE

Donald J. Schwalm, Northville, Mich., assignor to Holcroft & Company, Livonia, Mich.

Filed Jan. 19, 1977, Ser. No. 760,567
Int. Cl.² C21D *1/00*
U.S. Cl. 266—251 **16 Claims**



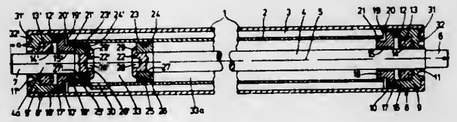
1. Carburizing apparatus comprising a furnace having means defining heating, carburizing and diffusion zones, longitudinally spaced piers mounted on the floor of said furnace in each of said zones and extending transversely between the side walls of said furnace, track means on said piers and means for conveying a plurality of work trays along said track means successively through said zones, means for introducing into each of said zones a gas atmosphere appropriate to that zone, and fan means in each zone for circulating the atmosphere therein through the work in said zone, said fan means each comprising a fan mounted in a side wall of said furnace and having its inlet and its outlet in said side wall below the level of said track means with said inlet and outlet being longitudinally spaced apart and separated by at least one of the piers in said zone, whereby atmosphere is circulated downwardly through the work at one pier position and upwardly through the work at an adjacent pier position within said zone.

4,093,196

LENGTH-ADJUSTABLE GAS SPRING

Fritz Bauer, Altdorf, Germany, assignor to Suspa Federungstechnik Fritz Bauer & Sohne OHG, Altdorf, Germany

Filed Aug. 17, 1977, Ser. No. 825,463
Claims priority, application Germany, Aug. 26, 1976, 2638363
Int. Cl.² F16F *9/32*
U.S. Cl. 267—65 R **6 Claims**



1. A continuously length-adjustable compressed gas-filled spring, such as for height adjustment of chair seats, table tops or the like comprising

an outer cylinder constituting a housing; an inner cylinder coaxially disposed in said outer cylinder, and defining an annular chamber therebetween; a piston mounted coaxially displaceably within said inner cylinder, said piston sealingly contacting the inner wall of said inner cylinder to prevent leakage of said gas across said piston between a first chamber on one side of said piston and a second chamber on the other side of said piston, said piston being connected to a piston rod extending through one end of the housing in a gas-tight manner through a first sealing plug at one end of said cylinders, a second sealing plug to seal the two cylinders at the opposite end in a gas-tight manner; means to provide communication between said first and second chambers separated in a gas-tight manner by the piston on the piston rod, said means comprising a valve including a valve push rod serving as a valve release pin and extending through the other end of said housing in a gas-tight manner through said second sealing plug, a first bypass channel located in the vicinity of said second sealing plug which is in the vicinity of said valve push rod, a second bypass channel located in the vicinity of said first sealing plug,

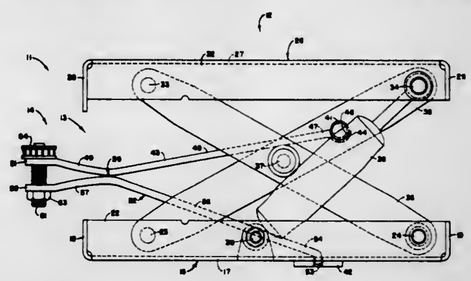
said valve comprising a piston sealing element coaxially displaceably mounted and guided in a gas-tight manner in said inner cylinder on said valve push rod; a bypass depression in the inner wall of said inner cylinder, whereby said valve is opened by moving said piston sealing element axially adjacent said bypass depression to provide gas flow communication between said first and second chambers through said bypass depression, said first and second bypass channels and said annular chamber, and said valve is closed when said piston sealing element is in a position axially spaced from said bypass depression to close said gas flow communication between said first and second chambers.

4,093,197

LEAF SPRING SUSPENSION

John W. Carter, Bettendorf, Iowa, and L. John Koutsky, Milan, Ill., assignors to Sears Manufacturing Company, Davenport, Iowa

Filed Mar. 16, 1977, Ser. No. 778,019
Int. Cl.² F16F *1/22*
U.S. Cl. 267—131 **10 Claims**



1. A suspension for use with a support structure for a seat, the support structure having upper and lower halves interconnected and variably spaced apart by movable linkage members, the seat being attached to the upper half, said suspension comprising:

first means for suspension having a first connecting end operably coupled to the upper half of the support structure and having an opposite, first terminating end, said first suspension means being bent to form a first pivot area therein between said first connecting and terminating ends, said first means having a bar member and a transverse member, said bar member being attached between two linkage members, said transverse member being joined to said first means at said first connecting end, said transverse member engaging said bar member;

second means for suspension having a second connecting end attached to the lower half of the support structure and having an opposite, second terminating end, said second suspension means being bent to form a second pivot area therein between said second connecting and terminating ends; and

control means for weight adjustment extending between said

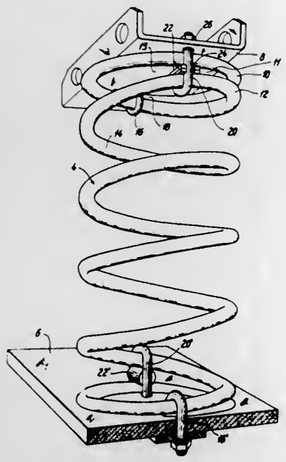
terminating ends to connect said first and second means, said first and second pivot areas abutting, said first means being rockable upon said second means at said pivot areas.

4,093,198

COIL SPRING DEVICE

Tom Lindhardt Petersen, Sodingevej 6, 5750 Ringe, Denmark

Continuation of Ser. No. 661,562, Feb. 26, 1976, abandoned.
This application May 12, 1977, Ser. No. 796,384
Claims priority, application Denmark, Feb. 26, 1975, 738/75
Int. Cl.² F16F 1/12
U.S. Cl. 267—179 **12 Claims**



1. A device such as a playground toy, comprising a heavy coil spring, the opposed ends of which are affixed to respective opposed parts so as to render these parts mutually resiliently moveable by compression, expansion or bending of the coil spring, said spring at least at one end thereof having an outermost winding of small pitch and a following winding of increased or increasing pitch confining together with said outermost winding a helical wedge shaped space, a substantially non-compressible distance element being arranged in a portion of said wedge shaped space between and in engagement with respective winding portions, said distance element causing a first portion of said windings on one side of said distance element to be substantially locked at a mutual distance apart and said distance element causing a second portion of said windings on an opposite side of said distance element to maintain a minimum freespace both between said windings and adjacent the sides thereof of a size sufficient to prevent body appendages of a user from becoming jammed between said windings, and a substantially non-stretchable connector means being arranged adjacent said distance element so as to hold the respective winding portions in said engagement with the distance element and prevent the winding portions from being moved away from each other.

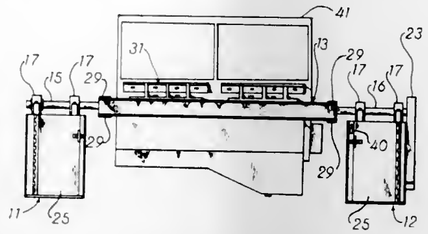
4,093,199

ROTATABLE ENGINE SUPPORTING APPARATUS

Paul Hefner, Billings, Mont., assignor to Ralph Stewart, Billings, Mont., a part interest

Filed Aug. 2, 1977, Ser. No. 821,225
Int. Cl.² B23Q 3/18
U.S. Cl. 269—61 **10 Claims**

1. A rotatable engine supporting apparatus including a pair of spaced truncated bases, an engine supporting frame disposed between the spaced bases on rotatable shafts extending through pairs of bearing assemblies mounted on the upper surface of each of said bases, one of said shafts being driven by a gear reduction motor located in one of said bases through a chain and sprocket arrangement; said engine supporting frame being of a generally rectangular configuration with shorter end members affixed to the shafts and longer side members extending between the end members, said side and end members being edge-reinforced I beams welded together at the corners with overlay corner plate reinforcememts, said frame having



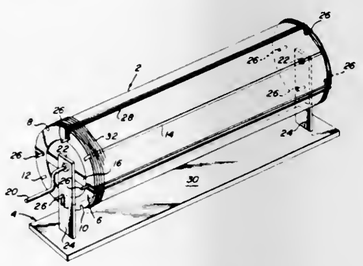
removable engine mounting brackets extending inwardly from each of said side members, each of said mounting brackets having an angle section with two faces engageable with said side member, a plurality of spaced connecting sections extending transversely from said angle section to an engine engaging section, said angle section and said engine engaging section having a plurality of openings along their lengths.

4,093,200

DEVICE FOR CUTTING YARN

George F. Ludvik, 9113 Rockefeller La., Springfield, Va. 22153

Filed Oct. 1, 1976, Ser. No. 728,560
Int. Cl.² B25B 5/14
U.S. Cl. 269—295 **9 Claims**



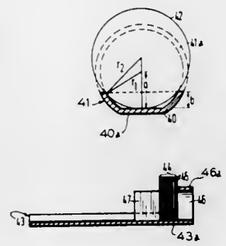
1. A device for cutting elongated material which comprises a drum having a plurality of axially disposed uniformly and equidistantly spaced, narrow grooves; said grooves being at least four in number; said material being disposed on said drum's surface, means for securing the material thereon, and comprising elastic band means mounted at opposite ends of the drum and spaced equidistant between adjacent grooves; base support means for rotatably supporting the drum, and including a pair of upright members rotatably receiving the drum, and said grooves being selected that when the material is cut by cutting means placed in selected ones of said grooves the material will be substantially equal in length.

4,093,201

DISC SUPPORT STRUCTURE

Wolfgang Dietze, Munich; Richard Mittermeier, Moosburg, and Gerhard Steinwagner, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Division of Ser. No. 452,934, Mar. 20, 1974, Pat. No. 3,962,301. This application Dec. 8, 1975, Ser. No. 638,299
Claims priority, application Germany, May 7, 1973, 2322952
Int. Cl.² B23Q 3/00
U.S. Cl. 269—296 **1 Claim**



1. A support structure for supporting a plurality of crystal discs thereon during treatment of said discs, comprising:

an elongated tub-shaped body having an open top, said body being composed of a material selected from the group consisting of Si and SiC, said body having a flat continuous bottom wall and upwardly extending curved side walls integrally formed with said bottom wall and being curved in opposition relative to one another, and at least one strut integrally formed with said side walls and extending upwardly beyond the periphery of said side walls a distance greater than the radius of a disc to be supported on said structure so as to form a closed arc above said bottom wall and join said curved side walls to one another; and

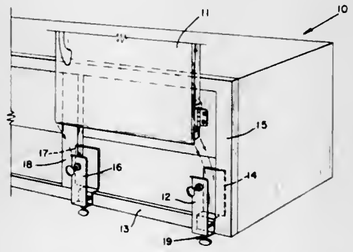
a movable block member composed of a material selected from the group consisting of Si and SiC, said block member being of a size fitting within said tub-shaped body to support a stack of said discs at a position within said support structure.

4,093,202

CABINET DOOR MOUNTING BRACKET

John E. Kincaid, 218 Center St., Kernersville, N.C. 27284

Filed Oct. 25, 1977, Ser. No. 845,328
Int. Cl.² B25B 5/14
U.S. Cl. 269—321 S **9 Claims**



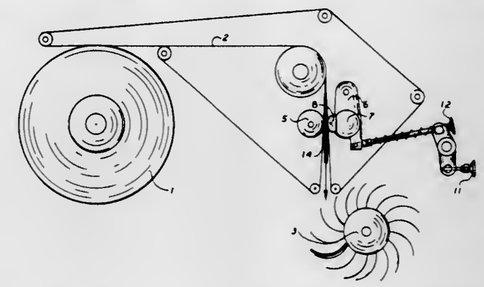
1. A door holding clamp comprising: a bracket, said bracket having first and second L-shaped sections, said L-shaped sections having leg and foot portions, said first and second L-shaped sections being joined in face-to-face relation to opposite ends on opposide sides of a vertical member, a support flange positioned on said leg portion of one of said L-shaped members and one of said L-shaped members having an adjusting means.

4,093,203

DEVICE FOR SLOWING DOWN PRINTING SPECIMEN IN THE FOLDING APPARATUS

Rudolf Fischer, Lu-Oggersheim, and Rudolf Frey, Dirmstein, both of Germany, assignors to Albert-Frankenthal AG, Frankenthal, Germany

Filed Jul. 29, 1976, Ser. No. 709,749
Claims priority, application Germany, Sep. 17, 1975, 2541502
Int. Cl.² B41F 13/56
U.S. Cl. 270—20 **5 Claims**



1. Apparatus for slowing down fed printing specimens which are fed from a folding cylinder by means of a conveyor belt at a given speed before they are introduced into a paddle wheel of the folding apparatus in a rotary printing press, comprising:

a frame;

a pair of rollers supported on said frame and including a driven roller and a cooperating, freely pivotable roller forming a wedge portion therebetween interposed between said folding cylinder and said paddle wheel, the conveyor belt and the fed printing specimens passing through said wedge portion, said driven roller being fixed for rotation in said frame in synchronism with the fed printing specimens, said driven roller including on the outer periphery thereof at least two peripherally spaced rings forming therebetween a first aperture, said pivotable roller being movably coupled to said frame and adjustable for movement relative to said driven roller, said pivotable roller including on the outer periphery thereof a radially protruding bar running longitudinally therealong, said bar having at least one undercut portion forming a second aperture adapted to be aligned with said first aperture for providing a path through which said conveyor belt runs, said rollers being operable at a lower speed than that of said given speed of said conveyor belt, so as to reduce the impact speed of the specimens when they are introduced into said paddle wheel; and

adjustable means to adjust the distance between said pair of rollers, coupled to said pivotable roller, so as to permit adjustment relative to the thickness of said fed printing specimen.

4,093,204

SHEET CUTTER, FOLDER AND STACKER

Glenn A. Landgraf, and Fred H. Ebel, both of Boca Raton, Fla., assignors to Irvin Industries, Inc., Greenwich, Conn.

Filed Nov. 15, 1976, Ser. No. 741,566
Int. Cl.² B41F 13/56
U.S. Cl. 270—21 **9 Claims**

1. A sheet cutting, folding and stacking machine comprising

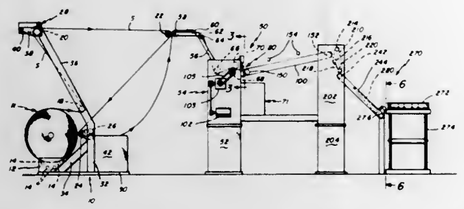
a cradle for supporting a roll of sheet material to be processed on the machine,

means for feeding the sheet material from a roll on the cradle to a cutting station,

a cutter including a hot wire forming part of the machine for cutting sheets of selected size from the roll,

a folder approach conveyor disposed adjacent the cutter

station for receiving the cut sheet one at a time from the cutting station,
a folder mounted immediately adjacent the approach conveyor for receiving the sheets to be folded,
means including a pair of rollers and a blade forming part of the folder for making at least one fold in each sheet after its leaves the approach conveyor,
a transfer conveyor mounted adjacent the folder for receiving the folded sheets from the folder,



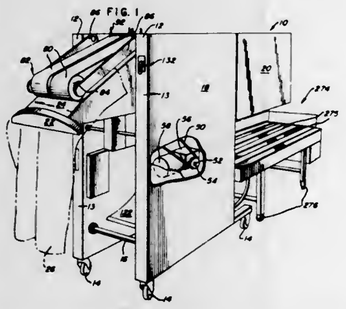
a stacker assembly mounted on the transfer conveyor in the path of folded sheets received by said conveyor for removing the folded sheets from the transfer conveyor,
said cradle including a plurality of idler rollers forming a bed to support the roll of sheet material,
driver rollers for engaging the sheet for pulling the sheet from the roll,
and a scray disposed between the wire cutter and drive rollers for temporarily collecting lengths of the sheet material prior to it being fed to the cutter.

4,093,205

FRENCH FOLDER CONSTRUCTION

Kasimir Kober, Chicago, Ill., assignor to Chicago Dryer Company, Chicago, Ill.

Filed Sep. 30, 1976, Ser. No. 728,080
Int. Cl.[2] B65H *45/22*
U.S. Cl. 270—66 **6 Claims**



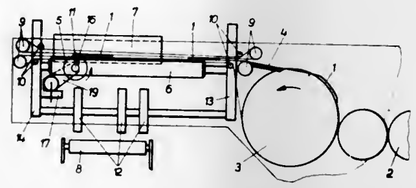
1. A folding apparatus comprising spaced parallel article support surfaces; having outermost parallel edges; the interval between said outermost edges of said support surfaces, defining an intervening effective article support surface; spaced support means for said opposed article support surfaces; a folding plate disposed beneath said support surfaces having parallel longitudinal edges; a first pivot mounted adjacent one end portion of said plate adjacent one longitudinal plate edge supportably mounting said plate for pivotal movement in a plane substantially parallel to said support surfaces; said folding plate parallel longitudinal edges being interconnected by a transverse article-engaging edge substantially traversing the interval between said outermost edges of said parallel support surfaces; motive means connected to said support means for said article support surfaces for uniformly moving said article support surfaces toward and away from each other in parallel relation; said motive means also being connected to said folding plate and simultaneously pivotally moving said folding plate about said pivot so that one of said folding plate longitudinal edges opposed to said pivot is maintained in substantial underlying alignment with the outermost edge of an overlying article support surface.

4,093,206

FOLDING DEVICE FOR ROLLER ROTATING PRINTING PRESSES

Karl-Heinz Hartmann, Lambsheim, and Hans-Günther Mayer, Frankenthal, both of Germany, assignors to Albert-Frankenthal AG, Frankenthal, Germany

Filed Nov. 3, 1976, Ser. No. 738,410
Claims priority, application Germany, Nov. 5, 1975, 2549595
Int. Cl.[2] B65H *45/18*
U.S. Cl. 270—67 **5 Claims**



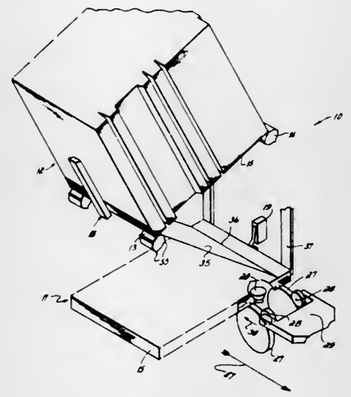
1. A folding device for roller rotating printing presses for folding a prefolded pack of sheets which are fed in a folding path between a pair of endless conveyor belts in a direction parallel to and underneath a folding knife comprising:
a frame;
a generally U-shaped yoke including a horizontally extending base member and two arms secured to, and extending upwardly from opposite ends of said base member, said yoke being pivotably mounted on said frame for pivotable movement about a vertical axis, and such that said arms thereof are disposed on opposite sides of said folding knife;
a pair of horizontally-disposed rotatable shafts each of which is coupled to the upper end of one of said arms of said yoke for rotation about a horizontal axis, said shafts being disposed beneath said belts;
a finger coupled to each of said shafts for rotation therewith, said fingers being rotatably movable into the folding path of the pack of sheets so as to engage an advancing leading edge thereof;
means for rotating said shafts so that said fingers are moved in a work cycle in the folding path of the pack of sheets so that one of the said fingers will engage an advancing leading edge thereof, said means rotating said shaft and, in turn, said fingers, in the feeding direction of the pack of sheets but at a slower speed so as to permit the trailing edge of the pack of sheets being fed at a higher speed by said belts, to become properly aligned with the leading edge; and
means for pivoting said yoke so as to, in turn, move one of said fingers toward the leading edge of the pack of sheets for engagement therewith, the other finger remaining in a non-engagement position relative to the pack of sheets until such time that the trailing edge of the pack of sheets becomes properly aligned with the leading edge thereof.

4,093,207

MAGAZINE AND FEEDER FOR CARTON BLANKS

Joseph Daniel Greenwell, Florence; Charles C. Hughes, and Robert W. Kinney, both of Ludlow, all of Ky., assignors to R. A. Jones & Co. Inc., Covington, Ky.

Filed Dec. 1, 1976, Ser. No. 746,466
Int. Cl.[2] B65H *1/30, 3/30*
U.S. Cl. 271—3.1 **3 Claims**



1. In a carton blank feeding mechanism
a magazine lower stage,
a blank ejecting mechanism located below the lower stage,
a magazine upper stage located immediately above the lower stage and being inclined to the vertical, and
a pair of transversely spaced feed rollers located between the upper and lower stages, said rollers forming the sole support for carton blanks mounted in the upper stage of said magazine,
the upper stage of the magazine having one wall which is at an angle of approximately 30° to the vertical,
the axes of said rollers defining a plane lying at an angle of approximately 105° to said inclined wall,
whereby cartons loaded in said upper stage and resting on said rollers will be shingled with respect to each other.

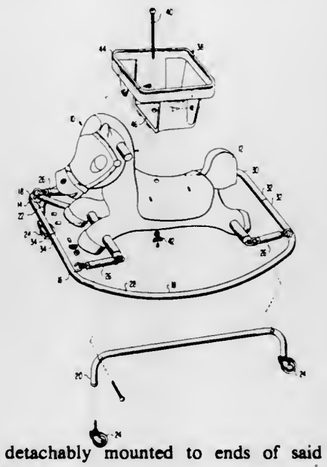
4,093,208

CHILD'S RIDING TOY AND STAND APPARATUS

William R. Tomalinas, Jr., Wapwallopen, Pa., assignor to Roth American, Inc., Wilkes-Barre, Pa.

Filed Jan. 18, 1977, Ser. No. 760,405
Int. Cl.[2] A63G *17/00*
U.S. Cl. 272—52.5 **7 Claims**

4. A stand apparatus for a riding toy supported from fixed positions thereon, comprising:
an elongated member formed in a closed curve;
means for resiliently supporting the riding toy in the horizontal plane within the closed curve of the elongated member from fixed locations on the member;
a pair of inverted, generally U-shaped frames, detachably mounted to sides of the elongated member, for supporting the apparatus on a supporting surface; and



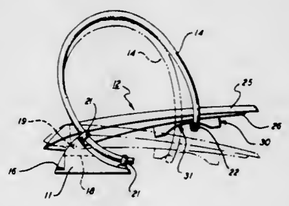
casters, detachably mounted to ends of said U-shaped frames.

4,093,209

DIVING APPARATUS

Lewis J. Daly, Fayetteville, N.Y., assignor to Robert C. Stevens, Pittsford and John M. Loftus, Scottsville, both of, N.Y.

Filed Mar. 28, 1977, Ser. No. 782,059
Int. Cl.[2] A63B *5/10*
U.S. Cl. 272—66 **10 Claims**



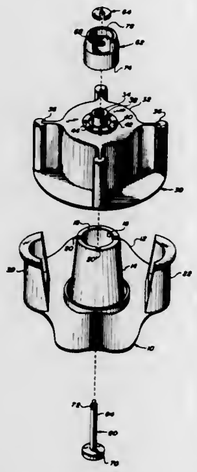
7. A self-adjusting diving platform of relatively short length including:
base member;
a board pivotally mounted at one end to said base member;
a pair of spaced apart arcuate shaped spring members secured in cantilevered fashion at one end in the base member and extending outwardly from said base each spring member extending along an edge of the board;
a crossbar secured to the free ends of said spring members said crossbar extending transversely and beneath the board; and
at least one arcuate guide slide means affixed to the bottom surface of the board and extending substantially longitudinally the board and having a generally concave working surface formed therein for receiving and guiding the crossbar in sliding relationship therewith when said board is used by a person, in rearward movement of the crossbar when the board is loaded to a predetermined level and to resist rearward movement of the crossbar when the board is loaded beyond said predetermined level.

4,093,210

FINGER/ARM FRICTION TYPE EXERCISING DEVICE

George I. Terpening, Telford, Pa., assignor to Acro Matic, Inc., Warrington, Pa.

Filed Jun. 3, 1977, Ser. No. 803,149
Int. Cl.[2] A63B *23/00, 21/26, 21/30*
U.S. Cl. 272—67 6 Claims



1. An exercising device adapted to strengthen the deep and superficial muscles of the forearm, comprising
   1. a base member for attachment to a wearer's waist, said base member having
      a. a projection means perpendicular thereto for receiving a wheel rotatable thereon, and
      b. means for attaching said base member to a wearer's waist;
   2. a wheel telescopically mounted for rotation on said projection, means said wheel having
      a. a plurality of radial projections to initiate rotation thereof by the wearer of said exercising device;
   3. said base member projection means having means for selectively receiving portions of said wheel to rotation of said wheel relative to said base member projection; and
   4. means joining said wheel to said base member projection means, said joining means having said selective receiving means positioned therewithin whereby said joining means may be adjusted incrementally to change the resistive force necessary to be overcome in order to rotate said wheel relative to said based member projection means.

4,093,211

COMBINATION JUMP ROPE AND FLEXIBLE EXERCISER

Thomas E. Hughes, 5908 Ridgewood Rd., Jackson, Miss. 39211, and Thomas E. Skornschek, 618 Ashcroft Dr., Brandon, Fla. 33511

Filed Feb. 4, 1977, Ser. No. 766,053
Int. Cl.[2] A63B *5/20, 21/14, 21/30*
U.S. Cl. 272—68 4 Claims

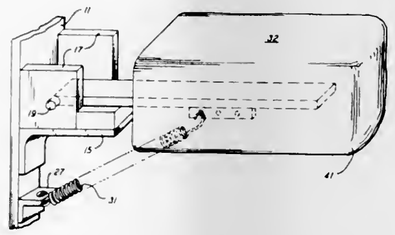
1. In an exercising apparatus, comprising, in combination:
   a. a pair of handgrips;
   b. an elastic, flexible member having two spaced ends connected to the handgrips, with the member being arranged extending between the handgrips; and
   c. fastening means attached to the handgrips for attaching the ends of the flexible member to the handgrips; the improvement wherein:
   d. each of the handgrips is resilient and includes a torsion spring provided with normally diverging arms, and two handles, one of the handles mounted on one of the arms and the other of the handles on the other of the arms, and each of the handles extending longitudinally away from the torsion spring, one of the handles of each of the handgrips being provided adjacent an end of the handle spaced farthest from the torsion spring with a recess means extending part way around the handle and substantially transverse to the longitudinal extent of the handle for selectively receiving the flexible member and permitting the apparatus to be employed as a chest exerciser by wrapping the flexible member around the one of the handles of each of the handgrips, the other of the handles of each of the handgrips being provided on an end of the handle spaced farthest from the torsion spring with a groove means disposed extending perpendicularly to the recess means provided in the one of the handles and toward the torsion spring for receiving the flexible member and facilitating performance of certain exercises by using the other of the handles of each of the handgrips as a fulcrum for the flexible member.

4,093,212

PUNCHING BAG FOR PRACTICING UPPERCUTS

Ronald Harmon Jacques, 15 E. Bunns La., Woodbridge, N.J. 07095

Filed May 12, 1976, Ser. No. 685,630
Int. Cl.[2] A63B *69/00*
U.S. Cl. 272—76 10 Claims



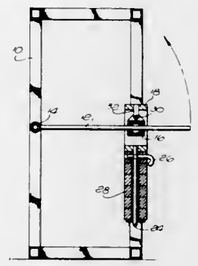
1. A training device for fighters permitting the practice of uppercut punches comprising:
   a. a mounting member for attachment to the wall of a room in which training is to take place said member arranged to be vertically disposed thereon;
   b. an arm having padding attached on all sides thereof and presenting at its outer end a portion simulating the chin of a fighter;
   c. an angle bracket rigidly attached to said mounting member;
   d. first and second side members rigidly attached to said mounting member and to said angle bracket said side members each having a hole formed therein; and
   e. a rod rigidly attached to the end of said arm disposed in said holes for rotation therein;
   f. means for limiting the downard motion of said padded arm to an approximately horizontal position such that the bottom portion of the padding on the end of said arm, when said mounting member is attached to the wall, will be approximately at the height of a man's chin; and
   g. means biasing said padded arm downward to said approximately horizontal position.

4,093,213

VARIABLE RESISTANCE LIFTING MECHANISM

Charles Milton Coker, Huntington Beach, and Gary Marvin Kling, Fullerton, both of Calif., assignors to Paramount Health Equipment Corp., Los Angeles, Calif.

Filed Feb. 10, 1977, Ser. No. 767,412
Int. Cl.[2] A63B *21/06*
U.S. Cl. 272—118 5 Claims



1. A variable resistance lifting mechanism, comprising:
   a frame having means for guiding the movement of weights:
   lever arm means pivotally attached to said frame at a pivot point and constructed to permit substantially only reciprocation of said lever arm means with respect through a sleeve means when said lever arm means is pivoted by a user
   a pivotable, linear bearing sleeve means for receiving said lever arm means in telescoping relationship, said sleeve means being mounted at a position remote from said lever arm means pivot point, said sleeve means being mounted for linear movement within said guide means and for simultaneous pivotal with respect to said frame to maintain alignment with said lever arm, said sleeve means simultaneously distributing a user's lifting forces over a substantial length of the respective lever arm means during lifting of the lever arm means
   bar weight supporting means pivotally connected to said each linear bearing sleeve means;
   a plurality of weights slidably mounted for linear movement of said guide means, said weight having adapted to distribute the forces against said guide means over a length of said guide means; and,
   means for attaching a selected number of said weights to said bar means,
   whereby pivoting by a user of said lever arm means about its pivot point causes pivoting said linear bearing sleeve means with respect to said guide means and simultaneous linear movement of said sleeve means and of said weights on said guide means.

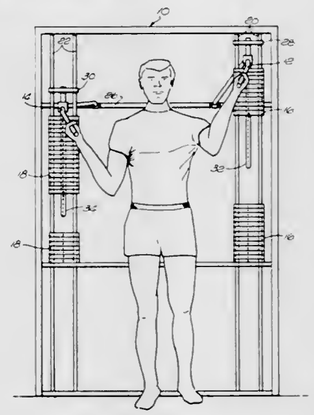
4,093,214

DUAL FUNCTION EXERCISE MACHINE

Charles Milton Coker, Huntington Beach, and Cliff James Coker, Calabasas, both of Calif., assignors to Paramount Health Equipment Corp., Los Angeles, Calif.

Filed Feb. 10, 1977, Ser. No. 767,411
Int. Cl.[2] A63B *21/06*
U.S. Cl. 272—118 4 Claims

1. A dual function exercise machine, comprising:
   a frame having means for guiding the movement of weights:
   a plurality of separate and independent adjacent lever arm means pivotally connected to said frame for lifting separate stacks of weights by a user;
   pivotable, linear bearing sleeve means for receiving each said lever arm means, each said sleeve means mounted at a position remote from each said lever arm means pivot point said each sleeve being mounted for linear movement with respect to said guide means and for simultaneous rotation with respect to said frame to maintain alignment with the respective lever arm means, each said sleeve means being adapted to simultaneously distribute lifting forces over a substantial length of each of the respective lever arm means;
   bar means pivotally connected to said each linear bearing sleeve means;
   a plurality of separate and independent stacks of weights, each stack of weights being slidably mounted for linear movement on said guide means and associated with one of said lever arm means; and,



   securing means adapted to secure each one of said bar means to a selected number of weights in an associated stack,
   said lever arm means being so situated on the frame as to permit exercise by one or both corresponding user's limbs on adjacent lever arm means connected to the same or a different number of weights and rotation by a user of said lever arm means causing rotation of an associated linear bearing sleeve means with said lever arm and simultaneous linear movement of said sleeve means and of said selected number of weights on said guide means.

4,093,215

CHANCE OPERATED SIMULATED CARD GAME

Chester P. Ballard, 1219-41 Barham Dr., San Marcos, Calif. 92069

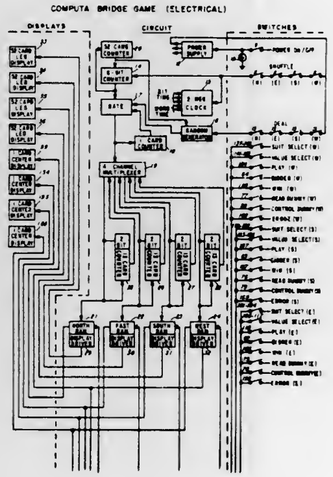
Filed Jun. 4, 1976, Ser. No. 693,276
Int. Cl.[2] A63F *1/18*
U.S. Cl. 273—1 E 4 Claims

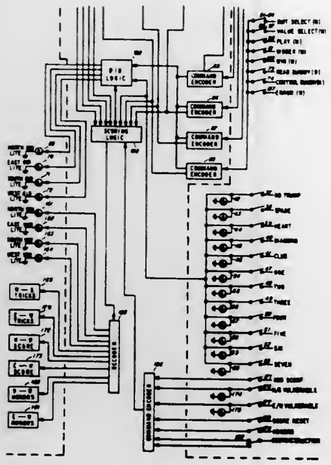
1. A game system, comprising:
   a center unit including a plurality of display devices for indicating cards respectively played by a plurality of individual players, wherein each display device provides display of a given card in response to a predetermined center display code signal;
   a plurality of player hand units, wherein each player hand unit is coupled to a separate center unit display device, and includes
      a plurality of display device for indicating the identity of the cards in an individual player's hand in response to predetermined hand display code signals representing different cards, and
      switch means for selecting a card for display in the center unit display device coupled to said player hand unit;
   means responsive to said selection of a card for providing a said predetermined center display code signal to the center unit display device coupled to said player hand unit; and
   means for randomly distributing a predetermined number of said hand display code signals to each player hand unit; wherein the distributing means comprise
   a plurality of RAM's, each separately coupled to each of the

player hand units, wherein each RAM provides said predetermined hand display code signals in response to being addressed by different hand card code signals having different counts;

a counter for providing a succession of hand card code signals having different counts;

a multiplexer connected to the RAM's for receiving said hand card code signals and distributing said received hand card code signals to separate RAM's;





means for randomly providing said hand card code signals from the counter to the multiplexer; and

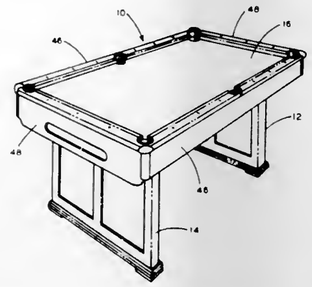
a plurality of card counters each of which is coupled to the multiplexer and to a given RAM for counting the number of hand card code signals provided to said given RAM and for inhibiting further distribution of said hand card code signals to said given RAM upon counting that a predetermined number of hand card code signals have been distributed to said given RAM.

4,093,216

POOL TABLE CONSTRUCTION AND ITS METHOD OF CONSTRUCTION

Ronald Lee Dunn, 2823 Knode Ct., Fort Wayne, Ind. 46806

Filed Apr. 13, 1977, Ser. No. 786,970
Int. Cl.² A63B *15/00*
U.S. Cl. 273—6 **7 Claims**



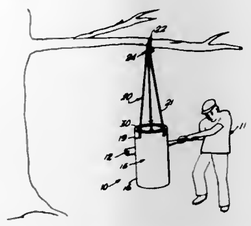
1. A pool table construction comprising a substrate of wood extending substantially throughout both the length and width of the playing area of the pool table and forming a complete underlayer which provides a support for the playing surface, and a substantially flat sheet of tempered glass having strength of from about 15,000 to about 35,000 psi and which overlies said supporting substrate of wood to provide the playing surface for the pool table, and including cutouts at the four corners and midsides of said flat sheet of tempered glass, a fabric covering for said glass which lies flatly against the playing surface of the glass and provides the playing surface of the pool table, a series of rails surrounding said tempered glass to confine the pool table operation to the playing area, and a plurality of spaced pockets at the four corners and two midsides of said pool table and corresponding with said cutouts formed in said flat sheet of tempered glass.

4,093,217

BATTING PRACTICE DEVICE

Silvio D. Piccini, 13620 SW. 74th Ct., Miami, Fla. 33158

Filed Mar. 15, 1976, Ser. No. 667,164
Int. Cl.² A63B *69/40*
U.S. Cl. 273—26 R **14 Claims**



1. A batting practice device comprising, in combination,

an open ended hollow cylinder,

said cylinder being formed of an elastomeric material,

a sling for said cylinder,

said sling including at least three support members,

support means for securing said support members at a position above the cylinder for swingably supporting said cylinder above a surface,

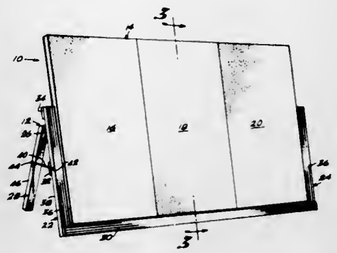
said cylinder having the properties of resilience and resistance to deformation under the blow of a bat to simulate the striking of a ball with a bat similar to a reinforced rubber tube of at least two plies and weighing at least ten pounds per foot, whereby a batter can practice repetitive swing at a strike area on said cylinder.

4,093,218

MODULAR BALL REBOUND APPARATUS

Samuel A. Burchers, 1910 Jamaica Way, Punta Gorda, Fla. 33950

Filed Nov. 26, 1976, Ser. No. 745,417
Int. Cl.² A63B *61/00*
U.S. Cl. 273—29 A **1 Claim**



1. A portable ball rebound apparatus comprising

at least three ball rebound panels each having a planar surface of a shock absorbing material,

means to removably support said rebound panels,

said means to support said rebound panels comprising an easel including a pair of opposed, spaced apart front legs interconnected by a plurality of transverse parallel rails of a length to removably support said three rebound panels, and a pair of side rear legs hingedly connected at their upper ends to the respective front legs,

means to adjust said means to support in a manner so as to selectively position said planar surface at various selective angles of inclination to the vertical,

each of said rebound panels comprising a rigid backing sheet with a cellular synthetic material bonded thereto comprising shock absorbing material, and

wherein said plurality of transverse parallel rails comprises a bottom rail fixed between the bottom ends of said front legs, each of said rebound panels being notched across its bottom edge in a manner so as to fit behind and on top of said bottom rail, and intermediate and top rails fixed between said front rails in positions to supportingly engage the back of each of said rebound panels.

4,093,219

BALLS FOR SPORT

Jean-Daniel Piraud, Thiers, France, assignor to Societe de Transformation du Caoutchouc-Sotrac, Cournon, France

Filed Oct. 22, 1976, Ser. No. 734,935
Claims priority, application France, Oct. 30, 1975, 75 33174
Int. Cl.² A63B *41/02*
U.S. Cl. 273—65 B **2 Claims**

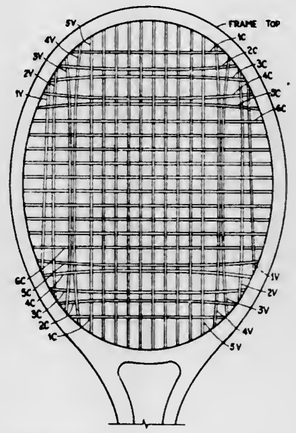
1. A two-ply ball for use in sports activities, consisting of an external cover layer fabricated of a wear-resistant material surrounding and secured to a composite bladder/body forming the inner layer in the ball, said composite bladder/body layer being fabricated from an elastomeric resin comprising a polycondensation product of at least one compound of the group consisting of the dicarboxylic acids and esters of the dicarboxylic acids having a molecular weight of less than 300 with a polyalkylene-oxyglycol whose molecular weight is between 400 and 6,000, and at least one diol having a molecular weight of less than 250.

4,093,220

TENNIS RACKET STRING NETWORK

Mike Prewarski, 3432 Lansdowne Dr., Lexington, Ky. 40502

Filed Oct. 28, 1976, Ser. No. 736,585
Int. Cl.² A63B *51/00*
U.S. Cl. 273—73 D **6 Claims**



1. A racket comprising:

a frame defining a central opening;

a handle extending outwardly from said frame;

first string means forming a plurality of longitudinal strings extending in the direction of said handle, spaced over the central opening and attached to said frame under tension;

second string means forming a plurality of cross strings extending at right angles to the first string means, spaced over the central opening and attached to said frame under tension;

a plurality of centrally located strings of the first and second string means being interwoven in the conventional basket-weave pattern and forming an imaginary center striking area bounded by longitudinal side strings and cross end strings;

the cross strings spaced from the longitudinal side strings being interwoven over and under at least two longitudinal strings with consecutive cross strings alternating the over and under pattern; and

a plurality of cross strings spaced from at least one end of the cross end strings being interwoven with a plurality of longitudinal strings in an identical predetermined pattern.

4,093,221

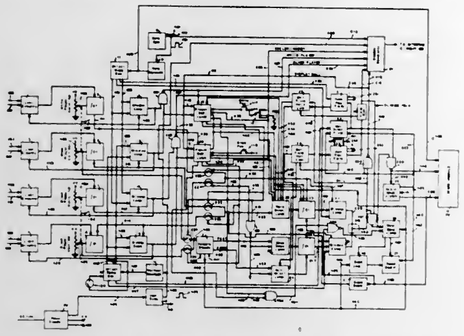
SIMULATED VIDEO GAME

Glen R. Dash, Watertown, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Dec. 13, 1976, Ser. No. 750,055
Int. Cl.² A63F *7/06*; G08B *5/22*; H04N *7/18*
U.S. Cl. 273—85 G **49 Claims**

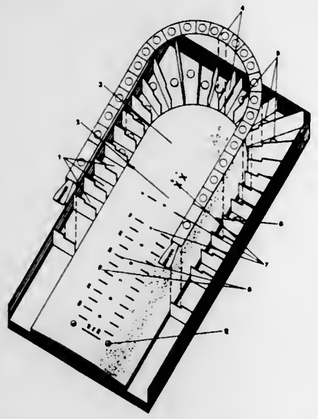
49. For use in an electronic game wherein simulated images are produced on the image screen of a CRT having a raster scan beam, electronic controller means operable to produce on said image screen the simulation of a playing area or region of the game, the simulation of at least one active component of said game, and the simulation of an object that moves about the playing area or region, said electronic controller means including, in combination, component signal generating means to provide an active component signal that serves to generate on the image screen the simulated active component, object generating means that serves to generate said object on the image

screen, latch means connected to receive the active component signal and the object signal and adapted to note the coincidence of the active component signal and the object signal and,



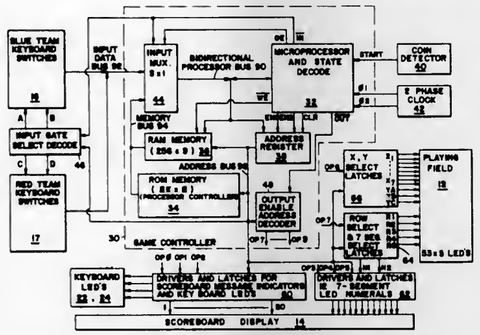
when activated, to lock the simulated component and the simulated object together on the image screen, and means to activate the latch means.

4,093,222
MINIATURIZED GOLF GAME
Robert C. Eshleman, 221 McAllister, Kentfield, Calif. 94904
Filed Mar. 23, 1977, Ser. No. 780,403
Int. Cl.[2] A63F *7/06*
U.S. Cl. 273—87 R **8 Claims**



1. A skill game simulating in miniature the playing of golf comprising:
- a miniature golf ball;
- a contoured game board having a plurality of slots arranged in a "U"-shaped configuration around a playing area convexly contoured with the apex thereof lying on the centerline of said "U" to arcuately accelerate said ball rolling thereon away from said centerline simulating hook and slice;
- designator means for associating golf shots of particular distances and directions with each of said slots, the distances of the golf shots being generally inversely related to the distances from the associated slots to said centerline, the directions of the golf shots associated with the slots on the legs of said "U" being primarily hooks and slices respectively;
- at least one miniature golf club for manual striking of said ball for movement on said contoured game board;
- a map depicting in miniature a golf course; and
- scaling means for translating the golf shots associated with said slots into corresponding movement on said map to simulate the playing of golf on the course depicted on said map by skilled manual manipulation of said ball on said contoured game board.

4,093,223
ELECTRONIC GAME APPARATUS AND METHOD
William F. Wilke, 702 N. Minnesota St., Carson City, Nev. 89701; Alan G. Hutcheson, 349 Smithridge, Reno, Nev. 89502, and Richard D. Ross, 285 E. Lincoln Way, Sparks, Nev. 89431
Filed Jan. 23, 1976, Ser. No. 651,914
Int. Cl.[2] A63F *9/00*
U.S. Cl. 273—94 R **24 Claims**

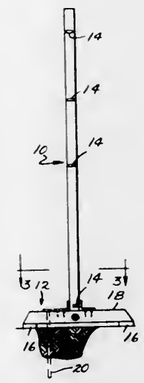


1. An electronic game apparatus comprising:
- a simulated playing field including automatically controllable indicia means for displaying game ball position and play execution movement;
- scoreboard display means including automatically controllable indicia means for displaying game data;
- first means for manually inputting a selected one of a plurality of play choices by a player presently on offense;
- second means for manually inputting a selected one of a plurality of play choices by a player presently on defense;
- game controller means including microprocessor means, random access memory means, and read-only memory means, wherein one portion of said read-only memory means includes probability table means comprising a plurality of stored electrical states arranged such that said states represent odds of success for different parameters involved in each play choice, and wherein a second portion of said read-only memory means includes a processor controller comprising a plurality of stored electrical states, said game controller means operating to detect input play choices and operating to generate a random number in response thereto, said processor controller operatively enabling said microprocessor means in conjunction with said random access memory means to automatically selectively access a plurality of said states in said probability table means based on the play choice of the offensive player, the play choice of the defensive player, and based on said random number, the accessed states of said probability table means constituting a specific play outcome;
- clock generator means, said clock generator means acting in conjunction with said microprocessor means and said random access memory means of said game controller means to use said play outcome to automatically generate a play execution;
- means for enabling said game controller to automatically control said playing field indicia means such that in real time said generated play execution is displayed, wherein the game ball is displayed as moving from an initial position on said playing field to a position corresponding to that determined by said play outcome; and
- means for automatically updating said scoreboard display means under the control of said game controller means

such that the current status of the game is continuously maintained thereon.

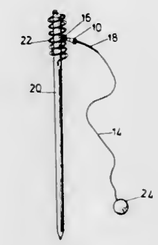
14. A method for electronically simulating the strategy of an athletic contest from electrical signals selected by competing players representing chosen offensive and counteracting defensive plays of said athletic contest comprising the steps of:
- a. electronically detecting said signals representing said chosen offensive play and said chosen counteracting defensive play;
- b. electronically generating one or more random numbers;
- c. operatively accessing automatically a plurality of electronically stored probability tables as a function of the detected plays chosen and random numbers generated, for obtaining data therefrom;
- d. electronically processing said obtained data to generate a play outcome; and
- e. thereafter electronically displaying automatically and in real time on a simulated playing field said play outcome, including the location and movement of opposing players.

4,093,224
NET HOLDING STANCHION ASSEMBLY
C. Marion Hale, 8525 Colesville Rd., Silver Spring, Md. 20910
Filed Mar. 9, 1976, Ser. No. 665,444
Int. Cl.[2] A63B *61/00*
U.S. Cl. 273—95 H **3 Claims**



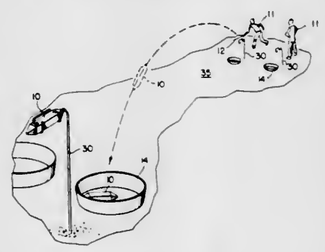
1. A net holding stanchion assembly comprising: a vertical support member having a plurality of net fastening members secured thereto at predetermined heights;
- a base member having a pair of spaced apart parallel ground engaging support members disposed parallel to the direction of a net when connected to the stanchion assembly, a pair of spaced apart parallel cross members fixedly secured at each end thereof to the central portions of the ground engaging support members, the vertical support member being releasably secured in the upright position between the cross members in their central portions;
- T-shaped spike means engagable with the upper surfaces of the cross members and extendable into the ground between the cross members so as to anchor the stanchion assembly to the ground during use.

4,093,225
ANCHORING DEVICE FOR CAPTIVE BALL AND CORD FOR A GAME
Robert John Oliver, Adelaide, Australia, assignor to Zimm-Zamm Aktiengesellschaft, Zurich, Switzerland
Filed Oct. 5, 1976, Ser. No. 729,775
Claims priority, application United Kingdom, May 20, 1976, 20955/76
Int. Cl.[2] A63B *69/00*
U.S. Cl. 273—95 AA **2 Claims**



1. An anchoring device for a captive ball and cord in a game comprising a stand supporting a spiral and a ball on one end of a cord, means interconnecting the other end of the cord and the spiral for vertical movement of said spiral and said other end of the cord relative to each other upon rotation of the ball around the stand, and an enlarged member on said other end of said cord adjacent but outside said spiral, said enlarged member having a diameter greater than the distance apart of the coils of the spiral so as to prevent the cord from becoming snagged in the coils of the spiral and to provide a prominent visual indication to the players of the game of the relative position of the cord and the spiral.

4,093,226
DINKEY GAME
Robert W. Priestle, Highland Heights, Ky., assignor to The Raymond Lee Organization, Inc., New York, N.Y.
Filed Oct. 19, 1976, Ser. No. 733,809
Int. Cl.[2] A63B *71/02*
U.S. Cl. 273—95 F **1 Claim**



1. A competitive game of skill and luck comprising a paddle, an object that is struck by the paddle to cause it to fly towards a goal, and
- a cradle for retaining the object in an elevated position above the ground prior to being struck, in which
- the object is a block of square cross-section formed at each of two opposing ends with a pyramid like tapered section, in which
- the paddle is formed of a handle fitted to a plate bounded by a pair of parallel surfaces that are joined along one side by a tapered section that extends to a rounded edge, and
- the cradle is formed of a continuous length of bent wire shaped with a straight shank section that serves as a vertical stake, joined at its upper extremity to a container

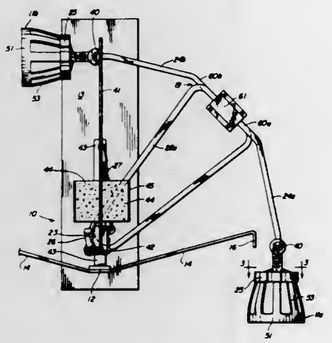
section, said container section formed to fit about the bottom and a pair of opposed sides of the said object and of a length shorter than that of the object, with said container section open at each end and open to the top of the container section, so that the opposed end section of the object may extend beyond the opposed ends of the container section, to permit a player to strike with the paddle, one projecting end of a said object resting in the container section, so as to permit the other end of the object when so struck to freely pivot and to permit the object to freely rise above the container after being so struck by the paddle.

4,093,227

TARGET WITH IMPROVED SHOCK ABSORBER MEANS

Charles A. Saunders, and Thomas Allen Saunders, both of Columbus, Nebr., assignors to Saunders Archery Co., Columbus, Nebr.

Continuation-in-part of Ser. No. 623,793, Oct. 20, 1975, Pat. No. 3,979,118. This application Jun. 28, 1976, Ser. No. 700,194
The portion of the term of this patent subsequent to Sep. 7, 1993, has been disclaimed.
Int. Cl.² F41J 7/04
U.S. Cl. 273—102.1 E **7 Claims**



5. A marksmanship target assembly comprising
an impact target producing a visible reaction to missile impacts and including a generally disk shaped target face, a target support arm supporting said target,
hub means supported by said target support arm and including a generally circular disc having a diameter no greater than the diameter of the target face, and
shock absorber means interposed between and connecting said target face to said hub means to cushion impacts of missiles striking said target, said shock absorber means comprising a plurality of annularly spaced, longitudinally resilient, linearly collapsible ribs formed integrally with said target face, said hub means securing rearwardly directed posterior ends of said ribs to said target support arm.

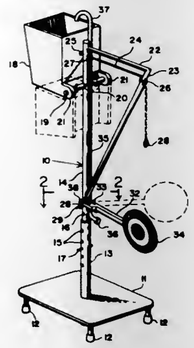
4,093,228

WATER DUMPING TARGET GAME

Franklin K. Pierce, 14220 SW. 74th St., Miami, Fla. 33183

Filed Jun. 27, 1977, Ser. No. 810,416
Int. Cl.² F41J 7/00, 5/00; A63B 71/06
U.S. Cl. 273—102.1 G **3 Claims**

1. A water dumping toy comprising a platform, support means extending upwardly of said platform, a water bucket, horizontally disposed pivot means supporting said water bucket on said support means, a lanyard, means securing an end of said lanyard to said bucket, said lanyard having a loop portion at the other end, a pin mounted on said support means receiving said loop portion and maintaining said water bucket in an upright position, a target arm, a target mounted at one end of said arm, pivot means mounting the other end of said target arm in proximity of said pin and release means mounted on said target engaging said loop whereby upon the swinging



of said target about said pivot means said loop is removed from said pin and said water bucket is compelled to pivot about said horizontally disposed pivot means and dump the water in said water bucket.

4,093,229

GAME TRACING ARROW

Richard C. Kelling, Grafton, Wis., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sep. 1, 1977, Ser. No. 829,608
Int. Cl.² F41B 5/02
U.S. Cl. 273—106.5 R **2 Claims**

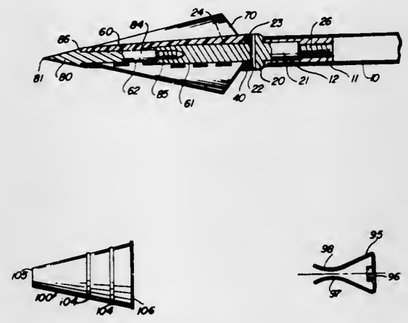
1. A game tracing arrow for providing a trail for game struck by the arrow, said game tracing arrow comprising
a hollow shaft having spaced opposite first and second ends, said shaft opening at its first end and being filled in so that it is solid in the area of its second end for a predetermined part of the length from said second end, said shaft having equiangularly spaced holes formed therethrough around the circumference thereof where said shaft is hollow but next-adjacent the solid part thereof;
a trail-indicating dye material in the shaft;
feathers on the shaft extending from the area of the second end thereof where said shaft is solid;
a piston member coaxially movably mounted in the shaft at the first end thereof and extending a predetermined distance out of said first end and a predetermined distance into said shaft; and
a head part on the piston member at the end thereof extending out of the first end of the shaft whereby when the arrow strikes a target the impact with the target forces the piston member back into the shaft thereby causing the dye material to gradually drip to the ground via the holes through the shaft to mark the trail of the target.

4,093,230

ARROWHEAD

Miroslav Andrew Simo, Riverside, Ill., assignor to New Archery Products Corp., Riverside, Ill.

Continuation-in-part of Ser. No. 619,824, Oct. 6, 1975, Pat. No. 4,006,901. This application Nov. 2, 1976, Ser. No. 738,030
The portion of the term of this patent subsequent to Feb. 8, 1994, has been disclaimed.
Int. Cl.² F41B 5/02
U.S. Cl. 273—106.5 B **34 Claims**



20. An arrowhead assembly comprising:
an arrow shaft having a head end, an adapter shaft having a head end and an other end, said adapter shaft provided by shaping said arrow shaft head end and having means for fastening a nosepiece at said adapter shaft head end;
an arrowhead body forming a hollow cylinder, said hollow cylinder having a diameter greater than said adapter shaft providing freely rotatable movement when said adapter shaft is inserted in said hollow cylinder, multiple blades firmly mounted within said body and having a shape exterior to said arrowhead body adapted for good aerodynamic flight characteristics and deep target penetration, the forward end of said arrowhead body having forwardly reducing diameter taper; and
a tapered nosepiece having a fastening means at its tail end for mating with said fastening means in the head end of the adapter shaft fastening said nosepiece in fixed relation to said adapter shaft and said arrow shaft, said nosepiece having a hollow taper portion to receive said tapered forward end of said arrowhead body while allowing freely rotatable movement of said arrowhead body and blades.

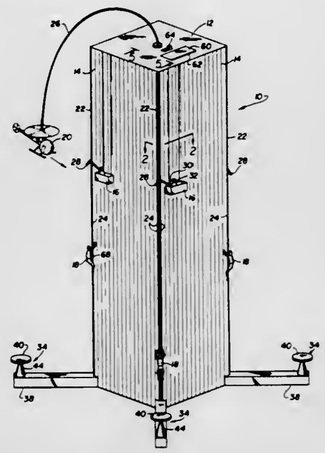
24. An arrowhead assembly for attachment to the head end of an arrow shaft comprising:
an adapter shaft having a head end and an other end, said other end having fastening means for securement to said head end of an arrow shaft and means for fastening a nosepiece at said adapter shaft head end;
an arrowhead body forming a hollow cylinder, said hollow cylinder having a diameter greater than said adapter shaft providing freely rotatable movement when said adapter shaft is inserted in said hollow cylinder, multiple blades firmly mounted within said body and having a shape exterior to said arrowhead body adapter for good aerodynamic flight characteristics and deep target penetration;
a tapered nosepiece having a fastening means at its tail end for mating with said fastening means in the head end of the adapter shaft fastening said nosepiece in fixed relation to said adapter shaft and said arrow shaft while allowing freely rotatable movement of said arrowhead body and blades; and
a protective sheath covering the blades, said sheath comprising an exterior wall the shape of a truncated cone having a large end which when in place extends rearwardly beyond the blades and an opposite small end which when in place extends forwardly beyond the blades, multiple fins extending inwardly from said exterior wall for a distance so that the fin ends engage said arrowhead body.

4,093,231

SUPERFLY GAME APPARATUS

John Gleason, 125-10 Queen Blvd., Kew Gardens, N.Y. 11415

Filed Aug. 3, 1977, Ser. No. 821,617
Int. Cl.² A63F 9/00
U.S. Cl. 273—108 **10 Claims**



1. Superfly game apparatus comprising in combination:
a simulated building structure having side walls and a roof;
a scaffold carried by each of said side walls having means thereon pivotable to a location approximate the adjacent corner of the structure;
a simulated helicopter mounted on said roof for rotation about the structure;
a series of playing pieces each configured in the representation of a human figure and positionable on the respective corners of the structure for movement therealong;
retaining means on said structure cooperable with said playing pieces for retaining said pieces at different elevational levels;
and manually operable means for propelling said playing pieces vertically along the corners of said structure.

4,093,232

PLAYER OPERATED GAME APPARATUS

David J. Nutting, and Jeffrey E. Frederiksen, both of Milwaukee, Wis., assignors to Bally Manufacturing Corporation, Chicago, Ill.

Filed May 13, 1975, Ser. No. 576,980
Int. Cl.² A63F 7/00
U.S. Cl. 273—121 A **55 Claims**

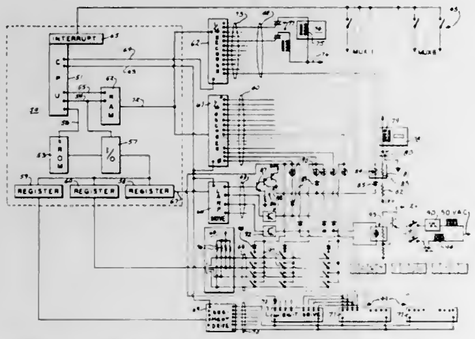
1. A game apparatus comprising:
a processor having program means for programming the processor and memory means for storing signals;
a physical mass capable of motion;
player-operated control means for affecting the motion of the physical means;
a plurality of response means for detecting the mass, each response means having signaling means associated therewith and operatively connected to the processor for signaling the processor that the response means has detected the mass;
a plurality of display means for presenting information based upon the detection of the mass by the response means, each display means having a display activation means associated therewith and operatively connected to the

processor for activating the display means in response to a signal from the processor; and

multiplexing means operatively connected to the processor for cyclicly and sequentially enabling each of the signaling means to signal the processor that its associated response means has detected the mass, and for cyclicly and sequentially enabling each of the display activation means to activate its associated display means;

said processor having means for storing the signals from the signaling means enabled by the multiplexing means into the memory means, for addressing the program means and the memory means, and for signaling the display activation means enabled by the multiplexing means, in response to the program means and the memory means.

45. A pinball game comprising a processor having programming means and memory means; a ball; a downwardly inclined playing field; player operated means for ejecting the ball on to the playing field whereby the ball may roll downwardly; a



plurality of response means for detecting the ball and having signaling means associated therewith and operatively connected to the processor for signaling the processor that the response means has detected the ball; a plurality of display means for presenting information based upon the detection of the ball by the response means and having display activation means associated therewith and operatively connected to the processor for activating the display means in response to a signal from the processor; and multiplexing means operatively connected to the processor for cyclicly and sequentially enabling the signaling means to signal the processor that its associated response means has detected the ball, and for cyclicly and sequentially enabling the display activation means to activate its associated display means; said processor having means for storing the signals from the signaling means enabled by the multiplexing means in the memory means, for addressing the program means and the memory means, and for signaling the display activation means enabled by the multiplexing means, in response to the program means and the memory means.

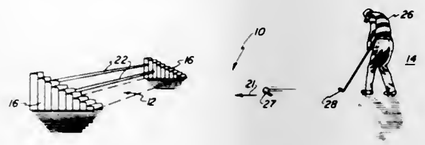
4,093,233
GOLF GAME
Charles E. Barbarow, 147 Greene Ave., Totowa, N.J. 07512
Filed Jan. 28, 1977, Ser. No. 763,497
Int. Cl.[2] A63B *67/02, 3/04*
U.S. Cl. 273—176 A **12 Claims**

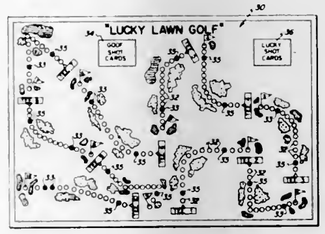
10. In a golf ball game apparatus, the improvement comprising:

a pair of scoring stands for placement upon a playing surface in laterally spaced-apart relationship, each scoring stand including a base; and

a plurality of scoring columns extending along each scoring stand upwardly from the base thereof and located longitudinally along each scoring stand, the scoring columns including corresponding delineated areas on confronting surfaces of the pair of scoring stands for defining a corresponding plurality of scoring zones within a scoring field extending along the playing surface between the scoring columns on the pair of scoring stands;

each scoring stand having a finite lateral width and including a stepped configuration wherein each subsequent consecutive scoring column, as viewed in the longitudinal direction away from the predetermined position on the playing





surface and toward the scoring field, extends upwardly one step further than the next previous scoring column to establish a plurality of consecutive steps of finite width; and

scoring indicia placed on each step for identifying the score corresponding to each scoring column and each delineated area thereof.

4,093,234
GOLF PRACTICE DEVICE
C. Dickinson Barton, c/o Barton Industries, 236 W. 54th St., Kansas City, Mo. 64112
Division of Ser. No. 695,830, Jun. 14, 1976, Pat. No. 4,022,476.
This application Jan. 31, 1977, Ser. No. 764,040
Int. Cl.[2] A63B *69/36, 43/02, 37/12*
U.S. Cl. 273—200 R **3 Claims**

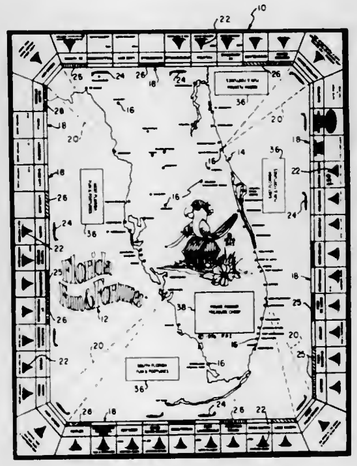
1. In a device for use to practice striking a ball such as a golf ball, the combination of:

means providing a generally vertical ball suspension member;

a flexible openwork net sized and arranged to completely and tightly surround the ball and presenting a plurality of apertures through which the surface of the ball may be struck, said net having an opening large enough for the ball to pass therethrough;

an endless cord threaded through the apertures of said net in extension substantially around the periphery of said opening, said cord presenting a pair of projecting loops located substantially across said opening from one another, one of said loops being passed through the other loop and secured to said ball suspension member to suspend the ball therefrom in a manner to hold said net opening closed and to maintain said net drawn completely around the ball in a tightly stretched condition.

4,093,235
TOURIST GAME
Dennis P. Barry, Bronx, N.Y., assignor to Publishers Planning Inc., New York, N.Y.
Filed Jul. 29, 1976, Ser. No. 709,633
Int. Cl.[2] A63F *3/04*
U.S. Cl. 273—254 **25 Claims**



1. A board game apparatus designed to acquaint players with a predetermined region as represented on a map, said apparatus comprising:

a board having predefined directions thereon corresponding to directions on said map and including a series of marked areas forming a path extending about said board, each of said areas representing a particular locality within said region, having indicia therein identifying said locality, and being disposed on said board to correspond generally with the location of said locality on said map, selected ones of said marked areas on said board being designated as accessible only by indicated modes of transportation;

at least one token means, each token means being dedicated to a different player and being moveable for transportation along said path, said token means comprising a set of tokens wherein each token represents a different mode of transportation for use by the corresponding player, each token being moveable only on marked areas corresponding to localities accessible by the corresponding mode of transportation; and

means for determining the movement of said token means about said path.

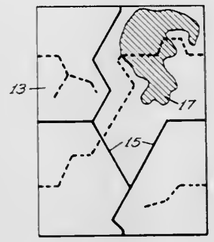
4,093,236
WAR GAME APPARATUS
Randy Lee Hoffa, 8000 E. River Rd., Minneapolis, Minn. 55432
Filed Nov. 22, 1976, Ser. No. 743,976
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—255 **2 Claims**

1. Tactical warfare game apparatus, comprising:

a game board on which various types of terrain and geography are designated, using color to determine elevation and which is marked with an overlying hexagonal grid pattern;

game pieces comprising accurately scaled three dimensional miniatures of instruments of warfare, said pieces visually distinguishable and identifiable;

first charts with tables printed thereon embodying data pertaining to each respective game piece enabling calculation of information relating to the ability of each said piece



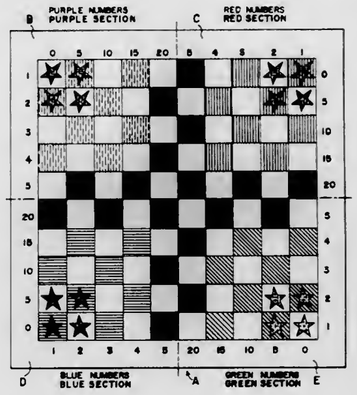
to be moved on said board, its firepower, and its resistance to opponents' fire;

second charts with tables printed thereon embodying data pertaining to said various terrain and geography on said board enabling calculation of the ability of each of said pieces to be moved on said various terrain on said board;

a single die; and

a worksheet having printed thereon a replica of the features on said game board.

4,093,237
CHESS BOARD GAME
Gary Douglas Weiss, P.O. Box 588, Redwood City, Calif. 94062
Filed Sep. 20, 1976, Ser. No. 724,733
Int. Cl.[2] A63F *3/02*
U.S. Cl. 273—260 **8 Claims**



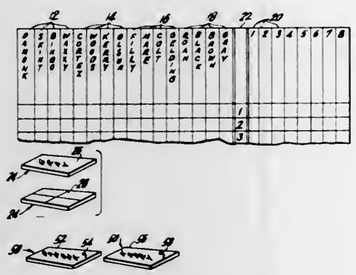
1. A modified chess game comprising a board with 100 squares which are evenly divided into four sections of 25 squares, each section having nine alternating light and dark colored squares along its interior borders and 16 interior squares which are alternating dark and light colors, each section having a characteristic color, the nine alternating light and dark colored squares of each section together forming two rows and columns of alternating light and dark colored squares in the middle portion of the board and four standard sets of chessmen, each set being colored to correspond to one of the section colors so that there are four different colored sets.

4,093,238

HORSE RACING GAME

Myron Alan Moskowitz, K 21 Avon Dr., E. Windsor Township, Mercer County, N.J. 08520

Filed May 7, 1976, Ser. No. 684,195
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—277 **10 Claims**



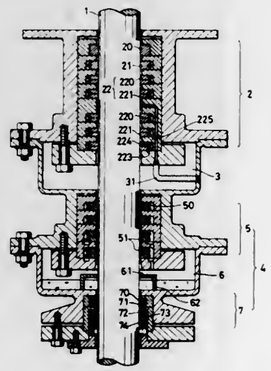
1. A game comprising a plurality of selection tiles each selection tile having two faces, one of a group of variables appearing on only one face of said selection tile, a selection tile being provided for each of said variables, a plurality of movement tiles, each of said movement tiles having two faces, each of said faces of said movement tiles having a variable thereon in an arrangement so that the same variable does not appear on both faces of any one of said movement tiles, each movement tile having a number on both faces of said movement tile, any one of a plurality of numbers being applied to said movement tile faces, the sum of such numbers for each group of variables being the same, a playing board comprising crossed lines forming a plurality of ranks and files of spaces, said ranks being provided for and including each said variable, said files underneath said ranks being used to score said game by recording in a particular file the number appearing on the uppermost face of a movement tile upon which also appears the variable of the particular file when said movement tile is played by a person competing in said game.

4,093,239

PISTON ROD SEALING ARRANGEMENT FOR A STIRLING ENGINE

Eisuke Sugahara, Tokyo, Japan, assignor to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1977, Ser. No. 759,701
Claims priority, application Japan, Jan. 21, 1976, 51-5681; Jan. 21, 1976, 51-5682
Int. Cl.[2] F02G *1/00*; F16J *15/40*
U.S. Cl. 277—3 **2 Claims**



1. A sealing arrangement for light molecular weight gases employed in a Stirling engine or the like, including a working cylinder, a reciprocating piston disposed in said cylinder, and an axially reciprocable piston rod secured to said piston and extending out of a cylinder opening, comprising:

(a) block seal means surrounding said piston rod immediately below said cylinder opening and including, in order, a bush, a breaker ring, at least one block seal packing ring, and at least one back-up ring, said block seal packing ring comprising a plurality of split ring segments inwardly biased by a coil spring disposed around the outer periphery thereof,

(b) liquid seal means surrounding said piston rod below said block seal means and comprising, in order, a liquid blocking portion including at least one liquid seal packing ring and at least one scraper ring, a liquid reservoir, and a seal means for preventing the escape of the liquid in said reservoir, said liquid seal packing ring comprising a plurality of split ring segments inwardly biased by a coil spring disposed around the outer periphery thereof, said liquid seal means further including an annular cup coaxial with and surrounding said piston rod in said liquid seal reservoir to prevent the outward spread of the liquid, said coaxial annular cup having holes about its periphery to supply the liquid therethrough,

(c) a leakage gas recirculation system including a return line coupled to said block seal means and drawing off gas leaking thereinto,

(d) a compressor having an input coupled to said return line and a discharge output connected to said working cylinder below said piston through a control valve, and

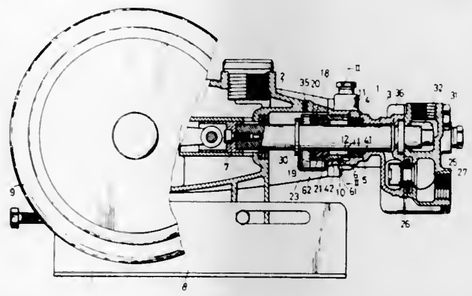
(e) opening means, including a crank angle timer, for opening said control valve when the cylinder pressure beneath said piston falls below a predetermined value.

4,093,240

PLUNGER SEALING AND LUBRICATING APPARATUS FOR PUMPS

Taiji Masuda, and Hitoshi Mizuno, both of Odawara, Japan, assignors to Kabushiki Kaisha Shikutani, Odawara, Japan

Filed Jun. 15, 1977, Ser. No. 806,701
Int. Cl.[2] B65D *53/00*; F04B *39/02*
U.S. Cl. 277—15 **7 Claims**



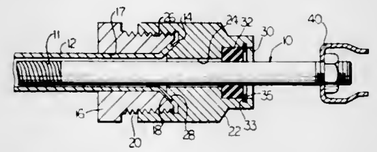
1. Plunger sealing and lubricating apparatus for horizontal plunger pumps provided with a crank case mounted on a base, a cylinder block fixed to the crank case, a cylinder head secured to the front of the cylinder block, and at least a plunger horizontally slidably disposed in the cylinder block, which comprises a hollow cylindrical room formed coaxially with each plunger in the cylinder block, said room having forward and rearward portions and an annular groove therebetween, a hollow cylindrical retainer having the front portion thereof threadedly fitted in the rearward portion of said room and the back portion projecting backwardly from said room, the front portion of said retainer being in diameter smaller than the back portion and forming an inner annular shoulder therebetween, a first sealing packing mounted in the forward portion of said room in front of said retainer, a second sealing packing mounted in the back portion of said retainer and having the front side pressed against said shoulder, an oiling packing mounted behind said second sealing packing in the back portion of said retainer and having a leg portion drawn down out of said retainer and immersed in oil in an oil-pan secured to the cylinder block, said retainer having a plurality of holes formed in the front portion for internal communication between a void space defined by said first and second sealing packings and said annular groove in said room, a liquid passage internally provided for communication between said groove in the cylinder block and a suction chamber in the cylinder head, a sealed conduit disposed in said liquid passage and bridging the joining between the cylinder block and the cylinder head.

4,093,241

PUSH-PULL CABLE AND ROD ASSEMBLY WITH SEAL

John Richard Muntjanoff, Aurora, and Ivan Richard Lamport, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 24, 1977, Ser. No. 771,505
Int. Cl.[2] F16J *15/32*; F16C *1/10*
U.S. Cl. 277—24 **15 Claims**



1. A seal cap assembly for a control cable system, the control cable system including a cylindrical housing having a cable extending therethrough, the seal cap assembly comprising:

rod means axially disposed in said housing for connection with said cable;

a first member associated with said housing proximate one end thereof, the rod means extending outwardly of the first member;

sealing means disposed about the rod means for sealingly associating the rod means with the cylindrical housing so that the rod means is movable therethrough; and

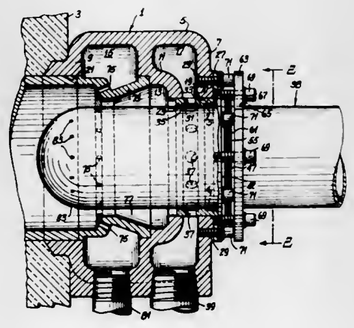
retention means for removably retaining said sealing means disposed about said rod means relative said first member.

4,093,242

SLAG BLOWER WALL BOX SEAL

Stevens M. Terry, Rte. No. 1, Box 500, Evington, Va. 24550

Filed May 31, 1977, Ser. No. 801,613
Int. Cl.[2] F16J *15/56*; F22B *37/52*
U.S. Cl. 277—58 **14 Claims**



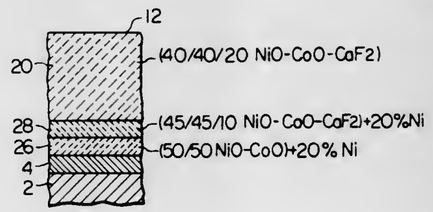
1. A slag blower wall box seal for an opening in a boiler wall adapted to seal around a slag blower or lance tube extending therethrough and into the interior of the boiler, comprising: a wall box having first sealing means contained therein engagable with a rotatable and axially slidable slag blower tube for substantially preventing products of combustion from escaping from the interior of the boiler to the exterior thereof between the slag blower tube and the first sealing means, said wall box including an outer annular flange provided with an opening through which the slag blower tube is to extend, said flange being fixed to the wall box and having a planar outer surface disposed normal to the opening in said first sealing means, in combination with a second seal disposed outside of said wall box and comprising: a diametrically split, floating seal ring having an opening therethrough of substantially the same diameter as the outer diameter of the slag blower tube, said floating seal ring having parallel sides and being mounted on the wall box with its inner side contiguous with and slidable on the planar outer surface of said flange, resilient means securing the parts of the split ring together so that the opening in the ring will engage with the outer surface of a slag blower tube extending therethrough, a thrust ring having a planar inner surface and an opening extending therethrough of a diameter larger than the outer diameter of the slag blower tube but smaller than the outer diameter of the floating split ring, said thrust ring being mounted on the exterior wall of the wall box with its planar inner surface contiguous with and slidably engaged by the outer parallel surface of the floating split seal ring, and with its opening in substantially axial alignment with the opening in said first sealing means, means spacing the inner planar surface of the thrust ring from the opposed outer planar surface of the annular flange, and means fixedly securing said thrust ring to the wall box, said spacing means being slightly greater than the distance between the parallel faces of the floating split seal ring by an amount only sufficient to permit the floating seal ring to move radially between said opposed planar surfaces and at the same time to sealingly engage said planar surfaces and the outer surface of a slag blower tube extending therethrough.

4,093,243

RUBBING CONTACT SEAL MEMBER WITH LOW WEAR COATING AND METAL-CONTAINING UNDERCOAT

Katsuhiro Kishida, and Akira Oyamada, both of Yokohama, Japan, assignors to Nissan Motor Company Limited, Yokohama, Japan

Filed Aug. 10, 1976, Ser. No. 713,265
Claims priority, application Japan, Aug. 29, 1975, 50-103902
Int. Cl.[2] F28D *19/00*; F16J *15/34*
U.S. Cl. 277—96.2 **12 Claims**



1. In a low wear member which is adapted for rubbing contact with another member and is useful as a high temperature rubbing contact seal member on a rotary regenerator of a gas turbine, the low wear member including a metal substrate, at least one undercoat layer formed on a surface of said substrate, and a surface layer coated on an outmost one of said at least one undercoat layer, the material of said surface layer consisting essentially of a major amount of a refractory and wear resistant ingredient selected from the group consisting of CoO, NiO and mixtures thereof and a minor amount of a solid lubricating ingredient, the material of said at least one undercoat layer being said refractory and wear resistant ingredient

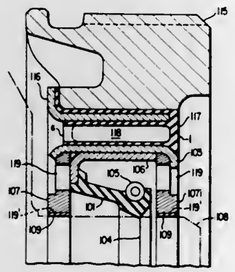
optionally and individually with the addition of a minor amount of said solid lubricating ingredient, said at least one undercoat layer and said surface layer being formed individually by flame spraying, the improvement comprising at least one of said at least one undercoat layers additionally containing a metal, at least one member of which is selected from the group consisting of Cu, Ni or Al, the coefficient of thermal expansion of said metal and the amount of said metal being such that each of the metal-containing undercoat layers is less different from said surface layer in thermal expansion coefficient than an undercoat layer without said metal from said each of the metal-containing undercoat layers.

4,093,244

STUFFING-BOX SEAL PARTICULARLY FOR ROTATING SHAFTS

Jean-Jacques Boutant, 44, rue Charles Drot 92500, Rueil-Malmaison, France, assignor to Regie Nationale Des Usines Renault, Boulogne Billiancourt, France

Filed Jan. 7, 1977, Ser. No. 757,733
Claims priority, application France, Jan. 26, 1976, 76 01955
Int. Cl.² F16J *15/18*
U.S. Cl. 277—153 **5 Claims**



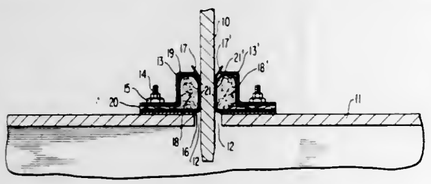
1. A stuffing-box seal particularly adapted for rotating shafts, comprising:
a ring seal;
a retaining sleeve for said ring seal;
an external housing;
a centering sleeve bonded together with said external housing and said retaining sleeve; and
two centering caps located at the opposing axial ends of said ring seal being held by said retaining sleeve wherein one of said centering caps has a set of orifices and grooves for supplying lubricant to a sealing lip of said ring seal.

4,093,245

MECHANICAL SEALING MEANS

Peter J. Connor, Bethlehem, Pa., assignor to Mosser Industries, Inc., Bethlehem, Pa.

Filed Jun. 2, 1977, Ser. No. 802,892
Int. Cl.² F23L *13/06*
U.S. Cl. 277—237 R **32 Claims**



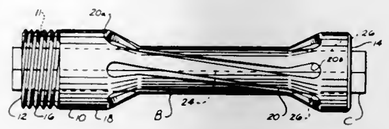
1. Apparatus comprising a moving member, a fixed frame with which the moving member cooperates, and means for sealing between said moving member and said fixed frame, said sealing means comprising means forming a rigid, elongated channel on the frame, said channel having a back wall and at least one side wall; a rope which is resiliently compressible across its width positioned lengthwise in said channel; and an elongated metal strip having opposing front and rear surfaces, said strip being flexibly attached along the first of its two long edges to a side wall of the channel so as to sandwich the rope between the back wall of the channel and the rear surface of the metal strip, said channel means, rope, and metal strip being positioned such that said moving member can press against the front surface of the metal strip in sealing engagement therewith, urging the strip against the rope, the resilience of the rope providing a pressure counter to that exerted by the moving member, said metal strip being thin enough to conform to surface irregularities of the moving member.

4,093,246

UNIVERSAL FEED FINGER DEVICE

Frederick Goff, Box 773, Rte. 4, Travelers Rest, S.C. 29690

Filed Aug. 9, 1977, Ser. No. 823,188
Int. Cl.² B23B *31/00*
U.S. Cl. 279—41 A **5 Claims**



1. A feed finger for gripping and feeding a bar of stock material on an automatic screw machine and the like comprising:
an elongated cylindrical member having a hollow interior and being open at both ends thereof;
one end of said cylindrical member adapted for attachment to a feed tube of said machine through which said bar stock is fed;
a plurality of elongated closed-ended slots extending obliquely to the longitudinal direction of said cylindrical member to define a helical cage; and
said cylindrical member being crimped in a section intermediate the closed ends of said helical slots defining a crimped bore in which said bar stock is gripped.

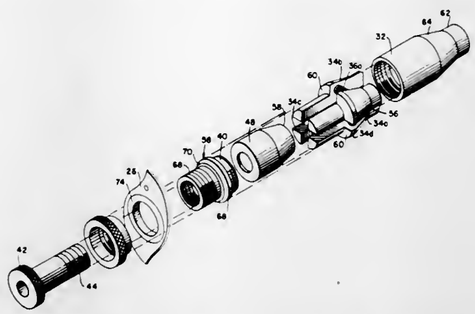
4,093,247

CHUCK

Arthur Alexander Bernard, Beecher, and Richard Allen Bernard, Flossmoor, both of Ill., assignors to Darex Corporation, Beecher, Ill.

Division of Ser. No. 594,349, Jul. 9, 1975, Pat. No. 4,001,975
This application Jul. 20, 1976, Ser. No. 707,026
Int. Cl.² B23B *31/12*
U.S. Cl. 279—53 **5 Claims**

1. In combination with a fluted twist drill sharpening device having a pair of spaced apart chuck receiving bearing surfaces; a plural-jawed chuck for gripping the fluted end of twist drills having two peripheral bearing surfaces receivable in the two bearing surfaces of the sharpening device; an outer tubular body having a first cylindrical rearward end and a second cylindrical forward end, the diameter of the first cylindrical end being greater than the diameter of the second end and a sloping wall section between said first and second cylindrical ends; a plurality of jaw members received in said tubular body, each said jaw member defining a clamping surface for gripping said drill and including a forward arcuate portion corresponding to the second cylindrical end of the tubular body, a rearward arcuate portion, and an arcuate sloping portion corresponding to the sloping portion of the tubular body; each said rearward arcuate portion being stepped to provide a shoulder on each jaw member; and means for applying a jaw closing force to said shoulder portion of each jaw, whereby the arcuate sloping portion on each of said jaw members is caused to co-act with the cylindrical sloping portion of the tubular body; said last named means including a bushing adapted to engage the shoulder on each jaw member, and a manually turnable



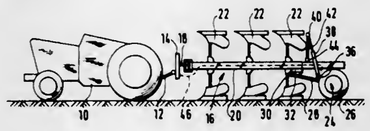
knob having threaded engagement with internal threads on the rearward end of the outer tubular body and adapted to urge said bushing into chuck closing engagement with the shoulder on each jaw.

4,093,248

PIVOTAL IMPLEMENT

Benno Gassner, D-8011 Haus near 14C, and Johann Gassner, D-8011 Haus near 10, both of Goggenhofen, Germany

Filed Mar. 22, 1977, Ser. No. 779,965
Claims priority, application Germany, Mar. 22, 1976, 2612068
Int. Cl.² B60G *17/00*
U.S. Cl. 280—6.1 **11 Claims**



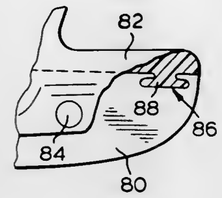
1. A pivotal implement, such as a pivotal plow, comprising:
an implement frame having an axle extending generally longitudinally in the direction of travel about which said frame may pivot;
an undercarriage on which said implement frame is pivotably supported for movement relative to said undercarriage about said longitudinal axle, said undercarriage including at least one pair of spaced-apart wheels and at least one pair of transversely-extending wheel axles, each of which supports one of said wheels and each of which is coupled to said undercarriage for independent movement in a substantially vertical direction, relative to the longitudinal axis of said undercarriage, between an upper limiting position and a lower limiting position;
blocking means associated with said wheel axles for preventing a tipping movement of said undercarriage relative to said implement frame about said longitudinal axle, said blocking means being movable between a blocking position and an unblocking position for respectively preventing and permitting movement of said wheel axles; and
sensor means associated with each of said wheel axles which are responsive to a change in position of its associated wheel axle relative to said longitudinal axle and which are coupled to said blocking means and which move said blocking means into a blocking position when the associated wheel axles moves from said upper limiting position downwardly relative to said longitudinal axle.

4,093,249

SKATE ASSEMBLY

Alan F. Chambers, 3 Gloxinia Crescent, Agincourt, Ontario, Canada

Continuation-in-part of Ser. No. 700,420, Jun. 28, 1976, abandoned. This application Dec. 20, 1976, Ser. No. 752,054
Int. Cl.² A63C *1/32, 1/42*
U.S. Cl. 280—11.12 **16 Claims**



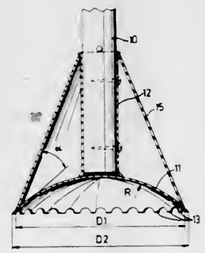
1. An ice skate assembly comprising:
a hardened steel blade having an upper portion and a lower portion including a lower ice engaging surface terminating in upwardly curved front and rear portions, the upper portion including a non-interfering upper surface which is rounded transversely and non-interfering side surfaces;
a blade-supporting body of a synthetic plastic material located about said upper portion such that said lower portion projects outwardly from the body;
anchor structure means defined by the blade and the body and positioned at a discrete location relative to the length of the blade whereby the blade and the body are attached to one another; and
fastener means passing through the body and through the upper portion of the blade at a plurality of locations along the length of the blade spaced from the anchor structure whereby the blade is further attached to the body.

4,093,250

SKI POLE

Nils Wikstrand, Mora, Sweden, assignor to Firma Moon, Malung, Sweden

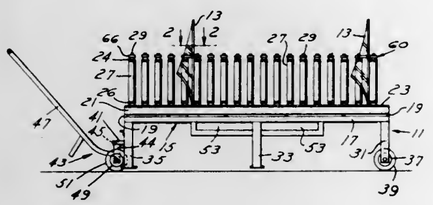
Filed Oct. 29, 1976, Ser. No. 736,850
Claims priority, application Sweden, Oct. 30, 1975, 7512169
Int. Cl.² A63C *11/24*
U.S. Cl. 280—11.37 Z **16 Claims**



1. In a ski pole having a pole and a snow collecting shoe attached to one end of the pole including cup means defining a recess facing away from the pole, the improvement comprising: means for attaching said cup means at an extreme end of the pole with said recess axially beneath said pole so that said recess is free from any part of said ski pole and said cup means defines a recess formed generally in the shape of a hemisphere having a substantially continuous spherical inner sliding surface, said cup means forming a gliding surface facing snow and

ice compacted therein during skiing and acting as a fulcrum and bearing point for the ski pole.

4,093,251
APPARATUS FOR CARRYING GLASS PANELS
Ambroise O. Boyer, 2345 Randolph, Windsor, Ontario, Canada
Continuation-in-part of Ser. No. 642,905, Dec. 22, 1975, Pat. No. 4,033,597. This application Apr. 27, 1977, Ser. No. 791,441
Int. Cl. B62b *1/08*
U.S. Cl. 280—46 **10 Claims**



1. An apparatus for carrying, holding and storing automobile glass windshields of the longitudinally curved type so that such windshields may be transported without damage thereto comprising a frame having first and second longitudinal frame members of generally the same length, said frame members being arranged parallel and in laterally spaced apart relation, said frame members having upper surfaces which are flat, with said upper surfaces of said frame members lying in a horizontal plane, a first row of upright dowels fixedly secured to and positioned at predetermined spaced locations along the length of said first longitudinal frame member, a second row of upright dowels fixedly secured to and positioned at corresponding predetermined spaced locations along the length of said second longitudinal frame member, each of said dowels of said first and second rows being provided with an elongated tubular resilient member which is sleeved over the dowel, each of the elongated tubular resilient members being adapted to support a portion of the windshield and prevent the scratching or breaking thereof, an end cap of resilient material for each dowel sleeved over the upper portion thereof, a rotatable locking finger made from a resilient material for each dowel and sleeved over the corresponding end cap, said locking finger having a pair of clamping surfaces, each clamping surface being adapted to cooperate with an opposing clamping surface on an adjacent locking finger to hold and clamp a windshield therebetween, and means associated with said frame for enabling said apparatus to be transported from place to place.

4,093,252
SCOOTER BOARD
John Rego Rue, Marietta, Ga., assignor to Charles A. Burrell, Marietta, Ga., a part interest
Filed Jan. 28, 1977, Ser. No. 763,247
Int. Cl.² B62K *9/00*
U.S. Cl. 280—87.04 A **8 Claims**

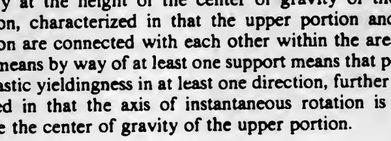
1. A scooter type coaster vehicle comprising a foot board, fore and aft spaced tandem caster wheels on the bottom of the foot board and each freely and independently swiveled for a full 360° of rotation in either direction on a swivel axis substantially normal to the foot board, a forward balancing handle for the vehicle attached fixedly to the foot board and rising thereabove, and said balancing handle having a top hand grip portion arranged substantially above the swivel axis of the forward caster wheel of the vehicle.

4,093,253
CHASSIS FRAME FOR MOTOR VEHICLES
Josef Lehr, Hannover, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany
Filed Dec. 7, 1976, Ser. No. 748,307
Claims priority, application Germany, Dec. 8, 1975, 2555107
Int. Cl.² B62D *21/02*
U.S. Cl. 280—789 **9 Claims**

1. A chassis frame for motor vehicles comprising parallel longitudinal members in form of hollow section girders; cross members projecting from the sides of the frame and interconnecting said longitudinal members; said longitudinal members having openings in their side walls enclosing the hollow section; said openings conforming with the cross section of the cross members, said cross members having a center section and abutting end sections, said sections being inserted from the sides through the openings into the hollow interior of the longitudianl section; said cross members passing through said longitudinal members, said end sections projecting beyond the longitudinal members, said center section of said cross members penetrating the wall of the longitudinal members facing the vehicle center, said end sections of said cross members passing through the outer wall of the longitudinal members, said center section and said end sections abutting bluntly each other and being connected to each other by welds within the interior of the hollow section of said longitudinal members.

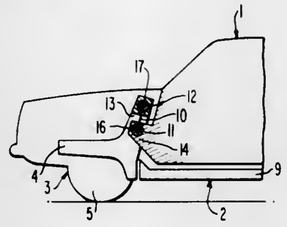
4,093,254
PROTECTIVE FRAME STRUCTURE FOR A MOTOR VEHICLE FUEL TANK
Toshi Ezaki, Toyota, Japan, assignor to Toyoto Jidosha Kogyo K. K., Toyota, Japan
Filed Oct. 22, 1976, Ser. No. 734,978
Claims priority, application Japan, Aug. 6, 1976, 51-105008
Int. Cl.² B60R *5/04*
U.S. Cl. 280—783 **12 Claims**

11. A structure for protecting a fuel tank which is mounted at the rear of the motor vehicle and between two frame members of said motor vehicle which extend along and beyond the sides of said fuel tank, said structure comprising reinforcing members coupled to said frame members, said reinforcing members extending at least the length of said tank whereby said frame members are provided with the reinforcing section adjacent at least the length of said fuel tank and non-reinforcing sections behind said tank and further comprising a kick-up section of said frame members in front of the gas tank, said kick-up section being reinforced by said reinforcing member



and an inner channel provided on said frame members forward of said kick-up section, the end of said inner channel only adjoining the end of said reinforcing member at the top of said kick-up section.

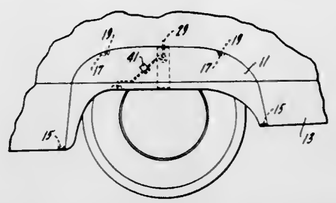
4,093,255
PASSENGER MOTOR VEHICLE
Karl Wilfert, Gerlingen-Waldstadt, and Walter Schmid, Sindelfingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany
Filed Apr. 30, 1975, Ser. No. 572,952
Claims priority, application Germany, May 2, 1974, 2421207
Int. Cl.² B62D *27/04*
U.S. Cl. 280—788 **39 Claims**



1. A passenger motor vehicle which comprises a lower portion including front and rear axle means operatively connected with each other and an upper portion independent of the lower portion and including at least the passenger space, the upper portion being pivotal with respect to the lower portion about an axis of instantaneous rotation extending generally in the vehicle transverse direction and disposed within the longitudinal center area of the vehicle at least approximately at the height of the center of gravity of the upper portion, characterized in that the upper portion and lower portion are connected with each other within the area of the axle means by way of at least one support means that possesses an elastic yieldingness in at least one direction, further characterized in that the axis of instantaneous rotation is located above the center of gravity of the upper portion.

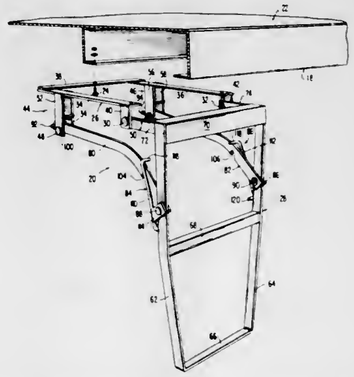
4,093,256
LOCKING MECHANISM FOR AUTOMOBILE FENDER SKIRT
Luther J. McAdams, Sr., 1626 E. 91st Pl., Chicago, Ill. 60617
Filed May 11, 1977, Ser. No. 795,727
Int. Cl.² B60J *9/00*
U.S. Cl. 280—153 R **3 Claims**

1. A locking device for an automobile fender skirt of the type which is pivotally supported on an automobile fender by hooks located at the lower edges of the front and rear portions of the fender skirt and has a pivotally mounted latch at the top of the fender skirt which latch extends behind the fender to prevent removal of the fender skirt from the fender, said latch being pivoted by operation of an arm integrally formed therewith, said locking device including:
an angle,
a threaded rod engaging a threaded opening in one leg of the angle to thereby enclosed said latch arm between the threaded rod and the legs of the angle when the latch extends behind the fender,
a key operated disc tumbler cylinder lock plug connected to one end of said threaded rod and having radially extending discs projecting from the plug along the length thereof, said key being insertable in the cylinder lock plug to retract said discs,



a cylinder lock housing fastened to and extending through said fender skirt,
said cylinder lock housing having a passage extending therethrough with said passage including a cylindrical portion adapted to receive said disc tumbler cylinder lock plug and spaced longitudinally extending stops adapted to engage said radially extending discs to prevent rotation of said key operated cylinder lock plug in said passage.

4,093,257
TRUCK LADDER
Larry G. Tarvin, R.R. 2, Havana, Ill. 62624
Filed Jul. 1, 1977, Ser. No. 812,401
Int. Cl. B60r *3/02*
U.S. Cl. 280—166 **10 Claims**



1. A ladder assembly securable to a platform of a truck for manual actuation between a collapsed position and an operable position facilitating access to and from the platform, said ladder assembly comprising:
support means including mounting means securable beneath the platform adjacent one side thereof, and guide means securable beneath the platform at a location disposed inwardly of said mounting means, and
a ladder portion comprising:
a ladder frame including a plurality of crosspieces, connectible adjacent one end thereof to said mounting means for swinging movement about a horizontal axis between a generally upright operable position in which said crosspieces are vertically spaced to form climbing steps, and a generally horizontal collapsed position in which said ladder frame is disposed beneath the platform,
stabilizer arm means pivotably connected at one end to said ladder frame and slidably carried by said guide means

during swinging movement of said frame between operable and collapsed positions, said arm means including,

first connecting means disposed remotely of said one end of said arm means for automatically latchingly engaging said guide means when said frame is in an operable position to resist swinging movement of said frame, and

second connecting means located proximate said one end of said arm means for automatically latchingly engaging said guide means when said frame is in a collapsed position to resist swinging movement of said frame,

said stabilizer arm means being manually swingable about the pivot connection thereof with said ladder frame to disengage said first and second connecting means from said guide means and permit swinging movement of said ladder frame, and

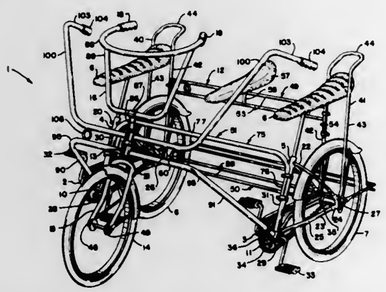
unlatching means mounted to said ladder frame for movement relative to said ladder frame and said stabilizer arm means, said unlatching means being manually movable and including a portion engageable with said stabilizer arm means to pivot said arm means in a manner disengaging said second connecting means from said guide means to allow said ladder frame to be swung to the operable position.

4,093,258

MULTIPASSENGER PEDAL VEHICLE

Eldan L. Ansel, 202 E. Lotus, Ulysses, Kans. 67880

Filed Jan. 13, 1977, Ser. No. 758,844
Int. Cl.² B62K *13/04*
U.S. Cl. 280—231 **14 Claims**



1. A multipassenger pedal vehicle comprising:

(a) a plurality of drive assemblies each having a frame with a pedal assembly, ground engaging wheel and seat mounted thereon, the seat being above said wheel and the pedal assembly being operatively connected to said wheel for rotating same;

(b) a steering assembly having a fork with a ground engaging wheel rotatably mounted therein and a stationary sleeve rotatably mounting said fork and handlebars connected to said fork for turning the same in said sleeve;

(c) rigid connecting means extending from the drive assembly frames to said sleeve and having means separably connecting said sleeve to each of said drive assemblies;

(d) vertically spaced first and second rigid transverse connecting means extending between the drive assembly frames and having means separably connecting the same to each of said drive assembly frames;

(e) stationary handlebars separably connected to said sleeve and extending laterally outwardly and rearwardly therefrom; and

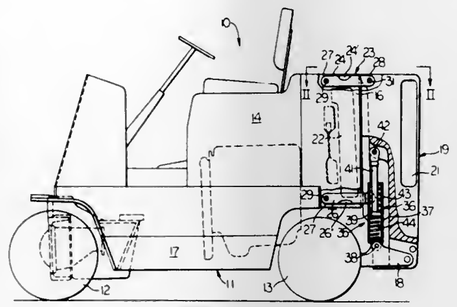
(f) means separably connecting said stationary handlebars to the respective adjacent rigid connecting means that extends from a drive assembly frame to said sleeve.

4,093,259

VEHICLE HAVING RESILIENTLY MOUNTED COUNTERWEIGHT

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 2, 1977, Ser. No. 793,211
Int. Cl. B60R *27/00*
U.S. Cl. 280—755 **7 Claims**



1. A vehicle comprising:

a frame having an end portion;

a counterweight positioned adjacent the end portion of the frame;

means for connecting the counterweight to the frame and permitting limited upward and downward movement thereof relative to the frame; and

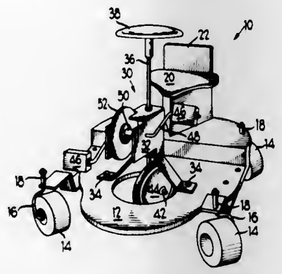
resilient supporting means connected to the end portion of the frame and attached to the counterweight for resiliently supporting the counterweight and for cushioning shock loads exerted on the frame in response to inertia force of the counterweight, said resilient supporting means being independent of said connecting means.

4,093,260

VELOCIPEDE STEERING AND DRIVING ARRANGEMENT

Rouben T. Terzian, Chicago, and Donald K. Fletchic, Arlington Heights, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Aug. 30, 1976, Ser. No. 718,907
Int. Cl.² B62M *1/02*
U.S. Cl. 280—240 **10 Claims**



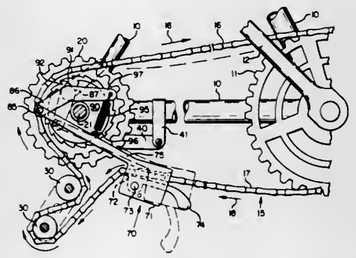
1. A vehicle, comprising: a carriage, propelling means movably mounted on the carriage for engaging a support surface to propel said carriage over the support surface, manually operable means on the carriage for driving said propelling means, steering means mounted on said carriage and operatively associated with said propelling means for moving said propelling means to steer the vehicle, said steering means including a generally vertical shaft mounted on the carriage and a horizontal shaft on the lower end of said shaft for mounting said propelling means, linkage means between said operable means and said propelling means permitting steering movement thereof by said steering means relative to said operable means and said carriage and a plurality of universally mounted support wheels for supporting the carriage for movement in any direction over the support surface.

4,093,261

COASTER BRAKE FOR BICYCLE WITH DERAILLEUR SPEED CHANGE MECHANISM

Ray S. Persson, 1220 Minnesota Ave., Bemidji, Minn. 56601

Filed May 9, 1977, Ser. No. 795,104
Int. Cl.² B62M *9/10*
U.S. Cl. 280—241 **8 Claims**



1. In a bicycle having a coaster brake and a derailleur speed change mechanism, a driving chain having a tensioned upper run to rotate a multiple drive sprocket in forward rotation, a wheel having a wheel hub, a drive clutch engagable with said hub to drive said hub in forward rotation from said sprocket, an overrunning chain clutch on a lower run of said chain allowing free movement of said chain in said forward rotation and arranged to seize said chain in reverse rotation when the lower run of the chain is tensioned, means operable by the movement of said chain clutch with the chain when the chain is seized to rotate said sprocket forcefully in a partial reverse rotation, and means actuated by said reverse rotation of said sprocket to disengage said drive clutch and apply said coaster brake.

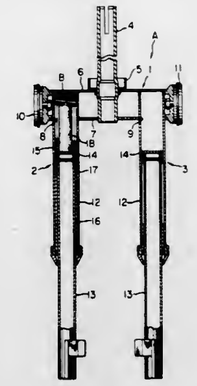
4,093,262

FRONT FORK FOR TWO-WHEELED VEHICLES

Mikihiro Koyama, Kawagoe, and Kazuo Watanabe, Asaka, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 20, 1976, Ser. No. 734,273
Claims priority, application Japan, Oct. 24, 1975, 50-145154
Int. Cl.² B62K *19/32*
U.S. Cl. 280—279 **4 Claims**

1. An improved front fork for a two-wheeled vehicle such as a motor-cycle comprising: a bridge member (1) having a steering stem 4 fixedly secured at the center part thereof; and a pair of fork members (2, 3) fixedly secured to both ends of the bridge member 1, the improvement comprises: said bridge member (1) being constructed of a hollow square tubular body having the top end parts of said fork members (2, 3) respectively being insertable and fitted into openings (8), (9) perforated at both left and right end parts of bottom wall surface of said bridge member 1, said top end parts of said pair of fork members (2), (3) being fixedly joined to the upper wall 6 and the lower wall (7) of said bridge member (1), respectively and an engagement member (5') being fixedly secured to the lower end part of a head pipe P of a front part F of a vehicle body frame to support said steering stem (4) in a freely rotatable manner, a handle stopper (5) being fixedly secured to said bridge member (1) at a center portion thereof, along said lower end part of said steering stem (4), said handle stopper (5) engaging said engagement member (5') for restricting the relative rotational range of a steering handle H, said handle H being



fixedly secured to the top end of said steering stem (4) with respect to said head pipe P.

4,093,263

SAFETY BICYCLE SEAT REFLECTOR

Peter L. Rihm, 642 N. Cherry St., Celina, Ohio 45822

Filed Jan. 13, 1977, Ser. No. 759,114
Int. Cl.² B62J *1/18*
U.S. Cl. 280—289 R **9 Claims**

1. In combination with a bicycle having a seat which includes a seat cover, springs and a post: a safety bicycle reflector secured directly to the seat and covering the back and springs of the seat, said reflector being in the form and the shape of a bib and comprising a material presenting a reflective surface on all sides and edges and in which the lower portion of the reflector extends forwardly beyond the seat post, said reflector having a securing opening in its forward lower portion for receiving the bicycle post to secure the reflector to the seat post.

4,093,264

SPEED CHANGING POSITION REGULATING DEVICE FOR AUTOBICYCLES

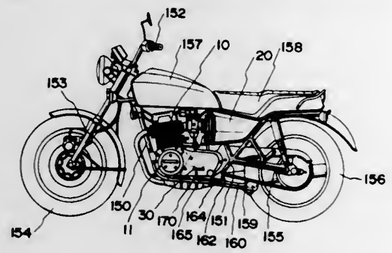
Takeo Ishihara, Asaka; Hitoshi Yamamoto, Wako, and Tsuyoshi Iiga, Kawagoe, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 12, 1976, Ser. No. 713,829
Claims priority, application Japan, Aug. 15, 1975, 50-98470
Int. Cl.² B60K *23/00*
U.S. Cl. 280—296 **7 Claims**

1. A speed changing position regulating device for a motorcycle having a transmission gear, comprising:

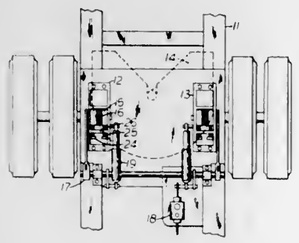
a shift pedal (30);

a link mechanism (40, 50, 80, 100);
connecting means (165, 170);
a stand (160) pivotally connected to the frame of said motorcycle;
a speed changing operating means (60) for the transmission gear for changing over speed changing positions by the operation of said shift pedal (30) which is operatively connected with said speed changing operating means (60);



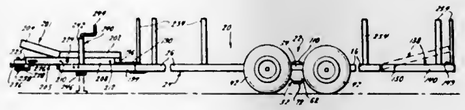
said link mechanism (40, 50, 80, 110) being operated through said connecting means (165, 170) by the rise and fall of said stand (160) so that, when said stand (160) rises, the shift position of said speed changing operating means (60) may be changed over to a neutral position by said link mechanism (40, 50, 80, 110) operated by said connecting means (165, 170) and said speed changing operating means (60) may be held in said neutral position.

4,093,265
FIFTH-WHEEL BRAKING CONTROL
John E. Hodge, Box 91, Moline, Ill. 61265
Filed Jan. 25, 1977, Ser. No. 762,289
Int. Cl.² B60T 7/20, 8/18
U.S. Cl. 280—438 R **2 Claims**



1. In a fifth-wheel assembly of the type having a braking control to prevent a trailer from overriding a tractor to which the trailer is connected, a stop assembly adjustable for different loads to determine the amount of traction to release brakes of the trailer;
said fifth-wheel assembly having a mounting bracket to be attached to a tractor, a fifth wheel, a supporting member for supporting said fifth wheel, and a substantially vertical supporting link, said supporting link having a lower portion to be connected to said bracket and an upper portion to be connected to said supporting member, said braking control being connected to said supporting link, bearing means rotatively connecting the lower portion of said supporting link to said mounting bracket, said supporting member being coupled between the upper portion of said supporting link and said fifth wheel, said supporting link being rotatable about said bearing means to allow movement of said upper portion of said supporting link a short distance between a fore position in a direction toward the front of a tractor and an aft position in a direction toward the rear of the tractor, said mounting bracket having means for stopping the rotative motion of said upper position of said supporting link in a direction toward the rear of the tractor at said aft position where the downward component of a load on the fifth wheel is slightly aft of the axis of rotation of said bearing means,
said stop assembly comprising a fixed member fastened rigidly with respect to said mounting bracket, said fixed member being positioned a short distance in a direction toward the front of the tractor from said upper portion of said supporting link,
stop means positioned between said fixed member and said upper portion of said supporting link,
adjusting means between said fixed member and said stop means, and said adjusting means adjustable to set said stop means in a fore-to-aft direction at a position where said upper portion of said supporting link comes in contact with said stop means and stops said supporting link as said supporting link is rotated to said fore position where the downward component of a load on the fifth wheel is a desired short distance from the axis of rotation of said bearing means in a direction toward the front of said tractor.

4,093,266
CARGO CARRIER
Bobby G. Baxter, Warrenton, Mo., assignor to The Binkley Company, Warrenton, Mo.
Division of Ser. No. 705,585, Jul. 15, 1976. This application Jun. 9, 1977, Ser. No. 804,928
Int. Cl. B60d 1/14
U.S. Cl. 280—491 R **9 Claims**

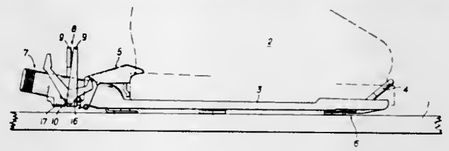


1. A cargo carrier operable between elevated and lowered positions, comprising a bed for supporting cargo, means for supporting the rearward end of said bed and means to raise and lower the front end of said bed relative to the ground, said front end raising and lowering means further comprising a member secured to the front end of said bed and inclined forwardly and upwardly relative thereto, and sliding means adapted to be attached to a towing vehicle and slidingly engaging said inclined member upon fore and aft movement of said sliding means relative to said inclined member, whereby forward movement of said sliding means along said inclined member toward the front end of said inclined member lowers the front end of said bed, and rearward movement of said sliding means along said inclined member toward the rear of said inclined member raises the front end of said bed.

4,093,267
SKI BRAKE
Hans Horn, Wellington, New Zealand, assignor to TMC Corporation, Baar, Zug, Switzerland
Filed Jul. 26, 1976, Ser. No. 708,597
Claims priority, application Austria, Jul. 24, 1975, 5749/75
Int. Cl.² A63C 7/10
U.S. Cl. 280—605 **5 Claims**

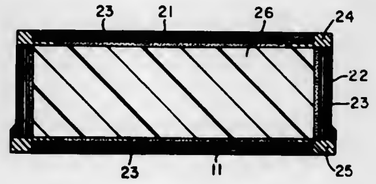
1. A ski brake for use on a ski, comprising:
a base;
a sole holder movably secured to said base and being movable between a ski boot holding position and a ski boot releasing position;
at least one ski brake arm pivotally secured to said base and being movable between a retracted position and a braking position;
first resilient means for biasing said ski brake arm toward said braking position;

releasable locking means for holding said ski brake arm in said retracted position when said sole holder is in said ski boot holding position and for releasing said ski brake arm to permit movement of said ski brake arm toward said braking position in response to a movement of said sole holder to said ski boot releasing position, said releasable locking means including a movable locking element on said ski brake arm and second resilient means therefor for biasing said locking element into locking relation with said



base to effect said holding of said ski brake arm in said retracted position and a cam member operatively connected to said sole holder and engaging said locking element and being movable in response to a movement of said sole holder, said cam member effecting an unlocking of said locking element from said base in response to said movement of said sole holder so that said first resilient means will urge said ski brake arm to said braking position.

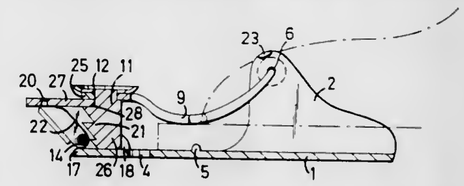
4,093,268
PLASTIC DRAG REDUCING SURFACING MATERIAL
Ronald N. Sampson, Murrysville, and Zal N. Sanjana, Penn Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Oct. 18, 1976, Ser. No. 733,593
Int. Cl.² A63C 5/04
U.S. Cl. 280—610 **10 Claims**



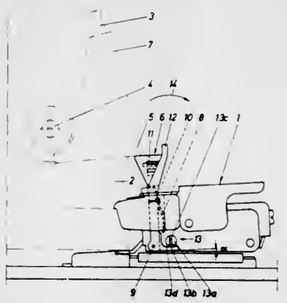
1. A ski comprising a core bonded to a base layer, wherein the base layer comprises a rigid plastic matrix and from about 5 wt.% to about 45 wt.% of a thermoplastic, water soluble polymer disposed within the plastic matrix, wherein the base layer provides a surface where the water soluble polymer will be leached out of the rigid plastic matrix upon contact with water, to provide a boundary lubricant film on the layer surface.

4,093,269
SKI BINDING
Börje Hoffman, Langshyttan, Sweden, assignor to Hoffmans Verkstads AB, Langshyttan, Sweden
Filed Aug. 27, 1976, Ser. No. 718,171
Claims priority, application Sweden, Sep. 19, 1975, 7510502
Int. Cl.² A63C 9/18
U.S. Cl. 280—615 **3 Claims**

1. An improved ski binding, including a base plate adapted to be fastened to a ski surface having upwardly directed side portions and a forward portion extending beyond said side portions, a boot clamp having a forward portion and two rearward arms having ends rotatably journaled in bearings in said side portions, said improvement comprising:
said boot clamp including first engagement means nonrotatably secured to said forward portion, including a plurality of forwardly extending teeth for removable engagement with second engagement means mounted on said base plate forward portion when said first engagement means is depressed against said second engagement means; and
said second engagement means including pawl means pivotally mounted on said base plate forward portion, pivotal between a first latch position and a second forward unlatched position, and having means biasing said pawl means into said latched position, said pawl means including a forwardly extending release trigger mounted above said pivotal mounting for pivoting said pawl means forward into said second unlatched position, said pawl means including a rearwardly extending latch means for engaging at least one of said first engagement means teeth in said first latched position.



4,093,270
SAFETY SKI BINDING
Erwin Krob, Vienna, and Josef Svoboda, Schwechat, both of Austria, assignors to TMC Corporation, Baar, Zug, Switzerland
Filed Dec. 14, 1976, Ser. No. 750,403
Claims priority, application Austria, Dec. 19, 1975, 9721/75
Int. Cl.² A63C 9/08
U.S. Cl. 280—626 **15 Claims**



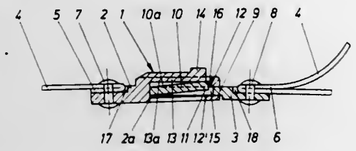
1. In a combination of a ski boot and a ski binding, said ski boot having a lower shell and an ankle cuff pivotally secured to said lower shell to allow pivotal movement of said ankle cuff about a pivot axis in response to shifts in the weight of an individual using said ski boot, said ski binding including at least a heel holder engaging the heel portion of said ski boot to hold said heel portion to a ski, the improvement comprising wherein said ankle cuff has projection means extending rearwardly therefrom and includes first means thereon defining a downwardly facing first surface and wherein said heel holder includes second means defining an upwardly facing second surface, said first surface directly engaging said second surface to limit the amount of pivotal movement of said ankle cuff to the rear of said lower shell, support means for supporting said second means for movement toward and away from said heel portion of said ski boot and resilient means for resiliently urging said second means toward said ski boot.

4,093,271

BUCKLE FOR SAFETY STRAP FOR SKIS

Erwin Weigl, Bruun am Gebirge, and Josef Svoboda, Schwechat, both of Austria, assignors to TMC Corporation, Zug, Switzerland

Filed Nov. 24, 1976, Ser. No. 744,938
Claims priority, application Austria, Nov. 26, 1975, 8990/75; Feb. 25, 1976, 1411/76
Int. Cl.² A63C 9/08
U.S. Cl. 280—637 **7 Claims**



1. A buckle for use with a safety strap to effect a securement of a skier to a ski, comprising:

a first buckle part having means defining a housing thereon, said housing having spaced side walls and spaced end walls, the spacing between said walls defining a cavity therebetween, means defining a passageway in one of said end walls extending from the exterior of said housing into said cavity, stationary lip means adjacent one side of said passageway and facing inwardly of said cavity, at least one of said side walls adjacent said lip means being defined by a first resiliently flexible tab formed on said housing and anchored thereon adjacent said end wall remote from said end wall having said passageway therein, said first tab being pivotal about the anchor point from a normal position spaced from said lip means into said cavity so that the free end thereof is movable into said cavity past said lip means, the resiliency of said first tab effecting a return thereof to said normal position; and

a second buckle part having a flat annular frame with a central opening therein and a second resiliently flexible tab extending into said opening from one edge of said annular frame, said second tab being formed to normally project out of the plane of said annular frame at the free end thereof and being flexible out of the normal position into the plane of said annular frame, said second buckle part being received in said passageway and said cavity with said one edge of said frame being positioned adjacent said one end wall of said housing and said free end of said second tab projecting toward said one side wall of said housing and said free end of said first tab past said lip means, said free end of said second tab engaging said lip means to prevent withdrawal of said second buckle part from said cavity, said first tab being resiliently flexed into said cavity and into engagement with said second tab to effect a movement of said second tab out of said normal position into said plane of said annular frame to position said second tab in alignment with said passageway and out of alignment with said lip means for removal of said second buckle part from said first buckle part.

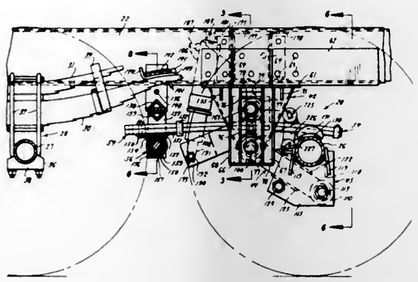
4,093,272

UNITARY LIFT AND SPRING VEHICULAR SUSPENSION

John E. Raidel, Rte. 9, Box 400-M, Springfield, Mo. 65804

Filed Oct. 15, 1976, Ser. No. 732,874
Int. Cl.² B60G 11/10
U.S. Cl. 280—686 **12 Claims**

10. In an axle suspension: bracket means attachable to a frame of a vehicle; a torque beam pivoted to the bracket means with an end extending therefrom, means for attaching said torque beam to an axle; a lift beam pivotally connected to the bracket means beside the torque beam; and means to connect the lift beam to the axle alongside the means for attaching the



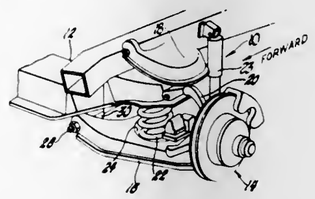
torque beam to the axle; the lift beam being pivotable in a plane parallel to the pivoting of the torque beam.

4,093,273

INDEPENDENT SUSPENSION SYSTEM

John D. Fitzpatrick, Utica, and Gary L. Smith, Pontiac, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 26, 1976, Ser. No. 745,215
Int. Cl.² B60G 3/14
U.S. Cl. 280—696 **4 Claims**



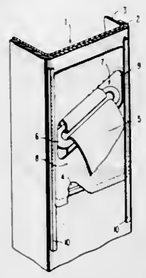
1. In combination with a vehicle frame, an independently sprung front wheel assembly including a wishbone-shaped control arm having an outer end and a pair of spaced apart inner ends; a steering knuckle and associated road wheel mounted on the outer end of said control arm; a vertically oriented coil spring disposed between said control arm and said frame; a horizontally oriented shaft; means connecting said spaced apart inner ends of said control arm for pivotal movement about said shaft; mounting means having a bore formed therethrough a predetermined diameter larger than the diameter of said shaft and surrounding said shaft intermediate said inner ends of said control arm; fastener means for rigidly securing said mounting means to said frame; and elastomeric bushings mounted on said shaft and confined in the bore of said mounting means, said elastomeric bushings having at least one side of reduced effective thickness forming a space providing a low horizontal rate and a high vertical rate for increased horizontal movement and minimal vertical movement of said wheel and said control arm relative to said frame during road impact conditions, thereby substantially isolating said frame from such impacts.

4,093,274

UPPER FITTING OF A SHOULDER STRAP ARRANGED DISPLACEABLE IN HEIGHT WITHIN A BODY HOLLOW SPACE

Hansjürgen Scholz, Echterdingen; Jürgen Gimbel, Gechingen, and Walter Jahn, Sindelfingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Nov. 11, 1976, Ser. No. 740,940
Claims priority, application Germany, Nov. 15, 1975, 2551329
Int. Cl.² B60R 21/02
U.S. Cl. 280—747 **10 Claims**



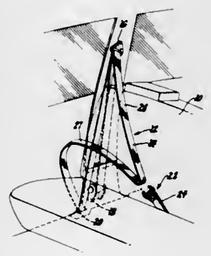
1. An upper fitting of a shoulder belt band arranged adjustable in height within a body hollow space means provided with an outlet opening for the belt band, characterized in that the outlet opening is covered off by a shield means which in turn is provided with an aperture for the belt band, and in that the position of the aperture is adapted to be matched to the adjusted height of the fitting.

4,093,275

SEAT BELT SECURING DEVICE

Gary A. Wize, Washington, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 11, 1977, Ser. No. 776,626
Int. Cl.² A62B 35/00
U.S. Cl. 280—747 **8 Claims**



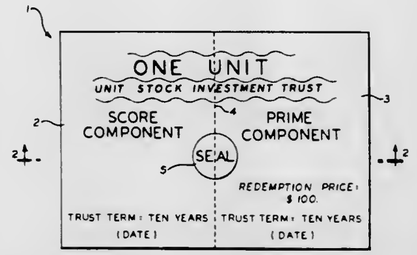
1. An occupant restraint system for a motor vehicle body having an occupant seat and comprising: a belt, means anchoring one end of the belt outboard the seat and adjacent the lap of the occupant and the other end of the belt outboard the seat and adjacent the shoulder of the occupant, one of the belt anchoring means being a retractor for winding up the belt to a vertically extending stored position outboard the seat to permit ease of occupant ingress and egress, a belt securing device connected to the vehicle body inboard the occupant, said securing device having a pair of tong arms pivotally mounted for movement to a closed position for capturing encirclement of the belt, spring means biasing the tong arms to an open spaced-apart belt-releasing position, an actuating member positioned between the tong arms and operably connected therewith for pivoting the tong arms against the bias of the spring to a closed position for capturing encirclement of the belt upon forced movement of the actuating member during one-handed entry of the belt between the tong arms, and releasible latch means operative on the tong arms for maintaining the tong arms in the closed position of belt capturing encirclement.

4,093,276

BIPARTITE STOCK CERTIFICATE

A. Joseph Debe, 214 Stewart Ave., Garden City, N.Y. 11530

Filed Apr. 20, 1977, Ser. No. 789,166
Int. Cl.² B42D 15/00
U.S. Cl. 283—1 R **10 Claims**



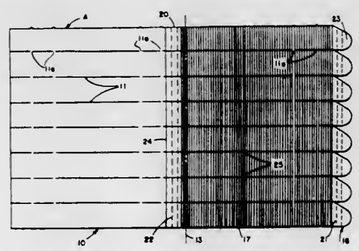
1. Stock certificate comprising a planar body having indicia thereon denoting the body as a single stock certificate and comprising a first portion corresponding to a first type of interest in the stock having indicia thereon denoting the first type of interest and a second portion corresponding to a second type of interest in the stock having indicia thereon denoting the second type of interest and means for effecting bipartition of the body into separated first portion to signify on its face that the holder has only the first interest in the stock, the separated second portion to signify on its face that the holder has only the second interest in the stock and the unseparated body to signify on its face that the holder has both the first and second interests in the stock.

4,093,277

ASSEMBLY FOR PREPARING INSERTS FOR HOSPITAL IDENTIFICATION BRACELETS

John L. Nolan, Glenview; Harvey M. Nordby, Buffalo Grove, and Marvin E. Jensen, Niles, all of Ill., assignors to Hollister Incorporated, Chicago, Ill.

Filed Jan. 21, 1977, Ser. No. 761,423
Int. Cl.² B41L 1/22, 1/26
U.S. Cl. 282—24 R **1 Claim**



1. An assembly for preparing imprinted inserts for hospital identification bracelets, including a base sheet of imprintable card stock, said sheet being divided by rows of parallel perforations into a plurality of severable elongated strips, said strips being divided by a transverse line of perforations across the central portion thereof into an identification section and a severable handle section, said identification sections having an outer insertion end portion of tapering shape, wherein the improvement comprises: a sheet of carbon paper arranged to overlay said identification sections with the carboncoated side

thereagainst, said carbon sheet being divided into a plurality of severable elongated strips having severance lines in alignment with those of said base sheet so that the base sheet strips can be removed one at a time with the respective overlying carbon strip, said carbon sheet strips each having a first uncoated margin extending over the insertion end portion of the underlying base strip and a second uncoated margin on the opposite side thereof adjacent the line of division between said identification and handle sections, said first and second margins of each carbon strip being adhesively attached to said base sheet in defined areas spaced inwardly from the outer edge of their respective margin, both of said margins providing unattached tab portions extending outwardly from said adhesive areas, one of said tab portions of each carbon strip overlying an insertion end of the underlying base strip and the other tab portion overlying the handle section thereof, said carbon strips being removable after the imprinting of said base strips by grasping one of said tab portions at either end thereof.

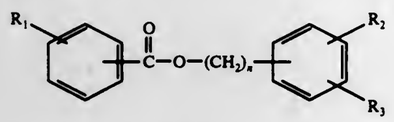
4,093,278

DYE SOLVENTS FOR PRESSURE-SENSITIVE COPYING SYSTEMS

James Kern Sears, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 27, 1976, Ser. No. 754,467
Int. Cl.² B41M 5/22
U.S. Cl. 282—27.5 **13 Claims**

1. A pressure-sensitive recording system comprising
(a) supporting sheet material,
(b) mark forming components arranged in contiguous juxtaposition and supported by said sheet material, said components comprising a chromogenic material held within microcapsules and an electron accepting material of the Lewis acid type reactive with said chromogenic material to produce a mark when brought into reactive contact, and
(c) a pressure releasable solvent for said chromogenic mark forming component, said solvent comprising an aryl ester represented by the structure



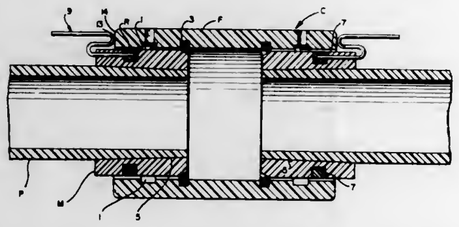
wherein R_1 is hydrogen, methyl or ethyl; R_2 is hydrogen or C_1 to C_9 alkyl; R_3 is hydrogen, methyl or ethyl; and n is zero or 1.

4,093,279

QUICK CONNECT-DISCONNECT PIPE COUPLING

Anthony Fredrick Verdesca, Haworth, N.J., and Orlando Borrajo, Hialeah, Fla., assignors to Fib-R-Fit Inc., Fairview, N.J.

Filed Sep. 2, 1976, Ser. No. 719,826
Int. Cl.² F16L 55/00
U.S. Cl. 285—23 **1 Claim**



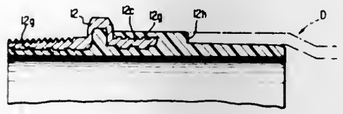
1. A coupling for joining the ends of a tubular pipeline through which a fluid is to flow comprising a tubular male adaptor member having an inside tapered surface suitable for receiving and being bonded to an appropriately tapered end of the pipeline; a split ring having side walls normal to the longitudinal axis of the coupling provided in a groove in the outside surface of said male adaptor member and containing a hole in each side of the split in the ring, the axis of said holes being parallel to the direction of fluid flow; a restraining pin fitted through the wall of the male adaptor member and seated in the holes of the split ring to retain said split ring in the contracted position in the groove of said male adaptor member without protrusion beyond the outside diameter surface of said male adaptor member; a female member for receiving the male adaptor member and containing a groove on the inside surface thereof, said groove being sized so that the walls thereof snugly engage the side walls of the split ring when the restraining pins which have a geometry such that in one position they will not engage the female member and when the pins are rotated in their seats away from the wall of the male adaptor member to another position, the female member will engage and automatically drive the pin from its seat when said male adaptor member is inserted into said female member allowing for expansion of said split ring to its natural uncontracted position within the grooves in the female section and male adaptor member thereby locking said male adaptor member and female member together.

4,093,280

SYNTHETIC RESINOUS PIPE JOINT MADE UP IN ONE-PIECE WITH A METALLIC MALE SCREW

Tadao Yoshizawa, and Saburo Kadowaki, both of Sakai, Japan, assignors to Kubota Ltd., Osaka, Japan

Filed Jun. 14, 1976, Ser. No. 695,564
Claims priority, application Japan, Jun. 14, 1975, 50-80872
Int. Cl.² F16L 35/00
U.S. Cl. 285—39 **16 Claims**



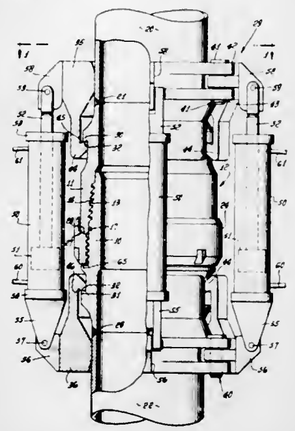
1. A pipe joint for connecting heterogeneous pipes comprising:
a metallic pipe connecting portion forming one end of said pipe joint and being externally threaded at one end thereof;
a synthetic resinous pipe connecting portion forming the other end of said pipe joint;
said metallic pipe connecting portion having a nut-shaped part formed on its outer peripheral surface between the externally threaded one end thereof and the other end thereof to facilitate tightening of said pipe joint, the inside face of metallic material constituting said nut-shaped tightener part exhibiting an out-of-round excavated form;
the other end of said metallic pipe connecting portion extending from said nut-shaped tightener part in the opposite direction of said externally threaded one end thereof being substantially tubular in configuration, and the external and internal peripheral surfaces of said substantially tubular configured other end of said metallic pipe connecting portion being provided with a ring-shaped part irregularly configured along the length thereof so as to provide, alternatingly, increasing and decreasing radial dimension thereof along any given line drawn longitudinally along the peripheral surface of said tubular other end;
said resinous pipe connecting portion including an integral inner layer completely covering the entire inner surface of said metallic pipe connecting portion extending from said resinous pipe connecting portion in the direction of said metallic pipe connecting portion, and including the inner surfaces of said externally threaded end, the excavated part of said nut-shaped part and the tubular other end of said metallic pipe connecting portion;
said resinous pipe connecting portion further embedding said tubular other end of said metallic pipe connecting portion, including the irregularly configured external peripheral surface thereof; and
said inner layer of said resinous pipe connecting portion having an inner surface form of substantial roundness throughout the length thereof and of the inner surface of said metallic pipe connecting portion which it covers.

4,093,281

METHOD AND APPARATUS FOR AXIALLY LOADING THREADED CONNECTORS

Martin B. Jansen, Jr., Houston, Tex., assignor to Vetco Offshore Industries, Inc., Ventura, Calif.

Filed Nov. 15, 1976, Ser. No. 742,072
Int. Cl.² F16L 55/00
U.S. Cl. 285—39 **26 Claims**



1. A pipe connector comprising, in combination; a tubular pin member having an external thread and a tubular box member having an internal thread meshing with said external thread, means for applying axially directed tensil forces in opposite directions to said pin member and box member, respectively, to preload engaging faces of said meshing threads against one another, and means for retaining said preload between said engaging faces while said axially directed tensile forces are applied and after application of said axially directed tensile forces has been discontinued.

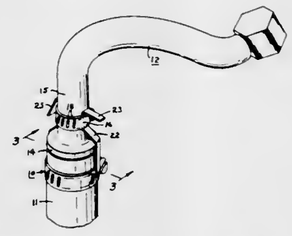
4,093,282

HOSE CLAMP

George H. Kyriakodis, 1944 King Arthur Rd., Philadelphia, Pa. 19116

Filed Nov. 24, 1976, Ser. No. 744,502
Int. Cl.² F16L 35/00
U.S. Cl. 285—114 **2 Claims**

1. A hose clamp adapter strap for use in conjunction with a pair of constricting band hose clamps wherein a first such clamp is clampingly disposable about a resilient hose to clamp such a hose about a rigid fitting, and wherein a second such clamp is clampingly disposable about another portion of the aforesaid rigid fitting, said adapter strap comprising in combination,
(a) an elongated strap made of semi-rigid deformable material having first and second strap ends, said strap being rigidly lockable at said first end to said first clamp, and being adjustably rigidly securable at said second end to said second clamp and being effective when so secured to prevent said clamps from moving away from one another, the adjustable rigid securement of said strap second end to said second clamp being effected by passing said strap second end between the constricting band hose clamp and the underlying surface of said rigid fitting and then reversely turning said strap second end outward away from the fitting and backward over the constricting band clamp and an intermediate portion of said strap,
(b) a tab extending toward said first strap end from an intermediate point along the length of the strap, the rigid lock of said strap to said first clamp being effected by capturing



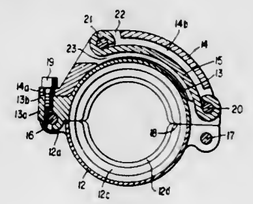
the clamp between the strap and the said tab with the strap disposed against the inside surface of the clamp and with the tab disposed against the outside surface of the clamp, and then turning the said first strap end outward around the clamp and reversely to overlie the outer surface of the clamp and align with the said tab, and
(c) hose surface deforming protuberances carried by said elongated strap in hose surface engaging position and effective to deform such hose surface radially inwardly in limited surface areas when said first clamp is clamped about the hose to thereby effectively lock the hose to said first clamp.

4,093,283

DEVICE FOR RELEASABLY FASTENING TUBE OR PIPE ENDS

Karl Weinhold, Um Jagdfeld 43, 4040 Neuss, Germany

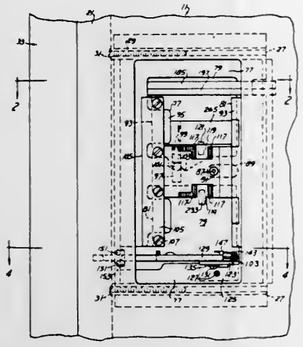
Filed Nov. 22, 1976, Ser. No. 744,090
Claims priority, application Germany, Nov. 27, 1975, 2553189
Int. Cl.² F16L 33/12
U.S. Cl. 285—243 **14 Claims**



1. A device for releasably fastening tube or pipe ends comprising a plurality of shell parts pivotally connected together and forming an annular shell in a closed position of the device, radially inwardly directed flanges on said shell parts for retaining the tube or pipe ends within said annular shell, a toggle lever lock connecting two adjacent shell parts having ends in engagement in said closed position of the device, a toggle lever for said toggle lever lock pivotally connected to an engaged end of one of said two shell parts and extending along the other of said two shell parts in the closed position of the device and a spring for said toggle lever lock lying, in said closed position of the device, between said toggle lever and said other of said two shell parts, engaging said engaged end of said other of said

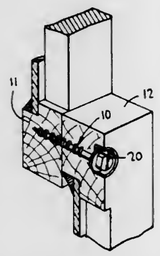
two shell parts and said toggle lever and loaded in said closed position of the device.

4,093,284
DOOR CONSTRUCTION
Leon Yulkowski, 2005 Pontiac Rd. E., Pontiac, Mich. 48057
Continuation-in-part of Ser. No. 530,958, Dec. 9, 1974. This application Jul. 19, 1976, Ser. No. 706,494
Int. Cl.² E05C 3/26
U.S. Cl. 292—216 **44 Claims**



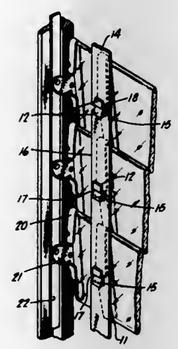
1. In a door hinged to a door frame and a locking mechanism on the closing upright edge of the door, the improvement comprising:
said locking mechanism including a longitudinal engaging element on and carried by said closing edge and being movably mounted;
a corresponding longitudinal counter element connected to one upright edge of the door frame and being laterally opposed to and generally parallel and interlocked with the engaging element;
said engaging element and counter element extending over at least a substantial part of the door height;
said engaging element being sufficiently movable that it disengages the counter element so that the door may open relative to the frame;
a blocking means movably mounted on the door and in one position retaining the engaging element in a locked position when the door is closed;
and a grip means movably mounted on the door and connected to said blocking means for moving it to a "release" position so that said engaging element moves to disengage said counter element.

4,093,285
WINDOW LOCK
Paul R. Fayle, P.O. Box 1121, Lexington, Va. 24450
Filed Mar. 18, 1976, Ser. No. 668,002
Int. Cl.² E05C 5/04
U.S. Cl. 292—251 **1 Claim**



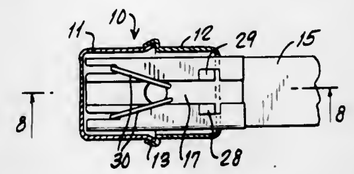
1. A screw lock assembly for windows, wherein the windows include abutting frame members in the closed position, comprising drilled aligned apertures at at least one position along said frames, said aligned apertures being open only at one end adjacent the inside of said windows and closed toward the outside, a screw for insertion into said apertures from the inside directly engaging said apertures to lock said windows together and draw said frame members together into face-to-face contact, a head and integral flat washer on said screw, a cup washer positioned adjacent the open end of the apertures, said apertures at the open end having a substantially enlarged portion, said cup washer being positioned in said enlarged portion with a tight frictional fit to prevent turning of the same, the head of said screw being recessed into said cup washer to limit accessibility to the head, and locking means formed over substantially the full interface between said washers to prevent unauthorized removal of said screw, said locking means comprising a plurality of curved ridges formed on the underside of said integral flat washer, said ridges frictionally engaging the adjacent face of said cup washer and binding against said washer prevented from rotating by the frictional fit in said enlarged portion.

4,093,286
SECURITY LOCKING DEVICE FOR LOUVRE AND JALOUSIE WINDOWS
Larry D. Burton, 12232 Waldorf Dr., Lynwood, Calif. 90262
Filed Mar. 3, 1976, Ser. No. 663,575
Int. Cl.² E05C 19/18
U.S. Cl. 292—259 R **2 Claims**



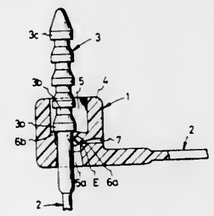
1. A security system for louvre and jalousie windows and/or doors having a multiplicity of glass slats or panes, said system comprised of:
a multiplicity of thin metallic bracs, that are formed in the shape of a rectangle having long and short sides whereby one of the long sides is uninterrupted while the other long side is interrupted intermediate said short sides to form two flanges having first and second portions, said first portions extending outward from said interrupted side to join with said second portions, said second portions extending substantially perpendicular to said first portions, each of said brac wrapping around each of said glass slats or panes; and
a latching means comprised of an elongated rigid flat member having a multiplicity of openings on one side in a predetermined space relationship based on the location of said brac flanges on said panes, whereby said openings of said latching means mates with said first portions of said bracs thereby forming a stationary integrated brac-latch system which precludes the removal of said glass panes or slats from said louvre window or door.

4,093,287
CAR SEAL
George G. Canter, 2 Overlook Ave., Great Neck, Long Island, N.Y. 11021
Filed Feb. 22, 1977, Ser. No. 770,915
Int. Cl.² B65D 33/34
U.S. Cl. 292—317 **4 Claims**



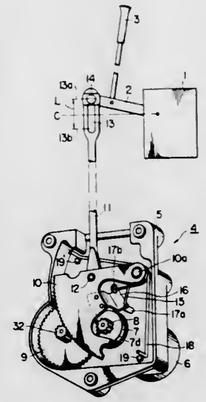
1. A car seal and the like comprising a two-piece cap and a sealing strip for overlapping a car door handle and the like, said two-piece cap disposed at substantially right angles to the plane of the strip, one of said sections having a slot therein, said strip of material at its outer free end being of a size and shape to pass through said slot, said strip of material at its opposite forward end and inwardly thereof having an enlarged section, said forward end being folded over said enlarged section in slightly spaced relation therewith, said enlarged section along its side edges also being folded over said forward end to provide flanges retaining the same in such folded-over position, said folded-over end of the strip, the enlarged portion of the strip, and said flanges having coinciding slots extending inwardly of their forward ends, spring-actuated locking means disposed in said coinciding slots, said flanges defining therebetween an area for laterally retaining said spring-actuated locking means in contact with the outer faces of the strip, said bent-over portions of the strip providing a longitudinal space therebetween to receive the outer free end of the strip, and holes in the free end of the strip and in the forward end of the strip between said flanges which coincide when said free end of the strip is inserted in the slot and pushed to the innermost end thereof, said spring-actuated means engaging in said coinciding holes in said strip to lock the same in position when said spring-actuated means are displaced by the free end of said strip.

4,093,288
BINDING STRAP MADE OF SYNTHETIC RESIN
Tadashi Suzuki, Saitama, Japan, assignor to Toska Co., Ltd., Tokyo, Japan
Filed Dec. 29, 1976, Ser. No. 755,171
Claims priority, application Japan, Jan. 14, 1976, 51-3049
Int. Cl.² B65D 55/06
U.S. Cl. 292—321 **8 Claims**



1. A binding strap comprising:
a head portion, said head portion including a centrally located passageway;
an intermediate portion having a first end extending from a side of said head portion;
a connecting portion formed at a second end of said intermediate portion remote from said first end;
stop tooth means formed within said passageway, said stop tooth means comprising a centrally projecting fixed tooth part having an upper face and a centrally projecting elastically rockable tooth part having upper and lower faces positioned diametrically opposite to said fixed tooth part;
a slit, said slit being positioned below said rockable tooth part for further assisting rocking motion of said rockable tooth part, said slit forming a supporting wall face which supports said lower face of said rockable tooth part when said rockable tooth part is in a first position for lockably restraining said connecting portion, while allowing free rocking motion when said lockable tooth part is in another position during insertion of said connecting portion, both said upper faces lying in the same plane only when said fixed tooth part and said rockable tooth part are lockably restraining said connecting portion.

4,093,289
ELECTRIC/MANUAL DOOR LOCK OPERATING MECHANISM
Akira Inabayashi, and Jun Watanabe, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima and Tanaka Instrument Co., Ltd., Yono, both of, Japan
Filed Apr. 5, 1977, Ser. No. 784,757
Claims priority, application Japan, Apr. 7, 1976, 51-43683[U]
Int. Cl.² E05C 13/04
U.S. Cl. 292—336.3 **13 Claims**



1. A vehicle door lock operating mechanism, comprising:
(a) a door lock mechanism,
(b) actuating means connected to said lock mechanism and movable between a locked position and an unlocked position,
(c) operating means connected to said actuating means for manually moving same between said locked and unlocked positions,
(d) a reversible electric motor,
(e) a pivotal member movable between a locking position, an unlocking position, and a neutral position,
(f) reduction gear means engageable between said electric motor and said pivotal member for implementing the movement of the latter from its neutral position to either its locking position or its unlocking position by the selective energization of said electric motor,
(g) means connecting said actuating means and said pivotal member and including means for permitting a limited degree of free movement of said actuating means independent from said pivotal member when the latter is in its neutral position, whereby the lock mechanism may be manually operated independently of said motor and reduction gear means, and
(h) spring means for biasing said pivotal member towards its neutral position.

4,093,290

VEHICLE WITH SAFETY DEVICE

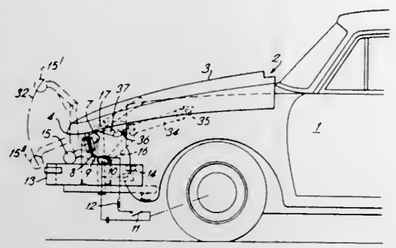
Leonard Charles Pearson, Wokingham, England, assignor to National Research Development Corporation, London, England

Filed Mar. 9, 1976, Ser. No. 665,229

Claims priority, application United Kingdom, Mar. 14, 1975, 10752/75

Int. Cl.² B60R *21/14*

U.S. Cl. 293—15 **7 Claims**



1. A vehicle including:

an impact member located at low height off the ground, and by which the moving vehicle will tend upon collision with a typical pedestrian to make impact below his center of gravity;

a bonnet onto which said impact by said impact member will tend to throw said pedestrian;

at least one sensor means connected to said vehicle for sensing and being actuated by one of (1) said initial collision of said impact member with said pedestrian and (2) the subsequent impact of said thrown pedestrian on said bonnet;

a safety device moveable in a path of movement from a stowed position to an operating position, in which operating position said safety device forms a barrier to restrain said pedestrian from falling off said bonnet;

said safety device in said stowed position lying at a height off the ground below that of said bonnet and closely similar to that of said impact member;

said path of movement of said safety device from said stowed to said operating position carrying it first horizontally and outward from said vehicle and then upward; and

means responsive to the actuation of said at least one sensor means for moving said safety device through said path of movement thereof from said stowed to said operating position.

4,093,291

CONTACT LENS APPLICATION AND REMOVAL INSTRUMENT

Herbert L. Schurgin, 26 Juniper St., Wenham, Mass. 01984

Filed Aug. 17, 1977, Ser. No. 825,184

Int. Cl.² A61F *9/00*

U.S. Cl. 294—1 CA **11 Claims**

1. An instrument for application onto and removal of a contact lens from a user's eye comprising:

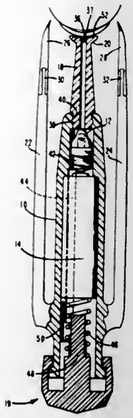
a body adapted to be hand-held by a contact lens user and having a chamber containing an illumination source;

first and second arms supported by said body and outwardly extending therefrom in spaced relationship to each other, said arms having end portions of a material and configuration for safe engagement with a user's eye;

said arms being manually movable toward and away from each other;

a footplate supported by and outwardly extending from said body between said first and second arms and having a curved outer surface for supporting a contact lens thereon, and an aperture centrally disposed in said curved surface through which light is emitted from said illumination source to provide a visual alignment target by which the instrument can be aligned with a user's eye; and

said first and second arms having end portions extending by



a predetermined amount beyond said footplate, the tips of said end portions being configured to facilitate grasping of the confronting peripheral edges of a contact lens on a user's eye.

4,093,292

SLING AND ITS METHOD OF MANUFACTURE

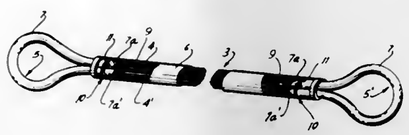
Jose Maria Maso Marcet, calle Navas de Tolosa 353, and Jose de Calasanz Peradejordi Guanabens, calle Enrique Granados 101, both of Barcelona, Spain

Continuation-in-part of Ser. No. 560,990, Mar. 21, 1975, abandoned. This application Mar. 7, 1977, Ser. No. 775,106

Claims priority, application Spain, Apr. 1, 1974, 201899; Nov. 13, 1976, 224442

Int. Cl.² B66C *1/18*

U.S. Cl. 294—74 **7 Claims**



1. A sling for moving loads, comprising a coil having a multitude of substantially uniform, closed and juxtaposed loops, said loops being elongated to form a middle portion of two substantially parallel adjacent coil sections, each coil section having filamentary material strands which are located adjacent to each other, and bight-shaped portions at opposite ends of said middle portion so that one of said bight-shaped portions may be connected with a load to be moved; means for retaining said coil sections in substantial parallelism adjacent each other when a load is to be moved, said retaining means including winding means having a plurality of substantially annular turns extending circumferentially about strands in each of said coil sections, said turns including a run located in interspaces bounded by said strands and extending from one to the other of said coil sections in direction transversely of the elongation of said loops for interconnecting said coil sections and for preventing them from moving apart from each other when said one bight-shaped portion is urged in direction away from the other of said bight-shaped portions during movement of the load, said retaining means including a substantially tubular flexible sheath surrounding said coil sections and having a length which extends over a substantial portion of the length of the coil; means for protecting said bight-shaped portions and including a pair of flexible protective sleeves each surrounding a respective one of said bight-shaped portions; and means for

preventing relative movement between said protective sleeves and said sheath, and including means for fastening said sleeves to opposite ends of said sheath, said fastening means including a threaded seam of stitches interconnecting said sleeves and said sheath, said threaded seam of stitches being located exteriorly of said winding means so that relative movement of said coil sections apart from each other during movement of the load is counter-acted substantially by said winding means, whereby said threaded seam of stitches is protected from damage to thereby prevent relative movement between said sleeves and said sheeth.

4,093,293

SHACKLES

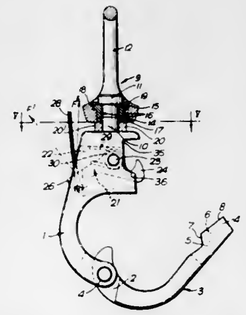
Richard D. J. Huggett, Clanfield, England, assignor to Lewmar Marine Limited, Havant, England

Filed Sep. 21, 1976, Ser. No. 725,271

Claims priority, application United Kingdom, Oct. 6, 1975, 40865/75

Int. Cl.² F16G *15/08*

U.S. Cl. 294—83 R **1 Claim**



1. In a marine shackle having a body comprising a closable and openable loop and a retaining means rotatably secured to the body the improvement comprising a post formed integrally in one piece with the body and having a cylindrical stem portion and a head portion of a diameter larger than that of the stem portion, the post penetrating an aperture in the retaining means, a split collar on the post in said aperture comprising two identical discrete parts held against lateral separation by the sides of said aperture and having at least a portion between the head portion and the retaining means effective to prevent movement of the retaining means away from the body over the head of the post, and spacer means surrounding the post and abuttable against both the body and the retaining means to maintain a fixed minimum spacing between said body and retaining means, the spacer means comprising two identical discrete parts engaged together to form an annulus about the stem portion, the said fixed minimum spacing being such that the retaining means is positioned so that said portion of the split collar is maintained between said head portion and the retaining means.

4,093,294

RELEASABLE WIRELINE SPEAR

William T. Taylor, 222 Camp Lilly Rd., Humble, Tex. 77338

Filed Jun. 4, 1975, Ser. No. 583,774

Int. Cl.² E21B *31/02*

U.S. Cl. 294—86.25 **11 Claims**

1. A spear comprising

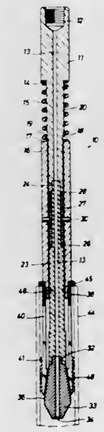
an elongate body having a connector means for supporting said body;

first means supported by said body;

an elongate set of collet fingers supported by said body and arranged in a circular fashion to engage the interior of a fish in a well, said fingers flexing to accommodate entry into the fish;

a tapered surface supported by said body adjacent to said collet fingers, said surface movable relative to said collet fingers which movement deflects said collet fingers radially inwardly and outwardly between fish engaging and disengaging positions;

cam means engaged by said first means which functions as a cam follower, said cam means and first means moving said collet fingers and tapered surface longitudinally of one another to deflect said collet fingers between fish engaging and fish disengaging positions, said cam means and said first means alternately moving between two positions, one associated with engaging and the other associated



with disengaging a fish, said cam means and said first means being constructed and arranged to operate between the engaging and disengaging positions on relative axial downward movement of said body, said cam means comprising a tubular member rotatably positioned around said body which is limited in axial movement along said body by a pair of spaced shoulders which capture said tubular member therebetween;

a sleeve telescoped over said body, said sleeve supporting a pair of radially inwardly directed pins which comprise said first means; and

said pins and said cam means forcing said body to move axially relative to said sleeve between the fish engaging and disengaging positions.

4,093,295

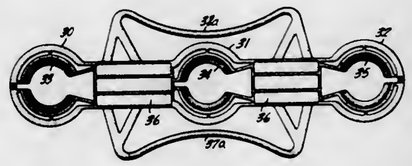
BOTTLE CARRIER

Gerald Erickson, Palm Beach, Fla., assignor to International Omni-Pak Corporation, Surfside, Fla.

Continuation of Ser. No. 587,895, Jun. 18, 1975, abandoned, which is a continuation of Ser. No. 462,110, Apr. 18, 1974, abandoned. This application Dec. 13, 1976, Ser. No. 750,196

Int. Cl.² B65D *71/00*

U.S. Cl. 294—87.2 **3 Claims**



1. An integrally formed bottle carrier for carrying a single row of bottles comprising a plurality of spaced open-ended collars for receiving and supporting therein the necks of the

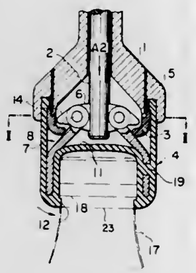
bottles, a longitudinally extending substantially rigid bridging bar connecting a pair of collars, an individual frame around and spacially separated from each collar and within which the respective collar is mounted, part of said frame forming a reinforcing edge of the adjacent rigid bridging bar, means connecting each collar to the individual frame to lend support thereto, diagonally extending legs connecting the open ends of each collar to the reinforcing edge of the adjacent rigid bridging bar to permit the open ends to be spread apart to receive the neck of a bottle, the extreme opposite of said longitudinally spaced collars in the carrier being oriented with the open ends facing inwardly opposite to each other and toward an adjacent rigid bridging bar to permit removal of either end bottle by pivoting the lower end thereof outwardly away from the adjacent bottle in the carrier, and a plurality of longitudinally extending reinforcing ribs beneath said rigid bridging bar and connecting the portions of the frames which form the opposite reinforced edges of each rigid bridging bar, said bottle carrier being further characterized in that there are at least two longitudinally extending bridging bars connecting at least three frames in a row and in that the open-ended collar intermediate a pair of rigid bridging bars is oriented longitudinally with the open end facing toward the open end of an adjacent collar.

4,093,296

BOTTLE GRIPPER

Tsutomu Itoh, Tokyo, Japan, assignor to Onoda Cement Co., Ltd., Onoda, Japan

Filed Jun. 20, 1977, Ser. No. 808,060
Claims priority, application Japan, Jun. 28, 1976, 51-75469
Int. Cl.² B66C *1/42*
U.S. Cl. 294—90 **19 Claims**



1. A bottle gripper comprising a cylindrically shaped arm in the center of which a shaft is inserted with a loose fit, at the lower portion of the arm there being an inwardly projecting supporter, and a resilient cap formed of an outer cylinder, an inner cylinder extending therefrom to form a gap therebetween and a flat upper wall formed at the top of the inner cylinder, said shaft having branch plates at its lower end to which a plurality of swingable pieces are attached, each swingable piece having a projection at its upper end to be supported on said supporter and a skirt portion to be received in the gap between the outer and inner cylinders.

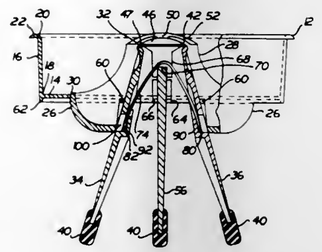
4,093,297

GRASPING DEVICE

Edwin E. Reiber, Worthington, Ohio, assignor to North American Systems, Inc., Bedford Heights, Ohio

Filed Nov. 29, 1976, Ser. No. 745,620
Int. Cl.² B25G *9/02*
U.S. Cl. 294—99 R **10 Claims**

1. A grasping device comprising:
a frame adapted to be held generally stationary with respect to an article being grasped;
said frame comprising a generally flat support, an aperture in the support, and a support riser adjacent to the aperture in the support and projecting from the support;
two manually operable, movable tweezer legs supported by said frame;
a third leg positioned between the two movable tweezer legs and attached to said support riser and held generally stationary with respect to the frame so that each movable leg is movable relative to the third leg and the frame;
said two movable legs and said third leg each having a



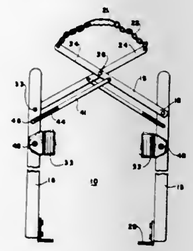
length such that all three legs terminate at approximately at the same point when the movable legs are closed against the third leg;
said movable legs being positioned and adapted for pivotal movement toward the third leg such that relative movement of the three legs lies in a common plane; and
means at the end of each leg for frictionally engaging an object to be grasped.

4,093,298

COMPRESSOR TONGS

Ralph M. Gatewood, Palmersville, Tenn., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Jan. 17, 1977, Ser. No. 759,793
Int. Cl.² B66C *1/28*
U.S. Cl. 294—118 **3 Claims**



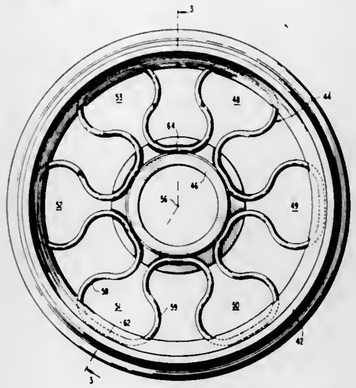
1. A tong assembly for gripping a cylindrical shaped body such as an air-compressor comprising,
a pair of vertical struts,
a pair of cross bars pivotally mounted together at an intermediate section of each cross bar, with a lower end of each cross bar pivotally mounted to an upper section of one vertical strut, with
a clamp bracket fixed to the lower end of each strut of a shape to fit under a corner of a cylindrical object, and with a clamp jaw, of a shape to fit about the curved side of said cylindrical object, pivotally mounted to an intermediate section of each strut, together with tension means fixed to the upper end of each cross-bar, said tension means suitable for suspending the assembly.

4,093,299

ARTICULATED RAILWAY SERVICE WHEEL AND UNITARY RAILWAY HUB AND AXLE

Overton B. Capps, Verona, and J. Richard Milliken, Pittsburgh, both of Pa., assignors to Edgewater Steel Company, Oakmont, Pa.

Filed Sept. 30, 1976, Ser. No. 728,115
Int. Cl.² B60B *17/00*
U.S. Cl. 295—14 **17 Claims**



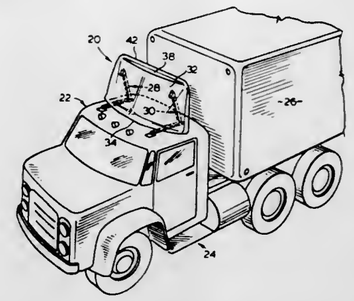
1. Structure for assembly of an articulated railway service wheel comprising
rim means of toroidal configuration,
hub means, and
open web spring means for removably interconnecting the rim means to the hub means,
the rim means in an assembled wheel being rotatable with and circumferentially disposed with relation to the hub means with open spaces being defined by the spring web means between the rim means and hub means in an assembled wheel,
the open web spring means comprising elongated rodlike means defining a plurality of spring units which are distributed symmetrically between the rim means and hub means when in an assembled wheel,
receiving means on the rim means and hub means for receiving and seating the spring units during assembly of a wheel,
said receiving means being free of fastener means which are non-unitary with said rim means and said hub means, respectively while providing for removably interconnecting the rim means, spring web means, and hub means so as to permit predetermined relative movement between said structures,
said predetermined relative movement being limited during assembled usage to movement permitted by tensioning and compressing of the spring units,
each said spring unit having a generally U-shaped configuration when projected onto a plane in perpendicular relationship to the axis of rotation of an assembled wheel,
each said generally U-shaped configuration spring unit comprising
a pair of elongated legs extending between the rim means and the hub means establishing a resultant directional component for each said leg which is radial of an assembled wheel,
said leg means presenting a curvilinear configuration when projected onto a plane in perpendicular relationship to the axis of rotation of an assembled wheel,
said curvilinear configuration of the leg means changing in response to vertical and lateral forces applied through the hub means and rim means in an assembled wheel when in use.

4,093,300

AIR DEFLECTOR

Heinz Werner Snizek, 45 Grenoble Drive, Apt. 2205, Don Mills, Ontario, Canada

Filed Jun. 21, 1976, Ser. No. 697,811
Int. Cl.² B62D *37/00*
U.S. Cl. 296—1 S **9 Claims**



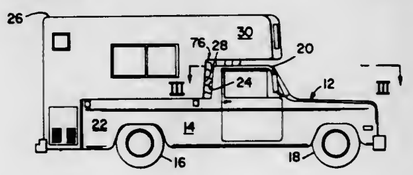
1. An air deflector for use with a road vehicle of the kind which is adapted for travel forwardly along a path of travel and which has a cab and a load-carrying body section disposed rearwardly of and extending above said cab, said deflector having a streamlined air deflecting face and being adapted to be mounted on said cab in front of said body portion with said air deflecting face facing generally forwardly and with said face disposed generally transversely of said path of travel, said face having the following features, which are defined with reference to an orientation of said face forwardly and disposed generally across said path of travel and oriented for movement along a horizontal said path of travel:
(a) a bottom leading edge,
(b) a first region extending from said bottom leading edge and sloping generally rearwardly and upwardly therefrom, said first region having an upper section sloping upwardly and rearwardly at a relatively steep angle to the horizontal,
(c) a second region extending from the upper margin of said upper section and sloping upwardly and rearwardly therefrom at a relatively shallow angle to the horizontal,
(d) a third spoiler region formed by a flange-like portion of said deflector, said spoiler region extending from the upper margin of said second region and forming an upper margin of said deflector, said spoiler region being disposed in a generally upright position so that air flowing over said face is deflected upwardly by said spoiler region as the air leaves the deflector.

4,093,301

MOVABLE DOOR FOR A VEHICLE

Samuel W. T. Kwok, 2642A Baldwin La., Walnut Creek, Calif. 94596

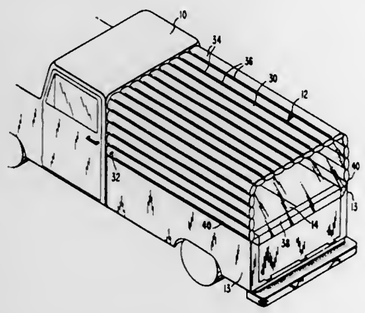
Filed Sep. 27, 1976, Ser. No. 727,262
Int. Cl.² B60P *3/32*
U.S. Cl. 296—23 MC **10 Claims**



1. In combination, a truck including a cab defining a laterally directed rear wall and a longitudinally directed, generally horizontal bed for supporting a load extending rearwardly from said cab,

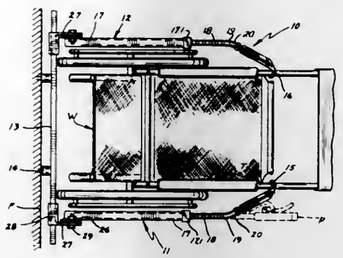
an enclosed camper body defining a laterally directed forward wall facing said rear wall of said truck cab,
a first opening in said rear wall of said truck cab,
a corresponding second opening in said forward wall of said camper body, said cab and camper body openings being aligned, one with the other,
said camper body being positioned rearwardly of said truck cab so as to define a space between said truck cab rear wall and said camper body forward wall,
a first slidable door and means on said truck cab rear wall for sliding said first door laterally between a first position obturating said first opening in said rear wall of said truck cab to a second position uncovering said first opening and within said space, and,
a second slidable door and means on said forward wall of said camper body for sliding said second door laterally in a direction opposite to the direction of sliding of said first door, between a first position obturating said second opening to a second position uncovering said second opening so that passengers may move to and from said cab and said camper.

4,093,302
VEHICLE COVER ASSEMBLY
Robert Michael Adams, 4018 Redwood Ave., Los Angeles, Calif. 90066
Continuation-in-part of Ser. No. 654,623, Feb. 2, 1976, abandoned. This application Mar. 10, 1976, Ser. No. 665,564
Int. Cl.² B60P *3/34*
U.S. Cl. 296—23 R **23 Claims**



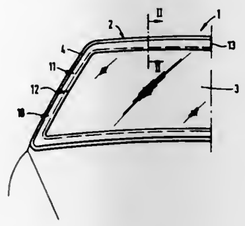
1. A camper cover adapted for attachment to a vehicle having a cargo area, said camper cover comprising:
a plurality of longitudinally spaced-apart, transverse frame members having an upper portion and depending side portions and adapted for mounting on a vehicle to form a camper frame over the cargo area of a vehicle;
an inflatable cover member having a front edge, a rear edge and two side edges and formed of opposed flexible, air tight sheets seamed together to form an inflatable enclosure between said sheets, said opposed sheets being further attached together by a plurality of elongated seams to form adjacent, longitudinal, inflatable sections within said enclosure, said inflatable sections being in gas communication and having means for introducing a gas into said inflatable cover member, said inflatable cover member adapted to fit over the camper frame formed by said frame members to form a camper cover; a plurality of longitudinal bracing members extending between adjacent frame members to form a V brace; and
means for securing said two side edges of said inflatable cover member to the sidewalls of the cargo area of the vehicle.

4,093,303
WHEELCHAIR RETAINING APPARATUS FOR VEHICLES
Eldrid W. Nelson, Minneapolis, Minn., assignor to Chas. Olson & Sons and Wheel Service Co., Inc., St. Paul, Minn.
Filed Feb. 28, 1977, Ser. No. 772,457
Int. Cl.² B60N *1/02*; B60P *7/08*; B61D *45/00*; B62B *11/00*
U.S. Cl. 296—65 R **26 Claims**



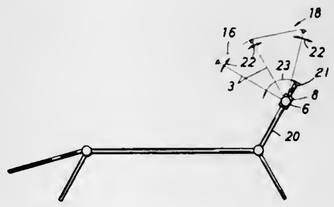
1. A wheelchair retaining device for use in a passenger carrying vehicle, comprising:
an elongate arm to extend generally horizontally alongside of the wheelchair from back to front, the arm having a rear end with attachment means to be affixed to a rigid part of the vehicle, the arm having a transversely extending front end to traverse the plane of the chair wheel and confront the tire of the wheel;
a releasable clamping jaw on the front end of the arm and facing rearwardly to embrace the frame of the wheelchair; and
articulated means in the arm permitting the front end of the arm and the clamping jaw to move in a transverse direction to swing away from the wheelchair frame and out of the way of the wheel of the chair.

4,093,304
HOLDING MEANS FOR A WINDOW, PREFERABLY WINDSHIELD IN VEHICLES
Hermann Ziegler, Renningen, Germany, assignor to Dr. Ing. h.c.F.Porsche Aktiengesellschaft, Germany
Filed May 7, 1976, Ser. No. 684,022
Claims priority, application Germany, May 7, 1976, 2520320
Int. Cl.² B60J *1/02*
U.S. Cl. 296—84 D **11 Claims**



1. In an arrangement for attaching a windshield to the windshield frame of an automobile by way of an adhesive material, the improvement comprising:
an easily removable member attached to said windshield frame,
said adhesive joining said windshield to said easily removable member,
wherein said easily removable member is at least in part U-shaped in cross-section and said windshield frame has a flange portion which is at least partially surrounded by said U-shaped part, and
wherein part of said flange portion of said windshield frame is cambered and the adjoining part of said easily removable member is provided with a camber so as to be retained against the cambered part of said flange portion of said windshield frame.

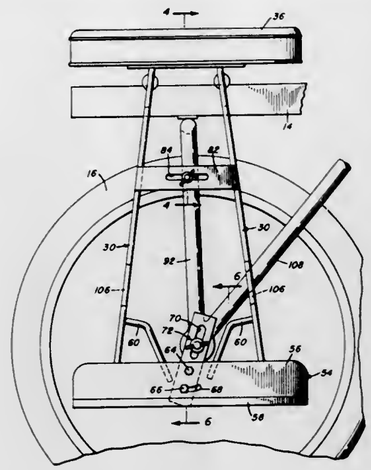
4,093,305
SUN PROTECTION
Joachim Staroste, Steinhaagweg 9, 6490 Schluchtern-Niederzell, and Peter Heuer, Nordstr. 25, 6497 Steinau, both of Germany
Filed Feb. 4, 1977, Ser. No. 765,674
Claims priority, application Germany, Dec. 11, 1976, 2656245
Int. Cl.² A47C *7/62*
U.S. Cl. 297—184 **9 Claims**



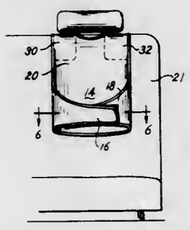
1. A sun protection, especially for use with deck chairs, camping chairs, or the like, said sun protection comprising a plurality of U-shaped supporting beams each of which includes a central cross beam, a pair of laterally spaced apart side beams, a pair of angular connections for removably coupling the opposed ends of said central beam to one end of each of said side beams, a mounting ear removably connected to the end of each said side beam that is opposite said respective cross beam, a pair of clamping holders coupled to the end of said side beams opposite said respective cross beam for detachably securing said sun protection to a chair, a pair of clamping bolts adjustably coupling said mounting ears to each other and to a respective one of said clamping holders, said U-shaped supporting beams being angularly displacable with respect to each other and being angularly dispiacable as a unit with respect to said clamping holders, said clamping holders being formed as angular elements in one of which is removably disposed one of said clamping bolts in a torsion-resistant manner, and a foldable fabric covering said U-shaped supporting beams.

4,093,306
AUXILIARY RIDER SUPPORT FOR JOG CARTS
Joseph Zitone, R.F.D. 1, Port Jervis, N.Y. 12771
Filed Mar. 25, 1977, Ser. No. 781,364
Int. Cl.² A47C *3/00*
U.S. Cl. 297—217 **14 Claims**

1. For use on a jog cart incorporating a pair of forwardly directed shafts and a cart frame mounting said shafts on wheels, a quick attaching and readily detachable auxiliary rider support, said support comprising an upright frame having an inner side and an outer side, said support frame also having an upper portion and a lower portion, hook means on the upper portion of the support frame inwardly directed for engagement over a jog cart shaft in general alignment over a wheel, locking means on the support frame below the hook means and inwardly directed for releasable engagement with a jog cart to, in conjunction with the hook means, releasably fix the rider support to the jog cart, said rider support including a rider accommodating seat mounted on the upper portion of the support frame and a footrest mounted on the lower portion of the support frame, said footrest projecting outwardly from the support frame.



4,093,307
VEHICLE RESTRAINING BELT STRUCTURE
Ronald A. McLennan, 520 Maple Row, Elkhart, Ind. 46514
Filed Oct. 22, 1976, Ser. No. 734,870
Int. Cl.² A62B *35/00*
U.S. Cl. 297—385 **9 Claims**

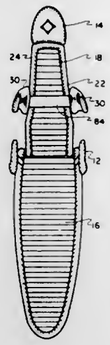


1. A passenger restraining belt structure for use with a vehicle seat having a back, comprising a body for engaging the front of the back of the seat, straps connected to said body and extending laterally therefrom, with both the top and bottom edges of each strap extending downwardly, to a position near the midsection of an adult passenger for overlapping one another in front of the passenger and at least partially supporting the weight of the passenger's body, the top and bottom edges of each strap extending generally in a parallel direction and the top edge being the normal position of the passenger's arm pit, means for securing said straps together with the straps around the body of the passenger, an upper portion attached to said body for extending over the top of the back of the seat, and means for attaching said upper portion to the back of the seat back.

4,093,308
DENTAL OPERATING CHAIR WITH RESTRAINING ARM SUPPORTS
Robert R. Runnells, Kaysville, Utah, assignor to MDT Instrument Company, Tualtin, Oreg.
Filed May 10, 1976, Ser. No. 684,659
Int. Cl.² A47C *7/54*
U.S. Cl. 297—416 **5 Claims**

1. In a dental operating chair of the type including a movable

back member which can be moved to position a patient in said chair in a substantially supine posture, wherein the back member has opposite longitudinal sides, the improvement which comprises arm supports which are connected by a band that



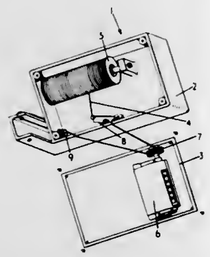
encircles said back member and are thereby removably secured along said opposite longitudinal sides of said back member constituting means for retaining the arms of a patient proximate the body trunk of said patient when said patient is in supine posture in said chair.

4,093,309

METHOD OF AND APPARATUS FOR CONTROLLING ADVANCE OF UNDERGROUND ARMORED CONVEYORS

Rex Mullins, Burton upon Trent, England, assignor to Coal Industry (Patents) Ltd., London, England

Continuation-in-part of Ser. No. 605,837, Aug. 19, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,438
Claims priority, application United Kingdom, Oct. 24, 1974, 45996/74
Int. Cl.[2] E21D *15/48*
U.S. Cl. 299—1 **3 Claims**



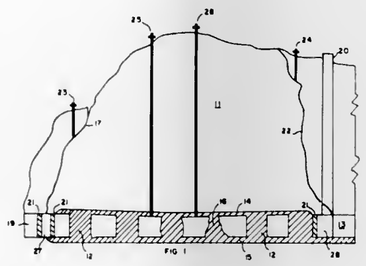
1. A method of controlling advance of an armored conveyor arranged along an underground mine longwall face having roadways adjacent to its ends, the conveyor comprising a series of articulated sections advanceable with respect to the fact in snake-like manner by a plurality of advancing mechanisms spaced along the length of the conveyor, comprising advancing the conveyor sections towards desired advance positions, detecting the advances of a plurality of said conveyor sections arranged over substantially the length of the conveyor, said detecting being done by means including a wound elongate member anchorable at one end for unwinding as the conveyor is advanced toward the longwall, the advances being indicated by signals corresponding to the unwound length of the member, comparing the summed detected advances, and controlling subsequent advances of the conveyor sections such that the relative advance of substantially the whole conveyor length tends to be maintained at the same distance from an initial base line, the straightness of the conveyor is maintained within preselected-limits and the summed advances of the conveyor sections adjacent to the ends of the conveyor are such that the angle of the substantially straight conveyor with respect to said roadways is maintained within a further preselected limit.

4,093,310

SEALING AN UNDERGROUND COAL DEPOSIT FOR IN SITU PRODUCTION

Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Division of Ser. No. 774,597, Mar. 7, 1977. This application Sep. 19, 1977, Ser. No. 834,182
Int. Cl.[2] E21B *33/13*
U.S. Cl. 299—2 **6 Claims**



5. A method of sealing an underground coal deposit wherein a subsidence crack forms a communication passage between the surface of the earth and the said underground coal, comprising the steps of

injecting a fluid into the said subsidence crack, the said fluid having the capability of sealing the said subsidence crack, sealing the said subsidence crack, and

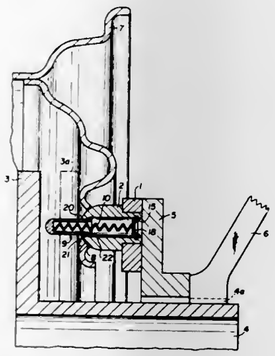
continuing injecting the said fluid into the said subsidence crack until sufficient fluid head pressure is established to withstand planned mine pressure within the said underground coal.

4,093,311

ARRANGEMENT FOR CLAMPING VEHICLE WHEELS

Otfrid Maus, Darmstadt, Germany, assignor to Firma Carl Schenck AG, Darmstadt, Germany

Filed Sep. 27, 1976, Ser. No. 726,814
Claims priority, application Germany, Jan. 26, 1976, 2602738
Int. Cl.[2] B25H *5/00*
U.S. Cl. 301—9 DH **9 Claims**



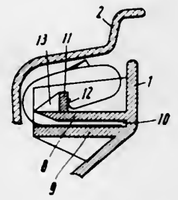
1. An apparatus for clamping a vehicle wheel rim having mounting holes therein to hold the respective wheel in a rotatable position, comprising rotatable backing means, a clamping device including wheel centering means for engaging a mounting hole in said vehicle wheel rim, said wheel centering means comprising centering bolt means secured to said clamping device, said centering bolt means extending toward said backing means, guide pin means extending from said centering bolt means also toward said backing means, biasing spring means cooperating with said guide pin means for yieldingly urging said guide pin means toward said backing means, said centering bolt means comprising a first bolt portion rigidly mounted to said clamping device and a second bolt portion operatively connected to said first bolt portion, said second bolt portion having a contoured surface facing toward said backing means for engaging a mounting hole, said centering bolt means further comprising a central, axially extending channel therein, said guide pin means and said biasing spring means being located in said central, axially extending channel of said centering bolt means, said guide pin means and said channel comprising cooperating shoulder means inhibiting the removal of said guide pin means from said channel, said spring means urging said guide pin means toward a shoulder engaging position.

4,093,312

FASTENING ARRANGEMENT FOR DECORATIVE WHEEL RINGS

Paul Kretschmer, Höhenstr. 18, 8752 Waldaschaff, Germany

Filed Oct. 21, 1976, Ser. No. 734,442
Claims priority, application Germany, Oct. 21, 1975, 2547064
Int. Cl.[2] B60B *7/06*
U.S. Cl. 301—37 R **2 Claims**



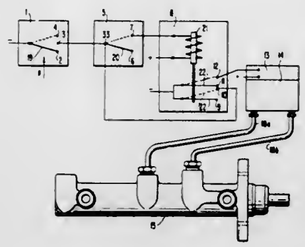
1. A decorative wheel ring comprising at least two spring clips for engagement in the rim of a wheel of a motor vehicle, the decorative wheel ring being provided with a clip support portion for each spring clip, wherein each spring clip has the form of a three-legged spring loop comprising an outer free leg joined at its one end to a central portion through a first bent portion, and an inner free leg joined to said central portion through a second bent portion, including tangs on said central portion which, after the decorative wheel ring together with said spring clips inserted in said clip support portions has been pressed into the wheel dish of the rim, engage the wall of the wheel dish and thus hold the decorative wheel ring freely suspended on the wheel of the vehicle, each clip support portion on the decorative wheel ring being provided with an axially extending guide slot adapted to receive said outer free leg of the spring loop of the spring clip, wherein said clip support portion also contains a projecting extension serving as an axial stop for the inner free leg of said spring loop of the spring clip which embraces said extension and forces said tangs against said rim thereby to secure said ring.

4,093,313

TWO-CIRCUIT BRAKE SYSTEM FOR MOTOR VEHICLES

Manfred H. Burckhardt, Waiblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Jun. 8, 1977, Ser. No. 804,743
Claims priority, application Germany, Jun. 9, 1976, 2625713
Int. Cl.[2] B60T *8/04, 8/18*
U.S. Cl. 303—6 C **10 Claims**



1. A two-circuit brake installation for motor vehicles, comprising a shiftable master brake cylinder means including two pressure space means for the two brake circuits, said two pressure space means being connected with each other by a line extending outside of the master brake cylinder means, a shifting valve means arranged in said line which is operable in dependence on the vehicle load to establish and interrupt the connection between the two pressure space means, and an intermediate piston in the master brake cylinder means between said two pressure space means, said intermediate piston being arranged substantially coaxially to two pressure points and being freely movable within a guide sleeve means of smaller diameter, said intermediate piston being provided on both sides thereof with central extensions for the mechanical cooperation with the two pressure pistons, characterized by control means for shifting the shifting valve means in dependence on the load, on the pressure prevailing in the master brake cylinder means and on the deceleration attainable with such pressure.

4,093,314

HYDRAULIC BRAKE PRESSURE CONTROL DEVICE

Asao Kozakai, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 22, 1976, Ser. No. 753,583
Claims priority, application Japan, Dec. 30, 1975, 50-156968
Int. Cl.[2] B60T *8/24*
U.S. Cl. 303—24 F **6 Claims**

1. In an hydraulic brake system for a vehicle including a master cylinder, two wheel brake cylinders located on opposite sides of the vehicle at the same point along the longitudinal axis of the vehicle in separate hydraulic communication with the master cylinder, the communication defining two pressure boundaries, a brake pressure proportioning unit for supplying equal reduced braking pressure to both brake cylinders during straight-ahead vehicle motion and proportioned reduced braking pressure to the brake cylinders during lateral vehicle motion, said reduced pressures being relative to the master cylinder pressure, the unit having

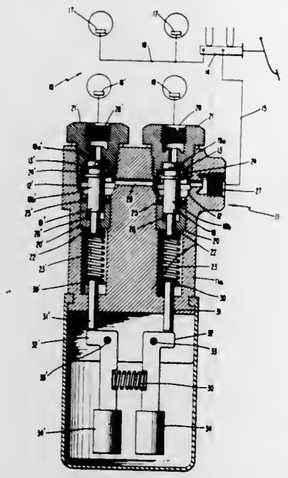
(i) two proportioning valves, one valve interposed in each of the separate hydraulic communications for supplying reduced wheel brake pressure to the respective wheel cylinder for master cylinder pressure greater than a predetermined valve setpoint,

(ii) two springs each associated with a respective one of the proportioning valves, each of the springs being biased, the respective predetermined setpoint being established by the exerting force of the respective one of the biased springs,

(iii) two weights each movable in response to centrifugal

force caused by the lateral motion of the vehicle during a turn, and

(iv) first and second lever means each applying the force of a respective one of the weights upon one of the springs, the first and second lever means being responsive to the movement of the respective weight for increasing the spring exerting force and the setpoint of the valve supplying reduced pressure to the brake cylinder outboard of the vehicle turning path and decreasing the spring exerting



force and the setpoint of the valve supplying reduced pressure to the inboard brake cylinder relative to the respective predetermined setpoints with no lateral vehicle motion,

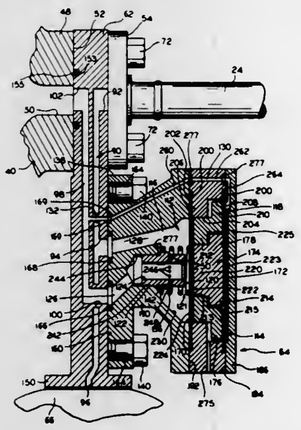
the improvement comprising mechanical link means interacting between the springs for automatically equalizing the exerting forces of the springs and the valve setpoints in the absence of lateral vehicle motion, said link means connecting the first and second lever means.

4,093,315

MODULATING VALVE ASSEMBLY FOR RAILROAD CAR BRAKE CYLINDERS

William R. Page, 400 E. Randolph St., Chicago, Ill. 60601, and James G. Rees, 1212 Lake Shore Dr., Chicago, Ill. 60610

Filed Jul. 5, 1977, Ser. No. 813,005
Int. Cl.² B60T *11/12*
U.S. Cl. 303—59 **17 Claims**



1. In a brake cylinder for railroad car air brake equipment including a brake cylinder pipe connected to the brake cylinder head for communicating fluid under pressure to the brake cylinder from the outlet of the brake cylinder pipe to the inlet of the brake cylinder head, a modulating valve assembly therefor for supplying the braking pressure fluid to the brake cylinder from the brake cylinder pipe at a pressure that is a predetermined percentage of the pressure fluid in the brake cylinder pipe for brake service strokes above minimum service applications, said assembly comprising:

a bracket plate interposed between the brake cylinder pipe outlet and brake cylinder head inlet,

said bracket plate being formed to define a first passage communicating with the brake cylinder pipe outlet and a second passage communicating with the brake cylinder inlet,

a modulating valve device carried by said bracket plate,

said valve device comprising:

a housing defining a cavity,

a differential valve member mounted across said cavity to define first and second chambers on either side of said valve member and for flexing movement laterally of said valve member,

said bracket plate first passage being in free communication with said first chamber,

an annular valve seat positioned in said first chamber adjacent said valve member, with said bracket plate second passage being in communication with said first chamber through said valve seat, and said valve member being mounted to be flexed against said seat for sealing off communication of said second passage to said first chamber,

said second chamber being in free communication with said bracket plate second passage,

said valve member having exposed in said chambers on either side of same working areas of which the working area exposed to said second chamber is greater than the working area of same that is exposed to said first chamber by a predetermined ratio, whereby when said chambers are subject to fluid pressure in said passages, said valve member will be subject to a differential pressure force biasing same toward said seat,

means for spring biasing said valve member away from said seat that is overcome when said differential force reaches a predetermined amount,

and check valve means in shunting relation to said seat for releasing fluid under pressure in said brake cylinder and second passage to said first passage when said brake cylinder pipe is free of the fluid under pressure.

4,093,316

COMBINED ANTISKID AND LOAD-DEPENDENT BRAKE CONTROL SYSTEM FOR A MOTOR VEHICLE

Erich Reinecke, Beinhorn, Germany, assignor to WABCO Westinghouse GmbH, Hanover, Germany

Filed Feb. 24, 1977, Ser. No. 771,477
Claims priority, application Germany, May 21, 1976, 2622746
Int. Cl.² B60T *8/02, 8/18*
U.S. Cl. 303—100 **6 Claims**

1. An antiskid brake control system for motor vehicles comprising:

(a) a reservoir in which fluid under pressure is stored;

(b) a brake cylinder device for each wheel of the vehicle;

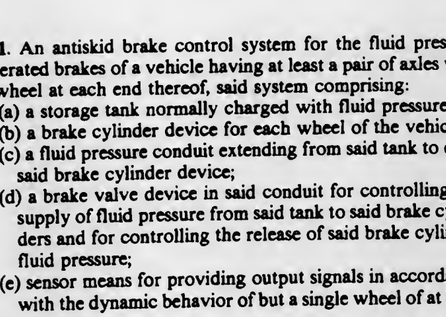
(c) an operator controlled brake valve device via which the fluid pressure from said reservoir is supplied to said brake cylinder devices in accordance with the degree of braking desired;

(d) valve means interposed between said brake valve device and said brake cylinder devices for influencing braking pressure independently of said brake valve device;

(e) antiskid control means for effecting operation of said valve means during wheel skid conditions;

(f) sensor means for providing output signals corresponding to the brake valve regulated supply fluid pressure, the effective brake cylinder pressure and the load supported by the respective axles of the vehicle; and

(g) load control means subject to the sensor output signals for effecting operation of said valve means to influence the fluid pressure of said brake cylinder device of a chosen



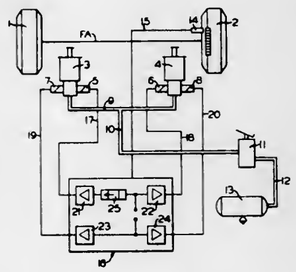
one of the respective vehicle axles so as to follow a predetermined brake cylinder pressure buildup curve that deviates from a normal buildup curve at a predetermined point thereon corresponding to the time when the brake valve supply pressure signal exceeds the signal of the load supported by the chosen axle.

4,093,317

VEHICLE ANTISKID BRAKE CONTROL SYSTEM HAVING MEANS FOR ADJUSTING A NON-SENSED WHEEL BRAKE PRESSURE RELATIVE TO A SENSED WHEEL BRAKE PRESSURE

Klaus Lindemann, Hanover; Lutz Weise, Misburg, and Erich Reinecke, Beinhorn, all of Germany, assignors to WABCO Westinghouse GmbH, Hanover, Germany

Filed May 27, 1977, Ser. No. 801,435
Claims priority, application Germany, Jun. 18, 1976, 2627284
Int. Cl.² B60T *13/68*
U.S. Cl. 303—111 **19 Claims**



1. An antiskid brake control system for the fluid pressure operated brakes of a vehicle having at least a pair of axles with a wheel at each end thereof, said system comprising:

(a) a storage tank normally charged with fluid pressure;

(b) a brake cylinder device for each wheel of the vehicle;

(c) a fluid pressure conduit extending from said tank to each said brake cylinder device;

(d) a brake valve device in said conduit for controlling the supply of fluid pressure from said tank to said brake cylinders and for controlling the release of said brake cylinder fluid pressure;

(e) sensor means for providing output signals in accordance with the dynamic behavior of but a single wheel of at least one axle;

(f) evaluation means for providing control signals in accordance with said output signals from said sensor means;

(g) control valve means for modulating the fluid pressure of each said brake cylinder device in response to said control signals in order to adjust the brake cylinder pressure at the respective wheels independently of said brake valve device;

wherein the improvement comprises,

(h) delay means for varying the degree of fluid pressure adjustment by said control valve means at said brake cylinder device of one of said wheels of an axle relative to the other of said wheels of the same axle, such as to preclude the fluid pressure at the brake cylinder of a wheel without said sensor means from attaining a level corresponding to the fluid pressure level at the brake cylinder of a wheel having said sensor means.

4,093,318

ENDLESS DRIVE SYSTEM

John W. Edwards, P.O. Box 1151, Brandon, Fla. 33511

Continuation-in-part of Ser. No. 590,938, Jun. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 576,641, May 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 532,698, Dec. 13, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,527
Int. Cl.² B62D *55/20*
U.S. Cl. 305—11 **50 Claims**

1. An endless drive system comprising:

a plurality of endless drive sections, each section including a substantially closed contact surface and inwardly sloped, substantially closed side surfaces extending from first and second sides of said contact surface toward the center of the endless drive system and forming therewith a body portion having a substantially closed periphery;

connecting means for pivotally connecting the portions of said endless drive sections adjacent the center of the drive system to enable movement of said endless drive system in an endless path; and

shield means extending from each body portion and overlapping an adjacent endless drive section for maintaining a substantially closed structure between adjacent endless drive sections as said endless drive system travels in an endless path.

4,093,319

TRACK CONSTRUCTION FOR TRACKED LAND VEHICLES SUCH AS TANKS

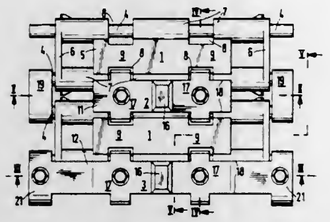
Hans G. K. Börner, Blieskastel-Mimbach, Germany, assignor to Gerlach-Werke GmbH, Germany

Filed Sep. 24, 1976, Ser. No. 726,110
Claims priority, application Germany, Mar. 19, 1976, 2611681; Dec. 6, 1975, 2554980
Int. Cl.² B62D *55/20*
U.S. Cl. 305—58 R **14 Claims**

1. A track construction for land vehicles, such as tracked armored vehicles, said track construction comprising:

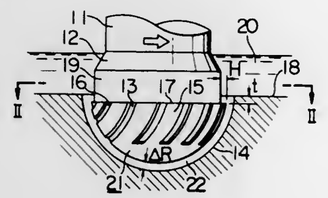
a plurality of track members each comprising first and second spaced, parallel sets of transversely extending tubular members, said sets each comprising at least two tubular members mounted in axially spaced relationship so as to define a gap therebetween and having axially aligned bores therein, said track members each including a wheel contacting surface located thereon;

a plurality of connection members each including a wheel contacting surface;
and connecting means, including a pair of connecting pins extending through resilient sleeves mounted in said aligned bores of said sets of tubular members, for connecting said connection members and said track members



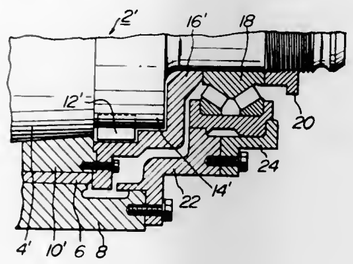
together in alternating relationship to form a track, said connection members including ground engaging means affixed thereto on the sides thereof opposite to said wheel contacting surfaces and extending in both longitudinal directions of the track beyond the two connecting pins of the connection member.

4,093,320
GROOVED SPHERICAL BEARING FOR VERTICAL MACHINES
Ryoichi Kaneko; Katutosi Nii; Hiroo Hiroyama, and Kinpei Okano, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan
Filed Nov. 5, 1975, Ser. No. 629,623
Claims priority, application Japan, Nov. 8, 1974, 49-127993
Int. Cl.² F16C *32/06*
U.S. Cl. 308—9 **19 Claims**



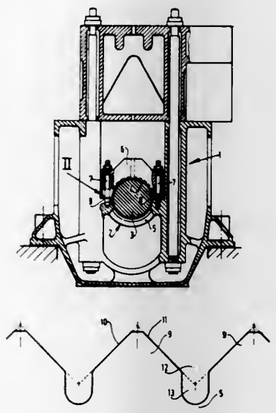
1. A grooved spherical bearing for vertical machines comprising:
a rotatable member including a semi-spherical end portion;
a stationary member for bearing said semi-spherical end portion of said rotatable member;
a plurality of grooves formed on the surface of said semi-spherical end portion of said rotatable member, said surface adapted to be brought into sliding contact with the surface of said stationary member, said grooves being arranged such that they perform the function of drawing lubricating oil, in which said semi-spherical end portion and said stationary member are immersed, toward the sliding surfaces of the two members as said rotatable member rotates;
means for reducing resistance of the lubricating oil flow directed along the sliding surfaces caused by a flow of the lubricating oil being radially forced by inertia of said rotatable member, and wherein each of said plurality of grooves has an intake portion for said lubricating oil disposed at a major diameter surface of said semi-spherical end portion and an outlet portion for said lubricating oil disposed at a minor diameter surface of said semi-spherical end portion, and wherein said resistance reducing means includes an edge portion of said stationary bearing member extending in an axial direction of said rotatable member by a predetermined distance upstream of said intake portion.

4,093,321
TAPER JOURNAL BEARING FOR ROLLS FOR USE IN ROLLING MILLS
Koichi Ikariishi, Ichihara; Kanji Kondo, and Toko Teshiba, both of Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan
Filed Mar. 19, 1976, Ser. No. 668,723
Claims priority, application Japan, Mar. 29, 1975, 50-41481[U]
Int. Cl.² F16C *3/00*
U.S. Cl. 308—20 **7 Claims**



1. A taper journal bearing for rolls for use in rolling mills, comprising a bushing housed in a roll bearing box, a sleeve closely fitted onto a taper journal of the roll, an oil film deposited between said bushing and said sleeve, and means for fixing said sleeve to said roll, said fixing means arranged at an area other than that directly subjected to a rolling force acting upon said sleeve, the rolling force being transmitted from said roll bearing box.

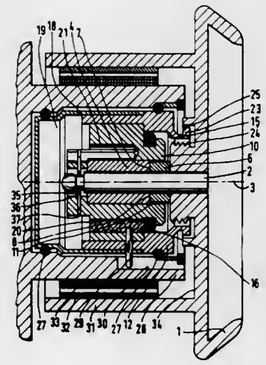
4,093,322
SLIDE BEARING FOR USE IN A COMBUSTION ENGINE AND ENGINE EQUIPPED WITH SUCH A BEARING
Karel Koskuba, Duivendrecht, Netherlands, assignor to Stork-Werkspoor Diesel B.V., Amsterdam, Netherlands
Filed Oct. 12, 1976, Ser. No. 731,448
Claims priority, application Netherlands, Oct. 10, 1975, 7511971
Int. Cl.² F16C *25/02*
U.S. Cl. 308—23 **12 Claims**



1. A slide bearing for a shaft absorbing a radial load on the shaft varying in direction, said bearing comprising two or more bearing bushings held in place by means of two bearing caps

provided at their boundary surfaces with meshing teeth securing them against relative displacements, each tooth having slanting opposite side faces such that adjacent faces of adjacent teeth of each bearing cap extend convergently downwardly to define a valley, the bottom of the valley between each pair of adjacent teeth of at least one bearing cap having a groove extending below said bottom of the valley.

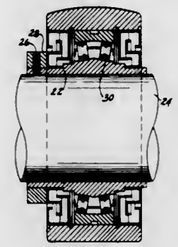
4,093,323
ROTOR BEARING
Gerhard Quandt, and Werner Ries, both of Heidelberg, Germany, assignors to Teldix GmbH, Heidelberg, Germany
Filed Jul. 14, 1976, Ser. No. 705,004
Claims priority, application Germany, Jul. 29, 1975, 2533804
Int. Cl.² F16C *32/06*
U.S. Cl. 308—121 **19 Claims**



1. In a bearing for the rotor of a rotary device, the bearing being composed of an oil-lubricated slide bearing bush and a journal pin connected to the rotor and mounted in the bush for rotation relative thereto, the bush presenting a cylindrical surface providing support for the pin in the radial direction, and means for yieldingly mounting the bush, the improvement comprising: a bearing ring mounted to rotate with the rotor and having an axial end face ring forming, with an axial end face of said bush, an axial slide bearing for the rotor, said axial bearing receiving a supply of lubricating oil during rotation of said device; and means defining a narrow annular gap extending substantially in the axial direction in the vicinity of, and spaced radially outwardly from, said axial slide bearing to provide a constricted region adjacent said axial bearing at which lubricating oil ejected from said axial bearing accumulates.

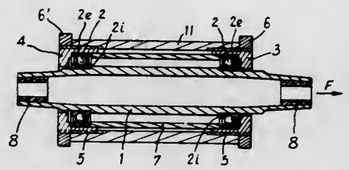
4,093,324
SEAL FOR SELF-ALIGNING BEARING
Erwin R. Carrigan, Manchester, Ohio, assignor to Emerson Electric Co., St. Louis, Mo.
Filed May 16, 1977, Ser. No. 797,278
Int. Cl.² F16C *33/80*
U.S. Cl. 308—187.1 **8 Claims**

1. In a free-running bearing seal axially assembled in an annular space between a journalled shaft and a bearing housing, comprising:
a first annular member of channel form in cross section having a radially extending web portion and an axially extending flange at each end thereof,
a second annular member of channel form in cross section having a shorter radially extending web portion and an axially extending flange at each end thereof,
said first and second members being arranged with their radial web portions coextending, with their flanges extending toward each other, and with their flanges at one end in axial alignment, whereby said first and second members together have the form in cross section of a block letter "G,"
a third annular member of generally block letter "S" form in cross section has first and second outer oppositely extending axial portions, an intermediate axial portion, a first radially extending portion connecting said intermediate axial portion with said first outer axial portion, and a second radially extending portion connecting said intermediate and second outer axial portions,
said third member having its first radial portion positioned between and coextending with said radially extending web portions of said first and second members, with its intermediate axial portion lying between and coextending



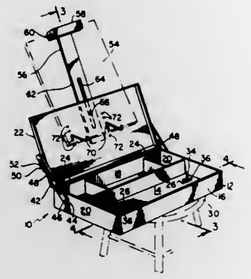
with said flange portions at the said other ends of said first and second members, with its first outer axial portion lying between the flanges of said second member and extending to a free end toward the web portion of said second member, with its second outer and intermediate axial portions lying on opposite side of and coextending with said flange at the said other end of said first member, and
said radially and axially coextending portions of said members being spaced and the free ends of said axially extending portions being spaced from adjacent radially extending portions to permit free relative rotation between said first said second members and said third member.

4,093,325
TUBULAR SPINDLE MOUNTING FOR BICYCLE BOTTOM-BRACKET HUB
Roger Troccaz, Annecy, France, assignor to Societe Nouvelle de Roulements, Annecy, France
Filed Oct. 29, 1976, Ser. No. 737,003
Claims priority, application France, Oct. 30, 1975, 75 33142
Int. Cl.² F16C *33/00*
U.S. Cl. 308—192 **3 Claims**



1. Bottom bracket hub of the ball-bearing type, comprising a hollow tubular spindle of relatively reduced wall thickness, means for effecting the axial adjustment of said spindle, a pair of bearings associated with, and mounted on, said spindle, and a pair of inserts rigidly fitted in the hollow ends of said spindle, wherein the hub body receives therethrough the hollow tubular spindle carrying the two bearings each provided with an outer race, characterised in that the outer races of said bearings are disposed in a pair of screw-threaded bushings, respectively, of which at least one is adapted to move axially in relation to the outer race of the relevant bearing, said bushings constituting the axial play adjustment members and being on the other hand screwed in the tapped body of said hub.

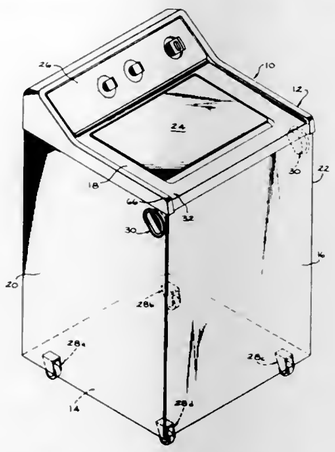
4,093,326
ARTIST'S KIT
Thomas Edward Ford, 150-24 6th Ave., Whitestone, N.Y. 11354
Filed May 11, 1976, Ser. No. 685,438
Int. Cl.² A47B *97/04*
U.S. Cl. 312—231 **12 Claims**



1. An artist's kit comprising:
a. a rectangular box for holding artist's materials including a base and a front wall, a rear wall and side walls all vertically disposed with respect to said base, and further including a cover;
b. means mounting said cover to said box for pivotal movement between a closed position wherein said cover overlays the walls of said box and any one of a plurality of open positions; and
c. means partly disposable within and without said box for releasably clamping said kit to an external mounting surface including means for biasing the base of said box against said mounting surface for effecting the clamping of said box to said mounting surface, wherein the releasable clamping means includes means defining at least two apertures in said bias, a pair of mounting members each having a first portion positionable beneath the mounting surface and a second portion connected to said first portion and extendable through one of said apertures and wherein said biasing means is disposable within said box for acting on each of said second portions for biasing each first portion against the underside of the mounting surface.

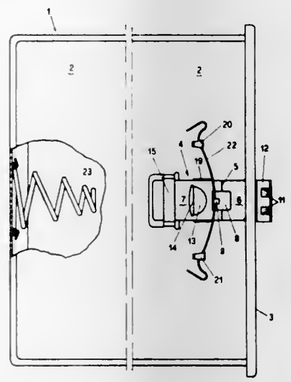
4,093,327
HAND GRIP ASSEMBLY FOR MOVABLE CABINET
Harrison K. Linger, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.
Filed Oct. 26, 1976, Ser. No. 735,603
Int. Cl.² A47B *95/02;* A47F *4/08;* B65D *25/06*
U.S. Cl. 312—244 **7 Claims**

1. In a portable cabinet including a bottom, front, top, and two side walls, an improved hand grip assembly comprising:
a finger receiving portion secured to each of the side walls and located on a line diagonally across the corner of each of the side walls near the top and front walls, and
a recess area in the top wall for receiving a thumb, said recess area being inwardly of each of the side walls and spaced relative to each of the finger receiving portions such that both hands of a person are accommodated in the



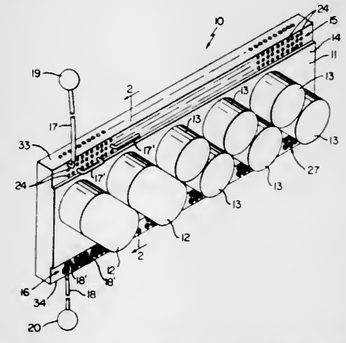
respective finger receiving portions and thumb recess simultaneously.

4,093,328
DEVICE FOR CLAMPING AND EJECTING FROM A CONTAINER AN AUTORADIO OR THE LIKE
Giulio Cesare Libianchi, Rome, Italy, assignor to Autovox S.p.A., Rome, Italy
Filed Mar. 23, 1977, Ser. No. 780,613
Int. Cl.² E05B *73/00;* F16B *41/00*
U.S. Cl. 312—333 **13 Claims**



1. A clamping and ejecting assembly for a support structure adapted to receive an apparatus, such as an autoradio or the like having complimentary clamping means thereon, said assembly comprising:
support means for receiving and supporting an apparatus having complimentary clamping means thereon;
spring element means mounted to said support means and reciprocally movable with respect to said support means between a first retracted position and a second extracted position;
clamping means arranged upon and movable with said spring element means for matingly engaging said complimentary clamping means of said apparatus and maintaining said apparatus inserted in said support means with said spring element means in its first retracted position; and
holding means mounted to said support means for selectively fixing said spring element means in its first retracted position, wherein said spring element means will clamp said apparatus in said support means while said holding means will keep said spring element means in said first retracted position, said holding means selectively releasing said spring element means and permitting removal of said apparatus from said support by allowing said received apparatus to move said spring element from its first retracted position to its second extracted position during removal of said apparatus whereby said clamping means disengages said complimentary clamping means on said apparatus when said spring element means is in its extracted position.

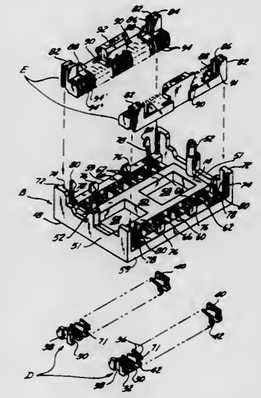
4,093,329
MANIFOLDING MEANS AND SYSTEM FOR ELECTRICAL AND/OR PNEUMATIC CONTROL DEVICES AND METHODS
Clarence M. Asbill, III, Richmond, Va., assignor to Robertshaw Controls Company, Richmond, Va.
Filed Mar. 22, 1977, Ser. No. 780,038
Int. Cl.² H01R *3/04*
U.S. Cl. 339—16 R **20 Claims**



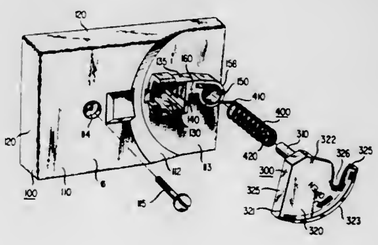
1. In a manifold means adapted to detachably carry on one side thereof a plurality of pneumatically and electrically operated control units each of which is adapted to be fluidly and electrically interconnected to pneumatic means and electrical means of said manifold means, the improvement wherein said one side of said manifold means has external interconnection means for said pneumatic means and said electrical means whereby external pneumatic and electrical lines can be interconnected to the same side of said manifold means that said units are adapted to be interconnected thereto.

4,093,330
CIRCUIT CHIP RECEPTACLE
Robert B. Pittman, River Edge, N.J., assignor to Industrial Electronic Hardware, New York, N.Y.
Filed May 16, 1977, Ser. No. 797,015
Int. Cl.² H05K *1/12*
U.S. Cl. 339—17 CF **40 Claims**

1. A receptacle for a circuit chip having a plurality of exposed connection pads spaced from one another, comprising:
(A) a support body having opposite faces, a chip-receiving station on one face thereof, and an aperture extending through said body to the other face thereof from said chip-receiving station in the vicinity of said chip-carried connection pads when said chip is at said chip-receiving station;
(B) a contact-holding element removably secured to said body and defining a plurality of spaced contact-receiving first passages in communication with said aperture;
(C) a plurality of contact members adapted to be associated with said receptacle, each of said members having a first contact portion extending at least partially through one of said first passages, a second contact portion extending from said first contact portion to said one body face and there exposed at said chip-receiving station to engage and make electrical connection with a given one of said chip-carried connection pads, and a third contact portion extending from said first contact portion to said other body face and there exposed for the making of an external connection thereto, said contact member having a first stop part engaging said contact-holding element from the direction of said one body face, thereby limiting the degree to which said contact member can move toward said other body face; and
(D) a contact-retaining element removably mounted on said body at said one body face thereof and having second passages in which said second contact portions are received, each of said contact members having a second stop part engaging said contact-retaining element from the direction of said other body face, thereby limiting the degree to which said contact member can move toward said one body face.



4,093,331
CONTAMINANT RESISTANT FEMALE CONNECTOR
Andrew John Molchan, Indianapolis, Ind., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed May 16, 1977, Ser. No. 796,991
Int. Cl.² H01R *13/44*
U.S. Cl. 339—39 **4 Claims**



1. A contaminant-resistant female connector comprising:
a housing including:
a front wall,
a plug-receiving cavity that is open to the front wall,
a ridge projecting forwardly from the front wall, the ridge substantially surrounding the opening to the plug-receiving cavity,
a carrier-receiving cavity that is situated adjacent to the plug-receiving cavity, communicates with the plug-

receiving cavity, and is open to the rear of the housing, and

a spindle-receiving cavity that is open to the front wall;

a cover pivotally mounted on the housing and movable between a closed and an open position and having an in-use position intermediate the closed and open positions, the cover including

a front wall overlying the front wall of the housing, the front wall of the cover extending into close proximity with the forward end of the ridge when the cover is in the closed and in-use positions,

a skirt extending rearwardly from the front wall of the cover, the skirt overlapping the ridge when the cover is in the closed and in-use positions, and

a spindle extending rearwardly from the front wall, the spindle being positioned within the spindle-receiving cavity of the housing;

means for biasing the cover toward the closed position;

a plurality of contact springs mounted on a dielectric carrier, the carrier being positioned in the carrier-receiving cavity of the housing; and

means for rotatively securing the spindle within the spindle-receiving cavity and also retaining the carrier within the carrier-receiving cavity.

4,093,332

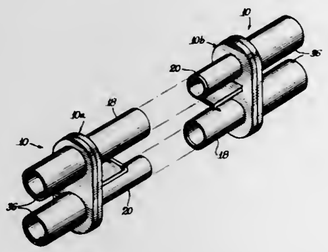
POWER CONNECTOR

Paul S. Simko, Naperville, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 426,156, Dec. 19, 1973, which is a continuation of Ser. No. 246,813, Jun. 21, 1972, abandoned. This application Nov. 27, 1974, Ser. No. 527,927

Int. Cl.² H01R *25/02*

U.S. Cl. 339—49 R **5 Claims**



1. A connector comprising a pair of identical halves,

each half including a plate-like base member, and a pair of transversely-spaced, elongated tubes extending forwardly therefrom to forward ends, the tubes being of different diameters, and a pair of tubular elements rearwardly extending to rear ends with substantially equal internal diameters and in communication with said tubes,

the halves being capable of being fitted together with their forward ends interfitted and the small tube on each half being positioned in the large tube on the other half, and the respective tubes then being substantially completely telescoped, each half also including a latch hook integrally formed with each base and disposed between the tubes and recessed below the forward ends of the tubes, each latch hook including a hook angled rearwardly and facing the large tube, the latch hooks being interconnected in a releasable locking relation when the halves are fitted together, and each connector half also including contacts with elements extending into but recessed below the tubes and tubular elements, and making mutual contact engagement within respective telescoped tubes, wherein the base member is made up of front and rear base members permanently secured together with the tubes and tubular elements being integral with the front and rear members, respectively,

wherein the tubes communicate with said rear tubular elements through openings of substantially lesser diameter than the internal diameter of the rear tubular elements thereby forming shoulders around those openings on the base member, and said contacts have outer portions of greater diameter than said openings forming shoulders thereon engaging said shoulders on the base member and tubular portions extending rearwardly from said shoulders, and

the rear tubular portions have spring tines biased radially inwardly against said tubular portions, normally retaining the contacts in position, but being capable of being flexed outwardly to release the contacts to enable withdrawal of the contacts out through said rear tubular elements.

4,093,333

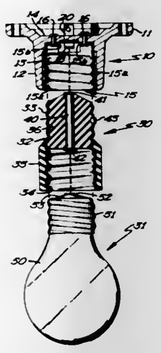
ELECTRICAL ADAPTER

David A. Tjornhom, Sr., 2895 West Rd., Wayzata, Minn. 55391

Continuation-in-part of Ser. No. 500,610, Aug. 26, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,937

Int. Cl.² H01R *17/20, 31/06*

U.S. Cl. 339—78 **11 Claims**



1. An adapter for electrically connecting an electric light socket having an internal threaded electrically conductive portion to a light bulb having an electrically conductive external sleeve provided with external threads, the adapter comprising: a tubular member having a threaded first end section adapted to mate with the threaded electrically conductive portion of the socket and a second end section having an internal threaded wall forming a cavity for accommodating the threaded sleeve of the light bulb, first electrical conductor means extended between the first end section and engageable with a portion of the socket and the second end sections and the socket and sleeve of the bulb, said first section having an externally open groove, said second section having an internally open groove, said first electrical conductor means comprising an elongated electrically conductive member located in said first and second grooves, and second electrically conductive means insulatively mounted on the tubular member adapted to contact the center of the base of the bulb and the center of the socket, and means for locking adapter in a socket, said means for locking the adapter in the socket comprising a band spring located within the tubular member, and locking finger means cooperating with the spring whereby the spring biases the finger locking means to a locking position, said first end section of the tubular member having a hole for accommodating said locking finger means.

4,093,334

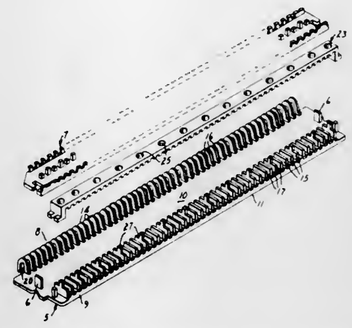
WIRE RETAINER

Ralph F. Wickenberg; Donald F. Miller, and Lyle R. Anderson, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 8, 1977, Ser. No. 814,024

Int. Cl.² H01R *13/58*

U.S. Cl. 339—107 **5 Claims**



1. A device for separating and positioning individual wires of a multiple conductor cable in a fixed relationship over the base element of a splice connector comprising:

an elongate insulative body member adapted to receive a base element of a splice connector and isolated wires from a multi-conductor cable, said body member having an upper and lower surface and a first and second edge on said upper surface, and

an insulative cap member formed to mate with said body member,

said body member having a plurality of spaced projections on said upper surface and positioned along said first and second edge to define a plurality of parallel transverse aligned wire receiving channels along said edges for receiving and holding said individual wires in substantially parallel alignment,

said body member having a plurality of strain relief recesses formed in said upper surface of said body member and located within said wire channels along said first edge,

said body member and said cap member having a plurality of alignment means for aligning said cap member with said body member,

said cap member having spaced wire pusher means aligned with said access holes to cooperate with said access holes for bending and binding said individual wires at said access holes, and

retaining means for securing said cap member on said body member.

4,093,335

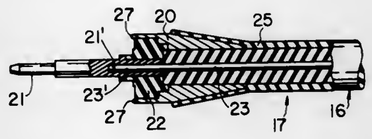
ELECTRICAL CONNECTORS FOR COAXIAL CABLES

Oscar H. Schwartz, Brooklyn, and Daniel A. Le Donne, Bronx, both of N.Y., assignors to Automatic Connector, Inc., Commack, N.Y.

Filed Jan. 24, 1977, Ser. No. 761,475

Int. Cl.² H01R *17/04*

U.S. Cl. 339—177 E **4 Claims**



1. An electrical connector for a coaxial cable of the type including a solid tubular dielectric having an inner conductor fitting therethrough and at least an outer tubular conductor covering along said dielectric, said connector comprising a contact wedge assembly, a body assembly and a nut assembly with said contact wedge assembly being pressed fit between said body and nut assemblies as they are connected together, said contact wedge assembly comprising an electrically conductive tapered funnel element for slidably receiving therein the end portion of the tubular dielectric of the cable whereby said tapered element shall lie between said dielectric and the outer tubular conductor of the cable and shall contact said outer tubular conductor, said contact wedge assembly comprising receptacle means to receive the extending bare end of the inner conductor, said nut assembly comprising an aperture to receive the cable and a clamping ferrule, said aperture terminating in said clamping ferrule, said ferrule capable of moving towards the end of the cable when the cable is associated with said tapered funnel element to cooperate with said tapered funnel element to clamp the outer tubular conductor of the cable between said ferrule and said tapered funnel element, said body assembly comprising a body telescoped in a coupling nut, said body comprising thin metal walls surrounding a central dielectric and terminating in a body seat facing said electrically conductive tapered element, and gripping means for holding said electrically conductive tapered element fixed to said body seat to prevent relative rotation between said inner conductor and said electrically conductive tapered element as said electrically conductive tapered element is pressed against said body seat, said gripping means comprising teeth extending oppositely from said taper, said teeth and said electrically conductive tapered element being integrally formed together and being of a metal material harder than the material of said body whereby edges of said teeth will bite into said body seat as said body and tapered element are drawn together.

4,093,336

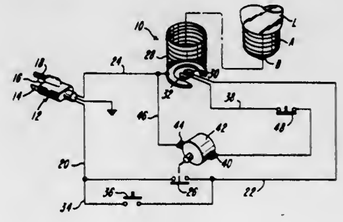
SAFETY CIRCUIT AND SOCKET CONSTRUCTION

Manning I. Rose, 2301 Glenheath, Dayton, Ohio 45440

Divison of Ser. No. 510,215, Sep. 30, 1974, Pat. No. 4,008,403. This application Feb. 10, 1977, Ser. No. 767,434

Int. Cl.² H01R *17/20*

U.S. Cl. 339—180 **9 Claims**

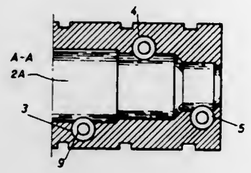


1. In a socket construction of the type having a first contact for engaging one terminal of a load and a second contact for engaging a second terminal of the load, the improvement wherein one of said contacts has two spaced parts, said spaced parts being electrically interconnected by one of said terminals upon insertion of said load in said socket, wherein first conductor means is connected to one of said contact parts for connecting said one of said contact parts to an electrical energy source, and wherein second conductor means is connected to the other of said contact parts for connecting said other of said spaced parts to electric circuit means external to said load.

4,093,337
SOCKET CONTACT

Tord Jacobson, Stockholm, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Nov. 19, 1976, Ser. No. 743,508
Int. Cl.[2] H01R *13/12*
U.S. Cl. 339—256 S 1 Claim

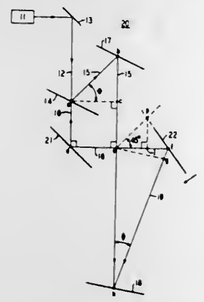


1. In a socket contact with an axial cavity for the reception of a contact element which is provided with an outer contact surface, the socket contact having a helical spring which is part of the conducting path of the socket contact and is arranged to touch the contact surface of the contact element, the improvement comprising means for supporting the helical spring with a straight longitudinal axis which is perpendicular to the longitudinal axis of the axial cavity and partly recessed in the wall of the axial cavity, and partly extending laterally into the axial cavity, said means permitting lateral movement of the helical spring radially outward from the axial cavity by the contact surface of the contact element upon insertion thereof into the axial cavity, said means fixing the helical spring in place by pressure against the ends of the helical spring, and the center of the helical spring having turns with shorter diameters than the turns at the ends of the helical spring.

4,093,338
APPARATUS FOR PIECEWISE GENERATION OF GRATING-LIKE PATTERNS

Gary Carl Bjorklund, West Windsor; Linn Frederick Mollenauer, Colts Necks, and Walter John Tomlinson, III, Holmdel, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 12, 1976, Ser. No. 648,326
Int. Cl.[2] G02B *5/32;* G03H *1/04;* G01B *9/02*
U.S. Cl. 350—3.70 2 Claims



1. Apparatus for piecewise generation of a grating-like pattern in a photoresponsive material, the apparatus comprising:

an interferometer having a plurality of elements wherein a coherent beam of light is split into two component beams which are made to intersect;

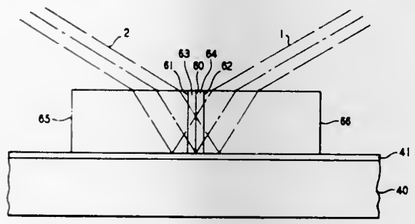
a photoresponsive material having a planar surface is positioned normal to the bisector of the angle between the two component beams at their intersection, the component beams forming a parallel plane interference pattern in a section of the photoresponsive material, wherein the difference between optical path lengths of the two component beams intersecting in the photoresponsive material can be adjusted to zero at any one point in the material, and the angle of intersection between the two intersecting component beams can be adjusted by rotation of a single element about a fixed axis, without changing the difference between the optical path lengths of the two component beams; and

means for translating the coherent beam, and thus the component beams, parallel to themselves so that the intersecting translated component beams form the parallel plane interference pattern in registration with the previously generated pattern in a different section of the photoresponsive material, the translating means comprising a reflector which is moved along an axis parallel to the longitudinal axis of the beam impinging upon the reflector.

4,093,339
METHOD AND APPARATUS FOR FABRICATING OPTICAL WAVEGUIDE GRATING RESONATORS

Peter Stanley Cross, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 26, 1977, Ser. No. 800,651
Int. Cl.[2] G02B *5/18, 5/32;* G03H *1/04*
U.S. Cl. 350—3.70 7 Claims



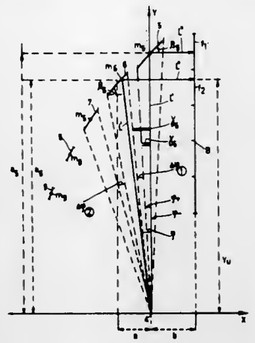
1. Apparatus for creating an interference pattern in a photoresist layer covering an optical substrate having a waveguiding layer, said apparatus comprising laser means for developing two coherent beams of radiation that are directed so as to create an interference pattern in a predetermined area of said photoresist layer, and at least one sheet of high index medium positioned adjacent to said predetermined area substantially perpendicular to said waveguiding layer and oriented such that only a portion of each of said two beams is caused to pass through said high index sheet before that portion impinges on said photoresist layer, whereby an optical grating resonator can be fabricated in the waveguiding layer of said optical substrate.

4,093,340
LIGHT-BEAM DEFLECTION SYSTEM

Karl Klose, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 19, 1976, Ser. No. 688,064
Claims priority, application Germany, May 30, 1975, 2524152
Int. Cl.[2] G02B *27/17*
U.S. Cl. 350—6.5 6 Claims

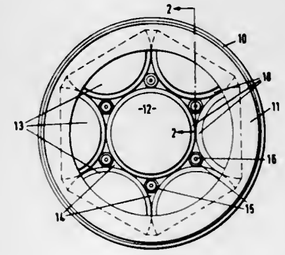
1. A light beam deflection system for scanning a planar surface along a linear scanning path at a uniform rate of speed, comprising light source means for providing a narrow light beam, rotational means for angularly deflecting said light beam about an axis of rotation in a scanning plane containing said scanning path, a series of stationary planar mirrors, each of said planar mirrors being arranged perpendicular to said deflecting path and tangential to a parabola defined in said deflection plane so that the focal point thereof coincides with the axis of rotation of said light beam and the axis of symmetry thereof is perpendicular to the planar surface to be scanned.



4,093,341
OPTICAL FIBER CONNECTOR

Aubrey M. Crick, Epping, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed May 10, 1976, Ser. No. 685,115
Claims priority, application United Kingdom, Jun. 19, 1975, 26105/75
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.21 4 Claims



1. An optical fiber multi-way connector member comprising:

a rigid shell having an elastomeric lining therein;

means comprising a plurality of aligned rods in said shell having cylindrical surfaces dimensioned to provide a plurality of tricuspid interstices that are each defined by the meeting together of three of said cylindrical surfaces;

a plurality of optical fibers each secured inside a ferrule to terminate at one end thereof the fiber axis aligned with the ferrule axis;

said ferrules being located in said tricuspid interstices in which they each have an interference fit;

an apertured member secured to said shell behind said ferrules, the apertures in said member being aligned with said ferrules;

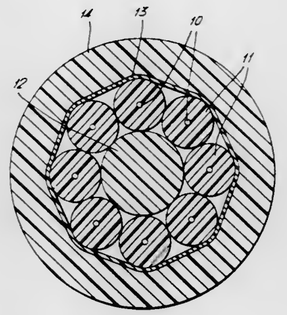
a helical spring surrounding the fiber protruding from each said ferrule and acting between said apertured member and ferrule to bias said ferrule forwardly into its associated interstice; and

said apertured member being sufficiently resilient to allow the insertion and withdrawal of the ferrules and their corresponding springs through its apertures.

4,093,342
OPTICAL FIBER CABLE

Stanley G. Foord, Harlow, and Walter E. Simpson, Ware, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Continuation of Ser. No. 626,073, Oct. 28, 1975, abandoned.
This application Nov. 17, 1976, Ser. No. 742,676
Claims priority, application United Kingdom, Nov. 12, 1974, 48859/74
Int. Cl.[2] G02B *5/16*
U.S. Cl. 350—96.23 1 Claim



1. An optical fiber cable comprising:

a plurality of optical fibers disposed lengthwise around a high elastic modulus strength reinforcement member extending along the neutral axis of the cable;

said reinforcement member consisting of a prestretched molecularly oriented plastic;

a plastic tape wrapped about said fibers on said reinforement member;

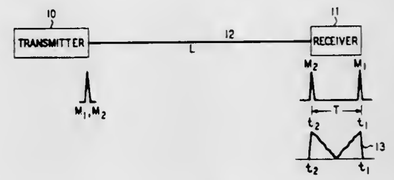
an extruded plastic sheath surrounding said tape on said reinforcement member; and

said plastic tape being of a material different than said sheath and being contiguous with said sheath, said plastic tape providing a heat shield for said reinforcement member so that shrinkage of said reinforcement member will not occur during extrusion of said plastic sheath.

4,093,343
OPTICAL WAVEGUIDE HAVING PERIODIC SPATIAL PERTURBATIONS

Logan Ezral Hargrove, Arlington, Va., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 22, 1976, Ser. No. 725,388
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.30 15 Claims



1. In a multimode waveguide capable of guiding wave energy at a frequency of interest in a plurality of different propagating modes, and of dissipating wave energy in the form of radiating modes, means, longitudinally distributed along said waveguide, for enhancing the coupling between selected pairs of propagating modes;

characterized in that:

the spatial frequency of said coupling-enhancing means

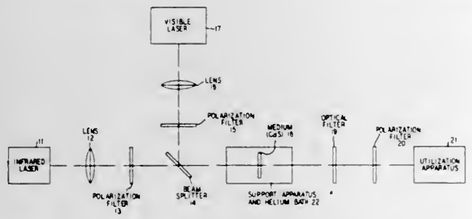
varies between a first frequency f_1 and a second frequency f_2, where f_1 and f_2 are the spatial frequencies corresponding, respectively, to the beat frequency between the two lowest order propagating modes, and the two highest order propagating modes.

4,093,344

INFRARED POLARIZATION ROTATOR AND OPTICAL SWITCH

Theodoor Charlouis Damen, Colts Neck; Erich Gornik, Red Bank; Van-Tran Nguyen, Holmdel, and Chandra Kumar Naranbhai Patel, Summit, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 5, 1976, Ser. No. 739,320
Int. Cl.² B01F *1/01*
U.S. Cl. 350—147 **14 Claims**



1. An infrared polarization rotator comprising a medium, means for applying to said medium a linearly polarized beam of light to be polarization rotated, means for applying to said medium substantially collinearly with said beam a control beam of circularly polarized light, the frequencies of the beams being adjusted so that the frequency of one beam is nearly equal to the frequency of a one-photon transition between the ground state of a two-photon transition of the medium and some intermediate state and so that the sum of the frequencies of the two beams is sufficiently close to the frequency of said two-photon transition for substantial resonance dispersion to be produced as the beams traverse the medium, the polarization of the beams being selected in accordance with the requirements of the quantum-mechanical angular momentum selection rule which applies to said two-photon transition, characterized in that said medium is a crystalline solid the index of refraction of which does not substantially vary azimuthally about the direction of propagation of the radiation to be polarization rotated, said crystal having a structure of excited states of excitons, which exciton states are involved in said one-photon and two-photon transitions.

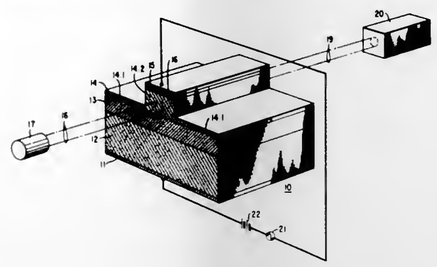
4,093,345

SEMICONDUCTOR RIB WAVEGUIDE OPTICAL MODULATOR WITH HETEROJUNCTION CONTROL ELECTRODE CLADDING

Ralph Andre Logan, Morristown; Franz Karl Reinhart, and William Robert Sinclair, both of Summit, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 27, 1976, Ser. No. 690,650
Int. Cl.² G02B *5/14*
U.S. Cl. 350—355 **19 Claims**

1. In a semiconductor device for modulating optical radiation in response to an electrical signal
(a) a first epitaxial semiconductor layer in direct physical contact with a second epitaxial semiconductor layer of the same conductivity type as that of the first epitaxial layer and of higher bulk refractive index than that of the first epitaxial layer, said second epitaxial layer having a relatively thick optical rib waveguide portion and a relatively thin slab portion, said rib waveguide portion having a major plateau surface;
(b) a third layer contacting at least a first portion of the plateau surface of the rib waveguide portion, said third layer thereby forming a heterojunction with the rib portion of the second epitaxial layer, said heterojunction characterized by a barrier potential height of at least 0.3 volt, said third layer being essentially a semiconductor compound composed of chemical constituent elements at least one of which is different from every chemical constituent element of the semiconductor material of the first and second epitaxial layers, and said third layer being essentially a polycrystalline material having a bulk refractive index for said optical radiation that is less than that of the second epitaxial layer and having a free carrier concentration that is at least an order of magnitude higher than those of the first and second epitaxial layers.

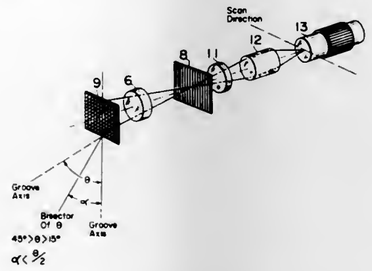


4,093,346

OPTICAL LOW PASS FILTER

Hisashi Nishino; Teruo Hosokawa, both of Sakai, and Ikuo Hioki, Kishiwada, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan

Continuation-in-part of Ser. No. 379,013, Jul. 13, 1973, Pat. No. 3,910,683, which is a continuation-in-part of Ser. No. 164,757, Jul. 21, 1971, Pat. No. 3,768,888. This application May 27, 1975, Ser. No. 581,004
Claims priority, application Japan, May 24, 1974, 58649[U]
The portion of the term of this patent subsequent to Oct. 30, 1990, has been disclaimed.
Int. Cl.² G02B *5/18, 27/38*
U.S. Cl. 350—162 SF **20 Claims**



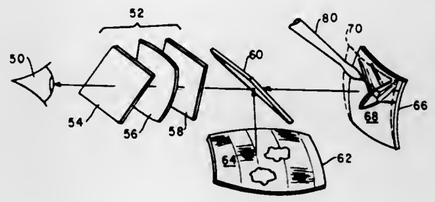
1. A color television camera including an optical system of the type having a color-encoding filter means disposed in the light path of said optical system and serving to spatially modulate at least two color images with respect to a scanning direction and scanning means for detecting said image and producing chrominance and luminance signals,
the optical system comprising optical low-pass filter means including a transparent substrate and at least two sets of channels formed on said substrate and delineating raised portions for introducing phase retardation,
the channels in each set being arranged in parallel with each other and disposed at an angle of not less than 15° and not more than 45° to the channels of at least one other set, the angle between a line bisecting the acute angle formed between said sets of channels and the perpendicular to said scanning direction being no greater than half said acute angle.

4,093,347

OPTICAL SIMULATION APPARATUS USING CONTROLLABLE REAL-LIFE ELEMENT

Joseph A. La Russa, Yorktown Heights, N.Y., assignor to Farrand Optical Co., Inc., Valhalla, N.Y.

Filed May 10, 1976, Ser. No. 685,017
Int. Cl.² G02B *27/10*; G09B *9/08*
U.S. Cl. 350—174 **6 Claims**



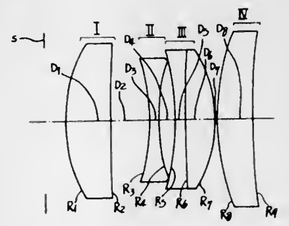
1. Optical simulation apparatus for training an observer in the manipulation of a controllable real-life element relative to at least one real-life image, said apparatus comprising:
(a) optical means for forming an image at or near infinity for stereoscopic viewing by said observer;
(b) a first display screen and means for generating a first display of a simulated real-life image on said first display screen;
(c) a second display screen and means for generating a second dislay of another simulated real-life image on said second display screen;
(d) means for combining images from said first and second display screens and for directing said images toward said optical means for forming an image viewable by said observer; and
(e) a three-dimensional physical object positioned between at least one of said display screens and said optical means for forming an image, whereby said physical object is itself directly viewable by said observer with parallax and relative distance relative to said first and second displays, said physical object being a dimensionally smaller model of said controllable real-life element.

4,093,348

LENS SYSTEM WITH FRONTAL APERTURE STOP

Mitsuo Yasukuni, Sakai, Japan, assignor to Minolta, Torrance, Calif.

Filed May 25, 1976, Ser. No. 689,851
Claims priority, application Japan, Jun. 3, 1975, 50/67325
Int. Cl.² G02B *9/34*
U.S. Cl. 350—206 **13 Claims**



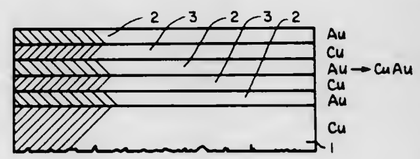
1. A frontal aperture lens system consisting, consecutively from the object to the image side, of:
an aperture stop,
a first positive lens component having a front surface convex to the object side,
a second biconcave lens component,
a third positive meniscus lens component convex to the image side, and
a fourth positive lens component having a front surface convex to the object side, characterized in that the third positive meniscus lens component is a doublet consisting of a negative lens and a positive lens which is cemented to the negative lens at the image side thereof.

4,093,349

HIGH REFLECTIVITY LASER MIRRORS

George J. Mills, Santa Ana, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 27, 1976, Ser. No. 736,157
Int. Cl.² G02B *5/08*
U.S. Cl. 350—288 **15 Claims**



1. A highly reflective laser mirror having high thermal conductivity comprising:
a. a polished copper substrate, and
b. a layer of copper-gold alloy which has been heat-treated and quenched to transform said layer into a face-centered cubic lattice structure in which the copper and gold atoms are ordered in certain lattice positions.

4,093,350

SYSTEM FOR CENTRIFUGALLY CASTING A THIN FILM PLASTIC IN A REPLICA PROCESS FOR PROVIDING MULTI-FACETED POLYGONAL SCANNERS

Tibor Fisli, Los Altos Hills, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed May 19, 1976, Ser. No. 687,720
Int. Cl.² G02B *5/08*
U.S. Cl. 350—299 **7 Claims**

1. A process of providing high speed multi-faceted polygonal scanners comprising providing a polygonal master the inner periphery of which comprises a plurality of facet shaped members, providing an aluminum preform positioned concentrically within said master, and centrifugally casting an epoxy against said aluminum preform in a replica process to provide a multi-faceted polygonal scanner said casted epoxy conforming to the shape of said faceted master.
7. A multi-faceted polygonal scanner produced in accordance with the process as defined in claim 1.

4,093,351

CONTROLLED FLEXIBLE MEMBRANE REFLECTOR

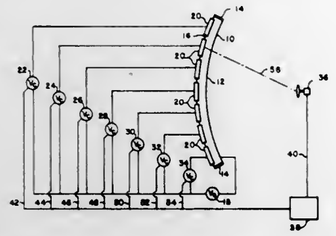
Charles W. Perkins, 5256 James Rd., Santa Barbara, Calif. 93111, and Gerhard Rohringer, 745 Winding Creek La., Santa Barbara, Calif. 93108

Filed Mar. 15, 1976, Ser. No. 667,169
Int. Cl.² G02B *5/10*
U.S. Cl. 350—310 **13 Claims**

1. A controlled flexible membrane reflector comprising:
a flexible conductive membrane with an optical surface;
a supporting structure on which said membrane is mounted;
means for providing an electric field operative on said flexible membrane, said optical surface of said flexible conductive membrane being shaped by said electric field;

a sensor for continuously detecting the shape of said optical surface of said flexible membrane; and

means responsive to said sensor for controlling selected



portions of said electric field for altering the shape of corresponding selected portions of said optical surface to counteract passive and dynamic perturbations in said surface.

4,093,352

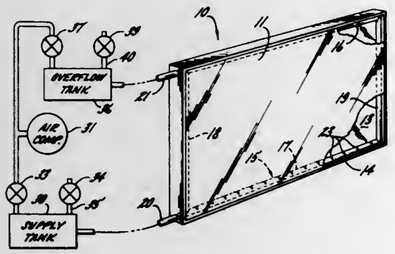
WINDOW ADAPTED TO BE FLOODED WITH LIQUID

Robert J. Pisar, 2807 Spring Creek Rd., Rockford, Ill. 61107

Filed Mar. 17, 1977, Ser. No. 778,496

Int. Cl.² G02B *5/24*

U.S. Cl. 350—312 **5 Claims**



2. A window comprising a pair of upright panes made of transparent material and disposed in spaced face-to-face relation whereby a space is defined between said panes, means extending around said panes and establishing a liquid-tight seal around said space, a liquid supply manifold disposed within said space, said manifold comprising upper and lower tubular branches disposed adjacent the top and bottom portions, respectively, of said space and further comprising an upright tubular branch disposed adjacent one side portion of said space and establishing communication between said upper and lower branches, liquid inlet means opening out of said lower branch and communicating with said space, gas outlet means in the upper end portion of said upright branch and establishing communication between said space and said upright branch, a supply reservoir containing liquid and communicating with said lower branch, an overflow reservoir communicating with said upper branch, selectively operable means for delivering liquid from said supply reservoir to said manifold with said liquid flowing into said space by way of said inlet means and flowing to said upper branch and thence to said overflow reservoir by way of said upright branch, the gas in said space being expelled therefrom through said outlet means and said upper branch as liquid enters said space through said inlet means, and selectively operable means for causing liquid to be returned from said overflow reservoir and said space to said supply reservoir, the liquid from said overflow reservoir flowing into said upper branch and then through said side branch to said lower branch and then flowing to said supply reservoir, the liquid in said space returning to said lower branch by way of said inlet means and then flowing to said supply reservoir.

4,093,353

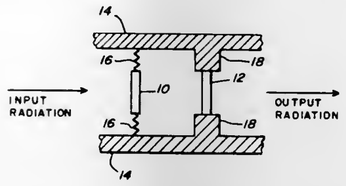
OPTICAL RADIATION LIMITER

Kenneth T. Lang, Dover, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 17, 1976, Ser. No. 751,836

Int. Cl.² G02B *5/22*

U.S. Cl. 350—313 **2 Claims**



1. An optical limiter for limiting radiation travelling along a path, the optical limiter comprising:

first bandpass filter means positioned in the light path and having a first spectral passband which shifts with changes in temperature of the first bandpass filter means;

second bandpass filter means positioned in the light path and having a second spectral passband, the first and second spectral passbands at least partially overlapping when the radiation travelling along the path has an intensity less than a threshold level; and

thermal isolation means for thermally isolating the first bandpass filter means to an extent greater than the second bandpass filter means, whereby radiation travelling along the path having intensity greater than the threshold level causes a shift of the first spectral passband with respect to the second spectral passband.

4,093,354

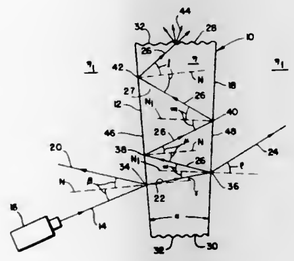
METHOD AND APPARATUS FOR SPLITTING A BEAM OF ENERGY

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Walter Robert Leeb, Seabrook, Md.

Filed Dec. 23, 1975, Ser. No. 643,897

Int. Cl.² G02B *27/17, 5/04*

U.S. Cl. 350—320 **13 Claims**



1. A method of forming two diverging beams of energy from a single beam of energy, comprising the steps of:

a. impinging said single beam of energy on a first surface of a substantially transparent prism means, a cross-section of said prism means forming substantially truncated isosceles triangle sides, said cross-section being taken perpendicular to said sides, said sides having a base forming a wide end of said prism means, said prism means having an index of refraction substantially greater than a surrounding medium, and said single beam of energy being angled at said first surface toward said wide end of said prism means;

b. splitting said single beam of energy into an externally reflected beam and an internally transmitted beam at said first surface, said internally transmitted beam traveling through said prism means toward a second surface angled toward said wide end;

c. impinging said internally transmitted beam on said second surface at an angle of incidence that is less than the minimum angle necessary for substantially total internal reflection;

d. splitting said internally transmitted beam into an internally reflected beam and an externally transmitted beam at said second surface, said internally reflected beam traveling through said prism means toward said first surface angled toward said wide end;

e. impinging said internally reflected beam on said first surface at an angle of incidence that exceeds the minimum angle necessary for substantially total internal reflection; and

f. reflecting said internally reflected beam between said first and second surfaces toward said wide end of said prism means for dispersal therefrom.

4,093,355

SYMMETRICAL INTERNAL HEATER FOR LIQUID CRYSTAL DISPLAY

Michael Kaplit, Birmingham; Daniel B. Hayden, Port Huron, and George W. Smith, Birmingham, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 4, 1977, Ser. No. 765,548

Int. Cl.² G02F *1/13*

U.S. Cl. 350—334 **6 Claims**

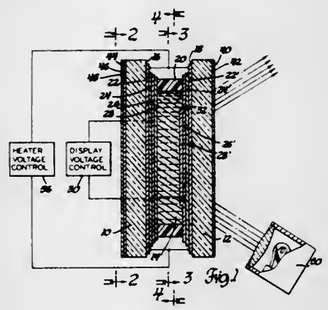


Fig. 1

1. A liquid crystal cell having a resistive-type internal heater for rapid warm-up of the liquid crystal cell and for use while the cell is functioning as an electro-optic visual display, said cell comprising:

first and second members having spaced apart facing surfaces in a visual display area, at least one of said members being transparent in said display area;

a liquid crystal between said facing surfaces for exhibiting an electro-optic efffect;

a transparent coating of resistive material on each of said facing surfaces for heating said liquid crystal material from two heat sources simultaneously, each coating being electrically symmetrical with the other for so heating said liquid crystal material without adversely affecting an electro-optic effect concurrently produced therein;

a transparent dielectric coating on each of said resistive material coatings; and

a transparent electrode on each of said dielectric coatings for producing an electro-optic effect in said liquid crystal material.

4,093,356

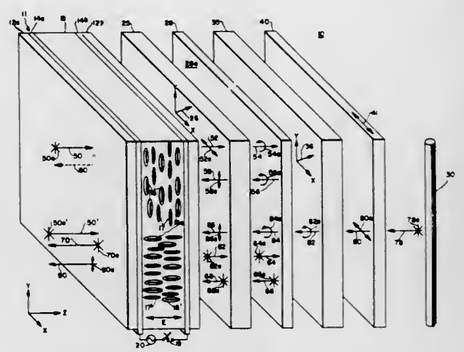
TRANSFLECTIVE LIQUID CRYSTAL DISPLAY

John E. Bigelow, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 14, 1977, Ser. No. 768,105

Int. Cl.² G02F *1/13*

U.S. Cl. 350—338 **6 Claims**



1. A transflective liquid crystal display capable of producing observable indicia responsive to substantially unpolarized light entering from the front or the rear of the display, comprises:

a liquid crystal cell switchable between first and second light transmissive conditions, the first transmissive condition causing substantial absorption of light having a polarization vector in a first direction, the second condition allowing transmission of light through said cell with substantially no attenuation thereof;

a first quarter-wave plate adjacent the rear of said cell and having an optical axis positioned substantially at a 45° angle with respect to said first direction;

a transflective member arranged adjacent said first quarter wave-plate and opposite said cell;

a second quarter-wave plate arranged upon the opposite side of said transflective member from said first quarter-wave plate, said second quarter-wave plate having an optical axis disposed essentially parallel to the optical axis of said first quarter-wave plate; and

means positioned adjacent said second quarter-wave plate opposite said transflective member for polarizing substantially unpolarized light in said first direction.

4,093,357

CERMET INTERFACE FOR ELECTRO-OPTICAL DEVICES

Alexander D. Jacobson, Topanga; Jan Grinberg; Paul O. Braatz, both of Los Angeles, and William P. Bleha, Jr., Carlsbad, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 5, 1977, Ser. No. 784,894

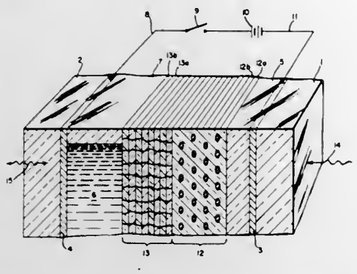
Int. Cl.² G02F *1/13*

U.S. Cl. 350—338 **5 Claims**

1. In an electro-optical device of the type having substrate means for providing spatially and temporally modulated voltage or current patterns, having electro-optical means for presenting a display controlled by said patterns, and having an interface comprising light blocking means and mirror means between said substrate means and said electro-optical display means, the improvement comprising:

said light blocking means comprising a plurality of layers each formed by a pair of sequentially alternating films, the first of said films in each of said pairs comprising a homogeneous dielectric material and the second of said films in each of said pairs comprising a randomly dispersed plurality of islands of a metallic electrical conductor separated by said dielectric material, said islands being spaced suffi-

ciently to minimize the lateral conductivity of said second films and said first dielectric films being thin enough to permit transverse conduction between metal islands in said second films of adjacent layers by electron tunneling



through the intervening first dielectric film to render said interface anisotropically conductive, said interface being a good electrical conductor in the transverse direction normal to the plane of its layers and being a good electrical insulator laterally in any direction in the plane of its layers.

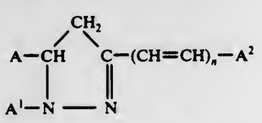
4,093,358

HIGH EFFICIENCY ELECTROCHROMIC DISPLAY DEVICE

Meredith David Shattuck, and Glenn Tavernia Sincerbox, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,303
Int. Cl.² G02F *1/17, 1/23;* C09K *3/00*
U.S. Cl. 350—357 **8 Claims**

1. In a reversible electrochromic display device comprising a reactive medium between two electrically conductive electrodes, at least one of which is transparent, said medium comprising an anhydrous solvent and an oxidant/reductant pair wherein the reductant is an electron acceptor, the improvement according to which the oxidant is a triaryl pyrazoline compound having the formula:



wherein A, A^1 and A^2 are each phenyl or phenyl substituted with an electron releasing group, and *n* is zero or one.

4,093,359

OCULAR FIXATION AID

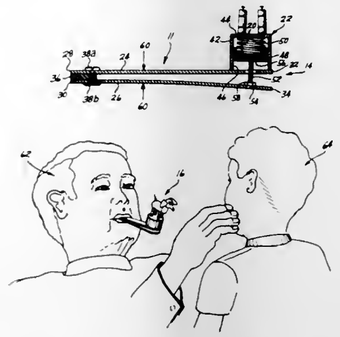
Ferris F. Ketcham, 4615 35th Ave., SW., Seattle, Wash. 98126

Filed Sep. 23, 1976, Ser. No. 725,968
Int. Cl.² A61B *3/00, 3/02*
U.S. Cl. 351—1 **5 Claims**

1. An orally held ocular fixation aid for use during the examination of a patient's eyes comprising:

animatable means for providing a fixation target that is effective when animated to attract and maintain the gaze of a patient and to stimulate accommodation;

a support means having a first end and a second end, said first end being sized and shaped for being held in the mouth of a person conducting the examination and for being gripped between such person's teeth, said second end projecting from the mouth of such person when the first end is so held, said animatable means being mounted on said support means adjacent said second end; and



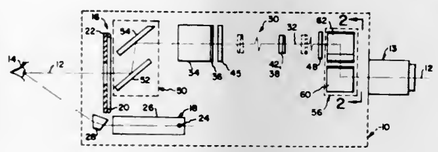
means associated with said support means for animating said animatable means in response to a change in pressure of the grip exerted by the teeth of such person.

4,093,360

OPHTHALMIC INSTRUMENT OPTICAL SYSTEM

Richard C. Mohrman, and Richard L. Seidenberg, both of Rochester, N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Sep. 13, 1976, Ser. No. 722,952
Int. Cl.² A61B *3/10*
U.S. Cl. 351—13 **3 Claims**



1. An ophthalmic instrument which utilizes a single imaging system for selectively measuring corneal curvature in the measuring mode of said instrument and for examining the surface of a cornea in the examining mode of said instrument, said instrument including a measuring light apparatus having an illuminated mire with apertures therethrough for projecting an image of said mire apertures through a cornea, said measuring light apparatus allowing the reflection of said mire image formed within the eye to pass through its center, said measuring light apparatus being disposed on an aligning axis about which said instrument may be rotated in order to align said instrument with the principal vertical and horizontal meridians of the eye in the measuring mode of said instrument, and a viewing light apparatus for projecting an image of the cornea along said aligning axis in the examining mode of said instrument, said instrument comprising:

(a) reflecting means for displacing an image from said aligning axis to an imaging system axis and for returning said image to said aligning axis in an erect and unreversed position in order to provide both mire and corneal images in vertical and horizontal alignment with the cornea itself;

(b) imaging system means disposed on said imaging system axis including objective lens means and optical wedge means for measuring the cornea in said measuring mode of said instrument and for examining the cornea in said examining mode of said instrument;

(c) said optical wedge means including a first optical wedge having a first optical axis and a second optical wedge having a second optical axis; and

(d) an eyepiece disposed on said aligning axis at the opposite

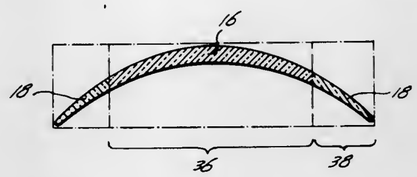
end of said instrument from said measuring light apparatus for viewing said images.

4,093,361

COMPOSITE PROSTHETIC POLYMERIC DEVICES

Charles E. Erickson, and Amar N. Neogi, both of Seattle, Wash., assignors to Precision Cosmet Co., Inc., Minneapolis, Minn.

Continuation of Ser. No. 198,544, Nov. 15, 1971, abandoned. This application Apr. 29, 1974, Ser. No. 464,734
Int. Cl.² G02C *7/04*
U.S. Cl. 351—160 **8 Claims**



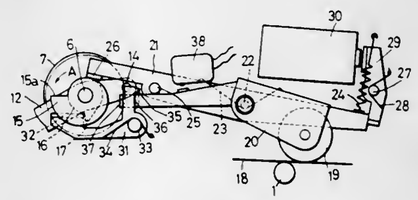
1. A contact lens comprising a center lens portion and a peripheral skirt portion attached thereto, said center lens portion having a greater hardness than said peripheral skirt portion, said peripheral skirt portion comprising a hydrophilic, normally water swellable, polymer matrix compatible with the material forming said center lens portion, said peripheral skirt portion being relatively free of stress and distortion and containing a water soluble solid inert substance dissolved throughout the polymer matrix before hydration; said substance being removed from said matrix during hydration of said hydrophilic polymer.

4,093,362

PINCH ROLLER MOVING DEVICES FOR SIMULTANEOUS IMAGE AND SOUND RECORDING CINECAMERAS

Masakathu Kato, Nagoya, Japan, assignor to Elmo Company, Limited, Nagoya, Japan

Filed Mar. 14, 1977, Ser. No. 777,078
Claims priority, application Japan, Mar. 15, 1976, 51/031373[U]
Int. Cl.² G03B *31/02*
U.S. Cl. 352—27 **13 Claims**



1. A pinch roller moving device for a simultaneous image and sound recording cinecamera having a capstan, a pinch roller movable into contact with said capstan to advance continuously a film having a sound recording track along one longitudinal edge thereof, means for driving said film intermittently, an electric motor for driving said capstan and an electric motor for driving said intermittent film driving means, said device comprising:

a rotatable lever on which said pinch roller is rotatably and transversely movably supported;

rotary means rotatable upon rotation of said capstan driving motor; and

means for transmitting said rotation of said capstan driving motor to said rotary means to rotate said lever to move said pinch roller transversely to press said film against said capstan;

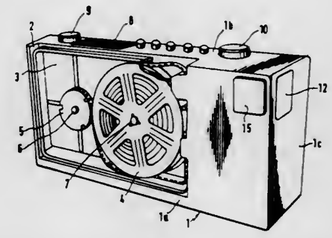
said capstan driving motor being actuatable upon depression of a cinecamera release button.

4,093,363

MOTION PICTURE PROJECTOR

Claus Prochnow, Brunswick, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Sep. 30, 1976, Ser. No. 728,210
Int. Cl.² G03B *21/10*
U.S. Cl. 352—104 **8 Claims**



1. A motion picture projector comprising a housing having a plurality of walls including a relatively narrow side wall, a relatively wide side wall, and an end wall, said projector being arranged for standing in either of two orientations wherein said wide side wall forms a top surface in a first orientation and said narrow side wall forms a top surface in a second orientation, control elements for said projector being mounted on said narrow side wall to face forward in said first orientation and upward in said second orientation, film spool means arranged on said wide side wall to rotate in a plane parallel with said wide side wall, a projection lens within said housing, said projection lens having an optical axis, a first mirror mounted for swinging movement between a first effective reflecting position intercepting a beam of light rays projected from said projection lens when said projector is in said first orientation and a second ineffective position out of said beam when said projector is in said second orientation, a first light aperture in said wide side wall of said housing in position to receive light reflected by said first mirror when in said first position with said projector in said first orientation, a second mirror mounted on said wide side wall adjacent said first light aperture in position to receive light reflected by said first mirror through said first aperture to said second mirror and to reflect such light in a direction approximately perpendicular to the direction of said optical axis of said projection lens and toward the plane of said narrow side wall on which said control elements are mounted, and a second light aperture in said end wall of said housing in alignment with said optical axis in position to have said beam of light from said projection lens pass along said optical axis and out of the housing through said second aperture when said first mirror is in its second ineffective position and said projector is in said second orientation.

4,093,364

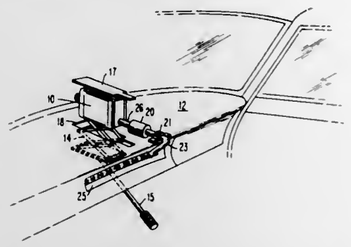
DUAL PATH PHOTOGRAPHIC CAMERA FOR USE IN MOTOR VEHICLES

Keith G. Miller, 88 Carroll St., Binghamton, N.Y. 13902

Filed Feb. 4, 1977, Ser. No. 765,841
Int. Cl.² G03B *29/00*
U.S. Cl. 352—132 **4 Claims**

1. A photographic recording arrangment for vehicles, including a camera extendably mounted on the dashboard thereof and faced in the direction of travel of said vehicle, said camera having a frontal lens element and a rear lens element for focusing an image of the subject in front of the camera onto the image plane thereof, and a light-splitting prism between

said lenses for focusing an object from a secondary path onto said rear element, said secondary path including an image gathering element comprising a tubular extension of light reflecting mirrors and a lens, said extension being adjustable



for facing the speedometer of said vehicle and thus directing an image thereof onto said prism and thereby through said rear lens element onto the light-sensitive film in the image plane of said camera.

4,093,365

AUTOMATIC FOCUS ADJUSTING DEVICE

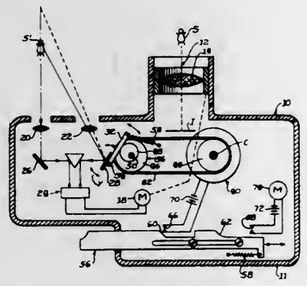
Tadao Isono, Kokubunji, Japan, assignor to Nihon Beru-Haueru Kabushiki Kaisha (Bell & Howell Japan, Ltd.), Higashimurayama, Japan

Filed Mar. 28, 1977, Ser. No. 782,106

Claims priority, application Japan, Mar. 30, 1976, 51-38477[U]

Int. Cl.² G03B *3/00, 7/08*

U.S. Cl. 352—140 **14 Claims**



1. In a motion picture camera for transporting sound and silent film, the camera having an operation control means, a film transport drive at a film exposure station energizably responsive to the operation control member, a sound station including a capstan selectively powered by a capstan drive, a focusable objective lens for imaging a remote subject onto an image plane at the film exposure station, and an improved automatic focus adjusting system for focusing said objective lens, and having a fixed sensor, an oscillatable sensor for imaging the remote subject on detector means of the adjusting system, and means responsive to the detector for adjusting the focus of said objective lens relative to camera-to-subject distance, the improvement comprising:

circuitry for energizing selectively the capstan drive motor responsive to first switch means associated with said camera operation control member and second switch means responsive to detecting whether silent film or sound film is in the camera;

means connecting said capstan drive to power said oscillatable sensor; and

focus mode selection means associated with said first and second switch means for energizing said capstan drive to power said oscillatable sensor independently of energization of said film transport drive,

whereby said objective lens can be adjusted into focus on a remote subject before film is transported through said exposure station of said camera.

4,093,366

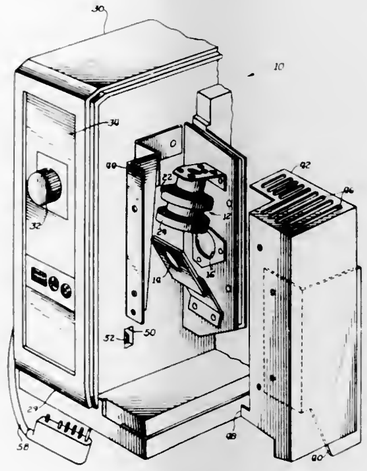
MOTION PICTURE PROJECTOR APPARATUS AND HIGH INTENSITY PROJECTION ARRANGEMENT

Kenyon A. Hapke, Libertyville, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Mar. 14, 1977, Ser. No. 777,494

Int. Cl.² G03B *21/00*

U.S. Cl. 352—198 **25 Claims**



1. Motion picture projection apparatus comprising:

a motion picture projection unit having a high intensity light source, film transporting apparatus and switch means for controlling the operation of said motion picture projection unit;

a power supply unit adapted to be connected to an AC supply source, said power supply unit comprising means for generating the operating supply requirements for said high intensity light source and means for enabling the operation of said generating means;

detachable means for interconnecting said motion picture projection unit and said power supply unit, said interconnecting means comprising a multiple conductor cable; and

means for detecting the proper interconnection of said power supply unit and said motion picture projection unit, said detecting means comprising a return continuity path conductor located within said multiple conductor cable, said return continuity path conductor being connected through said controlling switch means, said detecting means being effective to control said enabling means.

4,093,367

IMAGING APPARATUS

Roger H. Eichorn, deceased, late of Webster, N.Y.; by Lincoln First Bank of Rochester, executor, Rochester, N.Y., and Morton Silverberg, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 18, 1975, Ser. No. 569,237

Int. Cl.² G03G *15/00*

U.S. Cl. 355—3 R **34 Claims**

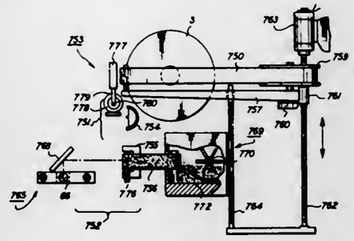
1. An imaging apparatus employing a transparent electrically photosensitive web member comprising:

(a) an elongate platen for supporting a receiving medium;

(b) means to suspend the photosensitive member in a plane substantially parallel to the axis of said platen, and to transport the photosensitive member through the various process means set forth below;

(c) charging means for placing a substantially uniform charge upon the side of the electrically photosensitive member closest to the platen;

(d) exposure means for imagewise exposing the electrically photosensitive member on the side opposite the charged side and creating an electrostatic latent image on the charged side, said exposure means further including a movable exposure head mounted for translation along a path parallel to the axis of said platen and means to advance said exposure head;



(e) development means for depositing marking material on the electrostatic latent image on the electrically photosensitive member;

(f) transfer station means for transferring the marking material image a line-at-a-time by heat and pressure to the receiving medium on said platen; and

(g) first control means for controlling and coordinating the operation of said means to suspend and transport, said various process means set forth above, and said means to advance said exposure head, whereby an image is created, developed and transferred to a predetermined position on the receiving medium.

4,093,368

ELECTROGRAPHIC APPARATUS

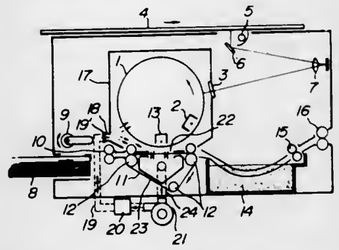
Masaji Nishikawa, Hachioji, Japan, assignor to Olympus Optical Company Limited, Tokyo, Japan

Filed Nov. 23, 1976, Ser. No. 744,267

Claims priority, application Japan, Nov. 27, 1975, 50-141114

Int. Cl.² G03G *15/00*

U.S. Cl. 355—3 SC **6 Claims**



1. In an electrographic apparatus comprising a drum type screen photosensitive body and for producing, on a record medium having a dielectric material layer, an electrostatic charge image corresponding to an image to be recorded in response to an electrostatic latent image formed on the screen photosensitive body by controlling a flow of corona ions directed from a corona discharge device through said screen photosensitive body toward the record medium, the improvement comprising: a casing for substantially hermetically surrounding said drum type screen photosensitive body, an air circulating device for circulating a flow of air through said casing, an air circulating path extending from said casing to said air circulating device, and suction means disposed in said air circulating path to secure said record medium firmly in position thereby maintaining a predetermined distance between said record medium and said screen photosensitive body.

4,093,369

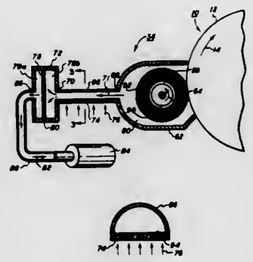
CLEANING SYSTEM

Robert E. Hewitt, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 18, 1977, Ser. No. 778,905

Int. Cl.² G03G *21/00*

U.S. Cl. 355—15 **10 Claims**



1. An apparatus for removing and collecting particles from a surface, including:

means for dislodging the particles from the surface;

means for storing the dislodged particles;

a particle tight conduit operatively connected to said dislodging means for conducting the dislodged particles from said dislodging means to said storing means;

means for moving the dislodged particles from said dislodging means through said conduit to said storing means; and

means for maintaining the dislodged particles spaced from the interior surface of the walls of said conduit the movement of the dislodged particles therethrough.

4,093,370

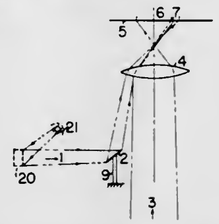
INDICIA RECORDING DEVICE

Roger A. Frech, Canoga Park, Calif., assignor to Terminal Data Corporation, Woodland Hills, Calif.

Continuation-in-part of Ser. No. 589,292, Jun. 23, 1975, abandoned. This application Jun. 13, 1977, Ser. No. 805,761

Int. Cl.² G03B *27/52, 27/70*

U.S. Cl. 355—43 **9 Claims**



1. A compound optical system apparatus, comprising;

(a) a main optical path (3), having,

(1) an image-receiving surface (5,8),

(2) an objective lens (4) for forming an image of a document (10) over a major increment (6) of the area of said image-receiving surface, and

(3) a shutter (26) in said main optical path adjacent to said document,

(b) an auxiliary object (20, 16) comprised of a line of indicia,

(c) an auxiliary optical path (1), having at least one quasi-collimative reflective means (2) small in area with respect to said major increment of area (6) and not greater than the area of said line of indicia, and a length substantially equal to the length of said main optical path,

(d) mounting means (9, 29) to position one said quasi-collimative reflective means (2) in close peripheral relation to, and spaced from, said objective lens (4) on the document side thereof, to cause said auxiliary optical path between said auxiliary object and said reflective means (2) to lie at an angle to the direction of said main optical path, and such as to alter the direction of said auxiliary optical path to lie approximately parallel to the direction of, and closely adjacent to said main optical path, through said objective lens near the periphery thereof and to impinge upon a minor increment (7) of said image-receiving surface adjacent to, and symmetrically aligned with, said image (6) of said document, on the side thereof opposite to the position of said reflective means (2), and

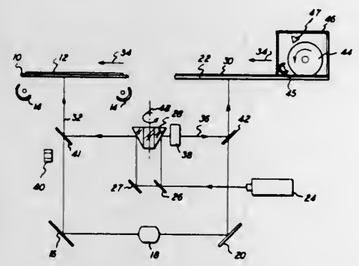
(e) control means (36) connected to synchronously move said document (10) and said image-receiving surface (8), and connected to said shutter and to said indicia, to alternately occlude said main optical path by means of said shutter, and to simultaneously cause said indicia to be illuminated.

4,093,371

COMPOSING MACHINE

Thomas P. Agliata, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 22, 1976, Ser. No. 725,899
Int. Cl.² G03B *27/52, 27/70*
U.S. Cl. 355—43 **7 Claims**



1. A composing machine, including:

means for supporting successive original documents;

means for masking selected portions of each original document disposed on said supporting means;

a viewing screen;

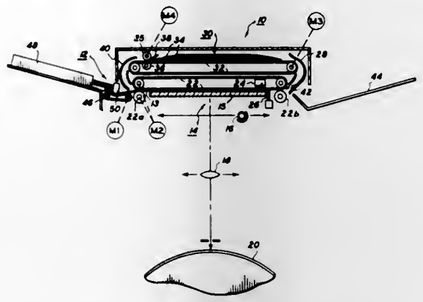
means for projecting the unmasked portions of each original document onto said viewing screen to display successive portions of each original document thereon, said projecting means comprises a light source for illuminating each original document disposed on said supporting means, a lens, first means for directing the light rays reflected from successive masked original documents through said lens forming a light image of the unmasked portion of each original document, and second means for directing the light image of the unmasked portion of each original document onto said viewing screen to be displayed thereon; and means for reproducing the portions of each original document being displayed on said viewing screen.

4,093,372

PRE-SEPARATED RECIRCULATING DOCUMENT COPYING SYSTEM

Joachim Guenther, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 28, 1977, Ser. No. 781,811
Int. Cl.² B65H *5/22*; G03B *27/48*
U.S. Cl. 355—50 **13 Claims**



1. In an automatic document handling system for recirculating a plurality of individual documents having pre-selected dimensions past an imaging station of a copier in a pre-collated order for making multiple collated copy sets from the documents, the improvement comprising:

document recirculation means for recirculating a plurality of individual documents toward and away from the imaging station while maintaining a separation between individual documents by shingling the documents in a partially separated, partially overlapping, configuation during a portion of said recirculation,

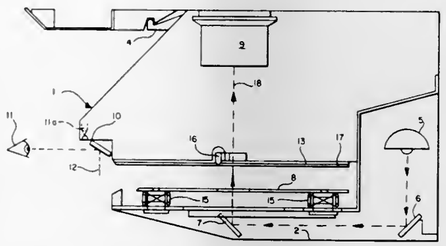
wherein a portion of said document recirculation means comprises a document transport which sequentially incrementally advances the documents transported thereon by a distance substantially less than a dimension of a document to provide said shingling.

4,093,373

MICROFICHE CAMERA EDITING DEVICE

Harry A. H. Spence-Bate, 115 Cheam Pl., P.O. Box 8, Morley, Australia (6062)

Filed Aug. 14, 1974, Ser. No. 497,463
Claims priority, application Australia, Aug. 15, 1973, PB4486
Int. Cl.² G03B *27/44, 27/04, 23/08*
U.S. Cl. 355—54 **10 Claims**



1. A microfiche editing and recording device for transmitting a microimage from a first microimage bearing film to a second photographic microfiche film comprising:

a microfiche camera;

a housing mounted to said microfiche camera, said housing being movably mounted to said microfiche camera so as to be moved on said camera to a storage position out of the optical axis of said microfiche camera when not in use as an editing device;

a means in said housing for defining an optical path, a portion of which is aligned with the optical axis of said microfiche camera;

a first film retaining means supported by said housing for holding said first microimage bearing film;

means connected to said first film retaining means for locating said first microimage bearing film in said first film retaining means in a plurality of predetermined X and a plurality of predetermined Y positions relative to said optical path;

means in said microfiche camera and connected to said second film for moving said second microfiche film to a plurality of predetermined X and a plurality of predetermined Y positions relative to said optical axis of said microfiche camera; and

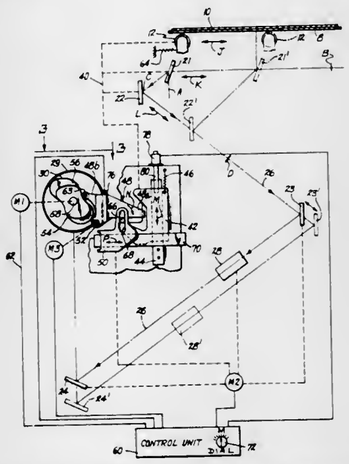
means for applying light from said first microimage bearing film to said second microfiche film along said optical path whereby the microimage on said first microimage bearing film is transferred to said second film.

4,093,374

MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE

Edwin Zucker, Rochester; David K. Shogren, Ontario, and David N. Redden, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 12, 1976, Ser. No. 647,941
Int. Cl.² G03B *27/34, 27/40, 27/70*
U.S. Cl. 355—57 **24 Claims**



1. A variable magnification reproduction machine comprising:

holding means comprising a platen for holding a document;

document scanning means including movable mirrors for scanning a document at said platen, said document scanning means comprising cam folllower means and a plurality of separate cam surfaces for driving said cam follower means which, in turn, imparts movement to said movable mirrors,

image receptor means for receiving an image of said document scanned by said document scanning means,

imaging means for focusing an image of said document onto said receptor means,

means for adjusting said imaging means for selecting between different document magnifications,

means responsive to said selected magnification for adjusting the scanning rate of said document scanning means in accordance with the selected magnification for each of said plurality of cam surfaces to thereby provide a continuously variable range of document magnifications for each cam surface, and

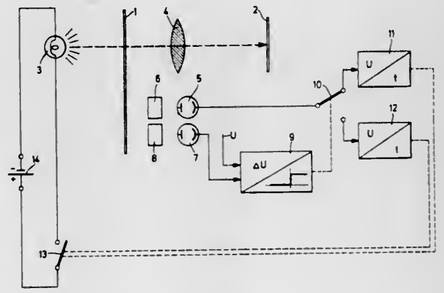
means responsive to the selected magnification for selecting one of said cam surfaces for driving said cam follower means.

4,093,375

METHODS AND APPARATUS FOR AUTOMATIC EXPOSURE CONTROL

Dorothee Griesch, Eltville; Herbert Schröter, Taunusstein; Peter Schwägler, Mainz, and Eckehard Stein, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Apr. 26, 1976, Ser. No. 680,461
Claims priority, application Germany, Apr. 28, 1975, 2518787
Int. Cl.² G03B *27/76, 27/78*
U.S. Cl. 355—68 **31 Claims**



11. Photographic printing apparatus for printing from originals made on different types of photographic material, the apparatus comprising:

means to determine which of at least two types (such as silver halide or diazo film) of photographic material the original employs comprising means to examine the spectral transmission characteristics of said original,

means to determine the image density of the original, and

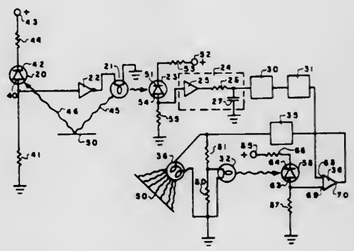
means to control the exposure in accordance with both the type of material as determined and the image density.

4,093,376

AUTOMATIC EXPOSURE CONTROL

Karavattuveetil George Rabindran, Morton Grove, and John R. Flint, Barrington, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jun. 1, 1976, Ser. No. 691,733
Int. Cl.² G03B *27/78*
U.S. Cl. 355—68 **13 Claims**



1. In a document recorder of the type having a document transport for feeding documents along a predetermined path, an exposure station within the predetermined path and including an exposure light source for illuminating each document as each document is presented to the exposure station to facilitate the photographing of the documents, an automatic exposure control system for controlling the illumination intensity of the

exposure light source to assure proper exposure of each document comprising:

a first light source arranged relative to the predetermined path for projecting light onto the documents to be recorded;

a first light sensitive element arranged relative to the predetermined path for receiving the light reflected from the documents originating from said first light source, said first light sensitive element providing a first control signal having a magnitude directly related to the intensity of said reflected light;

a feedback arrangement coupled between said first light sensitive element and said first light source for controlling the light output intensity of said first light source responsive to said first control signal to render the intensity of the reflected light received by said first light sensitive element substantially constant; and

control means coupled between said first light source and the exposure light source for controlling the illumination intensity of the exposure light source in direct relation to the light output intensity of said first light source, said control means comprising a second light sensive element arranged relative to said first light source for receiving the light output of said first light source, said second light sensitive element providing a second control signal having a magnitude directly related to the light output intensity of said first light source and averaging means coupled to said second light sensitive element for averaging said second control signal to thereby provide a third control signal, and means responsive to said third control signal for controlling the illumination intensity of the exposure light source.

4,093,377

COPYING MACHINE

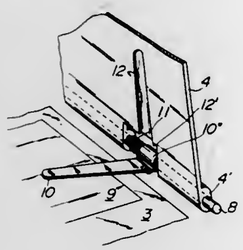
Hiroshi Tsuda, Mitaka, Japan, assignor to Olympus Optical Company Limited, Tokyo, Japan

Filed Dec. 10, 1976, Ser. No. 749,262

Claims priority, application Japan, Dec. 16, 1975, 50-168907[U]

Int. Cl.² G03B *27/62, 27/64*

U.S. Cl. 355—76 **3 Claims**



1. A copying machine employing a casing, a carriage movably mounted on said casing and supporting a manuscript to be copied thereon, a lid pivotally mounted at one side edge through a pivot shaft on said carriage disposed to cover said manuscript on said carriage; said machine comprising: manuscript holding means resiliently connected at one end to a pivotally mounted portion of said lid and having a free end projecting above said manuscript, a lower surface of said lid being formed with a depression for enclosing said manuscript holding means therein when said lid covers said manuscript; a connecting member resiliently connecting the one end of said manuscript holding means to said pivotally mounted portion of said lid, whereby said manuscript holding means being urged against said manuscript until said lid reaches an open position and separates from said manuscript as said lid further opens beyond said given open position.

4,093,378

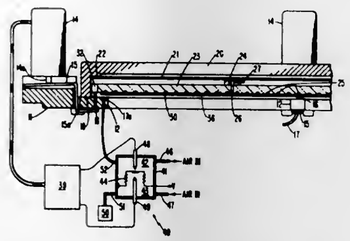
ALIGNMENT APPARATUS

Andrew Frederick Horr, Fairfax, and William Frederick White, Williston, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 1, 1976, Ser. No. 737,819

Int. Cl.² G03B *27/62, 27/64*

U.S. Cl. 355—76 **11 Claims**



1. A mechanism for positioning the surface of an object in a selected position with respect to a reference plane comprising:

means for holding said object,

means for defining said reference plane

driver means aligned with said holding means, and

sensor means coupled to said driver means and spaced from said object for sensing the the surface of said object with respect to said reference plane and controlling respective ones of said driver means to engage and move the holding means to position the sensed surface of said object in said selected position with respect to said reference plane.

4,093,379

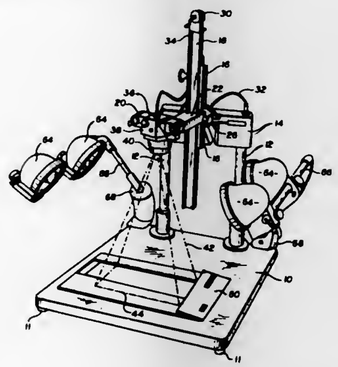
METHOD AND APPARATUS FOR MAKING PHOTOGRAPHIC COPIES

Manfred Weiner, East Meadow, N.Y., assignor to Ehrenreich Photo-Optical Industries, Inc., Garden City, N.Y.

Filed Sep. 14, 1976, Ser. No. 723,210

Int. Cl.² G03B *27/52, 27/32*

U.S. Cl. 355—77 **3 Claims**



1. The method of composing and photocopying graphic material, which method comprises locating a copying camera, having a viewfinder in one wall thereof, in position to photograph an area of a work support, projecting light, from outside the camera, through the viewfinder of the camera toward the camera lens, through the camera lens and onto the work support to illuminate the area of the work support that the camera will photograph, preventing overheating of the camera by locating the source of light at such a distance from the camera that heating of the light source does not reach the camera, focusing the camera, as necessary, for photographing the area of the support that is illuminated by said light, composing the graphic material with respect to the limits of the illuminated area, supplying to the graphic material additional light for copying, and operating the camera, while in its light-projecting position, to photograph the graphic material, characterized by transmitting said light from its source to a viewfinder of the camera by passing the light through a fibre optic bundle to avoid heating of the eyepiece and the camera by the light source, using a camera that has a finder screen with marking thereon, and focusing the camera on the area to be photographed by adjusting the focus to bring the image of the markings on the finder's screen into sharp focus on the illuminated area of the work support, using copying lights to illuminate the graphic material when photographing said material with the camera, and composing the art material while the copying lights are extinguished so that the area illuminated by the light projected by the camera is clearly defined with light of lower intensity than that required for copying, maintaining the work support under low illumination during composing of the graphic material whereby the contrast is improved between the area illuminated by the light projected from the camera and adjacent surfaces of the work support, using a flat horizontal surface as the work support, locating the camera above the support with the projection axis substantially normal to said support, holding the camera on a mechanically adjustable holder that shifts the camera toward and from the work support to obtain a desired field of coverage, using as the copying camera a reflex camera having its objective lens at the front of the camera and its viewfinder at the back of the camera, and projecting the light through a viewfinder to illuminate the area on the work support whereby the light projected on the work support for composing the graphic material, and the light that copies the graphic material, pass through the same camera lens.

4,093,380

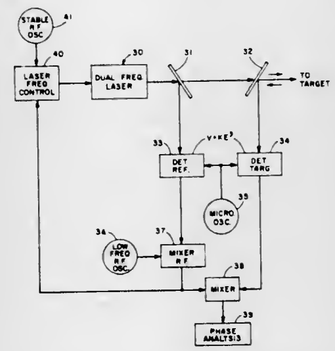
OPTICAL SYSTEMS UTILIZING THREE-WAVE HETERODYNE DETECTORS

Matthew B. White, Cohasset, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 4, 1976, Ser. No. 738,989

Int. Cl.² G01C *3/08*

U.S. Cl. 356—5 **5 Claims**



1. In an optical ranging system for determining the distance to a remote reflecting target, the combination of

means for generating at a first site a composite signal having two optical signal components ω_1 and ω_2;

means for directing said composite signal toward said remote target and for receiving the signal reflected therefrom;

a first and second optical signal detector which operate on the heterodyne principle;

means for directing said composite signal onto said first detector and said received reflected signal onto said second detector;

a first and second mixer;

means for coupling the output of said first detector to one input of said first mixer and the output of said second detector to one input of said second mixer;

a radio frequency oscillator;

means for generating a microwave signal, ω_{mw};

means for coupling said microwave signal to both said first and second detectors,

the two optical signal components of said composite signal and said received reflected signal interacting with said microwave signal to produce first and second difference signals of frequency $\omega_{mw} - \omega_2 + \omega_1$; and

means for coupling said radio frequency oscillator to the other input of said first mixer;

means for coupling the output of said first mixer to the other input of said second mixer whereby the output of said second mixer is a signal whose frequency corresponds to that of said radio frequency oscillator and whose phase is independent of any slow phase variations in said composite signal or said microwave signal; and

means for determining the phase relationship between said difference signals whereby to obtain a parameter which is related to the distance from said site to said remote target.

4,093,381

METHOD FOR ASSAYING ENDOTOXINS

Narbik A. Karamian, 7609 Exeter Rd., Bethesda, Md. 20014

Filed Nov. 29, 1976, Ser. No. 745,966

Int. Cl.² G01N *21/00*

U.S. Cl. 356—51 **3 Claims**

1. A method for assaying endotoxins in aqueous liquids comprising the following steps:

a. introducing a known volume of an aqueous liquid containing lipopolysaccharide endotoxins of the bacteria selected from the group consisting of *E. coli* 0127:B8, *E. coli* 055:B5, *S. abortus equi, S. enteritidis* and *S. flexneri*

b. maintaining the temperature of the sample in the cell at between 20° and 30° C,

c. passing ultra-violet radiation of a wave length between 200 and 800 nm thru said liquid sample in the cell,

d. measuring the absorbance of the detecting radiation at 259 nm.

4,093,382

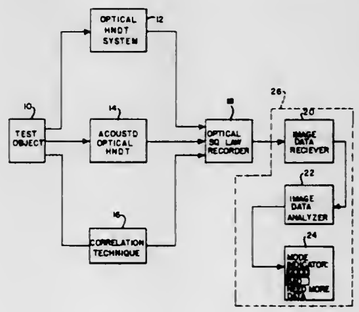
HYBRID HOLOGRAPHIC NON-DESTRUCTIVE TEST SYSTEM

Robert L. Kurtz, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 14, 1976, Ser. No. 686,331

Int. Cl.² G01N *21/00*; G02B *27/00*; G01N *3/00*

U.S. Cl. 356—72 **7 Claims**



1. A hybrid non-destructive testing system for determining the presence of inhomogeneities in a test object comprising:

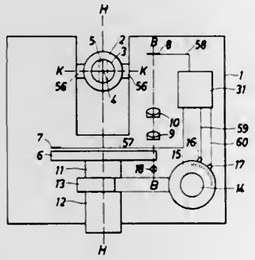
(a) an optical testing subsystem selectively operable to produce image data information of the object in the form of an optical hologram for detecting surface or subsurface flaws;
(b) an acousto/optical testing subsystem selectively operable to produce image data information of the object in the form of an optical hologram for detecting interior flaws;
(c) a correlation testing subsystem selectively operable to produce image data information of the object in the form of an optical hologram for determining the exact location and magnitude of flaws whose presence has been determined by the results of selective operation of the other subsystems of the testing system;
(d) real-time single format detector/read-out means for accepting image data information from the three subsystems; and
(e) optical receiver/analyzer means for analyzing image data information accepted by the detector/read-out means.

4,093,383

ANGLE MEASURING DEVICE WITH A TELESCOPE

Wieland Feist; Klaus Junghanns, and Alfred Kunz, all of Jena, Germany, assignors to Jenoptik Jena G.m.b.H., Jena, Germany

Filed Dec. 16, 1976, Ser. No. 748,623
Claims priority, application Germany, Jan. 9, 1976, 01190745
Int. Cl.[2] G01B *11/26*; G01C *1/00, 1/06*
U.S. Cl. 356—152 **1 Claim**



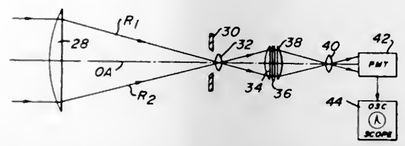
1. An angle measuring device comprising
a base,
a telescope being seated for rotation about at least one axis relative to said base,
at least one graduated circle being provided with at least one line division of equally spaced intervals, said graduated circle being connected to said base,
at least one scanner being connected with said telescope said scanner and said graduated circle being for measuring the rotations of said telescope,
a micrometer for subdividing said division intervals,
at least one electro-optic scanning means for taking readings on said micrometer,
electronic means connected to said scaner and said reading means for detecting signals from said scanner and said reading means and for formation of an angular measuring result,
a graduated plate being arranged in the field of view of said telescope and being provided with a reticle,
said graduated plate being provided with two lines substantially symmetrical and in parallel with one line of said reticle and being spaced apart from said one line by at least the width of one division interval of said line division.

4,093,384

NARROW ANGLE, NARROW BANDWIDTH OPTICAL RECEIVER SYSTEM

Gerald D. Ferguson, Yardley, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 4, 1976, Ser. No. 729,523
Int. Cl.[2] G01J *3/48*
U.S. Cl. 356—186 **11 Claims**



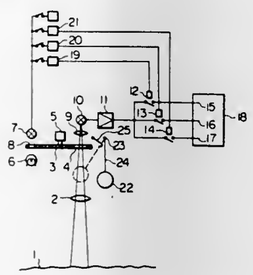
1. An optical system for receiving radiation reflected from an area illuminated by light of a specific frequency, comprising, in combination:
receiving means adapted to receive the reflected radiation over a narrow field of view for forming an imaged output, said receiving means including a circular collecting lens positioned at the input thereof;
interference filter means optically connected to receive said receiving means output including a flat top filter element in which said specific frequency is at the low end of the bandpass for normal incidence of radiation and at the high end for maximum incidence of radiation; and
detector means optically connected to receive the passed radiation from said filter means for producing an output signal when said detector means is illuminated by radiation at the specific frequency.

4,093,385

COLOR GRADIENT ANALYZER

Murata Noboru, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Oct. 7, 1976, Ser. No. 730,472
Claims priority, application Japan, Oct. 17, 1975, 50-124407
Int. Cl.[2] G01J *3/48, 1/02*
U.S. Cl. 356—188 **6 Claims**



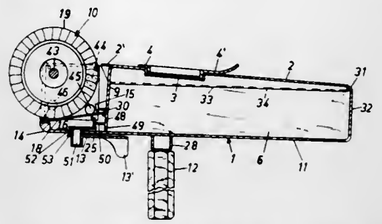
1. A color gradient analyzer comprising a rotational filter having a plurality of optical color filters, a motor for rotating the rotational filter, a photo-electric converter positioned observable an object illuminated by the natural sun to be analyzed through one of said color filters, a white ball positionable between the photo-electric converter and an object to be analyzed, said white ball being able to be illuminated by the sunlight, a plurality of relays connected to the output of the photo-electric converter, a recorder connected to the outputs of said relays, means for providing the signal concerning the rotational angle of the rotational filter, and a plurality of delay circuits connected between said means and said relays.

4,093,386

DEVICE FOR APPLICATION OF LIQUID PRODUCTS, SUCH AS PAINT, GLUE AND THE LIKE

Stig Gunnar Lundgren, and Lars Johan Tornell, both of Goteborg, Sweden

Filed Oct. 27, 1976, Ser. No. 736,162
Int. Cl.[2] B44D *3/28*
U.S. Cl. 401—219 **6 Claims**



1. An improved device for application of liquid products such as paint, glue and the like, comprising a container holding the aforesaid liquid, and an applicator roller, said roller mounted at the front wall of said container, a discharge opening formed in said front wall of the container, said opening communicating the interior of said container with said applicator roller,
an elongated chamber arranged intermediate said discharge opening of said container and said applicator roller, said chamber positioned underneath said roller and having a paint supply slot formed in its top section, said paint supply slot extending in the longitudinal direction of said applicator roller,
wall sections positioned in front of said container and above said chamber at the ends thereof, mounting plates for attachment of said applicator roller, said mounting plates removably arranged on said wall sections, a number of attachment elements arranged on said mounting plates in symmetrical positions relative to a certain point on each one of said plates, said attachment elements serving to retain said mounting plates to said wall sections,
a plurality of mounting holes in said mounting plates to receive therein the trunnion ends of said applicator roller, said mounting holes disposed non-symmetrically relative to said point and in mirror-image fashion in the two mounting plates,
said mounting plates arranged to be re-set so as to allow positioning of said mounting holes in their individual positions of use, each one of said mounting holes intended for an applicator roller of a certain size and type, said applicator roller mounted in said wall sections in a manner ensuring that a portion of the periphery of said roller extends closely above said paint supply slot and that said roller projects above as well as beyond these wall sections, and
said discharge opening extending along the front wall of said container with its lower delimitation line level with the bottom of said container.

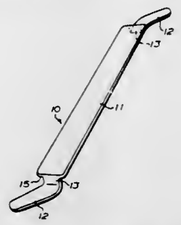
4,093,387

FASTENER FOR DETACHABLY INTERCONNECTING PUNCHED DOCUMENTS

Otto Julius Jönsson, Malmo, Sweden, assignor to AB Malmo PAC, Malmo, Sweden

Continuation of Ser. No. 385,198, Aug. 2, 1973, abandoned. This application Feb. 27, 1975, Ser. No. 553,766
Int. Cl.[2] B42F *3/00*
U.S. Cl. 402—19 **1 Claim**

1. An improved one-piece fastener in the form of a thin flat strip of resilient material for detachably interconnecting punched documents assembled in a sheaf, comprising an elongated planar intermediate portion adapted to engage, at one of the flat surfaces thereof, the sheaf of documents between the holes therein on one side of the sheaf, a planar end portion at each of the opposite ends of the intermediate portion having reduced width with respect to said intermediate portion, said end portions being disposed in a common plane essentially parallel to the plane of the intermediate portion but displaced transversely thereof and extending away from each other, and a web integrally interconnecting said intermediate portion and each of said end portions and forming a step therebetween, said



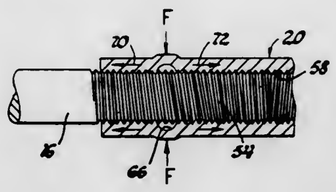
end portions being insertable each through one hole in the sheaf from the said one side thereof in order to extend along the opposite side of the sheaf, with said webs extending through the holes, wherein the improvement resides in that the end portions are angled in said essentially parallel plane in opposite directions in relation to said intermediate portion to form laterally projecting tongues.

4,093,388

TIE ROD ASSEMBLY FOR VEHICLES

Robert I. MacArthur, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 28, 1975, Ser. No. 635,682
Int. Cl.[2] F16B *17/06*
U.S. Cl. 403—46 **3 Claims**



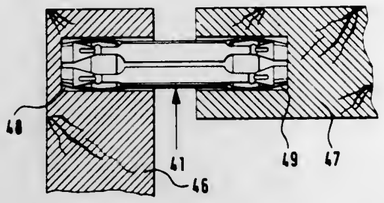
1. A tie rod assembly in a vehicle steering linkage comprising inner and outer tie rod members, said tie rod members having end portions space from each other, one of said end portions having a peripheral thread of a right-hand lead, the other of said end portions having a peripheral thread of a left-hand lead, an adjuster sleeve extending between said tie rod members, said sleeve being a tubular member of deformable metal with complementary right and left hand internal threads that engage the respective right and left hand threads of said end portions of said tie rod members, said adjuster sleeve being rotatable relative to said tie rod members to adjust the overall length of said tie rod members connected thereto, said adjuster sleeve having radially projecting bead means integral with the walls thereof encircling and located radially outwardly of said tie rods and inboard of the ends thereof, said bead being partially constricted radially inwardly to reduce its diameter and longitudinally displace material of said sleeve and thereby laterally load the engaged threads to maintain the tie rods and sleeve in an adjusted position.

4,093,389

CONNECTION AND FASTENING ELEMENT FOR CONNECTING WORKPIECES OF SOFT MATERIAL, ESPECIALLY DOWELS FOR PRESSBOARDS OR PARTS OF WOOD

Günter Wibrow, Norderstedt, Germany, assignor to ITW-Ateco G.m.b.H., Norderstedt, Germany

Filed Oct. 12, 1976, Ser. No. 731,597
Claims priority, application Germany, Oct. 14, 1975, 2545859
Int. Cl.² F16B 7/00
U.S. Cl. 403—280 7 Claims



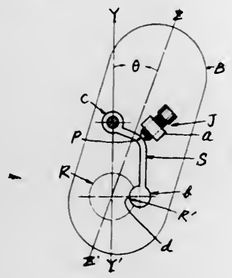
1. A one-piece sheet metal connection and fastening element adapted for connecting workpieces of relatively soft material having predetermined depth blind bores therein, said fastening element including a hollow pin bent from flat sheet metal stock having in at least one end thereof a plurality of circumferentially spaced axially extending elongated openings spaced from the ends of the pin, said elongated openings being provided in parallel spaced arrangement at a predetermined distance from the end of said at least one end portion and forming between said elongated openings a plurality of webs integrally connected at their opposite ends and adapted to be bent outwardly intermediate the extremities of said webs, a sheet metal, sleeve-like reinforcing member surrounded by and integral with the hollow pin, said member extending a predetermined distance into the end portions carrying said webs whereby said at least one end portion can be axially upset in the blind bore of said workpiece with at least partial portions of said webs being vaulted radially outwardly in a direction towards and into the wall of said bore.

4,093,390

BRACKET TIGHTENING DEVICE

Zenzaburo Tsukmo, Osaka, Japan, assignor to NTN Toyo Bearing Co. Ltd. and Zeazaburo Tsukumo, both of Osaka, Japan

Filed Oct. 27, 1976, Ser. No. 736,224
Claims priority, application Japan, Oct. 29, 1975, 50/130687; Oct. 29, 1975, 50/130688; Nov. 18, 1975, 50/139104; Nov. 18, 1975, 50/139105
Int. Cl.² F16B 2/02, 7/04
U.S. Cl. 403—373 7 Claims



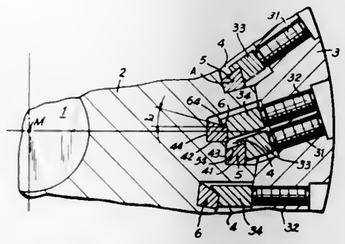
1. A device for tightening a bracket on a round rod or shaft by making use of resiliency, comprising an intermediate body having sufficient resiliency within the restorable elastic limits, one end of said intermediate body being pivotally mounted at a fixed point on the bracket, the other end thereof being engaged at a fixed point on the outer surface of the rod or shaft on which the bracket is to be tightened, an adjusting screw attached to said bracket and having its front end abutting against the intermediate portion of said intermediate body.

4,093,391

MILLING CUTTER HEAD FOR MAKING ARCUATE TOOTHING

Lothar Willy Bachmann, and Eberhardt Karl Reise, both of Karl-Marx-Stadt, Germany, assignors to VEB Werkzeugkombinat Schmalkalden, Schmalkalden, Germany

Filed Mar. 8, 1976, Ser. No. 665,059
Int. Cl.² B26D 1/12
U.S. Cl. 407—22 7 Claims



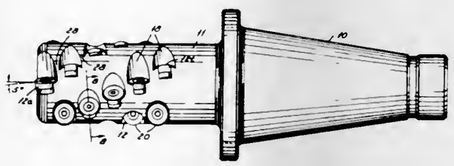
1. A milling cutter head for making arcuate toothing, the head having a main axis (M), comprising a substantially disk-shaped carrier body (2) with a locking ring (3) surrounding the same; said body having therein at least one pair of grooves (4) of a stepped cross-section, for a corresponding number of pairs of removably inserted, substantially axially extending outer (5) and inner (6) milling cutters, said grooves having different distances from the main axis; said cutters having head cutting edges (17) in head regions thereof, that partially overlap between adjoining cutters of a pair, and corresponding flank cutting edges (18); wherein said cutters both have cylindrical body surfaces (51 . . . 54, 61 . . . 64) that are substantially rectilinear along the entire cutting lengths; said body surfaces including chip bearing surfaces (54, 64) and associated limiting surfaces (53, 62), which latter adjoin said flank cutting edges; wherein the inclination angle (Ψ) defined between said chip bearing and said limiting surfaces is smaller than 90°; and wherein at least one of said chip bearing surfaces is substantially planar along said entire cutter length and constitutes a main active cutting surface from the outer end of the respective cutter to its cutting edge.

4,093,392

MILLING CUTTER

David Alan Hopkins, Detroit, Mich., assignor to The Valeron Corporation, Oak Park, Mich.

Filed Apr. 10, 1975, Ser. No. 566,727
Int. Cl.² B26D 1/12
U.S. Cl. 407—48 28 Claims



1. An indexable insert milling cutter comprising an annular cylindrical body, a plurality of individual insert pockets formed in the cylindrical periphery of said body, each of said pockets having a seat for holding an insert with its cutting face in a substantially axial plane modified to the extent of any axial and radial rake angles which are the same for every insert, and a minor portion of its cutting edge projecting beyond said periphery, each pocket having a chip clearance wall associated therewith, said wall providing chip clearance space projecting from the entire cutting face to the periphery of said body, each pocket with its chip clearance wall being substantially isolated from every other pocket by surrounding cylindrical periphery of said body, and said insert pockets being uniformly spaced in overlapping cutting relationship in an axial direction and angularly spaced in a circumferential direction on a continuous helical path for progressive cutter entry in milling a workpiece.

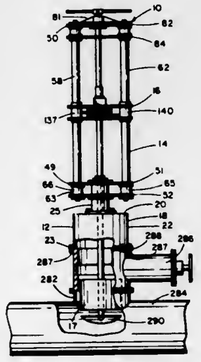
25. A milling cutter comprising an annular body constructed for mounting a plurality of individual cutting elements on its periphery, with a cutting edge of each element extending beyond the periphery, and on a continuous helical path, with equal angular spacing, within a range of 91° to 100°.

4,093,393

TAPPING MACHINE

Garland Y. Smith, Hinsdale, and Gerald R. Scott, Elmhurst, both of Ill., assignors to Garland Smith Engineering Co., Inc., Hinsdale, Ill.

Filed Sep. 8, 1976, Ser. No. 721,396
Int. Cl.² B23B 47/16
U.S. Cl. 408—67 21 Claims



1. A tapping machine comprising: a base adapted for fixed connection to a structure to be tapped; an elongated frame connected to said base; a movable balanced drive assembly mounted on said elongated frame, said movable balanced drive assembly being movable along said elongated frame relative to said structure to be tapped, said movable balanced drive assembly having a boring bar longitudinally fixed to a portion of the movable balanced drive assembly, said movable balanced drive assembly including a plurality of motors, each motor of said plurality being spaced equidistantly about said boring bar, a plurality of axially spaced driven members drivingly connected to said boring bar, each motor of said plurality being connected drivingly to a respective one of said plurality of driven members; and a cutter drivingly connected to said boring bar, said cutter being adapted to engage cuttingly a surface of the structure to be tapped.

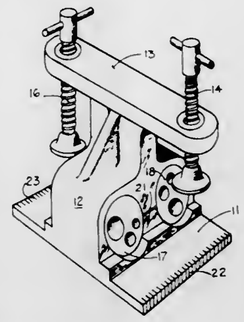
4,093,394

DOWEL HOLE-BORING JIG

Arthur Adams, c/o Karl Davenport, 9614 Heatherdale Dr., Dallas, Tex. 75243

Filed Jul. 5, 1977, Ser. No. 812,573
Int. Cl.² B23B 49/00
U.S. Cl. 408—103 8 Claims

1. A dowel hole boring jig comprising:
at least one right circular cylinder longitudinally pierced by at least one round cross-section hole having a selected diameter equal to a dowel hole bit diameter, said hole extending from a first end of the cylinder to the other end thereof;
a portable base;
a frame secured to said base and provided with at least one circular cross section aperture shaped, sized and positioned to hold said cylinder in a horizontal position above and parallel to the base;



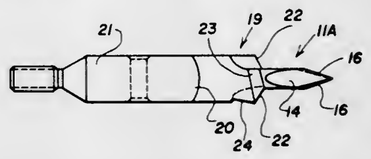
first clamp means secured in said frame above and beyond said cylinder's first end whereby a first work piece can be clamped adjacent to the cylinder's first end in positon to be bored by a bit passed through said hole from said other end thereof; and
second clamp means secured in said frame above and beyond said cylinder's other end whereby a second work piece can be clamped adjacent to the cylinder's other end in position to be bored by a bit passed through said hole from said first end thereof.

4,093,395

DRILL AND COMBINED DRILL COUNTERSINK

William K. Luebbert, St. Louis County; Thomas O. Blankenship, Marthasville, and Roy H. Freeman, St. Louis, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Mar. 14, 1977, Ser. No. 777,177
Int. Cl.² B23B 51/00, 31/44
U.S. Cl. 408—224 7 Claims

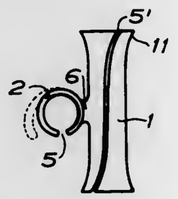


1. A drill for producing holes of close tolerance in non-ferrous and non-metallic composite materials, said drill comprising an axially elongated body having a cylindrical form with diametrally opposite substantially flat first surfaces which taper convergently toward one end of said body from the cylindrical body remote from said one end, said first surfaces having diametrally opposite margins substantially coextensive with said first flat surface and conforming to the cylindrical shape of said elongated body, and said one end of said body being formed with similar substantially flat drill point surfaces convergently directed toward the longitudinal axis of said body from each of said opposite side margins, said drill point surfaces and said first surfaces meeting along first edges forming the cutting edges for said drill and meeting along second edges spaced behind said cutting edges in the direction of drill rotation, said drill point surfaces being oppositely angled rela-

tive to each other to lay back of said associated cutting edges and directed to converge from said opposite margins to intersect along a line which constitutes a chisel edge on said one end of said body.

5. The drill set forth in claim 1 wherein a second cylindrical body is carried by said first mentioned body, said second body having a diameter larger than said first mentioned body and formed with a countersink drill face presented to said first mentioned body in position to perform a countersink operative in sequence with said cutting edges forming a hole.

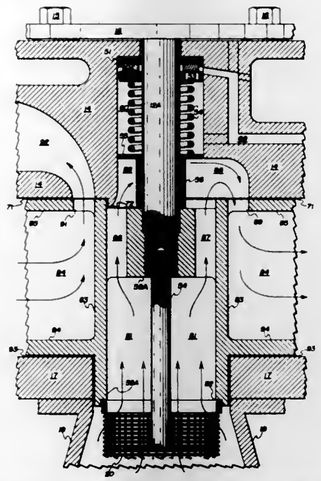
4,093,396
CHUCK KEY HOLDER
Sven Holger Widigs, Gustafs, Sweden, assignor to Lars Gosta Brandstrom and Karl Peter Brandstrom, both of Soderhamn, Sweden
Filed Dec. 15, 1976, Ser. No. 750,651
Claims priority, application Sweden, Jan. 30, 1976, 7600992
Int. Cl.² B23B *45/00*
U.S. Cl. 408—241 R **5 Claims**



1. A chuck key holder for releasably securing a chuck key to the electric cable of an electrically drivable hand tool comprising: a first tubular collet formed of a slightly elastic material and having a radial slot therein extending the axial length thereof, said first collet thus being elastically separable in the region of said slot for reception of an electric cable therewithin; and a second tubular collet formed of a slightly elastic material and having a radial slot therein extending the axial length thereof, said second collet thus being elastically separable in the region of said slot for reception of an element of a chuck key therewithin; said first and second collets being interconnected with their longitudinal axes angularly offset and spaced apart by at least the respective radius of each of said collets.

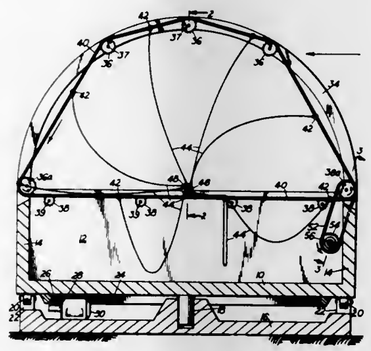
4,093,397
HIGH VACUUM PUMP
Grady R. Lovelady, 1624 San Altos Pl., Lemon Grove, Calif. 92045
Filed Apr. 15, 1976, Ser. No. 677,249
Int. Cl.² F04D *5/00*
U.S. Cl. 415—53 R **7 Claims**

1. A high vacuum pump comprising:
- a generally cylindrical housing having a housing inlet and a housing outlet,
- an impeller assembly having a rotor hub in the center thereof rotatably mounted eccentrically of the axis of said housing, said hub defining a passageway extending the length thereof and forming an intake at one axial end thereof;
- an outlet at the other axial end of said hub, said outlet communicating via an inlet chamber in said housing with impeller blades in said impeller assembly on one radial side thereof; and



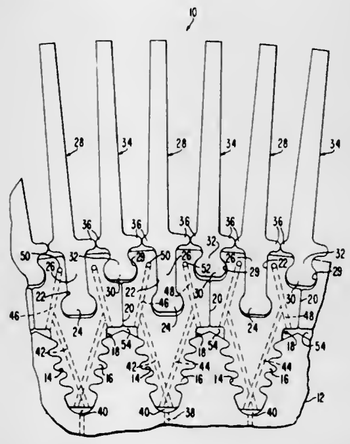
- an exhaust duct on the other radial side of said impeller assembly extending radially from the axis of said rotor hub.

4,093,398
WIND DRIVEN POWER MECHANISM
Denver W. Miller, 10208 SE. Tilford Rd., Boring, Oreg. 97009
Filed Sept. 23, 1976, Ser. No. 725,758
Int. Cl.² F03D *5/02*
U.S. Cl. 416—8 **2 Claims**



1. A wind driven power mechanism comprising
- (a) a base having forward and rearward ends and arranged to be disposed longitudinally in the direction of wind movement,
- (b) a pair of opposite, parallel endless carriers supported at opposite sides of said base for movement in the direction of the wind over an upper arcuate drive run and along a lower horizontal return run in the direction against the wind,
- (c) a plurality of flexible sail-type vane means having upper and lower ends,
- (d) means connecting the upper ends of said vane means laterally between said two endless carriers,
- (e) said vane means having movement along the upper run of said carriers in upright sail condition for surface engagement by the wind for driving the carriers longitudinally and having movement along the return run of said carriers in a collapsed condition uninfluenced by the wind,
- (f) a pair of horizontal axis idler wheels on said base disposed between said upper and return runs and being concentric with said upper arcuate drive run,
- (g) and means connecting the lower ends of said vane means to respective ones of said idler wheels whereby the lower ends of said vane means rotate with said idler wheels as the vane means move around the latter in the drive and return runs by wind engagement in the drive run of the carriers.

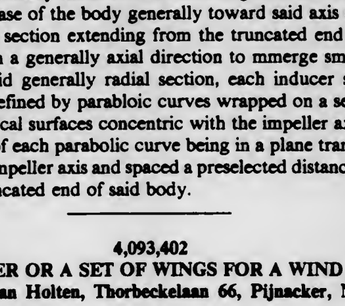
4,093,399
TURBINE ROTOR WITH CERAMIC BLADES
Robert G. Glenn, Huntington Valley, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.
Filed Dec. 1, 1976, Ser. No. 746,443
Int. Cl.² F01D *5/08, 5/30*
U.S. Cl. 416—95 **8 Claims**



1. In a gas turbine rotor: a rotor disk having a number of circumferentially spaced, outer peripheral grooves, an attachment piece for each groove of the rotor disk, respectively, the attachment pieces having respective roots received within corresponding grooves of said rotor disk; a plurality of ceramic rotor blades, each blade having a root; and means on said attachment pieces at the radially outer margins thereof for forming root-receiving grooves, the roots of said blades being received within respective grooves of said attachment pieces, said attachment pieces having structure isolating the rotor disk from gases impinging on said blades, said rotor disk and said attachment pieces having fluid passages therein forming parts of a closed path to permit the circulation of a coolant through the attachment pieces.

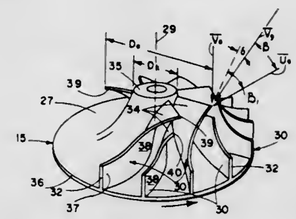
4,093,400
CROSS BEAM ROTOR
Robert Charles Rybicki, Trumbull, Conn., assignor to United Technologies Corporation, Hartford, Conn.
Filed Dec. 15, 1976, Ser. No. 751,006
Int. Cl.² B64C *27/38*
U.S. Cl. 416—141 **9 Claims**

1. A helicopter rotor adapted to be mounted for rotation about an axis of rotation and comprising:
- a spar member flexible in flapping, in-plane bending, and in twisting and extending through and on opposite sides of said axis or rotation and having a feathering axis about which said twisting occurs,
- a blade positioned at opposite ends of said spar and supported therefrom for rotation therewith,
- a hub member supporting said spar for rotation about said axis of rotation and connected thereto, and
- means connecting said spar to said hub comprising two spherical bearings supported from said hub at stations on opposite sides of said rotational axis and each supporting



said spar therefrom for universal motion about a point on said feathering axis.

4,093,401
COMPRESSOR IMPELLER AND METHOD OF MANUFACTURE
Homer E. Gravelle, Arvada, Colo., assignor to Sundstrand Corporation, Rockford, Ill.
Filed Apr. 12, 1976, Ser. No. 676,264
Int. Cl.² F04D *17/10*
U.S. Cl. 416—185 **22 Claims**

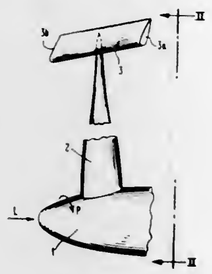


1. A centrifugal compressor impeller, comprising;
- a body formed as a truncated, generally conical body of revolution with a longitudinal axis of rotation, a circular cross section transverse to said axis and an arcuate axial section;
- a plurality of impeller blades on the surface of the conical body adjacent the ase thereof, each impeller blade including a generally radial section extending from an outer end at the base of the body generally toward said axis and an inducer section extending from the truncated end of the body, in a generally axial direction to mmerge smoothly with said generally radial section, each inducer section being defined by parabloic curves wrapped on a series of cylindrical surfaces concentric with the impeller axis, the origin of each parabolic curve being in a plane transverse to the impeller axis and spaced a preselected distance from the truncated end of said body.

4,093,402
PROPELLER OR A SET OF WINGS FOR A WIND MILL
Theodoor Van Holten, Thorbeckelaan 66, Pijnacker, Netherlands
Filed Nov. 9, 1976, Ser. No. 740,090
Int. Cl.² F03D *1/06*
U.S. Cl. 416—236 A **7 Claims**

1. A propeller or a set of wings for a wind mill or such a device for deriving or absorbing energy from a flow of fluid such as the wind, comprising a rotatable supported hub with at least one mainly radially extending blade having a cross section in the shape of a "wing profile" and a blade angle varying

along the length of the blade, said blade being provided with at least one auxiliary blade with a cross section in the shape of a "wing profile", which auxiliary blade as seen in a sectional plane going through the midchord point of the average chord of said auxiliary blade and lying parallel to the plane, defined by the relative wind with respect to said auxiliary blade and the centerline of the relating main blade, is positioned such that the



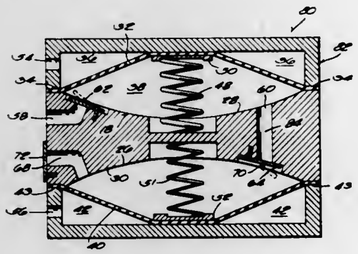
elongation of the chord lying in said sectional plane and starting from said midchord point and going through the leading edge of said auxiliary blade will interest a line positioned in said plane and running parallel to said relative wind and through the rotational axis of the hub of the propeller, wherein said auxiliary blade is mainly rectangular, the leading edge of it being positioned about normal to the relative direction of flow, the leading and trailing edges being situated in one flat plane.

4,093,403

MULTISTAGE FLUID-ACTUATED DIAPHRAGM PUMP WITH AMPLIFIED SUCTION CAPABILITY

Carl F. Schrimpf, Wauwatosa, and Russel J. Van Rens, Waukesha, both of Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Sep. 15, 1976, Ser. No. 723,334
Int. Cl.² F04B *3/00, 43/06*
U.S. Cl. 417—246 **14 Claims**



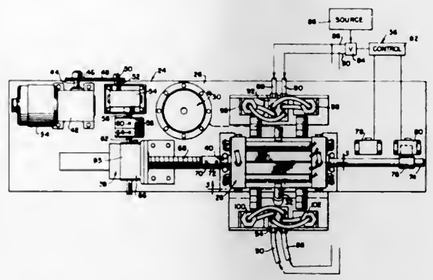
1. A fluid actuated fuel pump comprising means defining separate inlet and outlet chambers each including respective first and second wall portions, a first flexible diaphragm disposed in said inlet chamber and separating said inlet chamber into a first pulse chamber and a suction chamber including said first wall portion, said first diaphragm being movable away from and toward first wall portion, a fuel intake through which fuel is admitted into said suction chamber, a second flexible diaphragm in said outlet chamber and separating said outlet chamber into a second pulse chamber and a pressure chamber including said second wall portion, said second diaphragm being movable away from and toward said second wall portion, fuel transfer means communicating between said suction and pressure chambers and through which fuel is pumped from said suction chamber to said pressure chamber when said first diaphragm is moved toward said first wall portion, a fuel outlet through which fuel is pumped from said pressure chamber when said second diaphragm is moved toward said second wall portion, a first pressure inlet communicating with said first pulse chamber and adapted for connection to a first source of regularly cycling pressure pulses, a second pressure inlet communicating with said second pulse chamber and adapted for connection to a second source of regularly cycling pressure pulses, the second source of pressure pulses being of substantially equal intensity as the first source of pressure pulses and at least 90° out of phase from the first source of pressure pulses, whereby said first diaphragm in response to the cyclical pressure variations in said first pulse chamber alternately moves away from said first wall portion to draw fuel into said suction chamber through said fuel intake and toward said first wall portion to pump fuel from said suction chamber into said pressure chamber through said fuel transfer means and whereby said second diaphragm sequentially with respect to said first diaphragm and in response to cyclical pressure variations in said second pulse chamber alternatively moves away from said second wall portion to admit fuel being pumped through said fuel transfer means by said first diaphragm into said pressure chamber and toward said second wall portion to pump fuel from said pressure chamber through said fuel outlet, first biasing means for biasing said first diaphragm in a direction away from said first wall portion, and second biasing means for biasing said second diaphragm in a direction away from said second wall portion, the biasing force of said second biasing means being less than the biasing force of said first biasing means.

4,093,404

APPARATUS FOR PREPARATION OF MATRICES CONTAINING FRANGIBLE PARTICULATE MATTER

John W. Soehngen, and Albert Gerken, both of Berkeley Heights, N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,639
Int. Cl.² F04B *9/00*
U.S. Cl. 417—317 **26 Claims**



1. In matrix preparation apparatus having matrix supply means, reservoir means for supplying a flow of frangible particulate material, and mixing means for dispersing the flow of frangible particulate material in the matrix, the improvement being means for supplying the frangible particulate material to the mixing means comprising:

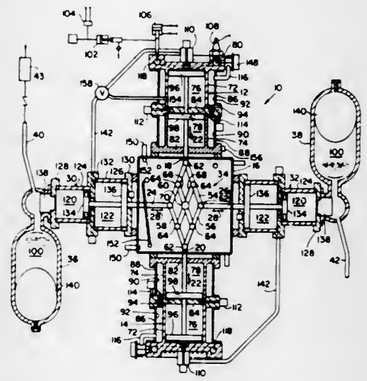
- **reciprocable pump means having a first annular pump chamber and a second annular pump chamber, coaxially alligned and alternately operable, for continuously pumping the flow of frangible particulate material at a uniform metered rate without substantial impairment of frangible particles;**
- **manifold means communicating with the reservoir means, the mixing means and the first and second pump chambers, for conveying the flow from the reservoir means to one of the first and second pump chambers and from the other of the first and second pump chambers to the mixing means; and**
- **control means connected with the manifold means for diverting the flow from the reservoir means to the first and second pump chambers and for simultaneously connecting the first and second pump chambers with the mixing means such that one pump chamber communicates with the reservoir means while the other pump chamber communicates with the mixing means.**

4,093,405

FUEL-OPERATED DEVICE

William Stanley Brian, 25 Landing Rd., Huntington, N.Y.

Filed Feb. 2, 1977, Ser. No. 764,751
Int. Cl.² F04B *17/00, 35/00;* F02B *75/32*
U.S. Cl. 417—343 **6 Claims**



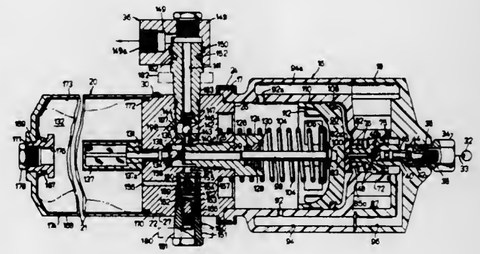
1. An improved fuel-operated device comprising a pair of combustion cylinders having pistons therein each having slidably disposed piston rods extending therefrom operatively arranged in opposing facing relation to each other such that said piston rods are urged through power strokes towards each other along a first movement path, means for admitting a gas-producing type fuel for said combustion cylinders effective to cause an initially maximum pressure expanding gas in said cylinders for powering said piston rods through said power strokes, a pair of pressure transfer fluid cylinders having pistons therein each having slidably disposed piston rods extending therefrom operatively arranged in opposing facing relation to each other such that said piston rods are urged through fluid pressure strokes away from each other along a second movement path oriented perpendicularly and in crossing relation to said first movement path, passage means connected from said pressure transfer fluid cylinders to a storage means for flowing said pressure transfer fluid thereto, an outlet connection from said storage means to a pressure fluid-operated motor for allowing said pressure transfer fluid to power said motor in operation in the performance of work utilizing said pressure transfer fluid energy, and a coupling linkage means strategically located at the intersection of said first and second movement paths operatively interconnected between said piston rods of said combustion and said pressure transfer fluid cylinders so as to produce said fluid pressure strokes in the latter in response to said power strokes of the former, said coupling linkage means including pivotally interconnected links in a diamond-shaped configuration effective to initially cause an amplification of said movement occurring along said first movement path in said corresponding extent of movement occurring along said second movement path and subsequently a reversal therein, whereby despite an initial maximum pressure in said expanding gas of said fuel there is produced in said fluid a pressure at a desirable starting minimum value which subsequently builds up therein to thereby contribute to the efficiency of the conversion of said fuel energy into usable pressure fluid energy.

4,093,406

FLUID OPERATED HYDRAULIC PUMP INCLUDING NOISE REDUCTION MEANS

Douglas P. Miller, Milwaukee, Wis., assignor to Applied Power Inc., Milwaukee, Wis.

Filed Aug. 25, 1976, Ser. No. 717,761
Int. Cl.² F04B *17/00;* F01N *3/06, 1/08*
U.S. Cl. 417—401 **3 Claims**



1. In a gas driven motor for driving a hydraulic fluid pump: a gas chamber in said motor; and a muffler for exhausting gas from said gas chamber of said motor to a region of pressure relief and for reducing noise generated by such exhaustion, said muffler comprising:

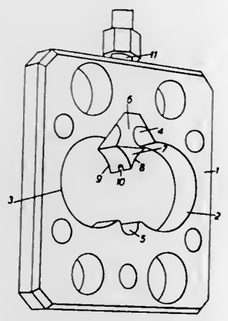
- **an annular expansion chamber;**
- **a first port for directing pressurized gas from said gas chamber of said motor into one portion of said annular expansion chamber;**
- **a plurality of second ports for exhausting gas from another portion of said annular expansion chamber to said region of pressure relief;**
- **and baffle means located in said expansion chamber on opposite sides of said first port and between said first port and said second ports for controlling gas flow between said first port and said second ports, said annular expansion chamber being defined by a pair of spaced apart end walls, a circumferential side wall extending between said end walls, and a projection extending between said end walls; said first port being located in said annular expansion chamber on one side of said projection; and said plurality of second ports being located in said annular expansion chamber on another side of said projection, said baffle means comprising:**
- **a pair of spaced apart first baffles disposed on opposite sides of said first port, each first baffle extending between said end walls and from said circumferential side wall and extending toward but spaced from said projection, each first baffle defining a first passage near said projection;**
- **a pair of spaced apart second baffles disposed on opposite sides of and spaced from said pair of first baffles, each second baffle extending between said projection and said circumferential side wall and from one of said end walls and extending toward but spaced from the other of said end walls, each second baffle defining a second passage near the other of said end walls;**
- **and a pair of spaced apart third baffles disposed on opposite sides of and spaced from said second baffles, each third baffle extending between said projection and said circumferential side wall and from the other of said end walls and extending toward but spaced from said one of said end walls, each third baffle defining a third passage near said one of said end walls;**
- **said passages causing gas entering said first port to be directed by said baffle means through said first, second, and third passages and through said second ports.**

4,093,407

INJECTION OF ADDITIVES INTO LIQUID STREAMS

David Roy Miles, Pontypool, England, assignor to Imperial Chemical Industries Inc., London, England

Division of Ser. No. 411,167, Oct. 30, 1973, Pat. No. 4,015,828.
This application Dec. 10, 1976, Ser. No. 749,562
Int. Cl.[2] F01C *1/18, 21/12;* F04C *1/08;* B01F *5/14*
U.S. Cl. 418—15 **3 Claims**



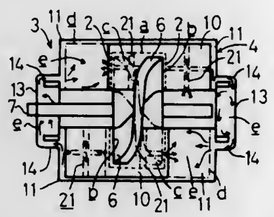
1. Apparatus for incorporating an additive into a liquid stream comprising a centre plate containing at least two intersecting circular openings, gear wheels rotatably mounted in said openings and each in meshing contact with an adjacent wheel, at least one of said wheels being driven, inlet and outlet openings positioned adjacent the points at which the gear wheels separate and mesh respectively and means projecting into the inlet opening and positioned adjacent the point at which the gear wheels separate to permit an additive to be injected into said inlet opening, said means being a hollow rod having an end portion shaped to conform to the gear wheels to the point at which they separate, the inlet opening for said additive being through the tip of said end portion where the gear wheels separate.

4,093,408

POSITIVE CAM TYPE COMPRESSOR

Yoshichika Yamaguchi, 101 Toyobafuji, Toyoyama-Chou, Nishikasugai-District, Aichi Prefecture, Japan

Filed Dec. 3, 1976, Ser. No. 747,086
Int. Cl.[2] F01C *1/00, 19/00, 21/04*
U.S. Cl. 418—92 **5 Claims**



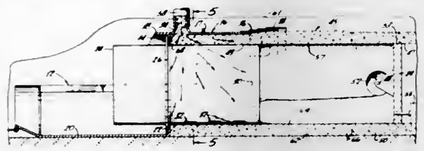
1. A positive cam type compressor comprising a cylinder having opposite ends, valve plates at each of the ends of the cylinder, front and rear plate casings on said valve plates defining respective compartments, a positive cam mounted in said cylinder to form chambers on opposite sides of the cam, means for rotating said cam, said valve plates having suction and exhaust valve openings for respective feed and discharge of fluid to and from said chambers, at least one isolator plate slidably supported by said cylinder, plate casings, and valve plates, said cam being slidably engaged with said isolator plate to produce successive suction and compression stages in said chambers and reciprocal movement of said plate into and out of said compartments as said cam undergoes rotation, a tank for lubricating fluid, said plate casings having small holes in opposite end walls thereof communicating with said tank, said isolator plate being provided with a network of lubricating channels which open at the surface of the isolator plate for facing regions to be lubricated, said isolator plate having opposite ends with small ports thereat leading to said network of channels, said ports facing said end walls of the plate casings for conveying lubricating fluid to and from said network as the isolator plate undergoes reciprocal movement, wherein said isolator plate constitutes a piston which penetrates into said compartments respectively and produces pressure therein to force the lubricating fluid into said network via said ports and withdraws from said compartments respectively and produces suction therein producing return of lubricating fluid thereto.

4,093,409

IN SITU CONCRETE PIPE FORMING MACHINE

Thomas W. Barber, El Toro, and Miles W. Proctor, Santa Ana, both of Calif., assignors to Donovan Construction Company, Irvine, Calif.

Continuation of Ser. No. 590,257, Jun. 25, 1975, abandoned.
This application Jan. 24, 1977, Ser. No. 762,063
Int. Cl.[2] B28B *13/02*
U.S. Cl. 425—59 **19 Claims**



1. An apparatus for forming in place continuous concrete pipe in an open trench, said apparatus comprising:
an interior forming member;
an exterior forming member;
means connecting said exterior forming member to said interior forming member in a spaced relation with respect to each other to define a space therebetween, said space being open at its rear end and closed at its forward end;
a concrete pump;
means connecting said concrete pump to said space for supplying concrete under pressure into said space between said interior and exterior forming members, said concrete reacting against the closed forward end of said space for moving said forming members forward; and
an inflatable support bag located and moving behind said interior forming member to support said pipe as said forming members move forward.

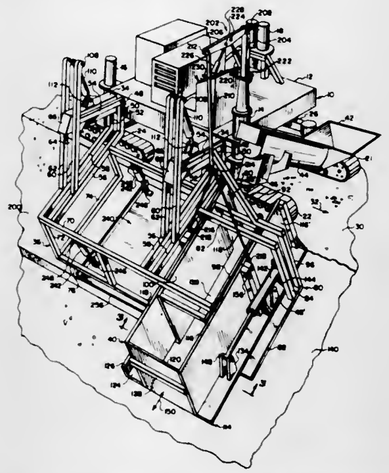
4,093,410

DITCH PAVING TOOL

Charles P. Miller, McHenry, Ill., assignor to Miller Formless Co., Inc., McHenry, Ill.

Filed Jan. 21, 1977, Ser. No. 761,272
Int. Cl.[2] 404 *104;* E02B *11/02*
U.S. Cl. 425—59 **6 Claims**

1. A ditch paving tool adapted to form a continuous layer of concrete along the sloping wall of a graded ditch upon being propelled therealong by a prime mover comprising:
a frame assembly including a pair of horizontal members supporting thereunder a framework angularly oriented with respect to said horizontal members;
said framework being disposable in a working relationship with the sloping wall of said ditch;
pivot means on said frame assembly for attaching to said prime mover for pivotal movement of said frame assembly therefrom on a generally horizontal axis;
at least a pair of upright support members extending from said frame assembly, and spaced laterally outward from said pivot means and having their upper ends above said horizontal axis;
a pair of front and rear guide means carried by the forward end of said frame assembly;
said pair of guide means being disposed and generally transverse said frame assembly;
the front guide means having a forwardly extending flange along its lower edge;
the rear guide means having a rearwardly extending flange along its lower edge;
a screed assembly carried by said pair of guide means and supported in sliding relationship on said flanges;



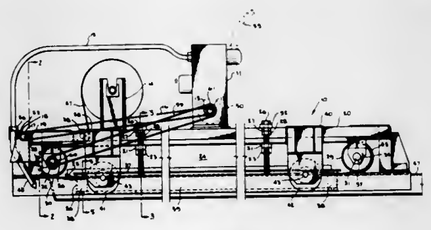
said screed assembly including enclosing substantially vertical side walls and an end wall adapted to retain said concrete for distribution in a continuous layer along said sloping wall;
power means connected between said pair of guide means and said screed assembly to extend and retract said screed assembly in relation to said pair of guide means whereby the width of said layer is controlled; and
means operatively connected to said upright support members to pivot said guide means about said pivot means to maintain said lower edges in substantially parallel spaced relationship with said sloping side.

4,093,411

APPARATUS FOR APPLYING FOAMED MATERIAL IN-PLACE TO SURFACES

Jimmy D. Lee, 6821 Piccadilly, Houston, Tex. 77017

Filed Dec. 29, 1975, Ser. No. 644,563
Int. Cl.[2] B29D *27/04*
U.S. Cl. 425—64 **10 Claims**



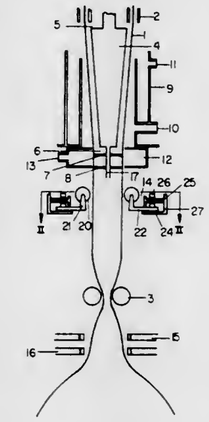
1. An apparatus for applying a foamed polymeric material in-place to a surface having an independent spacing element thereon comprising:
a framework adapted to move adjacent to the surface to which the foam is to be applied,
spacing means attached to said framework along only one side thereof for spacing said framework away from the surface to which said foam is to be applied, said framework being operatively associated with such an independent spacing element to slidably contact such an independent spacing element along the side of said framework opposite to said spacing means,
a fixed pressure plate adjustably mounted in said framework, substantially parallel to the surface to which the foam is to be applied, and adapted to cover a portion of the foamed material applied to the surface, said pressure plate being within a continuous belt mounted to said framework and which is a rolling surface, and
foam dispensing means, operably associated with one side of said framework and positioned to deliver a foamed material in proximity to the surface to which the foam is to be applied, and said pressure plate.

4,093,412

COOLING THERMOPLASTICS TUBES

John Brian Davis; Derek Skilling, and Nigel Edwin Wrigley, all of Dumfries, Scotland, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 480,273, Jun. 17, 1974, Pat. No. 3,993,723.
This application Sep. 23, 1976, Ser. No. 725,686
Claims priority, application United Kingdom, Jul. 2, 1973, 31404/73
Int. Cl.[2] B29D *23/04*
U.S. Cl. 425—71 **8 Claims**



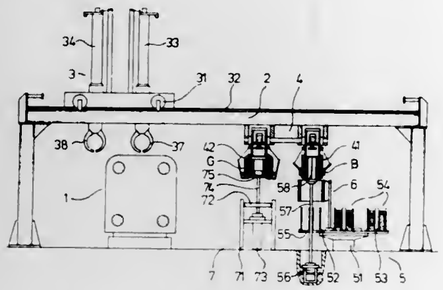
1. An apparatus for cooling an extruded tube of thermoplastic material comprising an annular orifice for extrusion of such a tube, a cooling surface downstream of said annular orifice, means downstream of said orifice for withdrawing such a tube, in the direction of extrusion, in heat-transfer relationship with said cooling surface, means operatively associated with said cooling surface for providing a sheath of a heat-transfer fluid between, and in contact with, such a tube and said cooling surface, and means between said withdrawing means and the downstream extremity of said cooling surface for displacing the whole tube in the same direction transversely of the direction of extrusion to decrease the thickness of the fluid sheath between at least a selected area of such a tube and the cooling surface.

4,093,413

AUTOMATED APPARATUS FOR MOLDING OR DIE CASTING

Wolfgang Schöllhorn, and Urban Ehret, both of Zuzwil, Switzerland, assignors to Gebruder Buhler AG, Switzerland

Filed Jun. 1, 1977, Ser. No. 802,313
Claims priority, application Switzerland, Jun. 9, 1976, 7238/76
Int. Cl.² B29C 6/00, 7/00
U.S. Cl. 425—110 26 Claims



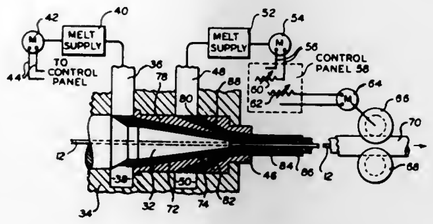
1. Apparatus for the automated manufacture, in repetitive cycles, of composites constituted by apertured composite articles having the aperture in a prefabricated insert thereof, said apparatus comprising, in combination, a mold-forming machine operable to apply molten material about said insert, by a molding operation, to form said composite; plural clamping mandrels operable to be clamped in said apertures to constitute, temporarily, "mandrel-with-insert" and "mandrel-with-composite" combinations; a discharge station for discharging composites from said mandrels; a charging station for charging said mandrels with said inserts; and a loading system with holding means, including holders for holding said mandrels, and with conveying means; said loading system repetitively carrying out, in timed sequence, the following operations: (1) at a loading/unloading position for said machine, taking hold, using a holder, of a "mandrel-with-composite" from said machine; (2) at said loading/unloading position, loading in "mandrel-with-insert" from a holder into said machine; (3) at a set-off position at said discharge station, setting-off at least one composite from a respective holder; and (4) at a take-up position at said charging station, taking-up at least one insert with a respective holder.

4,093,414

SINGLE DIE CO-EXTRUSION APPARATUS FOR INSULATION

Edward Stanley Swiatovy, Jr., Bonham, Tex., assignor to General Cable Corporation, Greenwich, Conn.

Filed Sep. 16, 1976, Ser. No. 723,783
Int. Cl.² B29F 3/10
U.S. Cl. 425—113 12 Claims



1. A single die for co-extrusion including in combination a tip having a wire passage extending lengthwise therethrough and tapering to a smaller diameter toward a discharge end of the passage at the forward end of the tip, an extrusion die surrounding a forward end portion of the tip and having an inside surface that confronts the tapered surface of the tip and that is spaced from the confronting surface of the tip to leave an annular passage between the confronting surfaces for the flow of plastic electrical insulating material through said annular passage, characterized by a melt flow separator extending into the space between said confronting surfaces and dividing said space into two passages, one of which has its sides converging to reduce the radial width of the passage along the entire portion of its length that confronts the flow separator, for different materials for forming superimposed layers of insulation, the melt flow separator extending for a portion and only a portion of the length of said annular passage, the melt flow separator terminating at its forward end at a location spaced back from the discharge end of the tip so that the separator cannot serve as an extrusion die for said tip, passages in communication with said two passages for supplying different insulating material to the upstream ends of each of said two passages on the different sides of the melt flow separator, and the extrusion die having a tapered passage therein extending beyond the tip and in which the superimposed layers of insulation are sized before discharge from the die.

4,093,415

TRANSFER PRINTING PROCESS FOR HYDROPHILIC, SYNTHETIC FIBRE MATERIAL OR MIXTURES OF HYDROPHILIC AND SYNTHETIC FIBRE MATERIAL

Raymond Defago, Riehen, and Zdenek Koci, Binningen, both of Switzerland, assignors to Ciba Geigy AG, Basel, Switzerland

Filed Jul. 8, 1975, Ser. No. 594,077
Claims priority, applications Switzerland, Jul. 12, 1974, 9638/74
Int. Cl.² D06P 5/00; C09D 11/00
U.S. Cl. 8—2.5 A 22 Claims

1. In a transfer printing process for the dyeing or optical brightening of hydrophilic fiber material, synthetic fiber material or mixtures thereof which comprises bringing a treated and dried surface of a temporary carrier into contact with the dry surface of the material to be dyed or optically brightened, applying heat sufficient to effect transfer of dyestuff or optical brightener from the temporary carrier to the material to be dyed or optically brightened, and separating the said material from the temporary carrier, the improvement according to which the temporary carrier comprises a flexible, dimensionally stable, heat stable, sheet-like base having on at least a portion of the surface thereof at least one sublimable dyestuff or optical brightener, a binder which is stable at temperatures below 230° C and at least one solid compound which melts during the heat exposure step of the transfer process and which has a vapor pressure above 10^{-5} mm Hg at 150 to 250° C, said solid compound being inert during the transfer printing process and being selected from the group consisting of amides, imides, unsubstituted and substituted ureas and thioureas and 5- or 6- membered saturated or unsaturated heterocyclic ring compound which possess at least one of the groups or atoms N, S, O, NH, CO, =CH or CH_2 as members and which compound is unsubstituted or substituted by a member from the group of alkyl (C_1 - C_4), OH, NH_2, hydroxyalkyl (C_1 - C_3) and halogen.

17. In a printing ink composition useful in the printing of temporary carriers for use in the transfer printing process, said composition comprising water, organic solvent or mixtures thereof having dissolved or dispersed therein at least one sublimable dyestuff or optical brightener and a binder which is stable below 230° C.

the improvement wherein the composition contains at least one solid compound which melts during the heat exposure step of the transfer printing process and which has a vapor pressure above 10^{-5} mm Hg at temperatures of 150° to 250° C, said solid compound being inert during the transfer printing process and being selected from the group consisting of amides, imides, unsubstituted and substituted ureas and thioureas and 5- or 6-membered saturated or unsaturated heterocyclic ring compounds which possess at least one of the groups or atoms N, S, O, NH, CO, =CH or CH_2 as members and which compound is unsubstituted or substituted by a member from the group of alkyl (C_1 - C_4), OH, NH_2, hydroxyalkyl (C_1 - C_3) and halogen.

18. In a temporary carrier for use in the transfer printing process the improvement wherein said carrier comprises a flexible, dimensionally stable, heat stable sheet-like base having on at least a portion of the surface thereof at least one sublimable dyestuff or optical brightener, a binder which is stable at temperatures below 230° C and at least one solid compound which melts during the heat exposure step of the transfer process and which has a vapor pressure above 10^{-5} mm Hg at 150° to 250° C, said solid compound being inert during the transfer printing process and being selected from the group consisting of amides, imides, unsubstituted and substituted ureas and thioureas and 5- or 6-membered saturated or unsaturated heterocyclic ring compounds which possess at least one of the groups or atoms N, S, NH, CO, =CH or CH_2 as members and which compound is unsubstituted or substituted by a member from the group of alkyl (C_1 - C_4), OH, NH_2, hydroxyalkyl (C_1 - C_3) and halogen.

4,093,416

PROCESS FOR PRINTING CARPETS

Björn Sigurd, Rump, Geneva, Switzerland, and Philippe Jean Dereux, St-Julien-en-Genevois, France, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Jan. 2, 1976, Ser. No. 646,026
Int. Cl.² D06P 1/20, 3/04, 7/00
U.S. Cl. 8—2.5 A 17 Claims

1. In a dry heat-transfer printing process for the printing of carpet yarns wherein web or warp of yarns is brought into contact with a temporary support carrying a vapor transferable dyestuff or dyestuffs and heat is applied to achieve the vapor transfer of the dyestuff or dyestuffs from the temporary support onto the web or warp of yarns, said vapor transfer being carried out prior to introducing said yarns into a machine for weaving, knitting or for attachment of the yarns to a base to form a carpet, the improvement according to which, following the vapor transfer and prior to separation of the temporary support from the yarns, the yarns and temporary support are wound onto a beam.

4,093,417

METHOD FOR PROCESSING TEXTILE MATERIAL

Karl Hans Heinlein, Alte Bahnhofstrasse 33, and Joachim Busch, Poststrasse 6, both of D-649 Schluechtern, Germany

Filed Jul. 29, 1975, Ser. No. 600,049
Claims priority, application Germany, Jun. 1, 1974, 2437173; Mar. 4, 1975, 2509381
Int. Cl.² B08B 3/00
U.S. Cl. 8—137 20 Claims

1. Method for washing textile material consisting of at least one prewash and main wash cycle and one or more rinse cycles, where a phosphate-free alkaline wash liquor is used in the main wash cycle, characterized in that a prewash detergent with surface-active substances acting in the acid range is used in acid wash solution in the prewash cycle, and that carbonate incrustations whose composition is such that they dissolve in the acid wash solution of the prewash cycle remaining on the textile material to be treated are formed in the main wash cycle.

4,093,418

METHOD OF SPOTTING GARMENTS TO BE LAUNDERED

John William Compton, Taylor, and Stephen Ellis Eisenstein, Southfield, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Mar. 23, 1977, Ser. No. 780,557
Int. Cl.² D06L 1/00
U.S. Cl. 8—142 4 Claims

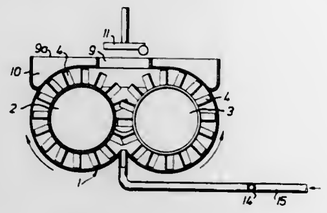
1. A method of spotting and laundering a garment containing organic soil in an area of said garment, said method comprising applying to said garment in the vicinity of said organic soil a composition which consists essentially of a solution of (1) about 10 weight percent or more of nonionic surfactant produced by reacting a mixture of fatty alcohols containing 10 to 18 carbon atoms (with the proviso that the proportions of such alcohols which is attributable to alcohols containing 17 or more carbon atoms is limited to about 20 percent by weight) with mixed lower-alkylene oxides selected from the group consisting of ethylene oxide and propylene oxide to such an extent as to have the mixed oxides comprise about 57 to 68 weight percent of the total fatty alcohols plus alkylene oxides used, with the proportion of ethylene oxide in the mixed oxides used being about 50 to 70 percent, and (2) an isoparaffinic solvent made of a mixture of isoparaffins containing an average of about 11 to 14 carbon atoms, and then laundering said garment.

4,093,419

DEVICE FOR IRRADIATING LIQUID AND PASTY SUBSTANCES

Manfred Tauber, Holm, and Dieter Heuer, Uetersen, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Germany

Filed Oct. 15, 1976, Ser. No. 732,893
Claims priority, application Germany, Oct. 22, 1975, 2547261
Int. Cl.[2] A61L 3/00; G01N 23/12
U.S. Cl. 21—102 R 6 Claims



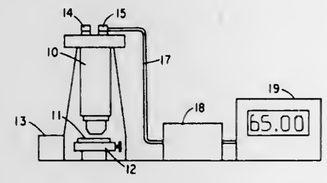
1. A device for irradiating liquid and pasty substance with high energy electrons in order to pasteurize or sterilize the irradiated substances and to also enrich them with one or more additives, particularly with gases, comprising, a horizontally disposed housing, a pair of cylindrical circulation members rotatably mounted in said housing in parallel relationship and being rotatable in opposite directions and having radially extending helically arranged blades, said housing having walls which extend in the axial direction of said circulation members and are closely conformable to the annular paths followed by the peripheries of said blades during rotation thereof, said housing having the shape of a solid figure eight formed of two tubes connected together and having a front side with an inlet for feeding the substance to be irradiated and having an opposite rear side with an outlet for discharging the irradiated substances, said housing further being provided with a plurality of openings between said inlet and said outlet for the introduction of additives and having a top with an irradiation opening between the axes of said circulation members, and electron beam radiation means disposed over said irradiation opening for directing a sweeping electron beam over said irradiation opening.

4,093,420

MINERAL PROSPECTING BY ORGANIC DIAGENESIS

John F. Grayson, Tulsa, Okla., and Peter K. H. Groth, Denver, Colo., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jun. 4, 1976, Ser. No. 692,825
Int. Cl.[2] G01N 33/24
U.S. Cl. 23—230 EP 6 Claims



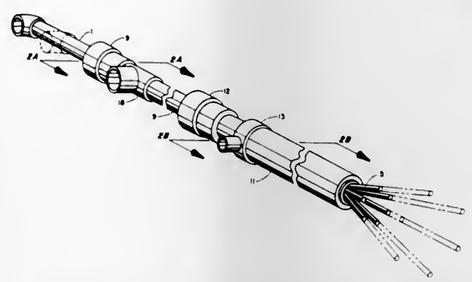
1. A method of prospecting comprising the following steps:
(a) removing palynomorphs from geological samples collected from a plurality of stations separated by a considerable distance in a region and,
(b) measuring a light characteristic due to transmission of light through a selected part of each of a plurality of said palynomorphs recovered from each sample to determine an average value thereof, whereby the average values from step (b) may be mapped against the location of said plurality of stations to produce anomalies characteristic of the subsurface below said stations.

4,093,421

APPARATUS FOR PRODUCING CARBON BLACK

Norman M. Jerkins, Rockport, Tex., assignor to Ashland Oil, Inc., Ashland, Ky.

Continuation of Ser. No. 709,814, Jul. 29, 1976, abandoned.
This application Sep. 1, 1977, Ser. No. 830,276
Int. Cl.[2] C09C 1/48; F23C 5/06
U.S. Cl. 23—259.5 5 Claims



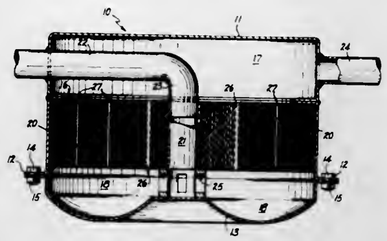
1. In a furnace-type reactor for the production of abrasion-resistant grades of rubber-reinforcing carbon black, said furnace having a tubular combustion chamber for effecting the burning of gaseous fuel therein whose diameter is substantially larger than the length thereof and whose downstream end is in open communication with an elongated axially aligned tubular reaction zone having a diameter substantially smaller than that of said combustion chamber, and means for injecting a normally liquid carbon black producing feedstock, centrally positioned within said chamber and adapted to introduce the feedstock axially into said reaction zone; the improvement wherein said feedstock injection means comprises:
a pipe shroud member fixedly and centrally positioned with respect to the upstream closure end of said combustion chamber and in axial alignment therewith, said shroud member having an upstream and downstream closure end, the latter freely accommodating the passage of the metallic feedstock supply tubes as hereinafter defined;
a feedstock suppy pipe concentrically disposed within said shroud member adapted to be longitudinally extended in the downstream direction and retracted in the upstream direction and whose upstream end projects beyond the upstream closure end of the pipe shroud member;
a cylindrical manifold rigidly attached to and in open communication with the downstream end of said feedstock suppy pipe and the header end of which is provided with a centrally located circular port and a plurality of like ports circumferentially disposed thereabout;
a metallic feedstock supply tube rigidly connected to and in axial alignment with said centrally located circular port and whose discharge end is about flush with the face of the pipe shroud member downstream closure end upon retraction of said feed stock supply pipe to its upstream excursion limit; and
a metallic feedstock supply tube of approximately the length of said centrally disposed feedstock supply tube rigidly connected to each of said circumferentially disposed header ports and permanently angularly preformed so that the discharg ends thereof assume an expanded circular pattern contiguous to and within the periphery of the opening of said reaction zone upon positioning same downstream of said pipe shroud member downstream closure end by extending said feed stock supply pipe beyond said upstream excursion limit thereof.

4,093,422

AUTOMOTIVE EXHAUST SYSTEM USING FILTER CONTAINING CALCIUM CARBONATE COATING

Paul O. Hain, Hamilton, Ohio, assignor to Champion International Corporation, Stamford, Conn.

Filed Jun. 1, 1976, Ser. No. 691,479
Int. Cl.[2] B01J 1/22; B01D 35/18
U.S. Cl. 23—284 8 Claims



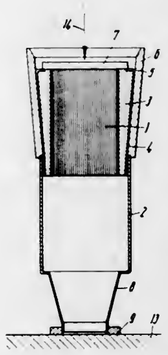
1. In an exhaust system for an internal combustion engine, the improvement comprising a filter contained in a container and interposed in the exhaust line, said filter containing paper formed into a gas filter in which the plane of the paper is parallel to the movement of the exhaust gases, said paper being coated with finely divided particles of calcium carbonate, said paper being ablative under the conditions encountered in said exhaust system, said calcium carbonate constituting at least 85% of the weight of pigments and fillers in the coating, and the proportion of binder in the coating not exceeding 20% of the total weight of pigments and fillers, and said filter being positioned so that when the exhaust gases are passed through the filter, the coated paper can fall away from the filter where it is initially contacted by said exhaust gases.

4,093,423

CATALYTIC DEVICE FOR THE CATALYTIC PURIFICATION OF EXHAUST GASES

Joachim Neumann, Stockheim, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Oct. 3, 1973, Ser. No. 403,270
Claims priority, application Germany, Dec. 7, 1972, 2259817; Oct. 3, 1972, 2248442; Apr. 18, 1973, 2319663
Int. Cl.[2] B01J 8/03, 35/04; F01N 3/15; B21D 53/00
U.S. Cl. 23—288 FC 8 Claims



1. A method of supporting a ceramic monolithic element in a generally tubular metal catalytic converter housing comprising the steps of: wrapping a compressible, resilient material around the periphery of a monolithic catalyst element; placing at least one self-supporting, thin metal liner member around said wrapper of resilient material, the combination of said monolithic element, said resilient material wrapper and said liner member having a diameter in an uncompressed state greater than the internal diameter of said housing; imposing an external compressive force about said liner member around its periphery to compress said wrapper of resilient material and to reduce the circumference of the liner member to a dimension less than the internal circumference of the converter housing; axially inserting said compressed combination of said liner member, said wrapper of resilient material and said monolithic element into said tubular housing and removing said external compressive force.

3. In a catalytic converter for treating exhaust gases having a metal housing containing gas inlet and outlet ports and a catalyst coated, axially channeled monolithic ceramic element positioned within said housing, the improvement comprising a wrapper of compressible, resilient material wrapped around said ceramic element, and extending axially for at least a portion of the length of said element, said wrapper being maintained in a partially compressed state as compared to either its free or its fully compressed state, within the walls of a tubular center portion of said housing and also comprising at least one metal liner member shaped to conform generally to and within the walls of the tubular center portion, the said liner member having non-joined longitudinal side edges which permit the diameter of the liner member to be varied, said liner member being positioned in surrounding relation to said wrapper and in contact with said wrapper so as to partially compress said wrapper and to space said wrapper from the walls of said tubular center portion of said metal housing, the resiliency of said wrapper causing said liner member to be forced outwardly to the maximum diametrical extent permitted by the constraint imposed by the center portion of the metal housing.

4,093,424

THERMOGENIC COMPOSITIONS

Rissaburo Yoshida; Keisuke Kaiho; Yusaku Ide, and Takeshi Hirose, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co,, Ltd., Tokyo, Japan

Filed Mar. 2, 1977, Ser. No. 773,715
Claims priority, application Japan, Mar. 9, 1976, 51-24700; Apr. 13, 1976, 51-40867; Jun. 15, 1976, 51-69297; Jun. 15, 1976, 51-69298; Jul. 21, 1976, 51-86051; Dec. 9, 1976, 51-147124
Int. Cl.[2] F24J 1/00, 3/00; C09K 3/18
U.S. Cl. 44—3 C 7 Claims

1. A thermogenic composition comprising (A) at least one compound selected from the group consisting of alkali metal sulphides, polysulphides, hydrosulphides, hydrates thereof and mixtures thereof and (B) at least one compound selected from the group consisting of (1) carbonaceous material, (2) iron carbide, (3) activated clay, (4) iron, nickel and cobalt sulphates and hydrates thereof and (5) potassium salt of anthraquinone sulphonate.

4,093,425

PROCESS FOR PREPARING COAL BRIQUETTES FOR COKE AND APPARATUS FOR THE PROCESS

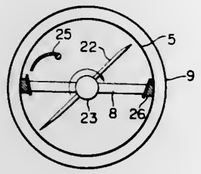
Eimi Araki, Kyoto; Takeo Sakai; Seizaburo Takai, both of Tokyo, and Sekiro Komori, Fukuyama, all of Japan, assignors to Keihan Rentan Kogyo Co., Ltd., Japan

Filed Oct. 29, 1976, Ser. No. 737,021
Claims priority, application Japan, Nov. 1, 1975, 50-131678
Int. Cl.[2] C10L 5/00, 5/22; B30B 11/00
U.S. Cl. 44—10 F 13 Claims

1. A process for preparing a coal briquette by pulverizing a starting coal followed by adding a caking agent and then molding the resulting mixture, which comprises introducing coal into a tightly closed vessel equipped with a high speed rotating blade, pulverizing the coal, while water content of the coal is left as it is, raising the temperature of coal by utilizing frictional heat generated during the pulverization, to a temperature above the melting point of said caking agent maintaining the system pressure at a predetermined value by regulating the water content of the pulverized coal, adding said caking agent to the pulverized coal while the coal is kept at said temperature

above the melting point of the caking agent, throughly mixing and kneading the caking agent with the pulverized coal and sufficiently spreading it over the pulverized coal and subsequently removing the coal from said tightly closed vessel and briquetting the coal.

12. A tightly closed type of kneader for pulverizing a starting coal for coal briquette and kneading the pulverized coal with caking agent which comprises a propeller type inclined lower stirring blade and a U type stirring upper blade near the



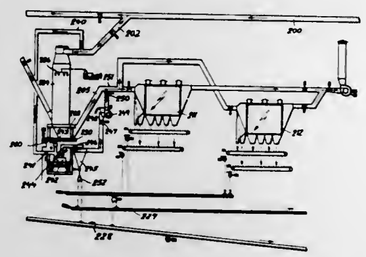
bottom where both the blades are fixed coaxially or to the same shaft and driven externally, an inlet for the starting coal and an outlet for product both of which can be opened, closed or tightly shut, a coal collecting blade having a sectoral cross section facing the direction of rotation of the coal and fixed inside of the U-type rotating blade, an automatically controlled external heating device and a pressure controlling device which can function also as a discharge valve for excessive steam pressure, and a water-supply pipe.

4,093,426

METHOD OF AND APPARATUS FOR THE LIQUID CONTACT OF DUST FROM A HOT-GAS STREAM AND DRYING SLUDGE

Juan Cantalapiedra Benjumea, Madrid, Spain, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jun. 16, 1977, Ser. No. 807,329
Claims priority, application Spain, Jun. 18, 1976, 448,984
Int. Cl.² B03C *1/00*
U.S. Cl. 55—8 **10 Claims**



1. In a method for the removal of solids from a hot-gas stream entraining particles of said solids wherein said hot-gas stream is cooled, treated with a liquid with settling of particles therefrom, and thereafter subjected to electrostatic precipitation, the improvement which comprises:

separating settled particles from the gas stream from which the particles settle;

branching a portion of a main stream of the hot-gas stream from the remainder of the main stream prior to the cooling thereof;

contacting the separated settled particles with the branched portion of said hot-gas stream to cool the branched portion and dry the separated settled particles; and

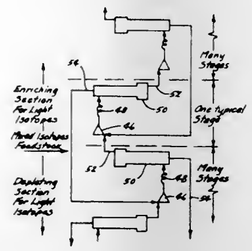
thereafter combining said cooled portion with the remainder of the main stream prior to electrostatic precipitation.

4,093,427

METHOD FOR SEPARATING ISOTOPES

Ralph F. Schlenker, R.R. #4, Indianola, Iowa 50125

Filed Jan. 23, 1975, Ser. No. 543,232
Int. Cl.² B01D *57/00*
U.S. Cl. 55—17 **5 Claims**



1. A method for separating a mixture of heavy and light isotopes comprising:

introducing a gaseous feed stock mixture containing light and heavy isotopes under sufficient pressure and temperature into an elongated cylindrical vortex tube in a circumferential fashion so as to impart a swirling action of said mixture within said tube around the longitudinal axis thereof which separates said mixture into a warmer outer, radial portion and a cooler inner, radial portion;

drawing off said outer radial portion of said swirling mixture which comprises about 60% of the feed stock mixture adjacent the cylindrical walls of said tube through an outer opening spaced radially outwardly from the longitudinal axis of said tube;

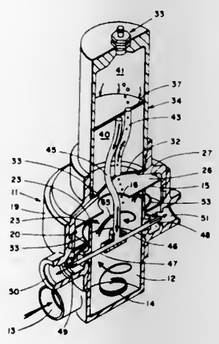
drawing off the inner radial portion of said whirling mixture which comprises about 40% of the gaseous feed stock mixture through an axial outlet located approximately along the longitudinal axis of said tube, said inner radial portion exiting from said axial outlet being enriched with heavy isotopes and said outer radial portion exiting from said outer opening being enriched in light isotopes.

4,093,428

GAS/LIQUID SEPARATOR

Emery C. Swogger, Arlington, Tex., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 12, 1977, Ser. No. 786,909
Int. Cl.² B01D *19/00*
U.S. Cl. 55—52 **11 Claims**



1. A method of separating liquid from gas bubbles entrained therein comprising:

creating a vortex of said liquid so that more dense substantially bubble-free liquid will collect in the periphery thereof and less dense bubble-containing liquid will collect in the center thereof,

said step of creating a vortex including initially directing liquid tangentially into a circular chamber;

recovering said more dense liquid by peripheral discharge and collecting said less dense liquid by aspiration effect from said vortex,

said step of recovering more dense liquid including changing circular flow of exiting liquid into radial flow thereof,

said step of collecting less dense liquid including discharging said less dense liquid symmetrically within the discharge of said more dense liquid to create said aspiration effect;

venting the bubbles from said collected liquid;

combining said liquid recovered by peripheral discharge and said collected liquid in an outlet flow arranged so as to create said aspiration effect; and

additionally removing bubbles from said less dense liquid by discharge thereof into a first volume and collecting the liquid in a second volume by peripheral settling from said first volume,

said step of recovering more dense liquid further including additionally baffling said peripherally discharged liquid so as to form radially outward movement thereof prior to said liquid entering the outlet of the separating device.

2. A gas and liquid separator for separating entrained gases from a liquid such as hydraulic fluid under extreme starting and operating conditions comprising:

a container having an inlet chamber and inlet means for directing liquid entering said chamber around the circumference thereof so as to produce a swirling motion therein thereby creating a centrifugal force action which causes heavier liquid to move to the wall of the chamber and liquid having gas entrained therein to be forced toward the center of the chamber so as to create a vortex in the liquid directed thereinto;

a separating chamber contiguous to said inlet chamber for initially separating larger gas bubbles from said liquid;

an annular chamber disposed about said separating chamber and a circumferential slot in said separating chamber permitting overflow of more dense liquid into said annular chamber so that the more dense substantially gas-free liquid may be discharged therefrom;

a settling chamber remote from said separating chamber and means for directing the liquid not discharged from said separating chamber and containing smaller gas bubbles into said settling chamber;

vent means connected to said settling chamber for venting gas therefrom,

said settling chamber partitioned into at least upper and lower communicating volumes;

means for collecting and conveying liquid not discharged from said separating chamber through said lower volume to said upper volume;

means including a baffle permitting peripheral settling of liquid from said upper volume to said lower volume for centrally concentrating said not discharged liquid;

conduit means for centrally discharging liquid from said lower volume at a position adjacent said means permitting peripheral settling;

means for combining liquid discharged from said separating chamber and said lower volume so as to augment flow of liquid through said separator,

said combining means including a restricted outlet in said container and said annular chamber communicating with and discharging liquid into said restricted outlet in such a relation to the discharge of liquid thereinto from said volume as to create an aspiration effect inducing circulation into and out of said upper volume;

and

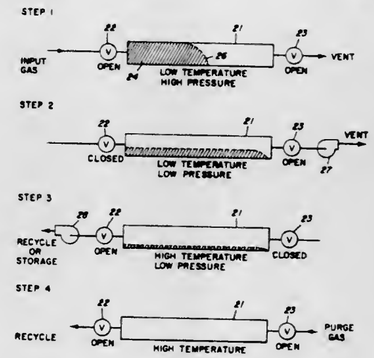
radially disposed baffles in said annular chamber for changing circular flow of liquid to radial flow thereof.

4,093,429

GAS SEPARATION SYSTEM

Manfred Siegler, San Jose, and Ted Lee Wong, Sunnyvale, both of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Dec. 19, 1975, Ser. No. 642,460
Int. Cl.² B01D *51/00, 53/04*
U.S. Cl. 55—58 **10 Claims**



1. In a processing system for processing a stream of a gas mixture including a relatively small portion of predetermined gas mixed with other gases. a process for removing said predetermined gas from said gas mixture and concentrating said predetermined gas comprising the steps of:

(1) providing a gas preconditioning system having an inlet and an outlet and including means for removing selected gases from said gas mixture;

(2) directing said gas mixture into said inlet of said preconditioning system to thereby provide a preconditioned gas mixture at said outlet of said preconditioning system;

(3) providing a gas separation system including first and second adsorber columns each including a bed of adsorbent having high selectivity for said predetermined gas in a container having inlet and outlet passages, said preconditioning system having a gas handling capacity which is multiple of the gas processing capacity of said separation system;

(4) directing all but a predetermined portion of said preconditioned gas mixture from said outlet of said preconditioning system to the inlet thereof for recirculation therethrough;

(5) directing said predetermined portion of said preconditioned gas mixture from said outlet of said preconditioning system into said inlet passage of said first column of said separation system and into the first column bed thereof while said column is at a low temperature and a high pressure favorable for adsorption of said predetermined gas on said adsorbent whereby an adsorbate of said predetermined gas and co-adsorbed other gases is adsorbed only on an upstream portion less than the full length of said first column bed while the remainder of said other gases free of said predetermined gas are exhausted through said outlet passage of said first column and vented from said processing system;

(6) directing said predetermined portion of said preconditioned gas mixture into said inlet passage of said second column and into the second column bed in accordance with the conditions of said step (5) when said upstream portion of said first column bed becomes saturated;

(7) closing said inlet passage of said first column when said upstream portion of said first column bed becomes saturated and reducing the pressure therein from said high pressure to a low pressure favorable for desorption of said adsorbate from said adsorbent by pump-down through said outlet passage of said first column for removing from said first column bed and venting from said processing

system a portion of said co-adsorbed other gases, and terminating said pump-down short of breakthrough of said predetermined gas from said bed whereby the vented gases are free of said predetermined gas;

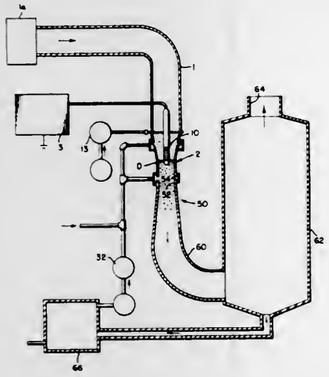
(8) closing said outlet passage of said first column and increasing the temperature of said first column bed above said low temperature to a high temperature favorable for desorption of said predetermined gas from said absorbent while reducing the pressure in said first column by pump-down through said inlet passage of said first column to desorb and remove said predetermined gas and co-adsorbed other gases from said first column bed and directing the thus removed gases into said inlet of said preconditioning system for recirculation therethrough whereby the concentration of said predetermined gas in said preconditioned gas mixture is increased.

4,093,430

APPARATUS FOR IONIZING GASES, ELECTROSTATICALLY CHARGING PARTICLES, AND ELECTROSTATICALLY CHARGING PARTICLES OR IONIZING GASES FOR REMOVING CONTAMINANTS FROM GAS STREAMS

James J. Schwab, Seattle, and David B. Goodson, Renton, both of Wash., assignors to Air Pollution Systems, Incorporated, Kent, Wash.

Division of Ser. No. 498,409, Aug. 19, 1974, abandoned. This application May 28, 1976, Ser. No. 690,948
Int. Cl.² B03C *3/41*
U.S. Cl. 55—107 **35 Claims**



1. An apparatus for removing contaminants from a gas, comprising:

a tubular outer electrode adapted to conduct said gas therethrough;

a generally planar inner electrode having a perimeter generally corresponding to the shape of said outer electrode, said inner electrode being positioned within said outer electrode and defining an electrode gap therebetween, said inner electrode having a smoothly curved peripheral surface converging outwardly from the center of said electrode when viewed in axial cross section said inner electrode being the sole corona current emitting structure within a sufficient distance from said inner electrode to allow an axial wedge-shaped expansion of the field to the outer electrode;

means for applying a high voltage across said electrodes for creating a corona discharge high intensity electrostatic field within said electrode gap;

means for cleaning the surface of said outer electrode;

means for moving said gas in a stream axially through said electrode gap thereby charging contaminants in said gas; and

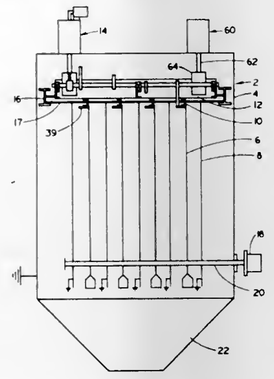
means for collecting said charged contaminants.

4,093,431

RAPPING ASSEMBLY AND ELECTRODE SUPPORTS FOR ELECTROSTATIC PRECIPITATORS

Alfred Frauenfelder, Zollikerberg, Switzerland, assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed Dec. 13, 1976, Ser. No. 749,674
Int. Cl.² B03C *3/76*
U.S. Cl. 55—112 **7 Claims**



1. In combination with an electrostatic precipitator having a housing with a flow-through inlet and a flow-through outlet and a plurality of discharge and collecting electrodes disposed therein defining an electrostatic field therebetween, said housing including an opening in the upper portion thereof with a rapping assembly extending therethrough, said rapping assembly for said discharge electrodes comprising:

an electrically insulated cover means covering said opening;

a vertically extending reciprocating support means having an upper end extending through said cover, insulating means insulating said reciprocating support means, the lower end of said support means having a pin wheel drive means mounted thereon;

driving means driving said reciprocating support means;

a vertically extending stationary support tube encircling said vertically extending reciprocating means attached to said insulated cover means at its upper end and having electrode carrying means mounted onto its lower end;

said electrode carrying means having a plurality of said discharge electrodes attached thereto and at least one rapper receiving means mounted onto said electrode carrying means;

said electrode carrying means including rapper shaft support means thereon supporting a horizontally extending rapper shaft, said rapper shaft including at least one rapper thereon, said rapper being in alignment with and received by said rapper receiving means, said rapper shaft including a pin wheel therein in alignment with and driven by said pin wheel drive means whereby said rapper shaft is rotatable at a preselected rate.

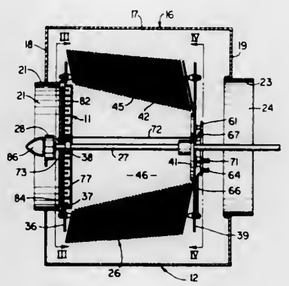
4,093,432

ELECTROSTATIC PRECIPITATOR

Willard K. Ahlrich, 2227 Pine Lake Rd. NW., Stuart, Fla. 33494

Continuation-in-part of Ser. No. 573,570, May 1, 1975, Pat. No. 4,018,578. This application Sep. 3, 1976, Ser. No. 720,219
Int. Cl.² B03C *3/00*
U.S. Cl. 55—138 **17 Claims**

1. In an electrostatic precipitator having a plurality of annular, axially spaced apart, parallel collector plates, said collector plates being axially aligned and each having a central opening therethrough, the central openings of said collector plates being aligned to define an axially elongated gas-receiving passage surrounded by said plurality of collector plates, inlet means associated with one end of said plurality of collector plates for permitting a gaseous stream to be supplied into said gas-receiving passage and then flow radially outwardly through channels defined between the adjacent collector plates, an end plate disposed adjacent the other end of said plurality of plates for closing the other end of said passage, ionizing means associated with said inlet means for ionizing the gaseous stream flowing therethrough, means for electrically insulatively supporting alternate ones of said collector plates from the others of said collector plates, and electrical connection means for supplying voltage to said alternate collector plates and said ionizing means, comprising the improvement



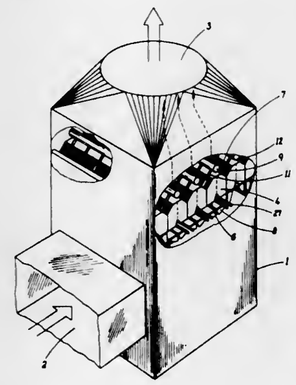
wherein the central openings of at least some of said collector plates are of decreasing diameter as the plates extend from one end thereof to the other end thereof so that the axially elongated gas-receiving passage decreases in cross-sectional area as it extends from said inlet means to said end plate, and wherein said plurality of plates extend at a nonperpendicular angle with respect to the axial direction of said passage so as to define a reverse slope as measured with respect to a radially outwardly extending direction which results in the radially outer edges of said plates being axially positioned between the radially inner edges of the plates and said inlet means.

4,093,433

DAMPER ASSEMBLY FOR MOBILE BED SCRUBBER

Mervin L. Smith, Sellersburg, Ind., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed Jul. 29, 1974, Ser. No. 492,705
Int. Cl.² B01D *47/12*
U.S. Cl. 55—226 **5 Claims**



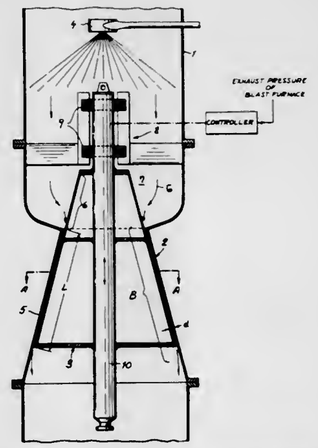
1. A wet scrubbing apparatus comprising: a housing with a fluid flow inlet and a fluid flow outlet; a plurality of contactor beds disposed within said housing, each bed including a fluid flow inlet and a fluid flow outlet, each said contactor bed fluid flow inlet being in fluid communication with said housing inlet; a spray means positioned to introduce scrubber solution into said contactor beds; each said contactor bed fluid flow outlet being in fluid communication with said housing outlet; a damper assembly pivotally disposed in each said contactor bed fluid flow inlet to control said contactor bed inlet fluid flow wherein individual contactor beds may be closed off to waste gas flow; each said contactor bed inlet includes an adjustable weir plate, said adjustable weir plate extending downwardly from the side of said inlet opposite a stop means, said weir plate in its downward extreme position abutting a trailing edge of said damper assembly in its normally closed position.

4,093,434

GAS-SCRUBBER APPARATUS FOR BLAST FURNACE

Gerhard Hausberg, Essen-Bredeney; Karl-Rudolf Hegemann, Essen-Bergerhausen; Günther Finger, Wesel; Hans Schäfer, Gelsenkirchen, and Helmut Weissert, Hamm, all of Germany, assignors to Gottfried Bischoff Bau Kompl. Gasreinigungs- und Wasserrueckkuhlanlagen Kommanditgesellschaft, Essen, Germany

Filed Mar. 25, 1976, Ser. No. 670,542
Claims priority, application Germany, Mar. 26, 1975, 2513360; Aug. 16, 1975, 2536534
Int. Cl.² B01D *47/00*
U.S. Cl. 55—226 **6 Claims**



1. A gas-cleaning apparatus for a high-pressure blast furnace comprising a cylindrical duct leading from the blast furnace, and an annular-gap washer connected to said duct, said annular-gap washer comprising:

wall means below said duct forming a frustoconical passage diverging progressively in the direction of gas flow;

a frustoconical insert body of complementary divergence received in said passage and defining with said wall means an annular gap of progressively increasing diameter from an inlet side of of said gap to an outlet side thereof:

means in said passage mounting said body for axial shifting relative to said wall means to adjust the radial width of said gap and control the pressure drop across the annular-gap washer, said body having the same conicity as said passage between said inlet and outlet sides;

nozzle means in said duct above said wall means and said body for spraying and scrubbing liquid into the gas entering the inlet side of said gap, said passage having a diameter at said outlet side corresponding to the diameter of said duct; and

a collecting chamber between said duct and said wall means, said chamber having an upper diameter equal to that of said duct and a lower diameter equal to that of said inlet side while forming a generally horizontal bottom on the level of said inlet side, said body having a projecting portion reaching into said chamber and engaging said mounting means for the axial shifting of said body, said

collecting chamber having a wall connected to said duct and to said wall means,

said gap being so dimensioned that the pressure drop along the length of said gap is substantially linear and the gas exits from said outlet side at substantially the same velocity as that with which it enters said inlet side.

4,093,435

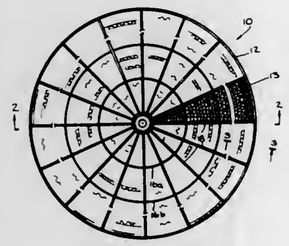
TOTAL HEAT ENERGY EXCHANGERS

Albert J. Marron, Spring Lake, and Walter J. Markowski, Cranford, both of N.J., assignors to Wing Industries Inc., Cranford, N.J.

Continuation-in-part of Ser. No. 418,364, Nov. 23, 1973, abandoned. This application Jul. 17, 1975, Ser. No. 596,642

Int. Cl.² B01D *53/06*; F28D *19/04*

U.S. Cl. 55—269 **24 Claims**



14. In a make-up air supply system having a total energy exchange wheel mounted for rotation spanning across an air supply duct leading from the outside atmosphere into a room or the like and a parallel adjacent exhaust air duct from said room to said outside atmosphere, the improvement comprising a media for said wheel providing parallel tubular passages aligned with said airstreams for the passage of air through said wheel, the diameter of each of said passages being not less then substantially 0.055 inch nor more than substantially 0.12 inch and the length of said passages being within the range of from substantially 100 to substantially 400 times said passage diameter, said media comprising cellulosic paper material constituted by substantially 84% by weight of paper fibres and substantially 16% by weight of ammonium sulfide and diammonium phosphate, and the temperature and humidity conditions of the air received in said room through said media being in other than straight line relationship, when plotted on a psychrometric chart, with the temperature and humidity conditions of said outside atmosphere and said room air.

4,093,436

URANIUM ENRICHMENT APPARATUS HAVING A CASCADE OF SEPARATING STAGES IN A SINGLE UNIT

Werner Wenzel, Spellen, Germany, assignor to NUSTEP Trenndusen Entwicklungsund Patentverwertungsgesellschaft mbH & Co. Kommanditgesellschaft, Essen, Germany

Filed Sep. 22, 1976, Ser. No. 725,493

Claims priority, application Germany, Sep. 23, 1975, 2542296

Int. Cl.² B01D *51/08*

U.S. Cl. 55—269 **6 Claims**

1. An apparatus for isotopic enrichment of a gas, especially uranium enrichment, comprising:

an upright column formed as a vacuum-tight multipartite container having an upper portion, an intermediate portion and a lower portion, said column being formed at least in the regions of said intermediate and upper portions with a central mounting tube;

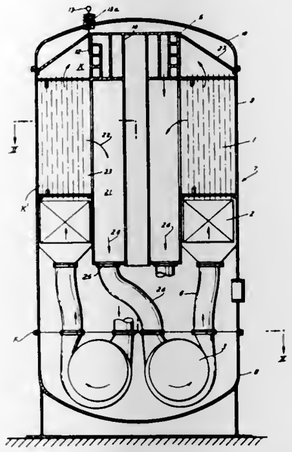
a multiplicity of radial partitions at least in said intermediate portion subdividing same into a plurality of sectors, said partitions being affixed to said mounting tube;

respective separating-nozzle units in each of said sectors for the isotopic separation of gas therein into light and heavy fractions;

respective coolers in said intermediate portion below each of said sectors for feeding gas to the respective unit;

respective compressors in said lower portion of said column for compressing gas and feeding it to each of said coolers;

duct means in said column for receiving respective fractions from the units of the units of the respective sectors and



mixing a light fraction from one unit with heavy fraction from another unit prior to passage into the respective compressor whereby said units are connected in cascade, said duct means including an annular gas distributor in said upper portion of said column having respective passages communicating with each sector at the top thereof; and

slider means for selectively controlling the flow cross-sections of said passages.

4,093,437

AIR FILTER MATERIAL

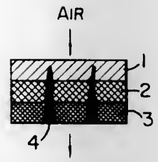
Hiroo Ichihara, Nagoya, and Yuzuru Ohta, Kasugai, both of Japan, assignors to Nippondenso Co., Ltd., Japan

Filed Aug. 25, 1976, Ser. No. 717,667

Claims priority, application Japan, Aug. 26, 1975, 50-103744

Int. Cl.² B01D *50/00*

U.S. Cl. 55—487 **6 Claims**



1. An air filter material comprising:

(1) an upper fibrous layer to be disposed at upperstream position of influent air, containing 50 to 70% by weight of polyester fiber having a diameter of about 2 denier and 50 to 30% by weight of polyester fiber having a diameter of about 6 denier, the basis weight of said layer being 25 to 45 g/m^2;

(2) an intermediate fibrous layer containing 60 to 80% by weight of polyester fiber having a diameter of about 1.5 denier and 40 to 20% by weight of polyester fiber having a diameter of 2 to 2.5 denier, the basis weight of said intermediate layer being 40 to 60 g/m^2;

(3) a lower fibrous layer to be disposed at downstream position of the influent air, containing 60 to 80% by weight of rayon fiber having a diameter of about 1.5 denier and 40 to 20% by weight of rayon fiber having a diameter of about 2 denier, the basis weight of said lower fibrous layer being 80 to 100 g/m^2;

(4) a resin applied to the unified mass of the said three fibrous layers to provide a fibrous layer lamination; and,

(5) a plurality of columns of intertwinement extending from one side of the fibrous layer lamination to the other to increase rigidity.

4,093,438

METHOD OF MAKING LAMINATED WINDSHIELDS

Robert M. Currie, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 28, 1977, Ser. No. 846,654

Int. Cl.² C03B *23/02*

U.S. Cl. 65—62 **1 Claim**

1. A method of making windshields from a glass ribbon manufactured by a float process in which molten glass is flowed out upon a molten metal bath to form a ribbon of glass, wherein the ribbon of glass is stretched by longitudinally applied stretching forces to a thickness less than an equilibrium thickness, and wherein the ribbon of glass is removed from the molten metal bath and annealed, the glass ribbon developing drawlines therein in the direction of movement of the ribbon over the molten metal bath because of the stretching forces applied thereto, which method of making windshields comprises the steps of:

cutting oblong glass brackets from said glass ribbon in a manner that the drawlines run across the shorter dimension of the bracket;

cutting the so-formed glass brackets into windshield shaped articles;

forming pairs of windshield shaped articles;

bending said formed pairs of windshield shaped articles to a final windshield configuration; and

laminating formed pairs of the so-bent windshield shaped articles to produce completed windshields which have the drawlines of the glass aligned in the top to bottom direction.

4,093,439

METHOD AND APPARATUS FOR MANUFACTURING GLASS RIBBON ON A BATH OF MOLTEN METAL

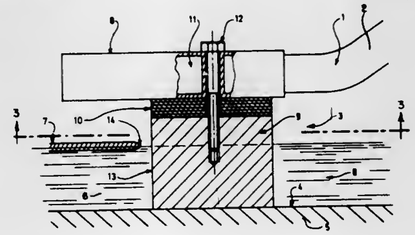
Jean-Claude Coulon, Chalon sur Saone, France, and Piero Amannati, Pisa, Italy, assignors to Saint Gobain Industries, Neuilly-sur-Seine, France

Filed May 19, 1977, Ser. No. 798,618

Claims priority, application France, May 19, 1976, 76 15049

Int. Cl.² C03B *18/02*

U.S. Cl. 65—65 **15 Claims**



1. An apparatus for manufacturing glass ribbon comprising in combination:

(a) a tank containing a bath of molten metal on which is poured molten glass to form a glass ribbon; and

(b) a guide member disposed interior of side walls of the tank along opposite edges of the glass ribbon, a lower portion of said guide member being made of a non-wettable material and having means for thrusting the glass ribbon contacting the guide member in a direction generally transverse to the axis of the glass ribbon, said means for thrusting the glass ribbon being rotatable about a vertical axis, an upper portion of said guide member having means for cooling the edges of the glass ribbon, said cooling means being separated from said rotatable thrusting means above the surface of the molten metal bath by a thermal insulating means which prevents the cooling means from cooling the thrusting means.

13. A method for manufacturing a glass ribbon comprising:

(a) directing molten glass onto a bath of molten metal;

(b) advancing the molten glass along the molten metal bath so as to form a glass ribbon;

(c) guiding and simultaneously cooling the edges of the glass ribbon as the glass ribbon advances along the molten metal bath, the glass ribbon being guided by rotatable means disposed about a vertical axis for thrusting the glass ribbon in a direction generally transverse to the advancing flow of the glass ribbon and the cooling being performed by cooling means positioned above the glass ribbon, said thrusting means and cooling means being parts of a single structure disposed interior of side walls of the bath along opposite edges of the glass ribbon; and

(d) thermal insulating the thrusting means from said cooling means.

4,093,440

SOLID PHYTOSANITARY COMPOSITION

Claude Denninger, Chazay d'Azergues; Michel Joly, Villeurbanne, and Jean-Noel Tabet, Lyon, all of France, assignors to Sogemaric, Lyon, France

Filed July 10, 1975, Ser. No. 594,856

Claims priority, application France, Jul. 15, 1974, 74 25780

Int. Cl.² A01N *17/08*

U.S. Cl. 71—65 **6 Claims**

1. A solid phytosanitary composition compacted into single doses for agricultural application intended to be progressively disintegrated by contact with a stream of water and containing a few to 80% by weight of an active material selected from the group consisting of a herbicide, growth regulator, and fertilizer, a solid nonhydrophilic filler of which talcum is the major component and 20–60% by weight of a solid water-insoluble starch.

4,093,441

METHOD FOR INHIBITING BUD GROWTH OF PLANTS

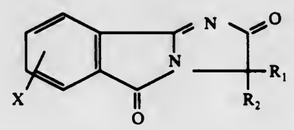
Saleh Abdul-Kadir Ashkar, Madison, Wis., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 631,359, Nov. 12, 1975, Pat. No. 4,067,718. This application Sep. 9, 1977, Ser. No. 831,841

Int. Cl.² A01N *9/22*

U.S. Cl. 71—78 **9 Claims**

1. A method for inhibiting bud growth on plants comprising, contacting the plants with a bud growth inhibiting amount of a compound of the formula:



(I)

wherein X represents H, CH_3, Cl, OCH_3, SCH_3 or NO_2; R_1 is phenyl, vinyl or alkyl C_1–C_4; R_2 is alkyl C_1–C_4, provided that when R_1 is alkyl the sum of the carbon atoms in the groups represented by R_1 and R_2 is 5 to 7, and when R_1 and R_2 are taken together with the carbon atom to which they are attached, they may represent cycloalkyl C_5–C_6 optionally substituted with methyl; and the optical and stereoisomers thereof.

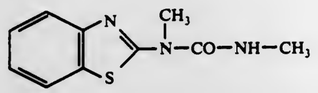
4,093,442

SYNERGISTIC HERBICIDAL COMPOSITIONS COMPRISING 3-(BENZTHIAZOL-2-yl)-1,3-DIMETHYLUREA AND A SUBSTITUTED DIPHENYL ETHER

Robert Rudolf Schmidt, Cologne, and Lothar Rohe, Wuppertal, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

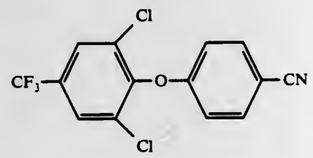
Filed Jun. 2, 1976, Ser. No. 692,169
Claims priority, application Germany, Jun. 19, 1975, 2527394
Int. Cl.[2] A01N *9/12*
U.S. Cl. 71—90 10 Claims

1. A herbicidal composition containing as active ingredients synergistically effective amounts of (1) 3-(benzthiazol-2-yl)-1,3-dimethylurea, of the formula



(I),

and (2) 2,6-dichloro-4-trifluoromethyl-4'-cyano-diphenyl ether of the formula



(II)

said composition containing (1) the urea and (2) the diphenyl ether in a ratio by weight of 1:0.1 to 1.

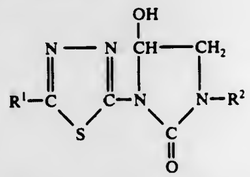
4,093,443

THIADIAZOLYLIMIDAZOLIDINONES

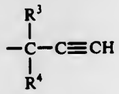
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 494,441, Aug. 5, 1974, Pat. No. 4,028,375.
This application Apr. 7, 1977, Ser. No. 785,711
The portion of the term of this patent subsequent to Jun. 15, 1993, has been disclaimed.
Int. Cl.[2] A01N *9/12*
U.S. Cl. 71—90 9 Claims

1. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of the formula



wherein R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; and R^2 is selected from the group consisting of lower alkenyl, lower chloroalkenyl, lower bromoalkenyl and



wherein R^3 and R^4 are selected from the group consisting of hydrogen and alkyl of up to three carbon atoms.

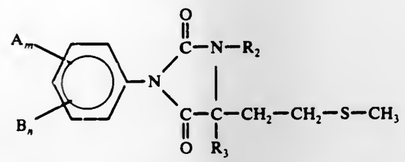
4,093,444

HYDANTOIN DERIVATIVES AND METHODS FOR REGULATING PLANT-GROWTH

Claude Clapot, Oullins; Jean Vial, Tassin, and Louis Dumont, Chaponost, all of France, assignors to PEPRO, Societe pour le Developpement et la Vente de Specialites Chimiques, Lyons, France

Division of Ser. No. 472,471, May 22, 1974, Pat. No. 3,990,883.
This application Sep. 21, 1976, Ser. No. 725,295
Claims priority, application France, May 22, 1973, 73 19579
Int. Cl.[2] A01N *9/12*; C07D *233/76*
U.S. Cl. 71—92 6 Claims

1. A process for modifying the growth of plants wherein the plants are treated with an effective amount of a compound corresponding to the formula:



in which

A represents hydrogen or halogen, except that the phenyl radical is not 3,5-dihalogenated,

B represents hydrogen, an alkyl, alkoxy, NO_2, CN, COOR' where R' = hydrogen, alkyl, the alkyl part of the radicals containing from 1 to 5 carbon atoms,

m is an integer from 0 to 5,

n is an integer from 0 to 3;

m and *n* together being at most equal to 5;

R_3 represents hydrogen or an alkyl radical containing 1 to 5 carbon atoms;

R_2 represents hydrogen, an optionally halogenated or hydroxy substituted $C_1 - C_5$ alkyl radical, a $C_1 - C_5$ alkanoyl radical, a carbamoyl radical monosubstituted or disubstituted on the nitrogen by $C_1 - C_5$ alkyl;

or a plant-growth-modifying salt thereof.

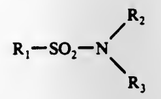
4,093,445

SULFONAMIDE HERBICIDE ANTIDOTE COMPOSITIONS AND METHODS OF USE

Duane R. Arneklev, Antelope, Mont., and Don R. Baker, Orinda, Calif., assignors to Stauffer Chemical, Westport, Conn.

Division of Ser. No. 285,971, Sep. 5, 1972, Pat. No. 4,021,229.
This application Jan. 24, 1977, Ser. No. 761,841
Int. Cl.[2] A01N *9/12*
U.S. Cl. 71—100 24 Claims

1. In the method of controlling weeds wherein a thiocarbamate herbicide is applied to the habitat of said weeds, the improvement comprising applying to the habitat thereof from about 0.01 to about 15 parts by weight for each part of weight of the thiocarbamate herbicide an antidote compound corresponding to the formula



wherein R_1 is selected from the group consisting of alkyl containing from 1 to 6 carbon atoms, inclusive, haloalkyl containing from 1 to 6 carbon atoms, inclusive, and in which halo includes chloro, bromo and fluoro, halogen which includes chlorine, bromine, and fluorine, isocyanate, alkenylamino, in which alkenyl contains from 3 to 6 carbon atoms, inclusive, halophenylamino wherein halo includes chloro, bromo and fluoro, phenyl, substituted phenyl wherein said substituents can be selected from alkyl containing from 1 to 4 carbon atoms, inclusive, alkoxy containing from 1 to 4 carbon atoms, inclusive, halogen which includes chlorine, bromine, and fluorine, nitro, amino and haloalkylaminosulfonyl containing from 1 to 4 carbon atoms, inclusive, and halo includes chloro, bromo and fluoro; R_2 and R_3 can be the same or different and are selected from the group consisting of hydrogen, alkyl containing from 1 to 6 carbon atoms, inclusive, haloalkyl containing from 1 to 6 carbon atoms, inclusive, and halo includes chloro, bromo and fluoro, alkoxy containing from 1 to 6 carbon atoms, inclusive, alkenyl containing from 3 to 6 carbon atoms, inclusive, alkynoxy, containing from 3 to 6 carbon atoms, inclusive, haloalkoxycarbonyl containing from 3 to 6 carbon atoms, inclusive, and wherein halo includes, chloro, bromo and fluoro, alkynoxycarbonyl containing from 3 to 6 carbon atoms, inclusive, carbamoyl, haloalkylthio containing from 1 to 6 carbon atoms, inclusive, in which halo includes chloro, bromo, and fluoro, diacetonitrilocarbamoyl, phenyl, substituted phenyl wherein said substituents can be selected from alkoxy containing from 1 to 4 carbon atoms, inclusive, halogen which includes chlorine, bromine and fluorine, hydroxy, nitro and carbamoyl, and R_2 and R_3 taken together form the ring structure alkyloxazolidyl in which each alkyl substituted contains from 1 to 4 carbon atoms, inclusive, as mono, di, tri or tetra substituents.

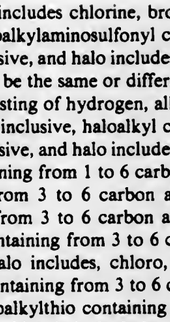
4,093,446

HERBICIDAL 4-TRIFLUOROMETHYL-4-NITRODIPHENYL ETHERS

Horst O. Bayer, Levittown; Colin Swithenbank, Perkasie, and Roy Y. Yih, Doylestown, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 617,560, Sep. 29, 1975, and Ser. No. 617,562, Sep. 29, 1975, said Ser. No. 617,560, is a continuation-in-part of Ser. No. 331,719, Feb. 12, 1973, Pat. No. 3,928,416, said Ser. No. 617,562, is a division of Ser. No. 331,719, Feb. 12, 1973, Pat. No. 3,928,416, which is a continuation-in-part of Ser. No. 234,651, Mar. 14, 1972, Pat. No. 3,798,276. This application Aug. 31, 1976, Ser. No. 719,484
Int. Cl.[2] A01N *9/20*; C07C *79/46*
U.S. Cl. 71—109 15 Claims

1. A compound of the formula



wherein

X is a hydrogen atom, a halogen atom, a trifluoromethyl group, or a (C_1-C_4) alkyl group,

T is a hydrogen atom, a halogen atom, or a trifluoromethyl group, and

Z is a (C_1-C_4) alkoxy group having one or more hydrogen atoms replaced by a carboxy group, or an agronomically-acceptable salt thereof, or a carb(C_1-C_4)alkoxy group.

12. A method of controlling weeds which comprises applying to the surface of the growth medium prior to the emergence of the weeds from the growth medium a compound according to claim 1 in an amount sufficient to control the growth of the weeds.

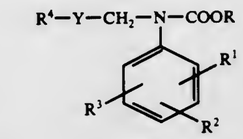
4,093,447

N-ARYLCARBAMIC ACID ESTERS AND PLANT GROWTH REGULANT COMPOSITIONS AND METHODS

Carl Metzger, Wuppertal-Vohwinkel; Gerhard Jager, Wuppertal-Elberfeld, and Klaus Lurssen, Koenigsdorf, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 265,909, Jun. 23, 1972, Pat. No. 3,920,727.
This application Nov. 17, 1975, Ser. No. 632,742
Claims priority, application Germany, Jun. 23, 1971, 2131028; Mar. 23, 1972, 2214057
Int. Cl.[2] A01N *9/20*; C07C *125/06*
U.S. Cl. 71—111 20 Claims

1. N-arylcarbamate of the formula



wherein

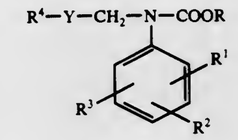
R is open-chain lower aliphatic hydrocarbyl containing up to ten carbon atoms or open chain substituted lower aliphatic hydrocarbyl wherein the substituents are hydroxy, halogen, alkoxy having 1 to 4 carbon atoms, aryl or substituted aryl having 6 to 10 carbon atoms; said substituted aryl being substituted by at least one member selected from the group consisting of halogen, alkyl of from 1 to 4 carbon atoms, haloalkyl of from 1 to 4 carbon atoms and 1 to 3 halogen atoms, alkoxy of from 1 to 4 carbon atoms and nitro R^1, R^2, and R^3 are individually selected from the group consisting of hydrogen, alkyl and haloalkyl of from 1 to 10 carbon atoms, alkoxy of from 1 to 10 carbon atoms, cycloalkyl of up to 8 carbon atoms and halogen.

R^4 is alkyl with 1 to 6 carbon atoms, alkenyl with 3 to 6 carbon atoms, alkynyl with 3 to 6 carbon atoms, haloalkyl with 1 to 6 carbon atoms and 1 to 3 halogen atoms, alkoxyalkyl, alkylthioalkyl, carbalkoxyalkyl and carbalkoxyalkenyl each with 1 to 4 carbon atoms in the alkoxy or alkylthio part and 1 to 4 carbon atoms in the alkyl part, cycloalkyl with 3 to 8 carbon atoms or aryl, aralkyl, aryloxyalkyl or arylthioalkyl with, in each case, 6 to 10 carbon atoms in the aryl part and 1 to 3 carbon atoms in the alkyl part, the aryl part of the four last-mentioned radicals being unsubstituted or substituted by halogen, alkyl with 1 to 3 carbon atoms, alkoxy with 1 to 3 carbon atoms, haloalkyl with 1 to 2 carbon atoms and 1 to 5 halogen atoms and

Y is oxygen or sulfur.

16. Plant-growth regulant composition comprising an agriculturally acceptable carrier and, as an active ingredient, plant growth regulatingly effective amounts of a compound as claimed in claim 1.

17. Method of regulating the growth of plants which comprises applying to the plants or their habitat an effective amount of an N-aryl carbamate of the formula



wherein

R is open-chain lower aliphatic hydrocarbyl containing up to 10 carbon atoms or substituted open-chain lower aliphatic hydrocarbyl wherein the substituents are hydroxy, halogen, alkoxy having 1 to 4 carbon atoms or aryl having 6 to 10 carbon atoms.

R^1, R^2 and R^3 are individually selected from the group con-

sisting of hydrogen, alkyl and haloalkyl of from 1 to 10 carbon atoms, alkoxy of from 1 to 10 carbon atoms, cycloalkyl of up to 8 carbon atoms and halogen;

R^4 is alkyl with 1 to 6 carbon atoms, alkenyl with 3 to 6 carbon atoms, alkynyl with 3 to 6 carbon atoms, haloalkyl with 1 to 6 carbon atoms and 1 to 3 halogen atoms, alkoxyalkyl alkylthioalkyl, carbalkoxyalkyl and carbalkoxyalkenyl each with 1 to 4 carbon atoms in the alkoxy or alkylthio part and 1 to 4 carbon atoms in the alkyl part, cycloalkyl with 3 to 8 carbon atoms or aryl, aralkyl, aryloxyalkyl or arylthioalkyl with, in each case, 6 to 10 carbon atoms in the aryl part and 1 to 3 carbon atoms in the alkyl part, the aryl part of the four last-mentioned radicals being unsubstituted or substituted by halogen, alkyl with 1 to 3 carbon atoms, alkoxy with 1 to 3 carbon atoms, haloalkyl with 1 to 2 carbon atoms and 1 to 5 halogen atoms and

Y is oxygen or sulfur.

4,093,448

METHOD OF PRODUCING PELLETS FROM ORE CONCENTRATES

Stanislav Borisovich Eliseev, ulitsa Peshestreletskaya, 115, kv. 1, Voronezh; Jury Alexandrovich Butskoi, selo Podgornoe, ulitsa 9 Yanvarya, 31, Voronezhskaya oblast, Ramonsky raion; Vladimir Sergeevich Dmitrievsky, ulitsa Studencheskava, 31, kv. 21, Voronezh; Albina Andreevna Golubeva, ulitsa Koltsovskaya, 77, kv. 41, Voronezh; Vladimir Mikhailovich Ozerov, ulitsa Svobody, 59, kv. 12, Voronezh; Valentin Stepanovich Volkov, ulitsa Khalzunova, 37, kv. 50, Voronezh, and Iya Petrovna Vasninova-Shipulina, ulitsa Tsimlyanskaya, 2, kv. 32, Voronezh, all of U.S.S.R.

Continuation of Ser. No. 519,018, Oct. 29, 1974, abandoned.
This application Sep. 27, 1976, Ser. No. 726,968
Int. Cl.² C22B *1/08*
U.S. Cl. 75—3 **9 Claims**

1. In a method of producing pellets from ore concentrates of particle size less than 0.83 mm, comprising mixing ore concentrate with a binding material, the major portion of which being selected from the group consisting essentially of calcium oxide, magnesium oxide and mixtures thereof to produce a total homogeneous mixture of said components, pelletizing said total homogeneous mixture to produce pellets and curing said pellets in saturated steam at a temperature of from 100° C to 350° C within a time period sufficient for their hardening, the improvement being that said mixing is performed in the following sequential steps:

a. mixing said ore concentrate and said binding material to form a first prepared mixture,

b. subjecting said first prepared mixture to hydration to form a first prepared hydrated mixture,

c. further mixing said first prepared hydrated mixture until homogenous to form a first prepared homogenous hydrated mixture, and

d. mixing said first prepared homogenous hydrated mixture with an additional amount of said ore concentrate to form said total homogeneous mixture so that said total homogenous mixture of said first prepared homogenous hydrated mixture and said additional ore concentrate contains 4 to 15 weight percent of said binding material.

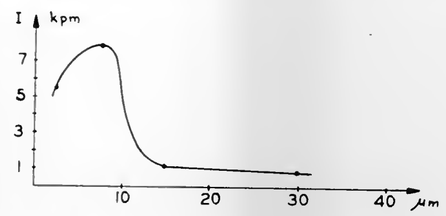
4,093,449

PHOSPHORUS STEEL POWDER AND A METHOD OF MANUFACTURING THE SAME

Lars-Erik Svensson, Hoganas; Jan Robert Tengzelius, Viken, and Per Folke Lindskog, Hoganas, all of Sweden, assignors to Hoganas AB, Fack, Hoganas, Sweden

Filed Oct. 26, 1976, Ser. No. 735,207
Int. Cl.² B22F *1/00*
U.S. Cl. 75—0.5 R **13 Claims**

1. A phosphorous steel powder for manufacturing sintered mouldings having high toughness and strength, comprising a basic powder of a steel powder substantially free from phosphorus and having good compressibility to which is intimately added a low-temperature-melting ferrophosphorus powder having a phosphorus content of at least 2.8%, in such an



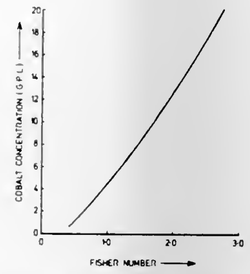
amount that the phosphorus content of the mixture is 0.2 to 1.5%, wherein the ferrophosphorus powder has a maximum particle size of 20 μm.

4,093,450

PRODUCTION OF ULTRAFINE COBALT POWDER FROM DILUTE SOLUTION

Barry N. Doyle; Willie H. Seibt, both of Edmonton; Kshitindra Mohan Sarkar, St. Albert, and Mark R. Benz, Fort Saskatchewan, all of, Calif., assignors to Sherritt Gordon Mines Limited, Toronto, Canada

Filed May 12, 1977, Ser. No. 796,241
Claims priority, application Canada, Mar. 7, 1977, 273334
Int. Cl.² C22B *23/04*
U.S. Cl. 75—0.5 AA **10 Claims**



1. A process for producing ultrafine cobalt powder comprising providing an aqueous solution of cobalt ammine carbonate, with the concentration of cobalt ions being in the range of from about 1 to about 20 gpl, heating the solution to drive off ammonia and carbon dioxide and precipitate ultrafine cobalt oxide, separating the cobalt oxide precipitate from the solution, and heating the separated cobalt oxide precipitate in a reducing atmosphere to reduce the cobalt oxide to ultrafine cobalt powder.

4,093,451

COKE AGGLOMERATE AND METHOD OF UTILIZING SAME

Boyd E. Cass, Ligonier; David W. Coate, and Joseph R. Quigley, both of Pittsburgh, all of Pa., assignors to Cardd, Inc., Pittsburgh, Pa.

Filed Sep. 28, 1977, Ser. No. 837,531
Int. Cl.² C22B *1/08*
U.S. Cl. 75—43 **23 Claims**

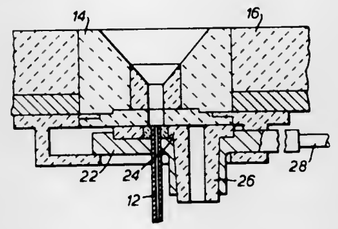
1. A coke agglomerate consisting essentially of a cured agglomerated mixture by weight of 30–70% coke fines, 5–15% cement on a dry basis, and 15–65% of at least one finely divided calcium bearing material selected from the group consisting of calcium hydroxide, calcium carbonate, and calcium fluoride.

4,093,452

REFINING LIQUID METAL

Gene Donald Spenceley, Penistone, Near Sheffield, and Neil Pigott, Rotherham, both of England, assignors to British Steel Corporation, London, England

Filed July 20, 1976, Ser. No. 707,060
Claims priority, application United Kingdom, July 23, 1975, 30841/75
Int. Cl.² C21C *7/00, 7/06*
U.S. Cl. 75—53 **10 Claims**



1. A method of treating a molten metal in a transfer container having a top, a base and a discharge nozzle in the base, said nozzle having, on the exterior of the container, a sliding gate valve assembly for controlling the discharge of metal from the nozzle and the introduction of reagent material entrained within a gas directly into the molten metal to promote the efficiency of mixing and reaction, said valve assembly comprising a discharge spout, a gas inlet pipe and a closure portion, said spout, pipe and closure portion being selectively movable into alignment with the discharge nozzle of the container, which comprises introducing the molten metal through the top of the transfer container while the nozzle of said container is stopped by the gate valve, moving said gate valve and introducing through the inlet pipe a particulate re-agent material entrained within a gas to promote efficient mixing and reacting of the re-agent with the molten metal and then removing the treated molten metal through the sliding gate valve.

4,093,453

METHOD OF MAKING AN ORDERED ALLOY

Yoshimi Makino, Fujisawa; Satoru Uedaira, and Shigeyasu Ito, both of Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 9, 1975, Ser. No. 639,121
Claims priority, application Japan, Dec. 20, 1974, 49-146423
Int. Cl.² C22C *33/00, 1/00*
U.S. Cl. 75—129 **9 Claims**

1. A method for making a substantially ordered alloy containing at least a first metallic element and a second metallic element comprising the steps of:

(a) providing a solid, imperforate metal base consisting of at least said first metallic element,

(b) depositing a thin metal layer on said base, said metal layer consisting of at least said second metallic element, said second metallic element being capable of forming an ordered alloy with said first metallic element, said metal layer being not in excess of 10 microns in thickness, and

(c) heating said metal base and the deposited metal layer at a temperature below the order-disorder transformation temperature of the ordered alloy to be made for a sufficient length of time to cause diffusion of said deposited metal into said metal base and formation of a continuous layer of ordered alloy between the two metals.

4,093,454

NICKEL-BASE SINTERED ALLOY

Yuichi Saito, and Osamu Mayama, both of Niigata, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1976, Ser. No. 744,932
Claims priority, application Japan, Dec. 18, 1975, 50-150123
Int. Cl.² B22F *1/00*
U.S. Cl. 75—236 **4 Claims**

1. A nickel-base sintered alloy having a density of at least 95 percent of the theoretical density thereof, and consisting essentially of, in weight percentage:

chromium	from	10.0	to	35.0 %
tungsten	from	0.5	to	15.0 %
cobalt	from	0.2	to	12.0 %
molybdenum	from	0.1	to	20.0 %
iron	from	0.1	to	20.0 %
titanium	from	0.05	to	2.00 %
silicon	from	0.05	to	1.50 %
manganese	from	0.05	to	1.00 %
carbon	from	0.1	to	3.5 %

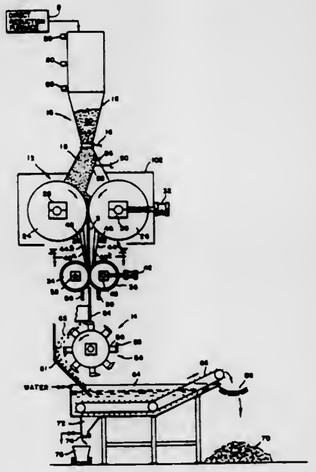
and the balance nickel and incidental impurities: said nickel-base sintered alloy being prepared by sintering a reduced powder mixture consisting of said metals and carbides of said metals, said reduced powder mixture being prepared by the steps comprising simultaneously reducing a mixed powder consisting essentially of powders of oxides of elements constituting said sintered alloy and carbon powder to produce a reduced sponge-like mass, and pulverizing said reduced sponge-like mass to obtain said reduced powder mixture; said alloy and said reduced powder mixture having substantially the same elemental chemical composition.

4,093,455

COMPACTED, PASSIVATED METALLIZED IRON PRODUCT

Wolfgang B. Pietsch, Matthews, N.C., assignor to Midrex Corporation, Charlotte, N.C.

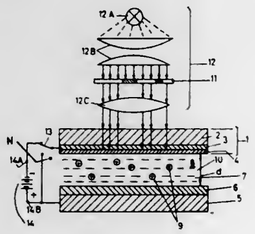
Continuation of Ser. No. 584,184, Jun. 5, 1975, abandoned. This application Dec. 22, 1976, Ser. No. 753,243
Int. Cl.² C22B *1/24*
U.S. Cl. 75—256 **5 Claims**



1. A compacted, passivated, metallized iron product useful as a feed material for a steelmaking process, said product hav-

ing dense, substantially pore-free faces with a densified surface layer on each face of from 0.1 to 1.0 mm thick and a surface density of from about 6.5 to 7.9 g/cc, a less dense center with an average density of at least 4.5 g/cc, and wherein from about 75% to about 96% of the total iron present is in the metallic state.

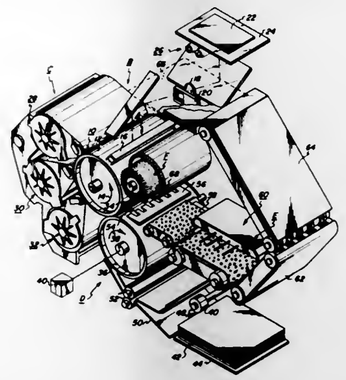
4,093,456
PROCESS AND DEVICE FOR ELECTROPHOTOGRAPHIC IMAGE GENERATION AND APPLICATION OF THE PROCESS
Hansjürg Hermann, Egg, Switzerland, assignor to Konishiroku Photo Ind., Ltd., Hino, Japan
Filed Jun. 11, 1976, Ser. No. 695,279
Claims priority, application Germany, June 25, 1975, 2528341
Int. Cl.² G03G *15/01, 15/22*
U.S. Cl. 96—1 PE **8 Claims**



1. A method of producing images in accordance with a master, comprising the steps of:
(a) providing a photoconductive layer spaced from an image support adjacent thereto, and electrodes respectively associated therewith,
(b) bringing a dispersion of charged toner particles into the space between said layer and said support, while shunting the electrodes,
(c) exposing the photoconductive layer to a light image of the master, thereby producing with respect to said layer, a conductivity image corresponding to the master,
(d) applying an electric field across said space by means including the electrodes during at least part of the exposure, said field causing migration of the charged toner particles in a first direction, with change of toner particle charge as controlled by said conductivity image,
(e) again shunting the electrodes, causing a further migration of toner particles in a second direction to form a visible image of the master on the image support, and
(f) opening the connection between said electrodes after a predetermined time sufficient to form an intense image, but insufficient for deposition of background consisting of toner particles.

4,093,457
METHOD OF TRANSFER
Oscar G. Hauser, Rochester; Kallis H. Mannik, Webster, and Charles A. Whited, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Jun. 10, 1976, Ser. No. 694,853
Int. Cl.² G03G *13/01, 13/08*
U.S. Cl. 96—1.2 **5 Claims**

1. A method of producing a copy, including the steps of:
recording successive electrostatic latent images on a member;
developing each successive electrostatic latent image with particles having differing triboelectric charges; and
transferring the particles from the successive electrostatic latent images to a sheet of support material in a pre-determined sequence wherein each successive layer of particles transferred to the sheet of support material has a decreasing triboelectric charge, thereby minimizing back transfer



from the sheet of support material to the electrostatic latent image.

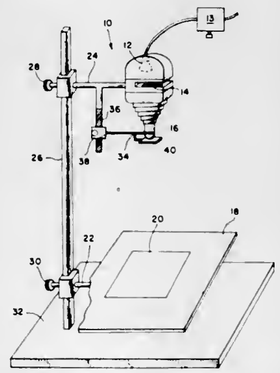
4,093,458
POLYURETHANE-POLYANHYDRIDE SUBBING LAYER FOR PHOTO SENSITIVE ELEMENTS
Patrick Terence McGrail, Ipswich; Stephen Richard Smith, Manningtree; Frederick Robert Bannister, Colchester, and David Leonard Boutle, Maldon, all of England, assignors to Imperial Chemical Industries Limited, London, England
Continuation of Ser. No. 416,496, Nov. 16, 1973, abandoned. This application Jun. 1, 1976, Ser. No. 691,461
Claims priority, application United Kingdom, Nov. 20, 1972, 53492/72; Jul. 13, 1973, 33446/73
Int. Cl.² G03C *1/78*
U.S. Cl. 96—87 R **9 Claims**

1. A photographic film material, which comprises a biaxially oriented film support of a linear polyester having a subbing layer and a hydrophilic light sensitive layer applied to one or both surfaces thereof wherein the subbing layer is adherent to the film support, and comprises a mixture consisting essentially of at least one polyurethane resin with at least one anhydride polymer selected from the group consisting of:
(a) at least one homopolymer of a polymerisable unsatured cyclic carboxylic acid anhydride wherein said mixture contains from about 16.5% by weight of the anhydride polymer; and
(b) at least one copolymer of a polymerisable unsaturated cyclic acid anhydride wherein said mixture contains from about 10% by weight of the anhydride polymer, the mixture containing up to 75% by weight of said anhydride polymer.

4,093,459
TREATED CARRIER PARTICLES USED IN ELECTROPHOTOGRAPHIC PROCESS
Virgil W. Westdale, Chagrin Falls, Ohio, and John Novotny, San Jose, Calif., assignors to Addressograph-Multigraph Corporation, Cleveland, Ohio
Division of Ser. No. 728,461, Sep. 29, 1976. This application Mar. 14, 1977, Ser. No. 777,628
Int. Cl.² G03G *13/08*
U.S. Cl. 96—1 SD **6 Claims**

1. A process for developing a latent electrostatic image which comprises mixing an electroscopic powder with a carrier which comprises a member selected from a group consisting of metallic particles and siliceous particles to the surface of which is adhered a mixture of a metallic sulfide and a member selected from the group consisting of perfluorinated and substantially perfluorinated carboxylic acids containing from 3 to 18 carbon atoms and salts, esters and amides thereof, said sulfide and acid being present in a ratio by weight of sulfide to acid of about 0.2:1 to 5:1, to impart opposite electrostatic charges to said electroscopid powder and said carrier, whereby said electroscopic powder is attracted to said carrier and transferring said electroscopic powder from said carrier to said latent electrostatic image.

4,093,460
CONTRAST ENHANCEMENT AND SMALL DETAIL BLENDING OF PHOTOGRAPHIC IMAGES
Leonard M. Weinstein, 13 Burke Ave., Newport News, Va. 23601
Continuation-in-part of Ser. No. 395,494, Sep. 10, 1973, abandoned. This application Apr. 15, 1976, Ser. No. 677,644
Int. Cl.² G03C *5/04*
U.S. Cl. 96—27 E **6 Claims**



1. A method of blending the granular appearance and small details of a projected image which comprises the steps of:
providing a projection system including a light source, a lens, and an image source;
inserting a linear radial transmission filter immediately adjacent to said lens whereby said projection system projects an image through said linear radial transmission filter;
placing a projection surface at the sharp focus position of the projection system whereby an image is secured;
moving said projection surface away from said sharp focus position thereby causing the granular structure and small detail of said image to be blended such that individual portions of the granular structure are not distinguishable from each other.

4,093,461
POSITIVE WORKING THERMALLY STABLE PHOTORESIST COMPOSITION, ARTICLE AND METHOD OF USING
Frank J. Loprest, Binghamton, N.Y., and Eugene F. McInerney, Chagrin Falls, Ohio, assignors to GAF Corporation, Wayne, N.J.
Filed Jul. 18, 1975, Ser. No. 597,226
Int. Cl.² G03C *1/54, 1/60, 5/34*
U.S. Cl. 96—36 **23 Claims**

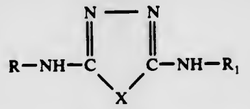
1. A positive working photoresist composition, comprising a mixture of a light-sensitive orthoquinone diazide or ortho naphthoquinone diazide and a polyamic acid condensation product of an aromatic dianhydride and an aromatic di-primary amine.

6. A photosensitive material, comprising a mixture of a support having coated thereon a layer comprising a light-sensitive orthoquinone diazide or orthonaphthoquinone diazide and a polyamic acid condensation product of an aromatic dianhydride and an aromatic di-primary amine.

13. A method of forming a thermally stable positive photoresist image, which comprises imagewise exposing to actinic light the photosensitive material according to claim 6, and developing a positive relief image by treating the exposed layer with an alkaline aqueous developer thereby removing the imagewise exposed areas.

4,093,462
2,5-BIS(SECONDARY AMINO) OXA- AND THIADIAZOLE PHOTOGRAPHIC DEVELOPING AGENTS
Henry Wolf Altland; Stanley Wray Cowan, both of Rochester, and Ismael Adolfo Olivares, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Nov. 11, 1976, Ser. No. 741,164
Int. Cl.² G03C *5/30*; C07D *277/38*
U.S. Cl. 96—66 HD **23 Claims**

15. A photographic process comprising developing an imagewise exposed photographic silver halide layer in the presence of a silver halide developing agent of the formula:



wherein each of R-NH— and —NH-R_1 is a secondary amino group, R and R_1 are independently selected from the group consisting of 1 to 4 carbon alkyl; 1 to 4 carbon alkyl substituted with alkoxy of 1 to 2 carbon atoms; 1 to 4 carbon alkyl substituted with alkylthio of 1 to 2 carbon atoms; aryl; aryl substituted with alkoxy of 1 to 2 carbon atoms; aryl substituted with alkylthio of 1 to 2 carbon atoms; and X is sulfur or oxygen.

4,093,463
WATER SOLUBLE BINDER OVERCOAT ON VESICULAR ELEMENT CONTAINING N_2-RELEASING AGENT
George Leland Fletcher, Pittsford, and Michael Mosehauer, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Feb. 22, 1977, Ser. No. 770,969
Int. Cl.² G03C *1/52, 1/68*
U.S. Cl. 96—67 **19 Claims**

1. A radiation-sensitive vesicular imaging element comprising, in laminar relationship,
(a) a support,
(b) a first layer comprising a binder that is substantially insoluble in water and, uniformly distributed in said binder in an amount between about 1 and about 15% by weight of said binder, a radiation-sensitive nitrogen-releasing, vesiculating agent; and
(c) a second layer superimposed over said first layer, said second layer comprising a water-soluble binder, said layer being substantially free of radiation-sensitive material,
said binders together providing a latent image stability period for N_2 that is sufficient for vesicular imaging.

8. A radiation-sensitive vesicular imaging element having enhanced speed comprising, in laminar relationship,
a support,
a first layer comprising a mixture of poly(-chloroacrylonitrile) and poly(vinylidene chloride-co-acrylonitrile), and uniformly admixed with said mixture in an amount between about 1 and about 15% by weight of said binder, 2,5-dimethoxy-4-morpholinobenzene diazonium hexafluorophosphate;
and a second layer superimposed over said first layer and comprising poly(vinyl alcohol) and a crosslinking agent, said second layer being substantially free of radiation-sensitive material;
said polymers of said layers together providing a latent

image stability period for N_2 that is sufficient for vesicular imaging.

4,093,464

LIGHT SENSITIVE O-QUINONE DIAZIDE CONTAINING TRANSFER COMPOSITION

Hans Ruckert, Naurod, and Barbara Wildenhain, Wiesbaden-Sonnenberg, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Jul. 26, 1973, Ser. No. 382,864
Claims priority, application Germany, Jul. 27, 1972, 2236941
Int. Cl.² G03C *1/54, 1/60*
U.S. Cl. 96—91 D **2 Claims**

1. A light-sensitive transfer composition comprising, as separate compounds in a homogeneous mixture,
(a) about 25 to 40% by weight of an alkali-soluble novolak,
(b) about 12 to 30% by weight of an o-naphthoquinone diazide sulfonic acid derivative selected from the group consisting of esters thereof and amides thereof, and
(c) about 5 to 30% by weight of a polyalkyl acrylate or a polyalkyl methacrylate.

4,093,465

PHOTOSENSITIVE DIAZO CONDENSATE COMPOSITIONS

Simon L. Chu, and Eugene Golda, both of Yonkers, N.Y., assignors to Polychrome Corporation, Yonkers, N.Y.

Continuation-in-part of Ser. No. 388,313, Aug. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 182,845, Sep. 22, 1971, abandoned, which is a continuation of Ser. No. 738,857, Jun. 21, 1968, abandoned. This application Mar. 12, 1975, Ser. No. 557,731
Int. Cl.² G03C *1/52, 1/70*
U.S. Cl. 96—115 R **2 Claims**

1. A light sensitive, solvent soluble, oleophilic film forming composition, which comprises:
A. A light sensitive, light hardenable, organic solvent soluble, substantially water-insoluble reaction product of:
1. A water-soluble, light sensitive condensation product of:
a. A negative acting diazonium salt of diphenylamine; and
b. An organic reactive carbonyl-containing condensing compound therefore; with
2. About an equimolar amount of a water insolubilizing alkali metal thiocyanate; and
B. An organic solvent soluble, substantially water insoluble epoxy resin; said composition capable of being coated onto a base sheet from solution in an organic solvent or substantially organic solvent medium to form a tack-free continuous surface; exposed to light in a predetermined area to harden the coating in such area; and removed from unexposed area by an aqueous or substantially aqueous developer.

4,093,466

ELECTROLESS TIN AND TIN-LEAD ALLOY PLATING BATHS

Thomas Francis Davis, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 6, 1975, Ser. No. 574,979
Int. Cl.² C23C *3/02*
U.S. Cl. 106—1.22 **6 Claims**

1. A salt composition, when diluted with 1 liter of water and sufficient hydrochloric acid to provide a solution having a pH of 0.5 to 1, is suitable for immersion plating of tin-lead alloys at increased rates, the salt composition comprising the proportions of:

a.	hydrous stannous chloride ($SnCl_2 \cdot 2H_2O$)	from about 10 to about 150 g,
b.	lead chloride ($PbCl_2$),	from about 1 to about 12 g,
c.	sodium hypophosphite ($NaH_2PO_2 \cdot H_2O$)	from about 10 to about 100 g, and
d.	thiourea ($NH_2 \cdot CS \cdot NH_2$)	from about 15 to about 100 g,

---

4,093,467

METHOD FOR MAKING FOUNDRY MOULDS AND CORES

Abram Moiseevich Lyass, Sharikopodshipnikovskaya ulitsa, 2, kv. 146; Sergei Semenovich Zhukovsky, Profsojuznaya ulitsa, 17, korpus 1, kv. 15, and Sergei Dmitrievich Teplyakov, Seleznevskaya ulitsa, 13, kv. 3, all of Moscow, U.S.S.R.

Continuation of Ser. No. 435,019, Jan. 21, 1974, abandoned, which is a continuation of Ser. No. 306,336, Nov. 13, 1972, abandoned, which is a continuation of Ser. No. 131,533, Apr. 5, 1971, abandoned. This application Apr. 28, 1976, Ser. No. 680,923
Int. Cl.² B28B *7/34*
U.S. Cl. 106—38.35 **10 Claims**

1. A method for making foundry moulds and cores which comprises preparing a mixture made up of from 94.0 to 98.5 parts by weight of moulding sand, from 2.0 to 10.0 parts by weight of ortho-phosphoric acid and a requisite amount of a material containing not less than 30% of ferrous oxide, so that the mixture obtained contains from 1.5 to 6.0 parts by weight of ferrous oxide, shaping the moulds and cores obtained from the moulding mixture and holding them in the air for hardening.

4,093,468

PROCESS TO OBTAIN TRANSPARENT COLORLESS AND GLASS-CERAMICS SO OBTAINED

Marius Charles Boitel, Avon, and Serge Andre Maurice Renault, Montigny sur Loing, both of France, assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 23, 1977, Ser. No. 780,513
Int. Cl.² C03C *3/22, 3/04*
U.S. Cl. 106—39.7 **2 Claims**

1. Sensibly colorless transpartent glass-ceramics wherein beta-quartz solid solution constitutes the predominant crystal phase having base compositions within the Li_2O-Al_2O_3-SiO_2 field which contain, on the basis of oxides and as calculated from the batch, about 0.5–6% by weight TiO_2, an amount of Fe_2O_3 up to about 500 ppm, and about 0.03–0.75% by weight Nd_2O_3.

4,093,469

MOLDED GLASS ARTICLES HAVING BULK HOMOGENEITY AND OPTICAL QUALITY SURFACE

Leon M. Sanford, and Che-Kuang Wu, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 689,791, May 25, 1976, Pat. No. 4,046,545. This application Apr. 20, 1977, Ser. No. 789,105
Int. Cl.² C03C *3/10, 3/04, 3/30*
U.S. Cl. 106—53 **4 Claims**

1. A hydrated glass article consisting essentially, in mole percent on the anhydrous basis, of about 70–82% SiO_2, 10–17% Na_2O and/or K_2O, and 5–15% ZnO and/or PbO, and having a water content of about 3–8% by weight of the total article, said water content being tightly bound within the article such that, upon DTG analysis, the glass demonstrates no water loss below about 120° C. and consisting of silanol groups and molecular water present in such proportions that the ratio of silanol groups to molecular water is equal to or greater than 1.0, said glass article having at least one portion with the surface thereof having a smoothness such that over a distance of at least 0.1 inch, on an arithmetic average basis, the Roughness Height is less than 3.0 microinches and having a

substantially uniform refractive index thoughout the bulk of the glass such that a transmissivity of visible light of about 92% is demonstrated.

4,093,470

ALUMINA REFRACTORIES

Carl James Cherry, King of Prussia, Pa., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Oct. 20, 1976, Ser. No. 734,141
Int. Cl.² C04B *35/10*
U.S. Cl. 106—56 **11 Claims**

1. An unshaped, unfired refractory material for use in monolithic refractory construction comprising a mixture of a volatilized silica slurry and a refractory batch wherein said volatilized silica slurry comprises:
a. from 60.0 to 90.0 weight percent water,
b. from 10.0 to 40.0 weight percent volatilized silica,
c. from 0.1 to 2.0 weight percent concentrated acid, and
d. from 0.05 to 1.5 weight percent dispersant,
and wherein said mixture comprises:
a. from 15 to 60 weight percent of an aggregate alumina-containing refractory of a relatively large particle size,
b. from 6 to 45 weight percent calcined alumina of a relatively small particle size,
c. from 5 to 20 weight percent graphite,
d. from 1 to 35 weight percent of a green strength binder material,
e. from 2 to 20 weight percent of said volatilized silica slurry, and
f. from 0 to 5 weight percent water.

4,093,471

GLASS FIBER REINFORCED CEMENT COMPOSITE MATERIALS

Ian Robert Kennedy Greig, Culcheth, Near Warrington, England, assignor to Pilkington Brothers Limited, St. Helens, England

Filed Jul. 2, 1976, Ser. No. 701,787
Claims priority, application United Kingdom, Jul. 4, 1975, 28359/75
Int. Cl.² C04B *31/06*
U.S. Cl. 106—99 **6 Claims**

1. In a method of making a glass fibre reinforced cement composite material in which chopped strands of glass filaments are mixed into a cement slurry which is then poured into a mould and allowed to cure, the improvement which consists in first preparing the cement slurry without filaments from a cement/water mix by a high shear mixing process using a mixer to which the power input is at least 5 KW/100 Kg of slurry, so that cement agglomerates are broken up into their primary particles, and then adding the chopped strands of glass filaments into the cement slurry during a relatively low shear mixing process using a mixer to which the power input is 1 KW/100 Kg of slurry or less to avoid separation of the strands into individual, filaments.

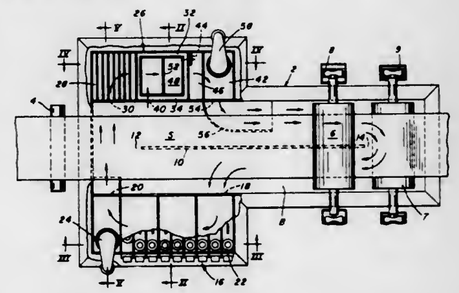
4,093,472

APPARATUS FOR CLEANING STRIP

Frederick S. Lukac, New Kensington, and William P. Zbryski, Tarentum, both of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Feb. 17, 1977, Ser. No. 769,496
Int. Cl.² B08B *3/10*
U.S. Cl. 134—104 **6 Claims**

1. Apparatus for cleaning strip in a molten salt bath, comprising a main tank for containing said molten bath, a central longitudinal baffle in said main tank, said baffle terminating short of the ends of said tank to provide passageways, a heating tank located along one side of said main tank adjacent the entry end thereof, a first opening from said main tank to the rear end of said heating tank, a second opening from said main tank to the lower forward end of said heating tank, heating tubes in said heating tank, bath circulating means in the forward end of said heating tank to circulate the heated molten bath from said heating tank through said forward passageway, a forward tank section located along the other side of said main tank at the entry end thereof, a third opening from said main tank to said forward tank section adjacent to the bottom thereof, an intermediate tank section located adjacent to the forward tank section, said intermediate tank section having upper and lower compartments, a rear tank section located adjacent said inter-



mediate tank section, bath circulating means in said rear tank section, large openings from said lower compartment to said front and rear tank sections, relatively small openings between said upper compartment and said main tank and said rear tank section at least one adjacent the top thereof, means for directing said bath from said rear tank section rearwardly in said main tank, and means for directing said strip through said main tank below the level of said molten bath and above said longitudinal baffle.

4,093,473

SOLAR PANEL WITH UV ABSORBER

Joseph Lindmayer, 6919 Blaisdell Rd., Bethesda, Md. 20034

Continuation-in-part of Ser. No. 715,407, Aug. 25, 1976, Pat. No. 4,057,939. This application June 15, 1977, Ser. No. 806,868
Int. Cl.² H01L *31/04*
U.S. Cl. 136—89 P **10 Claims**

1. A solar panel for maintaining solar energy cells in position to receive light impinging thereon, comprising a substrate on which said cells are mounted, a layer of silicone resin adhesively secured to said substrate and photovoltaic cells disposed within and encapsulated by said resin layer, said layer having distributed therein an ultraviolet light absorber in the form of a liquid or finely divided solid in an amount that will absorb sufficient ultraviolet light impinging on said layer to mitigate corrosion of metal parts of said cells and inhibit delamination of said resin from said substrate while having no adverse effect on curing of said resin.

4,093,474

METHOD FOR PREPARING ALUMINUM ALLOYS POSSESSING IMPROVED RESISTANCE WELDABILITY

Philip R. Sperry, North Haven, Conn.; William C. Setzer, Creve Coeur, Mo., and Lloyd E. Damon, Wallingford, Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Division of Ser. No. 703,781, Jul. 9, 1976, Pat. No. 4,043,840. This application Feb. 7, 1977, Ser. No. 765,982
Int. Cl.² C22F *1/04*
U.S. Cl. 148—2 **7 Claims**

1. A method for the preparation of wrought products which comprises:
A. providing an aluminum base alloy consisting essentially of from about 2.0 to about 6.0% magnesium, up to 0.40% iron, up to 0.40% silicon, and from about 0.03 to 0.20% vanadium, balance aluminum;
(B) casting said alloy;

(C) heating said alloy to a homogenizing temperature and thereafter homogenizing said alloy;
(D) hot and cold working said alloy;
(E) annealing said alloy whereby the vanadium is substantially retained in solid solution to provide a wrought produce exhibiting reduced electrical conductivity, increased electrical resistivity, improved resistance weldability plus good tensile properties, said wrought product being capable of plastic deformation; and
(F) resistance welding said wrought product to provide a resistance welded article.

4,093,475

METHOD OF CASTING ALUMINUM BASE ALLOY SHEET AND PRODUCT

Carmen C. Manzonelli, Cornopolis, Pa., and Joseph L. Tessandori, Owensboro, Ky., assignors to National Steel Corporation, Pittsburgh, Pa.

Filed Dec. 30, 1976, Ser. No. 755,950
Int. Cl.² C22C *21/16*; B22D *11/06, 21/04*
U.S. Cl. 148—32 **4 Claims**

3. An aluminum base alloy sheet which has been continuously cast in sheet form characterized by elimination or reduction in edge cracking and a resultant elimination of or significant reduction in the necessity for edge shearing consisting essentially of the following composition:

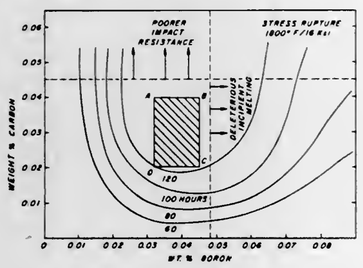
silicon from about 0.06 to about 0.30%, iron from about 0.45 to about 0.70%, manganese from about 0.35 to about 0.80%, magnesium from about 0.01 to about 0.29%, copper from about 0.10 to about 0.30% and the balance aluminum plus inconsequential amounts of other elements in which composition when the silicon and/or magnesium are on the low side of their ranges the iron and/or manganese are on the high side of their ranges, when the silicon is on the high side of its range the magnesium is on the low side of its range or the iron and/or manganese are on the high side of their ranges, when the magnesium is on the high side of its range the iron and manganese are on the high side of their ranges and when the magnesium is on the high side of its range and the iron and manganese are not on the high side of their ranges the silicon is on the low side of its range.

4,093,476

NICKEL BASE ALLOY

William J. Boesch, Utica, N.Y., assignor to Special Metals Corporation, New Hartford, N.Y.

Filed Dec. 22, 1976, Ser. No. 753,252
Int. Cl.² C22C *19/05*
U.S. Cl. 148—32.5 **8 Claims**



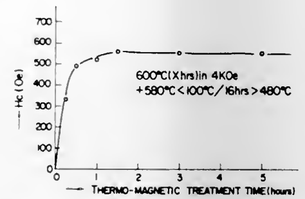
1. A gamma prime strengthened nickel base alloy consisting essentially of, by weight, from 12.0 to 20.0% chromium, from 4.0 to 7.0% titanium, from 1.2 to 3.5% aluminum, from 12.0 to 20.0% cobalt, from 2.0 to 4.0% molybdenum, from 0.5 to 2.5% tungsten, from 0.031 to 0.048% boron, from 0.005 to 0.045% carbon, up to 0.75% manganese, up to 0.5% silicon, up to 1.5% hafnium, up to 0.1% zirconium, up to 1.0% iron, up to 0.2% of rare earth elements that will not lower the incipient melting temperature below the solvus temperature of the gamma prime present in the alloy, up to 0.1% of elements from the group consisting of magnesium, calcium, strontium and barium, up to 6.0% of elements from the group consisting of rhenium and ruthenium, balance essentially nickel; said titanium plus said aluminum content being from 6.0 to 9.0%; said titanium and aluminum being present in a titanium to aluminum ratio of from 1.75:1 to 3.5:1; said alloy being substantially free of deleterious acicular, sigma and mu phases; said gamma prime being characterized as gamma prime which is substantially speroidal; said alloy being characterized by a highly desirable combination of hot corrosion resistance, strength, creep resistance, phase stability and stress rupture life; said desirable combination of properties being, in part, attributable to said boron content of from 0.031 to 0.048%.

4,093,477

ANISOTROPIC PERMANENT MAGNET ALLOY AND A PROCESS FOR THE PRODUCTION THEREOF

Masao Iwata, Chichibu, and Hisao Yoshizawa, Kumagaya, both of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Nov. 1, 1976, Ser. No. 737,268
Int. Cl.² C21D *1/04*
U.S. Cl. 148—108 **18 Claims**



1. A thermo-magnetic-treated anisotropic permanent magnet alloy having a residual magnetic flux density of 7,000 Gauss or more and a coercive force of 300 Oersted or more, said anisotropic permanent magnet alloy being prepared by subjecting an alloy consisting essentially of 17 to 45% by weight of chromium, 3 to 14.5% by weight of cobalt, 0.2 to 5% by weight of silicon and a balance of substantially iron to a solution treatment at 600° to 1300° C., heating the alloy in a magnetic field at a temperature of 570° to 670° C. for a period of 10 minutes to 5 hours, and then aging the thermo-magnetic treated alloy at a temperature within 200° C. below the thermo-magnetic treatment temperature for a period of 30 minutes to 50 hours.

4,093,478

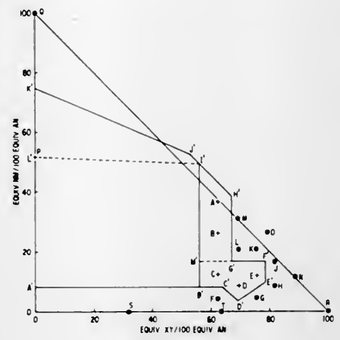
ACTIVATED AMMONIUM NITRATE EXPLOSIVE COMPOSITION

Gerald L. Hurst, Dallas, Tex., assignor to Tyler Holding Company, Dallas, Tex.

Continuation of Ser. No. 312,833, Dec. 7, 1972, which is a division of Ser. No. 79,096, Oct. 8, 1970, Pat. No. 3,722,410.
This application Jan. 17, 1977, Ser. No. 759,948
Int. Cl.² C06B *45/00*
U.S. Cl. 149—2 **22 Claims**

1. An explosive mixture comprising:

activated porous ammonium nitrate prills which have a bulk density of less than about 0.80 grams per cubic centimeter and which have been activated by combining a minor nondissolving proportion of a solvent with ammonium nitrate prills having a bulk density of greater than about 0.80 and thereafter heating the prills to an elevated temperature and evaporating substantially all of the solvent from the prills,



a fuel selected from a liquid hydrocarbon derivative having an oxygen equivalent weight less than about 4 grams per equivalent,

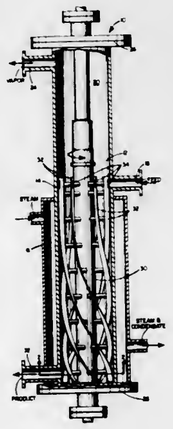
said mixture detonable by a commercial number 6 cap.

4,093,479

THIN-FILM PROCESSING APPARATUS AND METHOD

James L. Baird, Winchester, Mass., assignor to Artisan Industries Inc., Waltham, Mass.

Continuation of Ser. No. 587,995, Jun. 18, 1975, abandoned.
This application Jan. 13, 1977, Ser. No. 759,196
Int. Cl.² B01D *1/22*
U.S. Cl. 159—6 W **8 Claims**



1. In a fluid-processing apparatus of the wiped thin-film type, which apparatus comprises in combination:

(a) a substantially vertical closed chamber characterized by an interior wall defining a heated surface of revolution;
(b) a rotor shaft within the chamber;
(c) means to rotate the rotor shaft;
(d) a feed inlet at the upper part of the chamber for the introduction of feed material;
(e) a product outlet remotely spaced apart and downstream from the feed inlet for removal of product material;
(f) a vapor chamber within the closed chamber and upstream of the feed inlet;
(g) a vapor outlet in the vapor chamber for the removal of vapor; and
(h) a plurality of rotor blades secured to the rotor shaft for rotation therewith, the blades having a one end and another end, and radially and axially arranged from the rotor shaft and extending into a thin-film-forming relationship with the interior wall, said blades extending from the vicinity of the feed inlet to the vicinity of the product outlet, the peripheral edges of said blades being smooth along their length, the improvement which comprises

the rotor blades characterized by a helical twist therein from the one to the other end of the blades, and the helical twist of such blades varying continuously and nonsymmetrically from one to the other end, the total helical twist of the rotor blades increasing from the feed inlet to the product outlet, up to about 180° so as to provide a maximum twist of the rotor blades at the product outlet of the apparatus, and wherein the rotor blades are substantially aligned with the rotor axis at or about the feed inlet, and wherein the degree of twist of the helical blades from the feed inlet to the product outlet increases in relationship to the film thickness of the thin film on the interior wall of the chamber, thereby providing good agitation of the thin film of material being processed, as the film decreases in thickness by evaporation, on the surface of revolution from the feed inlet to the product outlet.

4,093,480

METHOD FOR MAKING ELECTRICAL CONNECTORS

Donald Raeford Bialock, McLeansville, and Julian Lesco Carrington, III, Greensboro, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 513,686, Oct. 11, 1974, abandoned.
This application Apr. 21, 1976, Ser. No. 678,804
Int. Cl.² H01B *13/06, 13/26*
U.S. Cl. 156—54 **5 Claims**

1. A method of manufacturing electrical connectors comprising the steps of:

continuously axially feeding a substantially endless strand of firm, solid elastomeric material which has a Shore A hardness of about 53 and which has a non-yielding core to which the elastomeric material is bonded along a first predetermined path through a folding zone, a bonding zone, and a cutting zone,

continuously feeding a substantially endless flat strip of insulating film along a second predetermined path which extends towards, and merges with, said first predetermined path at the beginning of said folding zone, said strip having a width which is greater than the circumference of said strand and having transversely extending spaced apart conductors adhered to the one side thereof which faces away from said first path,

said feeding steps being carried out by means of an endless belt which is moved continuously along said second predetermined path and which supports said film during movement through said folding and bonding zones,

progressively folding said plastic strip and said belt around said strand in said folding zone and locating marginal side surface portions of said strip against each other and slightly compressing said strand in a direction extending normally of its axis without elongation of said strand during final stages of said folding step so that said strip has a snug fit on said strand,

bonding said marginal side surface portions to each other in said bonding zone, and

cutting through said film and said strand at periodic time intervals as said strand passes through said cutting zone whereby,

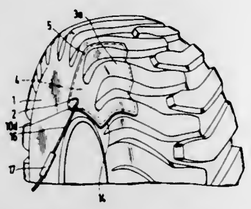
electrical connectors each comprising an elastomeric body having a film wrapped therearound and having spaced apart circumferentially extending conductors on the external surface of said film and produced serially.

4,093,481

METHOD FOR RETREADING AND REPAIRING VEHICLE TIRES

Wilhelm Schelkmann, Witten, Germany, assignor to Vakuum Vulk Holdings Limited, Nassau, Bahamas

Filed Jan. 28, 1976, Ser. No. 653,240
Claims priority, application Germany, Jan. 31, 1975, 2503973
Int. Cl.² B29H *17/36*
U.S. Cl. 156—95 **10 Claims**



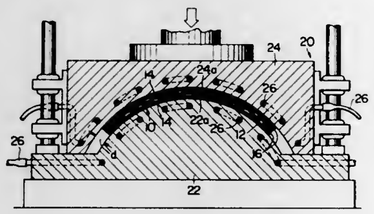
1. A method for repairing a vehicle tyre comprising the steps of:
- filling a repair region of the tyre with vulcanisable binding rubber material,
- applying a flexible cover to the rubber filled region,
- attaching the flexible cover to the tyre with an adhesive that can withstand the vulcanisation temperature of the rubber filling around the border of the flexible cover to provide a seal between the flexible cover and the tyre,
- piercing the flexible cover with a hollow suction needle at at least one point over the repair region where air or other gas or vapour has accumulated within the repair region,
- evacuating the air or other gas or vapour from the repair region at each of said points by applying a suction through the needle,
- removing the needle from the flexible covering at each of said points after the air or other gas or vapour has been evacuated,
- sealing off the puncture opening in the flexible cover made by the needle at each of said points,
- heating the repair region to vulcanise and bond the rubber filling to the tyre.

4,093,482

HEAT AND SOUND INSULATOR OF CURVED CORRUGATED PAPERBOARD AND METHOD OF SHAPING SAME

Mitsutoshi Ogata, and Norinao Naito, both of Fukuoka, Japan, assignors to Nissan Motor Company Limited and Fukuoka Paper Company, Limited, both of, Japan

Filed May 14, 1976, Ser. No. 686,314
Claims priority, application Japan, May 15, 1975, 50-58137
Int. Cl.² B32B *3/28, 1/00*
U.S. Cl. 156—210 **6 Claims**



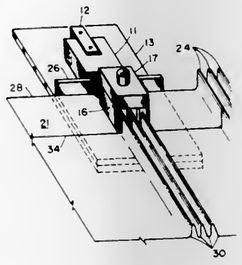
1. A method of shaping a heat and sound insulating plate member of corrugated paperboard to form a plate member having at least one permanently curved portion, the method comprising the steps of:
- preparing a plane composite plate by joining a sheet of plane liner paper to a corrugated medium of paper by a thermoplastic resin such that a layer of said resin in hardened state adheres both to said corrugated medium at respective top regions of parallel ridges thereof and to the inside surface of said plane liner;
- press-forming said plane composite plate into a desired shape having at least one permanently curved portion with application of heat to said layer from the outside of said liner and said corrugated medium such that the temperature of said layer is maintained above the softening point of said resin and that said resin fluidifies and permits said liner and said corrugated medium to compensate for relative displacement during the forming; and
- lowering the temperature to harden said layer in the shaped plate member whereby the shaped plate member is free from such internal strains as cause spontaneous deformation of the plate member.

4,093,483

PROCESS AND APPARATUS FOR FORMING PLEATS IN A DRAW DRAPE

Lawrence O'Quinn Jacobs, Richmond, Va., assignor to Plastic Products, Inc., Richmond, Va.

Filed Feb. 9, 1977, Ser. No. 767,100
Int. Cl.² B31F *1/00*; D06J *1/00*
U.S. Cl. 156—227 **18 Claims**



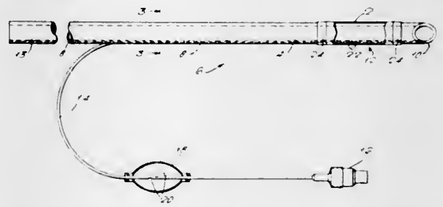
11. Process for the production of a straight uniform pleat in the heading of a drapery comprising the steps of:
- (a) positioning a piece of a sheet backing material on an essentially flat surface of a positioning means contoured so as to completely encompass the outer periphery of said sheet backing material in a substantially horizontal, motionless disposition,
- (b) positioning fold-forming means above said backing material,
- (c) placing the heading of a drapery having a front surface and a rear surface over said fold-forming means in a manner such that said front surface faces upward, and said rear surface contacts said fold-forming means,
- (d) forming folds in said heading by causing said fold-forming means to interengage with a shaping means brought vertically downward onto the front surface of the heading,
- (e) causing the bottoms of said folds to contact said backing material in straight line regions,
- (f) cohesively bonding the bottoms of said folds to said backing material within said straight line regions in abutment with said flat surface to form a finished pleat,
- (g) raising said shaping means, and
- (h) removing said fold-forming means from said pleat.

4,093,484

METHOD OF MAKING SURGICAL CATHETERS AND TUBES

Reginald William Harrison, Salisbury, and George Albert Peach, Andover, both of England, assignors to Warne Surgical Products Limited, Hampshire, England

Filed July 14, 1976, Ser. No. 705,336
Claims priority, application United Kingdom, Jul. 16, 1975, 29903/75
Int. Cl.² B29D *23/03, 23/04*; B32B *31/30*
U.S. Cl. 156—244.13 **7 Claims**



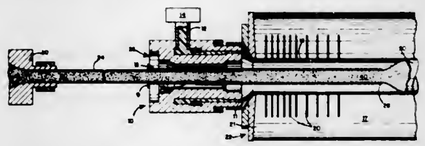
1. A method of forming a cuff on a self-retaining catheter, said method comprising the steps of
- providing a catheter having a tubular shaft, a passage extending inside and along the length of the wall of said shaft, and a hole extending between said passage and the outside surface of said shaft in proximity to the distal end of said shaft,
- extruding a thin-walled tube of thermoplastic material,
- fitting said tube onto said tubular shaft at the distal end thereof at a position where said tube overlies said hole,
- bonding the ends of said tube to said tubular shaft, and, thereafter,
- heating said tube to a first temperature to soften said tube and surrounding said tube with a mould, then
- injecting a fluid into said tube via said passage and said hole so as to cause said tube to expand and adopt the shape of said mould, then
- heating said mould to a second temperature higher than said first temperature, said second temperature being sufficient to allow flow of said thermoplastic material, then
- cooling said mould to cause said tube to retain its expanded shape, and then
- allowing the fluid in said tube to escape and removing the mould.

4,093,485

METHOD FOR FORMING A HOT MELT ADHESIVE CARTRIDGE

Robert L. Ornsteen, Shore Rd., Cape Neddick, Me. 03902

Filed May 31, 1977, Ser. No. 801,846
Int. Cl.² B29D *23/04*
U.S. Cl. 156—244.13 **7 Claims**



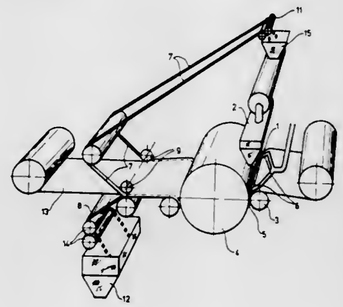
1. A method for continuously forming a hot melt adhesive cartridge of accurate outside dimension and having a non-stick, thermoplastic outer sleeve comprising the following steps:
- continuously extruding a hollow sleeve of non-stick, thermoplastic material;
- sizing said continuously extruded sleeve to a predetermined outside dimension;
- cooling said sleeve to a solidified set condition; and
- introducing a hot melt adhesive material into said hollow sleeve by dispensing such material at a point downstream from the initial extrusion of said sleeve, at which point the sleeve has been cooled to a substantially solidified set condition.

4,093,486

METHOD AND APPARATUS FOR MANUFACTURING AN EVEN LAMINATED PRODUCT BY EXTRUSION

Arto Honkanen, Helsinki, and Erkki Laiho, Kulloo, both of Finland, assignors to Pekema OY, Helsinki, Finland

Filed Aug. 25, 1976, Ser. No. 717,511
Claims priority, application Finland, Sep. 4, 1975, 752496
Int. Cl.² B29G *3/02*
U.S. Cl. 156—244.19 **17 Claims**



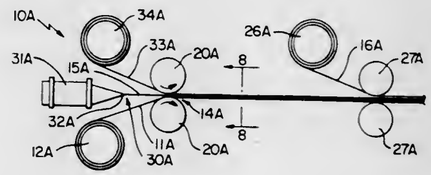
1. A method for manufacturing an even laminated product by extruding a molten thermoplastic coating-material track onto a basic-material track comprising the steps of cooling the edge strips of said coating-material track by means of jets of heat absorbing material to keep said edge strips from adhering to edge strips of said basic-material track, said strips of each of said tracks being cut off said tracks along predetermined boundary lines, chopped separately, and directed separately for recovery.

4,093,487

METHOD OF CONTINUOUSLY MAKING A PRINTING BLANKET CONSTRUCTION

Andrew J. Gaworowski, Waynesville, and Wayne W. Easley, Clyde, both of N.C., assignors to Dayco Corporation, Dayton, Ohio

Filed Nov. 15, 1976, Ser. No. 742,165
Int. Cl.² B29D *7/14*
U.S. Cl. 156—244.16 **4 Claims**



1. A method of continuously making a printing blanket construction comprising the steps of, supporting a fabric substrate web in coil form for unwinding rotation, unwinding and moving a forward portion of said substrate web through a laminating station, continuously laminating a thermoplastic polymeric layer against said substrate web at said station, continuously bonding a reinforcing layer against said polymeric layer, and continuously calendering a printing face against said reinforcing layer.

4,093,488

PROCESS FOR THE PRODUCTION OF BUILDING MATERIAL ELEMENTS, PARTICULARLY BUILDING BOARDS

Kurt Kirsch, Vienna; Volkmar Hilzensauer, Amstetten; Gunther Pflug, Vienna; Felix Wehrmann, Vienna, and Gerald Maresch, Vienna, all of Austria, assignors to Isovolta Osterreichische Isolierstoffwerk Aktiengesellschaft, Wiener Neudorf, Austria

Division of Ser. No. 450,847, Mar. 13, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,273

Claims priority, application Austria, Mar. 16, 1973, 2385/73; Dec. 12, 1973, 10381/73; Feb. 21, 1974, 1400/74

Int. Cl.² B29C *19/00*

U.S. Cl. 156—245 5 Claims

1. A process for the production of an incombustible building material element having good thermal insulation properties comprising

(a) spraying by a spraying means over the surface of vermiculite granules, while agitating the granules, a liquid containing an organic binder comprised of a resin mixture or mixed resin having at least one combustible resin component and at least one incombustible nitrogen-containing resin component, wherein the amount of resin, calculated as solid substance, coated on the granules is 2 to 30% by weight, based on the weight of the granules,

(b) placing the coated granules in a first press and pressing the coated granules without heating to bond them to form a transportable molded product,

(c) placing the transportable molded product in a second press provided with a heating means, and

(d) pressing and heating the transportable molded product at an elevated temperature to further bond the granules and organic binder in the molded product to form an incombustible building material element with good thermal insulation properties.

4,093,489

PROCESS FOR LAMINATING PHOTOGRAPHS AND THE LIKE INTO MOLDED ARTICLES OF MELAMINE-FORMALDEHYDE RESIN

Kwang Kil Hong, Rte. 2, Box 141, Colonial Beach, Va. 22443

Filed Sep. 22, 1976, Ser. No. 725,650

Int. Cl.² B29C *19/00*; B44F *7/00*

U.S. Cl. 156—245 7 Claims

1. A process for the production of a rigid molded decorative assembly comprising a decorative element embedded in melamine-formaldehyde resin, comprising the steps of:

(a) sandwiching a decorative element, consisting of an indicia-bearing opaque sheet of paper, between two flexible cast, preformed, self-supporting uncured translucent resin films formed by drying a layer of a catalyst-containing aqueous solution of a thermosetting melamine-formaldehyde condensation product at below curing temperature, to form a layup;

(b) overlaying the thus-produced layup onto a surface of a flexible three-dimensional molded article formed of a catalyst-containing partially-cured melamine-formaldehyde filled molding resin, with the indicia-bearing surface of the sheet of paper facing away from the molded article, to form an assembly; and

(c) curing the melamine-formaldehyde condensation product completing the cure of the partially-cured molding resin, conforming the layup to the shape of the molded article and bonding the layup thereto by heating the thus-produced assembly under pressure in a mold, to produce the rigid decorative assembly.

4,093,490

METHOD OF MAKING VAGINAL DIAPHRAGM

George A. Ziets, Bound Brook, and Bernard L. Williams, Martinsville, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Apr. 29, 1977, Ser. No. 792,383

Int. Cl.² B29F *1/00*

U.S. Cl. 156—245 7 Claims

1. The method of making a diaphragm comprising center injection molding a rim from a thermoplastic elastomer, deforming a sheet of a thermoplastic elastomer into a dome at an elevated temperature, said sheet having a diameter greater than said ring, and sealing said dome to said ring, whereby a diaphragm is formed having a continuous rim integral with a flexible dome-shaped membrane.

4,093,491

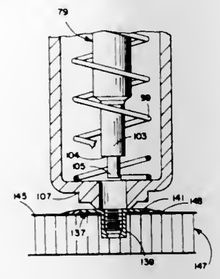
FASTENER INSTALLATION METHOD

Hugh G. Whelpton, 2059 W. Artesia, Torrance, Calif. 90504, and William H. Trembley, 8463 Hiquera St., Culver City, Calif. 90230

Continuation-in-part of Ser. No. 156,406, Jun. 24, 1971, abandoned. This application Mar. 18, 1974, Ser. No. 452,097

Int. Cl.² C09J *5/00*; B32B *3/12, 27/34*

U.S. Cl. 156—309 8 Claims



1. A method of installing a fastener insert to a panel having a cavity extending thereinto from one face thereof, the method comprising the following steps in combination:

providing a fastener insert having an axially extending body and a flanged heat conductive head portion integrally formed at one end of the body;

providing on an undersurface of said flange synthetic resin bonding material which is solid at room temperature, melts at an elevated temperature and resolidifies on cooling to bond adjacent structures;

providing a heating tool having an operating temperature substantially above the melting temperature of said bonding material;

providing a panel having a cavity, said cavity having a cross-sectional size adapted to receive said body and a depth sufficient to allow engagement between said bonding material and portion of the outer surface of said panel adjacent said cavity when said body is inserted in said cavity;

inserting said body in said cavity to provide engagement between said flanged head portion and said bonding material and between said bonding material and said outer surface portions of said panel;

transferring heat from said heating tool to said fastener insert and to said bonding material by placing said heating tool in proximity to said insert, and thereby melting said bonding material;

said bonding material being characterized by yielding increased bonding strength between said insert and panel after cooling upon an increase in the time of heat transfer from said heating tool beyond the time required to melt said bonding material, and up to a maximum time, beyond which said maximum time the bonding strength of said bonding material deteriorates, and

stopping the heating of said bonding material after melting thereof at a time to effect a resulting bonding strength which is approximately the maximum bonding strength of said bonding material.

4,093,492

COPOLYAMIDES CONTAINING CAPROLACTAM, LAURICLACTAM AND 11-AMINOUNDECANOIC ACID

Fritz Raabe, Bonn, and Eduard De Jong, Bonn-Beuel, both of Germany, assignors to Plate Bonn Gesellschaft Mit Beschrankter Haftung, Bonn, Germany

Division of Ser. No. 467,234, May 6, 1974, Pat. No. 3,948,844, which is a continuation-in-part of Ser. No. 384,371, Jul. 31, 1973, Pat. No. 3,883,487. This application Feb. 11, 1975, Ser. No. 548,965

Claims priority, application Germany, May 12, 1973, 2324160

Int. Cl.² C09J *5/06*

U.S. Cl. 156—331 12 Claims

1. A process for heat-sealing together surfaces of materials comprising applying to at least one of the surfaces to be sealed a composition comprising a copolyamide having a melting range below about 110° C and consisting essentially of recurring units of caprolactam, lauriclactam, 11-aminoundecanoic acid and a hexamethylene diamine salt of an aliphatic dicarboxylic acid of the formula:

$$HOOC—(CH_2)_n—COOH \quad (I)$$

in which n is 4, 7, 8, 10 or 11, joining said surfaces, heating the materials to be sealed to a temperature sufficient to melt the copolyamide and cooling the materials.

4,093,493

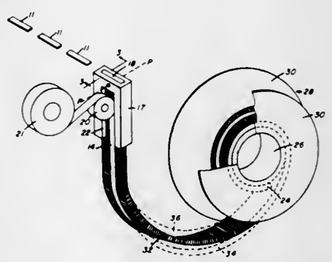
APPARATUS FOR FORMING A PHOTOGRAPHIC POD-TAPE PRODUCT

Richard D. Welch, Pittsford, and John E. Iversen, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 483,586, Jun. 27, 1974, abandoned. This application Sep. 19, 1975, Ser. No. 615,031

Int. Cl.² B32B *31/20, 31/10*

U.S. Cl. 156—358 5 Claims



1. In an apparatus for adhering rupturable photographic pods onto a tape to form a photographic pod-tape product in which each pod comprises a pair of facing rectangular walls formed of deformable sheet material and secured to one another at their marginal edges to form a cavity for a liquid photographic processing agent, the combination comprising:

an elongated pod collecting chute having entry and exit openings and a first slot along one side for exposing corresponding edges of a plurality of pods fed therein through said entry opening;

said chute having a portion of a width less than the width of a pod so that any pod fed therein through said entry opening is tilted at an angle to a plane perpendicular to the longitudinal axis of said chute; and

means extending into said first slot for simultaneously (1) applying the adhesive surface of a tape trained over a portion of said tape applying means into engagement with said corresponding edges of said pods to form said pod-tape product, and (2) transporting said product from said chute through said exit opening.

4,093,494

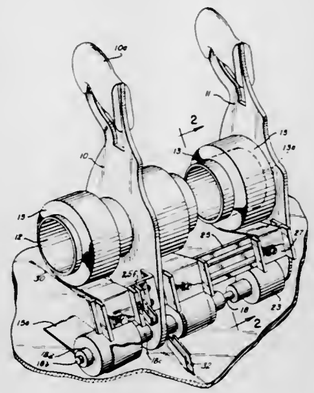
SECURING MEANS FOR PARQUET FLOOR BOARDS

William A. Boettcher, 4507 N. Clark St., Chicago, Ill. 60640

Filed May 9, 1977, Ser. No. 795,171

Int. Cl.² B44C *7/00*

U.S. Cl. 156—577 2 Claims



1. Securing means for parquet boards designed to be laid on a floor, comprising a machine adapted to travel in a direct course on the floor, transverse cylinder means mounted in the machine and carrying a series of rotatable rolls from which tapes adhesive on the under side may be drawn to adhere to the floor during said travel, the tapes showing a protective covering on the upper side when laid, and such covering removable to allow the parquet boards to be laid on said upper side into adhering engagement with the tapes, the machine having a pair of side walls receiving said cylinder means between them, a frontal tie bar carried by said walls, channel plates carried by the tie bar in line with the tapes, and means to adjust the channel plates according to lateral adjustments of the tapes.

4,093,495

APPARATUS FOR REMOVING A TIRE FROM A BUILDING DRUM OF A TIRE BUILDING MACHINE

Bruno Colombani, Milan, Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

Filed Jun. 24, 1977, Ser. No. 809,761

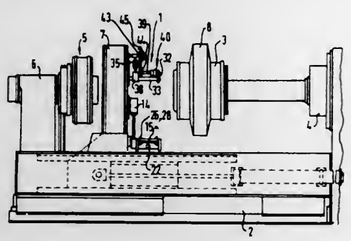
Claims priority, application Italy, Jun. 28, 1976, 24790/76

Int. Cl.² B29H *17/00*

U.S. Cl. 156—394 12 Claims

12. In a tire building apparatus having longitudinally spaced breaker building-drum and tire building drum and means intermediate the two drums for transferring a breaker structure from the breaker building-drum to the tire building drum by back and forth movement therebetween, a means mounted on said intermediate means facing said tire building drum for removing a tire from the tire building drum which comprises

means movably attached to said intermediate means for movement substantially perpendicularly with respect to the axis of the tire building drum disposed to move below a tire on the tire building drum and comprising a frame having a generally arcuate contour corresponding to a segment of the peripheral surface of a tire, means pivotably mounted on the frame having rollers disposed to contact the tire when the frame is disposed below the tire, means for moving the said frame into contact with the tire,



means attached to said intermediate means disposed near the top of a tire on said tire building drum comprising an arm, means for moving said arm radially inwardly to against the side of the tire,

means for moving said device longitudinally with said arm disposed against the side of the tire and pull the tire from the drum, and

means for pivoting said pivotal means to discharge the tire therefrom after the tire is removed from the drum.

4,093,496

APPARATUS FOR ASSEMBLING ROD-LIKE ARTICLES

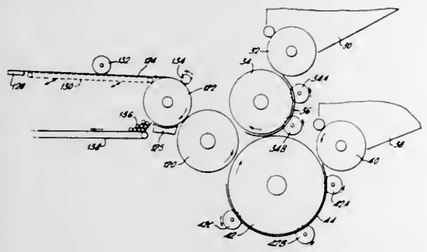
Desmond Walter Molins, London, England, assignor to Molins Limited, England

Filed Mar. 31, 1976, Ser. No. 672,148

Claims priority, application United Kingdom, Apr. 4, 1975, 13823/75

Int. Cl.² B65C *9/04*

U.S. Cl. 156—449 **2 Claims**



1. Apparatus for making composite filter rod, comprising means to feed successive groups each consisting of several axially aligned component filter portions, said means including at least one conveyor provided with flutes for supporting and conveying filter rods in a direction transverse to their lengths; means for cutting the rods into portions, the flutes of said conveyor being provided with additional lateral support means for said rods in the region where they are cut by said cutting means; means for subsequently axially spacing the portions apart to form a sub-group of component filter portions; means to feed a web of uniting material; slitting means to slit the web continuously longitudinally into a plurality of strips; guide means for changing the directions of travel of said strips and for spacing the strips apart; means for successively cutting portions from the strips to provide a plurality of uniting bands; and means for wrapping the uniting bands around the end portions of each adjacent pair of component filter portions of a group to join said portions into a composite filter rod; wherein the means for axially spacing the portions apart includes at least one stationary guide, including means for displacing a rod in its flute so that it projects beyond said lateral support means for engagement by the stationary guide.

4,093,497

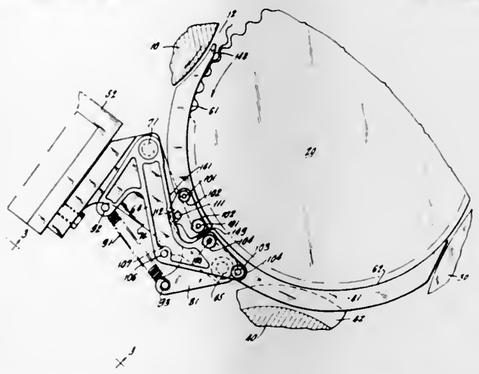
SELF RETRACTING STRIPPER FINGER FOR CORRUGATING MACHINE

Martin J. Leff, New York, N.Y., assignor to S&S Corrugated Paper Machinery Co., Inc., Brooklyn, N.Y.

Filed May 12, 1977, Ser. No. 796,188

Int. Cl.² B31F *1/00*

U.S. Cl. 156—473 **10 Claims**



1. Web corrugating apparatus including first and second rotating corrugating rollers operatively in mesh at a corrugating nip through which a flat web passes to be transformed into a corrugated web, a pressure roll operatively disposed adjacent said first corrugating roll at a pressure nip through which the corrugated web and another flat web pass and are joined to form single faced board, a plurality of transversely spaced finger means having arcuate surfaces operatively positioned to support the corrugated web in the region between said nips, each of said finger means including an upstream and a downstream section generally aligned in a plane parallel to the rotational axis of the corrugating rollers, biasing means urging arcuate surfaces of said sections toward said first corrugating roll, a first and a second holder to which the respective upstream and downstream sections are secured, a support to which said holders are movably mounted, and means operatively connecting said holders whereby movement of said first holder in a blade retracting direction is transmitted to said second holder to move the latter in a direction to retract said downstream blade.

4,093,498

AUTOMATIC SHIRT COLLAR STAY APPLYING MACHINE

David Wendell, 8803 Kelso Dr., Baltimore, Md. 21221

Filed May 11, 1977, Ser. No. 795,891

Int. Cl.² A41H *43/00*

U.S. Cl. 156—494 **5 Claims**

1. A machine for adhesively attaching a stiffening stay to the end sections of collar materials wherein the stiffening stays are provided with a heat sensitive adhesive on at least one side thereof, comprising:

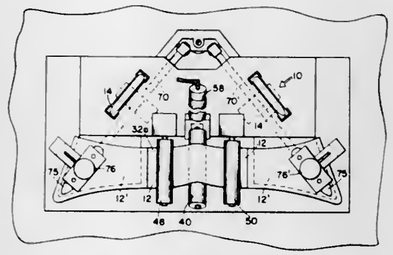
a. a frame for supporting said machine;

b. a pair of spaced collar or liner material supporting members spaced apart and in substantially the same plane and of substantially the same contour as the end of a collar or liner material, said supporting members being of such thickness as to be receivable between at least two layers of the collar or liner material;

c. a collar or liner tightening member positioned on said frame between the two collar or liner material supporting members having means for engaging the said collar or liner material and moving the same in a plane perpendicular to the plane of the collar or liner material supporting members for moving the end portions of the collar or liner material inwardly against the ends and outer edges of the said collar or liner supporting members;

d. said stays being formed of a flexible polyester plastic;

e. a pair of spaced magazines for carrying a stack of stays in each of said magazines adjacent the ends of said collar or liner materials supporting members;



f. means for automatically placing a single stay from each stack in position on the collar or liner material supporting means adjacent each end of the collar or liner material;

g. heating means positioned adjacent the location of the stays positioned on the collar or liner material, and means for moving the heating means in close proximity of the said stays and means for supplying heat to the said stays for a predetermined period to soften the said adhesive carried thereon sufficiently to adhesively bind the stays to the collar or liner material.

4,093,499

APPARATUS FOR PRODUCING FLEXIBLE NON-SKID STRIP

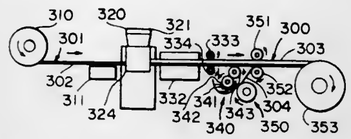
Hiromitsu Naka, No. 39, Caza Shinmachi, Yashio-shi, Saitama-ken, Japan

Continuation of Ser. No. 557,886, Mar. 12, 1975, abandoned, which is a division of Ser. No. 483,005, Jun. 25, 1974, abandoned. This application Nov. 15, 1976, Ser. No. 742,115

Claims priority, application Japan, Jul. 16, 1973, 48-79785

Int. Cl.² B29G *3/00, 3/06, 3/08*

U.S. Cl. 156—498 **3 Claims**



1. An apparatus for continuously producing a flexible non-skid strip having a lower layer and an upper non-skid layer, said apparatus consisting essentially of

feed means for continuously feeding a continuous length of sheet material which forms said lower layer from a supply roll, said sheet material being of a material selected from the group consisting of aluminum, copper, steel and stainless steel;

forming means for receiving said sheet material from said feed means comprising upper and lower forming rolls having a peripheral surface shape for continuously making a plurality of spaced holes in the sheet material in the longitudinal direction thereof with arcuate projections on the upper surface of said sheet material bridging each of the holes;

heating means for receiving said sheet material from said forming means and heating said sheet material;

an extruding die including

a straight application passage having an inlet for receiving said sheet material containing the spaced holes and arcuate projections thereupon at one end and an outlet at the other end, wherein a fused plastic material is integrally extruded onto the upper surface of said sheet material moving into said application passage as the sheet material passes through the application passage and wherein said fused plastic material is simultaneously permitted to flow into said holes of the sheet material moving into said application passage and to become integrally embedded in said arcuate projections on said sheet material;

a straight sheet passage communicating with the inlet of said application passage extending in the longitudinal direction of said application passage, and guiding said sheet material from said heating means to said inlet of the application passage,

a downwardly inclined passage therein communicating with said application passage whereby a fused plastic material may pass therethrough onto the upper surface of said sheet material as it passes through said application passage, and

a manifold located above said sheet passage and therein communicating with said inclined passage;

an extruder connected to said manifold for feeding said fused plastic material through said manifold and said inclined passage into said application passage for integrally forming the upper layer under pressure onto the perforated sheet material moving into said application passage so as to form an extruded product on the lower and upper layers; and

cooling means for receiving the thus-formed product and continuously cooling said extruded product.

4,093,500

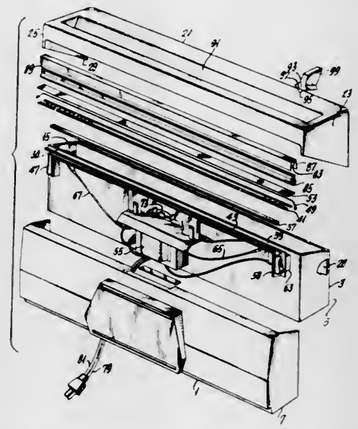
BAG FORMING APPARATUS

Thomas J. Browne, Birmingham, Mich., assignor to Lehigh Valley Industries, Inc., New York, N.Y.

Filed Mar. 28, 1977, Ser. No. 781,778

Int. Cl.² B26D *5/08*; B30B *15/34*

U.S. Cl. 156—510 **16 Claims**



1. An apparatus for making plastic bags from multilayered tubular plastic film comprising a housing including a front edge portion; a compartment in said housing for said tubular film, a substantially continuous elongated base rigidly secured to and substantially spanning the length of said front edge of the housing, said elongated base having a plurality of spaced integral ridges; a wire element supported by said spaced ridges of

said elongated base; a first insulating strip overlying said wire; an electrical circuit including a switch, said electrical circuit having terminals connectable to said switch and to an external power source; means in said lid for actuating said switch when said lid is closed; a second insulating strip in said lid which is substantially coextensive with and overlies said first insulating strip when said lid is closed; an elongated channel in said lid substantially coextensive with and parallel to said second insulating strip and a cutting means slideably mounted in said channel for severing the plastic bags from said tubular film.

4,093,501

FRICTIONAL HEAT WELD

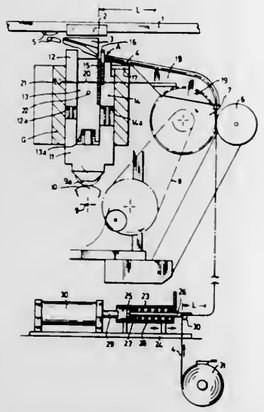
Dirk Adriaan van Staveren, Moerkapelle, Netherlands, assignor to N. V. Technische Maatschappij Marchand-Andriessen, Rijswijk, Netherlands

Filed Oct. 7, 1976, Ser. No. 730,329

Claims priority, application Netherlands, Oct. 10, 1975, 7511929

Int. Cl.² B32B *31/20*

U.S. Cl. 156—580 **5 Claims**



1. A device for connecting the ends of a strap of thermoplastic material wrapped about a package comprising

a platform for supporting the package having a longitudinal vertical slit,

a strap supply,

an upper die,

a lower die,

a cutting mechanism for severing a strap wrapped about a package to form two ends and a free end on said strap supply,

means for moving the upper and lower dies relative to one another to force the two ends of said strap wrapped about a package toward one another,

means for inserting the free end of said strap supply between the two ends of said strap wrapped about said package,

and means for moving said free end longitudinally of said two strap ends when the two strap ends and said free end are forced together by said means for moving said upper and lower dies together.

4,093,502

PROCESS FOR SYNTHESIZING AND GROWING SINGLE CRYSTALLINE BERYL

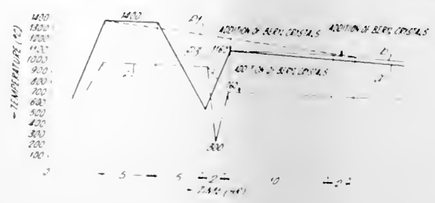
Masaya Hirabayashi, Yokaichi; Naoki Omi; Yuji Nakano, both of Kyoto, and Tetsuro Oshiba, Yokaichi, all of Japan, assignors to Kyoto Ceramic Co., Ltd., Kyoto, Japan

Filed Feb. 12, 1976, Ser. No. 657,595

Claims priority, application Japan, Feb. 18, 1975, 50-20692

Int. Cl.² B01J *17/04*

U.S. Cl. 156—624 **27 Claims**



1. A process for forming a single crystalline beryl out of a molten salt comprising the steps of:

(a) adding the component oxides of beryl to a flux to form a mixture;

(b) heating said mixture to a temperature higher than the melting point of said flux so as to form a molten salt;

(c) cooling said molten salt to a temperature below the temperature of beryl formation;

(d) reheating said salt to the upper temperature region of beryl formation for a sufficient length of time so as to preferentially form single crystalline beryl; and

(e) cooling said salt and recovering said single crystalline beryl therefrom.

4,093,503

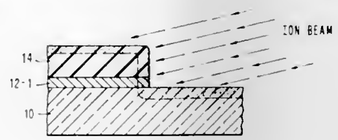
METHOD FOR FABRICATING ULTRA-NARROW METALLIC LINES

Erik Preston Harris, Yorktown Heights, and Robert William Keyes, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 7, 1977, Ser. No. 775,335

Int. Cl.² C23F *1/02*

U.S. Cl. 156—628 **4 Claims**



1. A method for fabricating ultra-narrow metal lines on a supporting substrate comprising the steps of:

applying a thin metal film on the surface of a substrate,

covering selected portions of said thin metal film with masking material to delineate a desired pattern,

removing the unmasked portions of said thin metal film,

selectively ion implanting the edges of said remaining masked portions of said thin metal film to predetermined desired depth,

removing said masking material from said remaining portions of said thin metal film,

and removing by selective etching the unimplanted portions of said thin metal film to provide a pattern of ultra-narrow metal lines on said substrate.

4,093,504

METHOD FOR PRODUCING ELECTRICALLY CONDUCTIVE INDIUM OXIDE PATTERNS ON AN INSULATING SUPPORT BY ETCHING WITH HYDROCHLORIC ACID AND FERRIC CHLORIDE

Johannes J. Ponjeé, and Hendrik J. Feil, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 5, 1976, Ser. No. 712,040

Claims priority, application Netherlands, Jun. 8, 1975, 7509341

Int. Cl.² C23F *1/02*

U.S. Cl. 156—656 **2 Claims**

1. A method of producing an electrically conductive pattern comprising forming a uniform layer of indium oxide on an electrically insulating support, applying to said indium oxide layer an etch-resistant coating in the negative image of the desired pattern, applying to said thus coated layer an aqueous hydrochloric acid etching solution containing in addition to the acid, ferric chloride in a quantity of between 0.01 mol/l and the saturation concentration thereof.

4,093,505

METHOD AND APPARATUS FOR HEATING AND REMOVING MOISTURE FROM WATERY MATERIAL

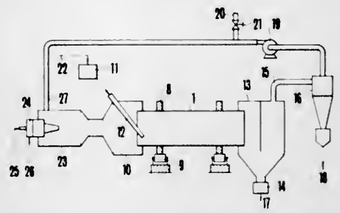
Hidemasa Tsuruta, Tokyo; Shoji Itoh, Chiba; Masayuki Otsuka, and Naoki Shimizu, both of Tokyo, all of Japan, assignors to Nittetu Chemical Engineering Ltd., Tokyo, Japan

Filed Apr. 6, 1976, Ser. No. 674,160

Claims priority, application Japan, Oct. 4, 1975, 50-119371

Int. Cl.² B01D *1/22*

U.S. Cl. 159—9 A **10 Claims**



4. An apparatus for heating and removing moisture from watery material, comprising:

a rotatably supported drum of cylindrical shape having an inlet and an outlet at opposite ends;

a plurality of perforated partitions dividing said drum into a number of longitudinally extending compartments for accommodating packing elements including a center compartment and circumferential compartments around said center compartment each compartment retaining packing elements therein, said perforated partitions all allowing passage of the watery material while blocking passage of the packing elements;

a feeding duct extending to said inlet of said drum for feeding watery material thereto;

means for introducing a hot gas axially through said drum; and

means for removing exhaust gas from said drum.

4,093,506

METHOD AND APPARATUS FOR EFFECTING EVEN DISTRIBUTION AND MIXING OF HIGH CONSISTENCY PULP AND TREATMENT FLUID

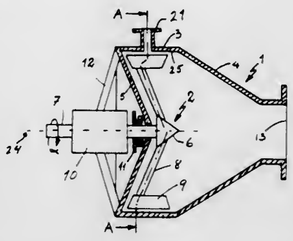
Johan C. F. C. Richter, Nice, France, assignor to Kamyr Aktiebolag, Karlstad, Sweden

Filed Mar. 10, 1976, Ser. No. 665,576

Claims priority, application Sweden, Mar. 14, 1975, 7502870

Int. Cl.² D21C *7/14, 9/12, 9/14, 3/24*

U.S. Cl. 162—17 **10 Claims**



1. A method for continuously distributing and mixing high consistency pulp with at least one treatment fluid in a housing having a cylindrical portion comprising the steps of

introducing pulp having a solids content of about 5% or more into the housing cylindrical portion,

imparting a rapid circular movement about an axis of rotation to said pulp, corresponding to a linear peripheral velocity at the velocity at which the pulp is fluidized, after introduction into said housing cylindrical portion, said moving pulp being contained by said housing cylindrical protion,

introducing treatment liquid in the housing cylindrical portion in a predominantly even layer over a layer of moving pulp in said housing cylindrical portion, thus forming repeated layers of pulp and treatment fluid,

transforming the circular movement of said pulp having a layer of treatment fluid into a whirling movement translating along said axis of rotation of said pulp, so that displacement between the pulp layers takes place effecting complete mixing of said pulp and said treatment fluid, and

transporting the now mixed pulp and treatment fluid to another treatment station, the mixed pulp and fluid no longer having a whirling movement during transport to the other treatment station.

8. Apparatus for continuously distributing and mixing high consistency pulp with at least one treatment fluid comprising

an enclosed housing, said housing having a cylindrical portion thereof,

means for tangentially introducing pulp having a solids consistency of about 5% or more into said housing cylindrical portion,

means for imparting a rapid circular movement about an axis of rotation to said pulp, corresponding to a linear peripheral velocity at the velocity at which the pulp is fluidized, after introduction into said housing cylindrical portion, said moving pulp being initially contained by said housing cylindrical portion,

means for generally radially introducing a treatment fluid into the housing cylindrical portion in a predominantly even layer over a layer of moving pulp in said housing cylindrical portion, thus forming repeated layers of pulp and treatment fluid,

means for transforming the circular movement of said pulp having a layer of treatment fluid into a whirling movement translating along said axis of rotation of said pulp, so that displacement between the pulp layers takes place effecting complete mixing of said pulp and said treatment fluid, said transforming means comprising a generally converging open conical portion extending outwardly from one end of said cylindrical housing portion, said

conical housing portion having an outlet disposed at the termination of the convergence thereof, and

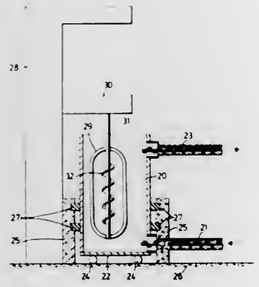
means for transporting the now mixed pulp and treatment fluid to another treatment station, the mixed pulp and fluid no longer having a whirling movement during transport to the other, treatment station.

4,093,507

METHOD OF LIQUID TREATING CELLULOSE FIBRES WITH ELASTIC PRESSURE SHOCKS

Torsten Gillberg, 39 Norralundsgatan, S-602 14 Norrkoping, Sweden

Filed Nov. 17, 1976, Ser. No. 742,919
Int. Cl.² D21C *1/02, 1/10, 5/02*
U.S. Cl. 162—18 **1 Claim**



1. In a method of treating cellulose fibers in a cellulose pulp wherein the pulp consistency is in the range of 10–90%, and wherein intermittent elastic compression forces are applied to the fibers, the improvement wherein the applying of elastic forces comprises the steps of:

positioning a rotatable paddle wheel eccentrically within a container so that paddle arms of the paddle wheel at least closely approach an interior wall portion of said container intermittently,

providing said wall portion with an elastic surface,

introducing the fibers into the container,

rotating the paddle wheel to intermittently elastically compress the fibers against said elastic surface to apply elastic pressure shocks to the fibers for a duration not exceeding one second and of a magnitude causing pressure in the interior of the fibers to exceed 0.2 atmospheres excess pressure, whereby liquid is expelled from the fibers and the fibers are not permanently deformed,

allowing the fibers to expand following the pressure shocks to adsorb liquid, and

repeating said steps of applying shocks and allowing the fibers to expand, until the fibers are completely impregnated with liquid.

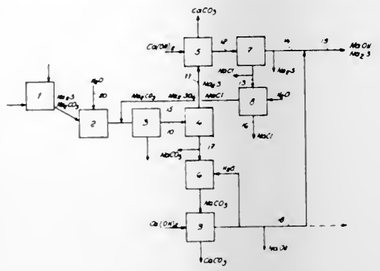
4,093,508

PROCESS FOR RECOVERING CHEMICALS FROM THE WASTE LIQUORS OF SULFATE CELLULOSE DIGESTION AND THE WASTE WATERS OF BLEACHING

Kaj Olof Henricson, Kauniainen, Finland, assignor to A. Ahlstrom Osakeyhtio, Finland

Filed Mar. 10, 1975, Ser. No. 556,974
Claims priority, application Finland, Mar. 12, 1974, 743/74
Int. Cl.² D21C *11/12*
U.S. Cl. 162—30 K **3 Claims**

1. In a process for the recovery of chemicals from the waste liquors of sulfate cellulose digestion and from the waste waters of bleaching, wherein the waste liquor from the digestion is concentrated by evaporation and the concentrated waste liquor is burned in a recovery boiler to produce a melt mainly containing sodium sulfide, sodium carbonate and sodium chloride, the melt is dissolved in the waste waters of bleaching and is clarified to produce green liquor containing sodium carbonate, sodium sulfide and sodium chloride and the carbonate and the chloride are separated from the green liquor, the improvement which consists of (1) separating sodium carbonate from the green liquor by crystallization under conditions to retain all the sodium chloride in the sodium sulfide-containing mother liquor said mother liquor being saturated with respect to sodium chloride, dissolving the crystallized sodium carbonate, caustizing at least a portion of the sodium carbonate solution



with a caustizing agent which is calcium hydroxide to form sodium hydroxide, (2) caustizing the sodium carbonate-depleted sodium sulfide containing mother liquor with calcium hydroxide, to convert residual sodium carbonate to sodium hydroxide (3) concentrating by evaporating said mother liquor to precipitate sodium chloride, (4) separating sodium chloride therefrom and combining the resultant mother liquor containing sodium sulfide with the sodium hydroxide-containing solution in a ratio suitable to form a digestion solution with a desired sulfide content.

4,093,509

PRODUCTION OF PULP SLURRIES EMPLOYING ISATOIC ANHYDRIDE

Richard L. Jacobs, Perrysburg, Ohio, assignor to The Sherwin-Williams Company, Cleveland, Ohio

Filed Jun. 27, 1977, Ser. No. 810,013
Int. Cl.² D21D *3/00*
U.S. Cl. 162—158 **1 Claim**

1. A method for making paper comprising adding to an aqueous pulp slurry, based upon the weight of the pulp in the slurry, from 1 to 5 percent of isatoic anhydride to shorten the beating time required to achieve a given degree of pulp freeness as compared to the beating time required to achieve the same degree of freeness for the pulp slurry without an isatoic anhydride addition, and forming the paper sheet, whereby the paper sheet has improved dry strength as compared to a paper formed from the pulp without an isatoic anhydride addition, and beaten to the same degree of freeness.

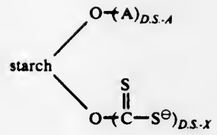
4,093,510

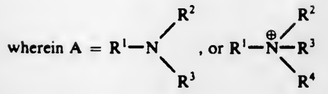
XANTHATED STARCH AMINE PAPER ADDITIVES

Merle E. Carr, Chillicothe, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 7, 1977, Ser. No. 785,616
Int. Cl.² D21D *3/00*
U.S. Cl. 162—175 **17 Claims**

1. Compositions for use in increasing the wet and dry strength of paper comprising xanthated starch amines (XSA) characterized by the following general structure:



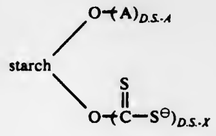


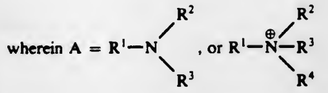
wherein R^1 is a C_1–C_6 alkylene or hydroxy-substituted alkylene; and R^2, R^3, and R^4 are each selected from the group consisting of hydrogen, C_1–C_{12} straight or branched alkyl, cyclohexyl, phenyl, and benzyl;

wherein D.S.-A represents the degree of substitution of the amine group; and

wherein D.S.-X represents the degree of substitution of the xanthate group.

8. A method of increasing the wet and dry strength of a paper product comprising adding to the pulp furnish as a wet-end additive in a papermaking process an effective amount of a xanthated starch amine (XSA) characterized by the following general structure:





wherein R^1 is a C_1–C_6 alkylene or hydroxy-substituted alkylene; and R^2, R^3, and R^4 are each selected from the group consisting of hydrogen, C_1–C_{12} straight or branched alkyl, cyclohexyl, phenyl, and benzyl;

wherein D.S.-A represents the degree of substitution of the amine group; and

wherein D.S.-X represents the degree of substitution of the xanthate group.

4,093,511

APPARATUS FOR OXYGEN BLEACHING OF PULP INCLUDING RECIRCULATION OF EXHAUST GASES

Johan Christoffer Fredrik Carl Richter, St. Jean Cap Ferrat, France, assignor to Kamyr Aktiebolag, Karlstad, Sweden

Division of Ser. No. 500,899, Aug. 26, 1974, Pat. No. 3,963,561.
This application Feb. 9, 1976, Ser. No. 656,585
Claims priority, application Sweden, Aug. 27, 1973, 7311580
Int. Cl.² D21C *9/10, 7/00*
U.S. Cl. 162—234 **4 Claims**

1. Apparatus for oxygen bleaching of pulp comprising

an oxygen reactor vessel including an inner concentric sub-vessel having a larger diameter at the open top thereof than at the bottom thereof, and an outer chamber surrounding and completely enclosing said inner sub-vessel, said outer chamber having a pressurized gas-filled top portion thereof above the open top of said inner sub-vessel, and having a liquid level below the top of said inner sub-vessel,

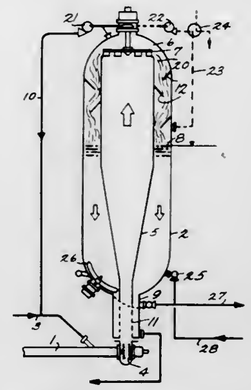
means for transporting high-consistency pulp to an inlet in the bottom of said sub-vessel,

means for adding oxygen to said pulp in said means for transporting said pulp before entry into said opening in the bottom of said sub-vessel,

means for emulsifying the pulp and the oxygen to thoroughly mix them together before entry of said pulp into the bottom inlet in said sub-vessel,

rotatable scraper means associated with said inner sub-vessel at the top thereof to distribute pulp over the top edge of said inner sub-vessel into said outer chamber,

an outlet for oxygen bleached pulp from said outer chamber, located adjacent the bottom of said outer chamber, and



means for exhausting gas from said top portion of said outer chamber and returning said exhausted gases to said means for adding oxygen to said pulp in said means for transporting said pulp before entry into said opening in the bottom of said sub-vessel.

4,093,512

PAPERMAKERS BELTS HAVING ULTRA-HIGH MODULUS LOAD BEARING YARNS

Thomas B. Fleischer, East Greenbush, N.Y., assignor to Huyck Corporation, Wake Forest, N.C.

Filed Apr. 23, 1975, Ser. No. 571,031
Int. Cl.² D21F *1/10, 7/08*
U.S. Cl. 162—348 **16 Claims**

1. A papermakers' belt for use in a papermaking machine and comprised of ultra-high modulus load-bearing yarns comprised of poly (para-phenylene terephthalamide).

4,093,513

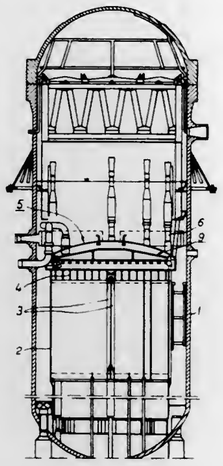
WATER MODERATED REACTOR

Tadeusz Berens, and Ragnar Mansson, both of Vasteras, Sweden, assignors to Aktiebolaget Asea-Atom, Vasteras, Sweden

Filed Aug. 25, 1975, Ser. No. 607,612
Claims priority, application Sweden, Aug. 29, 1974, 7410932
Int. Cl.² G21C *15/00*
U.S. Cl. 176—37 **2 Claims**

1. Water moderated reactor comprising a reactor pressure vessel with a plurality of vertically arranged fuel assemblies which are enclosed in a moderator tank provided with a cover and positioned by means of an upper core grid arranged in the moderator tank, and comprising a sprinkling device arranged above said core grid and below said cover, said sprinkling device comprising a plurality of substantially linear and horizontal main sprinkling tubes individually provided with a plurality of sprinkling nozzles, a common distributing pipe for

sprinkling water connected to said main sprinkling tubes, a plurality of auxiliary tubes each positioned above a corresponding main sprinkling tube, and a plurality of transverse metal tubes hydraulically and mechanically connecting said auxiliary tubes to corresponding main sprinkling tubes.



4,093,514

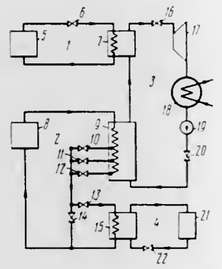
METHOD OF BRINGING NUCLEAR POWER PLANT TO FRACTIONAL ELECTRICAL LOAD CONDITIONS

Vladimir Grigorievich Iljunin, ulitsa Migunova, 9, kv. 28; Igor Alexeevich Kuznetsov, ulitsa Solnechnaya, 5, kv. 2; Viktor Mikhailovich Murogov, prospekt Lenina, 13/1, kv. 4, all of Obninsk, Kaluzhskoi oblasti, and Anatoly Nikolaevich Shmelev, Novorogozhskaya ulitsa, 4, kv. 7, Moscow, all of U.S.S.R.

Continuation of Ser. No. 586,802, Jun. 13, 1975, abandoned, which is a continuation of Ser. No. 406,215, Oct. 15, 1973, abandoned. This application Feb. 22, 1977, Ser. No. 770,773

Int. Cl.² G21C *15/16*

U.S. Cl. 176—65 **4 Claims**



1. A method of bringing a nuclear power plant to fractional electric load conditions, which nuclear power plant comprises a turbine driven by a working substance, at least two nuclear reactors, at least one nuclear reactor being a breeder and both reactors transferring heat to said working substance, said method comprising the steps of: reducing the supply of working substance to said turbine in accordance with a predetermined fractional load; transferring heat successively from said nuclear reactors to said working substance; connecting said breeding reactor to a first cooling circuit having a first coolant temperature; connecting the other nuclear reactor to a second cooling circuit with a coolant temperature higher than said first coolant temperature; lowering the coolant temperature at the inlet and outlet of said breeding reactor to a level corresponding to the reduced supply of said and increasing the power of said breeding reactor as a result of the lowering of the temperature of the coolant flowing therethrough; and removing excess heat resulting therefrom.

4,093,515

LAMINATED CARBON-CONTAINING SILICONE RUBBER MEMBRANE FOR USE IN MEMBRANE ARTIFICIAL LUNG

Theodor Kolobow, Rockville, Md., assignor to Government of the United States, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 663,127

Int. Cl.² B01D *13/00*

U.S. Cl. 195—1.8 **19 Claims**

1. In a membrane artificial lung device for extracorporeal blood gas exchange during blood perfusion therethrough including a blood-compatible gas-permeable membrane through which said exchange is effected, the improvement consisting of said membrane being a laminated silicone rubber membrane composed of at least two layers comprising a first layer of silicone rubber compounded with from about 25 to about 40% by weight of silica filler and a second layer of silicone rubber compounded with from about 0.25 to about 40% by weight of carbon black filler.

4,093,516

PREPARATION OF LIQUID FUEL AND NUTRIENTS FROM MUNICIPAL WASTE WATER

John L. Lang, P.O. Box 1242, Midland, Mich. 48640

Filed Sep. 27, 1974, Ser. No. 509,813

Int. Cl.² C12B *1/00*

U.S. Cl. 195—27 **9 Claims**

1. The process for preparation of useful substances, including liquid fuel stock and nutrient materials from liquidous municipal waste which comprises essentially the steps of:

(a) adjustment of the solids content of said liquidous waste;

(b) hydrolysis and saccharification of the polysaccharides and other components of said liquidous waste in the presence of an essentially constant concentration of a hydrolytic agent selected from the group consisting of oxygen, ozone, and acidic compounds of sulfur and phosphorus, and carried out to the extent that the organic portion of the liquidous waste is essentially solubilized and sterilized;

(c) rendering innocuous the hydrolytic agent of step (b);

(d) adjustment of the soluble solids content and the pH of the so-obtained mixture to provide a suitable environment for fermentation of said mixture;

(e) innoculation of said sterile mixture with a selected essentially single fermentation species, and, when desired, with enzymatic materials;

(f) fermentation of said mixture under conditions suitable for metabolic action by said fermentation species; and

(g) isolation of the desired product components from the fermented mixture.

4,093,517

METHOD FOR PRODUCING CHOLESTEROL OXIDASE IN THE PRESENCE OF A NONIONIC SURFACTANT

Prakash S. Masurekar, Webster, and Charles T. Goodhue, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 639,690, Dec. 11, 1975. This application Nov. 15, 1976, Ser. No. 741,908

Int. Cl.² C12D *13/10*

U.S. Cl. 195—66 R **10 Claims**

1. A method for producing cholesterol oxidase comprising:

growing a cholesterol oxidase-producing microorganism in a medium comprising a cholesterol oxidase inducer, from about 1.0 to about 5.0 g./liter of a nonionic surfactant which is non-toxic to the microorganism, and at least about 10 g./liter of yeast extract, thus producing cholesterol oxidase; and

recovering the cholesterol oxidase.

4,093,518

STIRRED GAS BUBBLE FERMENTER

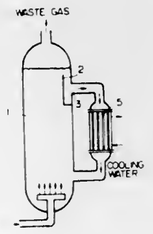
Michito Hamanaka; Toshio Sano, and Noriharu Kumura, all of Sodegaura, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Jan. 25, 1977, Ser. No. 762,422

Claims priority, application Japan, Feb. 4, 1976, 51-10413

Int. Cl.² C12B *1/12, 1/18*

U.S. Cl. 195—142 **19 Claims**



1. In a stirred gas bubble fermenter having aeration means, a waste gas outlet and an overflow exit, and provided with a cooler outside the fermenter and coupled to the fermenter through said overflow exit,

the improvement comprising:

an overflow weir connected to the inner wall of the fermenter below said overflow exit and extending at least in the upward direction of the fermenter so as to be opposite at least a portion of said overflow exit; and

a guide plate arranged between at least a portion of said overflow weir and at least a portion of said overflow exit to improve gas-liquid separation.

4,093,519

DECARBONIZING APPARATUS FOR AN UNDERJET-TYPE OF COKE OVEN BATTERY

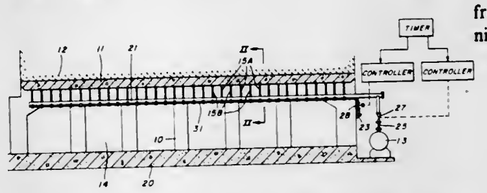
Erich Pries, Bochum, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Aug. 7, 1975, Ser. No. 602,766

Claims priority, application Germany, Aug. 19, 1974, 2439724

Int. Cl.² C10B *43/12, 21/12*

U.S. Cl. 202—241 **7 Claims**



1. In a battery of underjet coke ovens which includes regenerative heating by regenerators above a cellar, gas distribution pipes in the cellar including rich gas feed pipes extending from each distribution pipe through regenerators having a high temperature environment to conduct rich gas to burners within a row of heating flues between two coking chambers, a gas dispensing nozzle located within the relatively cool part of the pipes in the cellar below the regenerators for supplying rich gas to each burner, the improvement in a decarbonizing apparatus including:

a pipeline in said cellar for conducting compressed air below each row of heating flues, each pipeline extending in a generally parallel relation to a gas distribution pipe supplying rich gas to said nozzles,

means below the high temperature environment of said regenerators coupled between each gas dispensing nozzle for rich gas to inject compressed air from said pipeline into the gas distribution pipe toward the opening in a gas dispensing nozzle located below the regenerators within said relatively cool part of said distribution pipe for periodic cleaning of the gas dispensing nozzle,

a supply header for conducting compressed air along the battery of coke ovens for each said pipeline,

valve means for controlling the flow of compressed air from said supply header to each said pipeline,

a regenerative reversal control timer for reversing regenerative heating of the underjet coke ovens,

controller means responsive to a control signal from said timer to control regenerative heating reversals in the heating walls of the coke oven battery, and

control means coupled to operate said valve means in response to a signal from said regenerative reversal control timer for periodic cleaning of said gas dispensing nozzles.

4,093,520

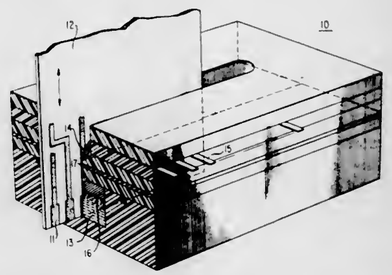
PROCESS FOR GOLD PLATING

Donald Eldridge Koontz, and Uziel Landau, both of Summit, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation of Ser. No. 658,702, Feb. 17, 1976, abandoned. This application Jul. 20, 1977, Ser. No. 817,267

Int. Cl.² C25D *5/02, 5/08, 5/16*

U.S. Cl. 204—15 **5 Claims**



1. A process for electroplating metals and alloys selected from the group consisting of soft gold, hard gold, nickel, tin-nickel, and tin-lead on surfaces comprising the step of:

passing current from an electrical energy source through an anode, plating solution and cathode with surfaces to be plated as part of the cathode in which electrical resistors are located outside the plating solution and in series between the electrical energy source and the surfaces to be plated and in which plating solution is pumped through a plating cell so that plating solution flows parallel to the surface to be plated with a given parallel flow rate characterized in that

(a) the electrical resistance is between 10 and 10,000 ohms;

(b) the flow rate of the plating solution parallel to the surface being plated is between 10 cm/sec and 800 cm/sec; and

(c) the current density is between 50–300 ma/cm² for hard gold, so as to produce uniform, predetermined plating thickness.

4,093,521

CHROMIUM ELECTROPLATING

Stanley Renton, 6 Kenilworth Close, Penkridge, Staffordshire, and John Cooper Crowther, 14 Gilbanks Road, Stourbridge, West Midlands, both of England

Continuation-in-part of Ser. No. 751,376, Dec. 17, 1976, abandoned. This application Jun. 28, 1977, Ser. No. 810,744
Claims priority, application United Kingdom, Dec. 18, 1975, 51798/75; Feb. 26, 1976, 07595/76
Int. Cl.² C25D *3/06, 3/56*
U.S. Cl. 204—43 R 7 Claims

1. In a trivalent chromium electroplating bath of the type which consists essentially of an acidic aqueous solution of trivalent chromium, a carboxylate selected from formate, acetate and mixtures thereof, a bromide and ammonium the improvement which consists in maintaining in said bath an amount of metal ion selected from (i) iron or nickel in the amount of between 30 and 150 parts per million of the solution by weight, or (ii) iron plus nickel in the amount of between 30 and 150 ppm with the nickel being in an amount up to about 100 ppm.

4,093,522

ELECTROLYTIC CHROMIC ACID BATH FOR CHROME PLATING

Horst Dillenberg, Kaiser-Wilhelm-Allee 26, 56 Wuppertal 1, Germany

Filed Dec. 17, 1975, Ser. No. 641,607
Claims priority, application Germany, Jan. 10, 1975, 2500730
Int. Cl.² C25D *3/10*
U.S. Cl. 204—51 3 Claims

1. An electrolytic chromic acid bath for chromium plating consisting essentially of:

chromic acid in an amount of about 110 grams up to about 450 grams per liter;

a water soluble pyridinium, quinolinium or acridinium halide salt;

a water soluble pyridinium, quinolinium or acridinium sulfate salt;

said sulfate salt being present in an amount of at least 1.1 grams per liter up to about 7.0 grams per liter;

said halide salt being present when one of fluoride, chloride, bromide and iodide, in an amount of about

0.12 to 0.4 grams per liter of fluoride

0.18 to 0.6 grams per liter of chloride

0.32 to 0.9 grams per liter of bromide

0.40 to 1.2 grams per liter of iodide; and

said water soluble sulfate salt and water soluble halide salt regulating electroplating and providing a high throwing power and highly glossy coating while avoiding scorching at coating sites of high current density.

4,093,523

BRIGHT ACID ZINC ELECTROPLATING BATHS

John A. Henricks, Oak Park, and Robert E. Wild, Wheaton, both of Ill., assignors to Edward B. Wild, Wheaton, Ill.

Filed Feb. 7, 1977, Ser. No. 766,554
Int. Cl.² C25D *3/22*
U.S. Cl. 204—55 R 8 Claims

1. The method of electroplating a bright zinc deposit from an aqueous acid chloride electrolyte containing potassium chloride as the conducting salt and boric acid as the buffer; by means of an aromatic aldehyde or ketone brightener that is dispersed into the electrolyte by means of a mixture of, 1- a fatty imidazole sulfonate, 2- a fatty amido betaine and 3- a hydrotropic coupling agent selected from the group consiting of cyclic alcohols, glycol ethers and aromatic sulfonates that are not wetting agents.

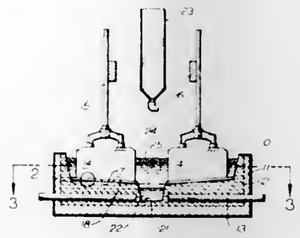
4. A mixture of addition agents that will produce a bright zinc deposit of an aqueous acid zinc chloride bath; said mixture consisting essentially of an aromatic aldehyde or ketone that is held in solution by means of a fatty imidazole sulfonate, a fatty amido betaine and a hydrotrope selected from the group consisting of cyclic alcohols, glycol ethers, and aromatic sulfonates that are not wetting agents.

4,093,524

BONDING OF REFRACTORY HARD METAL

John R. Payne, Pleasanton, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Continuation-in-part of Ser. No. 749,563, Dec. 10, 1976, abandoned. This application Oct. 27, 1977, Ser. No. 846,061
Int. Cl.² C25B *1/00;* C25C *3/06, 3/08, 7/02*
U.S. Cl. 204—61 19 Claims



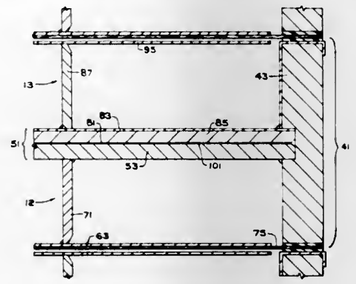
1. In an aluminum reduction cell comprising a shell defining a cavity with the inner surfaces thereof lined with refractory material, at least one electrode depending into the cavity, and a second electrode of opposite polarity to the first mentioned electrode wherein the surface of at least one of the electrodes is protected by refractory hard metal, the improvement comprising an aluminum carbide bond at the interface between the refractory hard metal and the protected electrode surface which is formed in situ at the interface thereof by reacting a carbonaceous material with molten aluminum.

4,093,525

METHOD OF PREVENTING HYDROGEN DETERIORATION IN A BIPOLAR ELECTROLYZER

Hugh Cunningham, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 20, 1976, Ser. No. 716,311
Int. Cl.² C25B *1/16, 1/26, 9/02*
U.S. Cl. 204—98 2 Claims



1. In a method of conducting electrolysis in a bipolar electrolyzer having a plurality of electrolytic cells electrically and mechanically in series comprising passing an electrical current from an anodic end of said electrolyzer to anodes of a first electrolytic cell through an aqueous alkali metal chloride anolyte and an aqueous alkali metal hydroxide containing catholyte to cathodes of said first electrolytic cell, evolving hydrogen at said cathodes, and passing said electrical current from said cathodes through a bipolar unit to which said cathodes are joined to anodes of a subsequent cell in said electrolyzer, said anodes joined to the opposite side of said bipolar unit, and thereafter to a cathodic end of said electrolyzer, the improvement comprising:

passing said electrical current from the cathodes of the first cell laterally to the overall vector flow of current through the electrolyzer, from an anodic end of said electrolyzer to a cathodic end of said electrolyzer, to conductor means at the periphery of said cell; and

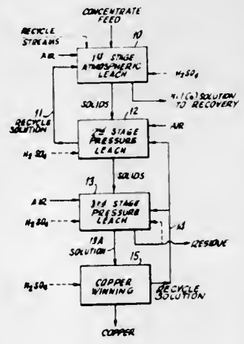
passing said electrical current through said conductor means parallel to the vector flow of current through the electrolyzer and then in a direction laterally to the vector flow of current through the electrolyzer from the conductor means to the anodes of the subsequent cell.

4,093,526

HYDROMETALLURGICAL LEACHING AND REFINING OF NICKEL-COPPER CONCENTRATES, AND ELECTROWINNING OF COPPER

Jorge L. Blanco, New Orleans; Ranko P. Crnojevich, Gretna, both of La., and Courtney S. Simons, Weston, Conn., assignors to Amax Inc., Greenwich, Conn.

Filed Sep. 8, 1977, Ser. No. 831,364
Int. Cl.² C25B *1/22;* C25C *1/12*
U.S. Cl. 204—104 32 Claims



1. A process for the hydrometallurgical refining of a sulfur-containing nickel-copper concentrate in which at least about 20% by weight of the total nickel present is in an acid-soluble metallic form which comprises:

providing a slurry of said concentrate in particulate form in a copper-containing sulfuric acid leaching solution having a pH ranging up to about 3.5,

subjecting said slurry to a first stage leaching and refining step at atmospheric pressure and a temperature ranging from about 40° to 95° C while simultaneously aerating said slurry to effect the simultaneous dissolution of nickel and cementation of substantial amounts of copper from said solution,

continuing said leaching to a terminal pH of over about 5 to refine said solution by further rejecting copper and impurities therefrom by hydrolysis and provide a purified nickel sulfate solution and a first stage atmospheric leach residue containing undissolved nickel, copper and impurities,

separating said purified solution from said first stage atmospheric leach residue for nickel recovery,

subjecting said first stage atmospheric leach residue as a slurry to a second stage oxidation leaching step at elevated temperature and pressure in a copper-containing sulfuric acid solution for a time sufficient to reach a terminal pH ranging from about 2.5 to 4 and to effect dissolution of substantial amounts of nickel and some copper and provide a second stage pregnant solution thereof and a second stage residue impoverished in said nickel,

the copper-containing sulfuric acid solution employed in said second stage leaching step having a composition such that the total molar ratio of free H_2SO_4 plus Cu-SO_4 to the nickel in said atmospheric leach residue ranges from about 0.7:1 to 1.3:1,

separating the second stage pregnant solution containing nickel and copper from said second stage leach residue,

recycling said second stage pregnant solution to said first stage atmospheric leach for separating the nickel from dissolved copper and impurities in said solution,

subjecting said second stage leach residue to a third stage oxidation leaching step at elevated temperature and pressure in a sulfuric acid-containing solution with the total sulfur to the total nickel + copper ratio on the molar basis ranging from about 0.9:1 to 1.3:1 to effect dissolution of substantially all of the nickel and copper in said residue, thereby forming a third stage leach residue and a third stage pregnant nickel-copper sulfate solution containing a major amount of copper, and having a terminal pH ranging up to about 3,

subjecting said third stage pregnant solution to a copper winning step for the selective removal of copper while regenerating acid therein and thereby provide a spent copper-sulfuric acid solution,

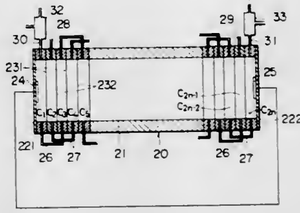
and recycling said spent acid solution back into the process to recover the remaining non-ferrous metal values therefrom.

4,093,527

HYDROGEN GENERATING APPARATUS

Kazuo Tanno, Hitachi; Yasumasa Furutani, Katsuta; Takashi Honda, Hitachi, and Akira Uenishi, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,362
Claims priority, application Japan, Dec. 13, 1974, 49-142535
Int. Cl.² C25B *1/02;* B01D *13/02*
U.S. Cl. 204—129 13 Claims



1. A hydrogen generating method, comprising:

(1) providing a cell having a casing, and first and second electrodes on the opposite ends of said casing;

(2) providing a plurality of cation and anion exchange membranes disposed in said casing in a manner that said cation and anion exchange membranes are alternately arranged between said electrodes and are spaced from each other to define a plurality of chambers, with each chamber constituting the space encompassed by a cation exchange membrane, an adjacent anion exchange membrane and said casing, and electrically isolating with said casing and membranes each chamber from the adjacent chambers and transferring only cations and anions from one chamber to an adjacent chamber through the respective membranes;

(3) introducing a first aqueous electrolyte into every other one of said chambers;

(4) introducing a second aqueous electrolyte of the same kind as said first electrolyte into said other chambers, while maintaining the second electrolyte at a concentration lower than that of the first electrolyte;

(5) heating part of the first electrolyte outside of said chambers to concentrate the first electrolyte by vaporizing water therein and removing the vaporized water from the first electrolyte;

(6) introducing water into said other chambers containing

the second electrolyte to dilute the second electrolyte so as to maintain a predetermined concentration difference between the first and second electrolytes; and

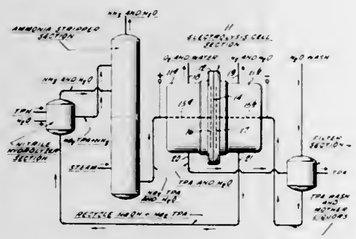
(7) maintaining the number of said chambers at least enough so that the sum of the theoretical decomposition voltage of water to be generated across said electrodes, a voltage drop due to the hydrogen over-voltage determined by the material of said electrodes and a voltage drop due to the interior resistance of the cell is high enough to decompose the water in the electrolyte to generate hydrogen at one of said electrodes when said electrodes are electrically interconnected in an electrical path electrically parallel to the chambers.

4,093,528

TEREPHTHALIC ACID PROCESS

Raymond Wynkoop, Media, Pa.; Oscar L. Norman, and Richard V. Norton, both of Wilmington, Del., assignors to Suntech, Inc., Wayne, Pa.

Filed Mar. 10, 1977, Ser. No. 776,453
Int. Cl.² C25B *3/00*; C07C *51/08, 63/26, 63/28*
U.S. Cl. 204—180 P **9 Claims**



1. A process for the preparation of terephthalic acid which comprises electrolyzing in the anode compartment of an electrolysis cell wherein said anode compartment is separated from the cathode compartment by a cation selective membrane, an aqueous solution of sodium terephthalate at a molar concentration of from about 0.1 to about 0.7 to form an aqueous suspension of terephthalic acid and separating said terephthalic acid product, said electrolysis being conducted at a temperature of from about 60° to about 120° C, a current density of from about 100 to about 500 amps per square foot, and at a voltage of from about 5 to about 12 volts.

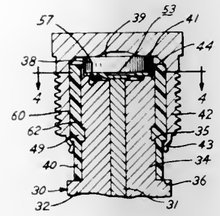
6. A process for the preparation of terephthalic acid which comprises hydrolyzing terephthalonitrile in an aqueous medium containing a stoichiometric excess of sodium hydroxide at a temperature of between about 100° and about 250° C, removing ammonia generated by the hydrolysis from the aqueous medium, subjecting an aqueous solution containing from about 0.1 to about 0.7 molar per liter of sodium terephthalate obtained by said hydrolysis to electrolysis in the anode compartment of an electrolysis cell wherein said anode compartment is separated from the cathode compartment by a cation selective membrane to form an aqueous suspension of terephthalic acid and separating said terephthalic acid product, said electrolysis being conducted at a temperature of from about 60° to about 120° C, a current density of from about 100 to about 500 amps per square foot, and at a voltage of from about 5 to about 12 volts.

4,093,529

RESISTOR ANODE FOR METAL TANK

Carl G. Strobach, Clarendon Hills, Ill., assignor to Rheem Manufacturing Company, New York, N.Y.

Continuation-in-part of Ser. No. 704,343, Jul. 12, 1976, abandoned, which is a continuation of Ser. No. 542,459, Jan. 20, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 772,517
Int. Cl.² C23F *13/00*
U.S. Cl. 204—197 **4 Claims**



1. An improved resistor anode assembly comprising, in combination:

an anode with a longitudinal axis and of generally cylindrical shape having a generally flat top surface, an exposed, center core wire generally on the axis, and including a groove adjacent the top surface;

a conductive metal cap including a top and cylindrical side wall to define a cylindrical receptacle for receipt of the anode, a lower internal surface in the receptacle, an external surface of said side wall being formed for attaching the cap through an opening in the tank;

a disc-shaped resistor having opposed generally flat contact surfaces, said resistor being interposed between the internal surface of the cap and the exposed end of the core wire, one of said disc contact surfaces being in mechanical and electrical contact with the internal surface of the cap;

a conductive biasing spring having an anode end and a resistor end, the spring having an axial passage with the anode end positioned at one end of the passage along the axis thereof whereby the anode end is accessible to a welding probe projecting in the passage, said anode end being in mechanical and electrical contact by welding to the core wire and the resistor end being generally flat to provide mechanical and electrical friction contact with the other contract surface of said disc; and

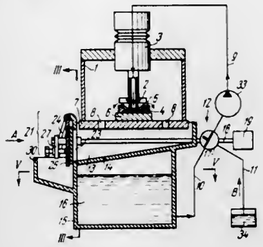
an elastic deformable, hollow, insulating sleeve positioned in said receptacle between the cap side wall and said anode, said sleeve being generally cylindrical and including means cooperating with the anode groove on the inside to facilitate holding the anode, the diameter of the anode being less than the cap receptacle, said anode also projecting into said receptacle, said cap being force fitted and swaged onto said sleeve to retain the anode, said sleeve also separating the resistor, and conductive biasing spring from the cylindrical side wall of the cap, whereby said resistor and spring provide a sole conductive, series path for electrical flow between the anode core wire and the lower internal surface of the cap and maintain said sole path by prevention of electrical contact between the conductive biasing spring or the edge of said disc and said cap regardless of dimensional changes in said anode assembly and by accommodation of any dimensional changes due to expansion or compression of the assembly.

4,093,530

DEVICE FOR ELECTROCHEMICAL TREATMENT OF WORKPIECES

Vladimir Isaakovich Suslin, ulitsa Frunze, 17, kv. 46; Alexandr Ivanovich Dubovik, ulitsa Gvardeitsev Shironintsev, 63 A, kv. 22; Boris Anatolievich Makeev, ulitsa Novgorodskaya, 6, kv. 29; Pavel Semenovich Razdymakha, ulitsa Bljukhera, 26, kv. 121, and Zinovy Abramovich Lekarev, ulitsa Trinklera, 20, kv. 71, all of Kharkov, U.S.S.R.

Filed May 20, 1977, Ser. No. 799,119
Int. Cl.² B23P *1/02*; C25B *15/08*
U.S. Cl. 204—224 M **1 Claim**



1. A device for electrochemical treatment of workpieces comprising:

a working chamber having a bottom and passages made in said bottom;

a tool disposed within said working chamber, a negative potential being applied to said tool in the course of treatment of a workpiece also disposed within said working chamber, to which workpiece a positive potential is applied;

a drive for said tool;

a working gap formed between said tool and said workpiece in the course of treatment thereof, an electrolyte and a washing medium being alternately delivered into said clearance and carried away therefrom separately through said passages;

an intermediate chamber with walls, said intermediate chamber being disposed directly under said working chamber and receiving said electrolyte and said washing medium alternately coming therein through said passages;

a feed tank for said electrolyte delivered into said working gap for treatment of said workpiece and discharged into the same feed tank from said intermediate chamber after said workpiece is treated;

a separate conduit for said electrolyte, communicating with said feed tank;

a water main for said washing delivered into said working gap for washing said workpiece and discharged into a drain from said intermediate chamber;

a separate conduit for said washing medium, communicating with said main and connected to said separate conduit for said electrolyte;

a common conduit for said electrolyte and said washing medium joining said separate conduits downstream of their junction and alternately delivering said electrolyte and said washing medium into said working gap;

a change-over means for actuating the delivery to said workpiece of said electrolyte or said washing medium and the discharge thereof, after the workpiece is treated, through said intermediate chamber, said change-over means consisting of a distribution valve located in said separate conduits, a control element operatively connected with said distribution valve so that said distribution valve alternately shuts off said conduit for the electrolyte or said conduit for the washing medium, a mechanism for separating the discharge of said electrolyte from that of said washing medium, disposed at said intermediate chamber and operatively connected through said distribution valve with said control element so that said mechanism carries out the discharge of the electrolyte or the washing medium according to their respective delivery through the distribution valve;

a pump for the delivery into said working clearance of said electrolyte from said electrolyte feed tank and said washing medium for said water main, or said electrolyte only;

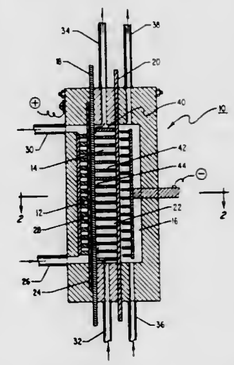
at least one pair of ports for the respective discharge of said electrolyte and said washing medium, made in one of the walls of said intermediate chamber; flaps provided in said mechanism for separating the discharge of said electrolyte from that of said washing medium, the number of said flaps corresponding to the number of said ports; an axle on which said flaps are hinged; a rod in said mechanism for separating the discharge of said electrolyte from that of said washing medium, having a first end and a second end, said first end being connected through said distribution valve with said control element; and a cam mounted on said second end of said rod and alternately interacting with each of said flaps in accordance with the operative position of said distribution valve.

4,093,531

APPARATUS FOR CONCENTRATION AND PURIFICATION OF A CELL LIQUOR IN AN ELECTROLYTIC CELL

Andrew D. Babinsky, Chagrin Falls, and Leo L. Benezra, Mentor, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Division of Ser. No. 644,977, Dec. 29, 1975, Pat. No. 4,036,717. This application Apr. 18, 1977, Ser. No. 788,250
Int. Cl.² C25B *9/00, 13/08, 5/00*
U.S. Cl. 204—265 **6 Claims**



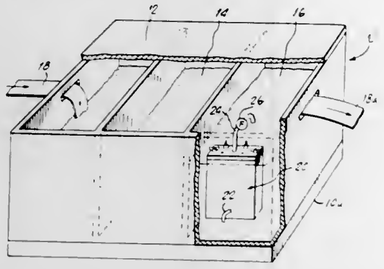
1. An electrolytic cell for the concentration and purification of a cell liquor comprising: a three compartment container; a porous catalytic anode disposed within an anode compartment of said container; a porous diaphragm separating the anode compartment and a central compartment; an essentially hydraulically impermeable cation-exchange membrane separating the central compartment and a cathode compartment; a cathode disposed within the cathode compartment; means for passing a cell liquor into the central compartment; means for passing hydrogen gas into the anode compartment and across said porous catalytic anode; means for passing an electrolyzing current between said anode and said cathode; means for recovering the purified and concentrated alkali metal hydroxide from the cathode compartment; means for recirculating hydrogen gas emanating from the cathode compartment and the anode compartment back into the anode compartment and across said porous catalytic anode; and means for stratifying the cell liquor within the central compartment.

4,093,532

RECOVERY OF SILVER FROM PHOTOGRAPHIC FILM

Nick G. Branibar, Sparta, N.J., assignor to Anken Industries, Morristown, N.J.

Filed Jan. 21, 1977, Ser. No. 761,376
Int. Cl.[2] C25C *1/20, 7/00, 7/02*
U.S. Cl. 204—271 5 Claims



1. Apparatus for the electrodeposition of silver from solution comprising a housing having a removable cover and walls with grooves therein, anode-cathode plates within said housing and positioned with edge portions thereof within said grooved walls, said anode-cathode plates being maintained in spaced relation from one another, said removable cover including electrical contacts on the underside thereof in electrical contact-making engagement with said anode-cathode plates, said housing including a fluid inlet and outlet and a bottom compartment for receiving fluid under pressure from said fluid inlet and closed by a perforated plate at its top portion, the combined area of said perforations being less than the area of said fluid inlet, and support means of resilient material positioned on the upper surface of said perforated plate for supporting the lower edges of said anode-cathode plates in spaced relation from said perforated plate.

4,093,533

BONDED ASBESTOS DIAPHRAGMS

Richard N. Beaver, and Charles W. Becker, both of Angleton, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 12, 1975, Ser. No. 640,119
Int. Cl.[2] C25B *13/02, 13/06, 13/08*
U.S. Cl. 204—296 6 Claims

1. An improved diaphragm for use in an electrolytic cell wherein brine is electrolyzed to produce chlorine, caustic, and hydrogen and wherein a polymeric fluorocarbon-bonded asbestos diaphragm is positioned between the electrodes, the improvement which comprises the use of a mixture of crocidolite and chrysotile as the asbestos, said mixtures of crocidolite/chrysotile being of a weight ratio in the range of about 33/67 to about 75/25.

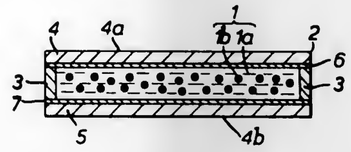
4,093,534

WORKING FLUIDS FOR ELECTROPHORETIC IMAGE DISPLAY DEVICES

Christopher Frederick Carter, Wooton; Roy Trevor Blunt, Towcester; James Cyril Alexander Lewis, and Geoffrey Michael Garner, both of Northampton, all of England, assignors to Plessey Handel und Investments AG, Zug, Switzerland

Filed Feb. 5, 1975, Ser. No. 547,338
Claims priority, application United Kingdom, Feb. 12, 1974, 06276/74; Jul. 19, 1974, 32047/74
Int. Cl.[2] C25D *1/12;* B03C *5/00*
U.S. Cl. 350—355 16 Claims

1. A working fluid for an electrophoretic image display comprising a dispersion of a species of finely divided particles of an opaque dielectric material suspended in a suspension medium, each of said particles having a chemical compound adsorbed onto the surface thereof and forming a coating thereon such that repulsive forces between the particles are modified by short range attractive interactions of functional groups possessed by the chemical compound, and wherein said



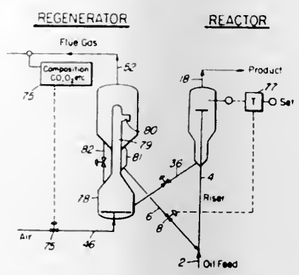
coated particles undergo selected transportation in dependence upon an applied electric field having a potential equal to or greater than the voltage threshold created by the dipole interaction between said coated particles.

4,093,535

CATALYTIC CRACKING PROCESS

Albert B. Schwartz, Philadelphia, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 649,261, Jan. 15, 1976, Pat. No. 4,072,600, and a continuation-in-part of Ser. No. 599,920, Jul. 28, 1975, and Ser. No. 440,890, Feb. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 399,008, Sep. 20, 1973, abandoned. This application Jun. 15, 1977, Ser. No. 806,713
Int. Cl.[2] C10G *11/04;* B01J *8/24;* C01B *29/12*
U.S. Cl. 208—120 9 Claims



1. In a process for the catalytic cracking of gas oil to produce products boiling in the motor fuel range, wherein said gas oil is contacted with a porous acidic solid catalyst in a cracking vessel at conversion conditions including elevated temperatures and the absence of added hydrogen so as to convert said gas oil to lower molecular weight products with deposit on said catalyst of a deactivating solid carbonaceous contaminant resulting from said cracking, the so deactivated catalyst being transferred to a regeneration vessel in which oxidation of said carbonaceous deposit proceeds in the presence of air with generation of carbon monoxide and carbon dioxide and the regenerated catalyst at elevated temperature is transferred from said regeneration vessel to said cracking vessel to catalyze further cracking and supply at least part of the heat of reaction required by said cracking, the improvement which comprises:

conducting said cracking and said regeneration with an inventory of solid, porous, acidic cracking catalyst particles of which at least a portion contains an oxidation catalyst comprising at least one metal selected from the group consisting of platinum, palladium, iridium, osmium, rhodium, ruthenium, and rhenium such that said metal is capable of contacting said gas oil but limiting the concentration of said metal to an amount great enough to promote oxidation of CO and inadequate to substantially increase the generation of coke and hydrogen in said reaction vessel as compared with a like catalyst free of such metal, said amount being less than 50 ppm based on total catalyst inventory.

4,093,536

CATALYTIC CRACKING AND DEHYDROCYCLIZING OF ALKANES USING ALKALINE EARTH OXIDES PROMOTED WITH MANGANESE OXIDE AND/OR RHENIUM OXIDE

Louis F. Heckelsberg, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 460,935, Apr. 15, 1974, abandoned. This application May 22, 1975, Ser. No. 580,010
Int. Cl.[2] C10G *11/04;* B01J *27/04*
U.S. Cl. 208—121 11 Claims

1. A method for catalytically converting alkanes comprising contacting the alkanes under converting conditions with a catalyst by forming a reaction mixture consisting essentially of said alkanes and a catalyst consisting essentially of components selected from the group consisting of:

(A) two alkaline earth oxides and a promoting amount of a promoter selected from the group consisting of manganese oxide and a mixture of manganese oxide and rhenium oxide,

(B) at least one alkaline earth oxide and a promoting amount of rhenium oxide, and

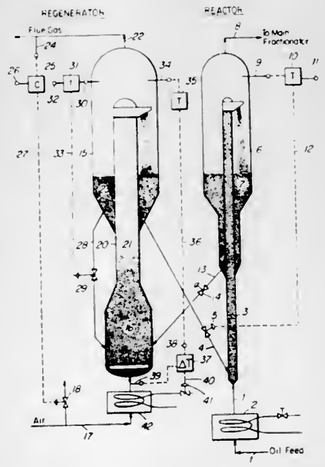
(C) an alkaline earth oxide selected from the group consisting of strontium and barium and a promoting amount of a promoter selected from the group consisting of manganese oxide and a mixture of manganese oxide and rhenium oxide.

4,093,537

FCC CATALYST SECTION CONTROL

Benjamin Gross, and Wooyoung Lee, both of Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 608,351, Aug. 27, 1975, abandoned, and Ser. No. 608,352, Aug. 27, 1975, abandoned. This application Feb. 17, 1977, Ser. No. 769,639
Int. Cl.[2] C10G *13/18*
U.S. Cl. 208—164 9 Claims



1. In a fluid catalytic cracking process for cracking a hydrocarbon feed stream, wherein said stream is contacted with hot regenerated catalyst in a reactor section maintained under catalytic cracking conditions to form cracked products and spent catalyst contaminated by coke; and wherein said cracked products and spent catalyst are separated in, and recovered from, said reactor section; and wherein said recovered spent catalyst is continuously circulated through a regenerator section operating in the complete CO-burning mode thereby burning said contaminating coke by contact with air and forming hot regenerated catalyst and flue gas at substantially the same temperature, said hot regenerated catalyst having a temperature substantially higher than said spent catalyst, said regenerator section being provided with adjustable means for recycling a portion of hot regenerated catalyst to said recovered spent catalyst; and also with adjustable means for preheating said air; and wherein hot regenerated catalyst is recirculated to said reactor section, the method for controlling the process, whereby improving its adaptive behavior, which comprises:

comparing the temperature of the hot regenerated catalyst with a predetermined temperature to obtain a regenerated catalyst temperature deviation; and,

adjusting within the regenerator section, the recycle of hot regenerated catalyst to spent catalyst to change the recycle ratio in a direction to reduce said temperature deviation, said recycle ratio being in the range of at least about 0.7 to about 5 before and after said change; and

adjusting the air preheat temperature in a direction to reduce said regenerated catalyst temperature deviation.

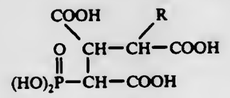
4,093,538

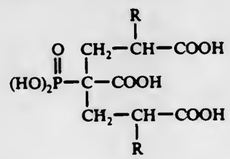
PROCESS FOR INHIBITING THE CORROSION OF HEAVY PULPS FOR HEAVY MEDIA SEPARATION OF MINERALS

Joachim Kandler, Erftstadt Lechenich; Klaus Komorniczyk, Kerpen, and Mathias Reitz, Cologne, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

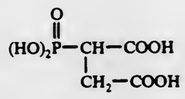
Filed Aug. 22, 1975, Ser. No. 607,013
Claims priority, application Germany, Aug. 28, 1974, 2441096
Int. Cl.[2] B03B *5/30*
U.S. Cl. 209—172.5 1 Claim

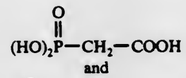
1. A process for inhibiting the corrosion of aqueous heavy pulps containing ferrosilicon with between 8 and 20 weight % of silicon therein as a heavy medium and being used in the heavy media separation of minerals, wherein the heavy pulp is used in admixture with between 0.1 and 0.8 weight % of a carboxy-alkane-phosphonic acid being selected from acids having one of the following formulae:


1)

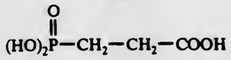

2)

in which R stands for hydrogen or alkyl having from 1 to 4 carbon atoms,


3)


4)

and

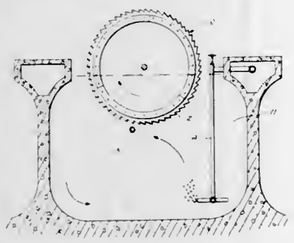

5)

4,093,539

ACTIVATED SLUDGE TREATMENT OF WASTEWATER

Carmen F. Guarino, Philadelphia, Pa., assignor to Autotrol Corporation, Milwaukee, Wis.

Filed May 12, 1976, Ser. No. 685,723
Int. Cl.[2] C02C *1/06, 1/10;* B01D *21/02*
U.S. Cl. 210—17 **2 Claims**



1. The method of improving the efficiency of an activated sludge wastewater treatment plant and of protecting it from destructive hydraulic surges which comprises:

(a) forceably aerating wastewater in an aeration tank,

(b) partially submerging a rotatable biological contactor in the aeration tank,

(c) recycling activated sludge to said aeration tank, and

(d) rotating said contactor to promote and support the growth upon said contactor of a filamentous, highly active and efficient biomass which includes as part of the biomass the living organisms normally present in activated sludge as well as those typically present on the surfaces of a rotatable biological contactor.

4,093,540

PURIFICATION PROCESS

Achintya Kumar Sen Gupta, Schenefeld Bez.Hamburg, Germany, assignor to Lever Brothers Company, New York, N.Y.

Filed Nov. 12, 1976, Ser. No. 741,171
Claims priority, application United Kingdom, Nov. 13, 1975, 46893/75
Int. Cl.[2] B01D *13/00*
U.S. Cl. 210—23 F **44 Claims**

1. A process for refining crude glyceride oil comprising the steps of:

(a) separating different molecular weight constituants of said crude oil into retentate and permeate fractions by ultrafiltering, under pressure, through a semipermeable membrane, a solution containing said crude oil in an organic solvent in which phospholipid micelles are formed; and

(b) passing, in solution in a non-polar solvent, the constituants contained in said permeate fraction through an adsorbant, wherein said adsorbant is a metal oxide or metalloid oxide adsorbant with an average pore size of 30 to 2,000 A and is selected from the group consisting of silicas, aluminas and mixtures thereof and further wherein said permeate fraction solution contains 5 to 90 percent by weight of oil.

4,093,541

METHOD FOR THE REMOVAL OF METALLIC MERCURY

Carlo Piccinini, Fano (Pesaro), and Vincenzo Conti, S.Ippolito, (Pesaro), both of Italy, assignors to Tecneco, S.p.A., Fano (Pesaro), Italy

Filed Sep. 30, 1976, Ser. No. 728,242
Claims priority, application Italy, Oct. 3, 1975, 27957 A/75
Int. Cl.[2] B01D *15/00*
U.S. Cl. 210—40 **1 Claim**

1. A method for the removal of metallic mercury from previously untreated industrial sewage waters containing it, comprising the step of contacting said sewage waters with activated carbon having a surface area of at least 350 square meters per gram.

4,093,542

FLOCCULATING AGENT COMPRISING WATER-IN-OIL EMULSION OF H-ACTIVE POLYMER CARRYING FORMALDEHYDE AND AMINE RADICALS

Kurt Dahmen, Rheydt; Wolfgang Hubner, Kempen, and Eduard Barthell, Krefeld, all of Germany, assignors to Chemische Fabrik Stockhausen & Cie, Bakerfad, Germany

Continuation-in-part of Ser. No. 484,474, Jul. 3, 1974, abandoned. This application Jan. 2, 1975, Ser. No. 538,428
Claims priority, application Germany, Jul. 4, 1973, 2333927
Int. Cl.[2] B01D *21/01;* C08L *61/32*
U.S. Cl. 210—54 **8 Claims**

1. A flocculation, sedimentation, dehydration or retention composition comprising a stable dispersion of about 10 to 50% concentration by weight of a polymeric Mannich base in a mixture of water, a water-insoluble liquid and a quantity of an emulsifier of a suitable HLB number effective to produce a stable water-in-oil emulsion, the Mannich base comprising an H-active polymer carrying carbonamide groups reacted with formaldehyde and a primary or secondary alkyl or hydroxyalkyl amine wherein the alkyl groups have up to about 18 carbon atoms, said formaldehyde and said amine being employed in the reaction in approximately equimolar amounts, and said formaldehyde being present in at least about 0.1 times the molar amount of the carbonamide groups.

8. The process for clarifying an aqueous liquid having material suspended therein comprising mixing said aqueous liquid with a composition according to claim 1, and allowing said mixture to settle, whereby the suspended material settles out more rapidly than in the absence of said composition.

4,093,543

DECOMPOSITION OF FORMIC ACID IN VERY LOW CONCENTRATION

Paul G. Rodewald, Rocky Hill, and Werner O. Haag, Trenton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 22, 1976, Ser. No. 725,211
Int. Cl.[2] C02B *1/18*
U.S. Cl. 210—59 **7 Claims**

1. The process of increasing the pH of a very dilute solution of formic acid to 4.0 or higher which comprises contacting said solution with a heterogeneous formic acid decomposition catalyst consisting essentially of caustic on a solid inorganic substrate selected from the group consisting of alumina, titania-zirconia, titania, zirconia, silica, and mixtures thereof, at a temperature of from about 500° to 1200° F, said solution containing up to about 1.0 weight percent of formic acid.

4,093,544

METHOD AND APPARATUS FOR AMMONIA-NITROGEN REMOVAL BY VACUUM DESORPTION

David S. Ross, Lorain, Ohio, assignor to Sterling Drug, Inc., New York, N.Y.

Continuation of Ser. No. 247,262, Feb. 5, 1975, abandoned. This application Nov. 12, 1976, Ser. No. 741,466
Int. Cl.[2] C01C *3/00;* C02C *1/02*
U.S. Cl. 210—59 **29 Claims**

1. A method for removing ammonia nitrogen from a body of wastewater having an upper surface, a given pH and a given temperature, said method comprising the steps of:

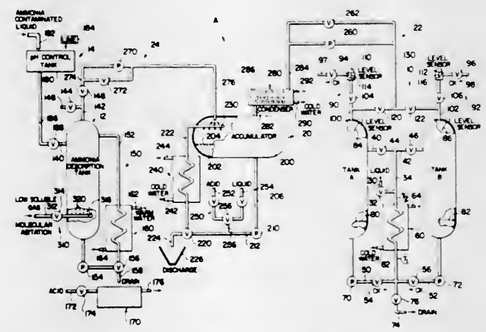
(a) increasing the pH of said wastewater to a highly basic condition;

(b) applying to said upper surface of said wastewater a vacuum corresponding approximately to the vapor pressure of said wastewater at said given temperature whereby ammonia is desorbed from said wastewater effluent;

(c) absorbing said desorbed ammonia in a body of liquid having a pH substantially less than said highly basic condition; and,

(d) introducing into said wastewater bubbles of a gas which is only slightly soluble in said wastewater.

4. An apparatus for removing ammonia nitrogen from wastewater having a given pH and a given temperature, said apparatus comprising means for increasing the pH of said wastewater; tank means for receiving said highly basic wastewater; means for creating a vacuum corresponding aproximately to the vapor pressure of said wastewater at said given temperature;



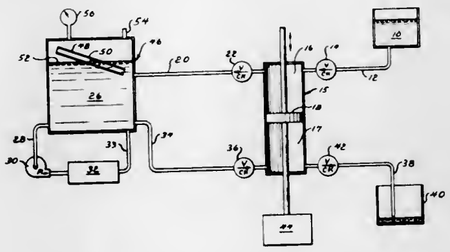
means for applying said vacuum to said tank means whereby ammonia is desorbed from said wastewater; means for introducing bubbles of a low soluble gas into said wastewater; means for directing said desorbed ammonia and said low soluble gas from said tank means; said vacuum creating means including a displacement tank, means for filling said tank with a liquid with an increasing liquid level, means for sealing said displacement tank, means for creating a vacuum in said sealed displacement tank by forcing said liquid therefrom, and means for communicating said vacuum from said displacement tank to said tank means; and, means for cooling said liquid in said displacement tank.

4,093,545

METHOD AND APPARATUS FOR DETERMINING THE AMOUNT OF ULTRAFILTRATION DURING DIALYSIS

Herbert M. Cullis, Silver Spring, Md., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Feb. 14, 1975, Ser. No. 550,051
Int. Cl.[2] B01D *31/00*
U.S. Cl. 210—86 **5 Claims**



1. In a dialysis system which includes dialysis solution conduit means for passing dialysis solution through a membrane dialyzer, the improvement comprising:

means for supplying and means for withdrawing essentially identical volumes of dialysis solution to and from a portion of said dialysis solution conduit means and a dialyzer connected to said conduit means, to precisely and positively control the input and output of dialysis solution to and from said conduit portion and connected dialyzer;

container means capable of holding a variable liquid volume and connected to said portion of the dialysis solution conduit means which is under precise positive control of the input and output of dialysis solution; and

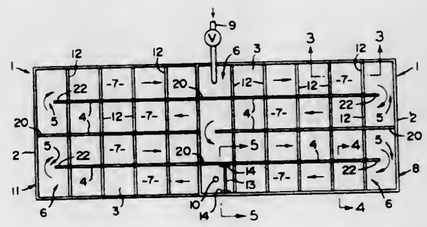
means for measuring the total liquid volume of dialysis solution in said precisely, positively controlled conduit portion and connected dialyzer, said total liquid volume being less than the entire liquid volume of dialysis solution in said dialysis system, whereby changes in said total liquid volume indicate the amount of ultrafiltration during dialysis; in which said means for supplying and means for withdrawing identical liquid volumes comprises double-faced piston means, reciprocable in a chamber, and defining a first, variable volume chamber portion adjacent one face of said piston, and a second, variable volume chamber portion adjacent the opposite face of said piston; a dialysis solution supply conduit, as part of said dialysis solution conduit means, communicating with said first chamber portion; first one-way valve means in said supply conduit for causing dialysis solution to be supplied to said first chamber as said piston causes its volume to expand, and to be expelled into said conduit portion and connected dialyzer as said piston causes said volume to contract, said second chamber portion communicating with a dialysis solution withdrawing conduit as part of said dialysis solution conduit means, and second one-way valve means for permitting dialysis solution to be withdrawn from said conduit portion and connected dialyzer into the second chamber as said piston causes the volume of said second chamber to expand, and for permitting dialysis solution to be expelled from said second chamber and from the dialysis system as the volume of said second chamber contracts, through reciprocating motion of said piston.

4,093,546

BIOLOGICAL FILTER

Jiri Taborsky, 5315 8th Ave., Bradenton, Fla. 33505

Filed Jun. 10, 1976, Ser. No. 694,721
Int. Cl.[2] C02C *1/04*
U.S. Cl. 210—150 **5 Claims**



1. Apparatus for cultivating organisms and for filtering water from a water source by use of the organisms to remove organic waste present therein comprising: a plurality of pan means including first pan means, said plurality of pan means each comprising a bottom portion and a rim portion extending in upwardly protruding relationship to said bottom portion, each of said plurality of pan means having rigidly secured therein a plurality of spaced apart divider means disposed adjacent the bottom portion of each of said pan means; said plurality of divider means being in substantially parallel relationship; one end of each of said parallel divider means abutting said rim portion with the opposite end of each of said parallel divider means being spaced apart from said rim portion, each successive divider means having said spaced apart end disposed in substantially reversed disposition relative to each preceding divider means forming a continuous extenuated channel between adjacent divider means; said continuous extenuated channel having an inlet for receiving water and an outlet disposed to pass water to drain means; said pan means being disposed in successively lower disposition than the next

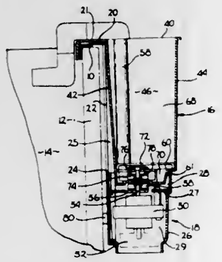
preceding pan means, the water source disposed to provide water to said inlet of said first pan means, said drain means formed within the bottom of each of said pan means and disposed in fluid communication with said inlet of the next subsequent successive pan means, whereby water flows along said extenuated channels of each of said pan means in successive order; and dam means transversely disposed relative to the sides of said channel and extenuating therebetween, said dam means extending vertically upward to a height less than said rim portion and said divider means whereby the flowing water is forced to pass over the upper longitudinal edge of said dam means and organic sediment present in the water is trapped.

4,093,547

MAGNETICALLY COUPLED AQUARIUM FILTER

Robert M. Sherman, Beverly Hills, and Charles O. Fuerst, Simi Valley, both of Calif., assignors to Aquaria, Inc., Van Nuys, Calif.

Filed Jan. 19, 1977, Ser. No. 760,590
Int. Cl.² E04H 3/16
U.S. Cl. 210—169 **6 Claims**



1. In a filter apparatus for use with a home-type aquarium having a wall defining a rim, said filter apparatus having:

a power unit having a housing, a motor having a drive shaft and a first magnet member mounted on said shaft, said motor being mounted within said housing, and hanger means attached to said housing for hanging said power unit on a rim of an aquarium wall so as to suspend said power unit from an aquarium wall, said hanger means extending upwardly and including a hook-shaped member for hooking engagement over an aquarium wall rim,

a separate filter unit, means for mounting said filter unit in close proximity to said power unit, said filter unit comprising a container, a pump housed in the lower portion of said container, said pump having a second magnet member to be rotated by the magnetic field of said first magnet member for the rotation of the pump impeller; the improvement comprising:

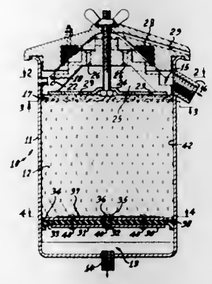
said means for mounting said filter unit with respect to said power unit includes an upward facing edge defined by the exterior surface of said hook-shaped member for hanging said power unit, hanger means mounted on said filter unit container for removable engagement with said upward facing edge of said hook-shaped member, said hanger means constructed and arranged for interlocking hooking engagement with said upward facing edge, and means mounted on said power unit housing for engaging the lower end of said separate filter unit container for providing accurate alignment of said first and second magnet members for transmitting power from said first magnet member to said second magnet member to drive said pump whereby said filter unit mounting means provides for removal of said separate filter unit without disturbing said power unit and the filter unit may be serviced by lifting it away from the power unit allowing it to retain its position on an aquarium rim.

4,093,548

LIQUID FILTER APPARATUS

Jon L. D. Sterkenburg, and George O. Kelbert, both of Jacksonville, Fla., assignors to Oil Refining Systems of Florida, Inc., Jacksonville, Fla.

Filed May 10, 1976, Ser. No. 684,749
Int. Cl.² B01D 3/28
U.S. Cl. 210—180 **15 Claims**



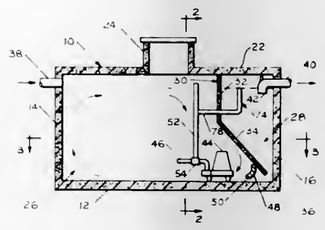
1. In a liquid filter apparatus having a housing with a side wall connecting between an upper portion and a bottom portion and with an inlet located in one of said portions and an outlet located in the other of said portions, a first rigid perforated plate fittingly disposed in said other end portion of said housing, a second rigid plate slidingly arranged in said one end portion of said housing, filter media for filtering fluid located in said housing between said plates, means for maintaining said first plate spaced from said outlet against the force of said filter media thereagainst, said second plate being disposed between said filter media and said inlet and having one face engaging said media and an opposite face facing said inlet and being constructed and arranged to sealingly slide along the interior surface of said side wall of said housing, said second plate having an aperture therethrough located spacedly inwardly of said side wall for the flow of fluid through said aperture to said filter media whereby, with channeling of said filter media and pressure drop within the interior of said filter media, fluid pressure on said opposite face of said second plate causes said second plate to slide in the direction toward said filter media to compress the filter media against said first plate and to close the channels causing such pressure drop.

4,093,549

AERATOR SEWAGE TANK

Harold L. Wilson, Antonia, Mo. 63052

Filed Jan. 31, 1977, Ser. No. 763,892
Int. Cl.² C02C 1/06
U.S. Cl. 210—195 S **11 Claims**



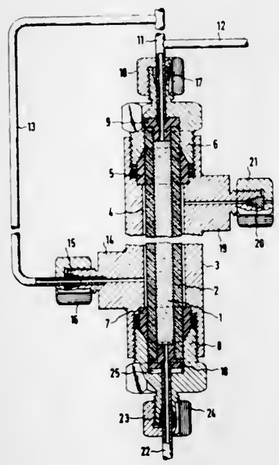
1. A sewage treatment tank comprising an aeration compartment and a pump, said pump having an inlet receiving fluid and an outlet for discharging said fluid, means for aerating fluid discharged through the outlet of said pump comprising a pipe-like vertical conduit connected to a horizontal outlet conduit from said pump at a lower end and extending above the fluid level in the tank at an upper end for drawing air through said conduit by aspiration and mixing with the raw sewage pumped through the outlet of the pump to the aerating compartment, the lower end of the vertical conduit having an upstream side wall having a concave bottom protruding into an outlet conduit from said pump to provide a resticted area throat to increase the velocity of fluid flow past the vertical air conduit for aspirating air through said conduit and mix said air with the raw sewage fluid in said outlet conduit and said upstream side wall has a concave configuration terminating at the bottom in a pair of opposed foot portions which rest on the inside wall of said outlet conduit to position the vertical conduit therein in proper registry.

4,093,550

COLUMN FOR HIGH PRESSURE LIQUID CHROMATOGRAPHY

Kurt-Wilhelm Stahl, Hanover, and Ekkehard Schuppe, Ronnenberg, both of Germany, assignors to Riedel-de Haen Aktiengesellschaft, Seelze, Germany

Filed Jun. 1, 1976, Ser. No. 691,531
Claims priority, application Germany, Jun. 4, 1975, 2524751
Int. Cl.² B01D 15/08
U.S. Cl. 210—198 C **4 Claims**



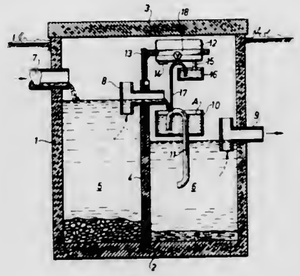
1. A column for high pressure liquid chromatography (HPLC) having a tube with an inlet and an outlet end and being filled with sorbent, said tube being concentrically surrounded by a pressure jacket so that an interspace between said tube and said pressure jacket is provided, which interspace is filled with the same medium as flows through the internal tube and the pressure in the interspace being equal to the pressure at the inlet of said tube, both ends of said interspace being sealed by means of packings surrounding said tube like stuffing boxes and sealing the interspace between said tube and said pressure jacket, and the interspace is connected by means of a pipe with the inlet end of said tube, a venting means is connected to the interspace, the pipe connected to the interspace opens up in a short pipe, the venting means is disposed on another short pipe mounted on the pressure jacket, and the two short pipes being mounted at opposite ends of the pressure jacket.

4,093,551

DEVICE FOR PURIFYING SEWER WATER IN SMALL SEWER SYSTEMS

Ülo Pääbo, Kristianstad, and Erik Horskjär Albertsen, Bromolla, both of Sweden, assignors to IFO AB, Bromolla, Sweden

Filed Nov. 29, 1976, Ser. No. 745,665
Claims priority, application Sweden, Dec. 11, 1975, 7514038
Int. Cl.² C02B 1/20; C02C 5/02
U.S. Cl. 210—201 **4 Claims**



1. A device for purifying sewer water in small sewer systems, said purifying device having no moving parts, comprising:

a sedimentation chamber (6) having an inlet (8) for receiving sewer water, means for receiving and holding water to be sedimented and an outlet (9) for removing sedimented water from said sedimentation chamber, said outlet (9) being mounted a predetermined distance above the bottom of said chamber (6) to provide a pool of water for sedimentation in said receiving means of said sedimentation chamber (6), and said inlet (8) being located at a higher level than said outlet (9);

a vessel (10) mounted in said sedimentation chamber (6) at an intermediate level between the levels of said inlet (8) and outlet (9), said vessel (10) being disposed to receive sewer water from said inlet (8) and to retain sewer water therein at a level above said pool of water in said sedimentation chamber (6);

a receptacle (16) in said sedimentation chamber (6) for holding a liquid containing sedimentation-promoting substance, said receptacle (16) being mounted at a higher level than said vessel (10);

a container (12) located completely above said receptacle (16) for supplying said liquid to said receptacle (16), said container (12) having a liquid outlet tube (15) connected adjacent its bottom but being otherwise provided with air-tight walls, said outlet tube (15) extending downwardly into said receptacle (16);

a first siphon tube (17) having an inlet in said receptacle (16) and a lower outlet in communication with said vessel (10) for supplying said liquid from said receptacle (16) to said vessel (10); and

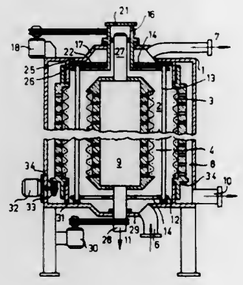
a second siphon tube (11) having an inlet within said vessel (10) and a lower outlet in said chamber (6) outside said vessel (10), said lower outlet of said second siphon tube (11) being located below the liquid level in vessel (10) and at a lower level than said outlet (9) of said sedimentation chamber (6), said lower outlet of said first siphon tube (17) being connected to the top portion of said second siphon tube (11) such that when suction is developed in said second siphon tube (11), suction is thereby developed in said first siphon tube (17) to supply said liquid to said sewer water.

4,093,552

FILTRATION APPARATUS

August Guyer, Zurich, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Nov. 30, 1976, Ser. No. 746,221
Claims priority, application Switzerland, Dec. 11, 1975, 016075/75
Int. Cl.² B01D *33/02*
U.S. Cl. 210—297 **7 Claims**



1. Apparatus for filtering a suspension under pressure comprising

a. a housing containing an elongated, annular filtration chamber bounded by external and internal surfaces in the form of bodies of revolution,

b. each of said surfaces being formed as a filtering member and being provided with a filtrate discharge collector;

c. an inlet for introducing suspension under pressure to one end of said annular chamber and an axially spaced outlet for discharging filtered material from the opposite end of that chamber;

d. means defining a permeable agitating partition of cylindrical form which is located in, and extends longitudinally of, the annular chamber; and

e. drive means for rotating said partition,

f. the partition being spaced radially from each of said surfaces so that, during operation, a body of suspension in a turbulent state forms between the partition and each surface and is effective to keep solids from accumulating on the adjacent surface.

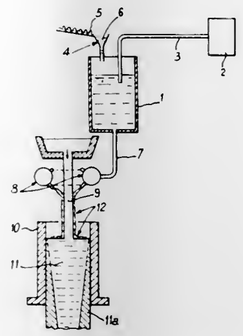
4,093,553

TREATING MOLTEN METAL WITH A MIXTURE OF A CRYOGENIC FLUID AND SOLID CARBON BLACK

Jean Galey, Voisins Bretonneux; Gérard Bentz, Elancourt-Trappes; Pierre Karinthi, Jouy-en-Josas; Ghislain Gilbert, Bures-sur-Yvette, and Serge Devalois, Fourqueux, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Jun. 30, 1975, Ser. No. 592,077
Claims priority, application France, Jni. 5, 1974, 74 23386
Int. Cl.² B22D *27/04*
U.S. Cl. 252—70 **1 Claim**

1. A composition of material intended for metallurgical treatments, comprising a body of at least one cryogenic fluid at its boiling temperature, and suspended in said body of cryogenic fluid finely divided carbon black in the form of particles having a size between 200 and 2,000 A, said cryogenic fluid being selected from the group consisting of nitrogen, helium, and argon, and said carbon black being present in said cryogenic fluid in a quantity between 10 and 1,000 grams per liter



of cryogenic fluid, whereby a homogeneous stable suspension is maintained in said cryogenic fluid.

4,093,554

HYDRAULIC FLUID COMPOSITIONS

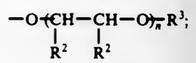
Gerald John Joseph Jayne; Herbert Frank Askew, and Colin John Harrington, all of Wokingham, England, assignors to Castrol Limited, Swindon, England

Filed Mar. 26, 1975, Ser. No. 562,253
Claims priority, application United Kingdom, Mar. 27, 1974, 13708/74
Int. Cl.² C09K *50/00*; C07F *7/18*
U.S. Cl. 252—78.3 **44 Claims**

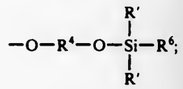
1. A glycol-substituted aryl silane of the formula:

wherein (a) R is aryl;

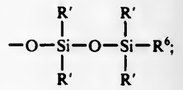
(b) X is selected from the group consisting of



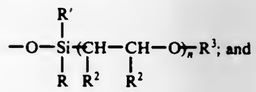
(A)



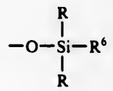
(B)



(C)



(D)

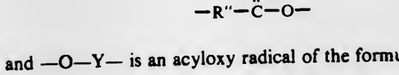


(E)

in which each R is defined above, R′ is as hereinafter defined, each R^2 is independently selected from the group consisting of hydrogen, methyl and ethyl provided that when any group R^2 is methyl or ethyl the group R^2 on the immediately adjacent carbon atom is hydrogen, R^3 is alkyl, R^4 is selected from the group consisting of diol and polyol residues, R^6 is selected from the group consisting of aryl and alkyl, and n is an integer; and

(c) each R′ is, independently selected from the group consisting of groups of formula (A) as defined above, alkyl, aryl, and groups of the formula:

wherein R^5 is alkyl and if the glycol-substituted aryl silane contains more than one group R^5 they may be the same or different; provided that the glycol-substituted arylsilane contains at least one group selected from the group consisting of



wherein R^2, R^4 and n are as defined above.

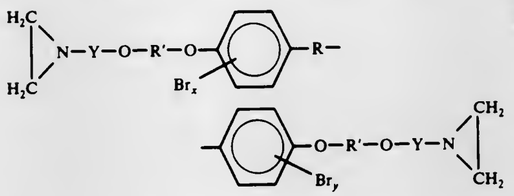
4,093,555

PRODUCTION OF DENTAL MODELS AND TOOTH REPLACEMENT PARTS

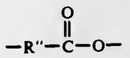
Werner Schmitt; Robert Purrmann, both of Starnberg; Peter Jochum, and Wolf-Dietrich Zahler, both of Hechendorf, all of Germany, assignors to ESPE Fabrik Pharmazeutischer Praparate GmbH, Seefeld, Germany

Continuation of Ser. No. 544,549, Jan. 27, 1975, abandoned. This application Jan. 4, 1977, Ser. No. 756,925
Claims priority, application Germany, Jan. 30, 1974, 2404380
Int. Cl.² C09K *3/00*; A61C *13/22, 13/08*
U.S. Cl. 252—188.3 R **7 Claims**

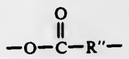
1. An homogenous composition suitable for the production of dental replacement parts and dental models comprising a mixture of a bromine containing compound of the formula



in which R is an alkylidene radical having 1 to 6 carbon atoms, a cycloalkylidene radical or a SO_2 radical, R′ is an alkylene radical having 2 to 6 carbon atoms or a cycloalkylene radical and —Y—O— is an acyloxy radical of the formula



and —O—Y— is an acyloxy radical of the formula



where R″ is an alkylene radical having 1 to 5 carbon atoms optionally bearing an aromatic substituent, and x is 1 or 2 and y is 0, 1 or 2; and at least one compound of the group consisting of the bromine-free analogs of the compounds.

4,093,556

PROCESS FOR MICROENCAPSULATION OF METALLOCENES

Stanley Wojciak, New Britain, Conn., assignor to Loctite Corporation, Newington, Conn.

Filed Jul. 2, 1975, Ser. No. 592,581
Int. Cl.² B01J *13/02*
U.S. Cl. 252—316 **9 Claims**

1. A process for microencapsulating a water-insoluble metallocene comprising:

(a) providing an aqueous solution of a water-soluble precondensate of urea and formaldehyde wherein the precondensate concentration is about 15 to about 50 percent by weight;

(b) adding to said precondensate solution a particulate metallocene in such amount that the weight ratio of metallocene to precondensate is between about 1:1 and about 8:1;

(c) adding to said precondensate solution or the mixture of said precondensate solution with said metallocene a cationic surfactant in such amount that the weight ratio of surfactant to metallocene is between about 1:6,000 and about 1:10 said surfactant having the formula $t\text{-}C_{18\text{-}22}H_{37\text{-}45}NHCH_2CH_2OH$

(d) forming a slurry of the metallocene;

(e) adjusting the pH of the resultant dispersion to about 1 to about 6.5 by addition of a water-soluble acid, thereby causing polymerization of said precondensate, and

(f) continuing said polymerization in the temperature range of about 15° to about 80° C. until said metallocene particles are encapsulated with a shell of water-insoluble urea-formaldehyde polymer.

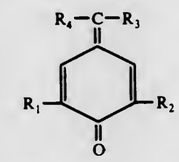
4,093,557

PROCESS FOR INHIBITING CORROSION OF METALS IN AQUEOUS SYSTEMS

David C. Zecher, Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

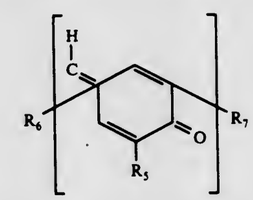
Filed Sep. 16, 1976, Ser. No. 723,676
Int. Cl.² C09K *3/00*
U.S. Cl. 252—389 R **11 Claims**

1. A process for inhibiting corrosion of metal surfaces in contact with recirculating water systems comprising maintaining within said systems from about 20 p.p.m. to about 200 p.p.m. by weight of a corrosion inhibiting composition containing a compound containing at least one quinomethide group selected from compounds of formula I



(I)

and resins of formula II which are at least partially oxidized phenolic resins containing at least one quinomethide group



(II)

in which formulas R_1 and R_5 are hydrogen, carboxyl, hydroxyl, $—SO_3H$, $—NH_2$ and alkyl and alkylene radicals having up to 8 carbon atoms; R_2 is hydrogen or lower alkyl having 1 to 4 carbon atoms; R_3 is hydrogen or lower alkyl having 1 to 4

carbon atoms, aryl or substituted aryl, R_4 is substituted aryl; R_6 and R_7 are residues of at least a partially oxidized phenolic resin.

4,093,558

MOLYBDATE CATALYSTS

Robert K. Grasselli, Chagrin Falls; Dev D. Suresh, Warrensville Heights, and Robert C. Miller, Northfield, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 313,495, Dec. 8, 1972, abandoned, which is a Division of Ser. No. 67,269, Aug. 26, 1970, abandoned.
Filed Jul. 29, 1974, Ser. No. 492,374
Int. Cl.² B01J *21/02*
U.S. Cl. 252—432 **11 Claims**

1. A molybdate catalyst of the formula

$$A_a X_b Sb_c Mo_d O_e$$

wherein

A is selected from the group consisting of iron or iron and vanadium;

X is at least one element selected from the group consisting of aluminum, chromium, cobalt, nickel, copper, bismuth, tellurium, boron, phosphorus, titanium and tungsten;

and wherein

a is a number from 0.01 to 2,

b is a number from 0 to 3;

c is a number from 0.1 to 12;

d is 12; and

e is a number as determined by the combined valence requirement of the elements other than oxygen present in the catalyst.

4,093,559

PROCESS FOR THE PREPARATION OF A PALLADIUM CATALYST

Hans Fernholz, Fischbach, Taunus; Günter Roscher, Kelkheim, Taunus; Hans-Joachim Schmidt, Falkenstein, Taunus; Heinz Schmitz, Frankfurt am Main, and Friedrich Wunder, Florsheim, Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 2, 1976, Ser. No. 663,117
Claims priority, application Germany, Mar. 4, 1975, 2509251
Int. Cl.² B01J *27/20, 31/12, 21/18, 29/06*
U.S. Cl. 252—443 **17 Claims**

1. A process for the preparation of a palladium catalyst for the oxacylation of olefins in the gaseous phase, which comprises impregnating a catalyst carrier with a solution comprising a palladium compound dissolved in an unsubstituted carboxylic acid, drying the catalyst at a temperature below 90° C until a residual solvent content of less than 8% by weight is attained, and thereafter reducing the catalyst in a gaseous phase at a temperature of 40° to 260° C by passing a gas mixture containing an inert gas and a reducing agent over the catalyst.

4,093,560

ULTRA HIGH SILICON-CONTENT ZEOLITES AND PREPARATION THEREOF

George T. Kerr, Trenton, and Arthur W. Chester, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 20, 1976, Ser. No. 688,459
Int. Cl.² B01J *29/06*
U.S. Cl. 252—455 Z **11 Claims**

1. A method of removing aluminum from a crystalline aluminosilicate zeolite characterized by an initial silica/alumina ratio of at least about 2:1 but less than about 6:1 which comprises preparing a slurry of said zeolite in alkali metal or ammonium form in an aqueous solution of an ammonium or alkali metal salt which upon acidification yields an anion which complexes with aluminum, adding to said slurry a water-soluble acid having a first ionization constant greater than 10^{-2} at a rate such that between about 5 and about 15 percent aluminum is removed per day to yield a resulting product which at least about 70 percent and as much as about 85 percent of the initial aluminum has been removed while retaining more than about 60 percent of the original crystallinity.

9. A crystalline product obtained by the method of claim 1.

4,093,561

CATALYST FOR THE REDUCTION OF NITROGEN OXIDES AND METHOD FOR THE PRODUCTION THEREOF

Yasuo Nishikawa; Akira Watanabe; Tetsuya Sugimoto, all of Okayama; Kazuyasu Yabuki, Bizen, and Yoshio Hatayama, Kashihara, all of Japan, assignors to Kyushu Refractories Co., Ltd., Bizen, Japan

Filed Feb. 1, 1977, Ser. No. 764,533
Claims priority, application Japan, Feb. 10, 1976, 51-13732
Int. Cl.² B01J *21/04, 23/74*
U.S. Cl. 252—466 J **12 Claims**

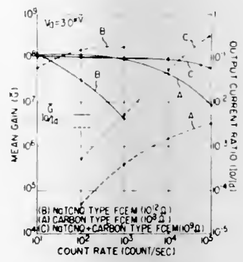
1. A catalyst for the reduction of nitrogen oxides obtained by calcining at least one particulate iron hydroxide at a temperature not exceeding 550° C and coating the calcined particles with an aqueous solution of an aluminum salt, washing, drying and molding the particles having the aluminum salt coating, followed by baking to form an alumina coating, said catalyst containing 60 to 90 percent by weight of Fe_2O_3 and 40 to 10 percent by weight of Al_2O_3 and having an average pore diameter of not more than 500 A, a pore volume of not less than 0.1 cc/g and a specific surface area of not less than 10 m^2/g.

4,093,562

POLYMERIC COMPOSITIONS FOR MANUFACTURE OF SECONDARY ELECTRON MULTIPLIER TUBES AND METHOD FOR MANUFACTURE THEREOF

Yoshi Kishimoto, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Feb. 16, 1977, Ser. No. 769,014
Claims priority, application Japan, Feb. 20, 1976, 51-18072
Int. Cl.² H01B *1/06*
U.S. Cl. 252—511 **11 Claims**



1. A polymeric composition for the manufacture of a secondary electron multiplier, comprising

a polar type or electron donor matrix polymer having a secondary electron yield higher than unity and molecularly dispersive conductive molecules and less than 40% by volume of granularly dispersive conductive particles, said composition having a volume resistivity in the range of 10^5 to 10^{10} ohm-cm.

4,093,563

RESILIENT MATERIAL WHICH IS ELECTRICALLY CONDUCTIVE UNDER PRESSURE

Manford Leslie Eaton, 1 rue Fulton, Paris 13eme, France

Filed Sep. 23, 1975, Ser. No. 616,054
Claims priority, application France, Sep. 30, 1974, 74 32907
Int. Cl.² H01B *1/02*
U.S. Cl. 252—513 **16 Claims**

1. A two component composite resilient material consisting

essentially of between 10% and 80% by volume of a vulcanized one-phase homogeneous silicone polymer having a Shore A Durometer hardness of between 15 and 50, having dispersed therein between 20% and 90% of electroconductive metallic particles, and being electrically conductive under an applied pressure, said composite material being produced by admixing and then vulcanizing at room temperature and without applied pressure an admixture of room temperature vulcanization polymer having said particles dispersed therein;

said room temperature vulcanization silicone polymer being thixotropic and non-corrosive to said particles, having a density between 0.9 and 1.15 at 25° C, a viscosity of about 2,000,000 centiposes and being characterized by a shrinkage coefficient during vulcanization of between 0.1 and 0.5%; and

said metallic particles comprise at least one metal selected from the group consisting of noble metals, aluminum, nickel, copper, and tin, and have an apparent density between 0.2 and 6.0, a tapped density between 0.5 and 6.0, a specific surface between 1 and 850 cm^2/gram, a flow rate between 15 and ∞, an average diameter between 0.7 micron and 2,500 microns, a diameter distribution within the same range, and an atomic mass between 9.01 and 207.19.

4,093,564

ELECTROCONDUCTIVE COATINGS

William F. Moll, Jr., Summit, and Frank J. Botta, Linden, both of N.J., assignors to Yara Engineering Corporation, Elizabeth, N.J.

Filed Feb. 14, 1977, Ser. No. 768,394
Int. Cl.² H01B *1/08*
U.S. Cl. 252—518 **9 Claims**

1. An electroconducting clay composition for electrophotography having solvent holdout characteristics comprising an expandable clay, an alkali metal salt and at least one organic compound from the group consisting of sugar and corn syrups, polyvinylacetate, acetylated polyvinylchloride, sulfonated polystyrene and fluorochemicals.

4,093,565

FLAVOR AND FRAGRANT COMPOSITIONS

Robert John Steltenkamp, Somerset, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 414,394, Nov. 9, 1973, Pat. No. 3,989,765, which is a division of Ser. No. 125,792, Mar. 18, 1971. abandoned. This application Mar. 18, 1976, Ser. No. 668,025
The portion of the term of this patent subsequent to Dec. 2, 1993, has been disclaimed.
Int. Cl.² A61K *7/46;* C07C *1/20*
U.S. Cl. 252—522 **4 Claims**

1. A method of making a synthetic lime mix having the fragrance of steam distilled natural lime oil comprising the steps of refluxing a mixture of (A) citral or a citral-containing oil selected from the group consisting of lemongrass oil, Eucalyptus staigeriana and Litsea cubeba and (B) an acid selected from the group consisting of mineral acids and organic carboxylic acids and water for a period of from 1 to 3 hours, said acid being a catalyst and being present in a weight ratio of citral to acid of from about 1:1 to 20:1 which is effective to adjust the pH of said mixture to between 1.0 and 2.0; distilling the refluxed mixture and recovering from the distilled mixture a reaction-product consisting essentially of a major amount of terpene hydrocarbons and minor amounts of oxygen-containing compounds and 1-methyl-1,3-cyclohexadiene.

4,093,566

PHOSPHATE-FREE SPRAY CLEANER FOR METALS

Elizabeth L. MacNamara, Holland, and Fred Pearlstein, Philadelphia, both of Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 27, 1976, Ser. No. 750,784
Int. Cl.² C11D *3/08, 3/10, 3/33*
U.S. Cl. 252—527 **6 Claims**

1. A metal cleaner composition essentially free from phosphates, consisting essentially of

about 50% by weight sodium metasilicate,

about 40% by weight sodium carbonate, and

about 10% by weight ethylenediamine tetraacetic acid disodium salt.

4. A metal cleaner composition essentially free from phosphates, consisting essentially of

about 50% by weight sodium metasilicate,

about 20% by weight sodium carbonate, and

about 30% by weight sodium hydroxide.

4,093,567

AMINATED CROSSLINKED COPOLYMERS OF BIS(CHLOROMETHYL) STYRENE WHICH EXHIBIT IMPROVED ANION EXCHANGE PROPERTIES

Marvin J. Hurwitz, Elkins Park, and Noyes L. Avery, Oreland, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Jan. 17, 1977, Ser. No. 759,950
Int. Cl.² C08F *2/18, 12/18, 12/34, 19/22*
U.S. Cl. 260—21 E **17 Claims**

1. A crosslinked copolymer resulting from copolymerizing a monomer mixture of

(a) one or more monoethylenically unsaturated monomers, including bis-(chloromethyl)styrene which comprises at least about 5 weight percent of the mixture; and

(b) a polyethylenically unsaturated monomer which is present at between about 0.5 and about 50 weight percent of the mixture.

17. A process for preparing an amine functionalized anion exchange resin comprising copolymerizing by a suspension polymerization reaction a monomer mixture containing from about 5% to about 99.4% by weight of bis(chloromethyl)styrene, from about 0.1% to about 94.5% by weight of vinylbenzyl chloride, and from about 0.5% to about 30% by weight of a polyethylenically unsaturated crosslinker, and aminating the copolymer with an alkylamine having 2–3 alkyl groups which may be different from one another and which contain 1–5 carbon atoms each.

4,093,568

PROCESS FOR PRODUCTION OF PERFLUOROCARBON TYPE CATION EXCHANGE MEMBRANE

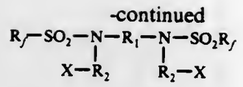
Maomi Seko; Yasumichi Yamakoshi, both of Tokyo; Hirotsugu Miyauchi, Kawasaki; Mitsunobu Fukumoto, Yokohama; Kyoji Kimoto, Yokohama; Itaru Watanabe, Yokohama, and Shigeo Yokoyama, Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 2, 1976, Ser. No. 738,223
Claims priority, application Japan, Nov. 17, 1975, 50-137228
Int. Cl.² C25B *13/00;* C25C *7/04*
U.S. Cl. 260—2.2 R **12 Claims**

1. A process for producing a cation exchange membrane, which comprises subjecting a cation exchange membrane containing perfluorocarbon polymers having pendant N-sulfonamide groups as represented by the formulas (I) and (II):

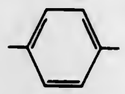
$$R_f—SO_2—N(R_2—X)—R_1—X \quad (I)$$

-continued



(II)

wherein R_f represents a perfluorocarbon polymer chain, R_1 represents $-C_mH_{2m}-$ (where m is an integer of 1 to 6) or



R_2represents $-C_nH_{2n}-$ (where n is an integer of 0 to 6) and X represents hydrogen, amino group or hydroxyl group, to treatment with an oxidizing agent under conditions such that the concentration of the oxidizing agent is from 0.1 milliequivalents/liter to 10 equivalents/liter, at a temperature of from 5° C to 100° C at an oxidation potential of from 0.3 to 1.5 volt; the said pendant sulfonamide groups being present in a surface stratum containing at least 90% of said groups based on the total cation exchange groups in said stratum, the thickness of said stratum being from 0.2 to 200 μ.

4,093,569

POLYURETHANE RESINS PRODUCED FROM ACTIVE HYDROGEN CONTAINING MATERIAL WHICH IS A DISPERSION OF POLYISOCYANATE-POLYADDITION PRODUCTS IN HYDROXYL CONTAINING COMPOUNDS AS DISPERSING AGENTS

Artur Reischl, Leverkusen; Gert Jabs, Cologne, and Alberto Carlos Gonzalez-Dörner, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Germany

Filed Nov. 10, 1976, Ser. No. 740,452

Claims priority, application Germany, Nov. 12, 1975, 2550796

Int. Cl.² C08G *18/08*

U.S. Cl. 260—2.5 AM **3 Claims**

1. In a process for the production of polyurethane resins in which polyisocyanates are reacted with materials containing active hydrogen atoms and other known additives, the improvement wherein the active hydrogen containing material is a stable dispersion of non-ionic polyisocyanate-polyaddition products in hydroxyl containing compounds as dispersing agents which are formed by the process which comprises reacting

1. organic polyisocyanates with
2. compounds having primary and/or secondary amino groups and/or primary hydroxyl groups in
3. as dispersing agent, compounds having at least one hydroxyl group and a molecular weight of between about 62 and about 16,000 wherein

compounds (3) having secondary groups in cases where compounds (2) have primary hydroxyl groups, and wherein the components are reacted in the presence of more than 4% by weight of water, based on the quantity of reaction mixture including water.

4,093,570

PRODUCTION OF POROUS POLYMERS

Tetsuya Miyake, Tokyo; Kunihiko Takeda, Yokohama; Akihiko Ikeda, Yokohama, and Kazuo Imamura, Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 14, 1976, Ser. No. 677,120

Claims priority, application Japan, May 1, 1975, 50-52911; May 10, 1975, 50-55238; Jun. 9, 1975, 50-69361; Jun. 9, 1975, 50-69362

Int. Cl.² C08J *9/00*

U.S. Cl. 260—2.5 B **37 Claims**

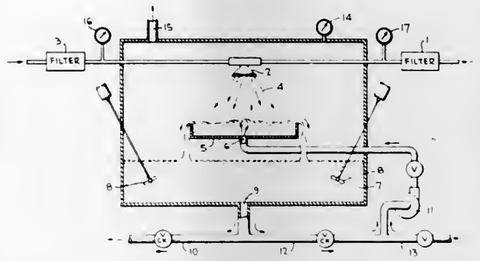
1. A method of producing a polar, porous polymer comprising polymerizing a monomer mixture comprising:

(A) about 2 to about 98 percent of at least one cross-linkable monomer having a plurality of $CH_2{=}C<$ groups and

(B) about 98 to about 2 percent by weight of at least one monomer selected from the group consisting of (i) copolymerizable monoethylenically unsaturated monomers and (ii) conjugated diene monomers, about 15 to about 100 percent by weight of the total monomers (A) and (B) being polar monomers,

in the presence of an organic medium which does not react with any of monomers (A) and (B), and selected from the group consisting of:

(I) a mixed organic liquid consisting essentially of at least one liquid selected from Group (i) and at least one liquid selected from Group (iii);



II. a mixed organic liquid consisting of at least one liquid selected from Group (i) and at least one liquid selected from Group (iii);

III. a mixed organic liquid consisting of at least one liquid selected from Group (ii) and at least one liquid selected from Group (iii); and

IV. one liquid selected from Group (iii);

wherein

Group (i) liquids dissolve all of the homopolymers of the monomers chosen;

Group (ii) liquids do not dissolve any of the homopolymers chosen, and

Group (iii) liquids dissolve at least one homopolymer of the monomers chosen but do not dissolve at least another homopolymer of the monomers chosen.

4,093,571

PROCESS FOR MAKING POROUS METAL CONTAINING POWDER COATING COMPOSITIONS

Marvin Gordon, Succassuna; Martin J. Hannon, Martinsville, and Henry H. George, Jr., Berkeley Heights, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Jan. 14, 1976, Ser. No. 649,128

Int. Cl.² C08J *9/30*

U.S. Cl. 260—2.5 B **13 Claims**

1. A process for preparing uncured curable porous metal particle-containing powder coating compositions useful in powder coating applications, which process comprises (a) atomizing by spraying a gas which is intermixed with a solution comprising a solvent, a resin which is melt extrudable and which will cure in the presence of a curing agent, a curing agent which will cross-link said resin upon the application of heat, and suspended metal particles to form droplets, and (b) collecting the sprayed droplets in a liquid bath wherein said liquid is miscible with said solvent but said liquid is a non-solvent for the solutes of the solution and wherein said liquid bath is subjected to a radial flow motion whereby said flow motion carries the particles away from one another thereby precipitating said powder coating compositions in substantially non-agglomerated form.

4,093,572

METHOD OF MAKING A STORAGE STABLE ISOCYANATE AND ITS USE

John R. White, Wadsworth, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 4, 1976, Ser. No. 729,319

Int. Cl.² C08G *18/14*

U.S. Cl. 260—2.5 AH **5 Claims**

1. A storage stable liquid isocyanate composition consisting of a blend of about 0.2 to 0.4 parts of silicone block copolymer of ethylene/propylene with a liquid isocyanate composition that develops crystals on standing for 96 hours at 25° C., said silicone block copolymer having ability at 0.5 parts by weight in 100 parts of said isocyanate composition to reduce surface tension of said isocyanate composition to less than 40 dynes/-centimeter as measured by Cenco-DuNony Interfacial Tensiometer at 25° C.

4,093,573

LOW-VISCOUS, STABLE POLYMER DISPERSIONS AND POLYURETHANES PREPARED THEREFROM

Gerhard G. Ramlow, Grosse Ile; Louis C. Pizzini, Trenton; John T. Patton, Wyandotte, and John R. Murphy, Trenton, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 465,072, Apr. 29, 1974, Pat. No. 4,014,846.

This application Jan. 17, 1977, Ser. No. 759,978

Int. Cl.² C08G *18/63*

U.S. Cl. 260—2.5 BE **12 Claims**

1. A polyurethane prepared by the reaction of an organic polyisocyanate with a low-viscous polymer disperson prepared by blending:

(a) from 45 to 95 weight percent of a polyol having an equivalent weight of from 500 to 10,000 with

(b) from 55 to 5 weight percent of a hydroxy-containing finely-divided solid polymer obtained by polymerizing in the presence of a free radical catalyst and an organic solvent:

(1) about 55 to 95 weight percent of an ethylenically unsaturated monomer or mixture of monomers and

(2) from about 45 to 5 weight percent of a hydroxy-terminated organic compound having from one to eight hydroxyl groups, a hydroxyl equivalent weight of from 500 to 10,000 and containing a polymerizable carbon-to-carbon double bond, said weight percents being based on the total weight of (1) and (2).

2. The polyurethane of claim 1 prepared in the presence of a blowing agent.

4,093,574

SOMATOSTATIN ANALOGS AND INTERMEDIATES THERETO

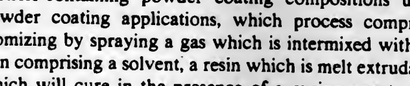
James E. Shields, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 2, 1977, Ser. No. 763,943

Int. Cl.² C08L *37/00*; C07C *103/52*; A61K *37/00*

U.S. Cl. 260—8 **19 Claims**

1. A compound selected from those of the formula



and their pharmaceutically acceptable non-toxic acid addition salts, and intermediates to said compounds, said intermediates having the formula R-L-Ala-D-Ser(R_4)-L-Cys(R_1)-L-Lys(R_2)-Y-L-Phe-L-Phe-D-Trp(R_5)-L-Lys(R_2)-L-Thr(R_3)-L-Phe-L-Thr(R_3)-L-Ser(R_4)-L-Cys(R_1)-X; in which

Y is L-Asn or L-Ala;

R is hydrogen or an α-amino protecting group;

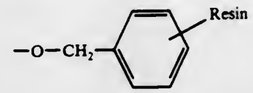
R_1 is hydrogen or a thio protecting group;

R_2 is hydrogen or an ϵ-amino protecting group;

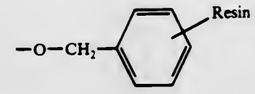
R_3 and R_4 each are hydrogen or a hydroxy protecting group;

R_5 is hydrogen or formyl; and

X is hydroxy or



in which the resin is polystyrene; with the proviso that, when X is hydroxy, each of R, R_1, R_2, R_3, R_4, and R_5 is hydrogen, and, when X is



each of R, R_1, R_2, R_3, and R_4 is other than hydrogen.

4,093,575

THERMOSETTING VINYL CHLORIDE POLYMER POWDER COATINGS

Joseph Weldon Hagan, Warren, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 12, 1976, Ser. No. 685,541

Int. Cl.² C08L *1/14*

U.S. Cl. 260—15 **5 Claims**

1. A thermosetting vinyl chloride polymer powder coating composition comprising finely divided particles; wherein the powder particles are of a blend of constitutents consisting essentially of:

A. 40 to 90 percent by weight of said composition of a vinyl chloride polymer having pendant hydroxyl groups consisting essentially of

i. 75 to 95 percent of weight, based on the weight of said vinyl chloride polymer, of vinyl chloride,

ii. 2 to 20 percent by weight, based on the weight of said vinyl chloride polymer, of an hydroxyalkyl acrylate having from 2 to 6 carbon atoms in the alkyl group, or the vinyl alcohol moiety,

iii. 0 to 23 percent by weight, based on the weight of said vinyl chloride polymer, of vinyl acetate;

wherein the vinyl chloride polymer has a number average molecular weight of from 5,000 to 25,000 and a glass transition temperature above 40° C.;

B. 3 to 60 percent by weight of said vinyl chloride polymer of a melamine formaldehyde resin, urea formaldehyde resin, phenol formaldehyde resin, or blocked isocyanate crosslinker; and

C. 10 to 30 percent by weight of said composition of cellulose acetate butyrate having a butyral content of from 45 to 60 percent.

4,093,576

MIXTURE FOR ANCHORING BONE IMPLANTS

Joost Robert deWijn, Nijmwegen, Netherlands, assignor to Sulzer Brothers, Ltd., Winterthur, Switzerland

Filed Apr. 5, 1976, Ser. No. 673,354

Claims priority, application Switzerland, Apr. 18, 1975, 4970/75

Int. Cl.² C08L *1/28*

U.S. Cl. 260—17 R **14 Claims**

1. A doughy mixture for anchoring implants and prosthetic joint ends in bones, said mixture comprising

a water-insoluble composition of a filler consisting of at least one polymethylmethacrylate (PMMA) polymer in powder form and a polymerizing liquid monomeric methylmethacrylate (MMA) monomer; and

a biologically compatible high-viscosity gel of 200,000 centipoise or more in admixture with said water-insoluble

composition to form a dispersion of said composition with said gel, said gel being soluble in water and in body fluid and being selected from the group consisting of polyvinylalcohol (PVAL), polyhydroxy alkylmethacrylate, polyvinylmethyl ether, polyvinylpyrrolidone, a polyacrylic acid salt, a water-soluble polysaccharide or a water-soluble cellulose ether more particularly partially neutralized carboxymethylcellulose (CMC); such substance having been dissolved in an aqueous liquid in a quantity of from 3 to 60 percent by weight.

4,093,577

PHOTOCURABLE RESIN COMPOSITIONS

Ryozo Koano; Akira Ikeda; Toshimitsu Ugai, and Akio Hirose, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

Filed Mar. 2, 1977, Ser. No. 773,650

Claims priority, application Japan, Mar. 5, 1976, 51-23108; Mar. 9, 1976, 51-24697; Mar. 9, 1976, 51-24698

Int. Cl.² C09D *3/64, 5/32, 11/10*

U.S. Cl. 260—22 CB **17 Claims**

1. A photocurable resin composition comprising (1) 1 to 90% by weight of a photopolymerizable photosensitizing compound prepared by esterifying with an ethylenically unsaturated fatty acid a resin having an OH equivalent of 150 – 500 produced by esterification of a dialkylaminobenzoic acid and a polybasic acid with a polyhydric alcohol, (2) 99 to 5.2% by weight of a photopolymerizable monomer and (3) 0 to 4.8% by weight of a photosensitizing agent, the percentages being based on the weight of said resin composition.

4,093,578

SELF-LUBRICATING ANTIFRICTION MATERIAL

Jury Nikolaevich Vasiliev, ulitsa Vostrukhina 6, korpus 3, kv. 67, Moscow; Andrei Viktorovich Petrenko, Pushkino, Moskovsky prospect, 43, kv. 17, Moskovskaya oblast; Georgy Nikolaevich Bagrov, Mozhaiskoe shosse, 74, kv. 87, Moscow; Galina Nikolaevna Gordeeva, Kosinskaya ulitsa, 18, korpus 2, kv. 56, Moscow; Timur Isaakovich Kazintsev, 3 Dorozhny proezd, 9, kv. 50, Moscow; Vasily Dmitrievich Telegin, Ljubertsy Oktyabrsky prospekt 306, kv. 71, Moskovskaya oblast, and Vitaly Naumovich Goldfain, Kuznetsovskaya ulitsa, 10, korpus 3, kv. 39, Leningrad, all of U.S.S.R.

Filed Feb. 27, 1976, Ser. No. 662,202

Int. Cl.² C08L *91/00*

U.S. Cl. 260—28 P **2 Claims**

1. A self-lubricating antifriction material comprising a carbon filler selected from the group consisting of a powder of fired oil coke, a powder of artificial graphite and carbon fabric; a binder in the form of epoxy resin having a molecular weight of 300–1560 obtained through condensation of epichlorohydrin with diphenylolpropane and polyalumophenylsiloxane resin having a molecular weight of 5000–15000 with a mole ratio of the silicon atoms to the aluminium atoms equal to 3–8; chlorinated paraffin having a molecular weight of 500–1100 and chlorine content of 40–70 mole percent; the proportion of said components in said self-lubricating antifriction material being as follows (% by weight):

epoxy resin — 15 – 57
polyalumophenylsiloxane resin — 3 – 10
chlorinated paraffin — 0.2 – 10
carbon filler — the balance

4,093,579

LOW PRESSURE MELAMINE RESINS CONTAINING AN ETHYLENE GLYCOL AND AN ELASTOMER

Darwin Fiske DeLapp, New Canaan; James Christopher Goebel, Stamford, both of Conn., and Kenneth Dana Bunkowski, Cincinnati, Ohio, assignors to Formica Corporation, Cincinnati, Ohio

Filed Feb. 11, 1977, Ser. No. 767,722

Int. Cl.² C08L *61/28*

U.S. Cl. 260—29.4 R **5 Claims**

1. A composition of matter comprising

(1) a blend of an aqueous melamine/formaldehyde resin solution and from about 2 to about 20%, by weight, based on the solids weight of said resin, of an ethylene glycol having a molecular weight of from about 62 to about 2100, or

(2) an aqueous solution of the resinuous reaction product of (I) melamine, (II) formaldehyde and (III) from about 2 to about 20.0%, by weight, based on the total weight of melamine and formaldehyde, of an ethylene glycol having a molecular weight of from about 62 to about 2,000, wherein said (1) or (2) contains, in admixture therewith, (3) from about 2.5 to about 30.0%, by weight, based on the weight of resin solids in (1) or (2), of an elastomer comprising

(a) an ethylene/vinyl chloride containing from about 20 to about 30% ethylene, from about 65 to about 80% vinyl chloride and from about 0.5 to about 7.0%, by weight, said percentages being based on the total weight of (a), of amide groups,

(b) a polyurethane resin containing from about 3.0 to about 10.0%, by weight, based on the total weight of (b), of carboxyl groups, or

(c) a butadine/acrylonitrile copolymer containing from about 50 to about 95% butadiene, from about 5 to 50% acrylonitrile and from about 1 to about 10%, by weight, said percentages being based on the total weight of (c), of carboxyl groups,

said elastomer having a particle size of up to about 20,000 Angstroms.

4,093,580

METHOD FOR TREATING AQUEOUS MEDIUMS CONTAINING MAGNESIUM SULFITE TRIHYDRATE

Robert L. Jones, Newtown; Lewis Volgenau, Ivyland, and Philip S. Davis, Furlong, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

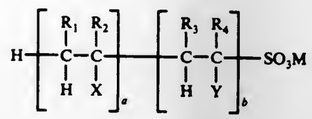
Filed Aug. 5, 1976, Ser. No. 711,914

Int. Cl.² C08L *41/00; C02B 5/06*

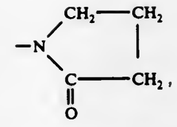
U.S. Cl. 260—29.6 SQ **30 Claims**

1. A method for dispersing magnesium sulfite tri-hydrate contained in an aqueous medium comprising adding in combination to the medium an effective amount for the purpose as a dispersant of

(i) an oligomer having the formula:

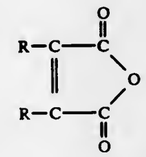


where R_1, R_2, R_3 and R_4 are the same or different and are selected from the group consisting of hydrogen, methyl and ethyl, Y is at least one member selected from the group consisting of —COOH, —COOM, —$CONH_2$, —OCH_3, —OC_2H_5, —CH_2OH, and



X is one or more members selected from the group consisting of —$COOC_2H_4OH$, —$COOC_3H_6OH$, —$CONHCH_2OH$, —$CONHCH_3$, —$CONHC_2H_5$, —$CONHC_3H_7$, —$CONHC_8H_{17}$, —$COOCH_3$, —$COOC_2H_5$, —CN, —$OOCCH_3$, —$OOCC_2H_5$, and —$CONHC(CH_3)_2$—CH_2COCH_3, $a+b$ is 4 to 250, $a/(a+b)$ is between 0.0 and 0.6, and M is a water soluble cation of a bisulfite salt; and

(ii) an effective metal salt of a copolymer of a 1-olefin having from 4 to 16 carbon atoms and a compound having the formula:



where R is individually selected from the group consisting of hydrogen, methyl and ethyl.

4,093,581

EMULSION POLYMERIZATION OF VINYL CHLORIDE USING PREHOMOGENIZED MIXED EMULSIFIER SYSTEM

Donald F. Anderson, White Plains, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Nov. 11, 1976, Ser. No. 740,989

Int. Cl.² C08L *27/06*

U.S. Cl. 260—29.6 MH **8 Claims**

1. In an emulsion polymerization procedure for forming vinyl chloride homopolymers or copolymers by heating a monomer charge containing vinyl chloride in the presence of a water soluble initiator and an emulsifier to form a latex containing particles of said polymers, the improvement which comprises using as an emulsifier, a prehomogenized mixture of: (1) at least one C_{12}-C_{18} straight chain alkyl or alkenyl surfactant of the formula $ROSO_3A$ or RC(O)OA, where R is a C_{12}-C_{18} straight alkyl or alkenyl group and A is an alkali metal cation, alkaline earth metal cation or alkanol amine of up to 6 carbon atoms and (2) at least one C_{16}-C_{20} straight chain alkyl or alkenyl alcohol or saturated hydrocarbon having a chain of greater than 18 carbon atoms to effect formation of the polymers in said latex in a single step.

4,093,582

ORGANO PHOSPHORUS ESTER PLASTICIZED POLYCARBONATE COMPOSITION

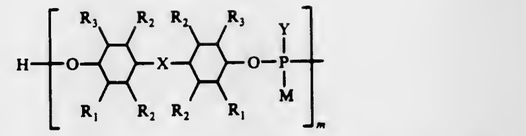
Victor Mark, Evansville, and Phillip Steven Wilson, Mt. Vernon, both of Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 8, 1976, Ser. No. 748,469

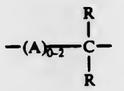
Int. Cl.² C08K *5/51*

U.S. Cl. 260—30.6 R **6 Claims**

1. A plasticized polycarbonate composition comprising in admixture, a high molecular weight aromatic carbonate polymer having an IV of 0.40 to 1.0 dl./g. in methylene chloride at 25° C and a minor amount of an oligomeric-polymeric organo phosphorus ester of the following formula:



wherein R_1 is independently selected from the group consisting of hydrogen, halogen or C_1 to C_{12} alkyl; R_2 is independently selected from the group consisting of hydrogen or C_1 to C_5 alkyl; R_3 is independently selected from the group consisting of hydrogen, halogen or C_1–C_2 alkyl; X is selected from the group consisting of:



(a)

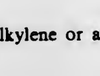
wherein A is

and R_4 is hydrogen or C_1–C_4 alkyl; R is independently selected from the group consisting of hydrogen, C_1–C_{15} alkyl; aryl or 6–14 carbon atoms and substituted aryl wherein the substituents are C_1–C_5 alkyl;

(b) —CH_2CH_2—

(c) —CH_2B-CH_2—

wherein B is C_1–C_{16} alkylene or arylene of 6 to 14 carbon atoms;



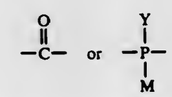
(d)

wherein *a* is an integer of 3 to 15;

(e) —O—

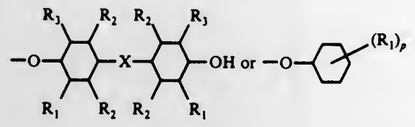
(f) —S—

Y is O, S or an electron pair; M is selected from the group consisting of C_1–C_{30} alkyl, aryl of 6 to 14 carbon atoms, C_1–C_{30} alkoxy, aryloxy of 6 to 14 carbon atoms, alkylthio of 1 to 30 carbon atoms, arylthio of 6 to 14 carbon atoms, alkylamino of 1 to 30 carbon atoms, arylamino of 6 to 14 carbon atoms and substituted aryl wherein the substituents are C_1 to C_{30} alkyl, aryloxy of 6 to 14 carbon atoms, alkylthio of 1 to 30 carbon atoms, arylthio of 1 to 30 carbon atoms, arylthio of 6 to 14 carbon atoms; T is



wherein Y and M are as previously defined; m and n are inte-

gers from 0 to 80 provided the sum of m and n is at least 2; and Z is



wherein R_1, R_2, R_3 and X are as previously defined and p is an integer of 0–5.

4,093,583

PEROXIDE VULCANIZATION OF OIL-EXTENDED ELASTOMERIC ETHYLENE COPOLYMERS CONTAINING BROMINE

David Apotheker, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 29, 1976, Ser. No. 728,003
Int. Cl.² C08K *5/01*
U.S. Cl. 260—33.6 AQ **14 Claims**

1. An elastomeric peroxide vulcanizable copolymer composition of ethylene, at least one C_3–C_{18} alpha-monoolefin, and at least one monoreactive nonconjugated diene containing at least about 0.1 weight percent allylically incorporated bromine, at least about 20 phr of a hydrocarbon extending oil, about 1–5 phr (active ingredient) of an organic peroxide and an unsaturated peroxide activator.

4,093,584

PROCESS FOR THE MASS COLORATION OR WHITENING OF LINEAR POLYESTERS

Günther Zwahlen, Dornach; Gerhard Umsonst, Frenkendorf, and Andreas Laely, Allschwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,559
Claims priority, application Switzerland, Dec. 18, 1974, 16889/74
Int. Cl.² C08K *9/04*
U.S. Cl. 260—40 P **6 Claims**

1. A process for the mass colouration or whitening of linear polyesters, wherein the polyester to be coloured is mixed, in the solid or fused state, with a preparation consisting substantially of a colourant or fluorescent brightener which is soluble or insoluble in the polyester, and of a polystyrene with a softening point above 100° C, and the resultant mixture, provided it is not already in the form of a melt, is converted into the molten state and formed into shaped articles.

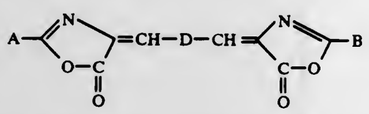
4,093,585

PROCESS FOR THE DYEING OF WATER-INSOLUBLE THERMOPLASTIC POLYMERS AND POLYCONDENSATES IN THE MASS

Wolfgang Teige, Kelkheim, Taunus, and Rudolf Schickfluss, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

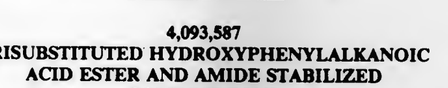
Filed Feb. 28, 1977, Ser. No. 772,576
Claims priority, application Germany, Mar. 2, 1976, 2608481
Int. Cl.² C08K *5/35*
U.S. Cl. 260—40 P **6 Claims**

1. Process for the dyeing of a water-insoluble thermoplastic polymer or polycondensate in mass, which comprises adding to the said thermoplastic material before the final molding thereof an azlactone dyestuff of the formula (1)



(1),

in which A and B each represents naphthyl, phenyl, chlorophenyl, bromophenyl, lower alkyl-phenyl, lower alkoxyphenyl, nitrophenyl,



cyanophenyl, dichlorophenyl, chloro-lower alkyl-phenyl, nitro-lower alkyl-phenyl, chloro-nitrophenyl, A and B being identical or different, D represents naphthylene, phenylene, monochlorophenylene, dichlorophenylene or di-lower alkoxyphenylene, or with a mixture of dyestuffs of the said formula (1).

4,093,586

PYRROLIDINE DICARBOXYLIC ACIDS AND ESTERS AND STABILIZED COMPOSITIONS

John F. Stephen, New City, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 541,373, Jan. 15, 1975, abandoned, which is a continuation-in-part of Ser. No. 429,328, Dec. 28, 1973, abandoned. This application Mar. 18, 1976, Ser. No. 668,010
Int. Cl.² C08K *5/34*; C07D *207/04*
U.S. Cl. 260—45.8 N **31 Claims**

1. A compound having the formula

wherein

X is hydrogen, hydroxyl, O, alkyl having 1 to 12 carbons, $CH_2CH_2OCH_3$, alkenyl having 3 to 4 carbons or $CH_2C{\equiv}CH$;

R^1 is hydrogen, alkyl having 1 to 20 carbons or phenethyl; and

R^2 are the same or different alkyls having 1 to 7 carbons.

16. A composition of matter stabilized against degradation which comprises a synthetic organic polymer subject to ultraviolet light degradation and a compound of claim 1.

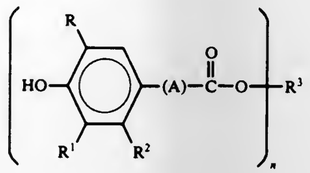
4,093,587

TRISUBSTITUTED HYDROXYPHENYLALKANOIC ACID ESTER AND AMIDE STABILIZED COMPOSITIONS

John D. Spivack, Spring Valley, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 490,835, July 23, 1974, Pat. No. 3,984,460, which is a continuation-in-part of Ser. No. 400,745, Sept. 25, 1973, abandoned. This application May 3, 1976, Ser. No. 682,236
Int. Cl.² C08K *5/20*
U.S. Cl. 260—45.8 NE **22 Claims**

1. A composition of matter comprising an organic material subject to deterioration and from 0.01 to 5% by weight of a stabilizing compound of the formula



wherein

R is a branched alkyl of 3 to 8 carbon atoms,

R^1 and R^2 are alkyl of 1 to 3 carbon atoms or together are a butylene chain which together with the phenyl ring form a tetrahydronaphthyl group,

R^3 is alkyl of 1 to 18 carbon atoms; cyclohexyl; phenyl; o-tolyl; p-tert-octyphenyl; 2,4-di-tert-butylphenyl; 2-(alkylthio)ethyl of 5 to 21 atoms in the chain; alkylene of 2 to 6 carbon atoms, thiodiethylene, 3,6-dioxa-1,8-octa-methylene; or a polyvalent saturated aliphatic hydrocarbon radical of 3 7 carbon atoms where *n* is 3 or 4,

A is a straight chain alkylene of 1 to 3 carbon atoms, and *n* is an integer of 1 to 4.

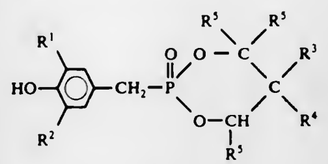
4,093,588

HINDERED PHENOLIC CYCLIC PHOSPHONATES AND STABILIZED COMPOSITIONS

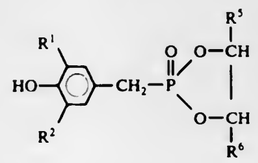
John D. Spivack, Spring Valley, and Martin Dexter, Briarcliff Manor, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 512,373, Oct. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 421,173, Dec. 3, 1973, abandoned. This application Sep. 3, 1976, Ser. No. 720,304
Int. Cl.² C08K *5/53*; C07F *9/15*
U.S. Cl. 260—45.8 R **10 Claims**

1. A compound having the formula



or



wherein

R^1 is alkyl of 1 to 8 carbon atoms,

R^2 is tert-alkyl of 4 to 8 carbon atoms,

R^3 and R^4 are independently hydrogen or alkyl of 1 to 12 carbon atoms,

R^5 is hydrogen, alkyl of 1 to 8 carbon atoms or phenyl and providing that each R^5 does not have to be the same, and

R^6 is alkyl of 1 to 8 carbon atoms or phenyl, or R^5 and R^6 together represent tetramethylene.

2. A composition of matter comprising a polyamide subject to oxidative and thermal deterioration stabilized with from 0.01 to 5% by weight of a compound of claim 1.

4,093,589

NON-OPAQUE FLAME RETARDANT POLYCARBONATE COMPOSITION

Arnold Factor, Scotia, N.Y.; Donald Benjamin George Jaquiss, New Harmony, and Victor Mark, Evansville, both of Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Feb. 3, 1977, Ser. No. 765,363
Int. Cl.² C08K *5/42*
U.S. Cl. 260—45.75 B **9 Claims**

1. A non-opaque flame retardant polycarbonate composition comprising in admixture an aromatic carbonate polymer and a minor amount of an additive selected from the group consisting of the organic cationic salts of unsubstituted and substituted monomeric or polymeric aliphatic, aromatic or heterocyclic sulfonic acids and mixtures thereof and inorganic acids, the cationic porion of said organic cationic salt being selected from substituted or unsubstituted carbonium, sulfonium, ammonium, phosphonium, arsonium, and iodonium cations.

4,093,590

FLAME RETARDANT POLYCARBONATE COMPOSITION

Victor Mark, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 429,126, Dec. 28, 1973, Pat. No. 3,978,024. This application Jul. 14, 1976, Ser. No. 705,025
Int. Cl.² C08K *5/42*
U.S. Cl. 260—45.85 S **11 Claims**

1. A flame retardant carbonate polymer composition selected from the group consisting of:

(a) a carbonate polymer having in admixture a minor amount of an additive selected from the group consisting of the metal salts of unsubstituted and substituted polymeric phenol ester sulfonic acid, and mixtures of the metal salts of unsubstituted and substituted monomeric phenol ester sulfonic acid and the metal salts of unsubstituted and substituted polymeric phenol ester sulfonic acid wherein the metal salts are selected from the group consisting of the alkali metal salts and alkali earth metal salts and mixtures of these metal salts, and the substituent on the metal salts of the substituted monomeric and polymeric phenol ester sulfonic acid is selected from the group consisting of an electron withdrawing radical, and mixtures of electron withdrawing radicals,

(b) a metal salt of a sulfonic acid substituted carbonate polymer wherein said metal salt comprises from 0.01 to up to 10.0 weight percent of said polymer, and

(c) mixtures of (a) and (b).

4,093,591

3,5-DITERTIARY ALKYL-4-HYDROXYPHENYL (ALKYL) 6-ACYLOXY-4-THIA HEXANOATES AND HEXENAMIDES AS ANTIOXIDANTS

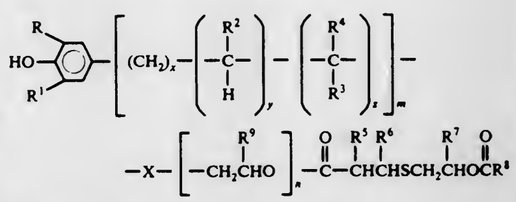
Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 8, 1976, Ser. No. 739,687
Int. Cl.² C08K *5/36*
U.S. Cl. 260—45.85 H **4 Claims**

1. A composition of matter stabilized against oxidative degradation which is comprised of:

A. a polymer susceptible to oxidative degradation selected from the group consisting of natural rubber, homopolymers wherein the monomer is selected from the group consisting of mono-olefin monomers and diolefin monomers, and synthetic copolymers wherein at least one of the monomers is selected from the group consisting of mono-olefin monomers and diolefin monomers; and

B. from 0.001 to 10 parts by weight of the anti-oxidant having the following structural formula:



wherein R and R^1 are radicals selected from the group consisting of tert. alkyl radicals having from 4 to 8 carbons, and cycloalkyl radicals having from 5 to 12 carbons; R^2 and R^3 are selected from the group consisting of H, and alkyl radicals having from 1 to 4 carbons; R^4, R^5, R^6, R^7 and R^9 are selected from the group consisting of H and alkyl radicals having from 1 to 4 carbons; R^8 is selected from the group consisting of alkyl

radicals having from 1 to 20 carbons, alkenyl radicals having from 12 to 20 carbons, cycloalkyl radicals having from 5 to 12 carbons, phenyl, substituted phenyl, and aralkyl radicals having from 7 to 12 carbon atoms; x, y or z equals 0 to 12; $x + y + z \leqq 12$; m equals 0 or 1; n equals 0 to 3; and X is 0 or NH per 100 parts by weight of polymer.

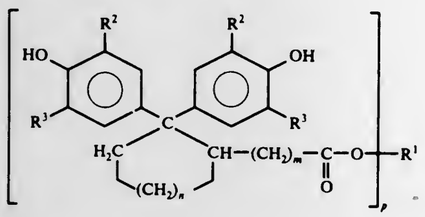
4,093,592

NOVEL PHENOLIC ANTIOXIDANTS, THEIR PREPARATION AND THEIR USE

Norbert Mayer, Gersthofen; Gerhard Pfahler, Augsburg, and Hartmut Wiezer, Gersthofen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 17, 1977, Ser. No. 778,706
Claims priority, application Germany, Mar. 23, 1976, 2612214
Int. Cl.² C07C 69/76; C08K 9/00
U.S. Cl. 260—45.85 B **5 Claims**

1. 2,2-Bis-(alkyl-4'-hydroxyphenyl)cycloalkyl-(alkyl)-carboxylic acid ester of the formula



wherein

m is o, 1 or 2,

n is an integer of from 2 to 9 and

p is 1, 2, 3 or 4,

R^1 is an alkyl or isoalkyl radical with up to 30 carbon atoms, the valency of which corresponds to the meaning of p in each case, or a mono- or bivalent, optionally alkylsubstituted cycloalkyl radical having of from 5 to 12 ring carbon atoms, or a monovalent alkene or alkyne radical having of from 3 to 30 carbon atoms,

R^2 is an alkyl or isoalkyl radical having up to 4 carbon atoms and

R^3 is hydrogen or an alkyl or isoalkyl radical having up to 4 carbon atoms.

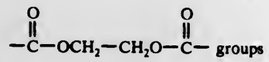
4,093,593

POLYESTER STABILIZATION, AND COMPOSITION

Santos W. Go, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Sep. 14, 1977, Ser. No. 833,192
Int. Cl.² C08K 5/09
U.S. Cl. 260—45.85 P **2 Claims**

2. A method for stabilizing a saturated polyester containing



which comprises forming an intimate admixture of said polyester with 0.3 to 3 parts by weight of 5-hydroxy isophthalic acid per 100 parts by weight of said polyester.

4,093,594

PROCESS FOR PREPARING CATHODICALLY DEPOSITABLE COATING COMPOSITIONS

Terry L. Anderson, Louisville, Ky., assignor to Celanese Polymer Specialties Company, Louisville, Ky.

Filed Aug. 18, 1976, Ser. No. 715,267
Int. Cl.² C08L 63/00
U.S. Cl. 260—47 EP **10 Claims**

1. A process for preparing a resinous composition which comprises

(A) adducting

(a) a polyepoxide resin derived from a dihydric phenol and an epihalohydrin, said polyepoxide resin having a 1,2-epoxide equivalent weight of about 400 to about 4000, with

(b) a polyamine having at least 2 amine nitrogen atoms per molecule, at least 3 amine hydrogen atom per molecule and no other groups reactive with epoxide groups; and wherein at least 1.5 mols of (b) are present for each epoxide equivalents of (a) and wherein the reaction is continued until all of the epoxide groups have reacted with amine groups;

(B) removing by distillaton the unreacted polyalkylene polyamine; and

(C) reacting at a temperature of about 150° to about 500° F. the so formed adduct with a monoepoxide which contains one 1,2-epoxide group and no other group reactive with amine groups, said monoepoxide having about 8 to 24 carbon atoms per molecule wherein about 2 to about 6 mols of (C) are reacted per each mol of (A) and wherein said resinous composition has a weight per active nitrogen of about 200 to about 600.

4,093,595

PROCESS FOR PREPARING POLYESTERS FROM DIPHENOLS AND AROMATIC DICARBOXYLIC ACIDS BY DIRECT POLYMERIZATION

Steven P. Elliott, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 19, 1976, Ser. No. 743,320
Int. Cl.² C08G 63/14, 63/18
U.S. Cl. 260—47 C **13 Claims**

1. A direct polymerization process comprising reacting a composition consisting essentially of at, least one aromatic dicarboxylic acid and at least one dihydric phenol in the presence of a catalytic amount of a compound selected from the group consisting of antimony, tin, and titanium compounds and at a temperature sufficient to maintain the resulting polyester in a molten state.

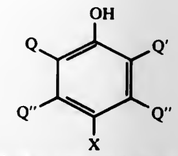
4,093,596

METHOD FOR POLYMERIZATION OF POLYPHENYLENE OXIDES

Walter Karl Olander, Clifton, N.Y., assignor to General Electric Company, Pittsfield, Mass.

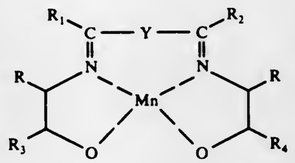
Filed Dec. 21, 1976, Ser. No. 753,501
Int. Cl.² C08G 65/44
U.S. Cl. 260—47 ET **12 Claims**

1. A method for the preparation of a polyphenylene oxide which comprises oxidatively coupling a phenolic monomer of the formula:



wherein X is a substituent selected from the group consisting of hydrogen, chlorine, bromine and iodine; Q is a monovalent substituent selected from the group consisting of hydrocarbon

radicals, halohydrocarbon radicals having at least two carbon atoms between the halogen atom and the phenol nucleus, hydrocarbonoxy and halohydrocarbonoxy radicals having at least two carbon atoms between the halogen atom and the phenol nucleus; and Q' is as defined for Q, and in addition may be halogen and Q'' are each as defined for Q' and in addition hydrogen with the proviso that Q, Q' and Q'' are all free of a tertiary carbon atom, in the presence of a catalyst of the formula:



wherein R_1, R_2, R_3 and R_4 are independently selected from the group consisting of lower alkyl of from 1 to 8 carbon atoms, aryl and hydrogen; R_1 and R_2 may be concatenated together when Y is a single bond to form a six carbon ring that may be saturated or have up to two double bonds and which may be substituted with a substituent selected from the group consisting of hydrogen, halogen, lower alkyl of from 1 to 8 carbon atoms, lower alkoxy of from 1 to 8 carbon atoms; Y is a single bond or is CH_2, and R is hydrogen or R may be concatenated together with R_3 to form an unsaturated ring containing 5 to 6 carbon atoms or saturated ring containing 5 to 6 carbon atoms which may be unsubstituted or substituted with lower alkyl groups of 1 to 8 carbon atoms or aryl groups, an organic solvent, an alkali and an oxygen containing gas, to form a polyphenylene oxide and thereafter recovering the polyphenylene oxide from the reaction mixture.

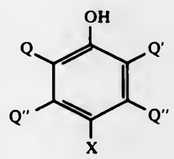
4,093,597

POLYMERIZATION OF 2,6-DI-SUBSTITUTED PHENOLS

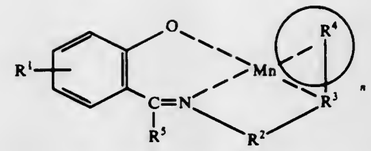
Walter Karl Olander, Clifton, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Filed Dec. 21, 1976, Ser. No. 753,506
Int. Cl.² C08G 65/44
U.S. Cl. 260—47 ET **13 Claims**

1. A method for the preparation of a polyphenylene oxide which comprises oxidatively coupling a phenolic monomer of the formula:



wherein X is substituent selected from the group consisting of hydrogen, chlorine, bromine and iodine; Q is a monovalent substituent selected from the group consisting of hydrocarbon radicals, halohydrocarbon radicals having at least two carbon atoms between the halogen atom and the phenol nucleus, hydrocarbonoxy and halohydrocarbonoxy radicals having at least two carbon atoms between the halogen atom and the phenol nucleus; and Q' is as defined for Q, and in addition may be halogen and Q'' are each as defined for Q' and in addition hydrogen with the proviso that Q, Q' and Q'' are all free of a tertiary carbon atom, in the presence of a catalyst of the formula:



wherein R^1 is selected from hydrogen, lower alkyl of from 1 to 8 carbon atoms and phenyl; halogen, lower alkoxy of from 1 to 8 carbon atoms; R^2 is o-phenylene; lower alkoxy o-phenylene wherein the lower alkoxy group has from 1 to 8 carbon atoms; halo-o-phenylene; lower alkyl-o-phenylene wherein the lower alkyl group has from 1 to 8 carbon atoms; lower alkylene of from 2 to 3 carbon atoms; phenyl lower alkylene wherein the alkylene portion has from 2 to 3 carbon atoms and lower alkyl substituted lower alkylene wherein the lower alkyl group has from 1 to 8 carbon atoms and the alkylene portion has from 2 to 3 carbon atoms; R^3 is oxygen or nitrogen; R^4 is lower alkyleneoxy having from 2 to 3 carbon atoms, lower alkyl substituted alkyleneoxy wherein the lower alkyl group has from 1 to 8 carbon atoms and the alkylene portion has from 2 to 3 carbon atoms, o-phenyleneoxy, phenyl lower alkyleneoxy wherein the alkylene group has from 2 to 3 carbon atoms' lower alkyl-o-phenylene wherein the lower alkyl group has from 1 to 8 carbon atoms or phenyl-o-phenyleneoxy; R^5 is selected from hydrogen, lower alkyl of 1 to 8 carbon atoms or phenyl; and n is 0 or 1 an organic solvent, a base, and an oxygen containing gas, to form a polyphenylene oxide and thereafter recovering the polyphenylene oxide from the reaction mixture.

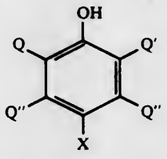
4,093,598

OXIDATIVE COUPLING OF PHENOLIC MONOMERS IN THE PRESENCE OF MANGANESE COMPLEXES OF MANGANESE PHENYL BENZOIN OXIME CATALYSTS

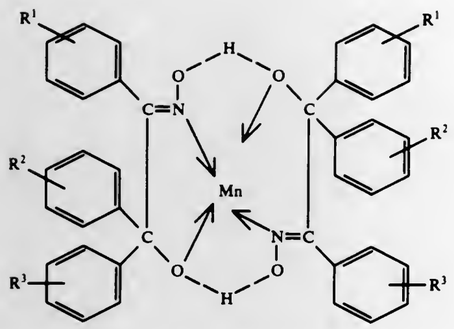
Eugene George Banucci, Scotia, and Walter Karl Olander, Clifton Park, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 21, 1976, Ser. No. 753,507
Int. Cl.² C08G 65/44
U.S. Cl. 260—47 ET **7 Claims**

1. A method for the preparation of a polyphenylene oxide which comprises oxidatively coupling a phenolic monomer having the formula



wherein X is a substituent selected from the group consisting of hydrogen, chlorine, bromine and iodine; Q is a monovalent substituent selected from the group consisting of hydrocarbon radicals, halohydrocarbon radicals having at least two carbon atoms between the halogen atom and the phenol nucleus, hydrocarbonoxy and halohydrocarbonoxy radicals having at least two carbon atoms between the halogen atom and the phenol nucleus; and Q' is as defined for Q, and in addition may be halogen and Q'' are each as defined for Q' and in addition hydrogen with the proviso that Q, Q' and Q'' are all free of a tertiary carbon atom in a basic reaction medium in the presence of oxygen and a manganese commplex having the formula



(I)

wherein R^1, R^2 and R^3 are independently selected from the group consisting of hydrogen, lower alkyl of 1 to 8 carbon atoms, lower alkenyl of from 1 to 8 carbon atoms, aryl, amino, lower alkoxy of from 1 to 8 carbon atoms and halogen.

4,093,599

PROCESS FOR THE PREPARATION OF VULCANIZABLE ELASTOMERS FROM THIODIETHANOL

Romeo Raymond Aloia, Bridgewater, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 18, 1977, Ser. No. 779,115
Int. Cl.² C08G *75/12*
U.S. Cl. 260—47 R **15 Claims**

1. A process for the preparation of a thiodiethanol-based elastomer composition which comprises condensing a monomer charge comprising thiodiethanol, or a major proportion of thiodiethanol with (A) one or more saturated or unsaturated aliphatic diols, or (B) one or more dihydric phenolic compounds or (C) mixtures of (A) and (B) at a temperature above about 150° C in the presence of from about 0.1 to 3 percent by weight, based on the weight of said monomer charge, of phosphorous acid, to provide an oligomeric precondensate having a molecular weight in the range of about 500 to 5000, said precondensate being fluid at temperatures above about 100° C; adding to said precondensate from about 0.01 to 0.1 percent by weight, based on the weight of said precondensate, of sulfuric acid and continuing the condensation reaction at a temperature in the range of about 150° C to 220° C until the condensate attains a molecular weight sufficient to provide a Mooney viscosity of at least about 10.

4,093,600

SILANE END-CAPPED POLYARYLENE POLYETHERS

You-Ling Fan, East Brunswick, and Alford Gailey Farnham, Mendham, both of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 30, 1976, Ser. No. 681,830
Int. Cl.² C08G *75/00*
U.S. Cl. 260—49 **17 Claims**

1. A silane end-capped polyarylene polyether of the formula: X—polyarylene polyether chain—X′
wherein X and X′ individually represent silane end groups, wherein each silane end group contains at least one hydrolyzable substituent group or at least one silanol hydroxyl group.

4,093,601

VINYL ESTERS OF TETRACARBOXYLIC ACIDS AND RESINS DERIVED THEREFROM

Erich Kuehn, Wilmington, Del., assignor to ICI Americas Inc., Wilmington, Del.

Filed Sep. 29, 1976, Ser. No. 727,411
Int. Cl.² C08F *218/14, 224/00, 226/06*
U.S. Cl. 260—63 UY **8 Claims**

1. A composition curable to a condensation or addition type copolymer resin comprising one or more ethylenically unsaturated monomers selected from the group consisting of vinyl esters, aryl vinyl compounds, vinyl nitriles and divinyl compounds and a carbocyclic or heterocyclic carboxylic ester monomer useful in imparting heat resistance to vinyl resin copolymers made therefrom having the general formula:

$$(RO_2C')_2{=}X{=}(C''O_2R')_2$$

wherein =X= is selected from a tetravalent 5 or 6 membered single ring system and a double 6 membered ring system selected from the group consisting of cyclopentane, cyclopentene, cyclopentadiene, tetrahydrofuran, pyrrole, benzene, pyridine, cyclohexane, dioxane, naphthalene, dibenzene, benzophenol, anthracene and dibenzylmethane wherein the C′ carbons are attached to one pair of vicinal carbons in said ring system and the C″ carbons are attached to one other pair of vicinal carbons in said ring system wherein 1 each of R and R′ is a terminally ethylenically unsaturated aliphatic radical linked by the removal of the hydroxyl group from compounds selected from the group consisting of monohydric vinyl alcohol and alkoxylated derivatives thereof and the other of each R and R′ is selected from the group consisting of —H, $—CH_2C-H(OH)CH_2O_2CCR''{=}CH_2$, and $—CH[CH_2(OH)]CH-{}_2O_2CCR''{=}CH_2$, wherein R″ is —H or $—CH_3$.

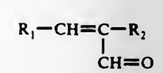
4,093,602

POLYMERIC MATERIAL CONTAINING ALDEHYDE GROUPS AND THE METHOD OF ITS PREPARATION

Jaroslav Kálal; Eva Žurková, both of Prague, and František Švec, Kladno, all of Czechoslovakia, assignors to Ceskoslovanska akademie ved, Prague, Czechoslovakia

Filed Oct. 20, 1975, Ser. No. 623,964
Claims priority, application Czechoslovakia, Oct. 24, 1974, 7282/74
Int. Cl.² C08G *2/00, 12/04, 2/26*
U.S. Cl. 260—73 R **4 Claims**

1. Polymeric material which is in the form of spherical particles having a diameter of up to 3 mm, contains up to 40% of free aldehyde groups, and is formed by radical copolymerization of a monomer of the general formula:



I,

where R_1 is selected from the group consisting of hydrogen, alkyl with 1 to 5 carbon atoms, aryl and furyl and R_2 is selected from the group consisting of hydrogen, alkyl with 1 to 5 carbon atoms, halogen, nitrile, aryl and furyl, with a crosslinking agent in an amount of from 43.8 to 63.6% on a molar basis.

4,093,603

COPOLYESTERS OF TEREPHTHALIC ACID, 1,2-PROPANEDIOL AND 1,4-CYCLOHEXANEDIMETHANOL

Winston J. Jackson, Jr., and Herbert F. Kuhfuss, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 19, 1977, Ser. No. 760,778
Int. Cl.² C08G *63/18*
U.S. Cl. 260—75 R **3 Claims**

1. A composition comprising a copolyester of Components 1, 2 and 3 as follows:
1. terephthalic acid or derivatives thereof;
2. from about 30 to about 75 mole percent of 1,4-cyclohexanedimethanol; and
3. from 70 to 25 mole percent of 1,2-propanediol; said copolyester having an inherent viscosity of at least about 0.40 as measured at 25° C. using 0.5 gram of polyester per 100 ml. of a solvent consisting of 60% by volume phenol and 40% by volume tetrachloroethane.

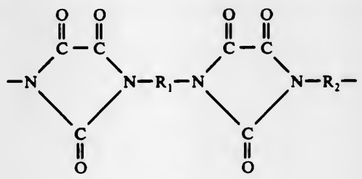
4,093,604

COPOLYMERS OF POLYPARABANIC ACIDS AND POLYAMIDES

Augustin T. Chen, Cheshire, and Kemal B. Onder, North Haven, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

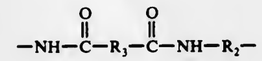
Filed Jul. 5, 1977, Ser. No. 812,800
Int. Cl.² C08G *18/00*
U.S. Cl. 260—77.5 CH **7 Claims**

1. A copolymer characterized by the presence in random arrangement of each of the following recurring units:



(I)

and



(II)

wherein R_1 represents a member selected from the group consisting of alkylene from 1 to 15 carbon atoms, inclusive, arylene from 6 to 12 carbon atoms, inclusive, and aralkylene from 7 to 25 carbon atoms, inclusive, R_2 is the residue of an organic diisocyanate $R_2—(NCO)_2$, and, in 75 to 100 percent of the units (II), R_3 is alkylene from 4 to 13 carbon atoms, inclusive, and, in 0 to 25 percent of the units (II), R_3 is arylene from 6 to 12 carbon atoms, inclusive, with the proviso that, when R_1 represents arylene, R_3 is free of aromaticity.

4,093,605

AUXILIARY AGENT FOR IMPROVING RETENTION, DRAINAGE AND TREATMENT

Lutz Hoppe; Branislav Boehmer, and Rudolf Behn, all of Walsrode, Germany, assignors to Wolff Walsrode Aktiengesellschaft, Walsrode, Germany

Filed Jan. 21, 1976, Ser. No. 650,966
Claims priority, application Germany, Jan. 24, 1975, 2502874; Aug. 30, 1975, 2538745
Int. Cl.² C08G *69/48*
U.S. Cl. 260—78 SC **3 Claims**

1. An auxiliary agent for improving the retention of flushable solids, for accelerating the drainage of suspensions and for rapid treatment of industrial waters, effluents and sludges by adding thereto basic water soluble polymer consisting essentially of a reaction product C formed by crosslinking 0.5 to 3 mols of an intermediate product A with 0.8 - 1.2 mols of an intermediate product B and 1-3 mols of a polyfunctional compound selected from the group consisting of epichlorohydrin and dihalogenoalkane, product A being at least one polyamine which contains quaternary nitrogen and formed at 40°-100° C by the action of 1-2 mols of a material selected from the group consisting of at least one polyvalent amine, at least one monovalent amine and mixture thereof with the reaction product of one mol of a secondary amine hydrochloride with 1 to 3 mols of epichlorohydrin, product B being at least one resinous, basic polyamino-amide formed from reacting materials selected from the group consisting of; at least one dicarboxylic acid and at least one polyalkylene polyamine; at least one aminocarboxylic acid and hexamethylenediammonium adipate; and at least one lactam and hexamethylene diammonium adipate.

4,093,606

METHOD OF PRODUCING INTRAVENOUSLY INJECTABLE GAMMA GLOBULIN AND A GAMMA GLOBULIN SUITABLE FOR CARRYING OUT THE METHOD

Myer Louis Coval, 6241 Chelton Dr., Oakland, Calif.

Continuation-in-part of Ser. No. 550,467, Feb. 18, 1975, abandoned. This application May 21, 1976, Ser. No. 688,621
Int. Cl.² A23J *1/06*
U.S. Cl. 260—112 B **6 Claims**

1. A process for preparing a gamma globulin substantially devoid of anticomplementary activity and suitable for intravenous administration, from a material selected from the Fraction II + III plasma protein paste having a protein content of about 25-30% and Fraction II paste which comprises the steps:
a. suspending said paste in water to form a solution of low ionic strength having a conductance of about 300×10^{-6} cm^{-6} ohm^{-1} at a pH of about 4.8 to 6.5 to produce a precipitate and filtrate,
b. fractionally precipitating impurities from said filtrate by adding polyethylene glycol to 4% weight/volume and then 5% weight/volume,
c. precipitating the gamma globulin by adding polyethylene glycol to 12% weight/volume at a pH of about 8.0.
said process being carried out at a temperature of about 0° to 20 ° C.

4,093,607

IMMUNOLOGIC CHEMOTHERAPEUTIC AGENTS COMPRISING ANTIGEN BINDING DIMERS COVALENTLY BOUND TO DRUGS

Michael Sela; Ruth Arnon, both of Rehovot; Ruth Maron, Tel Aviv, all of Israel, and Esther Hurvitz, Potomac, Md., assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

Filed May 25, 1976, Ser. No. 689,276
Claims priority, application Israel, May 27, 1975, 47372
Int. Cl.² C07G *7/00*
U.S. Cl. 260—112 B **17 Claims**

1. A composition of matter comprising an antigen binding dimer containing an anti-tumor antibody specific to a tumor antigen, said dimer covalently bonded to an anti-cancer drug through a functional group on the dimer that is nonessential for antibody activity of the dimer, and through a functional group on the drug that is nonessential for the pharmacological activity of the drug, thereby preserving both the antibody activity of the dimer and the pharmacological activity of the drug.

4,093,608

PROCESS FOR PURIFYING COAGULATION FACTOR VIII USING DEAE-CROSSLINKED DEXTRAN

Yoshiro Iga, Nishinomiya, and Masashi Shiga, Nagaokakyo, both of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Filed Apr. 1, 1977, Ser. No. 783,625
Claims priority, application Japan, Apr. 9, 1976, 51-39894
Int. Cl.² C07G *7/00*
U.S. Cl. 260—112 B **1 Claim**

1. A process for purifying coagulation factor VIII which comprises contacting for 10 to 60 minutes a human plasma or plasma fraction containing both prothrombin complex and factor VIII, said plasma or plasma fraction having an electroconductivity in the range of 7,000 to 12,000 μ Ω/cm, a pH of 6.8 to 7.9, and a liquid temperature of 0° to 10° C, with diethylaminoethyl cross-linked dextran and thereby adsorbing and removing said prothrombin complex.

4,093,609

SOMATOSTATIN SYNTHESIS

Dimitrios Sarantakis, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Dec. 10, 1976, Ser. No. 749,499
Int. Cl.[2] C07C *103/52*
U.S. Cl. 260—112.5 S 3 Claims

1. In a solution phase synthesis of somatostatin wherein successive amino acid residues are coupled N-terminally to a preceding peptide fragment followed ultimately by complete deprotection of the tetradecapeptide and oxidation to produce the 3–14 disulfide bond, the improvement which comprises:
(a) preforming by solid phase synthesis the compound (R)Phe-Phe-Trp-Lys(R)-Thr(R)-Phe-Thr(R)-Ser(R)-O-Resin
(b) removing the fully protected octapeptide from the Resin by reaction with hydrazine;
(c) coupling the octapeptide hydrazide with Cys(R)(OR) by the azide method and subsequently
(d) completing the N-terminal elongation of the peptide chain by the solution method.

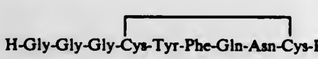
4,093,610

PROCESS FOR PRODUCING TRIGLYCYL-LYSINE VASOPRESSIN AND INTERMEDIATES THEREFOR

Nedumparambil A. Abraham, Dollard des Ormeaux; Hans U. Immer, Mount Royal, and Kazimir Sestanj, Point Claire, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

Filed Jan. 31, 1977, Ser. No. 763,772
Int. Cl.[2] C07C *103/52;* C07G *7/00;* C09H *00/00*
U.S. Cl. 260—112.5 R 12 Claims

1. A process for preparing a cyclic dodecapeptide of the formula



which comprises the steps of:
reacting first hexapeptide of formula Boc—Gly—Gly—Gly—Cys(Trt)—Tyr—Phe—$NHNH_2$ with a reagent which furnishes nitrous acid in situ in the presence of a mineral acid to convert said first hexapeptide to the corresponding first hexapeptide azide and reacting said azide with a second hexapeptide of formula H—Gln(Mbh)—Asn(Mbh)—Cys(Trt)—Pro—Lys(Boc)—Gly—NH_2—
oxidizing the resulting protected linear dodecapeptide of the formula:

Boc—Gly—Gly—Gly—Cys(Trt)—Tyr—
Phe—Gln(Mbh)—Asn(Mbh)—Cys(Trt)—Pro—
Lys(Boc)—Tly—NH_2

with iodine or thiocyanogen to obtain the protected cyclic disulfide dodecapeptide of the formula

reacting said protected linear dodecapeptide with mercuric acetate, mercuric chloride, silver acetate of silver nitrate to obtain the corresponding mercuric or disilver salt of the corresponding disulfhydryl derivative,
reacting said salt with hydrogen sulfide to obtain the protected linear disulfhydryl dodecapeptide,
oxidizing said last-named dodecapeptide with oxygen, 1,2-diiodoethane, sodium or potassium ferricyanide, iodine or thiocyanogen to obtain said protected cyclic disulfide dodecapeptide;] and
deprotecting said protected cyclic disulfide dodecapeptide in the presence of a concentrated organic acid or an aqueous solution of a mineral acid under moderately acidic conditions appropriate to remove the Boc and Mbh protecting groups to obtain said cyclic dodecapeptide.

4,093,611

OCTAPEPTIDES AND METHODS FOR THEIR PRODUCTION

Francis John Tinney, Ann Arbor, Mich., assignor to Parke, David & Company, Detroit, Mich.

Filed Apr. 7, 1977, Ser. No. 785,384
Int. Cl.[2] C07C *103/52*
U.S. Cl. 260—112.5 LH 6 Claims

1. An octapeptide having the name N^{α}-benzyloxycarbonyl-L-glutaminyl-L-prolyl-N^{im}-benzyl-L-histidyl-N^{im}-benzyl-L-histidyl-O-benzyl-L-seryl-L-prolyl-L-tryptophyl-D-alanine N-ethylamide.

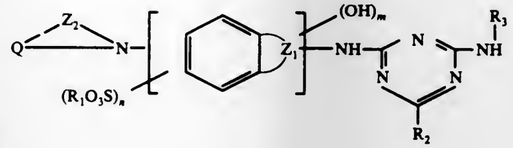
4,093,612

SELECTIVE REMOVAL OF ALBUMIN FROM BLOOD FLUIDS AND COMPOSITIONS THEREFORE

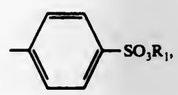
James Travis, and Ralph Pannell, both of Athens, Ga., assignors to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 601,676, Aug. 4, 1975, Pat. No. 4,016,149, which is a continuation-in-part of Ser. No. 396,036, Sep. 10, 1973, abandoned. This application Feb. 27, 1976, Ser. No. 661,890
Int. Cl.[2] A23J *1/00;* C07G *7/00*
U.S. Cl. 260—122 19 Claims

1. A method of obtaining albumin from substantially cell free aqueous fluids containing the same comprising the steps of
a. suspending a composition of the general formula $(SP)_x(CRD)$ wherein CRD is a color reactive dye of the general formula



wherein
R_3 is hydrogen, alkyl, phenyl, alkoxy phenyl, alkyl phenyl or



wherein R_1 is hydrogen, an alkali metal, or an alkaline earth metal, R_2 is halo or —O—dextran,
Z_1 is two hydrogen atoms, or —CH=CH—CH=CH— to form a naphthyl nucleus with the phenyl nucleus to which it is attached,
Z_2 is one bond of a nitrogen-nitrogen bond or a hydrogen attached to the nitrogen shown only,
Q is substituted or unsubstituted aryl where Z_2 is hydrogen, or Q is substituted or unsubstituted aryl-N= where Z_2 is one bond of a double bond,
m is 1 or 0, *n* is 1 or 2, provided that the substituent groups aforesaid are other than halo or heavy metal, and wherein SP is a solid support phase selected from the group consisting of agarose, polyacrylamide and acrylic resin containing amino groups, provided that where the CRD, R_2 is halo, the SP- linkage in the $(SP)_x(CRD)$ is to the R_2 bearing position of the triazine moiety, and where in the CRD R_2 is O-dextran, the SP- linkage in the $(SP)_x(CRD)$ is to the Q moiety,
and *x* is expressed as a weight ratio between 0.8 and 40,
in a buffer of at least 0.05 M molarity at a pH of between 6.5 and 8.5;
b. contacting said suspension with said albumin containing fluid to provide a suspension having albumin absorbed upon the solid phase thereof;
c. separating the solid phase-albumin adsorbate from the aqueous phase by treating the solid phase-albumin adsorbate with an aqueous ionic eluent wherein the anion is thiocyanate.

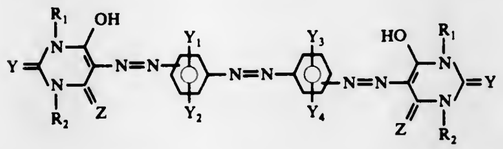
4,093,613

TRISAZO PIGMENTS CONTAINING TWO BARBITURIC ACID COUPLING COMPONENTS

Stefan Hari, Allschwil, and Armand Rouèche, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 19, 1976, Ser. No. 706,369
Claims priority, application Switzerland, Jul. 31, 1975, 10000/75
Int. Cl.[2] C09B *35/00*
U.S. Cl. 260—154 8 Claims

1. An azo pigment of the formula



in which R_1 and R_2 denote H, alkyl with 1–6 C atoms or aryl, Y denotes an O, S or imino, Z denotes O or imino and Y_1–Y_4 denote H, halogen, alkyl containing 1–4 C atoms, alkoxy containing 1–4 C atoms, nitro, trifluoromethyl or alkoxycarbonyl containing 2–4 C atoms.

4,093,614

METAL COMPLEXES OF NITROGEN COMPOUNDS

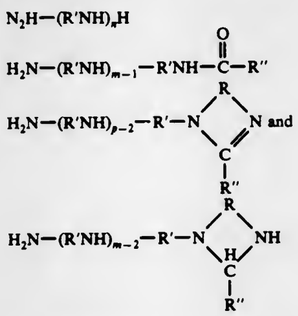
Sheldon Chibnik, Cherry Hill, and Ferdinand P. Otto, Woodbury, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 493,358, Jul. 31, 1974, Pat. No. 3,945,933. This application Dec. 9, 1975, Ser. No. 639,026
Int. Cl.[2] C07F *3/06;* C10L *1/30;* C10M *1/54*
U.S. Cl. 260—299 15 Claims

1. A double complex salt product which is a complex of a coordinated complex of the Werner type, said double complex salt product consisting essentially of the reaction product of
(1) an alkenyl succinic anhydride in which the alkenyl group contains from 8 to about 500 carbon atoms,
(2) a member selected from the group consisting of

(a) $N_2H-(R'NH)_nH$

(b)



(c)

(d)

wherein *n* is a number from 1 to 10, *m* is a number from 2 to 10, *p* is a number from 3 to 10, R' is alkylene of 2 to 5 carbon atoms and R'' is hydrogen or a hydrocarbyl group of 1 to 30 carbon atoms,
(3) a first metal compound consisting essentially of a metal of Periodic Groups IB, IIB, IVA, IVB, VB VIB, VIIB, or VIII which forms a complex with reactant (2) and
(4) a second metal compound, different from (3), selected from the group consisting of (3), and alkali and alkaline earth metal oxides, hydroxides, halides and carboxylates of monocarboxylic acids having from 1 to 30 carbon atoms.

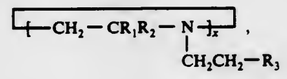
4,093,615

CYCLIC OLIGOMERS OF N-SUBSTITUTED AZIRIDINES

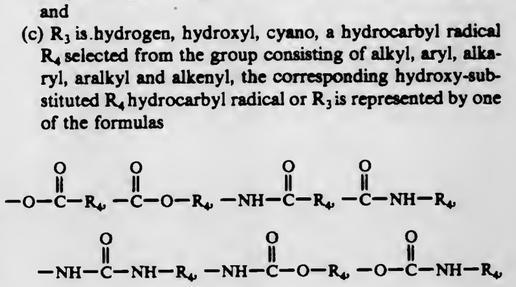
George E. Ham, Lake Jackson, and Ruben L. Krause, Angleton, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 180,236, Sep. 13, 1971, abandoned. This application Jan. 21, 1974, Ser. No. 435,049
Int. Cl.[2] C07D *255/02, 257/02, 259/00*
U.S. Cl. 260—239 BC 11 Claims

1. A cyclic oligomer of the formula



wherein
(a) *x* is an integer of from 3 to 8;
(b) R_1 and R_2 are independently hydrogen or lower alkyl; and
(c) R_3 is hydrogen, hydroxyl, cyano, a hydrocarbyl radical R_4 selected from the group consisting of alkyl, aryl, alkaryl, aralkyl and alkenyl, the corresponding hydroxy-substituted R_4 hydrocarbyl radical or R_3 is represented by one of the formulas



and —O—R_4, wherein each hydrocarbyl radical R_4 has from 1 to 24 carbon atoms.

4,093,616

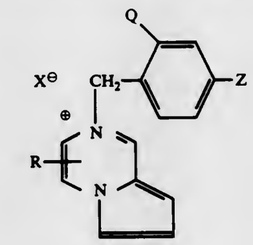
QUATERNARY SALTS AS HYPOGLYCEMIC AGENTS

Donald E. Kuhla, Gales Ferry, Conn., assignor to Pfizer Inc., New York, N.Y.

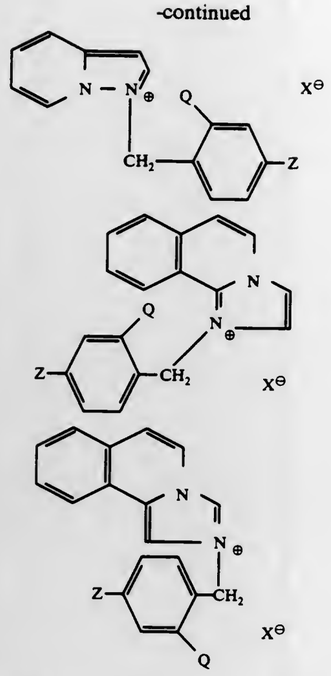
Division of Ser. No. 712,204, Aug. 6, 1976, Pat. No. 4,044,015, which is a continuation-in-part of Ser. No. 609,914, Sep. 3, 1975, abandoned. This application Aug. 8, 1977, Ser. No. 822,442
Int. Cl.[2] C07D *215/10, 241/38, 401/04;* A61K *31/495*
U.S. Cl. 544—344 11 Claims

1. A compound selected from those having the formulae:

III



-continued



wherein R is hydrogen or the carbon and hydrogen atoms completing a fused 3,4-benzo moiety; Q and Z are each selected from the group consisting of hydrogen and chlorine; and X is a pharmaceutically acceptable anion.

4,093,617

3,5,7-TRISUBSTITUTED PYRAZOLO[1,5-a]PYRIMIDINES

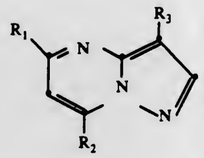
Roland K. Robins, Santa Ana; Darrell E. O'Brien, Mission Viejo, and Thomas Novinson, Costa Mesa, all of Calif., assignors to ICN Pharmaceuticals, Inc., Irvine, Calif.

Continuation of Ser. No. 520,731, Nov. 12, 1974, abandoned, which is a continuation of Ser. No. 273,465, Jul. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 206,538, Dec. 9, 1971, abandoned. This application Jan. 28, 1976, Ser. No. 653,013

Int. Cl.² C07D *487/04;* A61K *31/415*

U.S. Cl. 544—281 **8 Claims**

1. A compound of the structure



wherein R_1 is C_1–C_3 alkyl; R_2 is C_1–C_3alkyl; and R_3 is halogen.

4,093,618

IV

AMIDES OF 2,4,6-TRIALKYL-3-HYDROXY-PHENYLALKANOIC ACIDS

John D. Spivack, Spring Valley, and Martin Dexter, Briarcliff Manor, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

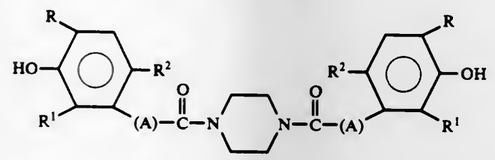
Division of Ser. No. 494,156, Aug. 2, 1974, Pat. No. 3,988,363, which is a continuation-in-part of Ser. No. 400,603, Sep. 25, 1973, abandoned. This application Jun. 7, 1976, Ser. No. 693,387

Int. Cl.² C07D *295/18*

U.S. Cl. 544—387 **4 Claims**

1. A compound having the formula

V



wherein

R is a branched alkyl of 3 to 8 carbon atoms,

R^1 and R^2 are alkyl of 1 to 3 carbon atoms, and

A is a straight chain alkylene of 1 to 3 carbon atoms.

4,093,619

METHOD FOR OXIDIZING CINCHONA ALKALOIDS

Francois Xavier Jarreau, and Jean-Jacques Koenig, both of Paris, France, assignors to Etablissements Nativelle S.A., Paris, France

Filed Nov. 19, 1976, Ser. No. 743,257

Claims priority, application France, Nov. 19, 1975, 75 35383

Int. Cl.² C07D *401/06;* C07G *5/00*

U.S. Cl. 260—284 **13 Claims**

1. A method of oxidizing cinchona alkaloids comprising the step of reacting a ketone represented by the formula: R_3COR_4 in which R_3 and R_4 are the same or different and denote a branched alkyl group, an aryl group or R_3 and R_4 together with the carbonyl group form a condensed ring or a carbon or heterocyclic ring having 5 to 7 atoms with a cinchona alkaloid in the presence of a strong base in an aprotic solvent.

4,093,620

PROCESS FOR PRODUCING 2-CYANO N-SUBSTITUTED HETEROCYCLIC COMPOUNDS AND PRODUCTS PRODUCED THEREBY

Thomas S. Osdene, and Edward B. Sanders, both of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

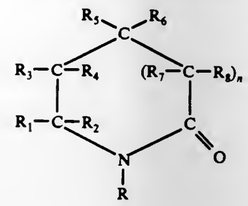
Filed Jun. 10, 1976, Ser. No. 694,687

Int. Cl.² C07D *213/57, 401/04*

U.S. Cl. 260—291 **10 Claims**

1. A process comprising the steps of:

(a) reacting an N-substituted lactam having the formula:



Wherein:

n is 0 to 1;

R is methyl or phenyl; R_1 is H or pyridyl; and each of R_2 through R_8 is H

with a reducing agent selected from the group consisting of sodium aluminum hydride, sodium bis-(methoxyethoxy)aluminum hydride and di-isobutylaluminum hydride at a temperature below about 20° C for at least 30 minutes under an inert atmosphere to produce an intermediate and

(b) then reacting said intermediate with a reagent comprising an alkali metal cyanide at a temperature from about 0° to about 30° C for at least 15 minutes.

4,093,621

PROCESS FOR PREPARING HETEROCYCLICALKYLTHIOALKYL-N-CYANOGUANIDINES AND THIOUREAS

Thomas Henry Brown; Graham John Durant, both of Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

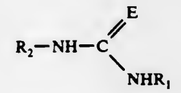
Division of Ser. No. 606,269, Aug. 20, 1975, Pat. No. 4,013,678. This application Nov. 15, 1976, Ser. No. 741,586

Claims priority, application United Kingdom, Sep. 2, 1974, 38257/74

Int. Cl.² C07D *213/44, 233/30*

U.S. Cl. 260—294.8 H **8 Claims**

1. A process for the production of a compound of the formula:



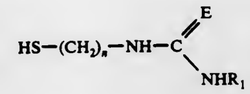
wherein E is sulphur or NCN, R_1 is hydrogen or lower alkyl, and R_2 is a grouping of the structure

$$\text{Het} - (CH_2)_m - S - (CH_2)_n -$$

wherein Het is a nitrogen containing 5 or 6 membered heterocyclic ring selected from imidazole, pyridine, thiazole, isothiazole, oxazole, triazole or thiadiazole which ring is optionally substituted by lower alkyl, hydroxyl, halogen or amino; and *m* is 1 or 2, and *n* is 2 or 3 such that the sum of *m* and *n* is 3 or 4; which comprises treating a compound of the formula

$$\text{Het} - (CH_2)_m - Z$$

wherein Het and *m* are as defined hereinabove and Z is a group selected from tosyloxy, methanesulphonyloxy, trifluoromethanesulphonyloxy, benzoyloxy with one or more nitro or chloro substituents, trifluoroacetoxy or diphenylphosphoryloxy, which forms a good leaving group, with a mercaptan of the formula



wherein *n*, E and R_1 are as defined hereinabove, in the presence of a base, said reactants and base being present in molar equivalent amounts.

4,093,622

PYRIDINE ESTERS OF CYCLOPROPANE-CARBOXYLIC ACID

Clive A. Henrick, and Gerardus B. Staal, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 578,837, May 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 418,595, Nov. 23, 1973, abandoned. This application Jul. 26, 1976, Ser. No. 708,825

Int. Cl.² C07D *213/51*

U.S. Cl. 260—295 R **2 Claims**

1. The compound, bis(cyclopropanemethyl)2,6-pyridinedicarboxylate.

2. The compound, bis(cyclopropanemethyl)2,5-pyridinedicarboxylate.

4,093,623

METHOD OF PREPARING THE ACID COPPER SALT OF 5-NITROTETRAZOLE

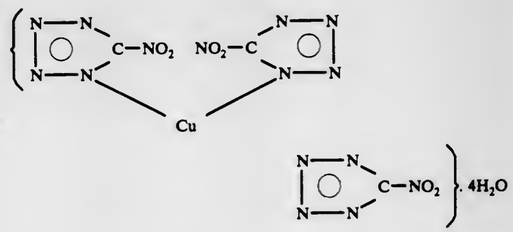
William H. Gilligan, Washington, D.C., and Mortimer J. Kamlet, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 5, 1977, Ser. No. 794,197

Int. Cl.² C07F *1/08*

U.S. Cl. 260—299 **12 Claims**

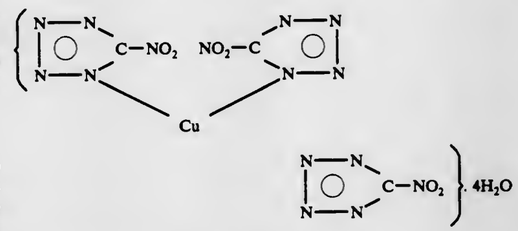
1. In the Von Herz process of preparing the acid copper salt of 5-nitrotetrazole having the composition



which comprises slowly adding a solution of 5-aminotetrazole and a strong inorganic acid in water to a solution of a compatible water soluble copper (II) salt and sodium nitrite in water in accordance with the method of Sandmeyer, the improvement comprising:

using a 25 to 100 percent excess of $NaNO_2$.

3. In the Von Herz process of preparing the acid copper salt of 5-nitrotetrazole having the composition



by slowly adding a solution of 5-aminotetrazole and a strong inorganic acid in water to a solution of a compatible water soluble copper (II) salt and sodium nitrite in water in accordance with the method of Sandmeyer, the improvement comprising:

adding small amounts of the water soluble copper (II) salt to the 5-aminotetrazole-acid solution to prevent the build up of detonation sensitive 5-diazotetrazole in the 5-aminotetrazole-acid solution during the addition of the 5-aminotetrazole-acid solution to the copper (II) salt-sodium nitrite solution.

4,093,624

1,2,4-THIADIAZOLIDINE-3,5-DIONE

Ganapathi R. Revankar, and Roland K. Robins, both of Santa Ana, Calif., assignors to ICN Pharmaceuticals, Inc., Irvine, Calif.

Filed Jan. 31, 1977, Ser. No. 763,913
Int. Cl.² C07D *285/08*
U.S. Cl. 260—302 D **1 Claim**

1. The compound 1,2,4-Thiadiazolidine-3,5-dione.

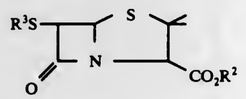
4,093,625

6-SULFUR ANALOGS OF PENICILLINS AND CEPHALOSPORINS

Thomas J. Commons, Boston; John C. Sheehan, Lexington, and Young-Sek Lo, Brookline, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 9, 1976, Ser. No. 712,540
Int. Cl.² C07D *499/00, 501/00, 501/04, 501/10*
U.S. Cl. 260—306.7 C **18 Claims**

1. A compound having the formula:



wherein R^2 is a conventional penicillin pharmaceutically acceptable group and R^3 is hydrogen or an organic moiety which is electrophyllic as compared to the sulfur to which it is attached, selected from the group of lower alkyl cyclopentyl, cyclohexyl, methycyclohexyl, phenyl, benzyl, tolyl, and a conventional pencillin side chain acyl radicals.

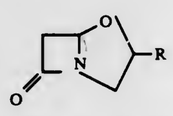
4,093,626

β-LACTAM ANTIBIOTICS

Eric Hunt, Reigate, England, assignor to Beecham Group Limited, United Kingdom

Filed Dec. 20, 1976, Ser. No. 752,002
Claims priority, application United Kingdom, Jan. 27, 1976, 02976/76
Int. Cl.² C07D *498/04*
U.S. Cl. 260—307 FA **5 Claims**

1. A compound of the formula (I):



(I)

wherein R is hydrogen, alkyl of 1–4 carbon atoms, alkenyl of 2–4 carbon atoms, epoxide of 2–4 carbon atoms or alkyl of 1–4 carbon atoms substituted by one or two moieties selected from the group consisting of halogen, azido and phthalimido.

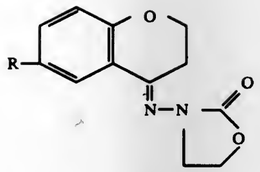
4,093,627

3-[(4-CHROMANYLIDENE)AMINO]-2-OXAZOLIDINONES

George C. Wright, and Marvin M. Goldenberg, both of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jul. 1, 1977, Ser. No. 812,126
Int. Cl.² C07D *263/26*
U.S. Cl. 260—307 C **4 Claims**

1. A compound of the formula:



wherein R is hydrogen, methoxy or nitro.

4,093,628

THIOPHENE ETHANOLAMINES

Jehan F. Bagli, Kirkland, and Eckhardt Ferdinandi, St. Laurent, both of Canada, assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 569,509, Apr. 18, 1975, Pat. No. 4,024,156. This application Feb. 15, 1977, Ser. No. 768,913
Claims priority, application Canada, Apr. 18, 1974, 197896
Int. Cl.² C07D *333/20, 333/28, 405/12, 409/12*
U.S. Cl. 260—326.12 R **5 Claims**

1. A compound of the formula

$$ArCHOR^1CHR^2NR^3R^4$$

in which Ar is selected from the group consisting of 2-thienyl, 5-(lower alkyl)-2-thienyl, 5-phenyl-2-thienyl and 4,5-dichloro-2-thienyl; R^1 is hydrogen or lower alkyl; R^2 is hydrogen or lower alkyl; R^3 is hydrogen or lower alkyl; and R^4 is 2-indol-3-ylethyl, and the acid addition salts thereof with pharmaceutically acceptable acids.

4,093,629

DERIVATIVES OF ANTIBIOTIC SUBSTANCE MILBEMYCIN AND PROCESSES THEREFOR

Michael H. Fisher, Bridgewater, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 11, 1977, Ser. No. 786,172
Int. Cl.² C07D *493/22*
U.S. Cl. 260—326.34 **4 Claims**

1. 13-Hydroxy milbemycin A_1, A_2, A_3, A_4, B_1, B_2, B_3, C_1 or C_2.

4. A process for the preparation of 13-hydroxy milbemycins A_1, A_2, A_3, A_4, B_1, B_2, B_3, C_1 or C_2 which comprises:
(a) brominating the 13-unsubstituted milbemycins with N-bromosuccinimide;
(b) acetylating the 13-bromomilbemycins with an alkali metal acetate; and
(c) hydrolizing the 13-acetoxy milbemycins with aqueous alkali metal hydroxide.

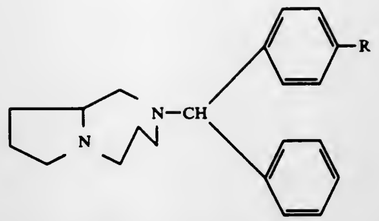
4,093,630

DIAZABICYCLOALKANE DERIVATIVES

Hideo Kato, Katsuyama; Tomoyasu Nishikawa, Ono, and Eiichi Koshinaka, Katsuyama, all of Japan, assignors to Hokuriku Pharmaceutical Co., Ltd., Fukui, Japan

Filed Jun. 8, 1977, Ser. No. 804,591
Claims priority, application Japan, Jun. 10, 1976, 51-67158
Int. Cl.² C07D *487/08*
U.S. Cl. 260—326.85 **5 Claims**

1. A diazabicycloalkane compound of the formula:



wherein R represents a hydrogen atom or a halogen atom selected from the group consisting of chlorine, bromine and iodine, and therapeutically acceptable acid addition salts thereof.

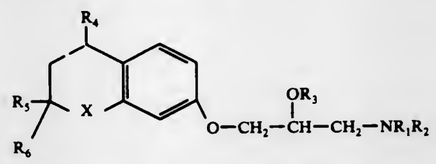
4,093,631

7-AMINOPROPOXY CHROMANE AND CHROMENES

Derek Victor Gardner, Bishop Stortford, England, assignor to Beecham Group Limited, United Kingdom

Filed Jun. 1, 1976, Ser. No. 691,865
Claims priority, application United Kingdom, Jun. 3, 1975, 24005/75
Int. Cl.² C07D *311/02;* A61K *31/35*
U.S. Cl. 260—345.2 **45 Claims**

1. A compound of the formula (I):



or a pharmaceutically acceptable salt thereof wherein R_1 is hydrogen, alkyl of 1 to 4 carbon atoms or benzyl; R_2 is hydrogen, alkyl of 1 to 4 carbon atoms or benzyl; R_3 is hydrogen, alkyl 1 to 4 carbon atoms or acyl of 1 to 4 carbon atoms; R_4 is naphthyl, phenyl unsubstituted or substituted by 1 or 2 substituents selected from the group consisting of fluorine, chlorine, bromine, methoxyl, benzyloxyl, trifluoromethyl, methyl, cyano, nitro, acetoxyl, amino, methylamino, ethylamino, dimethylamino, diethylamino, acetamido, hydroxyl, methoxycarbonyl, ethoxycarbonyl, carboxamido, sulphonamido, carboxy, trifluoromethylthio, trifluoromethoxyl, methylsulphonyl, trifluoromethylsulphonyl and methylthio; R_5 is hydrogen or alkyl of 1 to 4 carbon atoms; R_6 is hydrogen or alkyl of 1 to 4 carbon atoms; X is oxygen and the dotted line represents a single or double bond.

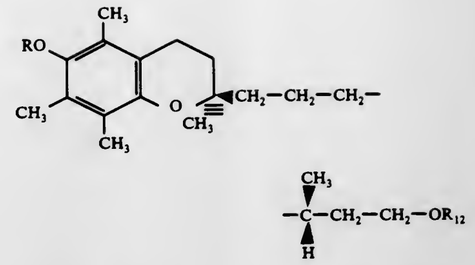
4,093,632

6(6-SUBSTITUTED-2,5,7,8-TETRAMETHYL-2-CHROMANYL)-3-METHYL HEXANOL DERIVATIVES

Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 638,382, Dec. 8, 1975, Pat. No. 4,029,678, which is a continuation-in-part of Ser. No. 544,153, Jan. 27, 1975, Pat. No. 4,000,169. This application Feb. 22, 1977, Ser. No. 770,542
Int. Cl.² C07D *311/72*
U.S. Cl. 260—345.5 **2 Claims**

1. A compound of the formula



wherein R is lower alkanoyl, benzyl, benzhydryl or trityl; R_{12} is hydrogen or taken together with its attached oxygen atom forms a leaving group.

4,093,633

PROCESS FOR PREPARING TETRAHYDROFURAN

Yasuo Tanabe; Jun Toriya; Masato Sato, and Ken Shiraga, all of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Jan. 28, 1977, Ser. No. 763,506
Claims priority, application Japan, Feb. 4, 1976, 51-11078
Int. Cl.² C07D *307/08*
U.S. Cl. 260—346.11 **10 Claims**

1. A process for preparing tetrahydrofuran by the dehydrocyclization reaction of 1,4-butanediol in the presence of an acid catalyst, consisting essentially of;
(a) supplying 1,4-butanediol and a non-volatile acid catalyst to a reaction zone,
(b) reacting said butanediol and said catalyst at a temperature between above the boiling point of an azeotropic mixture of water and tetrahydrofuran and below the boiling point of 1,4-butanediol,
(c) continuously removing a vapor mixture of water and tetrahydrofuran from said reaction zone,
(d) supplying said vapor mixtures to a first distillation column maintained under a pressure lower than that in said reaction zone and in the range of from atmospheric pressure to 3 kg/cm^2 gauge,
(e) distilling a first azeotropic mixture of water and tetrahydrofuran to form a first distillate,
(f) supplying said first distillate to a second distillation column maintained under a pressure higher than that in said first distillation column by 3 to 20 kg/cm^2 gauge,
(g) distilling a second azeotropic mixture of water and tetrahydrofuran from the top of said second distillation column to form a second distillate,
(h) recycling said second distillate to said first distillation column,
(i) supplying a substantially water-free-bottom of said second distillation column to a third distillation column maintained under atmospheric pressure or a pressure slightly higher than atmospheric pressure,
(j) recycling the bottom of said third distillation column into said reaction zone, and
(k) obtaining tetrahydrofuran from the top of said third distillation column.

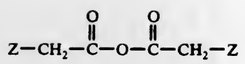
4,093,634

ANHYDRIDES OF CARBOXYMETHYLOXYSUCCINIC ACID

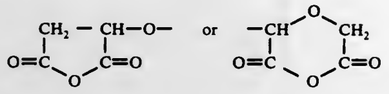
Vincent Lamberti, Upper Saddle River, and Eddie Nelson Gutierrez, Fort Lee, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed May 16, 1977, Ser. No. 797,226
Int. Cl.² C07D *307/60*
U.S. Cl. 260—346.74 **1 Claim**

1. A mixture of carboxymethyloxysuccinic anhydrides consisting essentially of species of the formulae:



wherein Z is independently



4,093,635

PREPARATION OF MALEIC ANHYDRIDE FROM FOUR-CARBON HYDROCARBONS

Noel J. Bremer, Kent; James F. White, Akron, and Ernest C. Milberger, Solon, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 19, 1976, Ser. No. 733,740
Int. Cl.² C07D 307/60
U.S. Cl. 260—346.75 **9 Claims**

1. In a process for the preparation of maleic anhydride by the oxidation of n-butane, n-butenes, 1,3-butadiene or mixture thereof with molecular oxygen in the vapor phase at a reaction temperature of about 250° C to 600° C in the presence of a catalyst, the improvement comprising using as a catalyst a catalyst which is free of iron, cobalt, nickel, an alkali metal and an alkaline earth metal, said catalyst having the formula

$$Mo_{12}P_aBi_bCu_cCl_dO_f$$

wherein
a, *b* and *c* are numbers from 0.001-10;
d is from 0.001-5;
and *f* is a positive number of oxygens required to satisfy the valence states of the other elements present.

9. In a process for the preparation of maleic anhydride by the oxidation of 1,3-butadiene with molecular oxygen in the vapor phase at a reaction temperature of about 250° C to 600° C in the presence of a catalyst, the improvement comprising using as a catalyst a catalyst which is free of iron, cobalt, nickel, an alkali metal and an alkaline earth metal, said catalyst having the formula

$$Mo_{12}P_aBi_bCu_cX_dO_f$$

wherein
X is a halogen selected from the group consisting of chlorine, bromine or iodine; and
wherein
a, *b* and *c* are numbers from 0.001-10;
d is from 0.001-5;
and *f* is a positive number of oxygens required to satisfy the valence states of the other elements present.

4,093,636

EPOXIDATION OF OLEFINIC COMPOUNDS

Pierre-Etienne Bost, Thiais, and Michel Costantini, Lyons, both of France, assignors to Rhone - Poulenc Industries, Paris, France

Continuation-in-part of Ser. No. 479,262, Jun. 13, 1974, abandoned. This application Feb. 14, 1977, Ser. No. 768,630
Claims priority, application France, Jun. 14, 1973, 73 21666
Int. Cl.² C07D 301/20
U.S. Cl. 260—348.29 **53 Claims**

1. Process for the catalytic epoxidation of an olefinic compound in the liquid phase which comprises treating the compound with an organic hydroperoxide in the liquid phase in the presence of a tin catalyst of the formula:

$$RR'SnCl_2 \qquad (I)$$

in which:
R is a wholly aliphatic or cycloaliphatic or aromatic, or mixed aliphatic/aromatic, aliphatic/cycloaliphatic or cycloaliphatic/aromatic, linear or branched, saturated or unsaturated monovalent hydrocarbon radical containing at most 20 carbon atoms, and
R′ is selected from the group consisting of chlorine and monovalent organic radicals of the formula:

$$R'' - Y \qquad (II)$$

in which:
Y represents an oxygen atom, or a (—O—O—) group, or a carbonyloxy group (—CO—O—), the radical R″ being attached to the carbon atom of (—CO—O—),
R″ is as defined under R and may be identical or different to R.

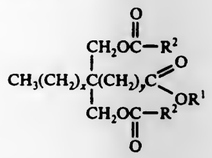
4,093,637

ALKYL 9,9(10,10)-BIS(ACYLOXYMETHYL)OCTADECANOATES AS PRIMARY PLASTICIZERS FOR POLYVINYLCHLORIDE

William R. Miller, and Everett H. Pryde, both of Peoria, Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 31, 1977, Ser. No. 764,113
Int. Cl.² C09F 5/00
U.S. Cl. 260—405 **14 Claims**

1. A method of preparing a primary plasticizer for polyvinylchloride comprising the following steps:
a. providing a compound selected from the group consisting of 9(10)-formylstearic acid and 9(10)-formylstearic acid alkyl esters;
b. converting said compound from step (a) to 9,9(10,10)-bis(hdroxymethyl)octadecanoic acid (BHMOA) by reaction with formaldehyde in the presence of base;
c. esterifying the acid from the preceeding step by reaction with a C_1-C_8 straight or branched alkyl alcohol;
d. acylating the ester from the preceeding step with a suitable acylating agent to yield the primary plasticizers having the general structure:



where
R^1 = C_1-C_8 Straight or branched alkyl;
R^2 = C_1-C_4 straight or branched alkyl or halogen-substituted alkyl;
x = 7 or 8; and
y = 7 or 8 with the proviso that $x + y = 15$; and
e. recovering said primary plasticizers prepared in step (d).

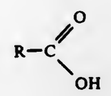
4,093,638

SIMULTANEOUS PREPARATION OF ORGANIC ACID CHLORIDES AND TRICHLOROACRYLOYL CHLORIDE AND PRODUCT

Francois Muller, Saint-Auban, France, assignor to Produits Chimiques Pechiney-Saint-Gobain, France

Continuation of Ser. No. 764,944, Oct. 3, 1968, abandoned. This application Mar. 25, 1974, Ser. No. 454,114
Claims priority, application France, Oct. 23, 1967, 67.125439
Int. Cl.² C09F 7/00; C11C 3/00
U.S. Cl. 260—408 **17 Claims**

1. A process for the simultaneous preparation of organic acid chlorides and trichloroacryloyl chloride comprising the steps of contacting hexachloropropene and an organic acid having the formula



in which R is selected from the group consisting of alkyl, chloroalkyl, alkenyl, phenyl, chlorophenyl, methoxyphenyl and cycloalkyl, heating the mixture to a temperature within the range of 50° to 220° C, and separating the trichloroalkylolyl chloride and the organic acid chlorides produced.

12. The process as claimed in claim 1 in which the organic acid component is selected from the group consisting of butyryl chloride, caproyl chloride, capryloyl chloride, lauroyl chloride, benzoyl chloride, p-chlorobenzoyl chloride and anisoyl chloride.

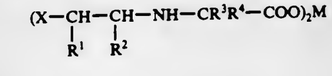
4,093,639

METAL SALTS OF N-HYDROXYALKYLATED OR N-AMINOALKYLATED BRANCHED α-AMINOACIDS

Jürgen Habermeier, Pfeffingen, Switzerland, and Godwin Berner, Furth, Odenwald, Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,238
Claims priority, application Switzerland, Apr. 14, 1975, 4719/75
Int. Cl.² C07F 3/06
U.S. Cl. 260—429.9 **11 Claims**

1. A metal complex, of an N-hydroxyalkylated or N-aminoalkylated, branched α-aminocarboxylic acid and a divalent metal cation, of the formula



wherein
X represents hydroxyl or aminomethyl,
R^1 represents hydrogen, alkyl of 1 to 4 carbon atoms or phenyl,
R^2 represents hydrogen, and with the proviso that when R^1 is alkyl of 1 to 4 carbon atoms or phenyl, R^2 also represents alkyl of 1 to 4 carbon atoms, or
R^1 and R^2 together represent tetramethylene,
R^3 and R^4 are the same or different and each independently represents alkyl of 1 to 4 carbon atoms, cycloalkyl of 5 or 6 carbon atoms, phenyl or benzyl, or said phenyl or said benzyl substituted by alkyl of 1 to 12 carbon atoms, or together R^3 and R^4 represent tetramethylene or pentamethylene, and
M represents a divalent copper, zinc, cobalt or nickel cation.

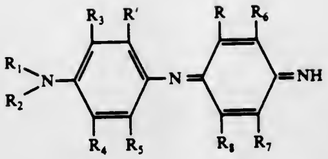
4,093,640

DOUBLE SALT OF ZINC CHLORIDE AND INDAMINES

Gregoire Kalopissis, Paris; Andree Bugaut, Boulogne-sur-Seine, and Francoise Estradier, Paris, all of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 553,067, Feb. 25, 1975, Pat. No. 3,984,443, which is a division of Ser. No. 387,613, Aug. 13, 1973, Pat. No. 3,876,368, and a continuation-in-part of Ser. No. 180,455, Sep. 14, 1971, abandoned. This application Jun. 23, 1976, Ser. No. 699,207
Claims priority, application France, Sep. 18, 1970, 70.34041
Int. Cl.² C07F 3/06
U.S. Cl. 260—429.9 **1 Claim**

1. A double salt of zinc chloride and an indamine having the formula



wherein R and R′ each independently represent a member selected from the group consisting of hydrogen, lower alkyl having 1-4 carbon atoms, lower alkoxy having 1-4 carbon atoms, amino, acetylamino and hydroxy with the proviso that one, but not both of R and R′ is said amino, acetylamino or hydroxy; R_1 and R_2 each independently represent a member selected from the group consisting of lower alkyl having 1-4 carbon atoms and lower alkyl having 1-4 carbon atoms and substituted with a member selected from the group consisting of hydroxy, acetylamino, carbamyl, benzoylamino and alkyl sulfonamido wherein the alkyl moiety has 1-4 carbon atoms, and
R_3, R_4, R_5, R_6, R_7 and R_8 each independently represent a member selected from the group consisting of hydrogen, lower alkyl having 1-4 carbon atoms and lower alkoxy having 1-4 carbon atoms.

4,093,641

PREPARATION OF SILYLALKYL ESTERS OF PHOSPHORUS

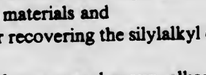
Edwin P. Plueddemann, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Sep. 26, 1977, Ser. No. 836,451
Int. Cl.² C07F 7/08
U.S. Cl. 260—448.2 E **11 Claims**

1. A method of preparing silylalkyl esters of phosphorus which consists of
(I) contacting and reacting silanes of the general formula
(i) $R_3SiR'X$ or siloxanes of the general formula
(ii) $Me_3SiO(Me_2SiO)_n(XR'MeSiO)_mSiMe_3$ or
(iii) oligomers of the general formula

$$(XR'Me_2Si)_2O(Me_2SiO)_n$$

with phosphorus compounds having the general formula



at a temperature in the range of 100° C. to 300° C. in the presence of amines or phosphines capable of forming onium compounds with the reactants, for a period of time sufficient to remove all by-produced organic halide, and then
(II) subjecting the resulting reaction mixture to a reduced pressure and an elevated temperature to remove undesired low boiling materials and
(III) thereafter recovering the silylalkyl ester of phosphorus, wherein
R is an alkyl group, aryl group, alkoxy group containing 1-4 carbon atoms, an R′X group or a siloxy group;
X is chlorine, bromine or iodine;
m is a positive integer;
n is 0 or a positive integer;
Me is methyl;
R′ is a divalent alkyl or aralkyl radical;
R″ is methyl, ethyl, phenyl, halobenzyl or —OR‴ wherein R‴ is methyl or phenyl.

4,093,642

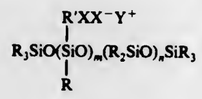
SURFACE ACTIVE SILICONES

Curtis L. Schilling, Croton-on-Hudson; Bela Prokai, Mahopac, and Bernard Kanner, West Nyack, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,879
Int. Cl.[2] C07F 7/10
U.S. Cl. 544—106 10 Claims

1. A composition of matter selected from the group consisting of:

A. Siloxane compounds having the structural formula:



where

(1) R is a monovalent hydrocarbon group having from 1 to 18 carbon atoms,

(2) R′ is a divalent organic group whose valences are provided by carbon atoms and having from 1 to 18 carbon atoms,

(3) XX^- is a divalent anionic group covalently bonded to R′ and ionically bonded to Y^+,

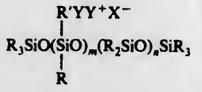
(4) Y^+ is a monovalent cation that has at least 8 carbon atoms and that is derived from a cationic surfactant having a halogen counterion by removal of the halogen and that is free of ionically-bonded hydrogen,

(5) *m* is an integer having a value from 1 to 100,

(6) *n* is an integer having a value from 0 to 200,

(7) the ratio of *m* to (*n*+2) being from 0.1 to 20, and

B. Siloxane compounds having the structural formula:



where

(1) R is a monovalent hydrocarbon group having from 1 to 18 carbon atoms,

(2) R′ is a divalent organic group whose valences are provided by carbon atoms and having from 1 to 18 carbon atoms,

(3) YY^+ is a divalent cationic group that is free of ionically-bonded hydrogen and that is covalently bonded to R′ and ionically bonded to X^-,

(4) X^- is a monovalent anion that has at least 8 carbon atoms and that is derived from an anionic surfactant having a monovalent metal counterion by removal of the metal,

(5) *m* is an integer having an average value from 1 to 100,

(6) *n* is an integer having a value from 0 to 200, and

(7) the ratio of *m* to (*n*+2) being from 0.1 to 20.

4,093,643

CATALYTIC FORMATION OF HYDROCARBONS FROM CO, H_2 MIXTURES AND PROCESS FOR MAINTAINING CATALYTIC ACTIVITY

M. Albert Vannice, Boalsburg, Pa., and Robert L. Garten, Summit, N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 644,561, Dec. 24, 1975, abandoned. This application Feb. 17, 1977, Ser. No. 769,574
Int. Cl.[2] C07C 1/04
U.S. Cl. 260—449 M 9 Claims

1. A process to produce low molecular weight organic compounds comprising substantially methane, said process consisting of the steps of passing a mixture of CO and H_2 over palladium supported on an acidic metal oxide selected from the group consisting of alumina and hydrogen-y-zeolite wherein the palladium metal particle size is maintained at less than 100 A by running at a reactor bed temperature of less than 350° C, at a pressure ranging from 1 to 500 atmospheres and at a GHSV of from 1200–4600 hr^{-1}

4,093,644

3-((4-(2,2-DICHLORO-1,1-DIFLUOROETHOXY)-2-METHYL-5-NITROPHENYL)SULFONYL)-2-PROPENENITRILE

George A. Burk, Bay City; Christian T. Goralski, and Craig E. Mixan, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 22, 1977, Ser. No. 770,862
Int. Cl.[2] C07C 121/75
U.S. Cl. 260—465 F 1 Claim

1. The compound 3-((4-(2,2-dichloro-1,1-difluoroethoxy)-2-methyl-5-nitrophenyl)sulfonyl)-2-propenenitrile.

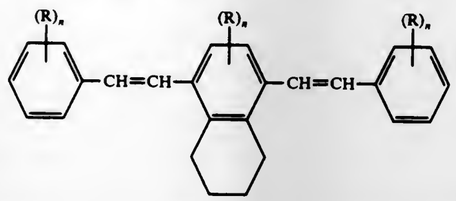
4,093,645

STYRYL-TETRAHYDRONAPHTHYL DERIVATIVES

Hugh Davidson, Castleford; Keith Trevor Johnson, Pontefract; Brian Ernest Leggeter, Wakefield, and Anthony John Moore, Leeds, all of England, assignors to Hickson & Welch Limited, Castleford, England

Division of Ser. No. 382,168, Jul. 24, 1973, Pat. No. 3,940,437. This application Nov. 28, 1975, Ser. No. 636,089
Claims priority, application United Kingdom, Jul. 26, 1972, 35033/72
Int. Cl.[2] C07C 143/24; D06P 1/00; D21H 1/46; C09K 11/00; C07C 143/42
U.S. Cl. 260—505 C 2 Claims

1. A compound of the formula



wherein R is $—SO_3H$, halo or alkoxy of 1–6 carbon atoms and *n* is 0, 1 or 2, at least one $—SO_3H$ group being present; or a salt thereof.

4,093,646

REDUCTION OF NITRO COMPOUNDS WITH AQUEOUS SOLUTIONS OF A FORMATE

Peter Bamfield; Peter Michael Quan, and Trevor James Smith, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Jul. 28, 1975, Ser. No. 599,345
Claims priority, application United Kingdom, Aug. 19, 1974, 36361/74
Int. Cl.[2] C07C 143/56, 143/64, 101/72
U.S. Cl. 260—508 10 Claims

1. In a process for the reduction of aromatic nitro compounds selected from the class consisting of nitronaphthalene monosulphonic acids, nitronaphthalene disulphonic acids, nitronaphthalene trisulphonic acids, nitrobenzene sulphonic acids, dinitrobenzene sulphonic acids, dinitromesitylene sulphonic acid, substituted nitrobenzene sulphonic acids in which the substituents are selected from acetylamino, methyl, methoxy, hydroxy, aminoanilino, methoxyanilino, cyclohexylamino and β-(nitro-sulphophenyl)-ethenyl, and substituted nitrobenzene carboxylic acids in which the substituents are selected from acetylamino, hydroxy and sulphonic acid, the improvement which consists of treatment of said compounds with an aqueous solution of a formate in the presence of a hydrogenation catalyst based on platinum, palladium or ruthenium at a temperature up to the boiling point and at a pH of 2 to 12.

4,093,647

PROCESS FOR OXYCARBONYLATION OF AROMATIC HYDROCARBONS

John J. van Venrooy, Media, Pa., assignor to Suntech, Inc., Wayne, Pa.

Filed Aug. 22, 1977, Ser. No. 826,291
Int. Cl.[2] C07C 63/00
U.S. Cl. 260—515 R 8 Claims

1. A process for making aromatic carboxylic acids which comprises reacting at a temperature of from about 0° to about 100° C, an aromatic hydrocarbon of the benzene series having at least one ring carbon atom attached to a hydrogen atom with carbon monoxide at a pressure of from about 10 to about 500 psi in a solvent selected from the group consisting of lower aliphatic carboxylic acids, their anhydrides and mixtures thereof and in the presence of a mixture comprising thallium trifluoroacetate and a divalent palladium salt in a mole ratio of thallium to palladium of from about 10:1 to about 1000:1.

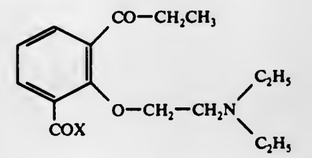
4,093,648

THERAPEUTICALLY ACTIVE BENZOIC ACID DERIVATIVES AND A PROCESS FOR PREPARING THEM

Enrico Sianesi, Milan; Giuseppe Bonola, San Donato Milan; Ivo Setnikar, Milan, and Maria José Magistretti, Milan, all of Italy, assignors to Recordati S.A. Chemical and Pharmaceutical Company, Chiasso, Switzerland

Filed Jun. 17, 1976, Ser. No. 697,154
Claims priority, application Italy, Jul. 16, 1975, 25448 A/75
Int. Cl.[2] C07C 65/08; A01N 9/24
U.S. Cl. 260—519 3 Claims

1. Therapeutically active 2- and 3-substituted benzoic acid derivative having the general formula



wherein X is OH and its alkaline or alkaline earth metal salts.

4,093,649

LIQUID PHASE OXIDATION OF UNSATURATED ALDEHYDES TO CARBOXYLIC ACIDS WITH A BISMUTH CATALYST

Jar-lin Kao, Cherry Hill, N.J., and John Joseph Leonard, Springfield, Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 7, 1977, Ser. No. 766,112
Int. Cl.[2] C07C 51/32, 57/04, 57/06, 57/08
U.S. Cl. 260—530 N 10 Claims

1. A process for the liquid phase oxidation of an α,β-unsaturated aliphatic aldehyde containing from 3 to 6 carbon atoms in an inert solvent solution to the corresponding unsaturated aliphatic carboxylic acid which comprises contacting said aldehyde with oxygen or an oxygen-containing gas at a temperature of from about 0° C. to 100° C. and a pressure between about atmospheric and 1500 psig in the presence of from about 0.00001 to 0.5 mole of an inorganic or organic bismuth salt catalyst selected from the group consisting of bismuth chloride, bismuth bromide, bismuth iodide, bismuth oxide, bismuth nitrate, bismuth sulfate, bismuth carbonate, bismuth pentafluoride, bismuth pentoxide, bismuth citrate, bismuth oleate, bismuth tartrate, bismuth phenate and bismuth ammonium citrate or mixtures thereof, per mole of said aldehyde to effect an in situ decomposition of intermediate peroxide compounds formed during the oxidation to said unsaturated aliphatic carboxylic acid.

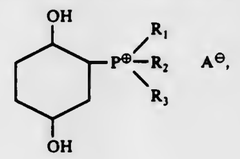
4,093,650

PROCESS FOR PREPARING TRIHYDROCARBYL (2,5-DIHYDROXYPHENYL) PHOSPHONIUM SALTS

George A. Doorakian, Bedford, and Lawrence G. Duquette, Maynard, both of Mass., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 23, 1976, Ser. No. 679,617
Int. Cl.[2] C07C 53/08
U.S. Cl. 260—539 A 12 Claims

1. A process for preparing a compound of the formula



wherein:

R_1, R_2 and R_3 are each independently hydrocarbyl or inertly-substituted hydrocarbyl groups of from 1 to about 20 carbon atoms, and $A^\ominus$ is an inert neutralizing anion; said process comprising reacting by contacting in essentially stoichiometric amounts

(a) a phosphine of the formula $R_1R_2R_3P$, wherein R_1-R_3 have the aforesaid meanings,

(b) p-benzoquinone, and

(c) a protic acid of the formula $H^\oplus A^\ominus$,

wherein $A^\ominus$ has the aforesaid meaning in a liquid reaction medium consisting essentially of a lower alkanol of from 1 to 4 carbon atoms, 1,2-ethylene glycol, 1,2-propylene glycol, diethylene glycol, dipropylene glycol, triethylene glycol, tripropylene glycol, or a lower alkyl (C_1-C_4) ether of said glycols, or a mixture thereof.

4,093,651

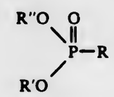
PRODUCTION OF PERCHLOROMETHYL MERCAPTAN

Milton L. Honig, Bronx; Carl C. Greco, Garnersville, and Edward N. Walsh, New City, all of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

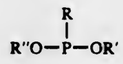
Filed Dec. 22, 1976, Ser. No. 753,119
Int. Cl.[2] C07C 145/00
U.S. Cl. 260—543 H 4 Claims

1. In a method for producing perchloromethyl mercaptan via the catalytic reaction of chlorine and carbon disulfide, the improvement which comprises:

(1) contacting the reactants with additive selected from the group consisting of phosphonates, phosphonites, or blends thereof, where said phosphonates are represented by the formula:



wherein R independently is hydrogen, hydrocarbyl, chlorine, or substituted hydrocarbyl; R′ and R″ independently are R but not chlorine; however, R, R′, and R″ cannot all be hydrogen simultaneously; and where said phosphonites are represented by the formula:



wherein R independently is hydrogen, hydrocarbyl, chlorine,

or substituted hydrocarbyl; R′ and R″ independently are R but not chlorine or hydrogen; said additives being added to the reaction system in amounts which vary in the range of from about 0.01 to about 10% by weight of the carbon disulfide feed, and

(2) using an activated carbon catalyst inert to said additive.

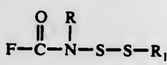
4,093,652

PROCESS FOR THE PREPARATION OF THIOSULFENYL CARBAMOYL HALIDES

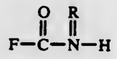
Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jul. 8, 1974, Ser. No. 486,631
Int. Cl.² C07C *125/00, 125/03*
U.S. Cl. 260—544 C **8 Claims**

1. A method of preparing a compound of the formula:



which comprises reacting a compound of the formula:



with a compound of the formula:

in the presence of an organic base, wherein:

X is chlorine

R is lower alkyl, lower alkenyl or lower alkyl substituted with one or more chloro, bromo, fluoro, nitro or cyano substituents or phenyl or lower phenyl alkyl either unsubstituted or substituted with one or more chloro, bromo, fluoro, nitro, cyano, lower alkyl, lower haloalkyl or lower alkoxy substituents.

R_1 is alkyl, alkenyl, cycloalkyl, bicycloalkyl, cycloalkenyl or bicycloalkenyl or lower phenylalkyl or phenyl; or lower phenylalkyl or phenyl substituted with one or more chloro, bromo, fluoro, nitro, cyano, lower alkyl, lower alkoxy, lower haloalkyl, lower alkanoyl or carbamoyl substituents.

4,093,653

PROCESS FOR THE PREPARATION OF OPTICALLY ACTIVE PHENYL GLYCINE AMIDE

Wilhelmus H. J. Boesten, Sittard, Netherlands, assignor to Stamicarbon, B.V., Geleen, Netherlands

Filed Dec. 8, 1976, Ser. No. 748,399
Claims priority, application Netherlands, Dec. 9, 1975, 7514300
The portion of the term of this patent subsequent to Jul. 19, 1994, has been disclaimed.
Int. Cl.² C07C *103/28*
U.S. Cl. 260—558 A **11 Claims**

1. A process for isolating an optically active form of phenyl glycine amide, from a mixture of D- and L-phenyl glycine amide, consisting essentially of:

preparing a mixture of D- and L-phenyl glycine amide and an optically active acid of the class consisting of 2-pyrrolidone-5-carboxylic acid and N-acetyl phenylglycine;

precipitating one antipode as diastereoisomer salt from a solution of said mixture;

and racemizing in a solvent the other antipode from the mixture in the presence of a ketone selected from the class consisting of acetone, methylethyl ketone and cyclohexanone and said optically active acid.

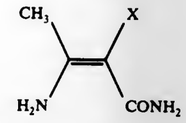
4,093,654

PRODUCTION OF PYRIDOXINE INTERMEDIATES FROM DIKETENE

David Llewellyn Coffen, Glen Ridge, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 31, 1977, Ser. No. 783,240
Int. Cl.² C07C *103/133*
U.S. Cl. 260—561 A **2 Claims**

1. A compound of the formula:



wherein X is halogen.

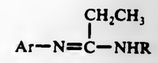
4,093,655

AMIDINE RICE HERBICIDES

George A. Miller, Glenside, and Marvin H. Fleischfresser, Warrington, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

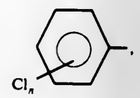
Filed Apr. 13, 1970, Ser. No. 28,038
Int. Cl.² C07C *123/00*
U.S. Cl. 260—564 RF **6 Claims**

1. A compound of the formula



wherein R is a (C_6-C_{10})alkyl group, and

Ar is a group of the formula



wherein *n* is 1 to 3.

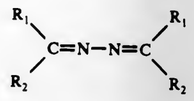
4,093,656

PROCESS FOR MAKING AZINES

Jean Pierre Schirmann, Oullins; Jean Combroux, Mornant, and Serge Yvon Delavarenne, Francheville-le-Haut, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Sep. 10, 1976, Ser. No. 722,232
Claims priority, application France, Sep. 17, 1975, 75 28457
Int. Cl.² C07C *119/00*
U.S. Cl. 260—566 B **42 Claims**

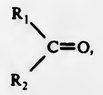
1. In the process for the production of azines of the general formula:



where R_1 and R_2 which may be identical or different represent hydrogen, linear alkyl groups having from 1 to 12 carbon atoms, branched alkyl or cycloalkyl groups having from 3 to 12 carbon atoms, or hydrocarbon having from 6 to 12 carbon atoms containing an aromatic ring or together R_1 and R_2 represent linear or branched alkylene having from 3 to 11 carbon atoms, these radicals being non-substituted or substituted by at least 1 chlorine, bromine or fluorine atom or by a nitro, hydroxy or alkoxy,

which process comprises reacting hydrogen peroxide in the

liquid phase with ammonia in the presence of a carbonyl compound, aldehyde or ketone, of general formula:



with R_1 and R_2 being defined as above, an amide of a monocarboxylic acid, the ionization constant of which is below 5×10^{-5} or an amide of a dicarboxylic acid at least one of the acid groups of which has an ionization constant below 5×10^{-5}, and a catalyst selected from the phosphates, phosphites, phosphonates, polyphosphates, pyrophosphates, arsenates, bicarbonates, antimonates, stannates or sulphonates of ammonium or alkali metals or the saturated alkyl (C_1-C_5) esters thereof,

the improvement comprising carrying out the process in the presence of the ammonium salt of the said monocarboxylic or dicarboxylic acid.

4,093,657

PROCESS FOR PREPARING MONOMER OF BILE ACID SEQUESTRANT POLYMER

Erwin F. Schoenewaldt, Watchung, and Paul Sohar, Warren, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 9, 1976, Ser. No. 675,375
Int. Cl.² C07C *85/04*
U.S. Cl. 260—567.6 M **3 Claims**

1. The process which comprises reacting together approximately equimolar quantities of N,N-bis(3-chloropropyl)methylamine and trimethylamine, said reaction being conducted in the presence of a polar organic solvent under conditions of time and temperature such that monoquaternization is substantially complete and diquaternization is minimized, thereby forming 3-[N-(3-chloropropyl) methylamine]-N,N,N-trimethyl-propan-1-aminium chloride.

4,093,658

PROCESS FOR THE PREPARATION OF AROMATIC POLYAMINES

Hartmut Knöfel, Leverkusen, and Günther Ellendt, Krefeld, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 29, 1975, Ser. No. 645,041
Claims priority, application Germany, Jan. 9, 1975, 2500574
Int. Cl.² C07C *85/24*
U.S. Cl. 260—570 D **10 Claims**

1. A process for the preparation of multinuclear aromatic polyamines comprising:

(A) condensing an aromatic amine with formaldehyde in the presence of a hydrophobic solvent and in the absence of an acid catalyst to produce a precondensate mixture containing the corresponding N,N′-disubstituted aminals,

(B) removing substantially all the water from said precondensate mixture to produce a first organic phase,

(C) mixing said first organic phase with an aqueous solution containing an acid catalyst thereby producing a first two-phase mixture,

(D) subjecting said first two-phase mixture to a first rearrangement reaction wherein a mono-N-substituted aminal is formed and wherein a second two-phase mixture is produced,

(E) separating said second two-phase mixture into a second organic phase and a first aqueous phase,

(F) subjecting said first aqueous phase to at least one more rearrangement reaction thereby producing an aqueous condensation mixture containing said aromatic polyamines,

(G) extracting said aqueous condensation mixture with a hydrophobic solvent to provide a solvent phase and a second aqueous phase comprising an aqueous solution containing the acid catalyst as an amine salt of said aromatic amine, and of said aromatic polyamines,

(H) recovering aromatic polyamines from said solvent phase, and

(I) returning said second aqueous phase to step (C).

6. A process for the preparation of multi-nuclear aromatic polyamines comprising:

(A) condensing an aromatic amine with formaldehyde in the presence of a hydrophobic solvent and in the absence of an acid catalyst to produce a precondensate mixture,

(B) removing substantially all the water from said precondensate mixture to produce a first organic phase,

(C) mixing said first organic phase with an aqueous solution containing an acid catalyst thereby producing a two-phase mixture,

(D) subjecting said two phase mixture to a rearrangement reaction thereby producing a second organic phase and an aqueous condensation mixture phase containing said aromatic polyamines,

(E) separating said second organic phase and said aqueous condensation mixture phase,

(F) extracting said aqueous condensation mixture phase with a hydrophobic solvent to provide a solvent phase and an aqueous phase comprising an aqueous solution containing the acid catalyst as an amine salt of said aromatic amine, and of said aromatic polyamines,

(G) recovering aromatic polyamines from said solvent phase, and

(H) returning said aqueous phase to step (C).

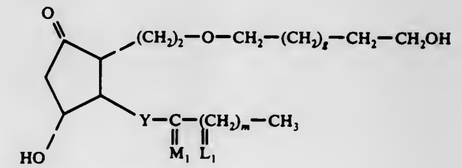
4,093,659

2-DECARBOXY-2-HYDROXYMETHYL-5-OXA-PGE$_1$ COMPOUNDS

Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

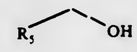
Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419.
This application Mar. 17, 1977, Ser. No. 778,645
Int. Cl.² C07C *49/46, 49/80, 49/82*
U.S. Cl. 260—586 R **22 Claims**

1. A prostaglandin analog of the formula

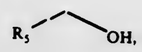


wherein Y is trans—CH=CH—;

wherein M_1 is

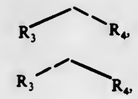


or

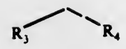


wherein R_5 is hydrogen or methyl;

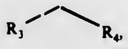
wherein L_1 is



or a mixture of



and



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is 1, 2, or 3; and
wherein *m* is 1 to 5, inclusive.

4,093,660

PROCESS FOR RECOVERING A DIALKYLARYLKETONE

Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Mar. 30, 1977, Ser. No. 782,630
Int. Cl.² C07C *49/76*
U.S. Cl. 260—591 **25 Claims**

1. A process for recovering a dialkylarylketone selected from the group consisting of 3,4,3',4'-tetramethylbenzophenone and 4,4'-dimethylbenzophenone from an oily mixture contaminated largely with the corresponding 1,1-diaryl-2-nitroethylene, said oily mixture having been obtained as a result of the nitric acid oxidation of a diarylalkane selected from the group consisting of 1,1-bis(p-tolyl)ethane and 1,1-bis(3,4-dimethylphenyl) ethane at a temperature below about 140° C. which comprises heating said mixture to a temperature of at least about 140° until solidification occurs and then recovering the dialkylarylketone as a solid from a solvent solution of the 1,1-diaryl-2-nitroethylene, said solvent being selected from the group consisting of alcohols, esters, ethers and hydrocarbons.

4,093,661

CATALYTIC DECARBONYLATION OF ESTERS

David John Trecker, South Charleston, and Michael Ray Sandner, Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jun. 4, 1973, Ser. No. 366,440
Int. Cl.² C07C *45/20, 47/02*
U.S. Cl. 260—595 **22 Claims**

1. A vapor phase process for the production of aldehydes and ketones, which comprises contacting a lower alkanoate ester of a primary or secondary alcohol, in the vapor phase, with an oxide of a metal selected from the group consisting of nickel, chromium, zinc, copper, manganese, cobalt, iron, titanium, and vanadium, at an elevated temperature and for a period of time sufficient to produce the aldehyde or ketone corresponding to said alcohol.

4,093,662

ETHER PHOSPHORIC ACID COMPOUND

Robert Harry Edwards; Thomas Alan Williams, and Kenneth Hall, all of Cumbria, England, assignors to Albright & Wilson Limited, Oldbury, England

Division of Ser. No. 437,891, Jan. 30, 1974, Pat. No. 3,947,499. This application Oct. 15, 1975, Ser. No. 622,485
Claims priority, application United Kingdom, Feb. 7, 1973, 06056/73
Int. Cl.² C07D *105/02, 107/02;* C01B *25/16, 25/26*
U.S. Cl. 260—606.5 P **2 Claims**

1. The solid anhydrous crystalline compound of formula $H_3PO_4 \cdot [(CH_3)_2CH]_2O$.

4,093,663

NOVEL ONIUM SURFACTANTS

Robert F. Harris, Midland, Mich., and Earl H. Wagener, Concord, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 15, 1973, Ser. No. 416,308
Int. Cl.² C07C *149/46*
U.S. Cl. 260—607 B **15 Claims**

1. An onium surfactant corresponding to the formula X $\{(CH_2CH_2O)_mCH_2—R—CHR'—Q^+A^-\}_n$ wherein X is a hydrophobic n-valent radical derived by the removal of n-atoms of active hydrogen from an organic compound and corresponding to the hydrophobic portion of a nonionic surfactant having a hydrophilic-lipophilic-balance of from 1 to about 30 and having the structural formula X $\{(CH_2CH_2O)_mH\}_n$; *m* is an integer of at least 1 and is the same in each of the above formulas; R is a divalent aromatic hydrocarbon radical of from 6 to about 14 carbon atoms, the chain length of which can be interrupted by oxygen or sulfur atoms; R' is hydrogen or methyl and is methyl only when R is m- or p-phenylene; Q^+ is a tertiary atom of sulfur; A^- is a compatible anion; and *n* is an integer of from 1 1 to 5 and is the same in each of the above formulas.

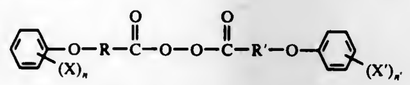
4,093,664

BIS HALOGENATED PHENOXYALKANOATES AND THE METHOD OF MAKING SAME

Lawrence H. Nash, Fort Lauderdale, Fla., assignor to Kalo Laboratories, Inc., Kansas City, Mo.

Filed Oct. 18, 1976, Ser. No. 733,178
Int. Cl.² C07C *179/14;* A01N *9/00*
U.S. Cl. 260—610 D **4 Claims**

1. A compound useful as a plant growth regulator and having the formula:



wherein X and X' are each chlorine atoms, R and R' are each alkyl groups containing from 1 to 4 carbon atoms and n and n' each have a value from 1 to 5.

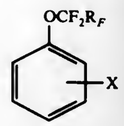
4,093,665

ARYL PERFLUORO-ALKYL ETHERS AND METHOD OF PRODUCING THEM

Viktor Mikhailovich Belous, ulitsa Ujutnaya, 5-a, kv. 3., Odessa; Lev Moiseevich Yagupolsky, ulitsa Ivana Kudri, 41, kv. 48., Kiev; Ljubov Antonovna Alexeeva, Proletarsky bulvar, 41, kv. 28., Odessa; Sergei Vasilievich Sokolov, ulitsa 3 Internatsionala, 67, kv. 222., and Alexei Ivanovich Ponomarev, ulitsa Ziny Portnovoi, 21, Korpus 1, kv. 18., both of Leningrad, all of U.S.S.R.

Continuation of Ser. No. 628,237, Nov. 3, 1975, abandoned. This application Sep. 29, 1976, Ser. No. 728,598
Claims priority, application U.S.S.R., Nov. 1, 1974, 2071094
Int. Cl.² C07C *43/28, 41/00*
U.S. Cl. 260—612 D **2 Claims**

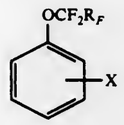
1. Aryl perfluoro-alkyl ethers of the formula



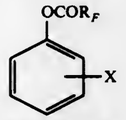
(I)

where
R_F= CF_3 or CF_2OCF_3, X = Br;
R_F= CF_2OCF_3, X = NO_2

2. A method of producing aryl perfluoro-alkyl ethers of the formula



where
R_F= CF_3, CF_2OCF_3, X = Br;
R_F= CF_2OCF_3, X = NO_2,
which comprises fluorinating of aryl esters of perfluorocarboxylic acids of the general formula



(II)

where R_F and X are as defined above, with sulphur tetrafluoride in an autoclave at a temperature of 25°–100° C in hydrogen fluoride solution with the concentration of the starting esters in hydrogen fluoride being 20–50%.

4,093,666

PROCESS FOR THE MANUFACTURE OF GLYCOL ETHER FORMALS

Hans-Jürgen Arpe, Fischbach, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt (Main), Germany

Continuation of Ser. No. 546,901, Feb. 4, 1975, abandoned. This application Nov. 12, 1976, Ser. No. 741,392
Claims priority, application Germany, Feb. 6, 1974, 2405633
Int. Cl.² C07C *41/00*
U.S. Cl. 260—615 A **10 Claims**

1. In a process for the production of an ethylene glycol monomethyl ether formal of the formula $[CH_3O(CH_2CH_2O)_n]_2CH_2$, wherein *n* is from 1 to 8, by reacting the corresponding ethylene glycol monomethyl ether with a 20 to 60% by weight aqueous formaldehyde solution in the presence of from 0.2 to 20% by weight, calculated on the ether, of an acid having a pK value of less than 4, the improvement which comprises reacting said ether and aqueous formaldehyde solution in the presence of a halohydrocarbon selected from the group consisting of dichloromethane, trichloromethane, tetrachloromethane, ethylene dichloride, 1,1,2-trichloroethane, 1,1,2-trichloro-trifluoroethane, tetrachloroethylene, isopropyl chloride, propyl chloride, propylene dichloride and butyl chloride, and distilling off water in a mixture comprising an azeotrope of water with said halohydrocarbon.

4,093,667

PREPARATION OF 4-N-HEXYLRESORCINOL

Charles Masterson Starks, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Mar. 14, 1977, Ser. No. 777,755
Int. Cl.² C07C *39/08*
U.S. Cl. 568—766 **9 Claims**

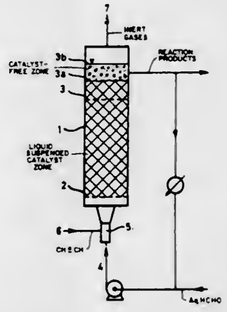
1. A process for the preparation of 4-n-hexylresorcinol comprising; a) preparing hexylresorcyl ethers by reacting recorcinol with a hexylating agent having the general formula 1-$C_6H_{13}X$ at a temperature of from about 25° C to about 175° C in the presence of a base selected from the group consisting of the oxides, hydroxides, or carbonates of sodium, potassium, calcium, ammonium, magnesium, tetra-alkyl ammonium, berium, and lithium, and b) heating the reaction product of (a) to a temperature of from about 150° C to about 300° C in the presence of an acidic catalyst to yield 4-n-hexylresorcinol, wherein X is selected from the group consisting of Cl^-, Br^-, $CH_3SO_3^-$, $C_2H_5SO_3^-$, $C_2H_5OSO_3^-$, $CH_3OSO_3^-$, $ArSO_3^-$, and ONO_3^-or mixtures of these.

4,093,668

MANUFACTURE OF BUTYNEDIOL

Wolfgang Reiss, Ludwigshafen; Hans-Ingo Joschek, Mannheim; Rudolf Schnur, Frankenthal; Siegfried Winderl, Heidelberg-Wieblingen; Juergen Dehler, Ludwigshafen, and Herwig Hoffmann, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Germany

Filed Mar. 19, 1974, Ser. No. 452,565
Claims priority, application Germany, Mar. 24, 1973, 2314693
Int. Cl.² C07C *29/00*
U.S. Cl. 568—855 **4 Claims**



1. A continuous process for the manufacture of butynediol which comprises reacting acetylene and formaldehyde in a liquid medium containing particles of a metal acetylide on a catalyst support, said particles being suspended in the liquid medium, said particles having diameters in the range of 0.1 to 3 mm. and a macroscopic density of about 1.1 g/cm³, withdrawing liquid reaction product from the upper portion of said chamber, said liquid reaction product in said portion being substantially free of suspended catalyst particles, recycling a portion of said reaction product to the lower portion of said reaction chamber and supplying said recycled liquid reaction product into the lower portion of said chamber in admixture with fresh aqueous formaldehyde solution to form said liquid medium in said chamber, flowing said liquid medium upwardly through said reaction chamber at a liquid medium throughput of about 10 to 60 m³ per m² per hour and provide in the reaction chamber a liquid medium velocity sufficient to maintain said catalyst particles in a suspended state in the upwardly flowing liquid medium with the upper zone of said liquid medium being substantially free of catalyst particles, said liquid product being withdrawn from said substantially catalyst-free upper zone, and feeding gaseous acetylene into the lower portion of said chamber with the gaseous acetylene finely distributed in the liquid medium at a rate at which the acetylene is virtually completely consumed in the liquid medium in said chamber.

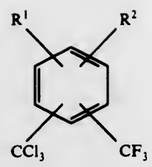
4,093,669

METHOD FOR PREPARING TRICHLOROMETHYL-TRIFLUOROMETHYL-BENZENES

Erich Klauke, Odenthal, and Gerhard Büttner, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 12, 1976, Ser. No. 731,479
Claims priority, application Germany, Nov. 3, 1975, 2548970
Int. Cl.² C07C *25/00*
U.S. Cl. 260—651 F **9 Claims**

1. A process for the preparation of a trichloromethyl-trifluoromethyl-benzene of the formula

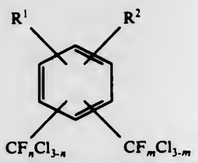


I

wherein

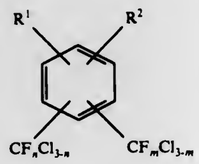
R^1 and R^2 are identical or different and represent hydrogen, fluorine or chlorine,

which comprises contacting at least one compound of the formula



II

selected from the group consisting of 1-fluorodichloromethyl-3-trichloromethyl-benzene, 1-fluorodichloromethyl-4-trichloromethyl-benzene, 1,3-bis-(fluorodichloromethyl)-benzene, 1,4-bis-(fluorodichloromethyl)-benzene, 2,4-bis-(fluorodichloromethyl)-chlorobenzene, 2,6-bis-(fluorodichloromethyl)-chlorobenzene, 2,5-bis-(fluorodichloromethyl)-chlorobenzene, 2,6-bis-(fluorodichloromethyl)-fluorobenzene, 2,4-bis-(fluorodichloromethyl-fluorobenzene, 2,5-bis-(fluorodichloromethyl)-1,4-dichlorobenzene, 1-fluorodichloromethyl-3-difluorochloromethylbenzene, 1-fluorodichloromethyl-4-difluorochloromethyl-benzene, 1,3-bis-(difluorochloromethyl)-benzene, 1,4-bis-(difluorochloromethyl)-benzene, 1,3-bis-(difluorochloromethyl)-5-chlorobenzene, 1,3-bis-(difluorochloromethyl)-5-bromobenzene, 1,4-bis-(difluorochloromethyl)-2-fluorobenzene, 1,4-bis-(difluorochloromethyl)-2-chlorobenzene, 1,3-bis-(difluorochloromethyl)-2-chlorobenzene, 1,4-bis-(difluorochloromethyl)-2,5-dichlorobenzene, 3-difluorochloromethyl-benzotrifluoride, 4-difluorochloromethyl-benzotrifluoride, 2-chloro-3-difluorochloromethyl-benzotrifluoride, 4-chloro-3-difluorochloromethylbenzotrifluoride, 4-bromo-3-difluorochloromethyl-benzotrifluoride and 2-fluoro-3-difluororochloromethyl-benzotrifluoride with a compound of the formula



II

wherein

R^1 and R^2 have the previously assigned significance,

said other compound also being selected from the group consisting of 1 -fluorodichloromethyl - 3 -trichloromethyl-benzene, 1-fluorodichloromethyl-4-trichloromethyl-benzene, 1,3-bis-(fluorodichloromethyl)-benzene, 1,4-bis-(fluorodichloromethyl)-benzene, 2,4-bis-(fluorodichloromethyl)-chlorobenzene, 2,6-bis-(fluorodichloromethyl)-chlorobenzene, 2,5-bis-(fluorodichloromethyl)-chlorobenzene, 2,6-bis-(fluorodichloromethyl)-fluorobenzene 2,4-bis-(fluorodichloromethyl)-fluorobenzene, 2,5-bis-(fluorodichloromethyl)-1,4-dichlorobenzene, 1-fluorodichloromethyl-3-difluorochloromethylbenzene, 1-fluorodichloromethyl-4-difluorochloromethyl-benzene, 1,3-bis-(difluorochloromethyl)-benzene 1,4-bis-(difluorochloromethyl)-benzenze, 1,3-bis-(difluorochloromethyl)-5-chlorobenzene, 1,3-bis-(difluorochloromethyl)-5-bromobenzene, 1,4-bis-(difluorochloromethyl)-2-fluorobenzene, 1,4-bis-(difluorochloromethyl)-2-chlorobenzene, 1,3-bis-(difluorochloromethyl)-2-chlorobenzene, 1,4-bis-(difluorochloromethyl)-2,5-dichlorobenzene, 3-difluorochloromethyl-benzotrifluoride, 4-difluorochloromethyl-benzotrifluoride, 2-chloro-3-difluorochloromethyl-benzotrifluoride, 4-chloro-3-difluorochloromethylbenzotrifluoride, 4-bromo-3-difluorochloromethyl-benzotrifluoride and 2-fluoro-3-difluorochloromethyl-benzotrifluoride in the presence of a halogen transfer catalyst.

4,093,670

PROCESS OF ISOMERIZING OLIGOMERS OF HEXAFLUOROPROPENE

Masahiro Ozawa, No. 1-6-8, Minami-dai, Kami-fukuoka City; Tadaaki Komatsu, No. 271-8, Fujikubo, Miyoshi-cho, Iruma-gun, Saitama Prefecture, and Kimiaki Matsuoka, No. 3-35-7, Kishi-machi, Kawagoe City, all of Japan

Filed Feb. 1, 1977, Ser. No. 764,652

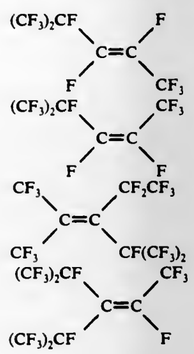
Claims priority, application Japan, Mar. 5, 1976, 51-23142

Int. Cl.² C07C *21/18*

U.S. Cl. 260—653.1 R **25 Claims**

1. A process of isomerizing oligomers of hexafluoropropene into a thermodynamically stable isomer, comprising the steps of:

preparing a mixture of non-protonic polar solvent, an alkali metal fluoride, a crown ether and at least one of the following dimers and trimers of hexafluoropropene;



(IIA),

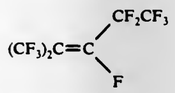
(IIA)$_c$

(IIIA)

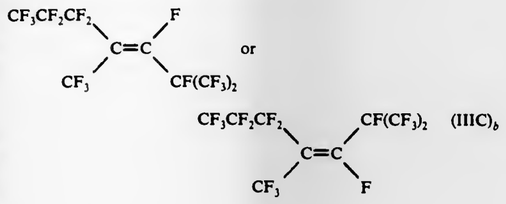
(IIIB)

and

heating the mixture at a temperature in the range from 20 to 150° C, whereby said dimers and trimers are isomerized respectively into a dimer having the formula (IIB)



and a trimer having the formula (IIIC)$_a$



(IIIC)$_b$

4,093,671

HYDROALKYLATION USING MULTI-METALLIC ZEOLITE CATALYST

Timothy P. Murtha; William A. Jones, and Ernest A. Zuech, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 22, 1976, Ser. No. 744,060

Int. Cl.² C07C *15/00*

U.S. Cl. 260—668 R **10 Claims**

1. A process for producing monocycloalkyl aromatic hydrocarbon and alkyl-substituted monocycloalkyl aromatic hydrocarbon which comprises:

contacting a monocyclic aromatic hydrocarbon or an alkyl substituted monocyclic aromatic hydrocarbon under hydroalkylation conditions and in the presence of hydrogen with a catalyst consisting essentially of at least one platinum compound supported on a calcined, acidic, nickel and rare earth-treated crystalline zeolite selected from the group consisting of Type X and Type Y Zeolite.

4,093,672

PROCESS FOR THE RECOVERY OF ULTRAHIGH PURITY INDENE

Yun Chung Sun, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 691,129, May 28, 1976, abandoned. This application Jul. 15, 1977, Ser. No. 815,965

Int. Cl.² C07C *7/14*

U.S. Cl. 260—674 R **6 Claims**

1. A process for the recovery of indene in ultrahigh purity from liquid hydrocarbon mixtures, the mixtures comprising indene and organic impurities of which at least one has a melt point above indene and of which at least one has a melt point below indene, the mixture having a co-crystallization temperature at least about 5° C lower than the freezing temperature of the mixture, the process comprising:

(a) crystallizing a substantial portion of the indene from the mixture to form a slurry composed of mother liquor and crystals of indene; and

(b) separating the impurities from the resulting crystals by passing a non-reactive gas at a temperature in the range between the freezing and the co-crystallization temperatures of the mixture over the surfaces of the crystals to remove said impurities while maintaining the crystals and the residual mother liquor at a temperature in the range between the freezing and the co-crystallization temperature of the mixture.

4,093,673

COATING COMPOSITIONS COMPOSED OF HYDROXYFUNCTIONAL POLYMERS OR COPOLYMERS AND ALKOXYSILANES

Wen-Hsuan Chang; Rostyslaw Dowbenko, both of Gibsonia; Marvis E. Hartman, Pittsburgh, and Samuel Porter, Jr., Tarentum, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 14, 1974, Ser. No. 523,781

Int. Cl.² C08L *43/04, 67/02, 75/06, 75/08*

U.S. Cl. 260—824 EP **35 Claims**

1. A resinous coating composition comprising a blend of a hydroxyfunctional acrylic polymer with:

(A) from about 10 percent to about 50 percent by weight of polymer solids of an organoalkoxysilane crosslinking agent selected from the group consisting of Cellosolve silicate and phenyltrimethoxysilane; and

(B) from about 0.1 percent to about 2.0 percent by weight of polymer solids of a cure accelerating catalyst.

4,093,674

POWDER COATING COMPOSITION

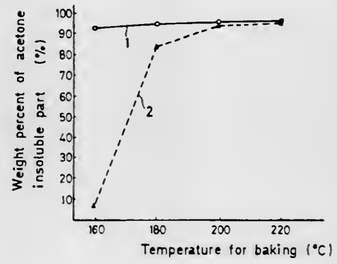
Koichi Tsutsui, Kyoto, and Yoshio Eguchie, Ikeda, both of Japan, assignors to Nippon Paint Co., Ltd., Japan

Continuation of Ser. No. 420,463, Nov. 30, 1973, abandoned. This application Nov. 5, 1975, Ser. No. 629,131

Claims priority, application Japan, Nov. 30, 1972, 47-120535

Int. Cl.² C08L *67/02, 29/04;* C08G *18/62, 18/42*

U.S. Cl. 260—830 P **10 Claims**



1. A substantially non-sticky, melt blended, thermosetting powder coating composition in the dry state which comprises at least one solid resin having a glass transition temperature of from 5° to 150° C and an OH content of 1×10^{-4} to 45×10^{-4} g equivalent/g, the OH group liberating an active hydrogen atom, and at least one polyisocyanate compound which is solid at room temperature and having at least two isocyanate groups in each molecule in an average weight ratio of about 99 : 1 to 30 : 70 and a molar proportion of the active hydrogen in the former to the isocyanate group in the latter of 1 : 0.2 - 2.

4,093,675

HIGH PEEL STRENGTH ADHESIVES

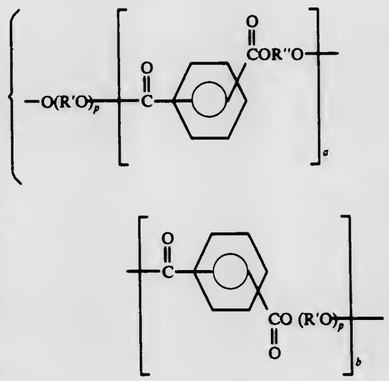
Ralph M. Schure, Darien; John H. Kooi, La Grange, and John M. Brown, Chicago, all of Ill., assignors to Unitech Chemical Inc., Chicago, Ill.

Filed Jun. 26, 1975, Ser. No. 590,622

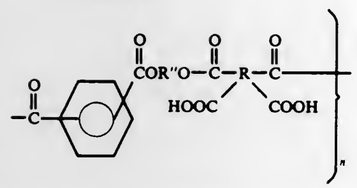
Int. Cl.² C08L *67/02, 63/00, 61/06, 61/20*

U.S. Cl. 260—835 **9 Claims**

1. A high peel strength thermoset adhesive composition which comprises a cured carboxylated poly(ester/ether) block copolymer in which one of the blocks is itself a block copolymer, said cured copolymer being a hydroxy-terminated poly(ester/ether) block copolymer that has been extended and carboxylated with a tetracarboxylic dianhydride and that has been cured with an epoxy resin, a phenol-aldehyde resin, or an amine-aldehyde resin, said carboxylated poly(ester/ether) block copolymer being represented by the formula:



-continued



wherein R is alkyl, cycloalkyl or aryl, *n* is a number from about 1 to about 2, R′ and R″ are alkyl, alicyclic, acyclic, aryl, or arylalkyl, *p* is a number from 2.4 to 136.0, *a* is a number such that the repeating ester block segment within its set of brackets makes up about 70 to about 20 weight % of the polymer, and *b* is a number such that the repeating ether block segment within its set of brackets makes up about 30 to about 80 weight % of the polymer, said cured carboxylated poly(ester/ether) block copolymer having both a crosslinked carboxy acid network constituent from said epoxy or aldehyde resin and a linear flexible block copolymer constituent and being a creep-resistent, high-tensile thermoset adhesive that simultaneously exhibits high peel strength.

4,093,676

ANTISTATIC AGENTS FOR MELT-FORMED POLYMERS

Eugene A. Weipert, Allen Park, and Charles F. Deck, Trenton, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Sep. 1, 1971, Ser. No. 177,136
Int. Cl.[2] C08L *77/00, 75/00, 67/00*
U.S. Cl. 260—857 PG **23 Claims**

1. A method for rendering a melt-formed polyamide and polyester polymer antistatic comprising:

incorporating with the polymer between about 1% and about 10% by weight based on the weight of said polymer of a polymeric composition which comprises the reaction product of

(a) a hydrogen reactive compound selected from the group consisting of

(1) organic polyisocyanate and

(2) alkyl ester of a dicarboxylic acid with

(b) an alkylene oxide adduct of a nitrogen-containing compound having a molecular weight of at least 1,000, the ratio of (a) to (b) being from about 0.5:1.0 to 1.0:1.0.

4,093,677

MACROMOLECULAR MATERIALS SUITABLE FOR FORMING ANTITHROMBOGENIC PROSTHESIS AND ARTIFICIAL ORGANS AND PROCESS FOR PREPARING SAME

Paolo Ferruti, V. le Cassiodoro 24, Milan; Ezio Martuscelli, Vico Monteroduni 8; Fernando Riva, Via Trigergola 2, both of Naples, and Luciano Provenzale, P.za dei Servili 2, Rome, all of Italy

Continuation-in-part of Ser. No. 694,394, Jun. 6, 1976, abandoned. This application Mar. 17, 1977, Ser. No. 778,454
Claims priority, application Italy, Jun. 10, 1975, 24245 A/75
Int. Cl.[2] C08L *77/00, 75/00*
U.S. Cl. 260—858 **16 Claims**

1. Macromolecular materials suitable for forming antithrombogenic artificial organs characterized in that they are block polymers comprising polyamidic-aminic blocks and blocks from conventional polyaddition or polycondensation polymers.

4,093,678

CRYSTALLINE CO-AND TERPOLYMERS OF ETHYLENE AND ACENAPHTHYLENE

Frederick Eugene Bailey, and Werner Claus von Dohlen, both of Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,385
Int. Cl.[2] C08L *23/08*
U.S. Cl. 260—897 A **4 Claims**

1. A compatible blend of high density polyethylene and a highly crystalline non-uniform copolymer comprised of ethylene and acenaphthylene; said blend having a higher use temperature than said high density polyethylene by itself, said non-uniform copolymer being one which lacks the independent beta thermomechanical transition in the torsion pendulum loss modulus curve possessed by known copolymers of ethylene and which is produced by the process of initiating polymerization of a reaction mixture of acenaphthalene; ethylene; a Ziegler or Natta catalyst; and an organic solvent, and thereafter continuously introducing ethylene monomer to the reaction mixture during the polymerization reaction.

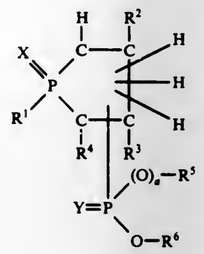
4,093,679

HYDROXYALKYL OR AMINOALKYL ESTERS OF PHOSPHOLANE PHOSPHONIC AND PHOSPHINIC ACIDS

Hans-Dieter Block, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 12, 1976, Ser. No. 741,576
Claims priority, application Germany, Nov. 21, 1975, 2552316
Int. Cl.[2] C07F *9/32, 9/40*
U.S. Cl. 260—927 R **2 Claims**

1. A hydroxyalkyl or aminoalkyl ester of a phospholane phosphonic or phosphinic acid of the formula



in which

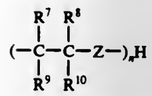
a is 0 or 1,

R^1 is alkyl with 1 to 10 carbon atoms or aryl with up to 14 carbon atoms,

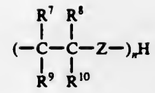
R^2, R^3 and R^4 each independently is alkyl with 1 to 4 carbon atoms, hydrogen, chlorine or bromine,

R^5 is alkyl with 1 to 8 carbon atoms and, where $a = 0$, optionally an aryl radical with up to 8

carbon atoms and, where $a = 1$, also optionally 1/m of an m-valent cation or a hydroxy alkylene or imino alkylene radical of the formula



R^6 is a hydroxy alkylene or imino alkylene radical of the formula



R^7 and R^8 each independently is hydrogen, alkyl with 1 to 6 carbon atoms, phenyl, alkenyl with 2 to 4 carbon atoms, chloromethyl, bromomethyl, hydroxy methyl or etherified or esterified hydroxy methyl, in addition to which R^7 and R^8 may together be an alkylene bridge of 2 to 4 carbon atoms to form a ring,

R^9 and R^{10} each independently is hydrogen or alkyl with 1 to 2 carbon atoms,

Z is oxygen or imino,

n is a number from 1 to 30, and

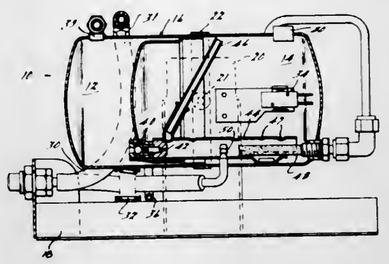
X and Y each independently is oxygen or sulphur.

4,093,680

PHOSPHORYLATED TERTIARY BUTYLATED PHENOL/PHENOL ESTER REACTION MIXTURES

Donald Richard Randell, and Wilfred Pickles, both of Stockport, England, assignors to Ciba-Geigy AG, Basel, Switzerland

Division of Ser. No. 586,756, Jun. 13, 1975, abandoned, which is a division of Ser. No. 370,455, Jun. 15, 1973, Pat. No. 3,919,158,
which is a continuation-in-part of Ser. No. 74,909, Sep. 23, 1970, abandoned, which is a division of Ser. No. 645,888, Jun. 14, 1967, Pat. No. 3,576,923, said Ser. No. 645,888. This application Jun. 16, 1976, Ser. No. 696,703
Claims priority, application United Kingdom, Jun. 18, 1966, 27316/66
The portion of the term of this patent subsequent to Mar. 2, 1988, has been disclaimed.
Int. Cl.[2] C07F *9/12*
U.S. Cl. 260—966 **3 Claims**



1. A phosphate ester composition consisting essentially of a phosphorylated tertiary butylated phenol/phenol ester mixture wherein the weight ratio of the tertiary butyl moiety to phenol moiety ranges from 0.10 to about 0.4, which ester is prepared by steps comprising:

(a) alkylating at a temperature of about 15° to 250° C in the presence of a Lewis acid or a Bronsted acid as a catalyst, phenol with isobutylene or diisobutylene to obtain a tertiary butylated phenol reaction mixture, and

(b) reacting said tertiary butylated phenol reaction mixture with a phosphorylating agent.

4,093,681

MOTORLESS CARBONATOR

Herman B. Castillo, Clawson, and Robert S. Mueller, Birmingham, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Dec. 13, 1976, Ser. No. 749,938
Int. Cl.[2] B01F *3/04*
U.S. Cl. 261—122 **5 Claims**

1. A carbonator for carbonating fluids comprising:

a housing defining a first fill chamber adapted to receive water and connected to a source of fresh water, and a second carbonation chamber;

fluid connection means having an inlet and outlet located within said housing, said inlet being in communication with the fill chamber and the outlet being in communication with said carbonation chamber, the connection means being adapted to transfer water from said fill chamber to said carbonation chamber;

means for supplying pressurized carbon dioxide to the fill chamber and to the carbonation chamber;

means cooperative with said carbon dioxide supply to maintain a pressure differential between the fill chamber and the carbonation chamber, the pressure differential means supplying carbon dioxide to the fill chamber at a first relatively high pressure and to the carbonation chamber at a second relatively low pressure;

a discharge port adapted to withdraw a carbon dioxide-water mixture from the carbonation chamber upon demand; and

means responsive to depletion of water in the fill chamber to vent the fill chamber to atmospheric pressure, thereby allowing fresh water to flow freely into the fill chamber filling the fill chamber to a predetermined level; and

means operative in response to filling of the fill chamber with water to the predetermined level to repressurize the fill chamber with carbon dioxide and stop filling.

4,093,682

PROCESS FOR THE PRODUCTION OF BLOCK-SHAPED FUEL ELEMENTS FOR HIGH TEMPERATURE REACTORS

Milan Hrovat, Rodenbach, and Lothar Rachor, Hanau, both of Germany, assignors to Hobeg Hochtemperaturreaktor - Brennelement GmbH, Hanau, Germany

Filed Feb. 14, 1977, Ser. No. 768,633
Claims priority, application Germany, Feb. 14, 1976, 2605975
Int. Cl.[2] G21C *3/38*
U.S. Cl. 264—0.5 **18 Claims**

1. In a process for the production of a hexagonally shaped block-fuel element for a gas cooled high temperature reactor by hot molding a granulated graphite material consisting essentially of a mixture of natural graphite, synthetic graphite and binder resin together with fissile and fertile coated fuel particles together with stearic acid as a lubricant to form molded blocks and wherein the blocks are subsequently heat treated and wherein the outer hexagonal shape of the block fuel element and the cooling gas channels are produced by molding, the improvement comprising incorporated into the matrix powder prior to molding an organic compound having a very low vapor pressure at room temperature and a vapor pressure of about 760 Torr at the molding temperature, of not over 200° C, said organic compound again being liquifiable under moderate pressure at the molding temperature.

4,093,683

METHOD FOR MAKING PIPE FITTING COVERINGS

Alfred H. Harley, Greensboro, N.C., assignor to Speed-Line Manufacturing Company, Inc., Greensboro, N.C.

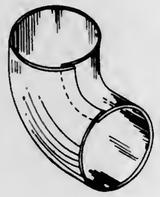
Continuation-in-part of Ser. No. 311,965, Dec. 5, 1972, abandoned.This application May 19, 1976, Ser. No. 687,657 .
Int. Cl.[2] B29C *17/02*
U.S. Cl. 264—25 **20 Claims**

1. A method of forming a cover for a pipe fitting having a complex configuration in the same complex configuration as the pipe fitting to be covered, said cover including an opening extending between the ends of the cover whereby the cover may be spread apart and placed in position surrounding the pipe fitting, said method comprising the steps of:

(a) forming a single piece of thermoplastic material into a preform having an intermediate non-planar configuration different from the complex configuration of the fitting to be covered,

(b) folding the preform into the final complex configuration of the fitting to be covered,
(c) heating the said material while retaining it in its final complex configuration, and
(d) cooling the said material to set it in its final complex configuration while retaining the said material in its said final complex configuration.

10. A method of making a pipe fitting cover from thermoplastic polymeric material as a single piece integral structure having a complex shape conforming to the configuration of the fitting to be covered, said pipe fitting cover including an opening extending between the ends of the pipe fitting cover whereby the pipe fitting cover may be spread apart and placed in position surrounding the pipe fitting, said method comprising the steps of:



(a) providing a sheet of thermoplastic polymeric material,
(b) forming said sheet of material into a preform having an intermediate configuration different from the configuration of the fitting to be covered,
(c) folding the preform from its intermediate configuration to its final configuration conforming to the configuration of the fitting to be covered,
(d) heating the preform above the softening temperature of the thermoplastic material while retaining the preform in its final configuration, and
(e) cooling the preform below the softening temperature of the thermoplastic material while retaining the preform in its final configuration to set it in the configuration of the fitting to be covered.

4,093,684

SOLID SOLDERABLE POLYURETHANE DATA SIGNAL RECORDING MEDIUM

Leo P. Parts, Dayton, and Edgar E. Hardy, Kettering, both of Ohio, assignors to Monsanto Research Corporation, St. Louis, Mo.

Continuation of Ser. No. 409,515, Oct. 25, 1973, abandoned, which is a continuation of Ser. No. 864,160, Oct. 6, 1969, abandoned. This application Jul. 21, 1977, Ser. No. 817,894

Int. Cl.² H05B *7/00*; C08G *18/80*; C08F *2/46*; G01D *5/48*

U.S. Cl. 264—25 **1 Claim**

1. In a process for data signal recording in which a recording medium is impinged upon by an intensity-modulated, focused laser beam to form a hole in at least one layer of the recording medium, the improvement wherein said one layer of the recording medium comprises a solid, solderable polyurethane polymer having the capability for undergoing residue free depolymerization when subjected to laser irradiation, said solderable polyurethane polymer being the heat-cured reaction product of a blocked polyisocyanate adduct having from 11.5 to 13.5 percent available NCO, and a polyester having a hydroxyl number of from 270 to 420 and an acid number of from 4.0 to 9.0, and the beam is of sufficient intensity to effect said depolymerization.

4,093,685

PRODUCTION OF SURFACING UNITS

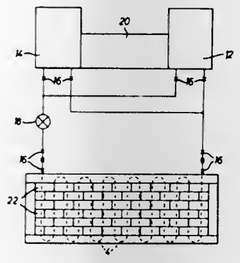
Frederick George Cond, Sutton Coldfield, England, assignor to Ibstock Building Products Limited, Leicester, England

Filed Dec. 14, 1976, Ser. No. 750,399

Claims priority, application United Kingdom, Dec. 23, 1975, 52687/75

Int. Cl.² B05B *3/00*

U.S. Cl. 264—28 **7 Claims**



1. A method of producing surfacing units composed of a plurality of elements of brick, tile, stone or the like connected by fillets of suitable mortar or other adhesive, comprising the steps of procuring a base member comprising a surface covering of deformable saturable material, saturating said material with a freezable liquid consisting essentially of water, laying the elements thereon in a spaced desired pattern such that the deformable material projects into the gaps between adjacent elements in the shape of a ridge, said base member being provided with freezing means whereby the water in said material is caused to freeze and thereby secure the elements in place, while the mortar or adhesive is applied to the gaps between edge surfaces of adjacent elements above the deformable material in the gaps, subsequent thawing of the water releasing the surfacing unit from the base member.

4,093,686

SHEET MATERIALS

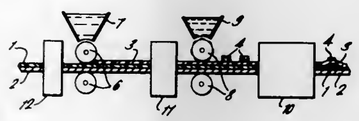
Rodney J. Briston, Blackburn, and Rodger G. Canning, Chorley, both of England, assignors to Reed International Limited, London, England

Continuation of Ser. No. 592,039, Jun. 30, 1975, abandoned. This application Sep. 14, 1976, Ser. No. 723,304

Claims priority, application United Kingdom, Jul. 1, 1974, 29145/74

Int. Cl.² B29D *27/00*

U.S. Cl. 264—45.5 **11 Claims**



1. A process for the manufacture of a differentially expanded resinous cellular sheet, comprising incorporating a heat decomposable blowing agent in a thermoplastic resinous composition; forming a sheet from said resinous composition; applying a lacquer, wherein at least part of the solvent phase of said lacquer is an organic solvent having an affinity for said resinous composition, to the surface of said resinous sheet containing said blowing agent and allowing said treated sheet to at least partially dry; applying a printing ink composition containing a kicker which depresses the decomposition temperature of said blowing agent to portions of said treated surface; and uniformly heating said treated sheet for a time and at a temperature so that those portions of the sheet which received an application of printing ink composition expand to a greater extent than those portions which did not receive an application of printing ink composition to produce said differentially expanded sheet.

4,093,687

HOT PRESSING OF SILICON NITRIDE USING MAGNESIUM SILICIDE

Charles D. Greskovich, Schenectady, and Chester R. O'Clair, Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 3, 1977, Ser. No. 756,083

Int. Cl.² C04B *35/58, 35/64*

U.S. Cl. 264—65 **4 Claims**

1. A method of producing a hot-pressed polycrystalline silicon nitride body having a density of at least 80% of the theoretical density of silicon nitride and which retains at least about 75% of its room temperature mechanical properties at elevated temperatures ranging up to at least 1350° C in air which consists essentially of providing at least a significantly homogeneous powder dispersion having an average particle size which is submicron of silicon nitride and magnesium silicide, and based on the total composition of the starting silicon nitride powder said silicon nitride powder containing up to about 0.1% by weight of metallic impurities which react with SiO_2 or Si and O_2 to form low melting intergranular silicate glassy phase, up to about 3% by weight of oxygen, up to about 4% by weight of elemental silicon, and up to about 1% by weight of halogen, said magnesium silicide being used in an amount ranging from about 0.5% by weight to about 3% by weight based on the amount of silicon nitride, and hot-pressing said dispersion in an atmosphere of nitrogen at a temperature ranging from about 1600° C to about 1850° C under a pressure of at least about 2000 psi, said body being at least substantially free of an intergranular silicate glassy phase at its grain boundaries.

4,093,688

METHOD OF MAKING MANGANESE-ZINC FERRITE

Arthur Withop, and Roger Emil Travagli, both of San Jose, Calif., assignors to Memorex Corporation, Santa Clara, Calif.

Filed Aug. 25, 1975, Ser. No. 607,211

Int. Cl.² F27B *9/04*

U.S. Cl. 264—65 **3 Claims**

1. A method of producing a low porosity manganese-zinc ferrite body with high permeability and induction comprising the steps of:
(a) heating an isostatically-pressed body comprising Fe_2O_3, MnO and ZnO within a temperature range of about 1180°–1230° C in a vacuum environment of 50 to 200 microns pressure for a period of time of about 3 to 5 hours:
(b) heating the body within a temperature range of about 1180°–1230° C for at least 18 hours in an atmosphere having an oxygen partial pressure of about 0.2% to 0.4% oxygen, by volume, at atmospheric pressures;
(c) cooling the body to a temperature in the range of about 880°–920° C in said oxygen partial pressure atmosphere;
(d) then soaking the body at a temperature in the range of about 880° to 920° C in an atmosphere having less than 0.02% oxygen, by volume, for at least 18 hours; and
(e) cooling the body to less than 400° C in an atmosphere of less than 0.02% oxygen.

4,093,689

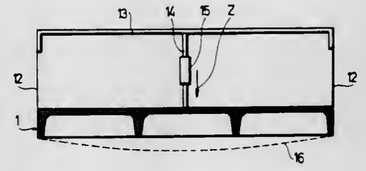
PROCESS FOR PRODUCING REINFORCED CONCRETE BUILDING UNITS, ESPECIALLY FLOOR PANELS HAVING SMOOTH SURFACES AND COFFER-LIKE INNER HOLES, AND FORMWORK ESPECIALLY FOR CARRYING OUT THE PROCESS

György Mayer; János Györi; Mihály Rikker; Antal Bánfai, and Ervin Eszenyi, all of Pecs, Hungary, assignors to Licencia Talalmanyokat Ertekesito Vallalat, Budapest, Hungary

Filed Mar. 14, 1974, Ser. No. 451,199

Int. Cl.² B28B *1/08*

U.S. Cl. 264—71 **2 Claims**



1. A process for the production of compressive prestressed reinforced concrete building units having smooth opposite surfaces and coffer-like inner holes, comprising connecting a mat of steel rods to the edges of ribs which are secured to a flat panel, pouring a layer of concrete onto a horizontal form plate the size of said panel, immersing said mat and rib edges in said concrete, vibrating said plate and panel to consolidate the concrete around the rods of said mat, prestressing said unit by flexing both said panel and said plate to the same upwardly concave curvature prior to hardening of said concrete, and then removing said plate and releasing the flexing of said panel after the concrete has hardened.

4,093,690

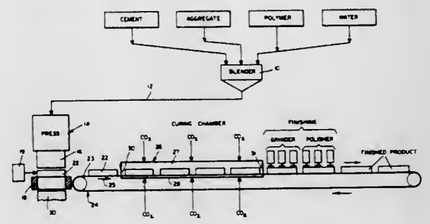
METHOD FOR THE MANUFACTURE OF CONCRETE AND LIKE PRODUCTS

John A. Murray, Norristown, Pa., assignor to U.S. Terrazzo Panels, Inc., Bryn Mawr, Pa.

Continuation of Ser. No. 534,203, Dec. 19, 1974, abandoned, which is a continuation of Ser. No. 336,362, Feb. 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 106,364, Jan. 14, 1971, abandoned. This application Oct. 26, 1976, Ser. No. 735,502

Int. Cl.² C04B *15/14*

U.S. Cl. 264—82 **13 Claims**



1. A method of rapidly manufacturing concrete or like products having an advanced state of cure comprising the steps of blending together a calcareous cementitious binder, an aggregate, the binder being present in a percentage of about 6–100, based upon total of binder plus aggregate; vinyl acetate-dibutyl maleate copolymer and water to form a mix, wherein the percentage by weight of water does not exceed about 10%, wherein the weight of vinyl acetate-dibutyl maleate copolymer in the mix is within the range of about 1% to about 2% based on the solids content of the mix, compressing the mixture under sufficient pressure to maintain the mixture in a predeter-

mined shape upon removal of the shape relative to the mold, moving said shape in a predetermined direction and exposing the shape to a preignition in an ambient atmosphere containing admixed carbon dioxide moving counter-current to said shape, subsequently subjecting said shape to an atmosphere consisting essentially of carbon dioxide gas containing minor amounts of air by moving the shape through a chamber, simultaneously feeding carbon dioxide gas to the chamber during the movement of the shape therein, maintaining the pressure within the chamber at substantially atmospheric pressure, continuing the feed to cause an exothermic temperature rise in the shape of at least 20° to 40° F in less than about 5 minutes, and subjecting the shape to further amounts of carbon dioxide after its emergence from the exit end of said chamber.

9. In a method of rapidly manufacturing concrete or like products having an advanced state of cure comprising a sufficiently low moisture cementitious mix to maintain its shape after molding into a shape and during subsequent curing, said mix comprising water and a vinyl acetate - dibutyl maleate copolymer, wherein the weight of vinyl acetate - dibutyl maleate in the mix is within the range of about 1% to 2% based on weight of solids of the mix, the percentage by weight of water not exceeding 10%, the steps which comprise molding the mixture into a predetermined shape by compressing the mixture under sufficient pressure to maintain the mixture in the predetermind shape upon removal of the shape relative to the mold, moving the shape in a predetermined direction, exposing the shape while it is so moving to preignition in an atmosphere containing a controlled amount of carbon dioxide which is moving countercurrent to the movement of said shape, then exposing said shape to an atmosphere of carbon dioxide gas admixed with minor amounts of air by moving the shape through a chamber the inner surfaces of which are substantially non-metallic, the height of the chamber being about 1.025 to about 4 times the height of the shape, but not exceeding the height of the shape by more than about 4½ inches, simultaneously feeding carbon dioxide gas to the chamber during the movement of the shape therein, maintaining the pressure, and continuing the feed to cause an exothermic temperature rise throughout the shape of at least 20° F - 40° F in less than about 5 minutes.

11. The method of treating a mix having concrete forming characteristics or the like for facilitating the curing thereof comprising the steps of adding water and a vinyl acetate-dibutyl maleate copolymer, said mix comprising water and a vinyl acetate-dibutyl maleate copolymer, wherein the weight of vinyl acetate-dibutyl maleate is within the range of about 1% to about 2% based on the weight of solids of the mix, the percentage by weight of water in the mix not exceeding 10%, molding the mix into a formed shape in a press, discharging the then formed shape from the press onto a conveying means, moving the shape along a predetermined path on the conveying means, exposing the shape, while it is so moving, to an atmosphere consisting essentially of carbon dioxide gas during its movement along said path, causing said carbon dioxide gas to permeate said conveying means to subject said shape to said gas by flow of said gas through said conveying means, said exposing step being performed by passing the shape through a yieldingly shielded chamber while simultaneously continuously delivering carbon dioxide gas to the chamber, causing a portion of said carbon dioxide gas to flow counter-currently thereby causing a preignition of said shape before its entry into said chamber, maintaining the gas pressure in said chamber at substantially atmospheric pressure, all as part of a continuous process.

4,093,691

METHOD FOR MANUFACTURING MOULDED PLASTIC ARTICLES

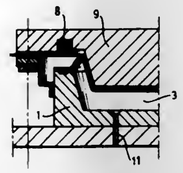
Gerardus Theodorus Joseph Eggen, 450, van der Helmstraat, Rotterdam 14, Netherlands

Continuation of Ser. No. 346,658, Mar. 30, 1973, abandoned. This application Jun. 23, 1975, Ser. No. 589,512

Claims priority, application Netherlands, Apr. 6, 1972, 7204628

Int. Cl.² B29C *17/04*

U.S. Cl. 264—93 **5 Claims**



1. A method for manufacturing articles from synthetic resin material by means of a mould, said method comprising heating pulverulent synthetic resin material to sintering temperature on a nonporous support to form a layer of said resin material on the support, mounting the support with the layer thereon on a mould, heating the material on the support to a softened deformable condition in which the surface of the material in contact with the non-porous surface of the support is rendered devoid of pores, attaching the softened deformable material to the mould along a circumferential region thereof, peeling the material from said support in the region where the material is attached to the mould by displacing the mould and support relative to one another in a direction away from one another to provide a free space around the circumference of the mould and applying a pressure medium via said free space against the material from the circumference thereof towards its center to continue the peeling of the material from the support and the introduction of the material into the mould to assume the form thereof.

4,093,692

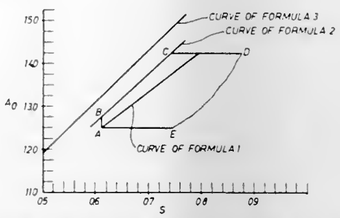
MELT EXTRUSION PROCESS

Donald R. J. Hill, Houston, Tex., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Mar. 21, 1977, Ser. No. 779,873

Int. Cl.² B29C *17/07*

U.S. Cl. 264—95 **6 Claims**



1. A process for preparing a melt extruded article of manufacture having improved physical properties which consists essentially of preparing such article by melt extruding a linear ethylene polymer at a shear stress of less than about 3×10^6 dynes/cm², said ethylene polymer being characterized by:

(a) having an annealed density of at least about 0.96 gms/ml,

(b) having melt flow properties such that the relationship between its slope parameter (s) and its apparent melt viscosity in poises at 1 sec.$^{-1}$(A_o) is defined by the formula:

$S \geqq 0.0830A_o - 0.442$

where S is the negative slope of the curve obtained from a plot of the natural logarithm of the polymer's apparent viscosity in poises versus the natural logarithm of the apparent shear rate in sec.$^{-1}$; and where A_o is the natural logarithm of the polymer's apparent viscosity in poises measured at 1 sec.$^{-1}$ at 190° C;

(c) having an A_o value in the range of about 12.0 to about 14.5; and

(d) having an S value in the range of about 0.61 to about 0.90.

4,093,693

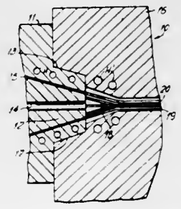
METHOD FOR MAKING COMPOSITE ARTICLES

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation of Ser. No. 848,949, Aug. 11, 1969, abandoned, which is a continuation-in-part of Ser. No. 267,262, Mar. 22, 1963, Pat. No. 3,461,197, which is a continuation-in-part of Ser. No. 651,749, Apr. 9, 1957, abandoned. This application Feb. 22, 1971, Ser. No. 117,743

Int. Cl.² B29F *3/10*

U.S. Cl. 264—171 **8 Claims**



1. A method for producing a composite article comprising:

rendering a first material in a molten condition,

passing said first material into a chamber in such molten condition,

rendering a second material having a melting point above that of said first material also in a molten condition,

continuously forcing said second material, while molten, through an orifice communicating with said chamber whereby said second material is formed to shape as it passes through said orifice and is passed continuously, as formed, into the molten first material in said chamber, and

surrounding said second material with said first material in said chamber and causing said first and second materials to completely fill said chamber,

transferring heat from said second material to said first material so as to solidify said second material within said first material, and

thereafter forming said first and second materials into an article by forcing said materials from said chamber and setting and solidifying said first material into a defined shape about said second material to provide a composite material composed of a discrete structural formation of said first and second materials.

4,093,694

METHOD OF MAKING A RUBBER ARTICLE HAVING A PERMANENT MARKING HEREIN

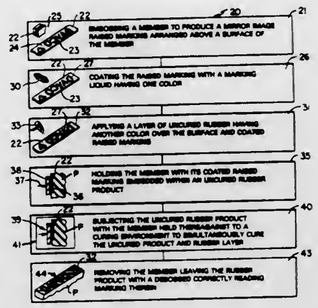
Vernon D. Browning, Waynesville, N.C., assignor to Dayco Corporation, Dayton, Ohio

Division of Ser. No. 559,280, Mar. 17, 1975, abandoned. This application Aug. 5, 1976, Ser. No. 711,922

Int. Cl.² B29D *3/00*; B29H *3/06*

U.S. Cl. 264—246 **12 Claims**

1. A method of permanently marking a rubber article comprising the steps of, embossing a member to produce a mirror image raised marking arranged above a surface of said member, coating said raised marking with a layer of marking material having one color, applying a layer of uncured rubber having another color over said surface and layer of raised marking material, embedding said member with its layer of raised marking material within an uncured rubber article and holding said member therein, subjecting said uncured rubber article with said member held therein to a curing environment to simultaneously cure said uncured article while curing said



layer of uncured rubber as an integral outer part of said rubber article and removing said member member leaving said rubber article with a unitary two-layer debossed correctly reading marking therein defined by said layer of marking material and rubber, said two layers helping to assure the permanence of said marking.

4,093,695

PROCESS FOR MAKING POLYMERIC FILM

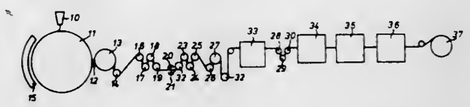
Wilfried André Heirbaut, Haasdonk, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Mar. 3, 1976, Ser. No. 663,497

Claims priority, application United Kingdom, Mar. 6, 1975, 9401/75

Int. Cl.² B29D *7/24*

U.S. Cl. 264—289 **11 Claims**

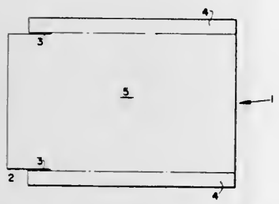


1. In a method for biaxially molecularly orienting polyester film comprising the successive steps of stretching a substantially amorphous crystallizable, polyester film in its longitudinal direction at a film temperature between the second order transition temperature of the film and about 50° C above said transition temperature, and stretching said film in the transverse direction at a temperature between the second order transition temperature of the film and about 50° C above said transition temperature, the improvement wherein between the longitudinal and transverse stretching steps the film is subjected to a thermal stress-relieving treatment by maintaining the film at a temperature which is between the second order transition temperature and about 30° C above said temperature and below the initial stretching temperature for a time insufficient to substantially increase its crystallinity, while the film is being subjected to a longitudinal tension which is not greater than half the longitudinal tension applied during the longitudinal stretching of the film.

4,093,696
METHOD OF MAKING A FLANGED FLUTED SELF-COILING SHEET

Edwin H. Land, Cambridge; Albert J. Bachelder, and Sarah H. Perry, both of Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 680,781, Apr. 27, 1976. This application Jun. 20, 1977, Ser. No. 808,050
Int. Cl.² B29D *15/00*
U.S. Cl. 264—295 **3 Claims**



1. The process of making a flexible film retaining imbibition chamber from a sheet of material that is curable to a springlike state, comprising the steps of folding the edges of said sheet of material over to form a pair of side flanges, fluting the side flanges and adjacent portions of the underlying sheet by deformation under sufficient stress to produce permanent departures alternately in opposite directions from the planes of the material, coiling the fluted material into a helix, and curing said coiled and fluted material.

4,093,697
PROCESS FOR RECOVERING MOLYBDENUM-99 FROM A MATRIX CONTAINING NEUTRON IRRADIATED FISSIONABLE MATERIALS AND FISSION PRODUCTS

Ali Sameh Abdel Hadi, Ettlingen-Schluttenbach; Peter-Michael Menzler, and Johann Reinhardt, both of Eggenstein-Leopoldshafen, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Mar. 14, 1977, Ser. No. 777,626
Claims priority, application Germany, Mar. 16, 1976, 2610947
Int. Cl.² C01G *39/00*
U.S. Cl. 423—2 **12 Claims**

1. Process for recovering molybdenum-99 from a matrix which has been irradiated with neutrons and contains fissionable materials and fission products, wherein the matrix is decomposed in an aqueous alkali hydroxide solution and the molybdenum-99 and part of the fission products are dissolved, the solution containing the molybdenum-99 is separated from a residue of particles containing at least actinides and lanthanides and is treated with thiocyanate ions to form a molybdenum complex comprising the steps of:

(a) conditioning the alkali solution containing molybdenum in the form of molybdate (MoO_4^{--}) with an iodine reduction agent in a quantity corresponding to a concentration range between 10^{-4} Mol and 0.2 Mol per liter alkali solution;

(b) adding mineral acid to the alkali solution until a hydronium ion concentration in the range from 0.1 to 6 Mol/l has been reached.

(c) reducing the molybdenum contained in the acidified solution of step b) to form a three-valent molybdenum Mo(III) and complexing the Mo(III) with SCN^- ions to form $[Mo(SCN)_6]^{3-}$ ions, said SCN^- ions being present in an ion concentration in the range between 0.1 Mol/l and 3 Mol/l of the solution being subjected to the reduction;

(d) bringing the aqueous acid solution from step c) as an aqueous phase which contains $[Mo(SCN)_6]^{3-}$ ions and contaminants into contact with an organic phase of previously conditioned di-sec butyl ether and selectively extracting the molybdenum thiocyanate complex ions from the aqueous phase into the organic phase, whereby the contaminants remain practically completely in the aqueous phase;

(e) separating the organic phase charged with $[Mo(SCN)_6]^{3-}$ ions from the molybdenum free solution;

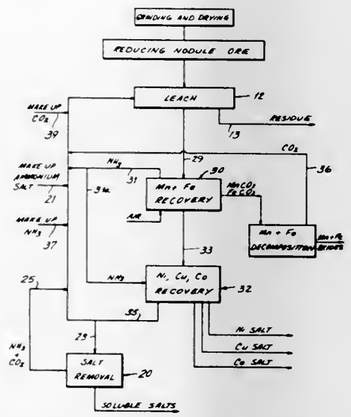
(f) washing the separated organic phase with diluted mineral acid having a concentration in the range from 0.001 to 0.1 Mol/l in a quantity approximately corresponding to the volume of the organic phase;

(g) re-extracting the molybdenum with mineral acid of a concentration in the range from 5 Mol/l to 11 Mol/l from the separated and washed organic phase into an aqueous phase.

4,093,698
PROCESS FOR THE SIMULTANEOUS EXTRACTION OF METAL VALUES FROM MANGANESE NODULES

Paul H. Cardwell, Zanoni, and William S. Kane, Wicomico, both of Va., assignors to Deepsea Ventures, Inc., Gloucester Point, Va.

Filed Oct. 18, 1976, Ser. No. 733,087
Int. Cl.² C01G *3/14, 51/12, 53/12*
U.S. Cl. 423—24 **16 Claims**



1. A process for removing the metal values from a manganese nodule ore, the ore comprising a primary proportion of manganese and iron and secondary proportions of nickel, copper and cobalt, the weight ratio of manganese:iron being at least about 5:1 and the total combined amounts of copper, cobalt and nickel being at least about 1.5% by weight of the nodule are, the process comprising:

(a) comminuting the ore to a particle size of not greater than about 20 mesh;

(b) reducing the comminuted ore at a temperature in the range of from about 300° to about 850° C., in the presence of a reducing agent selected from the group consisting of carbonaceous materials and hydrogen, such that substantially all of the manganese, nickel, cobalt and copper values and only a portion of the iron value are reduced to a condition in which the metal values are leachable by ammoniacal ammonium salt solutions with oxidation;

(c) leaching the reduced ore with an ammoniacal aqueous leaching solution of an ammonium salt wherein the total concentration of total ammonium ion is at least about 260 grams/liter, the concentration of ammonium hydroxide in the leaching solution being at least about 120 grams/liter, as ammonium ion, and wherein the concentration of the ammonium salt anion is at least about 0.83 Normal to form an aqueous pregnant leach solution comprising the soluble manganese, iron, nickel, copper and cobalt salts and at least a major amount of the ammonium hydroxide generated during the leaching step, and a solid residue, the ore and the leach solution being oxidized prior to completion of the leaching, the ratio of iron-to-manganese in the solution being less than that in the ore;

(d) treating the pregnant leach solution to remove sufficient ammonia to obtain the precipitation of substantially all of the iron and manganese values from the pregnant leach solution without substantial precipitation of any nickel, cobalt and copper to form a substantially manganese-and-iron-free pregnant leach solution and solid manganese and iron compounds; and

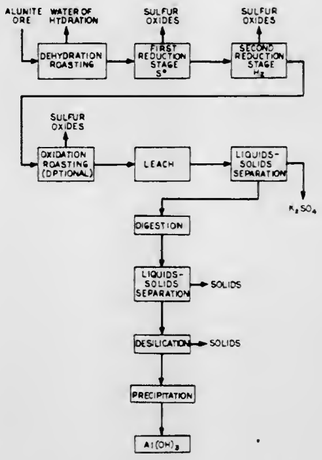
(e) separating the nickel, cobalt and copper values from the manganese-and-iron-free pregnant leach solution so as to regenerate the ammoniated ammonium salt leaching solution.

14. The process of claim 1, comprising contacting the leach solution with an organic water-immiscible, liquid ion exchange extracting medium comprising an extracting agent selected from the group consisting of alpha-hydroxyoximes and 7-hydrocarbon-substituted-8-hydroxyquinolines so as to selectively extract copper, forming an organic phase containing the copper value, substantially free of cobalt and nickel values, and connecting the first raffinate with a second organic, water-immiscible, liquid ion exchange medium comprising an extracting agent selected from the aforesaid group so as to selectively extract nickel, forming a second organic phase containing the nickel value and a second aqueous raffinate containing the cobalt value.

4,093,700
PROCESS FOR REDUCTION OF ALUNITE ORE IN ALUMINUM RECOVERY PROCESS

Kent W. Loest, Broomfield, and George H. Kesler, Evergreen, both of Colo., assignors to Southwire Company, Carrollton, Ga.; National Steel Corporation, Pittsburgh, Pa. and Earth Sciences, Inc., Golden, Colo.

Continuation-in-part of Ser. No. 655,085, Feb. 4, 1976, abandoned. This application May 27, 1977, Ser. No. 801,054
Int. Cl.² C01F *7/06*
U.S. Cl. 423—120 **10 Claims**



1. A method for recovering aluminum from alunite ore which comprises:

(a) dehydrating the ore;

(b) roasting the dehydrated ore in a reducing atmosphere of sulfur at a temperature up to about 650° C to effect about 65-90 percent reduction of the ore;

(c) roasting the reduced ore of step (b) at a temperature up to about 650° C in a reducing atmosphere other than sulfur to substantilly completely reduce it;

(d) leaching the reduced ore from step (c) with a solvent selected from the group consisting of an alkaline solvent and water to remove compounds of sulfur and alkali metals;

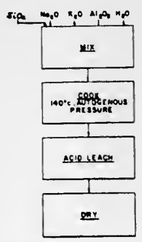
(e) digesting the residue from step (d) with at least one alkali metal hydroxide to convert aluminum values in the residue to soluble aluminates; and

(f) recovering aluminum values from the soluble aluminates.

4,093,699
SYNTHETIC ZEOLITE

Leonard B. Sand, Holden, Mass., assignor to Zeochem Corporation, Worcester, Mass.

Continuation of Ser. No. 543,652, Jan. 24, 1975, abandoned, which is a continuation of Ser. No. 334,125, Feb. 20, 1973, abandoned, which is a continuation of Ser. No. 148,730, Jun. 1, 1971, abandoned. This application Nov. 10, 1976, Ser. No. 740,733
Int. Cl.² C01B *33/28*
U.S. Cl. 423—118 **4 Claims**



1. A method for making a zeolite having the structure of offretite, as determined by x-ray defraction, and capable of absorbing 0.512 mmoles of benzene per gram of zeolite at P/Ps of 0.669, comprising reacting in a closed container filled with a composition of ¼ of its capacity under autogenous pressure and in the absence of tetramethylammonium ions, the composition having oxide mole ratios of:

$$(K_2O)0.65(Na_2O)_2(SiO_2)_{12}(Al_2O_3)(H_2O)36.11$$

wherein the source of silica is diatomite the composition being maintained at a temperature of between approximately 140° C. and 145° C inclusive, for a time sufficient to form the zeolite.

4,093,701
PROCESS FOR ACID GAS REMOVAL

Kenneth Francis Butwell, Newburgh, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 627,211, Oct. 30, 1975, abandoned. This application Sep. 17, 1976, Ser. No. 723,161
Int. Cl.² B01D *53/34*
U.S. Cl. 423—228 **28 Claims**

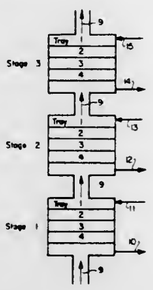
1. In a continuous process for the selective absorption of hydrogen sulfide from a feed gas comprising an acid gas mixture of carbon dioxide and hydrogen sulfide, said process comprising the steps of (I) counter-currently contacting the feed gas in an absorption zone with a lean aqueous alkanolamine solution to provide a rich aqueous alkanolamine solution, (II) introducing the rich solution into a stripping zone to provide a mixture of acid gas and water vapor overhead and lean solution as bottoms, and (III) recycling the lean solution to the absorption zone, the improvement which comprises:

(a) using an alkanolamine having the formula, $(R)_3N$, wherein R is an alkanol radical, which has 2 or 3 carbon atoms and is unsubstituted or methyl-substituted, or an

alkyl radical having 1 to 5 carbn atoms, provided at least one of the R groups is an alkanol radical;

(b) using a lean solution, which has a molality of about 1.5 to about 75 and a maximum loading of about 0.1 mole of acid gas per mole of alkanolamine;

(c) using an absorption zone having 2 to 10 separate stages, wherein the equilibrium approach between the hydrogen sulfide in the gas and liquid phases is maximized and the equilibrium approach between the carbon dioxide in the gas and liquid phases is minimized;



(d) adjusting the flow rate of the lean solution through each stage so that (i) from about 0.1 to about 0.9, by volume, of the hydrogen sulfide passing through each stage is absorbed by the lean solution passing through said stage, and (ii) the rich solution loading in each stage is from about 0.1 to about 0.3 mole of acid gas per mole of alkanolamine; and

(e) introducing lean solution from the stripping zone into about the top of each stage, removing rich solution from about the bottom of each stage and introducing said rich solution into the stripping zone.

4,093,702

METHOD OF REMOVING GASEOUS POLLUTANTS FROM GAS STREAMS UTILIZING AN ACTIVATED FORM OF ALUMINUM

George G. Merkl, 46 Sunset Ct., Haworth, N.J. 07641

Continuation of Ser. No. 346,772, Apr. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 86,364, Nov. 2, 1970, abandoned. This application Feb. 14, 1977, Ser. No. 768,573

The portion of the term of this patent subsequent to Mar. 15, 1994, has been disclaimed.

Int. Cl.² B01D *53/34*

U.S. Cl. 423—235 **12 Claims**

5. A process of removing pollutants selected from NO and NO_2 from a gaseous stream containing the same, which comprises:

contacting said gaseous stream, in an aqueous medium, with a bed of reactive aluminum comprising:

(a) aluminum metal of a purity of at least 99.9% by weight permeated with

(b) an effective activating amount of a liquid metal selected from mercury, gallium and indium/gallium alloys.

4,093,703

REMOVAL OF ETHYLENE FROM GASES

Oskar Buechner, Ludwigshafen; Herbert Geierhaas, Heidelberg; Volker Gierth, Ludwigshafen; Siegfried Mueller, Limburgerhof, and Wieland Zacher, Wesseling, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Continuation of Ser. No. 638,955, Dec. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 621,522, Oct. 10, 1975, abandoned, which is a continuation of Ser. No. 431,580, Jan. 7, 1974, abandoned. This application Jan. 31, 1977, Ser. No. 763,927

Claims priority, application Germany, Jan. 10, 1973, 2301016

Int. Cl.² B01D *53/34*

U.S. Cl. 423—245 **1 Claim**

1. A process for the oxidative removal of ethylene from industrial exhaust air which comprises: passing said industrial exhaust air which contains ethylene in a concentration of not more than 1.8% by volume over a supported palladium catalyst containing from 0.05 to 10 g of palladium per liter of an inert inorganic carrier, said oxidation reaction being started at a temperature of from 180° to 200° C.

4,093,704

METHOD FOR SYNTHESIS OF III-V COMPOUNDS

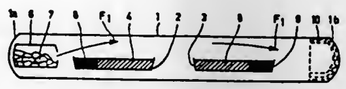
Guy Michel Jacob, Creteil, France, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 541,436, Jan. 16, 1975, abandoned. This application Oct. 15, 1976, Ser. No. 732,735

Claims priority, application France, Jan. 16, 1974, 74 01402

Int. Cl.² C01B *25/00*; C22C *28/00, 30/00*

U.S. Cl. 423—299 **9 Claims**



1. A method for the synthesis of a III-V semiconductor compound, wherein the group III element is selected from the group consisting of gallium and indium and the group V element is selected from the group consisting of phosphorus and arsenic, the group V element having a vapor pressure higher than that of the group III element at the synthesis temperature of said compound, said method comprising: placing in a first zone in a reaction vessel the group V element in non-gaseous form, placing in a second zone, in said reaction vessel, adjacent to said first zone, the group III element in liquid form, providing a third zone in said reaction vessel adjacent to said second zone and remote from said first zone, closing said reaction vessel, providing a temperature in said first zone higher than the evaporation temperature of said group V element, providing a temperature in said second zone higher than the liquifying temperature of said group III element but below the melting temperature of said III-V compound, the temperature in said second zone being substantially higher than the temperature in said first zone; providing a temperature in said third zone sufficiently low to cause condensation of said group V element in said third zone and sufficiently below the temperature in said first zone to cause a larger quantity of said group V element to be evaporated than is absorbed in said group III element liquid, maintaining said temperatures in said zones until all of said group V element in said first zone has evaporated and then reversing the temperatures in said first and third zones until all of the V element condensed in said third zone has evaporated.

4,093,705

CONTROL OF CARBON BLACK PRODUCTION

Gerard Kraus; Carl J. Stacy, and Paul J. Cheng, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 1, 1976, Ser. No. 728,825

Int. Cl.² C01B *31/02*; C09C *1/48*; G01N *31/00, 29/02*

U.S. Cl. 423—450 **8 Claims**

1. In a method of producing carbon black by introducing a carbonaceous feed material into a carbon black reactor, heating the feed material to an elevated temperature to decompose the feed material to produce carbon black particles, and withdrawing from the reactor an effluent stream which contains carbon black particles, the improvement which comprises controlling the structure of the thus produced carbon black particles by:

withdrawing a sample of the reactor effluent from said effluent stream and passing the thus withdrawn sample to an analysis zone, said sample containing carbon black particles:

introducing a beam of light into the analysis zone to impinge on the sample therein;

measuring the intensity of light scattered from the sample in said analysis zone in two different directions;

establishing a signal representative of the ratio of the two measured intensities; and

introducing an alkali metal into the reactor at a rate which is a function of the established signal so as to tend to maintain the established signal substantially constant at a predetermined value.

4,093,706

METHOD OF PRODUCTION OF SYNTHETIC FLUORITE HAVING A SELECTED GRAIN SIZE

Władysław Augustyn; Maria Dzięgielewska, both of Gliwice, and Andrzej Kossuth, Katowice, all of Poland, assignors to Politechnika Slaska and Instytut Chemii Nieorganicznej, both of Gliwice, Poland

Filed Oct. 21, 1976, Ser. No. 734,594

Claims priority, application Poland, Nov. 13, 1975, 184737

Int. Cl.² C01F *11/22*

U.S. Cl. 423—490 **14 Claims**

1. A method for the production of synthetic fluorite having a controlled selected grain size in the range from about 1 μm to 20 mm by reacting 1 mole of calcium carbonate having substantially said selected grain size with an aqueous solution of 2 to 6 moles of a fluoride selected from the group consisting of ammonium, potassium and sodium fluorides at a temperature in the range of 50° C. to 150° C. for a period of 1 to 120 hours to produce fluorite grains of said selected grain size which reproduce the size and shape of the grains of the calcium carbonate.

4,093,707

PROCESS FOR PREPARING PEROXIDE GROUP CONTAINING ALUMINUM COMPLEX

George G. Merkl, 46 Sunset Ct., Haworth, N.J. 07641

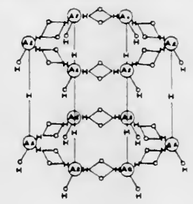
Continuation-in-part of Ser. No. 176,907, Sept. 1, 1971, abandoned, which is a continuation-in-part of Ser. No. 859,703, Sept. 22, 1969, abandoned, which is a continuation-in-part of Ser. No. 712,888, Feb. 19, 1968, abandoned. This application Nov. 17, 1975, Ser. No. 632,727

Int. Cl.² C01F *7/02*

U.S. Cl. 423—626 **12 Claims**

1. A method of preparing a complex of aluminum, oxygen and hydrogen, which comprises reacting by contacting, at a temperature below 150° F., aluminum metal of a purity of at least 99.98% by weight with an aqueous inorganic halogen acid in the presence of mercury and an oxygen gas containing atmosphere, said aluminum being partially immersed in said mercury and said aqueous inorganic halogen acid comprising a thin film over said mercury, the thickness of said film being insufficient to cover the aluminum not immersed in said mercury, whereby a portion of said aluminum is exposed to said oxygen gas containing atmosphere, said complex growing from the surface of said aluminum exposed to said oxygen gas containing atmosphere in the form of an easily frangible self-supporting sheet; and collecting said complex.

12. A method of preparing a complex of aluminum, oxygen and hydrogen, which comprises stripping aluminum metal of a purity of at least 99.98% by weight of surface oxide film, reacting by contacting at a temperature below 150° F the surface stripped aluminum metal with a source of protons in



the presence of mercury and an oxygen gas containing atmosphere, said aluminum being partially immersed in said mercury and said source of protons comprising a thin film over said mercury, the thickness of said film being insufficient to cover the aluminum not immersed in said mercury, whereby a portion of said aluminum is exposed to said oxygen gas containing atmosphere, said complex growing from the surface of said aluminum exposed to said oxygen gas containing atmosphere in the form of an easily frangible self-supporting sheet; and collecting said complex.

4,093,708

OSMOTIC RELEASING DEVICE HAVING A PLURALITY OF RELEASE RATE PATTERNS

Alejandro Zaffaroni; Alan S. Michaels, both of Atherton, and Felix Theeuwes, Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 536,006, Dec. 23, 1974, Pat. No. 4,036,227, which is a continuation-in-part of Ser. No. 354,344, Apr. 25, 1973, abandoned. This application Mar. 9, 1977, Ser. No. 775,988

Int. Cl.² A61K *9/22*

U.S. Cl. 424—15 **1 Claim**

1. A method for administering an ophthalmic drug to the tear fluid of the eye comprising,

a. placing in the eye tear fluid an osmotic device comprising;

1. a shaped wall formed of a semipermeable material that maintains its integrity during the dispensing period, is permeable to the passage of eye fluid and essentially impermeable to the passage of drug;

2. the wall surrounding and forming a compartment containing an ophthalmic drug that exhibits an osmotic pressure gradient across the wall against the eye fluid;

3. a layer formed of a material that bioerodes in the eye tear fluid on at least a part of the exterior surface of the semi-permeable wall;

4. a passageway in the wall, said passageway communicating with the compartment and the exterior of the device for dispensing drug from the device;

b. bioeroding the layer in the eye tear fluid at a controlled rate to regulate the amount of eye fluid available to the wall for imbibition, which fluid is imbibed through the wall into the compartment in a tendency towards osmotic equilibrium at a rate determind by the permeability of the wall and the osmotic pressure gradient across the wall continuously dissolving drug; and thereby,

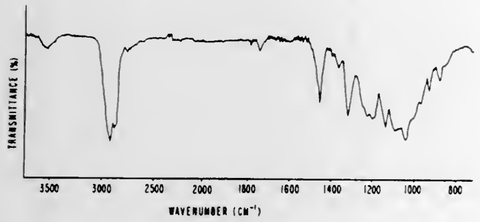
c. dispensing drug from the device to the eye tear fluid through the passageway at a controlled rate over a prolonged period of time.

4,093,709

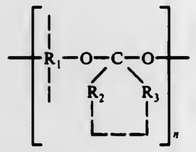
DRUG DELIVERY DEVICES MANUFACTURED FROM POLY(ORTHOESTERS) AND POLY(ORTHOCARBONATES)

Nam Sok Choi, Seoul, South Korea, and Jorge Heller, Palo Alto, Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed Jan. 28, 1975, Ser. No. 544,808
Int. Cl.[2] A61K *9/22, 9/56;* **A61M** *37/00*
U.S. Cl. 424—19 **31 Claims**



1. A drug delivery device for the controlled and continuous administration of drug, wherein the device comprises: (a) a shaped matrix sized and adapted for administering drug to an animal and formed of a bioerodible drug release rate controlling pharmaceutically acceptable material, which material comprises a polymer of the formula:



wherein R_1 is a member selected from the group of divalent, trivalent and tetravalent radicals consisting of alkylene of 1 to 10 carbons; alkenylene of 2 to 10 carbons; alkyleneoxy of 2 to 6 carbons; cycloalkylene of 3 to 7 carbons; cycloalkylene of 3 to 7 carbons substituted with an alkyl of 1 to 7 carbons, alkoxy of 1 to 7 carbons, an alkylene of 1 to 10 carbons, and an alkenyl of 2 to 7 carbons; cycloalkenylene of 4 to 7 carbons; cycloalkenylene of 4 to 7 carbons substituted with an alkyl of 1 to 7 carbons, an alkoxy of 1 to 7 carbons, an alkylene of 1 to 10 carbons, and an alkenyl of 2 to 7 carbons; arylene; and arylene substituted with an alkyl of 1 to 7 carbons, an alkoxy of 1 to 7 carbons, and an alkenyl of 2 to 7 carbons; R_2 and R_3 are selected from the group consisting of alkyl of 1 to 7 carbons; alkenyl of 2 to 7 carbons; alkoxy of 1 to 7 carbons; alkenyloxy of 2 to 7 carbons; alkylene of 2 to 6 carbons; alkenylene of 3 to 6 carbons; alkyleneoxy of 2 to 6 carbons; alkenyleneoxy of 3 to 6 carbons; aryloxy; aralkyleneoxy of 8 to 12 carbons; aralkenyleneoxy of 8 to 12 carbons; oxa; OR_1O with R_1 as defined above; a heterocyclic ring of 5 to 8 carbon and oxygen atoms formed when R_2 and R_3 are taken together; a heterocyclic ring of 5 to 8 carbon and oxygen atoms substituted with an alkyl of 1 to 7 carbons, an alkoxy of 1 to 7 carbons and an alkenyl of 2 to 7 carbons formed when R_2 and R_3 are taken together; a fused polycyclic ring of 8 to 12 carbon and oxygen atoms formed when R_2 and R_3 are taken together; a fused polycyclic ring of 8 to 12 carbon and oxygen atoms substituted with an alkyl of 1 to 7 carbons, an alkoxy of 1 to 7 carbons and an alkenyl of 2 to 7 carbons; and wherein at least one of said R_2 and R_3 is a member selected from the group consisting of alkoxy, alkenyloxy and OR_1O; R_2 and R_3 when taken together are a member selected from the group of heterocyclic and fused polycyclic rings having at least one oxygen atom in the ring; and wherein n is greater than 10; (b) a drug selected from the group consisting of locally and systemically acting pharmaceutically acceptable drugs present in the matrix; and, (c) wherein the device when in operation bioerodes at a controlled and continuous rate over a prolonged period of time, thereby administering a therapeutically effective amount of drug to the animal at a controlled and continuous rate over a prolonged period of time.

4,093,710

RAPID DISSOLVING EFFERVESCENT GRANULES

Robert N. Sass, Greenwood, and Chwang Tek Wie, Lincoln, both of Nebr., assignors to Sandoz, Inc., E. Hanover, N.J.

Filed Jul. 7, 1976, Ser. No. 703,255
Int. Cl.[2] A61L *9/04*
U.S. Cl. 424—44 **16 Claims**

1. A method of preparing stable, free flowing, rapid dissolving, palatable effervescent granules having essentially the following composition per unit dose:

Active ingredient suitable for administration orally in an effervescent drink	Therapeutically effective amount
Alkali metal carbonate or bicarbonate	0.200 Gm. - 2.000 Gm.
Organic Acid, Anhydrous granule	0.200 Gm. - 2.000 Gm.
Sweetener	0.005 Gm. - 0.100 Gm.
Surfactant	0.002 Gm. - 0.070 Gm.
Flavor	q.s.

which comprises:

(a) grinding the active ingredients, alkali metal carbonate, and sweetener to a mesh size of less than 80;

(b) mixing the active ingredient, alkali metal carbonate, and sweetener in a mixer to form a uniform mixture and granulating the mixture with a 1 percent to 25 percent by weight solution of the surfactant in water to form fine granules having a mesh size between #10 and #80;

(c) drying the granules at a temperature between 65° F. and 200° F. to a moisture level of less than 0.5 percent;

(d) sizing the granulation by grinding and screening to obtain particles having a particle size of less than 20 mesh;

(e) sizing the organic acid to obtain particles having a particle size of less than 20 mesh;

(f) milling the flavors to a particle size of less than 80 mesh; and

(g) blending the granulation of Step (d) with the acid and flavors of Steps (e) and (f) to obtain a uniform granule mixture.

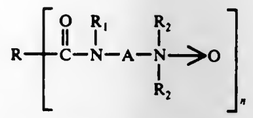
4,093,711

ORAL HYGIENE

Owen Rodney Blackburne, Baltimore, and Warren B. Shapiro, Randallstown, both of Md., assignors to Noxell Corporation, Baltimore, Md.

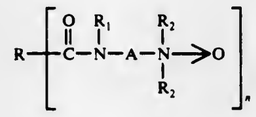
Filed Aug. 13, 1976, Ser. No. 714,149
Int. Cl.[2] N61K *7/22*
U.S. Cl. 424—54 **35 Claims**

1. A method for retarding pellicle and plaque formation which comprises intermittently contacting sites of plaque formation and growth with a preparation comprising an amount sufficient to retard pellicle and plaque formation of at least one compound of the formula:



wherein R is a monovalent or divalent hydrocarbyl group containing at least 13 carbon atoms, n is one when R is monovalent and is 2 when R is divalent; R_1 is H or an alkyl group containing from 1 to about 3 carbon atoms; A is a divalent hydrocarbon bridge containing from 1 to about 6 carbon atoms; and each R_2 individually is an alkyl group containing from 1 to about 5 carbon atoms; or both R_2 groups are interconnected to form a heterocyclic ring with the N atom to which they are attached and contain 5 to 6 members in the ring; and wherein said heterocyclic ring is selected from the group consisting of morpholinyl, piperidinyl, pyrrolidinyl, and piperazinyl.

30. A dental preparation retarding pellicle and plaque formation which comprises an amount sufficient to retard pellicle and plaque formation of at least one compound of the formula:



wherein R is a monovalent or divalent hydrocarbon group containing at least 13 carbon atoms, n is one when R is monovalent and is 2 when R is divalent, R_1 is H or an alkyl group containing from 1 to about 3 carbon atoms, A is a divalent hydrocarbon bridge containing from 1 to about 6 carbon atoms, each R_2 individually is an alkyl group containing from 1 to about 5 carbon atoms, or both R_2 groups are interconnected to form a heterocyclic ring with the N atom to which they are attached and contain 5 to 6 members in the ring, and being selected from the group consisting of morpholinyl, piperidinyl, pyrrolidinyl, and piperazinyl; from about 5 to about 50% by weight of an abrasive polishing agent; from about 0.5 to about 5% by weight of a sudsing agent; from about 0.1 to about 15% by weight of a thickening agent; and water.

4,093,712

N^2-ARYLSULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, 15-1i, Asahigaoka 3-chome, Tarumi-ku, Kobe-shi, Hyogo, Japan; Akiko Hijikata, Kobe, Japan; Ryoji Kikumoto, Machida, Japan; Yoshikuno Tamao, Yokohama, Japan; Kazuo Ohkubo, Machida, Japan; Tohru Tezuka, Yokohama, Japan, and Shinji Tonomura, Tokyo, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo and Shosuke Okamoto, both of, Japan

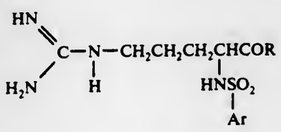
Continuation-in-part of Ser. No. 638,985, Dec. 9, 1975, Pat. No. 4,055,636, Ser. No. 646,522, Jan. 5, 1976, Pat. No. 4,018,915, Ser. No. 649,219, Jan. 14, 1976, Pat. No. 4,018,913, Ser. No. 656,014, Feb. 6, 1976, Pat. No. 4,041,156, Ser. No. 656,870, Feb. 10, 1976, Pat. No. 4,046,876, Ser. No. 669,743, Mar. 24, 1976, Ser. No. 671,436, Mar. 29, 1976, and Ser. No. 703,704, Jul. 8, 1976, said Ser. No. 671,436, is a continuation-in-part of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Jan. 19, 1977, Ser. No. 760,672

Claims priority, application Japan, Nov. 8, 1974, 49-128774; Nov. 8, 1974, 49-128775; Nov. 29, 1974, 49-136695; Nov. 29, 1974, 49-136697; Feb. 25, 1975, 50-023268; Feb. 26, 1975, 50-023635; Mar. 5, 1975, 50-026768; Mar. 11, 1975, 50-029357; Mar. 11, 1975, 50-029358

The portion of the term of this patent subsequent to Oct. 25, 1994, has been disclaimed.

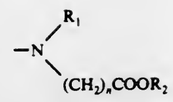
Int. Cl.[2] A61K *37/00;* **C07C** *103/52*
U.S. Cl. 424—177 **3 Claims**

1. An N^2-arylsulfonyl-L-argininamide having the formula (I):



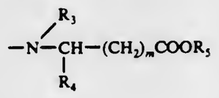
(I)

or a pharmaceutically acceptable salt thereof, wherein R is



(1)

wherein R_1 is C_2–C_{10} alkyl, C_3–C_{10} alkenyl, C_3–C_{10} alkynyl, C_2–C_{10} alkoxyalkyl, C_2–C_{10} alkylthioalkyl, C_2–C_{10} alkylsulfinylalkyl, C_1–C_{10} hydroxyalkyl, C_2–C_{10} carboxyalkyl, C_3–C_{10} alkoxycarbonylalkyl, C_1–C_{10} haloalkyl, C_7–C_{15} aralkyl, C_8–C_{15} α-carboxyaralkyl, C_3–C_{10} cycloalkyl or C_4–C_{10} cycloalkylalkyl; R_2 is hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl or 5-indanyl; and n is an integer of 1, 2 or 3; or



(2)

wherein

R_3 is hydrogen, C_1–C_{10} alkyl, C_3–C_{10} alkenyl, C_3–C_{10} alkynyl, C_2–C_{10} alkoxyalkyl, C_2–C_{10} alkylthioalkyl, C_2–C_{10} alkylsulfinylalkyl, C_1–C_{10} hydroxyalkyl, C_2–C_{10} carboxyalkyl, C_3–C_{10} alkoxycarbonylalkyl, C_1–C_{10} haloalkyl, C_7–C_{15} aralkyl, C_8–C_{15} α-carboxyaralkyl, C_3–C_{10} cycloalkyl or C_4–C_{10} cycloalkyloalkyl; R_4 is C_1–C_5 alkyl, carboxy, C_2–C_{10} alkoxycarbonyl, phenyl, C_7–C_{12} aralkyl or ring substituted benzyl wherein said substituent is C_1–C_5 alkyl or C_1–C_5 alkoxy; R_5 is hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl or 5-indanyl; and m is an integer of 0, 1 or 2;

Ar is a phenyl or naphthyl group, either substituted with at least one substituent selected from the group consisting of sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxy, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy, or mixtures thereof,

a phenyl or naphthyl group, either substituted with at least one substituent selected from the group consisting of sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxy, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy, or mixtures thereof,

and at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy and C_2–C_{20} dialkylamino;

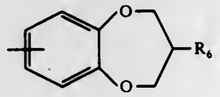
an oxanthrenyl or dibenzofuranyl group substituted with at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy, C_2–C_{20} dialkylamino, sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxyl, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl, and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy, or mixtures thereof,

a C_7–C_{12} aralkyl, tetrahydronaphthyl, 1,2-ethylenedioxyphenyl, chromanyl, 2,3-ethylenedioxynaphthyl or xanthenyl group, any substituted with at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy, C_2–C_{20} dialkylamino, sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxyl, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl,

oxo and phenyl optionally substituted with at least one hydroxy, C_1-C_5 alkoxy, or mixtures thereof;

a naphthoquinonyl, anthryl, phenanthryl, pentalenyl, heptalenyl, azulenyl, biphenylenyl, as-indacenyl, S-indacenyl, acenaphthylenyl, phenylcarbonylphenyl, phenoxyphenyl, benzofuranyl, isobenzofuranyl, benzo [b] thienyl, isobenzothienyl, thianthrenyl, dibenzothienyl, phenoxathiinyl, indolyl, 1H-indazolyl, quinolyl, isoquinolyl, phthalazinyl, 1,8-naphthridinyl, quinoxalinyl, quinazolinyl, cinnolinyl, carbazolyl, acridinyl, phenazinyl, phenothiazinyl, phenoxazinyl or benzimidazolyl group any of which is unsubstituted or substituted with one or more groups selected from the group consisting of halo, nitro, cyano, hydroxy, C_1-C_{10} alkyl, C_1-C_{10} alkoxy, C_2-C_{20} dialkylamino, sulfoamino, carbamoyl, C_3-C_{10} N,N-dialkylcarbamoyl, amino, C_1-C_{10} alkylamino, mercapto, C_1-C_{10} alkylthio, C_7-C_{12} aralkyl, carboxyl, C_2-C_{10} alkoxycarbonyl, C_2-C_{10} carboxyalkyl, C_1-C_{10} acylamino, C_2-C_{10} alkylcarbonyl, C_1-C_{10} hydroxyalkyl, C_1-C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy, C_1-C_5 alkoxy, or mixtures thereof;

9,10-dihydroanthryl, 5,6,7,8-tetrahydroanthryl, 9,10-dihydrophenanthryl, 1,2,3,4,5,6,7,8-octahydrophenanthryl, indenyl, indanyl, fluorenyl, acenaphthenyl, phenylthiophenyl, isochromanyl, 2,3-dihydrobenzofuranyl, 1,3-dihydroisobenzofuranyl, thioxanthenyl, 2H-chromenyl, 3,4-dehydro-1-isochromanyl, 4H-chromenyl, indolinyl, isoindolinyl, 1,2,3,4-tetrahydroquinolyl or 1,2,3,4-tetrahydroisoquinolyl group any of which is unsubstituted or substituted with one or more groups selected from the group consisting of halo, nitro, cyano, hydroxy, C_1-C_{10} alkyl, C_1-C_{10} alkoxy, C_2-C_{20} dialkylamino, sulfoamino, carbamoyl, C_3-C_{10} N,N-dialkylcarbamoyl, amino, C_1-C_{10} alkylamino, mercapto, C_1-C_{10} alkylthio, C_7-C_{12} aralkyl, carboxyl, C_2-C_{10} alkoxycarbonyl, C_2-C_{10} carboxyalkyl, C_1-C_{10} acylamino, C_2-C_{10} alkylcarbonyl, C_1-C_{10} hydroxyalkyl, C_1-C_{10} haloalkyl, oxo and phenyl optionally substituted with at least one hydroxy, C_1-C_5 alkoxy, or mixtures thereof; or benzene ring-substituted



wherein R_6 is hydrogen, C_1-C_{10} alkyl or C_1-C_{10} alkoxy, and said substituent is at least one C_1-C_5 alkyl, C_1-C_5 alkoxy or mixtures thereof.

4,093,713

DIPEPTIDE DERIVATIVES WITH CENTRAL NERVOUS SYSTEM ACTIVITY AND PREPARATION THEREOF

Kazimir Sestanj, Pointe Claire; Hans Ueli Immer, Mount Royal, and Manfred Karl Gotz, Hudson, all of Canada, assignors to Ayerst McKenna & Harrison Ltd., Montreal, Canada

Filed Feb. 28, 1977, Ser. No. 772,389

Int. Cl.[2] A61K *37/00*

U.S. Cl. 424—177 **18 Claims**

1. A compound of formula I

$$H—L—Pro—N(R^1)CH(R^2)CO—NHR^3 \quad (I)$$

in which R^1, R^2 and R^3 each independently is lower alkyl, or a therapeutically acceptable acid addition salt thereof.

16. A pharmaceutical composition in unit dosage form for treating Parkinson's disease comprising a combination of a compound of formula I of claim 1, or a therapeutically acceptable acid addition salt thereof, together with a therapeutic dose of levodopa and a pharmaceutically acceptable carrier.

4,093,714

9β-D-ARABINOFURANOSYLPURINE NUCLEOTIDES AND METHOD OF USE

Richard L. Tolman, Berkley Heights, N.J.; Robert W. Sidwell, Irvine, and Ganapathi R. Revankar, Santa Ana, both of Calif., assignors to ICN Pharmaceuticals, Inc., Irvine, Calif.

Continuation-in-part of Ser. No. 342,617, Mar. 19, 1975, abandoned. This application Mar. 15, 1974, Ser. No. 451,639

Int. Cl.[2] A61K *31/52*; C07H *19/20*; A61K *31/70*

U.S. Cl. 424—180 **14 Claims**

12. An antiviral composition for the treatment of DNA virus-caused infections containing as its active ingredient an effective amount of a compound chosen from the group 9-β-D-arabinofuranosylhypoxanthine 5'—O—C_1—C_6 alkyl phosphate, 9-β-D-arabinofuranosylhypoxanthine 3'-phosphate, and 9-β-D-arabinofuranosylhypoxanthine 3',5'-cyclic phosphate in a pharmaceutical carrier.

4,093,715

5-IODO-5'-AMINO-2',5'-DIDEOXYCYTIDINE AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Tai-Shun Lin, North Haven; H. William Prusoff, Branford, and David C. Ward, Guilford, all of Conn., assignors to Research Corporation, New York, N.Y.

Filed Apr. 28, 1977, Ser. No. 792,011

Int. Cl.[2] A61K *31/70*; C07H *19/06*

U.S. Cl. 424—180 **7 Claims**

5. A pharmaceutical composition containing an effective amount of a compound for treating herpes simplex virus infection in mammals, said compound being selected from the group consisting of 5-iodo-5'-amino-2',5'-dideoxycytidine and the pharmaceutically acceptable acid addition salts thereof together with a pharmaceutically acceptable carrier.

4,093,716

COMPOSITIONS CONTAINING 5-AMINO-5-DEOXYTHYMIDINE AND PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Tai-Shun Lin, North Haven; H. William Prusoff, Branford, and David C. Ward, Guilford, all of Conn., assignors to Research Corporation, New York, N.Y.

Filed Apr. 28, 1977, Ser. No. 792,047

Int. Cl.[2] A61K *31/70*; C07H *19/06*

U.S. Cl. 424—180 **4 Claims**

1. A pharmaceutical composition containing an effective amount of a compound for treating herpes simplex virus infection in mammals, said compound being selected from the group consisting of 5'-amino-5'-deoxythymidine and the pharmaceutically acceptable acid addition salts thereof together with a pharmaceutically acceptable carrier.

4,093,717

ANTIMICROBIAL COMPOSITIONS

Charles D. Hufford, Oxford, Miss., assignor to University of Mississippi, University, Miss.

Filed Jul. 16, 1975, Ser. No. 596,282

Int. Cl.[2] A61K *35/78, 31/47*

U.S. Cl. 424—195 **7 Claims**

1. An antimicrobial composition comprising a compound or mixture of compounds derived from an alcoholic extract of the heartwood of *Liriodendron tulipifera L.* selected from the group consisting of liriodenine, liriodenine methiodide, dehydroglaucine, oxoglaucine methiodide and mixtures thereof in admixture with a non-toxic pharmaceutically acceptable carrier in a therapeutically effective concentration.

4,093,718

O,O-DIALKYL-5-HALO-PYRIMIDIN(2) YL-THIONOPHOSPHORIC ACID ESTERS

Fritz Maurer; Hans-Jochem Riebel, both of Wuppertal; Ingeborg Hammann, Cologne; Wolfgang Behrenz, Overath-Steinenbrueck, and Bernhard Homeyer, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 6, 1976, Ser. No. 656,041

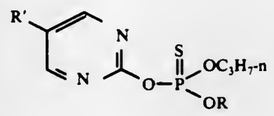
Claims priority, application Germany, Feb. 22, 1975, 2507702

The portion of the term of this patent subsequent to Mar. 29, 1994, has been disclaimed.

Int. Cl.[2] A01N *9/36*; C07F *9/56*

U.S. Cl. 424—200 **8 Claims**

1. An O,O-dialkyl-5-halo-pyrimidin(2)yl-thionophosphoric acid ester of the formula



in which

R is methyl or ethyl and

R' is chlorine or bromine.

6. An insecticidal or acaricidal composition containing as active ingredient an insecticidally or acaricidally effective amount of a compound according to claim 1 in admixture with a diluent.

7. A method of combatting insects or acarids which comprises applying to the insects or acarids or to a habitat thereof an insecticidally or acaricidally effective amount of a compound according to claim 1.

4,093,719

ANTIARTHRITIC COMPOSITIONS COMPRISING BIS[(TRIALKYL-PHOSPHINE)GOLD(I)]SULFIDES AND METHODS OF PRODUCING ANTIARTHRITIC ACTIVITY

David Taylor Hill, North Wales, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Feb. 16, 1977, Ser. No. 769,245

Int. Cl.[2] A61K *31/66*

U.S. Cl. 424—215 **4 Claims**

1. A pharmaceutical composition having antiarthritic activity, in dosage unit form, comprising a pharmaceutical carrier and an effective, nontoxic amount of a bis[(trialkylphosphine)-gold(I)]sulfide of the formula:

$$(R_3P\rightarrow Au)_2S$$

in which:

R is lower alkyl being straight or branched chain of from one to four carbons.

4,093,720

NOVEL-17-SPIROSULTINES THEIR CORRESPONDING HYDROXY ACIDS AND COMPOSITIONS THEREOF

Genevieve Rousseau, Paris, and Vesperto Torelli, Maisons-Alfort, both of France, assignors to Roussel Uclaf, Paris, France

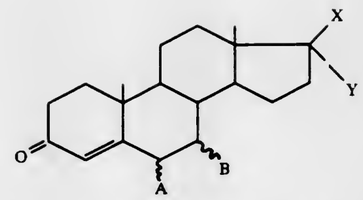
Filed Mar. 14, 1977, Ser. No. 776,942

Claims priority, application France, Mar. 16, 1976, 76 07476

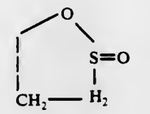
Int. Cl. C07j *33/00, 21/00*; A61k *31/58*

U.S. Cl. 424—241 **15 Claims**

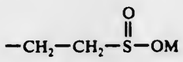
1. A compound selected from the group consisting of 17-spirosultines and their corresponding γ-hydroxy acids of the formula



wherein A is hydrogen and B is alkyl of 1 to 4 carbon atoms in the α- or β-position or A and B form a methylene group in the 6α, 7α- or 6β, 7β-position and X and Y form a group of the formula



or X is OH and Y is



and M is selected from the group consisting of hydrogen, $—NH_4$ and an alkali metal cation.

14. A method of relieving hypertension and cardiac insufficiencies in warm-blooded animals comprising administering to warm-blooded animals a hypotensively effective amount of at least one compound of claim 1.

4,093,721

PHARMACEUTICAL COMPOSITIONS OF 6α,9α-DIFLUORO-ANDROST-4-ENE-17β-CARBOXYLATES AND DERIVATIVES THEREOF

Gordon H. Phillippe, Wembley, and Brian M. Bain, Chalfont St. Peter, both of England, assignors to Glaxo Laboratories Limited, Greenford, England

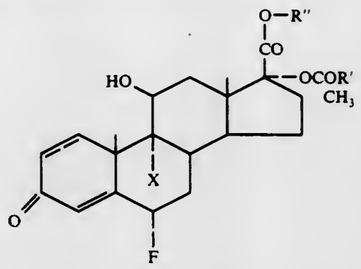
Continuation of Ser. No. 609,043, Aug. 29, 1975, abandoned. This application Jan. 6, 1977, Ser. No. 757,325

Claims priority, application United Kingdom, Aug. 30, 1974, 38090/74

Int. Cl.[2] A61K *31/56*

U.S. Cl. 424—243 **13 Claims**

1. Compounds of the general formula



(I)

wherein X represents a hydrogen or fluorine atom, R' represents a methyl, ethyl, n-propyl or iso-propyl group, R'' represents a methyl, chloromethyl, fluoromethyl, bromomethyl or 2- fluoroethyl group and represents a single or double bond.

7. Pharmaceutical compositions comprising, as active ingredient, at least one compound of claim 1 together with at least one pharmaceutical carner or excipient.

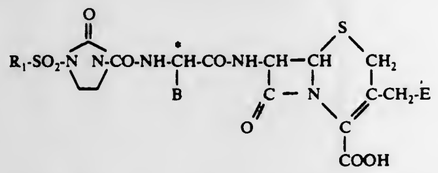
4,093,722

SULFONYLIMIDAZOLIDONE SUBSTITUTED CEPHALOSPORINS, ANTIBACTERIAL COMPOSITIONS CONTAINING THEM, AND METHODS OF COMBATTING BACTERIA EMPLOYING THEM

Wilfried Schröck; Hans-Bodo Konig; Michael Preiss; Karl Georg Metzger, all of Wuppertal, and Michael Walkowiak, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 590,794, Jun. 27, 1975, which is a continuation-in-part of Ser. No. 548,347, Feb. 10, 1975, abandoned. This application May 13, 1976, Ser. No. 686,103
Claims priority, application Germany, Feb. 18, 1974, 2407715
Int. Cl.[2] A61K *31/545*; C07D *501/34, 501/24*
U.S. Cl. 424—246 **16 Claims**

1. A compound selected from the group consisting of a cephalosporin derivative of the formula



the nontoxic salts thereof and the hydrates thereof wherein the carbon atom designated•constitutes a center of chirality;

E is hydrogen; hydroxy; or acetoxy;

B is phenyl; methylphenyl; chlorophenyl; hydroxyphenyl or cyclohexa-1,4-dien-1-yl; and

R_1 is thienyl; furyl; piperidyl; pyrrolidyl; amino; alkylamino of 1 to 4 carbon atoms in each alkyl group; phenyl; naphthyl; or phenyl or naphthyl substituted by one to five substituents selected from the group consisting of halo, cyano, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms and alkylsulfamyl of 1 to 4 carbon atoms; or $NC—CH_2—$.

10. A pharmaceutical composition useful for treating bacterial infections in humans and animals which comprises an antibacterially-effective amount of a compound of claim 1 in combination with a pharmaceutically acceptable nontoxic, inert diluent or carrier.

11. A method of treating bacterial infections in humans and animals which comprises administering to such human or animal an antibacterially-effective amount of a compound of claim 1.

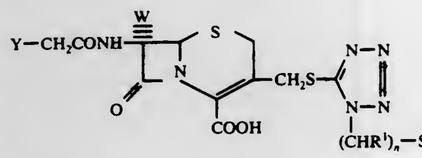
4,093,723

7-ACYL-3-(SULFONIC ACID AND SULFAMOYL SUBSTITUTED TETRAZOLYL THIOMETHYL) CEPHALOSPORINS

David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 687,792, May 19, 1976, Pat. No. 4,048,311, which is a continuation-in-part of Ser. No. 647,394, Jan. 8, 1976, abandoned, which is a continuation-in-part of Ser. No. 559,609, Mar. 18, 1975, abandoned. This application Jan. 13, 1977, Ser. No. 759,160
Int. Cl.[2] C07D *501/36*; A61K *31/545*
U.S. Cl. 424—246 **23 Claims**

1. A compound of the formula:



in which:

W is hydrogen or methoxy;

each individual R^1 is hydrogen or lower alkyl;

n is one to ten;

R^2 is hydroxy, amino, lower alkylamino or di(lower)alkylamino; and

Y is thienyl, tetrazolyl, cyano, sydnone or aminomethylphenyl,

or a non-toxic pharmaceutically acceptable salt thereof.

16. An antibacterial pharmaceutical composition comprising a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

4,093,724

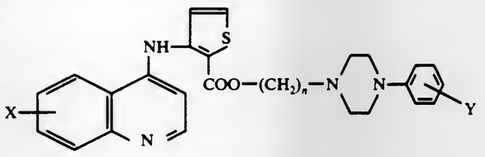
NOVEL-3-(4-QUINOLYLAMINO)-2-THIOPHENE-CARBOXYLATES

André Allais, Gagny; Jean Meier, La Varenne Saint-Hilaire, and Roger Deraedt, Pavillons-sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

Filed Feb. 22, 1977, Ser. No. 770,304
Claims priority, application France, Feb. 23, 1976, 76 04918
Int. Cl.[2] A61K *31/495*; C07D *295/14*
U.S. Cl. 424—250 **20 Claims**

1. A compound selected from the group consisting of 3-(4-quinolylamino)-2-thiophene-carboxylate of the formula

I



wherein X is in the 6,7 or 8-position and is selected from the group consisting of hydrogen, halogen, $—CF_3$ and alkyl and alkoxy of 1 to 8 carbon atoms, *n* is 2,3,4 or 5, Y is in the 2,3 or 4-position and is selected from the group consisting of hydrogen, halogen, $—CF_3$ and alkyl and alkoxy of 1 to 8 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

11. An analgesic composition comprising an analgesically effective amount of at least one compound of claim 1 and an inert pharmaceutical carrier.

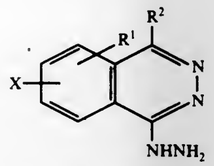
4,093,725

(3-ALKYLAMINO-2-HYDROXYPROPOXY)-1-HYDRAZINOPHTHALAZINES

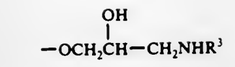
Anthony Maitland Roe, Hatfield; Robert Anthony Slater, Letchworth, and Edwin Michael Taylor, Welwyn, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Filed Jan. 31, 1977, Ser. No. 763,946
Claims priority, application United Kingdom, Feb. 9, 1976, 04896/76
Int. Cl.[2] A61K *31/50*; C07D *237/34*
U.S. Cl. 424—250 **12 Claims**

1. A compound of the formula:



wherein R^1 is hydrogen, lower alkyl, halogen, lower alkoxy or di lower alkylamino; R^2 is hydrogen, methyl, halogen, benzyl, chlorobenzyl or methoxybenzyl; and X is a group of the formula



wherein R^3 is isopropyl, t-butyl or phenylethyl; or a pharmaceutically acceptable acid addition salt thereof.

8. A pharmaceutical composition having β-adrenergic blocking and vasodilator activity comprising in an effective amount to produce β-adrenergic blocking and vasodilator activity a compound of claim 1 in combination with a pharmaceutically acceptable diluent or carrier.

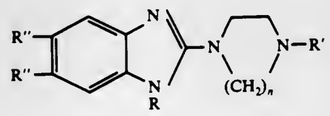
4,093,726

N-(2-BENZIMIDAZOLYL)-PIPERAZINES

Martin Winn, Deerfield, and Jaroslav Kyncl, Lake Bluff, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Dec. 2, 1976, Ser. No. 746,657
Int. Cl.[2] C07D *401/04*; A61K *31/495*
U.S. Cl. 424—250 **13 Claims**

1. A compound of the formula:

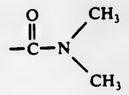


wherein:

n is 2;

R is selected from the group consisting of hydrogen or methyl;

R′ is C_1-C_6 alkyl, 4-methyl valeroyl, phenyl, dimethoxyphenyl, CF_3-phenyl, tetrahydrofuroyl, Furoyl,



or C_2-C_4 alkoxy carbonyl and

R″ is selected from the group consisting of hydrogen or methoxy.

6. An antihypertensive pharmaceutical composition comprising a compound selected from the group consisting of 1-(5,6-Dimethoxy-2-benzimidazolyl)-4-(2-furoyl) piperazine, 4-(5,6-Dimethoxy-2-benzimidazolyl) piperazine-1-carboxylic ethyl ester, 1-(5,6-Dimethoxy-1-methyl-2-benzimidazolyl)-4-(2-furoyl) piperazine, 1-(5,6-Dimethoxy-2-benzimidazolyl)-4 (tetrahydro-2-furoyl) piperazine, 4-(5,6-Dimethoxy-2-benzimidazolyl) piperazine-1-carboxylic acid isobutyl ester, N,N-Dimethyl 4-(5,6-dimethoxy-2-benzimidazolyl) piperazine-1-carboxamide, 1-(5,6-Dimethoxy-2-benzimidazolyl)-4(3,4-dimethoxy-phenyl) piperazine, N (4-methyl valeroyl) piperazine, 1-(5,6-Dimethoxy-2-benzimidazolyl)-4(4-methylvaleroyl) piperazine, 1-(5,6-Dimethoxy-2-benzimidazolyl)-4(3-trifluoromethyl phenyl) piperazine, 1-methyl 4(2-benzimidazolyl) piperazine and pharmaceutically acceptable acid addition salts thereof and a pharmaceutically acceptable carrier.

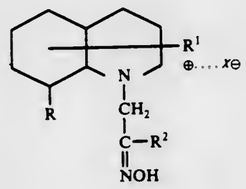
4,093,727

ALPHA-HYDROXYIMINO-ALKYLQUINOLINIUM SALTS HAVING FUNGICIDE ACTION

Luigi Abbruzzese, Milan; Franco Gozzo, S. Donato Milanese (Milan); Giorgio Rossi, Milan; Marcella Masoero, Milan; Simone Lorusso, S. Giuliano Milanese (Milan); Paola Bonola, Milan, and Gino Tamburin, S. Donato Milanese (Milan), all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Apr. 15, 1976, Ser. No. 677,247
Claims priority, application Italy, Apr. 15, 1975, 22346 A/75
Int. Cl.[2] C07D *215/10*; A61K *31/47*
U.S. Cl. 424—258 **13 Claims**

1. Alpha-hydroxyimino-akylquinolinium salts of the formula

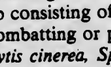


wherein:

R is H or OH;

R^1 is H or alkyl containing 1 to 5 carbon atoms;

R^2 is CN;



in which R^3 is alkyl containing 1 to 5 carbon atoms or phenyl; selected from the group consisting of Cl, Br and I.

13. The method of combatting or preventing fungine infections of plants by *Botrytis cinerea, Sphaerotheca fuliginea* and *Fusicladium dendriticum*, which comprises applying to the plants to be protected powders, suspensions or solutions of the compounds of claim 1, in an amount of at least 15 micrograms per sq. cm of foliar surface.

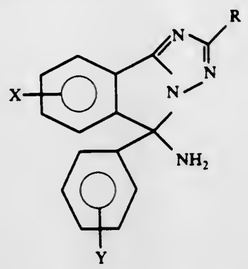
4,093,728

TRIAZOLOISOINDOLES

Peter C. Wade, Pennington, and Thomas P. Kissick, Princeton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 18, 1977, Ser. No. 825,640
Int. Cl.[2] A61K *31/41*; C07D *487/04*
U.S. Cl. 424—269 **10 Claims**

1. A compound of the structure



wherein X is hydrogen, halogen, lower alkyl, lower alkoxy, trifluoromethyl or nitro; Y is hydrogen, halogen, lower alkyl, lower alkoxy, trifluoromethyl or nitro; and R is hydrogen, lower alkyl or trifluoromethyl.

8. A pharmaceutical composition for treating inflammatory conditions in mammals or treating or preventing helminthiasis in mammals comprising a compound of claim 1 in an amount

effective for such purposes and a physiologically acceptable carrier therefor.

4,093,729

N-OXY AND N-AMINO GUANIDINES

Graham John Durant; Charon Robin Ganellin, and Geoffrey Robert Owen, all of Welwyn Garden City, England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

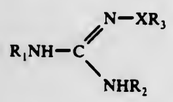
Division of Ser. No. 585,898, Jun. 11, 1975, Pat. No. 4,034,101. This application Apr. 11, 1977, Ser. No. 786,729

Claims priority, application United Kingdom, Jun. 28, 1974, 28722/74

Int. Cl.[2] C07D *277/22;* A61K *31/425*

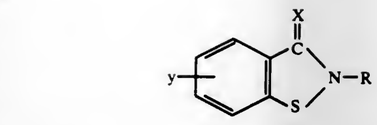
U.S. Cl. 424—270 **11 Claims**

1. A compound of the formula:



FORMULA I

wherein R_1 represents a grouping of the structure shown in the formula:



wherein:

X is either O or S;

y is H, NO_2, a halogen atom or an alkyl radical having 1–4 carbon atoms; and

R is H; a straight or branched alkyl or alkenyl radical having from 1–6 carbon atoms, optionally substituted by one or more hydroxyl or tertiary amino groups; a cycloaliphatic radical having from 3 to 8 carbon atoms; a phenyl radical, optionally substituted by halogen atoms or methoxy radicals; a benzyl or phenylethyl radical; or an acyl radical, —COR[1], wherein R^1 is an alkyl group having from 1 to 4 carbon atoms or a phenyl radical.

FORMULA II

wherein Het is thiazole, isothiazole, oxazole or isoxazole, which is optionally substituted by lower alkyl, chlorine or bromine; Z is sulphur or a methylene group; *m* is 0, 1 or 2 and *n* is 2 or 3 provided that the sum of *m* and *n* is 3 or 4; R_2 is hydrogen, lower alkyl or a grouping of the structure shown in Formula II wherein Het, *m*, *n* and Z are as defined above; X is oxygen or when R_2 is a grouping of the structure shown in Formula II, X may be NH; and R_3 is hydrogen, lower alkyl, phenyl or benzyl, or a pharmaceutically acceptable acid addition salt thereof.

9. A pharmaceutical composition to block histamine H_2-receptors comprising a pharmaceutically acceptable diluent or carrier and, in an effective amount to block histamine H_2-receptors, a compound of claim **1**.

10. A method of blocking histamine H_2-receptors which comprises administering to an animal in need of blocking of histamine H_2-receptors in an effective amount to block histamine H_2-receptors a compound of claim **1**.

11. A method of inhibiting gastric acid secretion which comprises administering to an animal in need thereof in an effective amount to inhibit gastric acid secretion a compound of claim **1**.

4,093,730

METHODS OF USING SPERMICIDAL VAGINAL COMPOSITIONS COMPRISING 1,2-BENZISOTHIAZOLE DERIVATIVES

Adriano Butti, Como, and Giovanni Gazzani, Appiano Gentile, both of Italy, assignors to Prephar Prospection de Recherches Pharmaceutiques S.A., Vordergasse, Switzerland

Filed Jun. 28, 1976, Ser. No. 700,115

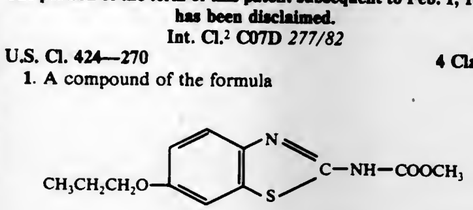
Claims priority, application Italy, Jul. 3, 1975, 25051 A/75

Int. Cl.[2] A61K *31/425*

U.S. Cl. 424—270 **15 Claims**

1. A method of contraception, comprising;

administering to a disease free human vagina immediately prior to coitus a spermatocidally effective amount of a 1,2-benzisothiazole derivative having the general formula



wherein:

X is either O or S;

y is H, NO_2, a halogen atom or an alkyl radical having 1–4 carbon atoms; and

R is H; a straight or branched alkyl or alkenyl radical having from 1–6 carbon atoms, optionally substituted by one or more hydroxyl or tertiary amino groups; a cycloaliphatic radical having from 3 to 8 carbon atoms; a phenyl radical, optionally substituted by halogen atoms or methoxy radicals; a benzyl or phenylethyl radical; or an acyl radical, —COR[1], wherein R^1 is an alkyl group having from 1 to 4 carbon atoms or a phenyl radical.

4,093,731

METHYL-6-N-PROPOXYBENZOTHIAZOLE-2-CARBAMATE AND ANTHELMINTIC PHARMACEUTICAL COMPOSITIONS THEREOF

Mohammed Mehdi Nafissi-Varchei, North Caldwell, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Mar. 7, 1977, Ser. No. 775,006

Claims priority, application Denmark, Mar. 30, 1976, 1460/76

The portion of the term of this patent subsequent to Feb. 1, 1994, has been disclaimed.

Int. Cl.[2] C07D *277/82*

U.S. Cl. 424—270 **4 Claims**

1. A compound of the formula

2. A pharmaceutical composition useful for the treatment of helminthiasis in mammals which comprises an anthelmintically effective amount of the compound of claim **1** in admixture with a suitable pharmaceutical carrier.

4,093,732

SULFOXIDE DERIVATIVES OF BENZIMIDAZOLES

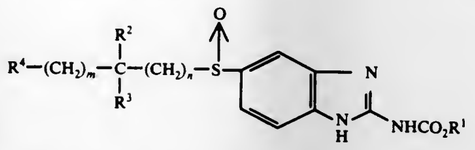
Rudiger D. Haugwitz, Titusville, and Larry R. Cruthers, Flemington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 17, 1977, Ser. No. 769,634

Int. Cl.[2] C07D *235/32;* A61K *31/415*

U.S. Cl. 424—273 R **13 Claims**

1. A compound of the structure



wherein R^1 is lower alkyl containing 1 to 7 carbons or phenyl-lower alkyl containing 1 to 7 carbons in the alkyl group, R^2 and R^3 are the same or different and are selected from the group consisting of hydrogen or lower alkyl containing 1 to 7 carbons, and R^4 is selected from the group consisting of halocycloalkyl containing 3 to 12 carbons or cycloalkenyl containing 3 to 10 carbons optionally substituted with alkyl containing 1 to 7 carbons or halo, *m* is 0 to 3, *n* is 0 to 3 and $m + n \leqq 5$.

9. A method for treating helminthiasis which comprises

administering to a mammalian host an effective amount of a pharmaceutical composition comprising an effective amount of a compound as defined in claim **1** and a pharmaceutically acceptable carrier therefor.

4,093,733

PARENTERAL SUSPENSIONS

Joel B. Portnoff, Philadelphia, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 9, 1976, Ser. No. 721,921

Int. Cl.[2] A61K *31/40*

U.S. Cl. 424—274 **2 Claims**

1. A parenteral suspension composition comprising 25 mg./ml. of total suspension of a medicament composition comprising 1-(p-chlorobenzoyl)-2-methyl-5-methoxy-3-indolyl acetic acid; 0.10 to 0.20 mg./ml. of total suspension of a deflocculating agent comprising polyoxyethylene (20) sorbitan monooleate; 9 to 12 mg./ml. of total suspension of a flocculating agent comprising benzyl alcohol; and water.

4,093,734

AMINO-BENZOIC ACID AMIDES

Gerd Krüger; Johannes Keck, both of Biberach; Klaus Reinhold Noll, Warthausen; Helmut Pieper, Biberach; Harald Ziegler, Biberach; Helmut Ballhause, Biberach, and Joachim Kühling, Biberach, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

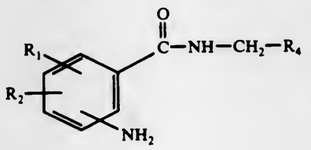
Filed Oct. 22, 1976, Ser. No. 734,818

Claims priority, application Germany, Nov. 3, 1975, 2548968; Aug. 10, 1976, 2635873; Sep. 3, 1976, 2639645

Int. Cl.[2] A61K *31/40;* C07D *207/44*

U.S. Cl. 424—274 **7 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen, chlorine or bromine,

R_2 is methyl, fluorine, chlorine, bromine, trifluoromethyl or nitro, and

R_4 is 1-(alkyl of 1 to 3 carbon atoms)-pyrrolidinyl (2),

or a non-toxic, phamacologically acceptable acid addition salt thereof.

6. An anxiolytic or anticonvulsive pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective amount of a compound of claim **1**.

4,093,735

5-SULFAMOYLBENZOIC ACID DERIVATIVES CARRYING A HETEROCYCLIC SUBSTITUENT

Dieter Bormann, Kelkheim, Taunus; Wulf Merkel, Neuenhain, Taunus, and Roman Muschaweck, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

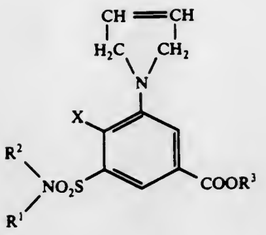
Division of Ser. No. 570,649, Apr. 23, 1975, Pat. No. 4,010,273. This application Nov. 10, 1976, Ser. No. 740,741

Claims priority, application Germany, Apr. 25, 1974, 2419970

Int. Cl.[2] C07D *207/20*

U.S. Cl. 424—274 **4 Claims**

1. A compound of the formula



and the physiologically tolerated salts thereof, wherein R^1, R^2, and R^3 are hydrogen or alkyl of 1 to 4 carbon atoms; and X is phenoxy, the phenyl ring of which may be substituted by halogen, OH, NO_2, NH_2, CF_3, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 3 carbon atoms, or dimethylamino.

4. A method of treatment which comprises administering to a patient a diuretically or saluretically effective amount of a compound as defined in claim **1**.

4,093,736

METHYLENEDIOXYPHENYL SUBSTITUTED ALIPHATIC DIKETONES

Joseph C. Collins, East Greenbush, N.Y., assignor to Sterling Drug, Inc., New York, N.Y.

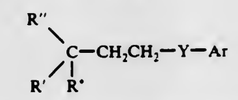
Continuation-in-part of Ser. No. 545,486, Jan. 30, 1975, which is a continuation-in-part of Ser. No. 436,611, Jan. 25, 1974, Pat. No. 3,917,718, which is a continuation-in-part of Ser. No. 265,333, Jun. 22, 1972, Pat. No. 3,829,475. This application Nov. 10, 1976, Ser. No. 740,358

Claims priority, application United Kingdom, Jun. 18, 1973, 28793/73

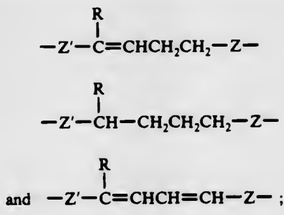
Int. Cl.[2] A01N *9/28;* A61K *31/36;* C07D *317/44*

U.S. Cl. 424—282 **22 Claims**

1. A compound of the formula



wherein Y is selected from the group consisting of



R′ is lower-alkanoyl of 2 to 6 carbon atoms;

R″ is lower-alkanoyl of 2 to 6 carbon atoms or carbo-lower-alkoxy of 2 to 6 carbon atoms;

R^0 is hydrogen, lower-alkyl of 1 to 4 carbon atoms or chloro;

R is hydrogen or lower-alkyl of 1 to 4 carbon atoms;

Z is a single bond, vinylene only when the remainder of Y is unsaturated, or ethylene only when Y is saturated;

Z′ is a single bond, methylene or ethylene; and

Ar is 3,4-methylenedioxyphenyl.

19. A composition for combatting arthropods by hindering their maturation which comprises an anti-maturation effective amount of at least one compound according to claim **1** in admixture with a suitable carrier or diluent.

20. A method for combatting arthropods by hindering their maturation which comprises treating said arthropods at any stage of their development with an anti-maturation effective

amount of at least one compound according to claim 1 in admixture with a suitable carrier or diluent.

21. A composition for combatting viruses which comprises an antivirally effective amount of at least one compound according to claim 1 in admixture with a suitable carrier or diluent.

22. A method for combatting viruses which comprises contacting the locus of said viruses with a composition containing an antivirally effective amount of at least one compound according to claim 1 in admixture with a suitable carrier or diluent.

4,093,737

ETHYNYLBENZENE COMPOUNDS AND DERIVATIVES THEREOF IN THE TREATMENT OF PAIN, FEVER OR INFLAMMATION

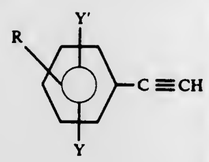
Julius Diamond, Lafayette Hill, Pa., assignor to William H. Rorer, Inc., Fort Washington, Pa.

Division of Ser. No. 574,837, May 14, 1975, which is a continuation of Ser. No. 431,254, Jan. 7, 1974, Pat. No. 3,923,910, which is a division of Ser. No. 268,419, Jul. 3, 1972, Pat. No. 3,852,364. This application Jan. 11, 1977, Ser. No. 758,459

Int. Cl.[2] A61K *31/275;* **C07C** *120/50*

U.S. Cl. 424—304 **14 Claims**

1. A method of treating inflammation, pain or fever in a warm blooded animal which comprises administering to the animal an effective amount of an active agent which is a compound of the formula:



where

R is hydrogen,
alkyl of 1 to 7 carbon atoms,
cycloalkyl of 5 to 7 carbon atoms,
1 to 7 carbon atoms alkyl substituted cycloalkyl of 5 to 7 carbon atoms,
cycloalkenyl of 5 to 7 carbon atoms phenyl or substituted phenyl where the substituent is Y";

Y and Y' are each selected from the group consisting of hydrogen and cyano;

Y" is selected from the group consisting of Y, lower alkyl of 1 to 7 carbon atoms, and trifluoromethyl,

with the proviso that at least one of Y and Y' is cyano.

4,093,738

MICROBICIDALLY-ACTIVE ACYLATED ANILINO-CARBOXYLIC ACID ESTERS AND THEIR COMPOSITIONS

Adolf Hubele, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

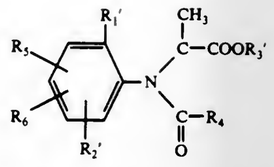
Continuation-in-part of Ser. No. 564,016, Apr. 1, 1975, abandoned. This application Sep. 16, 1976, Ser. No. 723,825

Claims priority, application Switzerland, Apr. 9, 1974, 4998/74; Mar. 7, 1975, 2906/75

Int. Cl.[2] A61K *31/24;* **C07C** *101/18*

U.S. Cl. 424—309 **16 Claims**

1. A compound of the formula Ia



Ia

wherein

R_1' represents methyl

R_2' represents methyl, ethyl or chlorine

R_5 represents hydrogen, alkyl of 1 to 3 carbon atoms or halogen and

R_6 represents hydrogen or methyl; the total number of carbon atoms in R_1', R_2', R_5, R_6 not exceeding 4;

R_3' represents methyl and

R_4 represents alkyl of 2 to 4 carbon atoms, alkenyl of 2 to 4 carbon atoms or cycloalkyl of 3 to 4 carbon atoms.

9. A microbicidal composition containing as active substance an effective amount of a compound as claimed in claim 1, together with a suitable carrier therefor.

4,093,739

MERCAPTOACYLAMIDOBENZOYL GLYCINE AND MUCOLYTIC PROCESS

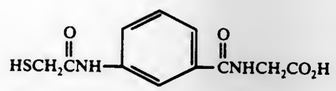
Tellis Alexander Martin, Evansville, Ind., assignor to Mead Johnson & Company, Evansville, Ind.

Filed Jun. 15, 1977, Ser. No. 806,877

Int. Cl.[2] A61K *31/205;* **C07C** *149/00*

U.S. Cl. 424—316 **19 Claims**

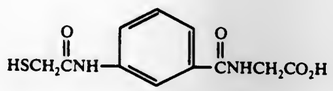
1. A compound selected from the group consisting of N-[3-(mercaptoacetylamino)benzoyl]glycine characterized by formula I



(I)

and a pharmaceutically acceptable salt thereof.

12. A process for liquefaction of mucus which comprises contacting said mucus with a mucolytic effective amount of a compound selected from the group consisting of N-[3-(mercaptoacetylamino)benzoyl]glycine characterized by Formula I



(I)

and a pharmaceutically acceptable salt thereof.

4,093,740

FODDER FOR RUMINANTS

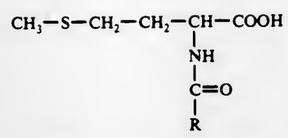
Rudolf Fahnenstich, Strotzbach; Joachim Heese, Grossauheim, both of Germany, and Dyfed Lewis, Loughborough, England, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Feb. 16, 1973, Ser. No. 330,110

Int. Cl.[2] A61K *31/195*

U.S. Cl. 424—319 **4 Claims**

1. A process of feeding sheep having a paunch containing a microflora of bacteria and protozoa which normally break down added synthetic aminoacids comprising feeding them fodder which goes to the paunch, said fodder containing an N-acyl-methionine of the formula



where R is an aliphatic hydrocarbon having 7 to 19 carbon atoms as a source of methionine which is not broken down in said paunch, the N-acyl-methionine being present in an amount effective to increase the growth of wool on sheep.

4,093,741

PROCESS FOR REDUCING BLOOD SUGAR CONCENTRATION IN A MAMMAL

Frederick A. Grunwald, Evansville, Ind., assignor to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 604,971, Aug. 15, 1975, Pat. No. 3,998,879, which is a division of Ser. No. 478,497, Jun. 12, 1974, Pat. No. 3,917,692. This application Oct. 20, 1976, Ser. No. 734,154

Int. Cl.[2] A61K *31/18*

U.S. Cl. 424—321 **6 Claims**

1. A process for reducing blood sugar concentration in a mammal which comprises administering to a mammal requiring blood sugar reduction an effective amount ranging from 3 to 200 mg./kg. body weight of said mammmal to exert a blood sugar reducing effect of a compound selected from the group consisting of

5,5-dimethyl-2-(N-p-toluenesulfonylcarbamoyl)-1,3-cyclohexanedione;

5-ethyl-2-(N-p-toluenesulfonylcarbamoyl)-1,3-cyclohexanedione;

5-isopropyl-2-(N-p-toluenesulfonylcarbamoyl)-1,3-cyclohexanedione;

5-tert.-butyl-2-(N-p-toluenesulfonylcarbamoyl)-1,3-cyclohexanedione;

2-(N-p-chlorobenzenesulfonylcarbamoyl)-5,5-dimethylcyclohexane-1,3-dione and pharmaceutically acceptable basic salts thereof.

4,093,742

ANTI-HYPERTENSIVE POLYHALOISOPROPYL-SUBSTITUTED ARYLUREAS

Bernard R. Neustadt, West Orange, N.J., assignor to Schering Corporation, Kenilworth, N.J.

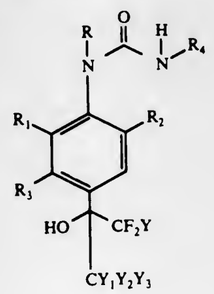
Continuation-in-part of Ser. No. 528,603, Dec. 2, 1974, abandoned. This application May 4, 1976, Ser. No. 683,104

Claims priority, application Switzerland, Nov. 21, 1975, 15164/75

Int. Cl.[2] A61K *31/17;* **C07C** *127/19*

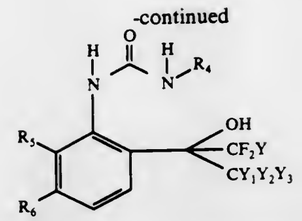
U.S. Cl. 424—322 **20 Claims**

1. A compound of the formula:



(Ia)

-continued



(Ib)

wherein R_4 is hydrogen or a methyl, ethyl, 2-chloroethyl or a 2-bromoethyl group;

R_1, R_2 and R_3 are independently hydrogen, fluorine, chlorine, bromine, aminocarbonyl, lower alkyl, lower alkoxy, lower alkoxycarbonyl, hydroxy lower alkyl or nitro;

Y, Y_1, Y_2 and Y_3 are independently hydrogen, fluorine or chlorine;

R is hydrogen, alkyl having 1 to 4 carbon atoms, lower alkoxy lower alkyl or lower dialkoxy lower alkyl;

R_5 and R_6 are hydrogen or a lower alkyl group or R_5 and R_6 together complete a 5 or 6 carbon fused hydrocarbon ring which may be saturated or aromatic and which may be optionally substituted by a lower alkyl group.

16. A pharmaceutical composition adapted to treat hypertension comprising an oral dosage form of an effective antihypertensive amount of a compound of claim 1, in a pharmaceutically acceptable diluent.

4,093,743

NOVEL BENZOIC ANILIDE DERIVATIVE AND FUNGICIDE CONTAINING SAME

Kunihiro Yabutani, Izumi; Kenichi Ikeda, Toyonaka; Shigenori Hatta, Sakai, and Tatsuo Harada, Kawachinagano, all of Japan, assignors to Nihon Nohyaku Co., Ltd., Tokyo, Japan

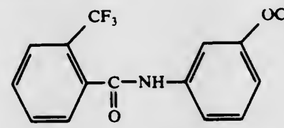
Filed Jul. 11, 1977, Ser. No. 814,714

Claims priority, application Japan, Jul. 12, 1976, 51-82711; Jun. 20, 1977, 52-73024

Int. Cl.[2] A01N *9/20;* **C07C** *103/76*

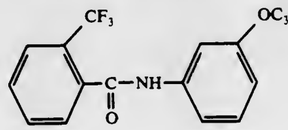
U.S. Cl. 424—324 **3 Claims**

1. The benzoic anilide derivative represented by the structural formula (I):



(I)

3. A method for controlling fungal diseases of agricultural and horticultural crops, which comprises applying to said crops a fungicidally effective amount of the compound represented by the structural formula (I),



(I)

4,093,744
KILLING BACTERIAL SPORES WITH GLUTARALDEHYDE SPORICIDAL COMPOSITIONS
Murray W. Winicov, Queens, N.Y., and Abraham Cantor, Elkins Park, Pa., assignors to West Laboratories, Inc., Long Island City, N.Y.
Continuation of Ser. No. 157,681, Jun. 28, 1971, abandoned.
This application Jul. 17, 1975, Ser. No. 596,637
Int. Cl.[2] A01N *9/24*
U.S. Cl. 424—333 3 Claims

1. A process for killing bacterial spores on medical appliances and apparatus which comprises immersing the same in a sporicidal composition comprising:
(a) a solvent consisting of water
(b) about 2 to 4% by weight glutaraldehyde, and
(c) 0.1 to 10% by weight of a surface active agent selected from the group consisting of the nonionic surface active agents which are alkylphenol ethoxylates, polyoxypropylene ethoxylates, butoxy derivatives of propylene oxide-ethylene oxide block polymers, and primary alkanol ethoxylates; the anionic surface active agents which are sulfated alcohols, sulfated alcohol ethoxylates, linear alkane sulfonates, and fluorinated anionic detergents; and the ampholytic surface active agent, disodium - N - lauryl - β - imino - dipropionate,
and being further characterized as having a pH of 7.0 ± 0.3.

4,093,745
METHOD FOR PRODUCING A PRILLED UREA BATH BEAD COMPOSITION
Donald C. Wood, Des Plaines, and Robert L. McLaughlin, Wilmette, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.
Continuation-in-part of Ser. No. 635,282, Nov. 26, 1975. This application Jun. 25, 1976, Ser. No. 699,982
Int. Cl.[2] A61K *7/50*
U.S. Cl. 424—358 15 Claims

1. A method for producing a non-segregating, free-flowing bath bead composition which comprises admixing urea prills with an oily liquid emollient in an amount of at least about 0.2 to about 10 weight percent, based on the weight of the prills, distributing said emollient substantially uniformly on said prills to provide emollient-bearing prills, adding to said emollient-bearing prills a powdered surfactant in an amount to provide about 1 to about 15 weight percent, based on the weight of the composition, and agitating the mixture of emollient-bearing prills and powdered surfactant while said emollient is absorbed or adsorbed into said prills to produce a free-flowing particulate composition in which the surfactant remains associated with the beads in a non-segregating fashion.

12. A method of producing a bath bead composition which comprises:
providing urea prills having moisture on the surface thereof in an amount sufficient to solubilize a water-soluble dye;
commingling said prills and a water-soluble dye to distribute said dye over the surface of said prills thereby producing dyed prills;
contacting the dyed prills with an absorbable liquid emollient to provide on the dyed prills at least about 0.2 to about 10 weight percent of the emollient, based on the weight of the prills to provide emollient-bearing prills; and
coating the emollient-bearing prills with a powdered surfactant in an amount to provide about 1 to about 15 weight percent, based on the weight of the composition.

4,093,746
METHOD OF AND FODDER FOR REARING WHITE-MEAT CALVES FOR SLAUGHTER
Germano Cagliero, Ivrea (Turin), Italy, assignor to Marxer S.p.A., Turin, Italy
Filed Apr. 7, 1977, Ser. No. 785,515
Claims priority, application Italy, Apr. 23, 1976, 67991 A/76
Int. Cl.[2] A23K *1/00*
U.S. Cl. 426—2 4 Claims

1. Method of increasing the growth rate of white-meat calves for slaughter, comprising systematically feeding the calves with reconstituted milk containing 40–60 ppm of nifuroxazide on a dry weight basis for substantially the entire period of growth.

4,093,747
METHOD OF AND FODDER FOR PIG-RAISING
Germano Cagliero, Ivrea (Turin), Italy, assignor to Marxer S.p.A., Turin, Italy
Filed Apr. 7, 1977, Ser. No. 785,459
Claims priority, application Italy, Apr. 23, 1976, 67990 A/76
Int. Cl.[2] A23K *1/00*
U.S. Cl. 426—2 4 Claims

1. Method of increasing the growth rate of pigs in the weaning stage, comprising feeding the pigs with a fodder containing from 50 to 70 ppm of nifuroxazide.

4,093,748
PROCESS FOR THE PREPARATION OF BREAD
Shin-Ichiro Akatsuka, Tokorozawa; Shozo Akutsu, Komae, and Michio Uchida, Yokohama, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan
Filed Dec. 27, 1976, Ser. No. 754,264
Claims priority, application Japan, Dec. 27, 1975, 50-155755
Int. Cl.[2] A21D *2/08, 2/34*
U.S. Cl. 426—19 7 Claims

1. A process for the preparation of bread including the conventional steps of kneading, fermentation and baking, which comprises adding a mixture of a yeast extract selected from the group consisting of beer-yeast extract, sake-yeast extract, soy-yeast extract, and wine-yeast extract, and hydrolyzed egg-white to wheat flour, wherein the yeast extract is added in an amount from 0.025 to 0.075%, and the hydrolyzed egg-white is added in an amount from 0.5 to 1.5% on the basis of the amount of wheat flour.

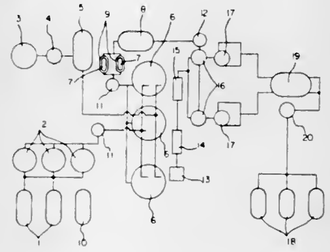
4,093,749
PREPARATION OF YEAST LEAVENED DOUGH PRODUCTS
George P. Sternberg, 727 W. 46th St., Kansas City, Mo. 64112
Continuation-in-part of Ser. No. 525,359, Nov. 20, 1974, abandoned. This application Aug. 9, 1976, Ser. No. 712,721
Int. Cl.[2] A21D *2/04, 2/14*
U.S. Cl. 426—20 11 Claims

1. A method of making a yeast leavened dough product comprising the steps of:
mixing dough ingredients consisting of flour, water, yeast, a starch digesting agent and monosodium glutamate, said monosodium glutamate added in the amount of 0.001 to 0.010 percent by weight of the flour content;
relaxing said dough at the completion of said mixing step; and
machining, proofing and baking said dough.

4,093,750
BEVERAGES CONTAINING POLYGLYCEROL ESTER CLOUD
Vigen K. Babayan, Indianapolis, Ind., assignor to Stokely-Van Camp Inc., Indianapolis, Ind.
Continuation of Ser. No. 496,550, Aug. 12, 1974, abandoned. This application Jun. 25, 1976, Ser. No. 699,997
Int. Cl.[2] H23L *2/00*
U.S. Cl. 426—250 23 Claims

1. A pasteurized beverage consisting essentially of
(a) from about 0.002% to about 2% of a polyglycerol ester of a fatty acid;
(b) from about 0.02% to about 2% of a citrus oil;
(c) a sweetening agent to provide sweetening equivalent to from about 5% to about 15% sucrose;
(d) sufficient acid to cause the beverage to have a pH of from 2.5 to 4.5; and
(e) from 84% to about 99% water.

4,093,751
PROCESS FOR TREATING MILK-COFFEE MIXTURES IN SEALED CONTAINERS TO ELIMINATE INCONSISTENCY AND DETERIORATION IN TASTE
Tadao Ueshima, 16-go, 2-ban, Takamaru, 1-chome, Tarumi-ku, Kobe-shi, Japan
Filed Oct. 8, 1975, Ser. No. 620,785
Claims priority, application Japan, Oct. 9, 1974, 49-116458
Int. Cl.[2] A23F *1/12;* B05B *3/00*
U.S. Cl. 426—407 1 Claim

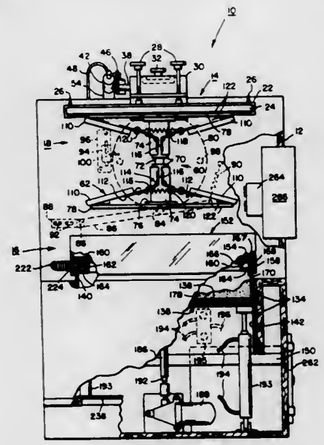


1. An improved process for treating milk-coffee mixtures in sealed containers to eliminate inconsistency and deterioration in taste, wherein a hot milk-coffee which has been previously heated to a temperature of 90° to 95° C is continuously introduced into containers which are then continuously sealed, and wherein the sealed containers are permitted to accumulate in number for subsequent pasteurization or sterilization as a group, in a batch-type pressure tank, wherein the improvement comprises:
rapidly force cooling the sealed accumulated containers containing the hot milk-coffee mixture from 90° to 95° C to about 40° C in about 5 minutes, allowing the cooled containers to further cool naturally in ambient air to about room temperature and pasteurizing or sterilizing the accumulated containers in the batch-type pressure tank.

4,093,752
FLAVORING WITH 2,4,6-TRIISOBUTYL-1,3,5-TRIOXANE
Donald Arthur Withycombe, Lincroft; Braja Dulal Mookherjee, Holmdel; Manfred Hugo Vock, Locust, and Joaquin Francisco Vinals, Red Bank, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.
Filed Jun. 16, 1977, Ser. No. 807,056
Int. Cl.[2] A23L *1/226*
U.S. Cl. 426—536 2 Claims

1. A process for augmenting or enhancing the organoleptic properties of a foodstuff comprising the step of adding to said foodstuff 5.0 parts per million up to about 100 parts per million based on total composition of 2,4,6-triisobutyl-1,3,5-trioxane.

4,093,753
METHOD OF APPLYING FLOCK TO A SUBSTRATE
Joseph E. Geary, Rochester; Joseph Pelensky, Perry, and John Peter Hart, Leicester, all of N.Y., assignors to Champion Products Inc., Rochester, N.Y.
Division of Ser. No. 714,475, Aug. 16, 1976. This application Jul. 18, 1977, Ser. No. 816,311
Int. Cl.[2] B05D *1/06, 1/12, 1/36*
U.S. Cl. 427—21 4 Claims



1. A method for flocking a substrate comprising:
(a) providing a flocking apparatus including a cabinet, a substrate holding turret with a horizontal rotatable shaft having two substrate holding metal platens diametrically opposed thereon, a screen printing apparatus located above the turret, a flocking tray located below the turret, and detent means on the turret apparatus for registering one platen with the screen printing apparatus for printing an adhesive onto the substrate associated therewith and the other platen with the flocking apparatus,
(b) positioning a high voltage metallic electrode in said flocking tray,
(d) establishing an electric field between said electrode and the platen associated therewith,
(c) and forming said cabinet and flocking tray of non-metallic materials, whereby the flock will move in a parallel, dense, straight and uniform direction from said flock tray to a printed substrate on the lowermost platen when said electric field is established and while a substrate on the uppermost platen is being printed.

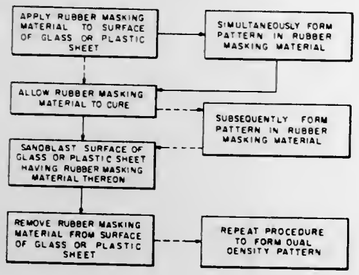
4,093,754
METHOD OF MAKING DECORATIVE PANELS
Robert C. Parsons, 8003 Inwood Rd., Dallas, Tex. 78413
Filed Apr. 15, 1976, Ser. No. 677,363
Int. Cl.[2] B24C *3/06;* G03C *5/00;* B41N *1/24;* E06B *7/20*
U.S. Cl. 427—259 1 Claim

1. A method of making decorative panels comprising:
forming a predetermined pattern on a screen such that a portion of the screen corresponding to the pattern permits the flow of liquid therethrough;
applying liquid elastomeric masking material to a surface of a panel through the screen thereby applying the liquid elastomeric material to the surface of the panel in accordance with the pattern;
curing the liquid elastomeric masking material on the surface of the panel and thereby forming a substantially solid

masking layer on the surface of the panel in accordance with the predetermined pattern;

impinging a high velocity stream of particulate material onto the surface of the panel having the masking layer thereon and thereby visually differentiating the unmasked portion of the surface of the panel from the masked portions thereof;

subsequently removing the masking layer to provide a panel having visually differentiated areas corresponding to the previously masked and the previously unmasked portions of the surface of the panel;



reapplying liquid elastomeric masking material to the surface of the panel through a second screen having a different pattern thereon thereby applying the liquid elastomeric material to the surface of the panel in accordance with the pattern on the second screen;

curing the liquid elastomeric masking material on the surface of the panel; and

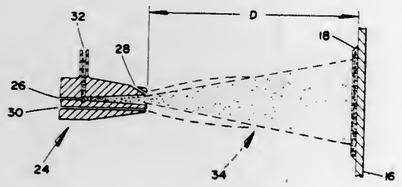
impinging a high velocity stream of particulate material onto the surface of the panel having the masking layer thereon thereby visually differentiating the unmasked portion of the surface of the panel from the masked portions thereof to form a panel having a dual density pattern.

4,093,755

METHOD FOR MAKING A LIQUID HEAT EXCHANGER COATING

Michael M. Dahl, Lakewood, and Lester D. Erb, Littleton, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Division of Ser. No. 546,063, Jan. 31, 1975, Pat. No. 3,990,862.
This application Jul. 26, 1976, Ser. No. 708,960
Int. Cl.² B05D *1/02, 1/08*
U.S. Cl. 427—299 **7 Claims**



1. A method for making a liquid heat exchanger coating comprising the steps of:

heating a plurality of powder particles of oxide film forming metal in an oxygen rich atmosphere and forming a metallic oxide film on the particles;

moving the particles with a stream of oxygen rich gas while simultaneously heating a plurality of the particles to at least a plastic state and some of the particles to a molten state;

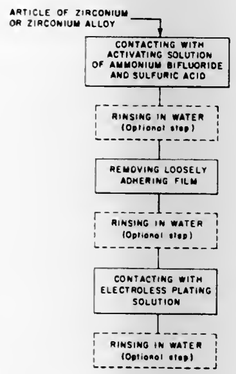
impacting a plurality of the particles against a metallic substrate and against themselves partially deforming, securing and mechanically interlocking a plurality of the particles to the substrate and to portions of each other, breaking the oxide film and fusing some of the molten particles to portions of each other and forming unconnected portions between a plurality of particles that define a plurality of open nucleation cells and the unconnected portions also forming porous interconnections between nucleation cells.

4,093,756

PROCESS FOR ELECTROLESS DEPOSITION OF METALS ON ZIRCONIUM MATERIALS

Robert E. Donaghy, Wilmington, N.C., assignor to General Electric Company, San Jose, Calif.

Filed Oct. 4, 1976, Ser. No. 729,860
Int. Cl.² C23C *3/02*
U.S. Cl. 427—304 **19 Claims**



1. A process for electroless deposition of a metal film on an article comprised of zirconium or a zirconium alloy comprising the steps of

(a) activating the article in an aqueous activating solution consisting essentially of from about 10 to about 20 grams per liter of ammonium bifluoride and from about 0.75 to about 2 grams per liter of sulfuric acid, the solution being aged by immersion of pickled zirconium in said solution for about 10 minutes,

(b) removing any loosely adhering film formed on the article in the activating step, and

(c) contacting the article with an electroless plating solution capable of plating the activated article and containing the metal to be deposited thereon upon sufficient contact with the article.

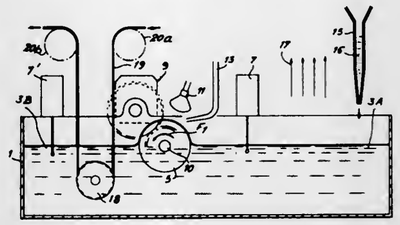
4,093,757

METHOD OF FORMING AND DEPOSITING MONOMOLECULAR LAYERS OF AMPHIPHILIC MOLECULES ON A SUBSTRATE

André Barraud, Bures-sur-Yvette; Roger Gras, Villiers le Bacle, and Michel Vandevyver, Chatenay Malabry, all of France, assignors to Commissariat a l'Energie Atomique, France

Filed Feb. 2, 1977, Ser. No. 765,063
Claims priority, application France, Feb. 11, 1976, 76 03756
Int. Cl.² B05D *1/20*
U.S. Cl. 427—434 A **11 Claims**

1. A method for producing and depositing a monomolecular layer of amphiphilic molecules on a substrate, of the type comprising a first step of formation of said layer from a solution of said molecules in a suitable solvent by introduction of said solution on a liquid surface and by removal of the solvent, a second step of application of a predetermined surface pressure to the layer thus formed and a third step of deposition of said layer on a substrate, wherein the operation is performed on a liquid surface divided into at least first and second adjacent liquid containing compartments, at least two adjacent compartments being separated by a horizontal member which is partly immersed in said liquid and capable of rotating on its own axis, wherein the solution of said molecules is introduced into said first compartment, wherein removal of the solvent is carried out and wherein transfer of the molecules of the monomolecular layer and application of a predetermined surface pressure to the layer thus formed are carried out by transferring said layer from said first compartment to at least said second adjacent compartment by imparting rotational motion to said member which provides a separation between said compartments.



4,093,758

ARTIFICIAL CHRISTMAS TREE WITH FOLDABLE BRANCHING AND METHOD OF MAKING SAME

Robert J. Weskamp, Prospect Heights, and Robert H. Barclay, Monee, both of Ill., assignors to Industrial Park Machine & Tool Co, Inc., South Chicago Heights, Ill.

Continuation of Ser. No. 631,446, Nov. 13, 1975, abandoned.
This application May 31, 1977, Ser. No. 801,652
Int. Cl.² A47G *33/06*
U.S. Cl. 428—8 **3 Claims**

1. In an artificial Christmas tree of the type including a central trunk and a plurality of branches pivotally movable to and from positions outstanding from said trunk and from and to positions substantially co-axial with said trunk, the improvement comprising an improved means for pivotally mounting at least one of said branches on said trunk, said improved means comprising:

the provision of a hole in said trunk;

a pivotal mounting member having a rear end portion press fitted into said hole, a front end portion extending outwardly from said trunk and a pivot member mounted on said front end portion rearwardly of the front end thereof; said front end portion of said pivot mounting being U-shaped, said pivot member extending between the legs of said U in spaced relation with the bight thereof, said one branch having its rear end pivotally mounted about said pivot member whereby, when said branch is pivotally moved to its outstanding position, it engages the front end of said front end portion to be held thereby in said outstanding position;

said U-shaped front end portion having a pair of aligned apertures for mounting said pivot member, one of said apertures having a larger diameter than the other, and said pivot member being formed of elastically deformable material and comprising a head having a diameter larger than said one aperture, a shank having a head end portion of diameter smaller than said one aperture and larger than the other and a tapered tail end portion, said shank further including a circumferential groove at the junction of said head and tail end portions of width greater than the length of said other aperture wherein said pivot member is an integral member injection molded from plastic, the edge of said groove on the tail end portion having a diameter greater than the diameter of said other aperture, said shank further having a slot extending across said shank from the tail end thereof to at least the plane of the edge of said groove on the head end portion of said shank, said slot being of sufficient width to permit inward flexing of said tapered end of said shank so that it can clear said other aperture when forced therethrough, whereby when said pivot member is moved longitudinally through said one aperture the tail end portion can be forced through said other aperture until said groove registers therewith, whereupon said tail end portion will elastically expand to dispose the portion of said leg surrounding said other aperture into said groove to hold said pivot member in said position.

4,093,759

GLASS CONTAINER COATED WITH POLYURETHANE

Akira Otsuki; Michihisa Naito; Yukifumi Mashimo, and Akira Ikeda, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 428,586, Dec. 26, 1973, abandoned.
This application Feb. 17, 1976, Ser. No. 658,789
Claims priority, application Japan, Dec. 23, 1972, 47-128840
Int. Cl.² B65D *1/02*
U.S. Cl. 428—35 **4 Claims**

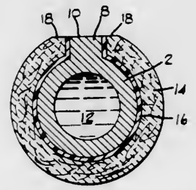
1. A glass container carrying on the surface thereof a single layer coating of a transparent non-tacky film in a thickness of at least 100 microns and having a tensile strength of at least 300 kg/cm² and a percent elongation of at least 200%, said film being a cured high molecular weight compound formed by the reaction of a powder having a particle diameter of about 1 to 100 microns of a solid compound having a melting point of more than 20° C. selected from the group consisting of melamine, benzoguanamine, and acetoguanamine with 0.9 to 1.5 equivalents per equivalent of said powder of a urethane prepolymer which is normally liquid and has at least 2 isocyanate groups and has a molecular weight of at least 400 per isocyanate group, said coating having been cured at a temperature of 180° to 200° C.

4,093,760

SKID PIPE INSULATION FOR STEEL MILL REHEATING FURNACES

Martin Bernard O'Malley, Pittsburgh, Pa., assignor to Johns-Manville Corporation, Denver, Colo.

Filed May 26, 1976, Ser. No. 690,220
Int. Cl.² B29C *17/04*
U.S. Cl. 428—36 **13 Claims**



1. The method of insulating a steel mill reheat furnace skid pipe which comprises adhering to said skid pipe an unbonded, unreinforced batt of refractory fiber, said batt being disposed in adhered position so that no significant portion thereof extends

above the level of the top of the rail projection of said skid pipe.

12. An insulating structure for a steel mill reheat furnace skid pipe formed according to the method of claim 1.

4,093,761

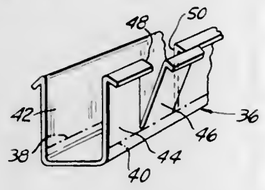
SHEET WITH BREAKAWAY LINE

Philip W. Taylor, Howell, Mich., assignor to Taylor Industries, Inc., Howell, Mich.

Continuation-in-part of Ser. No. 232,730, Mar. 8, 1972, abandoned. This application Aug. 19, 1974, Ser. No. 498,653

Int. Cl.² B65D *65/28;* G09F *3/00;* B32B *3/04*

U.S. Cl. 428—43 **3 Claims**



1. A sheet of extruded plastic material having a breakaway line disposed substantially parallel to an edge of said sheet, said sheet being of substantially constant thickness and said breakaway line being a non-apparent line of reduced elasticity along an autogenous weakened bond of said plastic material, said breakaway line being formed during extrusion of said sheet by causing the flow of plastic material to separate and rejoin along said line.

2. The sheet of extruded plastic material of claim 1 wherein said sheet is in the form of a U-shaped channel structure having a base portion and a pair of substantially parallel side walls integral with said base portion, and wherein at least one of said side walls is of said substantially constant thickness from bottom to top and has said breakaway line of reduced elasticity parallel to the top edge of said side wall proximate the base portion of said channel.

4,093,762

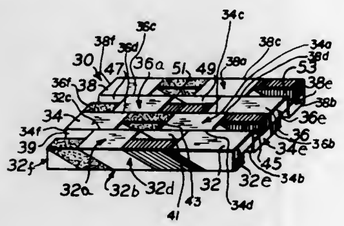
METHOD OF MAKING A HARDCORE HONEYCOMB PANEL AND HONEYCOMB PANEL MADE THEREBY

John Kiefer, 713 E. 6th St., New York, N.Y. 10019

Continuation-in-part of Ser. No. 465,493, Apr. 30, 1974, Pat. No. 3,895,144, which is a continuation-in-part of Ser. No. 351,671, Apr. 16, 1973, abandoned, which is a continuation of Ser. No. 118,216, Feb. 24, 1971, abandoned. This application Jul. 11, 1975, Ser. No. 595,055

Int. Cl.² B32B *3/14, 3/20, 5/12*

U.S. Cl. 428—55 **20 Claims**



1. A method of making a hardcore panel comprising the steps of providing a stack of predetermined width comprising a first plurality of parallel substantially uniform first width planar boards of grained lumber and a second plurality of parallel planar boards of grained lumber having a second substantially uniform width less than said first width with said first and second plurality of boards being fastened together and arranged in said stack in step-wise fashion in a plurality of levels with said first width being substantially equivalent to said stack width, said stack having opposed top and bottom parallel faces, opposed front and rear faces and a pair of opposed parallel side faces, with the top and bottom faces and side faces being substantially planar and the front and rear faces being stepped from said bottom to said top face, said first width planar boards comprising said bottom and said top faces of said stack, said bottom face comprising the bottom level of said stack and said top face comprising the top level of said stack with said second plurality of planar boards being arranged in alternate levels with said first plurality of boards in said stack and with each of said alternate levels comprised of said second plurality of boards being comprised of at least a pair of substantially uniformly spaced apart second width planar boards forming a longitudinally extending channel in said stack; initially completely cutting said stepped stack along a first cut line through said faces from said face to side face at a predetermined acute angle between said first cut line and said bottom face to provide a substantially planar front face normal to said first cut line, said front face being sloped between said parallel planar top and bottom faces at said acute angle with respect to the plane of said bottom face; completely cutting said initially cut stepped stack at a predetermined distance from said first cut line along said side face along a second cut line through said side faces from side face to side face at said predetermined acute angle between said second cut line and said bottom face to provide a first cut portion from said stepped stack having a substantially planar rear face for said first cut portion normal to said second cut line, said first cut portion front and rear faces being parallel completely cutting said first cut portion through said first cut portion front face from said first cut portion front face to said first cut portion rear face along a third cut line normal to said bottom face to provide a first plurality of substantially identical cut segments each having said first cut portion sloping front and rear faces and whose top, front, bottom and rear faces are rectangular and whose side faces are rhomboidal, each of said first plurality of cut segments comprising said stack between said top and bottom faces with the top and bottom faces of each board in said stack being parallel to said cut segment top and bottom faces; and fastening said cut segments together with said front faces in a common plane with alternate adjacent fastened segments being rotated 180° about a longitudinal axis through the center of said segment parallel to said front face slope to provide a top and bottom surface for said fastened segments comprising alternating inverted sloping surfaces of said segment top and bottom faces whose slope is at an angle supplementary to said acute angle to provide said panel with a portion of said sloping surfaces defining sloping channels in said panel, whereby a honeycomb hardwood panel is provided.

14. A hardcore panel comprising a plurality of adjacent batten-like members fastened together in a substantially planar configuration, each of said batten-like members having a top face, an opposed bottom face, a pair of opposed side faces, each of said faces being substantially normal to the adjacent face of said batten-like member, each of said batten-like members comprising a fastened plurality of stacked adjacent board segments of grained lumber, each of said segments having a top face, an opposed bottom face, a pair of opposed end faces and a pair of opposed side faces, said board segments being stacked along the longitudinal axis of said batten-like member from one of said batten-like member end faces to said opposed end face, at least a portion of said board segments defining a channel therethrough, said adjacent board segment end faces being fastened together and being substantially parallel to each other, said adjacent board segments top, bottom and side faces comprising said batten-like member top, bottom and side faces respectively, each of said segment adjacent end faces for every other one of said fastened batten-like members in said plurality forming a predetermined acute angle with said longitudinal axis, each of said adjacent end faces comprising said batten-like members adjacent to said every other one in said plurality forming a predetermined obtuse angle with said longitudinal

axis which is supplementary to said predetermined acute angle, whereby a honeycomb panel is provided.

4,093,763

MULTIPLE-LAYERED NON-WOVEN FABRIC

Ludwig Hartmann, Kaiserslautern; Paul F. Maahs, Bad Durkheim; Lüder Gerking, Kaiserslautern; Ivo Ruzek, Kaiserslautern, and Eberhard Schäfer, Kaiserslautern, all of Germany, assignors to Lutravil Spinnvlies GmbH & Co., Kaiserslautern, Germany

Filed Oct. 9, 1975, Ser. No. 621,069

Claims priority, application Germany, Oct. 10, 1974, 2448299

Int. Cl.² B32B *27/34, 27/36*

U.S. Cl. 428—95 **13 Claims**

1. A multiple-layered non-woven fabric suitable as a backing for tufted carpet, comprising randomly oriented synthetic filaments having points of bonding therebetween, said fabric exhibiting substantially isotropic strength parameters over its surface, said fabric having a weight per unit area of between about 100 and 150 metric pounds/m², said fabric having in an untufted condition a specific strength parameter A equaling at least 130, wherein

$$A = \frac{\text{Breaking load of a 5 cm. wide strip in p}}{\text{Weight per unit area in p/m}^2}$$

and said fabric having, after tufting with a continuous synthetic filament, a strength parameter B≧ 0.9 A, but at least 140, wherein

$$B = \frac{\text{Breaking load of a 5 cm wide strip in p, measured along the tuft rows}}{\text{Weight per unit area of the fabric in p/m}^2}$$

and a strength parameter C≧ 0.8 A, but at least 120, wherein

$$C = \frac{\text{Breaking load of a 5 cm wide strip in p, measured transverse to the tuft rows}}{\text{Weight per unit area of the fabric in p/m}^2}$$

said points of bonding between said randomly oriented continuous synthetic filaments being clearly graduated with respect to their number, magnitude and configuration over the thickness of said fabric, with both sides of said fabric differing from each other as regards said filament bonding.

4,093,764

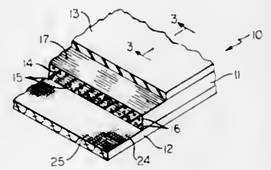
COMPRESSIBLE PRINTING BLANKET

John C. Duckett, Clyde, and Andrew J. Gaworowski, Waynesville, both of N.C., assignors to Dayco Corporation, Dayton, Ohio

Filed Oct. 13, 1976, Ser. No. 731,888

Int. Cl.² B32B *5/22, 5/12, 3/26*

U.S. Cl. 428—113 **18 Claims**



1. A compressible printing blanket comprising, a woven base ply, a rubber printing face, and a compressible body disposed between said base ply and said printing face, said compressible body comprising an elastomeric matrix having voids disposed therein substantially uniformly and a plurality of needle-punched layers of discontinuous fibers bonded together by said matrix as a single mass, each of said layers having its fibers disposed in substantially parallel relation and substantially uniformly throughout the layer with the fibers in each layer being disposed transverse and against the fibers of an adjoining layer to define a compacted sheet of oriented discrete fibers which results in a uniform embedment of fibers throughout said matrix, said uniform embedment of said fibers resulting in said uniform disposal of said voids and providing more precise control of the compression and resiliency characteristics of said body at each location throughout, said body assuring satisfactory operation of said blanket over a substantial range of interference between said blanket and printing means associated therewith, said voids comprising about 40-60% of the volume of the compressible body.

4,093,765

SOFT ABSORBENT FIBROUS WEB AND DISPOSABLE DIAPER INCLUDING SAME

Frank P. Schmidt, Cheltenham Township, Montgomery County, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Feb. 13, 1976, Ser. No. 657,893

Int. Cl.² A61F *13/16, 13/18, 13/20;* B32B *3/10*

U.S. Cl. 428—134 **16 Claims**

1. A disposable sanitary product including a liquid-pervious facing layer adapted to be positioned in contact with a wearer, a low density batt of cellulosic fibers disposed beneath the facing layer for absorbing body fluids, and a fibrous wicking layer disposed beneath, and in engagement with said fibrous batt for aiding in distributing the flow of fluid within said product, the improvement wherein said wicking layer is an embossed and creped fibrous web formed from an aqueous slurry, and comprises:

(a) randomly arranged and contacting sulfate wood pulp fibers constituting the predominate fiber component, by weight, of the web, said fibers being bonded together through a portion of the thickness of the web almost exclusively by papermaking bonds, said portion being substantially free of debonders and wet strength additives;

(b) a plurality of fractured areas provided by embossing, said fractured areas being in the form of apertures extending through the web thickness, said apertures being disposed in spaced-apart areas which are substantially uniformly distributed throughout the web;

(c) an adhesive bonding material extending only partially through the web thickness to form bonded regions having a greater strength than the portion of the web in which the fibers are bonded together almost exclusively by the papermaking bonds, said web being creped in regions containing bonding material to enhance web softness and to foreshorten the web to enhance its stretch;

(d) said web having a basis weight of from about 25 to about 100 lbs./2,880 feet², a greater density than that of the fluff batt, said density being in the range of from about 0.08 grams/cc to less than about 0.16 grams/cc, a liquid holding capacity greater than 500%, an absorbency rate of less than 2.5 seconds, a wicking rate of greater than 14 cm/10 minutes, a minimum cross-machine-direction stretch of 10% and a wet cross-machine-direction tensile strength of greater than 2 oz./inch.

8. A soft, absorbent, embossed and creped fibrous web formed from an aqueous slurry, said web comprising:

(a) randomly arranged and contacting sulfate wood pulp fibers constituting the predominate fiber component, by weight, of the web, said fibers being bonded together through a portion of the thickness of the web almost exclusively by papermaking bonds, said portion being substantially free of debonders and wet strength additives;

(b) a plurality of fractured areas provided by embossing, said fractured areas being in the form of apertures extending through the web thickness, said apertures being disposed in spaced-apart areas which are substantially uniformly distributed throughout the web;

(c) an adhesive bonding material extending only partially through the web thickness to form adhesively bonded regions having a greater strength than underlying regions which are bonded together almost exclusively by the papermaking bonds, said web being creped in regions containing bonding material to enhance web softness and to foreshorten the web to enhance its stretch;

(d) said web having a basis weight in the range of from about 25 to about 100 lbs./2,880 feet^2, a density of from about 0.08 grams/cc to less than about 0.16 grams/cc, a liquid holding capacity of greater than 500%, an absorbency rate of less than 2.5 seconds, a wicking rate of greater than 14 cm/10 minutes, a minimum cross-machine-direction stretch of 10% and a wet cross-machine-direction tensile strength of greater than 2 oz./inch.

4,093,766

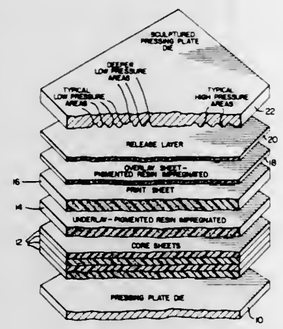
THREE-COLOR HIGH PRESSURE DECORATIVE LAMINATE HAVING REGISTERED COLOR AND EMBOSSING

Herbert I. Scher, Randallstown; Joseph A. Lex, Glen Burnie, and Israel S. Ungar, Randallstown, all of Md., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 594,094, Jul. 8, 1975, abandoned. This application May 16, 1977, Ser. No. 797,205

Int. Cl.^{2} B32B *3/30, 31/20*

U.S. Cl. 428—165 **14 Claims**



1. A method of forming a unitary decorative laminate having registered color and embossing, comprising:

A. assembling in a stack from the bottom up:

(1) backing means for said decorative laminate,

(2) a fibrous underlay sheet impregnated with a thermosetting resin impregnating solution having dispersed therein finely divided pigment of a first color, said pigment being retained substantially between the fibers of said underlay sheet,

(3) a thermosetting resin impregnated fibrous print sheet provided with a second color contrasting with said first color,

(4) a fibrous overlay sheet impregnated with a thermosetting resin impregnating solution having dispersed therein finely divided pigment of a third color contrasting with said first and second colors, said pigment of said third color being retained substantially between the fibers of said overlay sheet, and

(5) a sculptured pressing plate die having a surface with high areas, intermediate areas and low areas capable of being impressed into the uppermost of said fibrous sheets, and means to prevent said sculptured pressing plate die from sticking to said overlay sheet during lamination;

B. applying to the upper and lower surfaces of said assembly sufficient heat and pressure to cure said resins to produce said unitary embossed decorative pressure laminate by

(1) effecting a lamination of said fibrous sheets together with each other and with said backing means,

(2) imparting the sculptured surface of said die to the uppermost of fibrous sheets,

(3) effecting lateral flow of said thermosetting resin and the pigment of said third color within said overlay sheet from the debossed portions of the surface of said laminate to the intermediate portions of said laminate so that said second color is visible in said debossed portions and said third and contrasting color of said finely divided pigment is visible in said intermediate portions, and

(4) effecting vertical flow of said thermosetting resin and the pigment of said first color within said underlay sheet from said underlay sheet to the upper surface portion of said overlay sheet in the areas of the highest peaks so that said first color is visible in the highest embossed portions to contrast with the second color at said debossed portions and the third color at said intermediate portions; and

C. stripping said sculptured die from the resultant laminated assembly so as to provide said laminate having areas of registered color and embossing.

10. A unitary decorative high pressure laminate having a pebbly appearance, comprising

a plurality of resin impregnated paper sheets laminated together to form an integral laminate having a plurality of layers and having on the upper surface thereof debossed portions, embossed portions of intermediate height 2–10 mils, and embossed high peaks of 14–24 mils height;

the upper layer of said laminate having therein at least one first color in the area of said high peaks;

said debossed portions being relatively devoid of pigment within the upper layer and being transparent to show therebeneath a second color; and

said intermediate embossed portions having concentrated porportions of an opacifying pigment of a third color in the upper layer of said laminate, wherein there is a gradual transition of said second and third colors between said intermediate height portions and said debossed portions.

4,093,767

COPY SHEET SUITABLE FOR THERMOCOPYING

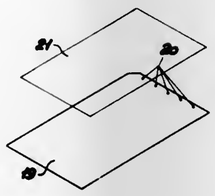
Einar Munk Laursen, Rodovre, Denmark, assignor to Memofax A/S, Copenhagen, Denmark

Filed Jun. 1, 1976, Ser. No. 691,835

Claims priority, application Denmark, Jun. 3, 1975, 2473/75

Int. Cl.^{2} B32B *3/02*

U.S. Cl. 428—194 **3 Claims**



1. A thermocopying copy sheet containing in at least one margin a heat responsive adhesive adapted to be activated by the heat transmitted by a thermocopier as the copy sheet and a superimposed original pass therethrough so as to releasably affix the original to the copy sheet so as to prevent movement of the original relative to the copy sheet.

4,093,768

COPPER FOIL ELECTRICAL LAMINATE WITH REINFORCED PLASTICS

Howard P. Cordts, Grafton; Robert F. Navin, and R. Charles Ross, both of Port Washington, all of Wis., assignors to Freeman Chemical Corporation, Port Washington, Wis.

Filed Feb. 19, 1976, Ser. No. 659,480

Int. Cl.^{2} B32B *15/08, 15/20, 15/14*

U.S. Cl. 428—287 **3 Claims**

1. A copper foil electrical laminate comprising a sheet of copper or copper alloy foil directly bonded to glass fiber reinforced unsaturated polyester resin containing up to about 2% by weight, based on the unsaturated polyester resin syrup of benzotriazole incorporated in said resin prior to curing of said resin.

4,093,769

CAPILLARY BODY AND METHOD OF PRODUCING THE SAME

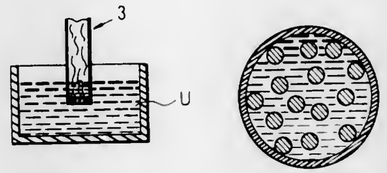
Yoshio Midorikawa, Tokyo, Japan, assignor to Glasrock Products, Inc., Fairburn, Ga.

Filed Mar. 10, 1976, Ser. No. 665,622

Claims priority, application Japan, Feb. 18, 1976, 51-16849

Int. Cl.^{2} B43K *1/12;* **D04H** *3/14*

U.S. Cl. 428—295 **8 Claims**



1. A method for producing capillary body comprising:

forming a plurality of fibers into a fiber bundle;

forming a skin around the outer periphery of said fiber bundle;

impregnating the skin-encased fiber bundle with a urethane prepolymer, water and a solvent for said prepolymer; then

polymerizing said prepolymer whereby the gases generated by reaction and by volatilization of the solvent form capillary passages along said fibers.

4,093,770

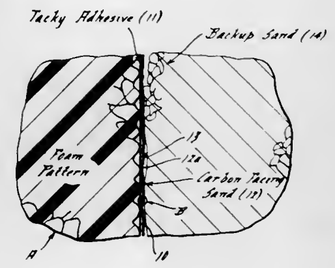
COATING FOR GASIFIABLE FOAM PATTERNS

Adolf Hetke, Livonia, and Kip M. Bonds, Union Lake, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 608,959, Aug. 29, 1975, Pat. No. 4,010,791. This application Dec. 13, 1976, Ser. No. 750,347

Int. Cl.^{2} B32B *3/26, 5/16*

U.S. Cl. 428—306 **2 Claims**



1. A destructible pattern for use in the cavityless method of casting, comprising:

(a) a body of foam thermoplastic resinous material in a predetermined shape conforming to the shape of a desired metal casting,

(b) a first coating layer covering entirely the outer surface of said body, said first coating layer presenting an exposed highly tacky viscous adhesive surface, said first coating layer not only adhering to said body and filling surface crevices of said body but also securing dry particles brought into contact with said exposed surface, and

(c) a second coating layer covering coating substantially the first layer, said second coating layer consisting essentially of dry refractory particles, each particle being unsecured with respect to each other but secured by the adhesive qualities of said exposed surface to said first coating layer.

2. The destructible pattern as in claim 1, in which the particles of said second coating layer are aligned side by side and substantially only particle deep to provide for a permeable and highly smooth casting wall.

4,093,771

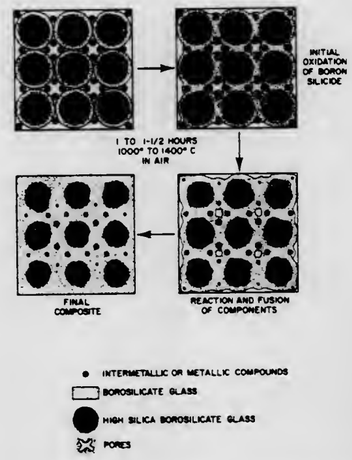
REACTION CURED GLASS AND GLASS COATINGS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, Howard E. Goldstein, Saratoga, Calif.; Daniel B. Leiser, and Victor W. Katvala, both of San Francisco, Calif.

Filed Oct. 29, 1976, Ser. No. 736,910

Int. Cl.^{2} B32B *5/18, 17/06*

U.S. Cl. 428—312 **14 Claims**



1. A reaction cured glass ceramic-metal composition comprising the reaction product of:

(a) the reaction of about two tenths to about 6 percent by weight of a less than about 80 mesh powder of a substance selected from the group consisting of silicon tetraboride, silicon hexaboride, boron silicides, boron and mixtures thereof, with;

(b) finely divided particles of a reactive glass frit prepared by combining two tenths of a part to 10 parts boron oxide with 100 parts of a porous high silica borosilicate glass wherein said glass frit is sintered rather than fused and is a two-phase glass with a very reactive high boron oxide borosilicate glass layer on the outside covering a more refractory low boron content high silica borosilicate glass in the core of each particle.

6. A high temperature resistant article comprising a reaction cured glass coating composition resulting from the process of:

(a) reacting about two tenths of a percent to about 6 percent by weight of a less than about 80 mesh powder of a substance selected from the group consisting of silicon tetraboride, silicon hexaboride, other boron silicides, boron and mixtures thereof, with a finely divided particulate reactive glass frit prepared by combining two tenths of a

part to 10 parts of boron oxide with 100 parts of a porous high silica borosilicate glass wherein said glass frit is sintered rather than fused and is a two-phase glass with a very reactive high boron oxide borosilicate glass layer on the outside covering a more refractory low boron content high silica borosilicate glass in the core of each particle;

(b) blending the reaction product in a ball mill with a carrier solution and a prebinder in a ratio of 35 to 50 percent by weight solid components to provide a coating slurry;

(c) applying said coating slurry to a porous silica glass substrate or a ceramic substrate;

(d) drying said coating at about 20° to about 100° C; and

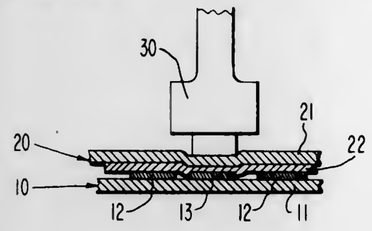
(e) glazing said coating for about one half to two hours at about 1000° to about 1400° C, by inserting the coated substrate into the furnace at temperature and removing it rapidly after glazing.

4,093,772

PRESSURE-ACTIVATED AND NON-TACKY LIFT-OFF ELEMENT AND PROCESS THEREFOR

Jerry H. Taylor, Webster, and Gabriel T. Turula, Rochester, both of N.Y., assignors to Burroughs Corporation, Detroit, Mich.

Filed Jan. 31, 1977, Ser. No. 764,204
Int. Cl.² B32B *27/08, 27/10*
U.S. Cl. 428—339 **15 Claims**



1. A pressure-activated element comprising:

a flexible, pressure-deformable flexible film substrate foundation supporting a removal adhesive layer for removing typed or printed errors or the like;

said removal adhesive layer consisting essentially of a resin and an amide wax combined as a homogeneous coating such that said adhesive layer is substantially homogeneous and of uniform thickness providing a continuous stratum which is substantially non-tacky to the touch.

9. A non-tacky lift-off element for use as a tape, ribbon, sheet or tab for removing printed characters comprising:

a flexible film substrate;

a non-tacky coating on the substrate consisting essentially of:

a synthetic non-crystalline amide wax;

a polyamide resin and plasticizers therefor, and

a solvent; and wherein the solvent is less than 80% of the coating by weight upon application of the coating to the substrate.

15. A process for producing pressure-activated elements for removing types or printed errors or the like comprising the steps of producing a composition consisting essentially of:

a resin; and

between 14 to 26% by weight of an amide wax material; and

between 42 and 78% by weight of a volatile solvent vehicle consisting of an alcohol, toluene, or mixture thereof; and

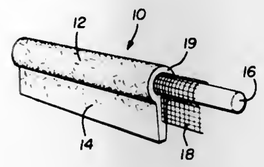
subsequently applying said composition to a flexible, pressure-deformable foundation, and then evaporating said vehicle to form an adhesive layer on the foundation in which said adhesive layer is substantially homogeneous and of uniform thickness and provides a continuous stratum which is substantially non-tacky.

4,093,773

FINISHING WELT, AND METHOD AND APPARATUS FOR FORMING FINISHING WELTS

Edward M. Danko, Detroit, Mich., assignor to Color Custom Compounding, Inc., Warren, Mich.

Filed Sep. 20, 1976, Ser. No. 724,815
Int. Cl.² D02G *3/00*
U.S. Cl. 428—365 **3 Claims**



1. An upholstery welt of indeterminate length, having a generally cylindrical head portion integral with a generally radially projecting sewing tail portion;

the welt consisting essentially of (a) a, cylindrical, flexible plastic rod coextensive with the welt and coaxially located within the head of the welt, (b) a fabric scrim wrapped about the rod in the head portion of the welt and having an end portion extending radially into the welt tail portion for reinforcement, and (c) an outer layer of thermoplastic material having an outer, generally key-hole shaped surface, the plastic material encasing the scrim in the region of the welt tail, encasing the rod and scrim in the head of the welt, and self-bonding to itself through the interstices of the scrim in the welt tail to form a, generally key-hole shaped structure reinforced at its head portion by said rod and at its tail portion by said scrim internally located therein.

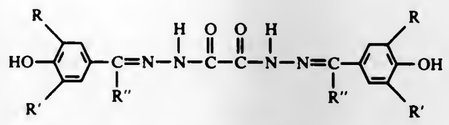
4,093,774

STABILIZED POLYMERIC COMPOSITION IN CONTACT WITH METALS

Ray Lawson Hartless, Lopatcong Township, Warren County, and Anthony Marion Trozzolo, Murray Hill, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 500,957, Aug. 27, 1974, abandoned. This application Jan. 23, 1976, Ser. No. 651,642
Int. Cl.² B32B *15/00;* D02G *3/00*
U.S. Cl. 428—379 **8 Claims**

1. An article comprising a metal surface which is in intimate contact with a polymeric composition wherein the said polymeric composition exclusive of filler is at least 90 percent by weight of essentially saturated polyolefin polymer, said polymer containing a stabilizer composition characterized in that the said stabilizer composition contains only one thermal oxidation stabilizer, said thermal oxidation stabilizer consisting essentially of at least one compound in accordance with the formula



in which R is an alkyl substituent containing a tertiary carbon, said tertiary carbon being attached directly to the aryl ring, in whcih R′ is hydrogen or an alkyl substituent which may also contain a tertiary carbon and in which R″ is hydrogen or an alkyl substituent, and in which any of the aryl hydrogens bonded directly to either of the aryl rings may be replaced by a hydrocarbon substituent wherein said saturated polyolefin

polymer contains a percentage by weight of said thermal oxidation stabilizer in the range of 0.01 to 0.5.

4,093,775

TREATING A POLYMERIC SHAPE WITH NONIONIC FLUOROCHEMICAL SURFACTANTS AND PRODUCT THEREFROM

Alex J. Szur, North Plainfield, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Division of Ser. No. 560,698, Mar. 21, 1975, Pat. No. 3,980,715. This application Apr. 27, 1976, Ser. No. 680,787
Int. Cl.² B32B *27/00;* D02G *3/00*
U.S. Cl. 428—394 **30 Claims**

1. A process of treating a polymeric shape with an effective amount of a nonionic fluorochemical surfactant selected from the group consisting of:

(a) condensation product of one mole of 6-hydroxyhexyl perfluoroisopropyl ether with from about 1 to about 20 moles of ethylene oxide, and

(b) condensation product of one mole of 2,2,3,4,4,4-hexafluorobutanol with from about 1 to about 6 moles of propylene oxide and with from about 0 to about 20 moles of ethylene oxide to improve lubricity properties, antistatic properties and antisoiling properties of the shape.

10. A polymeric shape produced by the process of claim 1.

11. The process of claim 1 wherein the polymeric shape is treated with an effective amount of a condensation product of one mole of 6-hydroxyhexyl perfluoroisopropyl ether with from about 1 to about 20 moles of ethylene oxide to improve lubricity properties, antistatic properties and antisoiling properties of the shape.

4,093,776

PROCESS FOR PREPARATION OF SPONTANEOUSLY-CROSSLINKED ALKALI METAL ACRYLATE POLYMERS

Shuzo Aoki, Ito, and Harumasa Yamasaki, Wakayama, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Sep. 23, 1977, Ser. No. 836,058
Claims priority, application Japan, Oct. 7, 1976, 51-120591
Int. Cl.² C08F *120/06, 2/32*
U.S. Cl. 428—402 **7 Claims**

1. A process for the preparation of powdery, spontaneously crosslinked, alkali metal acrylate homopolymer having a water absorption capacity of at least 400 grams per one gram of dried polymer, said process comprising dispersing and suspending an aqueous solution of an alkali metal acrylate having a concentration of at least 40% by weight and containing a water-soluble radical polymerization initiator in a liquid aliphatic hydrocarbon solvent, in the presence of a sorbitan fatty acid ester having an HLB value of 3 to 6, and polymerizing the alkali metal acrylate in the absence of a crosslinking agent.

4,093,777

COATED STABILIZED CADMIUM CHALCOGENIDE PIGMENTS

Heinrich Heine; Peter Woditsch, both of Krefeld; Theodor Bohmann, Leverkusen, and Dieter Räde, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 6, 1975, Ser. No. 620,092
Claims priority, application Germany, Oct. 10, 1974, 2448338
Int. Cl.² B32B *9/04*
U.S. Cl. 428—403 **7 Claims**

1. A coated stabilized cadmium chalcogenide pigment carrying a coating of at least one sparingly-soluble sulfide.

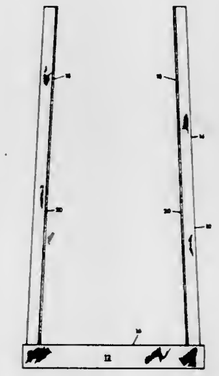
7. In a lacquer or plastic pigmented with about 0.1 to 50% by weight of cadmium chalcogenide, the improvement wherein said cadmium chalcogenide is a coated pigment according to claim 1, whereby the pigment is stabilized against leaching out therefrom of cadmium.

4,093,778

INGOT MOLD FOR PRODUCING STEEL INGOTS

Frederick V. Reven, Homewood, and Charles W. Connors, Wilmette, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Sep. 10, 1976, Ser. No. 722,176
Int. Cl.² B22C *3/00*
U.S. Cl. 428—411 **10 Claims**



1. An ingot mold for producing steel ingots having its inner surfaces coated with a composition consisting essentially of:

Ingredients	% By Weight
A. Finely divided Fe_2O_3	5 - 30
B. A lignosulfonate	.1 - 25
C. Water	Balance

4,093,779

PAPER COATED WITH AMMONIA-CONTAINING SIZING COMPOSITIONS

Ralph Waldo Emerson, Boston, Mass., and John R. Shattuck, Cumberland Foreside, Me., assignors to The Plasmine Corporation, Portland, Me.

Division of Ser. No. 565,810, Mar. 31, 1975, Pat. No. 4,022,634, which is a continuation-in-part of Ser. No. 542,943, Jan. 22, 1975, abandoned, which is a continuation of Ser. No. 436,917, Jan. 28, 1974, abandoned. This application Feb. 4, 1977, Ser. No. 765,610
Int. Cl.² B32B *9/04, 23/08, 21/04, 27/10*
U.S. Cl. 428—411 **9 Claims**

1. Paper sized with from about 0.05 to 4 percent by dry weight based on the weight of the fibers of a sizing agent comprising from about 3 to 30 percent ammonia, from about 4 to 72 percent ammonium salt, and from about 93 to 25 percent of a rosin that is modified with from about 5 to 50 percent, based on the weight of the rosin, of an organic acidic compound selected from the group consisting of maleic acid, maleic anhydride, fumaric acid, and their mixtures, based on the total weight of the ammonia, the ammonium salt and the rosin and organic acidic compound on a dry basis and using an ammonium salt to ammonia ratio of greater than about 1 to 1.

4,093,780

TREATMENT OF ZINC SURFACES TO INHIBIT WET STORAGE STAINING AND PRODUCTS EMPLOYED THEREIN

Rodney Lash LeRoy, Pointe Claire, Canada, assignor to Noranda Mines Limited, Quebec, Canada

Division of Ser. No. 386,628, Aug. 8, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 633,100
Claims priority, application Canada, Aug. 21, 1972, 149910
Int. Cl.² B32B *15/08*; B05D *3/00*
U.S. Cl. 428—458 18 Claims

1. Zinc or galvanized articles having a wet storage staining and white rust inhibiting surface coating consisting essentially of a protective water-insoluble zinc-thioglycolate or zinc-polythioglycolate complex.

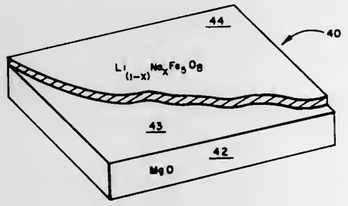
6. A method for inhibiting wet storage staining and formation of white rust on zinc surfaces which comprises treating said surfaces with an inhibiting composition, which composition comprises 0.01% to 99% by weight, as active compound, of an ester of polyester of thioglycolic acid for producing a protective, water insoluble complex zinc-thioglycolate or zinc-polythioglycolate on the zinc surface.

4,093,781

EPITAXIAL, SODIUM-SUBSTITUTED LITHIUM FERRITE FILMS

David M. Heinz, Orange, and Eugene C. Whitcomb, Mission Viejo, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 27, 1975, Ser. No. 580,641
Int. Cl.² B01J *17/36*
U.S. Cl. 428—539 8 Claims



1. A composite comprising a monocrystalline substrate having a lattice constant which causes single crystalline lithium ferrite disposed thereon to crack, said substrate having epitaxially disposed thereon a crackfree monocrystalline layer of lithium ferrite having sodium substituted for a portion of the lithium, said film having sodium and lithium present in a molar ratio Na/Li within a range of about 0.024 to 0.268.

4,093,782

BRAZED ALUMINUM COMPOSITE

William H. Anthony; James M. Popplewell, both of Guilford, and Andrew J. Brock, Cheshire, all of Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Mar. 3, 1977, Ser. No. 773,959
Int. Cl.² B32B *15/00*
U.S. Cl. 428—654 6 Claims

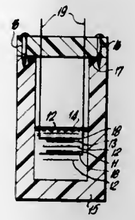
1. A brazed aluminum composite having improved resistance to intergranular corrosion comprising an aluminum alloy core material consisting essentially of from 0.05 to 0.4% chromium, from 0.2 to 0.9% manganese, up to 0.2% iron, up to 0.1% silicon, balance essentially aluminum, clad with a brazing alloy consisting essentially of from 4 to 14% silicon, up to 3% magnesium, up to 0.2% bismuth, balance essentially aluminum wherein the core contains reduced size and population density of second phase iron containing particles and wherein a silicon rich eutectic from the cladding migrates into the core to a reduced depth, said core being substantially free from $FeAl_3$ phase.

4,093,783

NOVEL FORMULATIONS $M_2UO_2F_2$ AND THEIR USE IN ELECTROCHEMICAL CELLS

Edward T. Maas, Jr., Kendall Park; John M. Longo, New Providence, and Chin H. Chang, Edison, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 22, 1977, Ser. No. 789,813
Int. Cl.² H01M *14/00*
U.S. Cl. 429—5 34 Claims



1. A composition of matter having the formula $M_1UO_2F_2$ where each M is any alkali metal ion or mixtures thereof.

4,093,784

LITHIUM PRIMARY CELL

Joseph R. Driscoll, Dorchester, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 26, 1977, Ser. No. 828,074
Int. Cl.² H01M *6/14*
U.S. Cl. 429—101 12 Claims

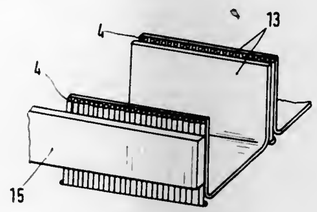
1. In a lithium primary cell including lithium as the anode, a solution of an inorganic salt in an inorganic solvent as the electrolyte, and a current collector as the cathode, the improvement in cell performance obtained by coating the lithium anode with calcium.

4,093,785

LIGHTER LEAD STORAGE BATTERY

Günter Sassmannshausen, and Dieter Hasenauer, both of Brilon, Germany, assignors to Accumulatorenwerk Hoppecke Carl Zoellner & Sohn, Cologne, Germany

Filed Jan. 3, 1977, Ser. No. 756,438
Claims priority, application Germany, Jan. 20, 1976, 2601975
Int. Cl.² H01M *6/42*
U.S. Cl. 429—149 20 Claims



1. A lead storage battery comprising in combination
a lead-sulfuric acid battery defining therein an acid space,
a plurality of plate grids disposed in said acid space and each having a grid upper part,
an acid resistant synthetic material completely covering said grid upper part and having a substantially trapezoidal shape,
a contact lug extending upwardly from one side of each of said plate grids, respectively through said synthetic material, said synthetic material forming an upwardly extending flange range covering and acid-tightly surrounding a portion of said contact lug,
said synthetic material constitutes a synthetic material covering having at least one projection spaced from said contact lugs on an opposite end of said plate grids,
a cover being connected acid-tight with said synthetic material covering at said projection and at said flange range around said contact lugs, said cover defining openings around said contact lugs through which said contact lugs extend,
lug bridges, disposed outside of the acid space on a side of said cover remote from the acid space, connecting said contact lugs with one another.

20. A lead storage battery having an acid space, with positive and negative plates, and having contact lugs respectively connected with one another respectively by means of lug bridges, comprising in combination
a plurality of plate grids each having a grid upper part,
an acid resistant synthetic material covering said grid upper part,
a contact lug extending upwardly from said plate grids, respectively,
said synthetic material covering and acid-tightly surrounding said contact lug,
a cover being connected acid-tight with said synthetic material,
lug bridges, disposed outside of the acid space, connecting said contact lugs with one another, said lug bridges have a U-shaped cross-section with upwardly pointing legs, the latter are connected to adjacent of said contact lugs on outwardly facing surfaces of said legs.

4,093,786

1,1-BIS(TERT-BUTYLPEROXY)CYCLODODECANE

Takeshi Komai; Masaru Matsushima, and Takeshi Nakajima, all of Aichi, Japan, assignors to Nihon Yushi Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,401
Claims priority, application Japan, Oct. 22, 1974, 49-120959
Int. Cl.² C08F *8/06*
U.S. Cl. 526—57 9 Claims

1. A process for crosslinking a polymeric material which comprises treating said polymeric material with a crosslinking agent composition comprising 1,1-bis (tert-butylperoxy)cyclododecane at a pressure of 50 to 200 kg/cm^2 and at a temperature of 100° to 200° C.

4,093,787

VINYL CHLORIDE POLYMERIZATION PROCESS

Robin Henry Burgess, Hertford, and Jeffrey Chester Greaves, Welwyn Garden City, both of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 412,030, Nov. 1, 1973, abandoned. This application Aug. 14, 1975, Ser. No. 604,896
Claims priority, application United Kingdom, Nov. 20, 1972, 53490/72
Int. Cl.² C08F *2/20*
U.S. Cl. 526—62 7 Claims

1. A process for the production of vinyl chloride polymers which comprises polymerizing vinyl chloride, or vinyl chloride and up to 20% by weight thereof of at least one ethylenically unsaturated monomer copolymerizable therewith, an aqueous dispersion, in a reactor having an inner wall(s) on which there has been directly deposited an insoluble layer of a cross-linked polymeric material containing polar groups and comprising a reaction product of formaldehyde and polyethylene imine.

4,093,788

METHOD FOR THE PREPARATION OF POLYVINYL CHLORIDE BY SUSPENSION OR EMULSION POLYMERIZATION

Jung Il Jin, Irvington, N.Y., and Arthur J. Yu, Stamford, Conn., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Jun. 24, 1974, Ser. No. 482,176
Int. Cl.² C08F *2/24, 2/18*
U.S. Cl. 526—74 10 Claims

1. In the polymerization of an aqueous batch charge comprising a vinyl chloride monomer and an initiator in a reactor wherein the improvement comprises incorporating in said batch charge an amount of an anthraquinone sulfonate dye intermediate which is effective for reducing the polymer scale deposition on the walls of the reactor.

4,093,789

PROCESS FOR PREPARING POLYOLEFINS

Nobuyuki Kuroda; Toru Nakamura, both of Yokohama; Takeichi Shiraishi; Kazuo Matsuura, both of Kawasaki, and Mituji Miyoshi, Naka, all of Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan

Filed Jul. 15, 1976, Ser. No. 705,607
Claims priority, application Japan, Aug. 12, 1975, 50-97190
Int. Cl.² C08F *4/02, 10/02*
U.S. Cl. 526—114 9 Claims

1. A process for preparing polyolefins by polymerizing or copolymerizing alpha- olefins at a temperature in the range of from 20° to 120° C and at a pressure in the range of atmospheric pressure to 70 $Kg/cm.^2G.$, in the presence of a catalyst comprising a solid component and an organometallic compound component, characterized in that said solid component is obtained by copulverizing
(1) a magnesium dihalide and/or a manganese dihalide,
(2) an aromatic hydrocarbon selected from the group consisting of monocylic aromatic hydrocarbon and the halogen-and/or alkyl-substituted derivatives thereof and polycyclic aromatic hydrocarbon, the ratios of magnesium dihalide and/or manganese dihalide to said aromatic hydrocarbon being in the range of from 1:0.5 to 1:0.1,
(3) a tetravalent titanium compound represented by the general formula $Ti(OR)_nX_{4-n}$ wherein R is an alkyl, allyl, aryl or aralkyl group having 1 to 20 carbon atoms, X is a halogen atom and n is a whole number of from 0 to 4, and
(4) a trivalent titanium compound selected from the group consisting of titanium trihalides obtained by reducing titanium tetrachloride with hydrogen, aluminum, titanium or an oganometallic compound, and trivalent titanium compounds obtained by reducing tetravalent titanium alkoxyhalides represented by the general formula $Ti(OR)_nX_{4-n}$ wherein R is alkyl, allyl, aryl or aralkyl having 1 to 20 carbon atoms, X is a halogen atom and n is a whole number of from 1 to 4, with an organometallic compound of a metal of the groups I to III of the periodic table present in a molar ration with tetravalent titanium compound (3) of from 50:1 to 1:50 and in that said organometallic compound component is a mixture of
(5) a trialkylaluminum and
(6) a compound represented by the general formula AlR_nX_{3-n} wherein R is alkyl having 1 to 10 carbon atoms and may be same or different, X is halogen and $0 < n \leq 3$, said compound being present in a molar ratio with trialkylaluminum (5) of from 2:1 to 1000:1.

4,093,790

POLYPHENYLENE RESINS

William J. I. Bracke, Brussels, Belgium, assignor to Labofina S.A., Brussels, Belgium

Filed Jan. 5, 1972, Ser. No. 215,465
Claims priority, application France, Apr. 14, 1971, 71.13111
Int. Cl.² C08F *38/00*
U.S. Cl. 526—144 1 Claim

1. A normally solid, aromatic hydrocarbon soluble polyphenylene polymer prepared by polymerizing a mixture consisting essentially of phenyl acetylene and meta-diethynyl benzene, the mixture containing between 50 and 60 mol percent of meta-diethynyl benzene and 40–50 mol percent of phenyl acetylene, with a catalyst solution prepared from Al, $AlCl_3$, chlorobenzene and $TiCl_4$, in an inert solvent and under inert atmosphere at a temperature of from − 80° to 150° C.

4,093,791

PROCESS FOR SUSPENSION POLYMERIZATION OF VINYL CHLORIDE WITH MOLECULAR OXYGEN

Johann Bauer, and Joseph Heckmaier, both of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Continuation of Ser. No. 386,724, Aug. 8, 1973, abandoned, which is a continuation of Ser. No. 812,399, Apr. 1, 1969, abandoned. This application Aug. 25, 1975, Ser. No. 607,207
Claims priority, application Germany, Mar. 29, 1968, 1770090
Int. Cl.² C08F *4/28, 2/20*
U.S. Cl. 526—200 3 Claims

1. A process for the production of a polymerizate of polyvinyl chloride by suspension polymerization which consists essentially of the steps of

(1) mixing vinyl chloride with water, in a ratio such that the amount of said vinyl chloride is from 20 to 50% by weight of the total weight of water and vinyl chloride, in the presence of from 0.01 to 0.5% by weight, based on the weight of said vinyl chloride, of hydroxyethylcellulose, and a gas containing molecular oxygen selected from the group consisting of air and oxygen in an amount of from 0.01 to 3% by weight of molecular oxygen, based on the weight of said vinyl chloride, as the sole polymerization catalyst or catalyst-forming substance,

(2) adjusting said mixture to a pH of from 1.0 to 7.5,

(3) heating said mixture to polymerization temperature of from 65° to 80° C and under the autogenetic pressure while under continuous agitation for a time sufficient to effect polymerization, and

(4) recovering said polymerizate.

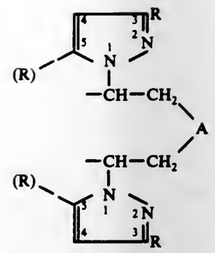
4,093,792

COPOLYMERIZATION PRODUCT OF N-VINYLMETHYLPYRAZOLE AND DIVINYL CROSS-LINKING AGENT AND METHOD OF PREPARING SAME

Alla Lvovna Bratslavskaya, ulitsa Zheleznodorozhnaya, 25a, kv. 38, Krasnogorsk Moskovskoi oblasti; Serafima Borisovna Makarova, prospekt Mira, 184, kv. 45, Moscow; Roman Yakovlevich Mushy, ulitsa Lisichanskaya, 45, kv. 15, Severodonetsk Voroshilovogradskoi oblasti; Galina Vladimirovna Myasoedova, ulitsa Fertsmana, 7, kv. 98; Sergei Borisovich Savvin, Pervaya ulitsa Stroitelei, 11, korpus 1, kv. 157, both of, Moscow, and Vera Ivanovna Seraya, ulitsa Gagarina, 56, kv. 42, Severodonetsk Voroshilovogradskoi oblasti, all of U.S.S.R.

Filed Aug. 3, 1976, Ser. No. 711,506
Int. Cl.² C08F *212/36, 218/14, 220/20, 226/06*
U.S. Cl. 526—200 7 Claims

1. A copolymerization product of N-vinylmethylpyrazole with a divinyl cross-linking agent said product having an elemental unit of the formula:



wherein R is a CH_3 radical in the position 3 or 5, A is a divinyl cross-linking agent selected from the group consisting of divinylbenzene, diallylmaleate, ethyleneglycol dimethacrylate, diethyleneglycol dimethacrylate and triethyleneglycol dimethacrylate and said product having a sorption capacity, in respect of platinum-group elements and silver of E_{Au}=420 to 785 mg/g of the sorbent, E_{Ag}= 320 to 450 mg/g of the sorbent, E_{Pd} = 130 to 170 mg/g of the sorbent, E_{Pt} = 180 to 230 mg/g of the sorbent and a swelling factor in water of 2 to 4 ml/g.

4,093,793

COPOLYMERS OF ANTHRAQUINONE DYES AND ACRYLAMIDE

Michel Maurice Luce Champenois, Le Mesnil Esnard, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Aug. 1, 1975, Ser. No. 601,010
Claims priority, application France, Feb. 8, 1974, 74 26846
Int. Cl.² C08F *212/32*
U.S. Cl. 526—221 4 Claims

1. A structurally dyed water-insoluble macromolecular material containing, in copolymerized form, acrylamide, at least one colorless monomer selected from the group consisting of vinyl chloride, vinyl acetate, styrene, acrylic acid, acrylates and acrylonitrile and at least one anthraquinone dye having a group containing a polymerizable double bond, obtained by reacting for one to two minutes, in an aqueous medium and in the presence of a tetravalent cerium complex, the dye with the acrylamide and then introducing in the medium said colorless monomer and continuing the polymerization, the amount of dye being from 0.1 to 25% by weight of the colorless monomer and the amount of acrylamide being from 0.5 to 50% by weight of the colorless monomer.

4,093,794

PROCESS FOR THE POLYMERIZATION OF VINYL CHLORIDE

Andre Chippaux, Levallois, France, assignor to Plastimer, Clichy, France

Continuation of Ser. No. 376,547, Jul. 5, 1973, abandoned. This application Aug. 29, 1975, Ser. No. 609,831
Claims priority, application France, Jul. 21, 1972, 72.26304
Int. Cl.² C08F *2/20, 2/16*
U.S. Cl. 526—344 7 Claims

1. A process for the preparation of a vinyl chloride polymer composition having superior physical properties which comprises polymerizing vinyl chloride monomer under suspension or bulk polymerization conditions to form vinyl chloride polymer particles having a mean diameter of from about 10 to 500 microns, adding to the reaction medium emulsion polymerization additives at a time when the polymer particles formed are from 5 to 99% by weight of the total resultant polymer product, polymerizing under emulsion polymerization conditions the vinyl chloride monomer to produce a product having vinyl chloride polymer granules of mean diameter of from about 0.02 to 2 microns agglutinated to the surface of the suspension or bulk polymerization prepared vinyl chloride particles.

4,093,795

MULTI-STAGE ISOLATION OF HIGH PRESSURE POLYETHYLENE

Oskar Buechner, Dudenhofen; Gottfried Schlichthaerle, Neustadt, and Friedrich Urban, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Germany

Filed May 19, 1976, Ser. No. 687,870
Int. Cl.² C08F *6/26, 6/28*
U.S. Cl. 528—481 6 Claims

1. A process for the manufacture of ethylene polymers by homopolymerization of ethylene or copolymerization of ethylene with other monomers which are copolymerizable with ethylene, in a polymerization zone at pressures of from 500 to 5,000 bars and at from 50° to 450° C, followed by isolation of the resulting polymer from the reaction mixture in a two-stage isolation zone at pressures in the first stage of the isolation zone of from 100 to 500 bars and in the second stage of the isolation zone of from 1 to 10 bars and at from 100° to 400° C, with mean product residence times of from 0.5 to 60 minutes in the different stages of the isolation zone, wherein the improvement comprises varying the temperature in the isolation zone to control the molecular weight of the ethylene polymer the temperature being raised to decrease the molecular weight and lowered to increase the molecular weight.

4,093,796

ANTIBIOTIC DERIVATIVES OF POLYENE MACROLIDE GROUP AND METHOD OF OBTAINING THE SAME

Leonard Falkowski, Gdansk; Miroslaw Bobrowski; Helena Buluk, both of Bialystok; Elzbieta Bylec, Gdansk; Barbara Cybulska; Jerzy Golik, both of Sopot; Pawel Kolodziejczyk, Gdansk; Jan Pawlak, Gdansk; Andrzej Rudowski, Gdansk; Jan Zielinski, Gdansk; Tadeusz Ziminski, Gdynia, and Edward Borowski, Gdansk, all of Poland, assignors to Politechnika Gdanska, Gdansk, Poland

Filed Aug. 10, 1972, Ser. No. 279,737
Claims priority, application Poland, Aug. 13, 1971, 149994; May 4, 1972, 155167
Int. Cl.² C07H *17/08*
U.S. Cl. 536—17 19 Claims

1. The N-glycosyl reaction product of an amino group-containing polyene macrolide antibiotic obtained by reacting said antibiotic with a saccharide selected from the group consisting of aldose monosaccharides, ketose monosaccharides, aldose oligosaccharides and oligosaccharides. oligosacharides.

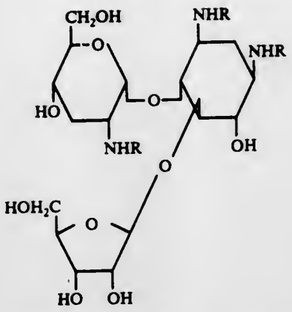
4,093,797

NOVEL AMINOCYCLITOLS AND PROCESS FOR PRODUCTION THEREOF

Takeshi Oda, Kodaira; Toshito Mori, and Takashi Yamaguchi, both of Higashimurayama, all of Japan, assignors to Kowa Company Ltd., Nagoya, Japan

Filed Aug. 30, 1976, Ser. No. 718,770
Claims priority, application Japan, Sep. 3, 1975, 50/106031
Int. Cl.² C07H *15/22*
U.S. Cl. 536—17 2 Claims

1. β-D-ribofuranosyl (1→5), O-[α-D-2-amino (or 2-acylamino)-2,3-dideoxy-glucopyranosyl (1→4)] 1,3-diamino (or 1,3-diacylamino)-1,2,3-trideoxy-myoinositol of the following formula



wherein R represents a member selected from the group consisting of hydrogen, acetyl, and an acid salt of said acetyl.

4,093,798

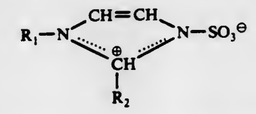
METHOD FOR PREPARING STARCH SULFATE ESTERS

Martin M. Tessler, Edison, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Dec. 6, 1976, Ser. No. 747,895
Int. Cl.² C08B *31/02*
U.S. Cl. 536—48 8 Claims

1. A method for preparing sulfate esters of starch comprising the steps of:

a. reacting a starch base having free reactive hydroxyl groups with a sulfating agent selected from the group of N-alkylimidazole-N'-sulfonates corresponding to the general formula:



wherein R_1 is selected from the group consisting of lower alkyl and R_2 is selected from the group consisting of lower alkyl and hydrogen, said reaction being conducted in an aqueous medium at a pH of 11.2 to 13.0 and at a temperature of about 15 to 90° C. for a period of about 1 to 20 hours, the amount of said sulfating agent employed being from about 1 to 100%, based on the weight of dry starch; and

b. isolating the resultant starch sulfate ester.

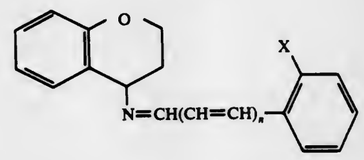
4,093,799

N-ARYLIDENE-4-CHROMANAMINES

George C. Wright, and Marvin M. Goldenberg, both of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jul. 1, 1977, Ser. No. 812,104
Int. Cl.² C07D *311/68*
U.S. Cl. 542—422 3 Claims

1. A compound of the formula:



wherein *n* is 0 or 1 and X is hydrogen or hydroxy.

4,093,800

PROCESS FOR PREPARING CEPHAM COMPOUNDS

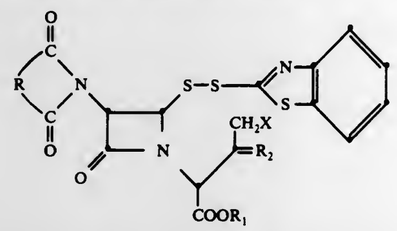
Stjepan Kukolja, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 615,154, Sep. 19, 1975, Pat. No. 4,024,152. This application Feb. 14, 1977, Ser. No. 768,138

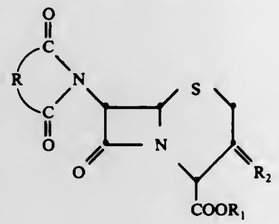
Int. Cl.² C07D *501/02*

U.S. Cl. 544—16 **11 Claims**

1. A process for preparing a cepham compound which comprises reacting a compound of the formula



with at least a molar ratio of sodium or potassium iodide at a temperature of from about 40° C. to about 80° C., to produce the 3-exomethylene or 3-keto cepham of the formula



in which, in the above formulae, R_1 is a carboxy protecting group; R is the residue of an imide derived from a dicarboxylic acid; R_2 is $=CH_2$ or $=O$; and X is chloro or bromo.

4,093,801

[[[(2,4-DIOXO-1-IMIDAZOLIDINYL)AMINO]CARBONYL]AMINO]-ACETYLCEPHALOSPORIN DERIVATIVES

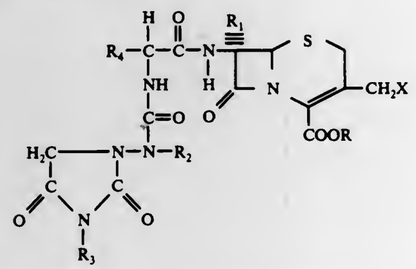
Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 671,788, Mar. 30, 1976, Pat. No. 4,063,019. This application Jul. 27, 1977, Ser. No. 819,648

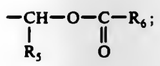
Int. Cl.² C07D *501/220, 501/36, 501/34, 501/46*

U.S. Cl. 544—25 **12 Claims**

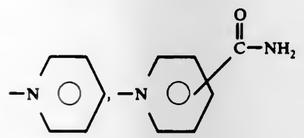
1. A compound of the formula



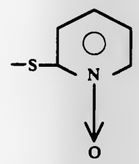
wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, tri(lower alkyl)silyl, trihaloethyl, aluminum, alkali metal, alkaline earth metal, phenyl-lower alkylamine, lower alkylamine, tri(lower alkyl)amine, N-lower alkylpiperidine or



R_1 is in the α-configuration and is hydrogen or methoxy; R_2, R_3 and R_5 each is hydrogen or lower alkyl; R_4 is hydrogen, lower alkyl, cyclo-lower alkyl of 3 to 7 carbons, cycloalkenyl of 3 to 7 carbons, cycloalkadienyl of 6 or 7 carbons, phenyl, phenyl-lower alkyl, substituted phenyl or phenyl-lower alkyl wherein said phenyl substituent is one or two members selected from the group consisting of halogen, lower alkyl, lower alkoxy and hydroxy, or a mono-subsituted or unsubstituted heterocyclic selected from the group consisting of 2-thienyl, 3-thienyl, 2-furyl, 3-furyl, 2-pyridyl, 3-pyridyl and 4-pyridyl wherein said heterocyclic substituent is attached at an available carbon atom and is halogen or lower alkyl; R_6 is lower alkyl and X is hydrogen, lower alkanoyloxy,



or



4,093,802

THIOCARBAMATEMETHYL-SUBSTITUTED CEPHALOSPORIN DERIVATIVES

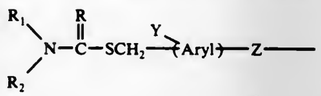
Fortuna Haviv, Montreal, Canada; Abraham Patchornik, Ness-Zione, and Janina Altman, Haifa, both of Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

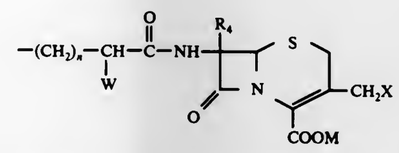
Division of Ser. No. 625,541, Oct. 24, 1975, Pat. No. 4,031,083. This application Jan. 14, 1977, Ser. No. 759,276

Int. Cl.² C07D *501/36*

U.S. Cl. 544—27 **31 Claims**

1. A compound selected from a base of the formula:





wherein each of R_1 and R_2 is selected from hydrogen and lower alkyl of from 1 to 4 carbon atoms or NR_1R_2 taken together form a monocyclic heterocyclic group selected from pyrrolidino, piperidino and morpholino; R is oxygen or sulfur; Aryl is selected from phenyl and 2-thienyl; Y is selected from hydrogen, chlorine, bromine, a straight or branched lower alkyl group of from 1 to 4 carbon atoms and a lower alkoxy group of from 1 to 4 carbon atoms with the proviso that when Aryl is 2-thienyl, Y is hydrogen; Z is selected from a bond, oxygen, sulfur and imino with the proviso that when Aryl is 2-thienyl Z is a bond; W is selected from hydrogen, methyl, amino, hydroxy, SO_3H and $COOR_3$ wherein R_3 is selected from hydrogen and 5-indanyl; *n* is zero, 1 or 2 with the proviso that when W is other than hydrogen or methyl, and Z is other than a bond, *n* is not zero; R_4 is selected from hydrogen and methoxy; M is selected from hydrogen, a pharmaceutically acceptable non-toxic cation; alkanoyloxymethyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched; alkanoylaminomethyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched and wherein the amino nitrogen atom may be substituted with an alkyl group of from 1 to 4 carbon atoms; alkoxycarbonylaminomethyl wherein the alkoxy moiety contains from 1 to 4 carbon atoms and may be straight or branched and wherein the amino nitrogen atom may be substituted with an alkyl group of from 1 to 4 carbon atoms; *p*-(alkanoyloxy)benzyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched; and aminoalkanoyloxymethyl wherein the alkanoyl moiety contains from 2 to 15 carbon atoms and the amino nitrogen may be mono- or di- substituted with a lower alkyl group of from 1 to 4 carbon atoms; X is selected from 1,3,4-thiadiazol-5-ylthio, 3-methyl-1,2,4-thiadiazol-5-ylthio, tetrazol-5-ylthio, 1-methyltetrazol-5-ylthio, 2-methyl-1,3,4-oxadiazol-5-ylthio, 2-methyl-1,3,4-thiadiazol-5-ylthio, and 1,2,3-triazol-5-ylthio; and pharmaceutically acceptable salts thereof.

4,093,803

7β-[2-ETHERIFIED OXIMINO-2-(THIENYL-, FURYL- OR PYRIDYLACETAMIDO)] CEPHALOSPORINS

Martin Christopher Cook; Gordon Ian Gregory, both of Chalfont St. Peter, and Janice Bradshaw, Harrow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

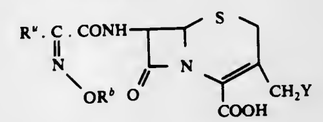
Division of Ser. No. 587,064, Jun. 16, 1975, Pat. No. 4,024,133, which is a division of Ser. No. 304,524, Nov. 7, 1972, Pat. No. 3,971,778, which is a continuation-in-part of Ser. No. 252,666, May 12, 1972, abandoned. This application Jan. 26, 1977, Ser. No. 762,927

Claims priority, application United Kingdom, May 14, 1971, 15082/71; Oct. 1, 1971, 45884/71

Int. Cl.² C07D *501/36*

U.S. Cl. 544—27 **3 Claims**

1. A compound selected from the group consisting of a highly active cephalosporin antibiotic highly stable to β-lactamases, having the formula:



wherein R^a is thienyl, furyl, or pyridyl or any of these groups substituted by a chloro, bromo, iodo, fluoro, hydroxy, lower alkyl, nitro, amino, lower alkylamino, diloweralkylamino, lower alkanoyl, lower alkanoylamino, lower alkoxy, lower alkylthio or carbamoyl group;

R^b is phenyl, napththyl, benzyl, phenylethyl, diphenylmethyl, triphenylmethyl, thienylmethyl, furylmethyl, pyridylmethyl, pyrrolylmethyl or any of these groups substituted by a hydroxy, lower alkoxy, phenoxy, benzyloxy, carboxy, lower alkoxycarbonyl, benzyloxycarbonyl, mercapto, lower alkylthio, phenylthio, benzylthio, acetamido, benzamido, cyano, formyl, lower alkanoyl, benzoyl, amino, methylamino, ethylamino, dimethylamino, lower alkoxycarbonylamino, benzyloxycarbonylamino, phthalimido, acetoxy, propionyloxy, pivaloyloxy, chloro, bromo, iodo, fluoro, nitro, or azido group, and

Y is a group of formula -SW and W is thiadiazolyl, 5-methyl-1,3,4-thiadiazol-2-yl, diazolyl, triazolyl, tetrazolyl, 1-methyltetrazol-5-yl, 1-ethyltetrazol-5-yl, thiatriazolyl, oxazolyl, oxadiazolyl, 2-phenyl-1,3,4-oxadiazol-5-yl, benzimidazolyl, benzoxazolyl, triazolopyridyl, benzothiazolyl, nitrobenzothiazolyl, purinyl, pyridyl, pyrimidyl or an alkyl group of 1–4 carbon atoms; said cephalosporin antibiotic being in the form of a syn isomer free of the corresponding anti-isomer to the extent of at least 75% based on the total weight of said antibiotic; and a physiologically acceptable salt thereof.

4,093,804

PYRIDINIUMMETHYLARYL-SUBSTITUTED CEPHALOSPORIN DERIVATIVES

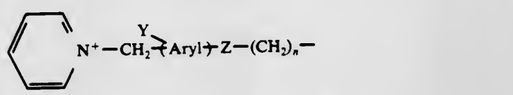
Fortuna Haviv, Montreal, Canada, and Abraham Patchornik, Ness-Ziona, Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

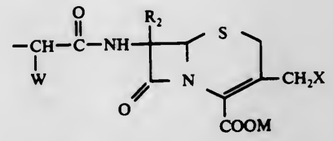
Division of Ser. No. 625,570, Oct. 24, 1975, Pat. No. 4,026,887. This application Jan. 14, 1977, Ser. No. 759,466

Int. Cl.² C07D *501/36*

U.S. Cl. 544—27 **36 Claims**

1. A compound selected from a base of the formula:





wherein Aryl is selected from phenyl and 2-thienyl; Y is selected from hydrogen, chlorine, bromine, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, and a lower alkoxy group of from 1 to 4 carbon atoms with the proviso that when Aryl is 2-thienyl, Y is hydrogen; Z is selected from a bond, oxygen, sulfur and imino with the proviso that when Aryl is 2-thienyl, Z is a bond; W is selected from hydrogen, methyl, amino, hydroxy, SO_3H and $COOR_1$ wherein R_1 is selected from hydrogen and 5-indanyl; *n* is zero, 1 or 2 with the proviso that when W is other than hydrogen or methyl, and Z is other than a bond, *n* is not zero; R_2 is selected from hydrogen or methoxy and is either cis- or trans-; M is selected from an anion; hydrogen; alkanoyloxymethyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched; alkanoylaminomethyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched and wherein the amino nitrogen may be substituted with an alkyl group of from 1 to 4 carbon atoms; alkoxycarbonylaminomethyl wherein the alkoxy moiety contains from 1 to 4 carbon atoms and may be straight or branched and wherein the amino nitrogen atom may be substituted with an alkyl group of from 1 to 4 carbon atoms; p-(alkanoyloxy)-benzyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched; and aminoalkanoyloxymethyl wherein the alkanoyl moiety contains from 2 to 15 carbon atoms, and the amino nitrogen atom may be mono- or di-substituted with a lower alkyl group of from 1 to 4 carbon atoms; with the proviso that when M is other than an anion the compound exists as a salt of a pharmaceutically acceptable inorganic or organic acid; X is selected from 1,3,4-thiadiazol-5-ylthio, 3-methyl-1,2,4-thiadiazol-5-ylthio, tetrazol-5-ylthio, 1-methyltetrazol-5-ylthio, 2-methyl-1,3,4-oxadiazol-5-ylthio, 2-methyl-1,3,4-thiadiazol-5ylthio and 1,2,3-triazol-5-ylthio; and pharmaceutically acceptable salts thereof.

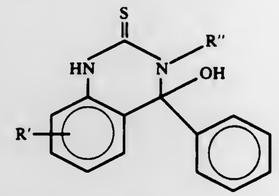
4,093,805

4-HYDROXY-3,4-DIHYDRO-2(1H)-QUINAZOLINETHIONES

Thomas C. Britton, and Donald L. Trepanier, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 17, 1977, Ser. No. 769,480
Int. Cl.[2] C07D *413/06*
U.S. Cl. 544—116 10 Claims

1. A compound of the formula



wherein R′ represents alkyl, halo, and hydrogen, and R″ represents amino, dialkylaminoalkyl, (pyrrolidinyl)ethyl, (piperidinyl)ethyl and 4-morpholinylalkyl and further including the pharmaceutically-acceptable salts thereof and wherein any alkyl refers to a moiety having from 1 to 4 carbon atoms.

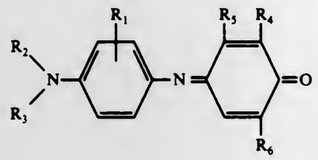
4,093,806

INDOANILINES

Gregoire Kalopissis, Paris; Andree Bugaut, Boulogne-sur-Seine, and Francoise Estradier, Paris, all of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 619,477, Oct. 3, 1975, Pat. No. 4,046,786, which is a division of Ser. No. 482,523, Jun. 24, 1974, Pat. No. 3,929,404. This application May 20, 1977, Ser. No. 798,886
Claims priority, application Luxembourg, Jun. 22, 1973, 67860
Int. Cl.[2] C07D *295/14*
U.S. Cl. 544—165 10 Claims

1. An indoaniline having the formula



wherein:
R_1 represents hydrogen, halogen, alkyl or alkoxy;
R_2 represents alkyl and hydroxyalkyl,
R_3 represents piperidinoalkyl, morpholinoalkyl or R_2 and R_3 together with the nitrogen atom to which they are attached form a heterocycle selected from piperidino and morpholino;
R_4, R_5 and R_6 each independently represent hydrogen, halogen, alkyl, alkoxy, acetylamino, ureido or carbalkoxyamino,
with the proviso that at least one of R_4, R_5 and R_6 is other than hydrogen or halogen and that at least two of said R_4, R_5 and R_6 are other than hydrogen when R_4 or R_6 is methyl and R_5 can further represent amino, alkylamino, hydroxyalkylamino and carbamylalkylamino,
wherein the alkyl and alkoxy groups contain from 1 to 6 carbon atoms.

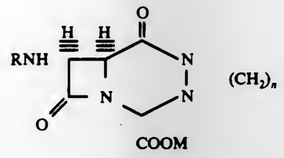
4,093,807

TRICYCLIC β-LACTAMS

Carl David Perchonock, Philadelphia, Pa., assignor to Smith-Kline Corporation, Philadelphia, Pa.

Filed Jun. 27, 1977, Ser. No. 810,127
Int. Cl.[2] C07D *251/72*
U.S. Cl. 544—183 11 Claims

1. A compound of the formula



where
R is phenoxyacetyl or 2-thienylacetyl,
n is 3 or 4, l and
M is hydrogen, a pharmaceutically acceptable non-toxic cation, or a carboxylic acid protective ester residue.

4,093,808

PRODUCTION OF CYANURIC ACID FROM UREA

George D. Nelson, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 20, 1976, Ser. No. 752,380
Int. Cl.[2] C07D *251/32*
U.S. Cl. 544—192 9 Claims

1. A process for the manufacture of crude cyanuric acid of improved purity which comprises heating in a pyrolysis zone at a temperature from about 250° C. to about 300° C., a mixture comprising:
(a) 100 parts by weight of urea;
(b) from about 20 to about 200 parts by weight, based upon the urea, of recycled cyanuric acid; and
(c) from about 3 to about 40 parts by weight, based upon the urea, of ammonium nitrate or concentrated nitric acid;
for a time sufficient to complete the pyrolysis reaction.

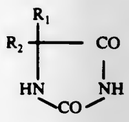
4,093,809

5-SUBSTITUTED PHOSPHONATE HYDANTOINS AND DERIVATIVES THEREOF

Luther A. R. Hall, Woodcliff Lake, N.J., and David A. Gordon, Scarsdale, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

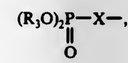
Filed Jun. 21, 1976, Ser. No. 698,623
Int. Cl.[2] C07F *9/65*
U.S. Cl. 548—308 21 Claims

1. A compound of the formula



(I)

wherein
R_1 is hydrogen or alkyl of 1 to 8 carbon atoms,
R_2 is

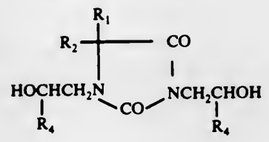


R_3 is alkyl of 1 to 8 carbon atoms, and
X is a straight or branched chain alkylene of 1 to 4 carbon atoms or a straight or branched chain alkylene of 3 to 6 carbon atoms containing an internal carbamido group, or

R_1 and R_2 together are Y where Y is a straight or branched chain alkylene of 4 to 8 carbon atoms having a pendant

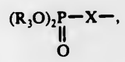
moiety.

13. A compound of the formula

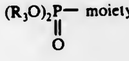


(IV)

wherein
R_1 is hydrogen or alkyl of 1 to 8 carbon atoms,
R_2 is



R_3 is alkyl of 1 to 8 carbon atoms, and
X is a straight or branched chain alkylene of 1 to 4 carbon atoms or a straight or branched chain alkylene of 3 to 6 carbon atoms containing an internal carbamido group, or
R_1 and R_2 together are Y where Y is a straight or branched chain alkylene of 4 to 8 carbon atoms having a pendant



moiety.
and
R_4 is hydrogen, methyl or ethyl.

4,093,810

PROCESS FOR PRODUCING 4-CARBOXAMIDO-5-CYANO-2-IMIDAZOLONE

Takakazu Kojima, Yamato, and Yozo Ohtsuka, Sagamihara, both of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

Filed July 26, 1976, Ser. No. 708,974
Claims priority, application Japan, Jul. 25, 1975, 50-90211
Int. Cl.[2] C07D *233/90*
U.S. Cl. 548—321 2 Claims

1. A process for producing 4-carboxamido-5-cyano-2-imidazolone which comprises reacting diaminomaleonitrile in the presence of a basic catalyst selected from the group consisting of a trialkylamine having 1 to 4 carbon atoms in each of the alkyl moieties thereof, triethylenediamine, hexamethylenetetramine, N-methylmorpholine, and pyridine with carbon dioxide in an organic polar solvent selected from the group consisting of dimethyl sulfoxide, N, N-dimethylformamide, an alcohol having 1 to 4 carbon atoms, tetrahydrofuran, dioxane, diethyl ether, dimethoxyethane, pyridine, acetonitrile and ethyl acetate at a temperature of from about 0° C to about 60° C.

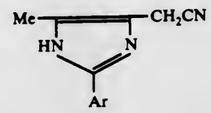
4,093,811

2-ARYL-4-CYANOMETHYL-5-METHYLIMIDAZOLES

Chris Royce Rasmussen, Ambler, Pa., assignor to McNeil Laboratories, Incorporated, Ft. Washington, Pa.

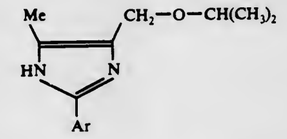
Continuation of Ser. No. 483,251, Jun. 26, 1974, abandoned. This application Jun. 3, 1976, Ser. No. 692,268
Int. Cl.[2] C07D *233/64*
U.S. Cl. 548—342 8 Claims

1. A compound selected from the group consisting of 2-aryl-4-cyanomethyl-5-methylimidazole having the formula:



and mineral acid addition salts thereof, wherein Ar is a member selected from the group consisting of phenyl, methylenedioxyphenyl, loweralkanoylphenyl, loweralkylthiophenyl and phenyl substituted with 1 to 3 members selected from the group consisting of loweralkyl, loweralkoxy, halo, hydroxy, phenoxy and nitro.

8. A compound selected from the group consisting of 2-aryl-4-isopropoxymethyl-5-methylimidazole having the formula:



and the mineral acid addition salts thereof, wherein Ar is a member selected from the group consisting of methylenedioxyphenyl, loweralkanoylphenyl, loweralkylthiophenyl and phenyl substituted with 1 to 3 members selected from the group consisting of loweralkyl, loweralkoxy, halo, hydroxy, phenoxy and nitro.

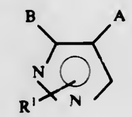
4,093,812

(NITROFURYL)PYRAZOLES, THEIR SYNTHESIS AND USE, AND COMPOSITIONS CONTAINING THEM

Georg Rainer, Constance, Germany, assignor to Byk Gulden Lomberg Chemische Fabrik GmbH, Constance, Germany

Filed Mar. 23, 1976, Ser. No. 669,611
Claims priority, application Luxembourg, Mar. 25, 1975, 72129; Feb. 20, 1976, 74400
Int. Cl.[2] C07D *231/12*; A61K *31/415*
U.S. Cl. 548—374 85 Claims

1. An antimicrobially-active pyrazole, the pyrazole ring of which is substituted by 5-nitro-2-furyl on a ring carbon atom ortho to one ring nitrogen atom and is unsubstituted on the ring carbon atom ortho to the other ring nitrogen atom, the pyrazole having the formula:

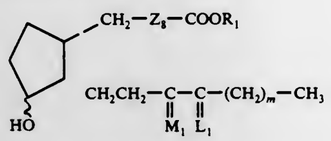


wherein
R^1 is directly bound to one of the two nitrogen atoms of the pyrazole ring, is heterocycle-free, and is —H, substituted or unsubstituted hydrocarbyl, carboxylic acid acyl or carbonic acid acyl, the hydrocarbyl being saturated or unsaturated, acyclic, alicyclic or aromatic, or araliphatic;
A is —CN, —CH(=X), aminol, or —C(=U)—R^{11};
U is =O, =S, =NR^3, =N—O—R^4 or =N—N(R^7)$_2$;
X is =O, =S, =N—R^3, =N—O—R^4, =N—N(R^5)R^6,

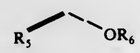
{—O—(lower)-alkyl}$_2$, {-S-(lower)alkyl}$_2$, —O—Y—O— or —S—Y—S—;
Y is lower alkylene with from 2 to 5 carbon atoms and optionally substituted by alkyl with from one to 5 carbon atoms;
Z is =O, =S or =NH;
R^3 is one of the meanings of R^1;
R^4 is —H, alkanoyl with from 1 to 7 carbon atoms or aroyl;
R^5 is —H or optionally-substituted alkyl;
R^6 is one of the meanings of R^7 or —C(=Z)—N(R^7)R^8;
each of
R^7 and R^8 is, independently, —H, optionally-substituted alkyl, organic acyl or optionally-substituted aryl;
R^{11} is —OH, alkoxy with from 1 to 11 carbon atoms, aryloxy with up to 12 carbon atoms, aralkoxy with up to 14 carbon atoms, halo, acyloxy, mercapto, azido, —N(R^{12})R^{13}, substituted or unsubstituted hydroxylamino or —N—H—N(R^{14})R^{15};
each of
R^{12} and R^{13} is, independently, —H, alkyl having from one to 7 carbon atoms or hydroxyalkyl having from one to 7 carbon atoms;
each of
R^{14} and R^{15}, independently, has one of the meanings of R^7; and
B is 5-nitro-2-furyl.

4,093,813
INTER-OXA-13,14-DIHYDRO-9-DEOXY-PGF COMPOUNDS
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Division of Ser. No. 614,243, Sep. 17, 1975, Pat. No. 4,033,989. This application Apr. 11, 1977, Ser. No. 786,713
Int. Cl.^{2} C07C *177/00*
U.S. Cl. 560—121 **25 Claims**

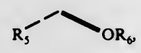
1. A prostaglandin analog of the formula



wherein *m* is one to 5, inclusive;
wherein M_1 is

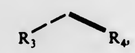


or

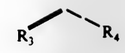


wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is

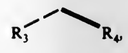
or



or a mixture of



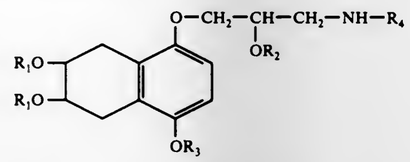
and



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein Z_8 is
(1) —CH_2—O—CH_2—$(CH_2)_g$—CH_2—,
(2) —$(CH_2)_2$—O—$(CH_2)_g$—CH_2—, or
(3) —$(CH_2)_3$—O—$(CH_2)_g$—,
wherein *g* is one, 2, or 3.

4,093,814
ESTERS OF 4-[3-(SUBSTITUTED AMINO)-2-HYDROXYPROPOXY]-5,6,7,8-TETRAHYDRO-1,6,7-NAPHTHALENETRIOLS
Frederic P. Hauck, Somerville; Michael E. Condon, Lawrenceville, and Rita T. Fox, Princeton, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.
Division of Ser. No. 656,769, Feb. 9, 1976, Pat. No. 4,048,231. This application May 18, 1977, Ser. No. 798,275
Int. Cl.^{2} C07G *93/06*; C07C *93/26*
U.S. Cl. 560—139 **10 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein R_1, R_2 and R_3 are acyl, R_1 is hydrogen and R_2 and R_3 are acyl, or R_1 and R_2 are hydrogen and R_3 is acyl; and R_4 is lower alkyl; with the proviso that if more than one of R_1, R_2 and R_3 are acyl, they are the same acyl group; wherein acyl is

wherein X is alkyl having 1 to 11 carbon atoms, aryl, or aryl-lower alkyl; lower alkyl is alkyl of 1 to 4 carbon atoms; and aryl is phenyl or phenyl substituted with one or two lower alkyl, lower alkoxy, halogen or nitro groups.

4,093,815
METHOD FOR THE OXIDATION OF A CONJUGATED DIOLEFIN
Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Aug. 12, 1976, Ser. No. 713,777
Int. Cl.^{2} C07C *67/05*; B01J *23/10*
U.S. Cl. 560—246 **11 Claims**

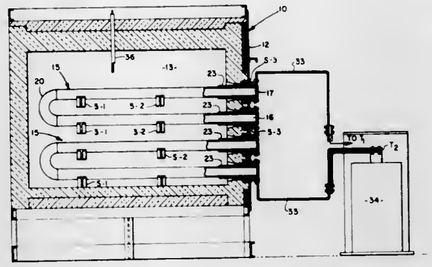
1. A method for producing diacyloxyalkenes comprising: reacting a conjugated diolefin with oxygen and at least one compound selected from the group consisting of a carboxylic acid and a carboxylic acid anhydride using a catalyst consisting essentially of three components,
wherein said first component is a rare earth metal containing compound,
wherein said second component is an alkali metal containing compound,
wherein said third component is a halide containing compound,
wherein the number of carbon atoms in the conjugated diolefin is within a range of from about 4 to about 12, the conjugated diolefin is selected from unsubstituted compounds and substituted compounds wherein the substituents are selected from the group consisting of halogen, cyano and carbalkoxy radicals, and the carboxylic acid and carboxylic acid anhydride are selected from the group consisting of mono and dicarboxylic aliphatic and aromatic acids and acid anhydrides having from about 2 to about 18 carbon atoms per molecule,
wherein the first component is selected from the group consisting of rare earth metal oxides, carboxylates, nitrates, halides, sulfates and mixtures thereof,
wherein the second component is selected from the group consisting of alkali metal oxides, carboxylates, halides and mixtures thereof, and
wherein the third component is selected from the group consisting of rare earth halides, alkali metal halides, organohalides and mixtures thereof.

4,093,816

FURNACE HEATING APPARATUS

Thomas L. Case, Toledo, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Feb. 11, 1977, Ser. No. 767,927
Int. Cl.[2] H05B *3/10, 3/40*
U.S. Cl. 13—2 R 8 Claims



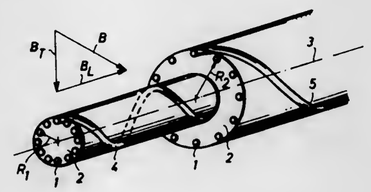
1. Heating apparatus for a furnace enclosure comprising:
a thin-walled, open-ended tube extending into and out of said enclosure;
electrical power means attached to said ends of said tube for heating said enclosure by initially passing a high amperage current of about 3800 amperes but not less than about 3000 amperes through said tube;
combustion means attached to an end of said tube for heating said enclosure by passing hot gases through said tube; and
switching means for actuating said electrical power means while deactivating said combustion means without removing said combustion means from said tube and actuating said combustion means while deactivating said electrical power means without removing said electrical power means from said tube.

4,093,817

SUPERCONDUCTOR

Klaus-Peter Jüngst, and Günter Ries, both of Karlsruhe, Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Apr. 23, 1976, Ser. No. 679,879
Claims priority, application Germany, Apr. 23, 1975, 2517924
Int. Cl.[2] H01B *12/00*
U.S. Cl. 174—32 3 Claims



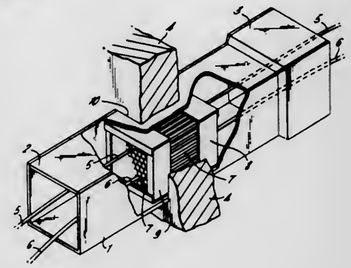
1. In a superconductor having a plurality of superconducting filaments embedded in a solid conductor of normal conducting material, said filaments being disposed on different radii within the cross section of said conductor, and each of said filaments being twisted about the longitudinal axis of said conductor and forming a helix which is concentric with respect to said longitudinal axis; the improvement wherein: each of said filaments is twisted in a first sense of rotation and then in a second sense of rotation in respective alternate sections of equal predetermined length, said second sense of rotation being opposite said first sense of rotation, whereby the coupling effects between filaments on circles of different radii produced by the components of time variable magnetic fields are suppressed.

4,093,818

FIRE-PROTECTIVE CELLULAR SERVICE DUCTING

Peter John Thwaites, Eltisley, and Deanis William Green, Stapleford, both of England, assignors to Dufaylite Developments Limited, England

Continuation of Ser. No. 642,511, Dec. 19, 1975, abandoned.
This application Aug. 13, 1976, Ser. No. 714,224
Claims priority, application United Kingdom, Dec. 20, 1974, 55237/74
Int. Cl.[2] H02G *3/22;* A62C *3/16;* E04B *1/94;* F16L *5/00*
U.S. Cl. 174—48 9 Claims



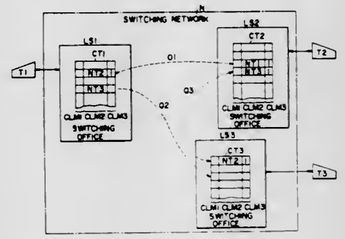
1. An assembly, for accommodating service lines, which comprises a length of ducting, a pair of metal frames each having a peripheral fit with the interior of the ducting, said frames being spaced apart in the length direction of the ducting to define a thermal conduction restricting gap between the frames, a block of structural cellular material so shaped, dimensioned and positioned as to have ends which engage within the frames and to extend from within one frame and across the position of the gap to within the other frame, said material having cell walls which define cells extending in the length direction of the ducting and permitting service lines to be passed through the block in said direction, and an intumescent material coated on said walls and being expandable to close said cells under fire conditions.

4,093,819

CLOSED USER GROUP FACILITY

Kyuta Saito, Hoya, and Fukuya Ishino, Kodaira, both of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Nov. 17, 1976, Ser. No. 742,673
Claims priority, application Japan, Nov. 29, 1975, 50-143489
Int. Cl.[2] H04L *11/00*
U.S. Cl. 178—2 R 4 Claims



1. A closed user group facility having a closed user group of terminals accommodated in a switching network for transmission, comprising:
means responsive to a terminal registration request from an originating one of the terminals for registering a terminating terminal corresponding to said request with its respective one of codes with which each of the terminals accom-

modated in the switching network can be respectively identified individually;

means for verifying whether or not the codes of the originating and terminating terminals have been mutually registered; and

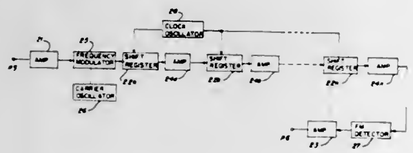
means for controlling the transmission of data based on the result of verification of the mutual registration of the terminal codes.

4,093,820

ELECTRONIC ECHO GENERATION EQUIPMENT

Shigeru Yamashita, Takatsuki; Kazuo Masaki, Osaka, and Masashi Shibahara, Kishiwada, all of Japan, assignors to Nihon Hammond Kabushiki Kaisha, Osaka, Japan

Filed Jul. 11, 1977, Ser. No. 814,748
Claims priority, application Japan, Jul. 16, 1976, 51-085240
Int. Cl.[2] H04R *3/00*; H03H *7/30*
U.S. Cl. 179—1 J **5 Claims**



1. An electronic echo sound generation system having a direct path and a delay path, the delay path comprising:

frequency modulation means for frequency modulating an input audio signal on a carrier and having an output;

a plurality of analog shift registers operable to time delay the modulated signal, coupled in series at a first end from the output of the frequency modulation means;

amplifier means coupled in series with the analog shift registers for compensating for the insertion losses of the analog shift registers; and

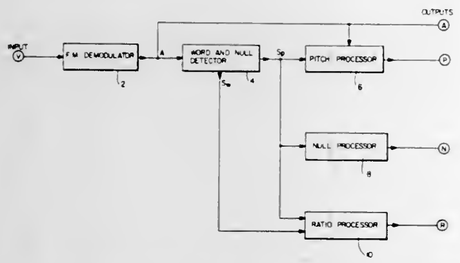
frequency modulation detector means coupled from the second end of the series coupled analog shift registers for producing at an output an echo audio signal derived from the input audio signal.

4,093,821

SPEECH ANALYZER FOR ANALYZING PITCH OR FREQUENCY PERTURBATIONS IN INDIVIDUAL SPEECH PATTERN TO DETERMINE THE EMOTIONAL STATE OF THE PERSON

John Decatur Williamson, Box 763, Theodore, Ala. 36582

Filed Jun. 14, 1977, Ser. No. 806,497
Int. Cl.[2] G10L *1/00*
U.S. Cl. 179—1 SC **12 Claims**



7. A speech analyzer for analyzing an FM demodulated speech signal said analyzer comprising:

(a) detector means for receiving said FM demodulated signal and for producing a first output indicative of nulls therein and for detecting the presence of a word and producing a second output indicative thereof;

(b) pitch frequency processor means, coupled to the output of said FM demodulator and the first output of said detector means for producing an output having an amplitude proportional to the frequency of the speech signal at said nulls;

(c) pitch null duration processor means, coupled to the first output of said detector means, for producing an output having an amplitude proportional to the duration of said nulls; and

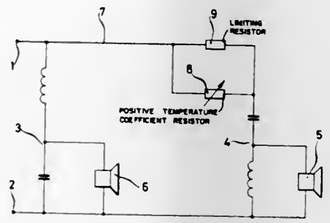
(d) ratio processor means, coupled to the first and second outputs of said detector means for producing an output proportional to the ratio of the total duration of all of said nulls within a word to the total duration of the word.

4,093,822

LOUDSPEAKER PROTECTION CIRCUIT

Günter Steinle, Monchweiler, Germany, assignor to Dual Gebrüder Steidinger, St. Georgen, Schwarzwald, Germany

Filed Mar. 31, 1977, Ser. No. 783,416
Claims priority, application Germany, Apr. 8, 1976, 2615305
Int. Cl.[2] H02H *3/28*
U.S. Cl. 179—1 VL **2 Claims**



1. A circuit for connection of a loudspeaker combination to an amplifier with a control device for emphasizing the amplification in the range of the treble frequencies, comprising,

a first loudspeaker means for reproduction of low and middle tone frequencies,

first electrical connection means for connecting said first loudspeaker means for reproduction of the low and middle tone frequencies to the amplifier,

a second loudspeaker means for reproduction of high-pitch frequencies,

second electrical connection means for connecting said second loudspeaker means for reproduction of the high-pitch frequencies to the amplifier,

a first resistor with positive temperature coefficient,

a second resistor with a fixed resistance being connected in parallel to said first resistor with positive temperature coefficient, thereby constituting a parallel resistor combination,

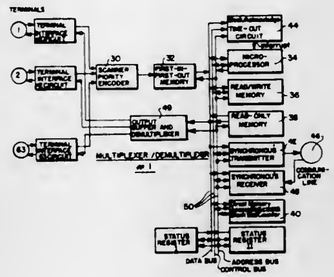
said parallel resistor combination being connected in series with said second electrical connection means for connecting said second loudspeaker means and substantially via said first resistor having a value which during normal operation of the loudspeaker combination is smaller than that of said second loudspeaker means for reproduction of the high-pitch frequencies, and further having a temperature coefficient such that by exceeding of a permissible constant load voltage for said second loudspeaker means its resistance value increases with respect to said second loudspeaker means such that said second loudspeaker means is not thermally overloaded, whereby said second resistor limits the resistance increase of said resistor combination to a predetermined value.

4,093,823

STATISTICAL MULTIPLEXING SYSTEM FOR COMPUTER COMMUNICATIONS

Wesley W. Chu, 16794 Charmel La., Pacific Palisades, Calif. 90272

Continuation-in-part of Ser. No. 717,341, Aug. 24, 1976, abandoned. This application Jul. 5, 1977, Ser. No. 812,802
Int. Cl.[2] H04J *3/16*
U.S. Cl. 179—15 BA **49 Claims**



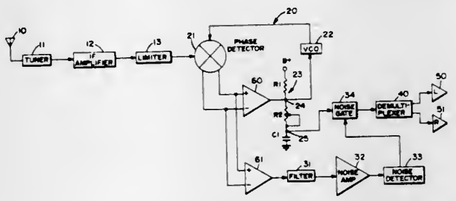
1. A statistical multiplexing system for transmitting user messages from a plurality of terminals to at least one remote location over at least one common communication channel, said system including: first buffer memory means for moderating the effects of statistically excessive demand, second buffer memory means for forming information from the first buffer memory means into data blocks, a plurality of interface circuits respectively connected to the terminal, means for introducing data from the terminals into said first buffer memory means, means for transferring said data from the first buffer memory means to the second buffer memory means, transmitter means for transmitting the data blocks from the second buffer memory means over the common communication channel to the remote location; receiver means coupled to the common communication channel for receiving multiplexed data blocks from at least one remote location over the common communication channel for distribution to the terminals; a demultiplexing circuit interposed between the receiver means and the terminal interface circuits for distributing the received data blocks, and microprocessor means for controlling the flow of signals between the first buffer memory means and the transmitter means for multiplexing the data blocks to be transmitted over the common communication channel, and for controlling the flow of signals from the receiver means to the demultiplexing circuit for demultiplexing data blocks received over the common communication channel by said receiver means.

4,093,824

RECEIVER HAVING A PHASE-LOCKED LOOP

Jon Paul Grosjean, Batavia, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Nov. 15, 1976, Ser. No. 741,897
Int. Cl.[2] H04H *5/00*
U.S. Cl. 179—15 BT **1 Claim**



1. In a receiver having a phase-locked loop demodulator comprising a phase detector, a VCO, and a loop filter circuit for demodulating a carrier signal modulated by a baseband signal which is derived from a plurality of distinct signal components and having a demultiplexer for reconstructing said signal components, the loop filter circuit comprising:

a first resistor connected between the input of the VCO and a source of potential voltage;

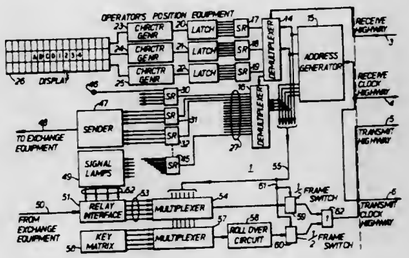
a resistive-capacitive branch connected between the input of the VCO and circuit ground, said branch comprising a second, variable, resistor and series-connected capacitor, wherein the loop filter circuit is characterized by a damping factor, Z, whose value is determined by the value of the variable resistive element and whereby the value of the variable resistive element is adjusted to effect optimum phase-linearity of the demodulated baseband signal, thereby allowing optimum separation of the reconstructed signal components.

4,093,825

DATA TRANSMISSION SYSTEM

David John Gladstone, Chigwell, and Peter Andrew Moldram, Aylesbury, both of England, assignors to Post Office, London, England

Filed Mar. 1, 1977, Ser. No. 773,265
Claims priority, application United Kingdom, Mar. 11, 1976, 9870/76
Int. Cl.[2] H04J *3/06*
U.S. Cl. 179—15 BS **17 Claims**



1. A data transmission system for transmitting data between a first unit and a second unit comprising first digital multiplex means located at said first unit and coupled via first data highway means to first digital demultiplex means located at said second unit, clock pulse generating means in the first unit connected to the first digital multiplex means to apply clock pulses thereto to effect the multiplexing of data on the first data highway means, first clock highway means connected from the clock pulse generating means to the second unit to enable clock pulses from the clock pulse generating means to be applied to the first digital demultiplex means to effect the demultiplexing of data received via the first data highway means, second digital multiplex means located in the second unit coupled by second data highway means to second digital demultiplex means located in the first unit, the second multiplex means being coupled to the first clock highway means to effect multiplexing of data on to the second data highway means in response to clock signals from the first clock highway means, and second clock highway means connected from the first clock highway means at the second unit to the first unit, the second digital demultiplex means being connected to the end of the second clock highway means at the first unit to effect demultiplexing of data received via the second data highway means in response to the clock signal received via the second clock highway means, the first unit including a first source of data which causes a signal to appear repeatedly in a particular time slot of each multiplex frame of the first multiplex means, and said second unit including a second source of data which causes a signal to appear repeatedly in a particular

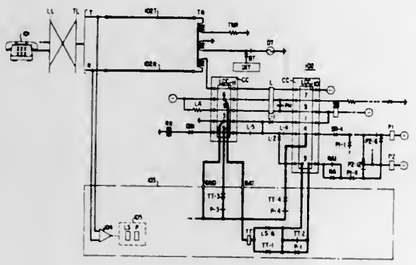
time slot of each multiplex frame of the second digital multiplex means, said particular time slots being characteristic of the data.

4,093,826

TONE SIGNALING CONVERSION APPARATUS

Frederick Henry Koster, Granite Springs, N.Y., assignor to American Telephone and Telegraph Inc., New York, N.Y.

Filed Jan. 17, 1977, Ser. No. 759,832
Int. Cl.[2] H04M *3/42*
U.S. Cl. 179—16 EC **7 Claims**



1. An interface arrangement for adapting a register normally responsive to pulse signaling appearing at the register's line terminals for operation with a converter responsive to combinatorial a.c. signals in which the line relay of the register normally directly controls pulse counting means in the register, said arrangement comprising:

means interposed between said line relay and said line terminals for allowing said line relay continuously to provide power to said terminals throughout the interval of operation of said converter, and

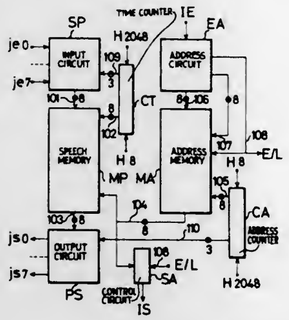
means interposed at said line relay between said pulse counting means and said converter for permitting said converter directly to control said pulse counting means independently of said line relay.

4,093,827

SYMMETRICAL TIME DIVISION MATRIX AND A NETWORK EQUIPPED WITH THIS KIND OF MATRIX

Pierre Charransol; Jacques Hauri, and Claude Athenes, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Feb. 14, 1977, Ser. No. 768,632
Claims priority, application France, Feb. 17, 1976, 76 04345; Apr. 9, 1976, 76 10566
Int. Cl.[2] H04Q *11/04*
U.S. Cl. 179—15 AT **15 Claims**



1. A symmetrical time-division matrix for switching input time-slots of a first set of input series PCM junctions towards output time-slots of a second set of output series PCM junctions, said matrix comprising:

parallelizing means for receiving simultaneously in serial form said input time-slots from said input series PCM junctions and delivering successively in parallel form said input time-slots;

time-division switching means for receiving said input time-slots from said parallelizing means according to a first order, switching said input time-slots into said output time-slots according to a second order, and delivering successively in parallel form said output time-slots according to said second order; and

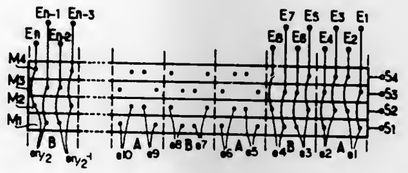
serializing means for receiving from said timedivision switching means said output time-slots, for selecting an output series PCM junction for a time-slot based solely on the position of said time-slot in the succession of output time-slots, and for delivering simultaneously in serial form said output time-slots to said output series PCM junctions.

4,093,828

SWITCHING NETWORKS, E.G. SPACE-DIVISION CONCENTRATORS

Jacques Baudin, Lannion, France, assignor to Societe Lannionnaise d'Electronique SLE-Citerel S. A., Lannion, France

Filed Oct. 6, 1976, Ser. No. 730,117
Claims priority, application France, Oct. 15, 1975, 75 31590
Int. Cl.[2] H04Q *3/42, 3/60*
U.S. Cl. 179—18 FC **14 Claims**



1. A switching network comprising a matrix of cross-point switches disposed in a pattern at selected ones of the cross-points in an array of mutually orthogonal inlets and outlets; wherein the pattern of selected cross-points is built up from a rectangular array of basic layouts each comprising eight cross-point switches distributed among the sixteen cross-points formed by a group of four consecutive inlets crossing a row of four consecutive outlets, either the group of inlets or the row of outlets being disposed in four consecutively numbered lines; the basic layouts being of two types: a first type having its switches at the end cross-points of its odd numbered lines and at the inner cross-points of its even numbered lines, and a second type having its switches at its other cross-points; basic layouts of both types being disposed in a pattern over the array in such a manner that all the cross-point switches are arranged in a single matrix, the pattern of basic layout types being a binary pattern such that the matrix has a first line of alternating types of layout, a second line of alternating pairs of layout types and so on, each n-th line having at least one set of 2^{n-1} consecutive layouts of the same type, said lines in which the layouts are disposed being parallel to said four consecutively numbered lines within the layouts.

4,093,829

SINGLE LINE TELEPHONE HOLD CIRCUIT

Robert L. Silberman, 470 Groveland Ave., Highland Park, Ill. 60035

Filed Mar. 14, 1977, Ser. No. 777,067
Int. Cl.[2] H04M *1/00*
U.S. Cl. 179—81 R **2 Claims**

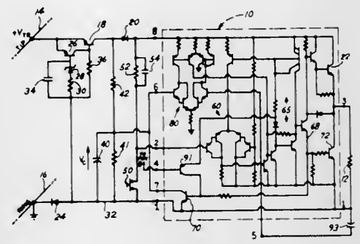
1. In combination with a two-wire telephone line connecting at least one telephone station set to a central exchange, an auxiliary hold circuit for maintaining line-current when said station set is placed in an on-hook state to prevent undesired disconnection of an active call at said central exchange, said hold circuit comprising, in combination,

first and second semiconductor switching devices serially connected with a shunt impedance across said two-wire line;

means for rendering said first semiconductor switching device conductive whenever the voltage across said two-wire line is less than a predetermined value;

manually-operated switching means for rendering said second semiconductor switching device conductive to connect said shunt impedance across said line; and

a control circuit for rendering said second device nonconductive whenever the voltage across said line exhibits a substantial decrease while said shunt impedance is connected across said line.

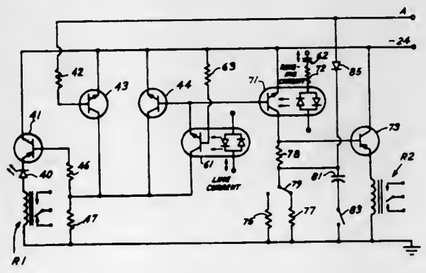


4,093,830

KEY TELEPHONE SYSTEM LINE CIRCUIT

Jeffrey Pappas, Mordea, Canada, assignor to Vortex Design Ltd., Canada

Filed Jan. 19, 1977, Ser. No. 760,747
Int. Cl.[2] H04M *1/72*
U.S. Cl. 179—99 **3 Claims**



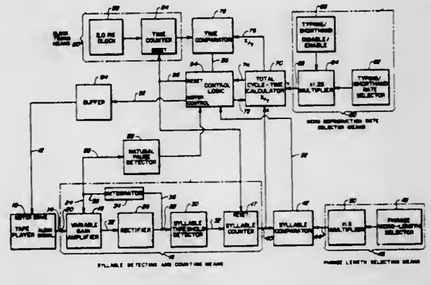
1. In combination with a key telephone system in which a telephone station-set is linked to a central exchange by at least one transmission line and in which said station-set includes switching means for applying an operating signal to a control conductor whenever said station-set is actively connected to said line, a line card circuit for supervising the operation of said line which comprises, in combination, first and second relays, a first optical semiconductor coupling device having an input circuit operatively connected to said line and an output circuit operatively connected to energize said first relay upon the occurrence of ringing signals on said line, a second optical semiconductor coupling device having an input circuit operatively connected in series with said line and having an output circuit operatively connected to energize both said first and said second relays when line current flows in said line, and a transistor switching circuit having its input connected to said control conductor for disabling said second optical semiconductor coupling device whenever said operating signal is present on said control conductor.

4,093,831

TRANSCRIBER HAVING SELECTABLE WORD REPRODUCTION RATE

Walter M. Sharp, and Gary E. Bergstrom, both of Columbus, Ohio, assignors to Business Education Products, Inc., Columbus, Ohio

Filed Oct. 12, 1976, Ser. No. 731,462
Int. Cl.[2] G11B *19/20, 27/22*
U.S. Cl. 179—100.1 VC **16 Claims**



1. An apparatus for controlling the average word reproduction rate from a recording which is mounted to a playback means including an electrically operable drive motor and a sound pickup and output means, said apparatus providing an operating cycle comprising alternate playback intervals and stopped intervals and comprising:

(a) means connected to said sound pickup and output means for detecting and counting syllables reproduced during a playback interval;

(b) clock timing means for counting the elapsed time from the beginning of said cycle;

(c) rate selector means for selecting a time rate of word reproduction;

(d) circuit means connected to the outputs of said rate selector means and said syllable counter means for computing a total cycle time;

(e) time comparator means connected to the outputs of said computing circuit means and said clock timing means for signalling the coincidence of the computed cycle time and the clock time; and

(f) control logic means having a motor drive control output coupled to said drive motor and having an input connected to said time comparator means, for at times stopping said playback and for initiating playback in response to the coincidence of said elapsed time and said computed total cycle time.

11. A method for playback of a recording at a selected average word reproduction rate, said method comprising;

(a) selecting a reproduction rate;

(b) initiating and subsequently stopping the playback of a recording;

(c) counting the time elapsed from said initiating of said playback;

(d) detecting and counting the syllables reproduced during said playback

(e) computing a total cycle time by dividing said counted syllables by said selected reproduction rate; and

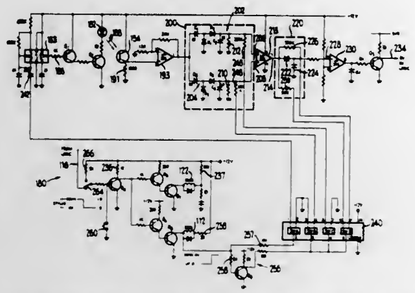
(f) reinitating said playback when said counted time substantially equals said computed time.

4,093,832

PROGRAMMABLE RECORD CHANGER

Anson Isaacson, Chicago; Howard J. Morrison, Deerfield, both of Ill.; Ralph H. Baer, Manchester, N.H.; Donald K. Fletchic, Arlington Heights, and Albert G. Keller, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Apr. 30, 1976, Ser. No. 682,079
Int. Cl.[2] G11B *19/14*
U.S. Cl. 179—100.4 D 39 Claims



1. A programmable phonograph record player providing automatic sound track selection from a record having a plurality of sound track bands spaced apart by a plurality of intraband land areas, comprising:

an electro-optic scanner including a source of radiation and a detector for radiation by said source reflected from the surface of a record;

land sensing means connected to said detector and including means for developing a threshold signal which varies with the record surface reflectivity characteristics and means controlled in part by said threshold developing means for detecting the presence of a land area below the stylus by providing an output signal as said stylus encounters said land area;

means for storing a predetermined selection of sound track bands to be played; and

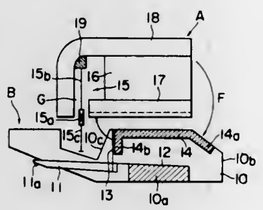
control means responsive to said output signal for positioning the stylus on the record to play the preselected sound track bands as stored in said storage means.

4,093,833

MOVING COIL CARTRIDGE WITH MAGNETIC MEANS TO AFFIX STYLUS HOLDER TO CARTRIDGE CASING

Kenkichi Tsukamoto, 47, Koyamashimofusa-cho, Kita-Ku, Kyoto-Shi, Kyoto-Fu, Japan

Filed Jul. 13, 1976, Ser. No. 704,802
Claims priority, application Japan, Jul. 15, 1975, 50-86422
Int. Cl.[2] H04R *9/16*
U.S. Cl. 179—100.41 D 3 Claims



1. A moving coil cartridge device comprising:

a. a vibrator section (B) including a cantilever stylus with a stylus holder case (10) and stylus holding means (10*b*, 10*c*) for said section;

b. a cartridge casing (40) disposed over said vibrator means (B), said cartridge casing (40) having retaining members (40*a*, 40*b*) for retaining said holding means (10*b*, 10*c*);

c. generator means (A) within said cartridge casing (40) for translating said stylus motion into electrical energy, said generator means (A) having a magnet (16) and yokes (17,18) with an air gap (G) for providing a magnetic field therein, a moving coil (15*a*) coupled to said vibrator section (B) in said air gap (G), a recess (20) in one of said yokes (17); and,

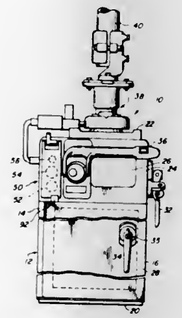
d. a magnet member (14) on said stylus holder case (10) so disposed as to be attracted by said magnet (16) and enter said recess (20) to affix said vibrator section (B) to said generator means (A).

4,093,834

PROTECTIVE COVER ARRANGEMENT

Norman J. Stranczek, Niles, Ill., assignor to S&C Electric Company, Chicago, Ill.

Filed Jun. 30, 1976, Ser. No. 701,066
Int. Cl.[2] H01H *9/20*
U.S. Cl. 200—50 A 23 Claims



1. In a switch operating mechanism having a housing, a door overlying an access opening, the door being mounted for movement between a closed and an open position, and a mechanism control switch mounted externally on the housing, an improved protective cover arrangement comprising:

hinge means mounted on the housing adjacent the switch;

cover means mounted on said hinge means for movement between first and second locations and for pivotal movement at both locations between a closed position overlying the switch and an open position exposing the switch;

flange means mounted on the door adjacent said cover means for engaging said cover means when said cover means is in its first location so that said cover means is retained in its closed position when the door is closed and for disengaging said cover means when said cover means is moved to its second location so that said cover means can be pivoted to its open position even when the door is closed, said flange means moving out of engagement with said cover means when the door is opened so that said cover means can be pivoted to its open position when said cover means is in its first location; and

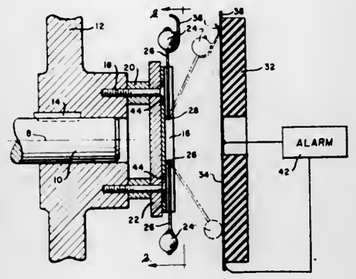
locking means on said hinge means for receiving a removable lock, the presence of the lock in said locking means preventing said cover means from being moved from its first location to its second location, and the absence of the lock in said locking means permitting said cover means to be moved to its second location.

4,093,835

ROTATION SENSOR SWITCH

John B. Sevec, Joliet, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 4, 1977, Ser. No. 784,401
Int. Cl.[2] H01H *35/02*
U.S. Cl. 200—61.45 M 3 Claims



1. A switch to operate an apparatus for providing an alarm when a rotating shaft slows comprising:

a pair of ferromagnetic weights;

a pair of electrically conducting brackets, each connected at a first end to one of the pair of ferromagnetic weights;

a pair of hinges connected in a fixed spatial relation to the shaft in a plane perpendicular to an axis of rotation of the rotating shaft and equidistant from the axis of rotation, each one of the pair of hinges connected to a second end of one of the pair of electrically conducting brackets, the hinges placed to permit rotation of the ferromagnetic weights about the hinges in a plane containing the axis of rotation of the rotating shaft, the hinges further supporting the weights in balanced rotation in a plane perpendicular to the axis of the rotating shaft;

a conducting disk disposed concentrically with and perpendicular to the axis of the rotating shaft at a distance from the plane perpendicular to the axis of the shaft that is less than the length of the combination of one each of the weights and the brackets; and

a disk magnet touching the conducting disk on a side away from the weights, the disk magnet disposed and magnetized in a direction to attract the weights toward the conducting disk whereby the ferromagnetic weights are attracted by the disk magnet to the conducting disk to make electrical contact as a switch from the conducting disk through the weights, the brackets, and the hinges when the rotating shaft slows.

4,093,836

ACCELERATION SENSITIVE SWITCH

Robert J. Ewy, Olathe, and Robert P. Moore, Lawrence, both of Kans., assignors to King Radio Corporation, Olathe, Kans.

Filed Jun. 28, 1976, Ser. No. 700,501
Int. Cl.[2] H01H *35/14, 67/02*
U.S. Cl. 200—61.53 3 Claims

1. An acceleration sensitive device comprising:

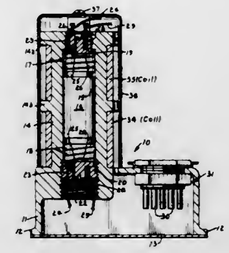
a housing having a spool-type post with a bore;

a ferromagnetic mass supported within said bore for movement therein along an axis of acceleration;

a pair of springs engaging said housing and opposite ends of said mass in a manner to resiliently urge said mass toward a preselected stable position along said axis of acceleration, said mass being displaceable in both directions along said axis of acceleration in response to acceleration and deceleration in the direction of said axis;

indicating means providing an indication of the displacement of said mass and the direction of displacement from said stable position; and

test means for displacing said mass from its stable position independently of acceleration to test the device, said test means including a pair of conductive coils wound concentrically about said axis of acceleration between opposite ends of said post and arranged to provide respective fields



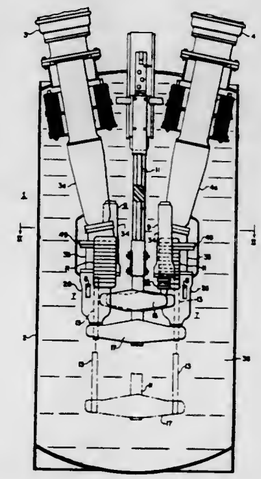
having centers located along said axis on opposite sides of said stable position, whereby application of current to the respective coils acts to displace said mass in opposite directions from its stable position independently of acceleration forces.

4,093,837

OIL CIRCUIT-BREAKER PUMP-ASSEMBLY WITH IMPROVED SHUNTING CONTACT STRUCTURE

Richard J. Bohinc, Hempfield Township, Westmoreland County; Charles W. Tragesser, Murrysville, Westmoreland County; Ronald E. Vaill, Penn Township, Westmoreland County, and Francis R. Racki, O'Hara Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 31, 1975, Ser. No. 600,556
Int. Cl.[2] H01H *33/92*
U.S. Cl. 200—150 G 7 Claims



1. The combination in an oil-type circuit-interrupter of an arcing-grid structure having an adjacently-disposed oil-pumping piston-assembly, said arcing grid structure having a pair of separable arcing contacts (13, 20) disposed therewithin, said oil pumping-assembly including an operating cylinder and a movable oil-driving rigid piston slidable within said operating cylinder, said movable rigid oil-driving piston having an enlarged central aperature provided therein, a rigid piston rod for driving said piston and actuated externally of the oil-pumping piston assembly, said piston rod extending with clearance through the enlarged hole provided in the rigid movable piston, and a resilient connection provided between the rigid

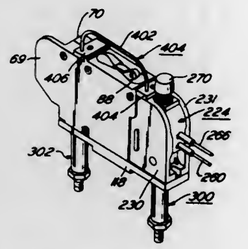
piston-rod and the movable rigid piston including one or more resilient washers surrounding said rigid piston rod and disposed on both sides of said enlarged hole in the piston for accommodating misalignment between the bore in the surrounding operating cylinder and the movable rigid piston for uninhibited smooth circuit-breaker operation.

4,093,838

CIRCUIT BREAKER HOUSING, GRIP MEANS AND BUS TERMINAL

Ronald Nicol, Trenton, N.J., assignor to Heinemann Electric Company, Trenton, N.J.

Division of Ser. No. 519,874, Nov. 1, 1974, Pat. No. 3,955,162, which is a division of Ser. No. 384,702, Aug. 1, 1973, Pat. No. 3,863,042. This application Jan. 7, 1976, Ser. No. 646,988
Int. Cl.² H01H 9/02
U.S. Cl. 200—303 **1 Claim**



1. A circuit breaker comprising

a case defining a chamber enclosing a linkage, separable contacts and a current responsive electro-magnetic means for opening said contacts on predetermined electrical conditions,

said case being formed by two half-cases and including an approximately right angle wall structure defined by two side walls and an end wall defining a space therebetween and two openings on two sides of said case at approximately a right angle to each other,

said space being in communication with said chamber through a further opening in said end wall,

said side and end walls being arranged in a U shape with said side walls being opposed to each other,

a unitary switch device trapped between said side walls,

said switch device having a housing interfitting with said side walls so as to capture said housing therebetween,

said side walls and said end wall including complementary projections and recesses restraining said switch device in all directions of possible movement, and

said switch device extending through said two openings of said two sides.

4,093,839

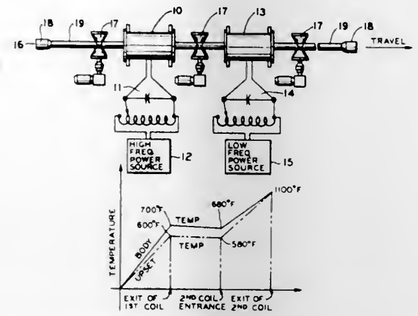
APPARATUS AND METHOD FOR INDUCTIVELY HEATING METALLIC TUBING HAVING AN UPSET PORTION

Louis J. Moliterno, Girard, and Reuel E. Jennings, Warren, both of Ohio, assignors to Ajax Magnethermic Corporation, Warren, Ohio

Filed Apr. 2, 1976, Ser. No. 672,981
Int. Cl.² H05B 5/06
U.S. Cl. 219—8.5 **9 Claims**

1. Apparatus for progressively inductively heating metallic tubing having at least one relatively thickened portion, comprising at least one induction heating coil energized with power at a relatively high frequency which will cause the temperature of the body of the tubing to rise at a faster rate than the temperature of said thickened portion, and at least one induction heating coil energized with power at a relatively low frequency which will cause the temperature of said thickened portion of the tubing to rise at a faster rate than the temperature of the body of the tubing, means to adjust the ratio of the power applied at said low frequency relative to the power applied at the high frequency so that said body and said thickened portion attain substantially the same predetermined final temperature upon exiting from said apparatus.

4. Method for progressively inductively heating sections of metallic tubing, each section having at least one relatively thickened portion, comprising passing said tubing through at least one induction heating coil energized with power at a relatively high frequency causing the temperature of the body



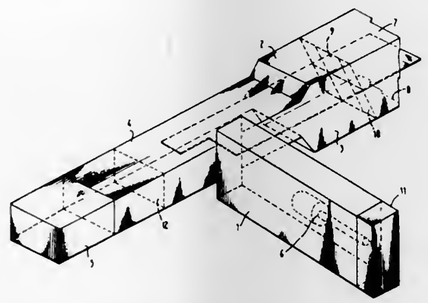
of the tubing to rise at a faster rate than the temperature of said thickened portion, and passing said tubing through at least one induction heating coil energized with power at a relatively low frequency causing the temperature of said thickened portion of the tubing to rise at a faster rate than the temperature of the body, the ratio of the power applied at said low frequency relative to the power applied at said high frequency being such that said body and said thickened portion of each section attain substantially the same predetermined final temperature upon exiting from the last of said coils.

4,093,840

PARALLEL ARRANGEMENT OF APPLICATOR AND PROCESS FOR APPLYING MICROWAVES TO A MATERIAL

Olivier A. Jean, 12 avenue Lavoisier, 78600 Maisons Laffitte, and Georges Roussy, 17 rue Ernest Renan, 54520 Laxou, both of France

Filed Jun. 24, 1976, Ser. No. 699,435
Claims priority, application France, Jul. 4, 1975, 75 21064
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 F **4 Claims**



1. Applicator for applying microwaves to a material divided into two portions each of which has its inlet face comprising:

two waveguides electromagnetically decoupled from each other in which are respectively located said two portions,

means for generating microwaves and for sending them onto said inlet faces so as to obtain two separate beams reflected by the inlet faces,

means for shifting the phase of said beams, so as to obtain in phase beams,

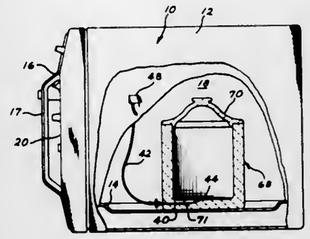
means for returning said in phase beams onto the inlet faces.

4,093,841

LOW-TEMPERATURE SLOW-COOKING MICROWAVE OVEN

Raymond L. Dills, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Aug. 19, 1976, Ser. No. 716,015
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 E **7 Claims**



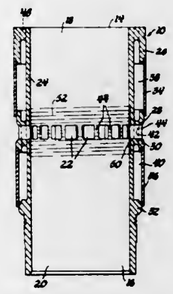
1. In a microwave oven for slow cooking, said oven having walls forming an oven cooking cavity, a source of microwave energy, and means for coupling the energy from the microwave source to the oven cavity, the improvement comprising a closed cooking vessel within the microwave oven cavity for supporting food to be heated throughout simultaneously, circuitry for adjusting the microwave energy to a predetermined reduced power level suitable for simmer-cooking and means for monitoring the temperature of the food within the vessel and maintaining it to just below the boiling point, whereby the maximum food temperature is held a plurality of hours to obtain simmer cooking at a slow-cooking rate.

4,093,842

PORTED ENGINE CYLINDER WITH SELECTIVELY HARDENED BORE

David I. Scott, Homewood, Ill., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 19, 1976, Ser. No. 649,969
Int. Cl.² B23K 9/00
U.S. Cl. 219—121 LM **4 Claims**



1. The method of making a scuff resistant engine cylinder liner, said method comprising the steps of

providing a coolant jacketed cast iron cylinder liner body defining a generally cylindrical interior wall with a plurality of ports through said wall and spaced annularly thereabout intermediate the ends of said wall,

machining finish said liner body, including the inner surface of said wall, to form approximately cylindrical upper and lower bore portions respectively above and below said ports and an annular band at and extending slightly above and below said ports of slightly greater inner diameter than that of said upper and lower bore portions and blended into said adjacent bore portions to form a blended port relief area between said bore portions, and

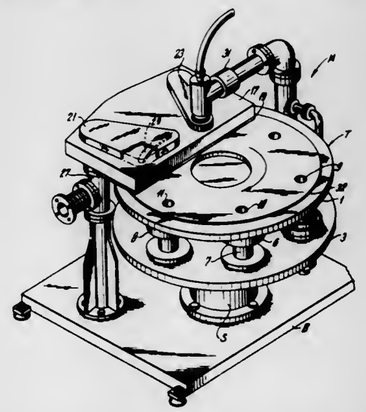
fully case hardening only the inner surface of said blended port relief area through localized heating to hardening temperature by traversing a laser beam across said inner surface and subsequent ambient cooling such that a scuff resistant hardened surface is provided in said port relief area without significant distortion of said cast iron cylinder liner body and its previously machined surfaces.

4,093,843

ELECTRON BEAM WELDING MACHINE

George Adam Lindstrom, Greenwood, and Robert Charles Holland, Danville, both of Ind., assignors to Union Carbide Corporation, New York, N.Y.

Filed Mar. 17, 1977, Ser. No. 778,621
Int. Cl.² B23K 9/00
U.S. Cl. 219—121 EB **7 Claims**



1. An electron beam welding machine comprising:

(a) a moveable weld table containing therein a plurality of openings each communicating with a weld chamber for housing parts to be welded and each opening being provided for passing an electron beam therethrough and for evacuating said chambers to welding vacuum;

(b) a seal plate above and at least partially in contact with the top surface of said weld table; said seal plate having a flat seal and bearing surface which is coextensive with at least a substantial portion of the top surface of said weld table surrounding said openings and which is composed of a low friction, compressible, wear resistant material, said seal plate being in intimate contact with the top surface of said table and having a first pump chamber and a separate second pump chamber therein;

(c) means for moving said weld table in an indexing fashion against said seal and bearing surface;

(d) first vacuum pump means connected to the first pump chamber in said seal plate to create a vacuum in said weld chambers as such chambers are indexed into registry with said pump chamber;

(e) second vacuum pump means connected to such second pump chamber in said seal plate to at least maintain said vacuum, the arrangement being such that said seal plate is allowed to move relative to the top surface of said weld table without destroying said vacuum; and

(f) an electron beam welding gun connected to said seal plate at said second pump chamber for passing an electron beam

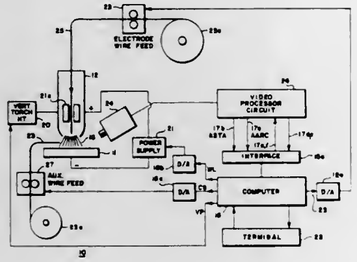
from said gun through said second pump chamber into said weld chambers for welding the parts therein.

4,093,844

ARC LENGTH MEASUREMENT AND CONTROL BY OPTICAL SCANNING

James Erwin Fellure, Heath, and Endre Leslie Toth, Lancaster, both of Ohio, assignors to Arcair Company, Lancaster, Ohio

Filed Sep. 14, 1976, Ser. No. 723,362
Int. Cl.² B23K *9/10*
U.S. Cl. 219—124.02 **14 Claims**



1. An optical system for controlling the length of a welding arc between a pair of electrodes comprising

optical means for optically sensing said arc and producing arc signals related to said arc,

reference setting means for producing a reference signal corresponding to a desired arc length,

difference means coupled to said optical means and said reference setting means and responsive to said arc signals for measuring the arc length and producing a difference signal related to the difference between said measured arc length and said desired arc length,

a plurality of control devices each operable for changing the length of said arc in accordance with a respective set point signal, and

controlling means including incrementing means responsive to said difference signal for producing a set point signal for each control device by an updating function of a prior respective set point signal.

4,093,845

CONTROLLER FOR DC ARC WELDING GENERATORS

Nelson Hairgrove, Sr., 5411 Northington, Houston, Tex. 77039

Continuation-in-part of Ser. No. 588,200, Jun. 19, 1975, abandoned. This application Jan. 24, 1977, Ser. No. 761,580
Int. Cl.² B23K *9/10*
U.S. Cl. 219—132 **10 Claims**

1. A controller for remotely starting and automatically stopping an internal combustion engine coupled to a DC generator that supplies DC power to the welding cables of an arc welding circuit, the engine having a starter, an ignition, and an intake manifold, comprising in combination:

a DC power source for providing a control current to said welding circuit, a current-blocking device for blocking said control current from said generator, and a current sensing device for sensing the flow of welding current,

a vacuum-actuated switching means coupled to said intake manifold and being responsive to the vacuum produced therein,

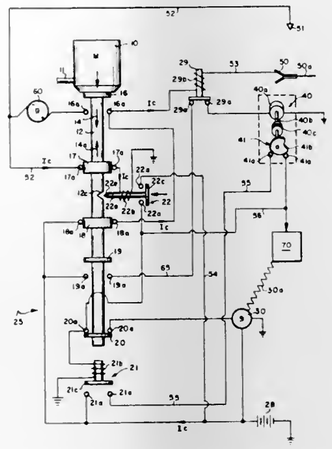
a switching circuit coupled to and controlled by said vacuum-actuated switching means,

a starter coupled to said switching circuit,

an ignition coupled to said switching circuit,

a timer having a predetermined timing interval and being coupled (1) to said switching circuit, (2) to said welding circuit, and (3) to said ignition,

said switching circuit, upon establishing continuity between said cables for said control current, energizing said ignition and said starter, thereby enabling the starting of said engine, and



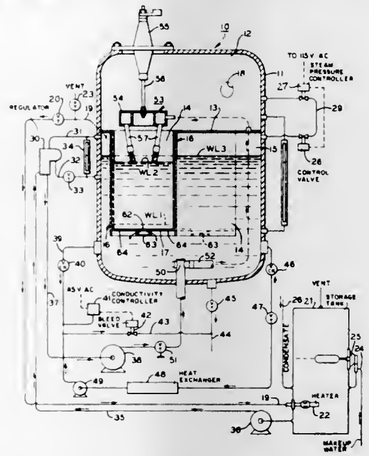
said timer stopping said engine if welding current does not flow through said cables at any time during the timing interval of said timer.

4,093,846

MULTI-JET ELECTRODE BOILER

Milton Eaton, Shawinigan, Canada, assignor to General Electric Company, Carmel, Ind.

Filed Mar. 15, 1976, Ser. No. 666,894
Int. Cl.² H05B *3/60;* **H01C** *10/02;* **F22B** *1/30*
U.S. Cl. 219—286 **15 Claims**



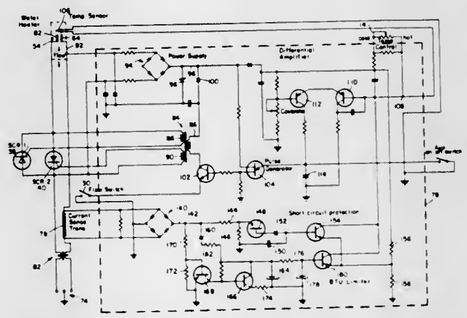
1. An electrode boiler comprising: at least one vertically elongated steam generating compartment surrounded by a control compartment; means for transferring water between said compartments to provide a regulated water level in said at least one steam generating compartment for regulating the load; jet forming means positioned above the regulated water level in said at least one steam generating compartment and formed to direct a plurality of electrode forming jets of water downwardly within said at least one stream generating compartment for impingement on the surface of the water therein; means for providing said jet forming means with a supply of water; means for connecting said jet forming means to a source of electric energy and means forming an electric neutral positioned below the minimum regulated water level in said at least one steam generating compartment; so that electric current flow through the water, including the electrodes formed by the jets of water, will heat the water.

4,093,847

TEMPERATURE CONTROL SYSTEM FOR ELECTRIC FLUID HEATER

John A. Walker, and Dimitri S. Dimitri, both of Northridge, Calif., assignors to Datametrics Corporation, Van Nuys, Calif.

Division of Ser. No. 504,814, Sept. 10, 1974, Pat. No. 3,983,559, which is a division of Ser. No. 385,275, Aug. 3, 1973, Pat. No. 3,909,588. This application Mar. 19, 1976, Ser. No. 668,470
Int. Cl.² H05B *1/02, 3/60*
U.S. Cl. 219—501 **7 Claims**



1. For use with an electric fluid heater having spaced-apart electrodes for applying electrical current to a fluid, and having a temperature sensor for sensing the temperature of the fluid, an electronic temperature control system comprising:

(a) power control means connectable to the electrodes and operable for applying power to the electrodes, said power control means being responsive to application of a control signal thereto for controlling the electric power output in accordance with an electrical characteristic of the control signal; and,

(b) control circuit means connected to said power control means and adapted to be connected to the temperature sensor, said control circuit means normally generating the control signal, said control circuit means being responsive to signals from the temperature sensor for altering the electrical characteristics of the control signal whenever the temperature of the fluid varies from a preset value, said control circuit means including means for sensing the electric current supplied to the electrodes, and further including a power limiting circuit, responsive to the sensed electric current for output generating a power detection signal whose magnitude represents the power being applied to the electrodes, said control circuit means being responsive to said power detection signal exceeding a preset value for altering the control signal to decrease the power applied to the electrodes.

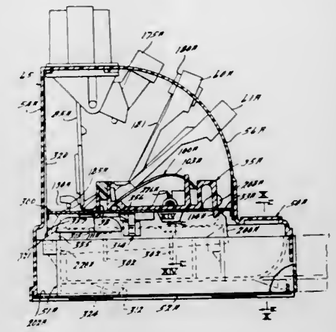
4,093,848

TOY CASH REGISTER CONSTRUCTION

James E. Thomson, Pleasant Lake, Mich., assignor to Western Stamping Corporation, Jackson, Mich.

Continuation-in-part of Ser. No. 501,166, Aug. 28, 1974, Pat. No. 3,957,198. This application Apr. 19, 1976, Ser. No. 677,928
Int. Cl.² G07G *1/00;* **G06C** *27/00*
U.S. Cl. 235—1 E **21 Claims**

1. In a toy cash register or the like having a pair of components which comprise a housing and a drawer horizontally slidable in the housing, means biasing the drawer to a projected relation with respect to the housing, characterized by an initially straight spring wire which tends to straighten when relaxed, said wire being looped to generally circular form and secured at its two ends to one of said components and reacting against but unsecured to the other, whereby it tends to return to circular form when distorted, said looped wire being arranged under the drawer and stressed to oval shape by the



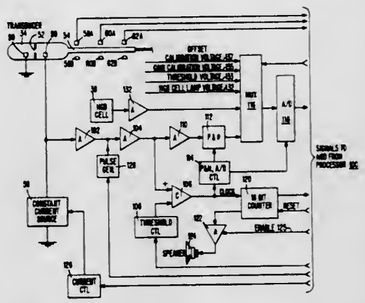
drawer and housing when the drawer is closed, said spring wire biasing the drawer to projected position due to the tendency of the wire to assume a circular shape.

4,093,849

AUTOMATIC BLOOD ANALYZING SYSTEM

Robert Baxter, Jr., Stratford; Frank J. Antoci, Milford; William J. Tynes, III, Stamford; Pasquale M. Petrucci, Orange, and George F. Martin, Westbrook, all of Conn., assignors to J. T. Baker Chemical Co., Phillipsburg, N.J.

Filed Apr. 28, 1976, Ser. No. 681,285
Int. Cl.² G06M *11/00*
U.S. Cl. 235—92 PC **23 Claims**



1. A blood analysis system adapted to receive and analyze a blood sample comprising:

transducer means responsive to the blood sample for providing electrical pulses representative of blood cells passing therethrough;

a fluid path coupled to the transducer means and through which the blood sample flows after flowing through the transducer means;

first sensing means located along the fluid path for providing a first signal representative of the flow of a first predetermined sample volume through the fluid path;

second sensing means located along the fluid path for providing a second signal representative of the flow of a second predetermined sample volume through the fluid path;

means responsive to the electrical pulses and to the first signal for providing a first count of blood cell concentration in the first predetermined sample volume;

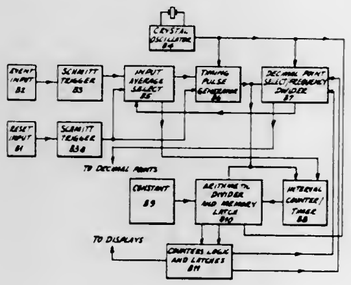
the means for providing said first representation being further responsive to the electrical pulses and to the second signal for providing a second count of the blood cell

concentration in the second predetermined sample volume;
means for comparing the first and the second counts to provide a determination of when said first and second counts differ by less than a predetermined difference; and
means operative only upon said determination and responsive to said first and second counts for providing as an output an average of said counts.

4,093,850
RATEMETER WHICH CALCULATES THE RECIPROCAL OF THE PERIOD

Thomas A. Karnowski, Milwaukee, and Michael W. Shawaluk, Watertown, both of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Feb. 22, 1977, Ser. No. 771,169
Int. Cl.² G01R *23/02*
U.S. Cl. 235—92 TF **35 Claims**

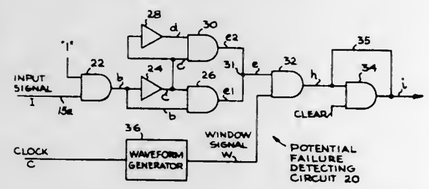


1. A ratemeter comprising:
clock means generating clock pulses at a known frequency;
means responsive to recurring input events to generate event pulses defining event periods;
period counter means for accumulating said clock pulses;
means responsive to said event pulses for dividing the contents of said period counter means accumulated during a previous event period into a known constant simultaneously with accumulation by said period counter means of clock pulses occurring in the present event period; and
means responsive to said dividing means to provide a signal representative of the rate of recurrence of said input events.

4,093,851
MEANS AND METHODS FOR DETECTING THE POSSIBILITY OF A FAILURE OCCURRING IN THE OPERATION OF A DIGITAL CIRCUIT

Ronald Adam Paulinski, Goleta, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Dec. 27, 1976, Ser. No. 754,311
Int. Cl.² G06F *11/00*
U.S. Cl. 235—302.2 **11 Claims**

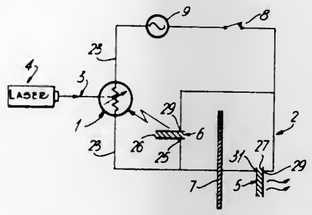


1. Potential failure detecting means for detecting the possibility of a potential failure occurring in a digital circuit while the circuit is operating in a data processing system in a normal manner without failure, said potential failure detecting means comprising:
means coupled to a communication line provided between said data processing system and said digital circuit for deriving a test signal indicative of a signal communicated between said digital circuit and said system during actual operation of said circuit in said system;
criteria establishing means for generating a potential failure criteria signal indicative of predetermined criteria for said test signal, said criteria signal having a predetermined timing characteristic;
comparing means for comparing time relationships between said test signal and said criteria signal; and
indicating means responsive to said comparing means for providing an indication of whether said test signal meets said predetermined criteria.

4,093,852
LASER ADDRESSED DISPLAY

Graham Olive, Vancouver; Royston Ernest Walter Lake, Richmond, and Joseph Guy Gilles Dionne, Ottawa, all of Canada, assignors to Her Majesty the Queen in right of Canada as represented by the Minister of National Defence, Ottawa, Canada

Filed Sep. 29, 1976, Ser. No. 727,882
Claims priority, application Canada, Jan. 30, 1976, 244634
Int. Cl.² H01J *31/50, 39/12*
U.S. Cl. 250—213 A **12 Claims**

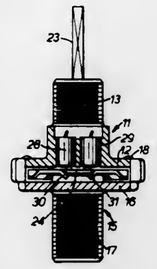


1. A photoconductor-switched electroluminescent matrix panel element for use in a laser addressed display system comprising: a photoconducting layer, deposited on a transparent substrate, electrically and optically coupled with a superimposed parallel plate capacitor structure having at least two dielectric layers with a common electrode, said dielectric layers containing phosphor particles which emit visible radiation upon excitation by an alternating electric current; said photoconducting layer having a dark impedance such that insufficient alternating current may pass through said capacitor structure to cause significant visible radiation emission and a light impedance such that when addressed by an incident light pulse provided by a laser source sufficient alternating current may pass through said capacitor structure to cause visible radiation emission; said photoconductor layer being adapted to maintain a sufficiently low light impedance, for a time period after said light pulse, to permit feedback of light emitted from one of said dielectric layers to build up and thereby sustain said low light impedance until interruption of said alternating electric current.

4,093,853
ROTATIONAL SPEED TRANSDUCERS

Norman Hunt, Leamington Spa, England, assignor to Associated Engineering Limited, Leamington Spa, England

Filed Feb. 22, 1977, Ser. No. 770,363
Claims priority, application United Kingdom, Mar. 5, 1976, 9035/76
Int. Cl.² G01D *5/34*
U.S. Cl. 250—231 SE **2 Claims**



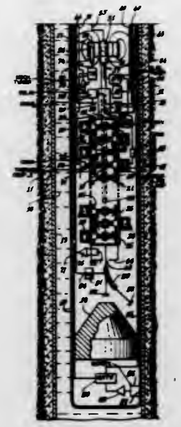
1. A rotational speed transducer comprising:
rotatable means;
means mounting said rotatable means such that it can rotate at a speed related to a rotational speed input;
said rotatable means having a plurality of light reflector portions;
means mounting said plurality of reflector portions at an angle to the axis of rotation of said rotatable means;
lamp means for emitting light;
photocell means for receiving light from said lamp means and providing an electrical output in response thereto;
and means mounting said lamp means and said photocell means in relation to said rotatable means whereby to reflect light emitted by said lamp means from a first reflector portion to a second reflector portion and from said latter portion to said photocell means each time said first reflector portion comes into a given relation with said lamp means, as said rotatable means rotates, thereby to provide from said photocell means an electrical output which is a measure of the rotational speed input.

4,093,854
WELL LOGGING SONDE INCLUDING A LINEAR PARTICLE ACCELERATOR

Ronald E. Turcotte, and John S. Wahl, both of Ridgefield, Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 580,071, May 22, 1975, abandoned. This application Nov. 16, 1976, Ser. No. 742,403
Int. Cl.² G01V *5/00*
U.S. Cl. 250—269 **26 Claims**

1. A method of logging the media surrounding a borehole that traverses an earth formation, comprising the steps of:
accelerating charged particles to high energy levels in a number of individual cavities containing an accelerating field;
controlling the acceleration of said particles in response to variations of at least one condition of said cavities;
bombarding a target with the accelerated particles to emit nuclear radiation that penetrates the surrounding media; and

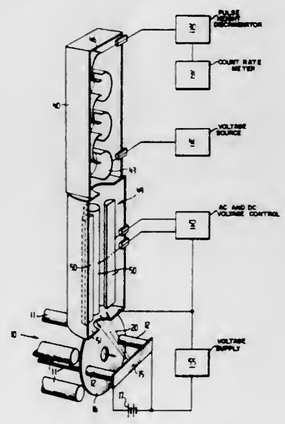


detecting nuclear radiation returning to the borehole as a result of the interaction of the emitted radiation and the surrounding media.

4,093,855
DETECTOR FOR HEAVY IONS FOLLOWING MASS ANALYSIS

Wade L. Fite, Pittsburgh, and Richard L. Myers, Harmony, both of Pa., assignors to Extranuclear Laboratories, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 465,163, Apr. 29, 1974, Pat. No. 3,973,121, which is a continuation-in-part of Ser. No. 319,442, Dec. 29, 1972, Pat. No. 3,808,433. This application Aug. 3, 1976, Ser. No. 711,231
The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.
Int. Cl.² H01J *39/34*
U.S. Cl. 250—282 **10 Claims**



1. A method for detecting in macromolecular ions emerging from the exit end of a device which separates said macromolecular ions on the basis of their charge-to-mass ratios, the presence of selected elements and compounds, said method comprising the impinging of said emerging macromolecular ions having an instantaneous uniform charge-to-mass ratio upon a hot surface whereupon said macromolecular ions decompose at the high temperature of the heated surface into fragments, at least some of said fragments being surface ionizable by said hot

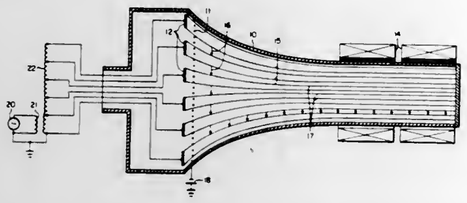
surface evolving from said hot surface as fragment ions and analyzing the fragment ions so produced by separating said fragment ions by their charge-to-mass ratios.

4,093,856

METHOD OF AND APPARATUS FOR THE ELECTROSTATIC EXCITATION OF IONS

Reiner L. Stenzel, Pacific Palisades, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Jun. 9, 1976, Ser. No. 694,492
Int. Cl.[2] B01D *59/44*; H01J *39/34*
U.S. Cl. 250—293 **15 Claims**



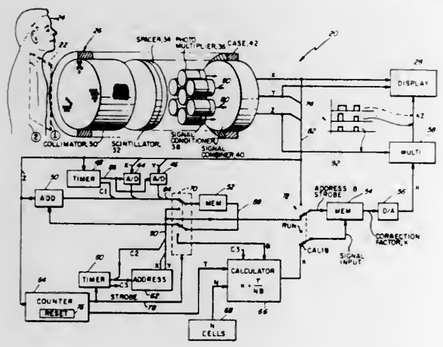
1. Apparatus for imparting more energy to a selected one of the isotopes of an element in a plasma, said apparatus comprising:
(a) an elongated evacuated container having a central axis;
(b) means for generating in said container a dense, substantially electrically neutral, and substantially collisionless plasma including ions of an element having at least two isotopes;
(c) means for generating a steady magnetic field within said container, along said axis and through said plasma;
(d) a cathode and an anode in said container;
(e) said anode being disposed substantially at right angles to said longitudinal axis and consisting of at least two separate spaced sections; and
(f) means for applying a different alternating electric voltage to each section of said anode, the frequency of the alternating voltage applied to said anode corresponding to the resonant frequency of the selected isotope, whereby a varying electric field is applied to the plasma for imparting more energy to the selected ionized isotope than to other ions.

4,093,857

RADIOGRAPHIC NORMALIZING SYSTEM

Stanley N. Lapidus, Burlington, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Dec. 20, 1976, Ser. No. 752,650
Int. Cl.[2] G01T *1/166, 1/20*
U.S. Cl. 250—369 **6 Claims**



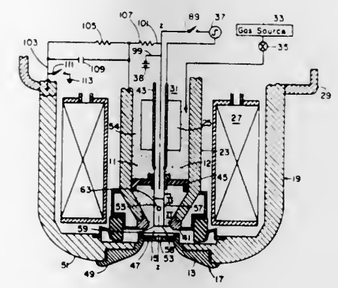
1. A system for coupling a display to a radiographic camera producing address signals signaling the locations of radioactive events, said system comprising:
means coupled to said camera and responsive to said address signals for measuring the activity of event signals of said camera wherein each of said event signals represents the occurrence of a radioactive event in a subject being imaged by said camera, said measuring means providing activity signals including addresses of respective ones of said events which signal measures of said activity; and
means coupled between said camera and said measuring means for mathematically operating on the relative energies of respective ones of event signals by corresponding ones of said activity signals, each of said event signals having a common address with each of said corresponding ones of said activity signals, whereby data of said subject is normalized relative to said measurement of said activity.

4,093,858

CESIUM INJECTION SYSTEM FOR NEGATIVE ION DUOPLASMATRONS

Masaaki Kobayashi, Oho, Japan; Krsto Prelec, Setauket, and Theodorus J Sluyters, East Patchogue, both of N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 6, 1977, Ser. No. 804,189
Int. Cl.[2] H01J *27/00*
U.S. Cl. 250—424 **10 Claims**



1. The method of producing negatively charged hydrogen ions, comprising the steps of:
a. forming an annular hydrogen plasma ring containing energetic hydrogen atoms in the annulus thereof;
b. interacting the hydrogen atoms and ions with a flat, circular, Cs coated metal surface in the annulus of the plasma ring to form negative hydrogen ions; and
c. maintaining the flat, circular Cs coated metal surface in an electrical potential well for extracting the negative hydrogen ions along the axis of the annular hydrogen plasma ring.

4,093,859

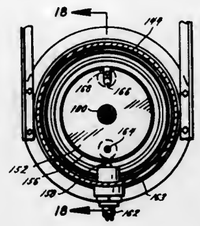
AXIAL TOMOGRAPHIC APPARATUS

Gregory A. Davis, St. Charles; Kenneth E. Krippner, St. Louis; Jan A. Roestel, Ladue; Gottfried Vonk, Maplewood, and Albert R. Zacher, Jr., University City, all of Mo., assignors to Artronix, Inc., St. Louis, Mo.

Filed Nov. 28, 1975, Ser. No. 636,102
Int. Cl.[2] G01M *23/00*
U.S. Cl. 250—445 T **25 Claims**

1. An apparatus for examination of an object having a support, means to position an object to be examined in cooperation with the support, an x-ray source mounted on the support, an x-ray detector mounted on the support in a cooperating relationship with the x-ray source and an object, the detector being positioned to receive x-rays emanating from the x-ray source and passing through the object, means to rotate the support

about the object, and means providing power connections to the apparatus, the power connection means being capable of



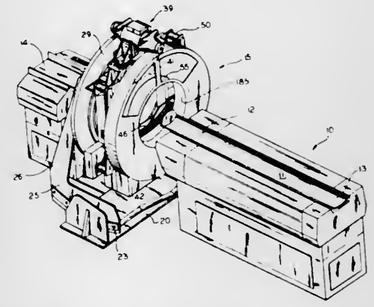
supplying power through continuous rotation of the rotating means in one rotational direction.

4,093,860

GANTRY FOR COMPUTED TOMOGRAPHY

Arnold Lloyd Kelman, Waukesha, and William Raymond O'Dell, Milwaukee, both of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 25, 1977, Ser. No. 771,863
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—445 T **2 Claims**



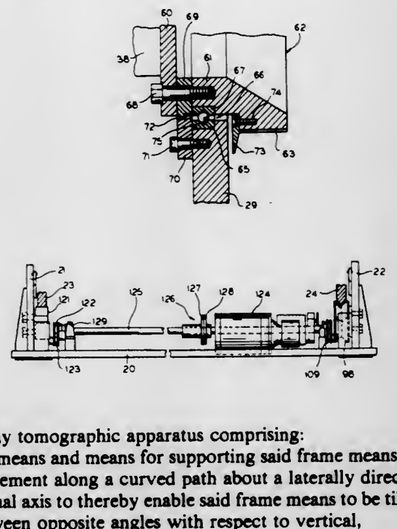
1. A tilting gantry for x-ray tomography comprising:
a pair of generally L-shaped members spaced apart from each other in the transverse direction, each of said members comprising an upstanding leg portion and an angularly related base portion, each of said base portions having a lower edge which is cured convexly downwardly,
a downwardly convex curved track fastened to each of said base portions, the radii of curvature of each of said tracks passing through a virtual transversely extending axis which is above said tracks,
a stand fixed adjacent each of said tracks,
first and second sets of rollers supported on respective stands for rotation and said tracks being supported on said sets of rollers, respectively, for translating thereon along a curved path about said virtual transverse axis,
support means spanning between and connected with said upstanding portions of said L-shaped members,
pulley means journaled in said support means and rotatable about a longitudinally directed axis which intersects and is perpendicular to said virtual transverse axis, said pulley means being open within its circumference for permitting an examination subject to be translated along said longitudinal axis,
a rotatable base fastened to said pulley means for rotation therewith,
x-ray source and x-ray detector means mounted to said rotatable base on opposite sides of said longitudinal axis for orbiting about said axis when said base is rotated,
means for driving said pulley means rotationally, and
means for moving said tracks on said rollers to effect tilting of said L-shaped members.

4,093,861

GANTRY FOR COMPUTED TOMOGRAPHY

Arnold Lloyd Kelman, Waukesha, and Thomas Eben Peterson, Greendale, both of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 25, 1977, Ser. No. 772,210
Int. Cl.[2] A61B *6/02*; G01N *23/08*
U.S. Cl. 250—445 T **3 Claims**



1. X-ray tomographic apparatus comprising:
frame means and means for supporting said frame means for movement along a curved path about a laterally directed virtual axis to thereby enable said frame means to be tilted between opposite angles with respect to vertical,
means for driving said frame means along said curved path to thereby effect tilting of said frame means about said virtual axis of rotation,
ball bearing means having an outer race supported from said frame means and having an inner race and a plurality of balls between said races, said bearing means having a center of rotation about a longitudinal axis that is perpendicular to said laterally directed virtual axis, said outer race being fixed to said frame means,
said inner race having a single v-shaped groove encircling its outside periphery and said outer race having a single v-shaped groove encircling its inside periphery, said grooves being presented toward each other for confining said plurality of balls,
rotatable base means,
X-ray source and X-rays detector means mounted on said rotatable base means on opposite sides, respectively, of said longitudinal axis for jointly orbiting about said longitudinal axis,
pulley means coupled to said inner race and said rotatable base means being fastened to said pulley means, said pulley means and base means having aligned central openings for enabling an examination body to be disposed along said longitudinal axis in the path of the beam from said X-ray source, and
motor means and means for supporting said motor means on said frame means and means for coupling said motor means in driving relation with said pulley means.
2. X-ray tomographic apparatus comprising:
frame means mounted for movement along a curved path about a laterally directed virtual axis to thereby enable said frame means to be tilted between opposite angles with respect to vertical,
stationary support means spaced from each other in the lateral direction at opposite sides of said frame means,
a pair of curved tracks disposed downwardly convexly at

opposite sides of said frame means, respectively, and mounted on one of said frame means and said stationary support means, the radii of curvature of said tracks passing through said virtual transversely directed axis,

roller means at opposite sides, respectively, of said frame means and supported for rotation on the other of said frame means and said stationary support means for cooperating with said tracks,

one of said tracks having an edge that is substantially v-shaped in cross section and the roller means with which said track cooperates have peripheral grooves which are substantially v-shaped, the other of said tracks having an edge that is substantially flat and the roller means with which said other track cooperates have peripheries which are substantially flat,

rotatable base means supported for rotation relative to said frame means about a longitudinal axis which is perpendicular to and intersects said laterally directed virtual axis,

X-ray source and X-ray detector means mounted on said rotatable means on opposite sides, respectively, of said longitudinal axis for jointly orbiting about an examination body which may be disposed along said longitudinal axis,

means for driving said frame means along said curved path to thereby effect tilting of said frame means about said virtual axis of rotation, and

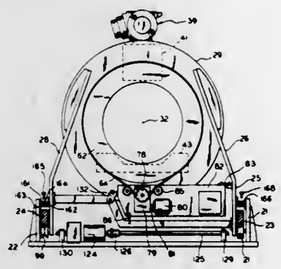
means for driving said base rotatably.

4,093,862

GANTRY FOR COMPUTED TOMOGRAPHY

Richard Thornton Brandt, and Paul William Hein, both of New Berlin, Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 25, 1977, Ser. No. 772,209
Int. Cl.[2] A61B *6/02*; G01N *23/08*
U.S. Cl. 250—445 T **4 Claims**



1. X-ray tomographic apparatus comprising:

frame means and means for supporting said frame means for movement along a curved path about a laterally directed virtual axis to thereby enable said frame means to be tilted between opposite angles with respect to vertical,

said means for supporting said frame means for movement including stationary support means spaced from each other in the lateral direction at opposite sides of said frame means,

curved track means disposed downwardly convexly at opposite sides of said frame means, respectively, and mounted on one of said frame means and said stationary support means, the radii of curvature of said track means passing through said virtual transversely directed axis,

roller means at opposite sides, respectively, of said frame means and supported for rotation on the other of said frame means and said stationary support means for cooperating with said track means, and

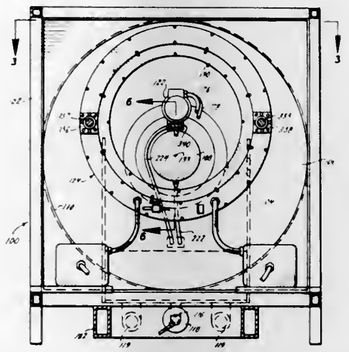
means at opposite sides of said frame means constructed and arranged for being selectively operable to lift said frame means to cause said roller means and track means to separate and to support said frame means directly from said stationary means and to lock said frame means against tilting.

4,093,863

TOMOGRAPHIC APPARATUS

Albert R. Zacher, Jr., University City, Mo., assignor to Artronix, Inc., St. Louis, Mo.

Filed Mar. 3, 1977, Ser. No. 773,833
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—445 T **24 Claims**



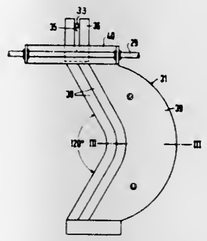
1. Apparatus for examining an object by radiation which comprises a support for said object, a source of radiation, a mounting for said source, a detector, a mounting for said detector, said mounting for said source permitting said source to move relative to said object in a predetermined path, said mounting for said detector permitting said detector to move relative to said object in a second path, at least one of said paths being arcuate in at least part thereof, and means to interrelate said predetermined path with said second path so a predetermined point on said source and a predetermined point on said detector define a succession of translated parallel lines, as said source and said detector move, respectively, throughout said predetermined path and said second path.

4,093,864

PRIMARY X-RAY DIAPHRAGM ASSEMBLY

Alfred Hahn; Ernst Steiner, and Rudolf Pospischil, all of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sep. 14, 1976, Ser. No. 723,067
Claims priority, application Germany, Apr. 8, 1976, 2615335
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—505 **16 Claims**



1. In a primary X-ray diaphragm assembly for X-ray examination apparatus, including a plurality of diaphragm plates which define a cone of rays, said diaphragm plates being adjustable in a direction generally perpendicular to a symmetry axis of the diaphragm plates and being rotatable about the symmetry axis, said diaphragm plates having cooperating front

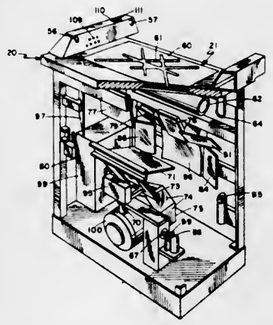
edges for defining a diaphragm aperture with respect to an aperture plane perpendicular to the direction of transmission of X-ray energy in said cone of rays, said front edges of said diaphragm plates being of X-ray absorbing material for relatively attenuating the transmission of X-ray energy impinging on said edges in comparison to the cone of rays transmitted by such diaphragm aperture, and motorized drive mechanism coupled with said diaphragm plates for adjusting said diaphragm plates relative to one another to vary the size of said diaphragm aperture, said edges of said diaphragm plates including angularly related edge sections and central edge sections defining oppositely directed generally V-shaped edge configurations as viewed in said aperture plane with the V-shaped edge configurations opening toward the symmetry axis, the angularly related edge sections of each V-shaped edge configuration having an angle therebetween in the range from about 50° to about 150°, and the central edge section of each V-shaped edge configuration being rounded for defining diaphragm apertures accommodating distinctly rounded contours, said motorized drive mechanism having means for selectively individually adjusting one only of the respective diaphragm plates while the other diaphragm plate remains stationary.

4,093,865

CODE SYMBOL SCANNER USING A DOUBLE X BAR PATTERN

Franklyn George Nickl, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Apr. 29, 1977, Ser. No. 792,393
Int. Cl.[2] G06K *7/10*
U.S. Cl. 250—566 **23 Claims**



1. A system for scanning a code symbol consisting of a combination of spaced parallel bars affixed to an object for providing coded information related to said object, and for providing an electrical signal indicative of said coded information in response to scanning said code symbol, comprising

a housing for defining a scanning region adjacent the housing for receiving objects having said code symbol;

means for providing a light beam;

means for scanning said light beam in a predetermined scanning pattern within said defined scanning region;

means for detecting light having at least a predetermined intensity and for providing an electrical signal in response to detection of said light; and

means for directing light from said scanned light beam that is reflected from a said code symbol on a said received object to the detecting means; characterized by

the scanning means including an optical system for scanning said light beam at an acute angle to a reference plane defining a boundary of said defined scanning region and in a predetermined scanning pattern that includes

a first bar in said reference plane extending normal to a first direction;

second and third bars in said reference plane disposed along lines that intersect with each other and disposed symmetrically in relation to the first bar; and

fourth and fifth bars in said reference plane disposed along lines that intersect with each other and disposed symmetrically in relation to the first bar;

wherein the second and third bars intersect with each other and/or the fourth and fifth bars intersect with each other; and

wherein the second bar intersects with the fifth bar and the third bar intersects with the fourth bar; and said pattern further includes

a first plane extending through the first bar into said defined scanning region at an acute angle to said reference plane in said first direction, a second plane extending through the second bar into said defined scanning region at an acute angle to the reference plane at an acute angle to said first direction, a third plane extending through the third bar into said defined scanning region at an acute angle to said reference plane and at an acute angle to said first direction, a fourth plane extending through the fourth bar into said defined scanning region normal to said reference plane and at an acute angle to said first direction, and a fifth plane extending through the fifth bar into said defined scanning region normal to said reference plane and at an acute angle to said first direction,

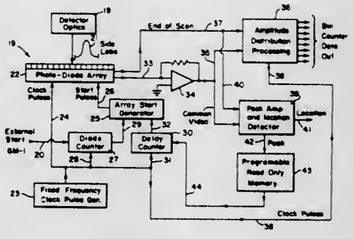
whereby when a said received object containing a said code symbol is moved within said defined scanning region from said first direction with said code symbol facing said reference plane or facing opposite said first direction, light scanned into said defined scanning region by the scanning means is reflected by said code symbol to the detecting means, and the detecting means provides an electrical signal indicative of said coded information.

4,093,866

DIFFRACTION PATTERN AMPLITUDE ANALYSIS FOR USE IN FABRIC INSPECTION

Harvey Lee Kasdan, Van Nuys, and Donald Carleton Mead, Granada Hills, both of Calif., assignors to Greenwood Mills, Inc., Greenwood, S.C.

Continuation of Ser. No. 673,887, Apr. 5, 1976, abandoned. This application Jun. 15, 1977, Ser. No. 806,827
Int. Cl.[2] G01N *21/32*
U.S. Cl. 250—563 **14 Claims**



1. A method of analyzing the shape of the amplitude envelope of a light lobe including the steps of:

a. scanning the light intensity of the lobe from one side of the lobe to the other to provide successive voltage signals whose respective voltage values are a function of the light intensity at successively spaced increments from the one side to the other;

b. providing a series of reference voltages of substantially less number than the number of spaced increments, each reference voltage having a value greater than the value of the preceding reference voltage in the series to define a voltage range encompassing the highest voltage in said series of voltage signals;

c. comparing each successive voltage signal with all of said reference voltages simultaneously; and

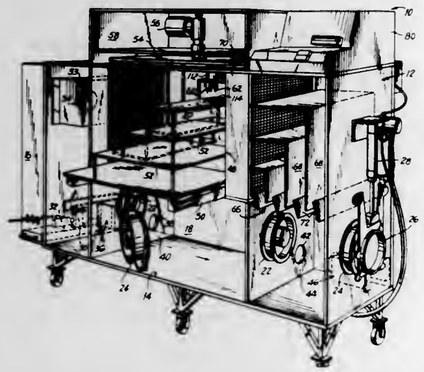
d. providing a numerical count of those voltage signals which have voltage values falling between the values of adjacent reference voltages in said series of reference voltages so that a plurality of counts is provided which indicates the amplitude distribution of light in said light lobe, said plurality of counts being substantially less in number than the number of spaced increments thereby reducing storage data requirements in the analysis of the amplitude envelope of said light lobe.

4,093,867

APPARATUS FOR AUTOMATICALLY CALIBRATING AND TESTING SMOKE DETECTORS

Mahesh J. Shah, Bridgeport, and Joseph P. Mallozzi, Norwalk, both of Conn., assignors to General Signal Corporation, Rochester, N.Y.

Filed Oct. 27, 1976, Ser. No. 736,036
Int. Cl.² G01N *21/26*
U.S. Cl. 250—576 **13 Claims**



1. Apparatus for the testing of smoke detector devices, comprising

an enclosure defining a smoke chamber;

means for measuring the light obscuration produced by varying levels of smoke in said chamber, said means for measuring including a light source and a photocell for sensing the light output from said source;

means for automatically increasing the obscuration in said chamber at a predetermined uniform rate,

including means for comparing the obscuration due to a current or instantaneous level of smoke in the chamber with a programmed level, and

means for regulating or gating the intake of smoke to said chamber so as to reach the programmed level within a predetermined time period.

4,093,868

METHOD AND SYSTEM UTILIZING STEAM TURBINE AND HEAT PUMP

John I. Manning, 22 N. Grand St., Cobleskill, N.Y. 12043

Filed Apr. 29, 1974, Ser. No. 464,850
Int. Cl.² F24D *9/00*
U.S. Cl. 290—2 **12 Claims**

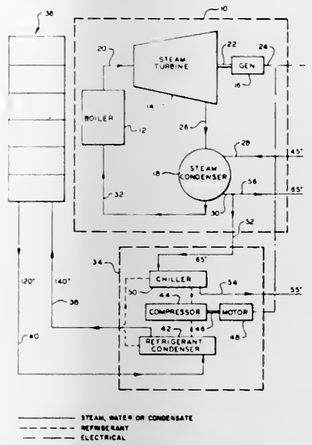
1. A method of conjointly operating a steam turbine generating plant and a mechanical compression heat pump for heating duty comprising:

(a) providing water from a source at ambient temperature to the steam condenser of the generating plant;

(b) providing at least a portion of the water discharged from the steam condenser to the chiller of the heat pump for extraction of heat from such water by evaporation of refrigerant in the chiller;

(c) discharging the water from the chiller back into said source;

(d) circulating water returning from a space heating system through the refrigerant condenser, thereby raising the temperature of such water; and



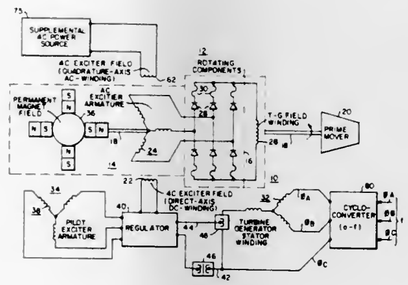
(e) circulating the water from the refrigerant condenser back to the space heating system to provide useful space heating.

4,093,869

QUADRATURE AXIS FIELD BRUSHLESS EXCITER

Arthur H. Hoffmann, Monroeville; Dale I. Gorden, North Versailles, and Lee A. Kilgore, Export, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 13, 1976, Ser. No. 676,449
Int. Cl.² F02N *11/04*
U.S. Cl. 290—31 **10 Claims**



1. In combination,

a synchronous dynamoelectric machine having a stator member carrying a polyphase alternating current stator winding and a rotor member carrying a direct current rotor field winding; and,

a main exciter for said synchronous dynamoelectric machine having a rotatable armature winding and rectifier connected to conduct direct current to said rotor field winding, a stator core comprising a plurality of salient poles, a plurality of field coils disposed on selected ones of said salient poles, said field coils being connected together to constitute a direct current stator field winding, and at least one starting coil interposed between salient poles, the magnetic axis of said starting coil being disposed substantially in space-quadrature relation with respect to the magnetic axes of adjacent field coils, said starting coil being disposed to induce alternating current in said armature winding when said starting coil is energized by a single phase alternating current source.

4,093,870

APPARATUS FOR TESTING REFLEXES AND/OR FOR FUNCTIONING AS A COMBINATION LOCK

Lawrence J. Epstein, 4216 Shoreclub Dr., Mercer Island, Wash. 98040

Filed Apr. 26, 1976, Ser. No. 680,217
Int. Cl.² B60R *25/04*
U.S. Cl. 307—10 R **10 Claims**

1. An electronic control apparatus comprising:

a. an input gate;

b. a first storage unit;

c. said input gate and said first storage unit connecting with each other;

d. an output gate for producing an unlock signal;

e. said first storage unit and said output gate connecting with each other;

f. a second storage unit connecting with said output gate to receive said unlock signal;

g. a first counter operatively connecting with said second storage unit;

h. a clear gate;

i. said first counter and said clear gate connecting with each other;

j. a second counter connecting with said clear gate;

k. a third counter connecting with said clear gate;

l. said clear gate connecting with said first storage unit;

m. said clear gate being capable of clearing said second counter and said third counter and said first storage unit;

n. said first counter and said second counter connecting with said input gate to send a signal to the input gate;

o. a third storage unit;

p. an input device connecting with said third storage unit;

q. a pulse generator and delay unit;

r. said third storage unit connecting with said first counter and with said pulse generator and delay unit for sending a first signal to said first counter and for sending a second signal to said pulse generator and delay unit;

s. said pulse generator and delay unit connecting with said input gate;

t. said pulse generator and delay unit controls the second signal to said input gate;

u. a display unit, operatively, connecting to the second counter;

v. a device to receive said unlock signal, operatively, connecting with said second storage unit;

w. a clock connecting with the second counter;

x. said second storage unit receives said unlock signal and controls said device; and

y. said first counter, operatively, connecting with said output gate to clear said unlock signal.

4,093,871

CORRECTION CIRCUIT

George Arthur Plumb, Lower Withington; John Leo Thomas Bushell, Cheadle Hulme, and Patrick Louis Radford, Stockport, all of England, assignors to P.C. Compteurs Limited, Cheadle Hulme, England

Filed Oct. 6, 1976, Ser. No. 730,033
Claims priority, application United Kingdom, Oct. 8, 1975, 41130/75
Int. Cl.² H02K *3/00, 3/64*
U.S. Cl. 307—106 **8 Claims**

1. A correction circuit for correcting the output signal produced by a fluid flowmeter which produces an electrical pulse output signal at a pulse repetition rate which is representative of the volumetric flow rate of the fluid whose flow rate is being measured by the flowmeter, said correction being effected in dependence upon at least one parameter of said fluid, the circuit comprising:

a first input for receiving the output signal produced by the flowmeter,

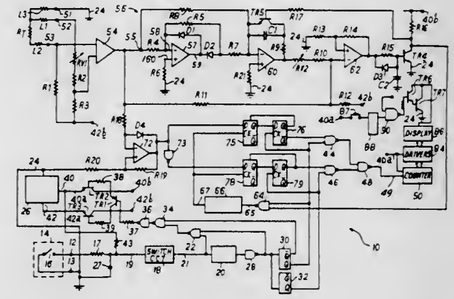
a second input for receiving an input signal representative of the magnitude of said parameter,

first circuit means responsive to the flowmeter output signal at the first input to generate a first pulse train at a first average pulse repetition rate which is dependent upon said pulse repetition rate of the flowmeter output signal,

a difference circuit responsive to the input signal at the second input to generate an auxiliary signal whose magnitude is dependent upon the difference between the magnitude of said parameter and a reference magnitude of said parameter,

means responsive to said first average pulse repetition rate and to the magnitude of the auxiliary signal to increase the number of pulses in the first pulse train by adding auxiliary pulses thereto at a rate dependent upon the magnitude of said difference when said difference is of one polarity, and to decrease the number of pulses in the first pulse train by blocking a fraction thereof at a rate dependent upon the magnitude of said difference when said difference is of the other polarity, whereby the pulse adding and blocking means produces an output pulse train at a second average pulse repetition rate which is representative of the volumetric flow rate of the fluid corrected for variations in said parameter,

an oscillator for producing test pulses of predetermined frequency,



switch means for applying the test pulses to the first circuit means in place of the flowmeter output signal, and

counter means arranged to count the number of pulses produced by the pulse adding and blocking means during an internal defined between a selected one of two successive adding operations and two succesive blocking operations of the pulse adding and blocking means, whereby the count in said counter means at the end of said interval is indicative of the magnitude of said difference.

8. A correction circuit for correcting the output signal produced by a fluid flowmeter which produces an electrical pulse output signal whose pulse repetition rate is representative of the volumetric flow rate of the fluid whose flow rate is being measured by the flowmeter, said correction being effected in dependence upon at least one parameter of said fluid, the circuit comprising:

a first input for receiving the output signal produced by the flowmeter,

a second input for receiving an input signal representative of the magnitude of said parameter,

first circuit means responsive to the flowmeter output signal at the first input to generate a first pulse train whose average pulse repetition rate is dependent on the pulse repetition rate of the flowmeter output signal,

second circuit means responsive to the input signal at the second input to generate a second pulse train whose aver-

age pulse repetition rate is dependent on the magnitude of said parameter,

means for combining said first and second pulse trains so as to produce an output pulse train whose average pulse repetitive rate is representative of the volumetric flow rate of the fluid corrected for variations in said parameter,

a power supply which, in operation, is continuously connected to energize a first portion of the circuit, said first portion being arranged to consume a relatively small proportion of the power required by the circuit, and

switching means connected to the power supply and responsive to each pulse of the flowmeter output signal to energize the remainder of the circuit for a relatively short period, whereby to reduce to total power required by the circuit.

4,093,872

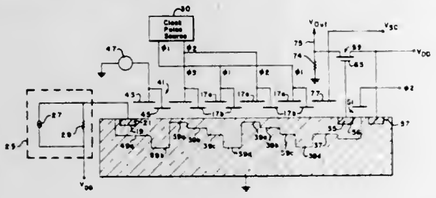
CHARGE COUPLED DEVICE WITH INPUT FOR DIRECT INJECTION OF SIGNAL

John M. Hartman, Costa Mesa, and Darrell M. Erb, Newport Beach, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 436,587, Jan. 25, 1974, abandoned. This application Sep. 2, 1975, Ser. No. 609,774

Int. Cl.[2] G11C *19/28;* **H01L** *29/78, 27/14, 31/00*

U.S. Cl. 307—221 D **8 Claims**



1. In semiconductor apparatus wherein a dielectric layer is disposed over a surface of a semiconductive storage medium and a series of electrodes are disposed in or over said dielectric layer for causing a series of potential wells to be formed in response to voltages applied to said electrodes periodically, said potential wells being adapted to store packets of electric charge, said electrodes being operable in response to said voltages to transfer said charge packets along said potential wells, the improvement whereby charge may be injected directly into said storage medium comprising:

(a) means for injecting charge into said storage medium near at least one of said potential wells;

(b) means connected to said injecting means for generating an analog signal so as to cause a charge proportional to said analog signal to be injected into said substrate through said injecting means;

(c) an electrode structure disposed between said injecting means and said at least one potential well; and

(d) a steady bias voltage source connected to said electrode structure, said electrode structure including a transfer portion nearest said injecting means and a storage portion nearest said at least one potential well and non-overlapping with said injecting means, said electrode structure and said steady bias voltage being arranged so as to maintain a potential well under said electrode structure which is deeper under said storage portion than it is under said transfer portion whereby said charge injected through said injecting means is temporarily stored under said storage portion, isolated from said injecting means.

4,093,873

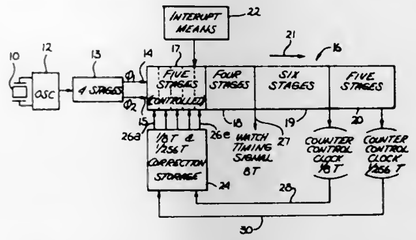
COMPENSATING DIGITAL COUNTER FOR QUARTZ CRYSTAL OSCILLATOR

Jerald W. Vannier, Santa Clara, and Gary T. Bastian, Cupertino, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Oct. 28, 1976, Ser. No. 736,377

Int. Cl.[2] H03K *21/00*

U.S. Cl. 307—223 R **17 Claims**



1. A digital counter for providing compensated timing signals comprising:

a frequency reference source;

storage means for providing a predetermined digital number;

a plurality of counter stages coupled to said frequency reference source for reducing the frequency of said source to a lower frequency, said plurality of counter stages including a first group of counter stages which are coupled to said storage means;

interrupt means for interrupting the flow of signals through at least one of said plurality of counter stages;

control means coupled to said interrupt means, said storage means, and said plurality of counter stages for controlling said interrupt means and said storage means such that the count in said first group of counter stages is selectively made a function of said predetermined number;

said predetermined number causing lesser counting in said counter stages for a slow one of said frequency source and additional counting for a fast one of said frequency source, said predetermined number being introduced into said first group of stages when said interrupt means interrupts said flow of said signals;

whereby compensation may be provided for a fast or a slow frequency source.

4,093,874

CONSTANT IMPEDANCE MOSFET SWITCH

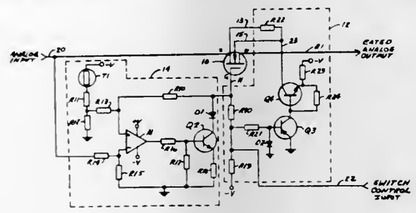
Glenn A. Pollitt, Burnaby, Canada, assignor to GTE Lenkurt Electric (Canada) Ltd., Burnaby, Canada

Filed Dec. 29, 1976, Ser. No. 755,422

Claims priority, application Canada, Feb. 10, 1976, 245393

Int. Cl.[2] H03K *17/12, 17/14, 17/68;* **H03G** *3/30*

U.S. Cl. 307—251 **4 Claims**



1. Apparatus comprising:

(a) MOSFET switching means having first and second mutually exclusive conductive states, said first conductive state characterized by an internal resistance R_{ON} and said second conductive state characterized by an internal resistance R_{ON} wherein $R_{OFF} >> R_{ON}$, said means also having a source electrode for receiving an analog signal, a drain electrode for transmitting an output signal proportional to the analog signal when the means is in the first state, a gate electrode and a substrate electrode;

(b) bias means having an input, and a first, second, and third output, said input for receiving an external control signal, and first, second, and third outputs connected to said gate, substrate and source electrodes respectively, said bias means, in the presence of the external control signal, applying appropriate bias voltages to the switch means to place the switch means in the appropriate one of first and second conductive states; and

(c) compensation means having an input connected to said source electrode and an output connected to said gate electrode, said compensation means providing in the absence of said analog signal a compensating voltage across said electrodes such that the magnitude of R_{ON} remains constant despite ambient temperature variations, and said compensation means in the presence of the said analog signal providing a compensating voltage across said electrodes such that the magnitude of R_{ON} remains constant despite analog signal variations.

4,093,875

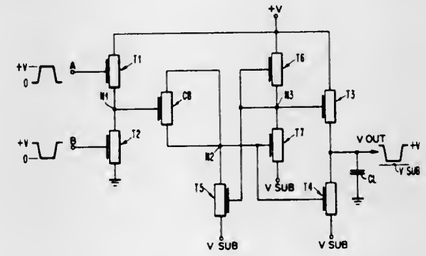
FIELD EFFECT TRANSISTOR (FET) CIRCUIT UTILIZING SUBSTRATE POTENTIAL FOR TURNING OFF DEPLETION MODE DEVICES

Ronald William Knepper, La Grangeville, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 31, 1977, Ser. No. 764,494

Int. Cl.[2] H03K *17/60, 17/04*

U.S. Cl. 307—251 **18 Claims**



1. A field effect transistor circuit, formed on a semiconductor substrate comprising:

first, second, and third sources of potential having potentials of unequal magnitude;

an input stage having at least a first pair of field effect transistors connected in electrical series between said first and second sources of potential;

an output stage having at least a second pair of field effect transistors connected in electrical series between said first and third sources of potential; and

means coupling said input stage to said output stage having at least a third pair of field effect transistors connected in electrical series between said first and third sources of potential;

said input stage having an output from a circuit point between said first pair of field effect transistors to said means coupling, and also electrically coupled to at least one of said third pair of field effect transistors;

said means coupling having an output electrically coupled from a circuit point between said third pair of field effect transistors to at least one of said second pair of field effect transistors;

whereby a binary logic signal having stable potential levels approximating said first and second sources of potential, applied to said input stage, provides a binary logic output signal having stable potential levels approximating said first and third sources of potential at an output of said output stage, said third source of potential being derived from the substrate.

4,093,876

BASELINE RESTORER CIRCUIT

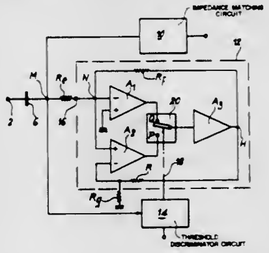
Kamal Labib Henein, Evry, and Vsevolod Goursky, Paris, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 5, 1977, Ser. No. 757,016

Claims priority, application France, Jan. 12, 1976, 76 00607

Int. Cl.[2] H03K *1/14, 5/08*

U.S. Cl. 307—264 **16 Claims**



1. A baseline restorer circuit of the type comprising:

a first circuit having an input connected to a coupling capacitor, an output and a control lead to which is applied a control signal which is capable of assuming either a first value or a second value, said first circuit being provided between the input and the output thereof with a resistor having a value of resistance equal either to a first value R_0 of a low order when the control signal assumes its first value or to a second value R_∞ which is considerably higher than R_0 when the control signal assumes its second value,

a second circuit of the threshold discriminator type whose input is connected to the input of the first circuit aforesaid and whose output is connected to the control lead aforesaid, said second circuit being capable of delivering at its output said control signal whose first value is obtained when the voltage applied to the input of the second circuit is lower than a threshold value and whose second value is obtained when the voltage applied to the input is higher than said threshold value,

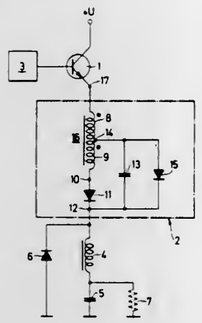
wherein said first circuit comprises an amplifier A_3 whose input is connected through a switch having two inputs and one output either to the output of a first amplifier A_1, or the output of a second amplifier A_2, said switch being provided with a control lead which constitutes the control lead of said first circuit, said amplifier A_1 being provided with a negative input connected on the one hand to said capacitor through an input resistor R_e and on the other hand to the output of the amplifier A_3 through a resistor R_f being provided with a positive input connected to a reference point, said amplifier A_2 being provided with a negative input connected to the output of the amplifier A_3 and additionally to a reference point through a resistor R_g and a positive input connected to the negative input of the amplifier A_1.

4,093,877

SEMI-CONDUCTOR SWITCHING CIRCUIT WITH TRANSISTOR SWITCHING POWER LOSS REDUCTION MEANS

Werner Pollmeier, Verl, Germany, assignor to Nixdorf Computer AG, Paderborn, Germany

Division of Ser. No. 612,535, Sep. 11, 1978, Pat. No. 4,015,185.
This application Dec. 30, 1976, Ser. No. 755,637
Int. Cl.[2] H02M *3/155*
U.S. Cl. 307—270 **6 Claims**



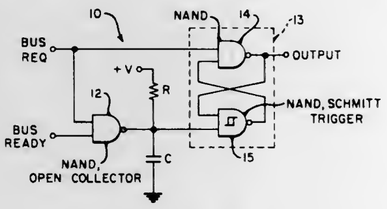
1. A semiconductor switching circuit comprising a direct current source; a semiconductor switch; and an inductor; said semiconductor switch and said inductor connected in series combination to said direct current source; means for deriving an output voltage from said inductor; a diode; a capacitor; an additional circuit including said diode and said capacitor connected in a first series combination; means connecting said series combination in parallel with said inductor; with said diode poled in the blocking direction as regards direct voltage applied to said inductor from said direct current source; a charging circuit coupled with said capacitor, said charging circuit including a further diode, with said further diode poled to pass current in response to direct voltage applied thereto from said source by way of said semiconductor switch; said charging circuit further including a choke coil, with said choke coil connected in series combination with said further diode and connected between said further diode and said capacitor; whereby the power loss occurring upon switching off said semiconductor switch is reduced.

4,093,878

DE-GLITCHABLENON-METASTABLE FLIP-FLOP CIRCUIT

James P. Paschal; Donald F. Nickel, and Charles J. Drozd, all of West Columbia, S.C., assignors to NCR Corporation, Dayton, Ohio

Filed Nov. 29, 1976, Ser. No. 745,740
Int. Cl.[2] H03K *3/286*
U.S. Cl. 307—291 **10 Claims**



1. An de-glitchable non-metastable flip-flop circuit comprising:

a first gate having a first and a second input for receiving asynchronous input signals and for providing an output signal, the duration of said output signal being indicative of the degree of coincidence of said asynchronous input signals;

first means for providing a signal the level of which is a function of the duration of said output signal; and

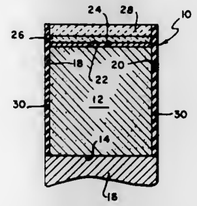
second means, including threshold means activated upon sensing a particular level of signal from said first means, for receiving one of said asynchronous input signals and including means for providing a circuit output when activation of said threshold means coincides with the receipt of said one asynchronous input signal.

4,093,879

MAGNETOHYDRODYNAMIC ELECTRODE

David D. Marchant, Richland, Wash., and Don H. Killpatrick, Orland Park, Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 1, 1977, Ser. No. 773,360
Int. Cl.[2] H02N *4/02*
U.S. Cl. 310—11 **11 Claims**



1. An electrode for use in a magnetohydrodynamic generator comprising:

a base portion of sintered powdered metal having a predetermined density, the base having a lower surface for attaching the electrode to a magnetohydrodynamic generator, two parallel side walls and an upper surface;

a first layer of nickel aluminide on the upper surface;

an intermediate layer of nickel aluminide and refractory ceramic on the first layer, the refractory ceramic being electrically conductive at MHD operating temperature; and

an outer layer of refractory ceramic on the intermediate layer, the refractory ceramic being electrically conductive at MHD operating temperatures.

4,093,880

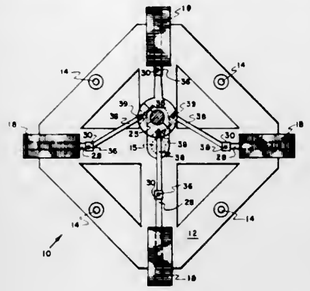
MAGNETICALLY OPERABLE ENGINE

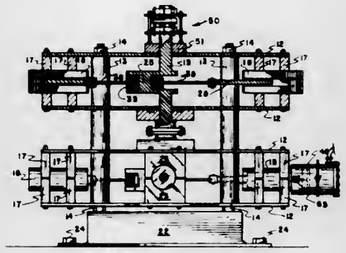
Benjiman R. Teal, 611 Marion St. NW., Madison, Fla. 32340

Filed Apr. 28, 1977, Ser. No. 791,957
Int. Cl.[2] H02K *41/00*
U.S. Cl. 310—24 **3 Claims**

1. An engine combination comprising a plurality of electromagnetic coil means for operating a like number of solenoids for converting electricity to mechanical power, a first separate bank of electro-magnetic coils and solenoids arranged about a single crank shaft and mounted upon a supporting plate to form a single power unit, and a base for supporting said first electric power unit and at least a second set of electro-magnetic coils and solenoids arranged about a second single crank shaft and mounted upon a second single plate to form a second single power unit positioned above said first power unit, and means for connecting one end of the crank shaft of the first power unit to one end of the crank shaft of the second power unit, a single timing mechanism arranged to connect all of the said electro-magnetic coils in proper sychronization with each of the said power units, each of the power unit supporting units

having means extending upwardly from the base for supporting the said plates supporting each of the power units, and





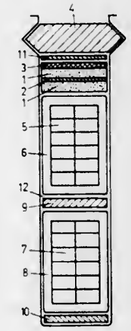
means for connecting the said coils in each bank with a source of electric energy.

4,093,881

ARRANGEMENT FOR SUPPORTING WINDING ELEMENTS IN THE STATOR SLOTS OF A DYNAMO-ELECTRIC MACHINE

Gábor Liptàk, and Roland Schuler, both of Wettingen, Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Continuation of Ser. No. 566,450, Apr. 9, 1975, abandoned. This application Aug. 17, 1976, Ser. No. 715,181
Claims priority, application Switzerland, Apr. 17, 1974, 5279/74
Int. Cl.[2] H02K *3/48*
U.S. Cl. 310—214 **5 Claims**



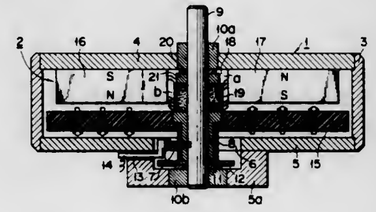
1. In an arrangement for supporting insulated conductor components within the slots of the stator component of a dynamo-electric machine under compression so as to inhibit vibration thereof, and wherein a resilient element is located in the slots along with the conductor components, and the conductor components and resilient element are placed under compression by means including slot key closing off the entrance to the slot, the improvement wherein said resilient element is constituted by a planar multi-layer structure possessing a spring characteristic which is degressive in relation to the spring force and which includes at least one layer of felt adjacent a layer or hard material, the ratio of the thickness of said felt layer to said hard layer being substantially 3:1, and wherein said felt layer includes an interior layer of a synthetic rubber, the ratio of the thickness of said felt layer to said synthetic rubber layer being in the range from 5:1 to 3:1.

4,093,882

CORELESS MOTOR

Kenji Furuta, Hachioji, Japan, assignor to Olympus Optical Company Limited, Tokyo, Japan

Filed Jul. 14, 1975, Ser. No. 595,400
Claims priority, application Japan, Jul. 13, 1974, 49-83082[U]; Jul. 24, 1974, 49-88031[U]; Jul. 31, 1974, 49-91509[U]; Aug. 6, 1974, 49-93863[U]; Dec. 17, 1974, 49-153568[U]; Dec. 27, 1974, 50-266[U]; Dec. 27, 1974, 50-270[U]; Dec. 27, 1974, 50-271[U]; Apr. 17, 1975, 50-52577[U]; Jun. 6, 1975, 50-76638[U]; Jul. 19, 1974, 49-83014; Jul. 26, 1974, 49-85642
Int. Cl.[2] H02K *1/22*
U.S. Cl. 310—268 **9 Claims**



1. A coreless motor comprising:

a rotary shaft,

a rotor mounted on said rotary shaft and having a rotor substrate and a plurality of flat type loop coils disposed on the rotor substrate,

a motor housing including a magnetic yoke made of a magnetic material and having at least two spaced journal bearings for rotatably supporting said rotary shaft,

a stator including a pair of permanent magnetic poles opposed to said rotor within said housing so as to provide a closed magnetic flux path in which a magnetic flux emanated from one pole of said pair of permanent magnetic poles passes through said rotor and yoke and enters into the other pole, and

a generally cylindrical thrusting magnetic member attached to said rotor and being located in a space between said rotary shaft and said permanent magnetic poles, said magnetic member being displaceable axially of said rotor by a magnetic flux produced by said permanent magnetic poles of said stator so as to be thrusted toward either of said at least two journal bearings.

4,093,883

PIEZOELECTRIC MULTIMORPH SWITCHES

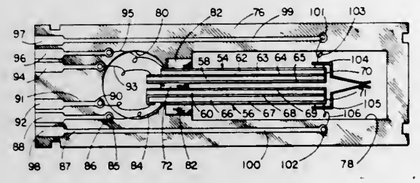
Yujiro Yamamoto, 2001 S. Eastwood, Santa Ana, Calif. 92705

Continuation-in-part of Ser. No. 589,255, Jun. 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 390,473, Aug. 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 246,310, Apr. 21, 1972, abandoned. This application Apr. 20, 1977, Ser. No. 789,185
Int. Cl.[2] H01L *41/10*
U.S. Cl. 310—317 **12 Claims**

1. In combination:

a frame;

a multimorph of piezoelectric material having a fixed part carried by said frame and a movable part free to flex in a plane of movement upon excitation of the multimorph;
a pair of electrical contacts, at least one of which is resiliently mounted, movable relative to one another in response to multimorph flexure;
means for applying an electrical potential to said multimorph in a magnitude sufficient to cause flexure of said multimorph whereby to actuate said contacts;
means for developing an electric field polarized such that it extends in a direction having a component parallel with the plane of movement of said multimorph and positioned

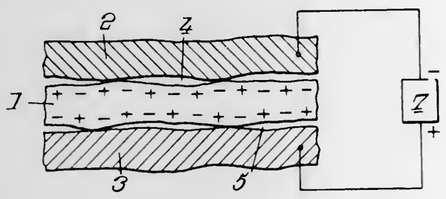


such that a part of said multimorph is subjected to said field whereby flexure of said multimorph as an incident to excitation will be altered by said field;
said multimorph comprising strips of piezoelectric material, and a layer of conductive material fixed to a side of said strips;
said means for developing an electric field being effective to form the field such that it terminates at said layers of conductive material; and
said frame being electrically conductive and said field extending from said frame to said layer of conductive material.

4,093,884
THIN STRUCTURES HAVING A PIEZOELECTRIC EFFECT, DEVICES EQUIPPED WITH SUCH STRUCTURES AND IN THEIR METHODS OF MANUFACTURE

Gerard Dreyfus, Villebon sur Yvette, and Jacques Lewiner, Saint Cloud, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly, Seine, France

Continuation of Ser. No. 394,553, Sep. 6, 1973, abandoned. This application May 19, 1977, Ser. No. 798,355.
Claims priority, application France, Sep. 8, 1972, 72.31903
Int. Cl.² H01L *41/10*
U.S. Cl. 310—328 **9 Claims**

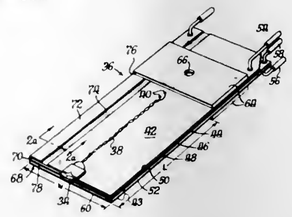


1. A thin structure comprising a dielectric leaf having trapped on or proximate at least one of the surfaces of said leaf electrostatic charges of opposite signs in balanced amounts and distribution such that the overall electrical field produced by said charges close to said surface is at least substantially nil, said leaf exhibits substantially no electrostatic effect, and said leaf exhibits a piezoelectric effect as a result of said charges which is independent of any polarization of said leaf.

4,093,885
TRANSDUCER ASSEMBLY VIBRATION SENSOR

David Edward Brown, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Continuation-in-part of Ser. No. 668,653, Mar. 19, 1976, abandoned. This application Apr. 16, 1976, Ser. No. 677,683
Int. Cl.² H01L *41/04*
U.S. Cl. 310—331 **5 Claims**



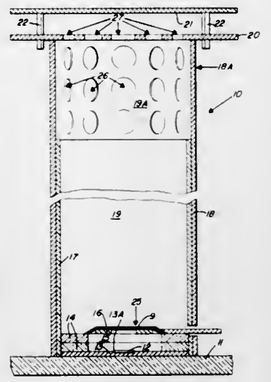
1. A deflectable read transducer assembly for use in a magnetic recorder, comprising:
a deflectable support arm comprising a pair of piezo-ceramic elements bonded to a common electrically conductive substrate between said pair of elements, one of said elements having a first conductive layer on the surface opposite said substrate, the other element having a second conductive layer opposite said substrate, said support arm being cantilevered at one end portion of its lengthwise dimension and being free to deflect at its opposed end portion;
a read transducer mounted to one of said pairs of elements on the opposed free end portion of said support arm, said transducer being electrically isolated from said conductive layers so that voltage applied to said substrate and said first and second layers does not produce a signal that is read by said transducer; and,
a support arm deflection sensor comprising a piezo-ceramic generator element bonded to said common substrate and a third conductive layer overlying said generator element, said third conductive layer being generally in the same plane as said first layer and separated therefrom by a dielectric gap, said third conductive layer being electrically isolated from said first and second conductive layers, whereby deflection of said support arm results in an electrical output signal between said substrate and said third conductive layer, which output signal is indicative of the instantaneous amount of deflection of said support arm.

4,093,886
AEROSOL DETECTION DEVICE

Lyman L. Blackwell, Boulder, Colo., assignor to Statitrol Corporation, Lakewood, Colo.

Filed Jul. 6, 1976, Ser. No. 702,909
Int. Cl.² H01J *7/40*
U.S. Cl. 313—54 **32 Claims**

1. An aerosol detection device, comprising:
means for defining inner and outer ion chambers;
means for defining a path of interconnection between said inner and outer ion chambers;
means for isolating said inner ion chamber except through said path of ion chamber interconnection from atmosphere outside thereof;
means for connecting said outer ion chamber in communication with atmosphere to be monitored;
particle source means positioned within said inner ion chamber for emitting and radiating charged particles into said inner ion chamber and through said path of ion chamber interconnection into said outer ion chamber;
a barrier of dielectric material formed across said path of ion chamber interconnection which is radiation permeable and aerosol impermeable, said dielectric barrier being permeable to and permitting the passage of said charged particles being radiated into said outer ion chamber, said dielectric barrier being impermeable to and preventing the passage of smoke aerosols and the like whereby to isolate

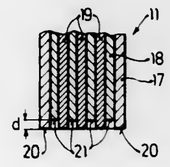


the particle source of said device from contamination; and,
electrode means for generating and sensing ion current flow through said ion chambers.

4,093,887
SPARK PLUG, PARTICULARLY FOR INTERNAL COMBUSTION ENGINES HAVING COMPOSITE CENTER ELECTRODE

Rainer Corbach, Stuttgart; Leo Steinke, Waiblingen-Hegnach; Walter Benedikt, Stuttgart, and Rudolf Jurinke, Schwieberdingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Nov. 4, 1976, Ser. No. 738,936
Claims priority, application Germany, Nov. 7, 1975, 2549931
Int. Cl.² H01T *13/20*
U.S. Cl. 313—140 **13 Claims**

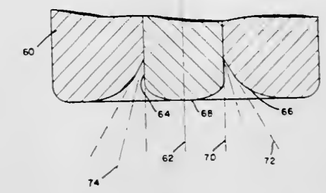


1. Spark plug having a center electrode formed with a sparking end face comprising
an outer jacket (17, 17') of corrosion resistant material;
an embedding matrix material (18) of high electrical and thermal conductivity within the jacket (17, 17');
and at least one filamentary electrode element (19) of corrosion resistant material embedded in the matrix material (18),
wherein, in accordance with the invention,
the matrix material (18) is recessed with respect to the jacket (17, 17') at the sparking end face plane (20) of the spark plug, the distance of recess (*d*) being in the order of between about 50 to 500 μm.

4,093,888
LIQUID-METAL PLASMA VALVE CONFIGURATIONS

Gisela Eckhardt, and Wilfried O. Eckhardt, both of Malibu, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Jun. 2, 1976, Ser. No. 692,173
Int. Cl.² H01J *13/00*
U.S. Cl. 313—163 **22 Claims**

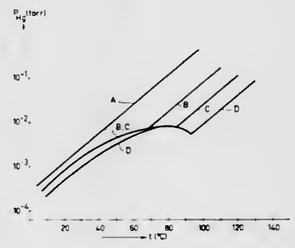


1. A liquid-metal plasma valve comprising:
an anode, a cathode and a condenser, an axis through said plasma valve, said anode facing said cathode to define an interelectrode space therebetween, said axis extending between said anode and said cathode through said interelectrode space, said condenser surrounding at least a portion of the interelectrode space;
said cathode having inner and outer pool-keeping walls defining a groove therebetween for containing a liquid-metal pool, said outer wall being divergent with respect to said inner wall in the direction out of said groove and the bisector between said walls being divergent away from said axis in the direction along said axis from said cathode toward said anode.

4,093,889
LOW-PRESSURE MERCURY VAPOR DISCHARGE LAMP

Jan Bloem, and Albert Bouwknegt, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 3, 1977, Ser. No. 765,097
Claims priority, application Netherlands, Apr. 3, 1976, 7602232
Int. Cl.² H01J *61/18*
U.S. Cl. 313—229 **4 Claims**



1. A low-pressure mercury vapour discharge lamp which comprises a discharge space and disposed in said space two thermally emitting electrodes and a mercury amalgam composed of mercury, bismuth, tin and lead.

4,093,890

TERBIUM-ACTIVATED LUMINESCENT GARNET MATERIAL AND MERCURY VAPOR DISCHARGE LAMP CONTAINING THE SAME

Johannes Gerardus Verriet, and Antonius Maria Josephus Hubertus Sauter, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 9, 1977, Ser. No. 795,009

Claims priority, application Netherlands, May 13, 1976, 7605094

Int. Cl.² C09K *11/46*

U.S. Cl. 313—486 **8 Claims**

1. A terbium-activated luminescent material with garnet crystal structure, characterized in that the luminescent material satisfies the formula

$$Ln_{3-x-p}Tb_pA_{5-x-2}Me^{II}_{x+p}Me^{IV}_{x+y}O_{12},$$

wherein Ln represents at least one of the elements yttrium, gadolinium and lutecium, A is at least one of the elements aluminium and gallium, wherein upto 40 mole % of A is replaceable by scandium, Me^{II} is at least one of the elements magnesium, calcium, strontium and zinc, and Me^{IV} is at least one of the elements silicon, germanium and zirconium and wherein

$0 \leqq x \leqq 2.8$
$0 \leqq y \leqq 2.0$
$0.4 \leqq x+y \leqq 2.8$
$0.02 \leqq p \leqq 1.50$
$x+p \leqq 3.0$

4,093,891

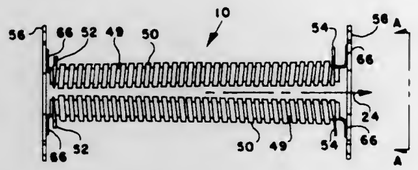
TRAVELING WAVE DEFLECTOR FOR ELECTRON BEAMS

Alvin Benson Christie, Dundee, and Ronald Eugene Correll, Lake Oswego, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Dec. 10, 1976, Ser. No. 749,579

Int. Cl.² H01J *23/16, 29/96*

U.S. Cl. 315—3 **7 Claims**



1. A traveling wave deflector for deflecting an electron beam emitted from a source of electrons, comprising:

a pair of helical deflection members, each of said members having a plurality of spaced and substantially flat conductive ribbon turns positioned along and spaced relative to an axis of the electron beam and on opposite sides thereof;

a ground member disposed in coaxial relationship inside each of said helical deflection members and being supported in spaced relationship thereto; and

means for insulatively supporting said ground member and said deflection members in said spaced relationship, said means disposed inside each of said helical deflection members.

4,093,892

RING-AND-BAR SLOW WAVE CIRCUITS EMPLOYING CERAMIC SUPPORTS AT THE BARS

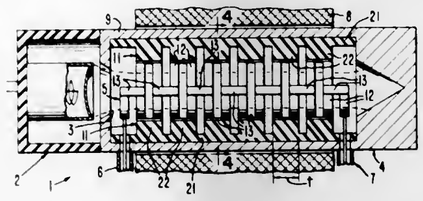
Norman R. Vanderplaats, Sunnyvale, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Jan. 16, 1967, Ser. No. 609,466

The portion of the term of this patent subsequent to Apr. 6, 1994, has been disclaimed.

Int. Cl.² H01J *25/34*

U.S. Cl. 315—3.5 **6 Claims**



1. In a microwave tube apparatus, means for forming a slow wave circuit having an array of spaced coaxially aligned conductive ring portions conductively connected together by an array of conductive bar portions, means for forming and projecting a beam of electrons axially through said ring portions for electronic interaction with the microwave fields of said slow wave circuit, means for forming a barrel structure surrounding said slow wave circuit, means forming an array of ceramic insulative support member portions interposed between said surrounding barrel structure and said slow wave circuit and spaced apart along the axis of said slow wave circuit, the improvement wherein, said support member portions are finger-shaped with the ends of said finger portions supportively contacting said connecting bar portions of said slow wave circuit, said support fingers are the finger portions of a ceramic comb-shaped structure having a spine portion and said finger portions.

4,093,893

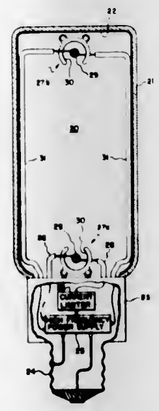
SHORT ARC FLUORESCENT LAMP

John M. Anderson, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 22, 1976, Ser. No. 743,761

Int. Cl.² H01J *17/34, 1/15, 17/20, 61/16*

U.S. Cl. 315—48 **36 Claims**



1. An improved short-arc fluorescent lamp of the type comprising two electrodes disposed in a gas and contained within and at opposite ends of a substantially tubular, light-transmissive evacuable envelope; wherein, as an improvement:

said gas comprises inert gases at a pressure between approximately 0.2 torr and approximately 2.0 torr; and

each of said electrodes comprises a heated filament coated with an electron emissive material and disposed within a substantially hollow cathode element which is adapted to provide a diffuse termination for an electric discharge, said cathode element having at least one aperture therein for electron emission therefrom, each of said electrodes having a dimension along the axis of the envelope no greater than its dimension across the envelope, whereby the arc distance is lengthened; and

said tubular envelope has a large diameter substantially half its length, whereby the envelope area is increased and phosphor loading is lessened.

12. The lamp of claim 1 further comprising a lamp base assembly, attached to one end of said envelope, containing means for receiving electric power from a line source and means for supplying power to an electric discharge between said electrodes.

4,093,894

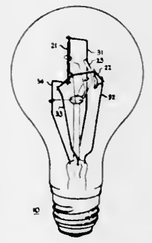
STAY-ON LAMP

Leroy G. Leighton, Highland Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 15, 1976, Ser. No. 741,898

Int. Cl.² H01J *7/44, 13/46, 17/34;* H01K *1/62*

U.S. Cl. 315—64 **6 Claims**



1. A stay-on incandescent lamp comprising:

a primary filament;

a secondary filament which is less luminous than said primary filament;

switch means within said lamp for closing a circuit including said secondary filament in response to thermal radiation from said primary filament and maintaining said closed circuit for a predetermined time after thermal radiation from said primary filament ceases; and wherein

said lamp comprises three terminals, one of which is connected to both said primary filament and said circuit, a second of which is connected to the other end of said primary filament, and a third of which is connected to the other end of said circuit.

4,093,895

ASSYMETRIC TOP-BOTTOM PINCUSHION CORRECTION CIRCUIT

Robert P. Collette, Elba, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

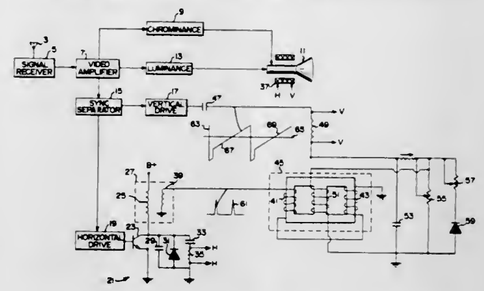
Filed May 3, 1976, Ser. No. 682,640

Int. Cl.² H01J *29/56*

U.S. Cl. 315—371 **8 Claims**

1. In a cathode ray tube scanning system having a cathode ray tube with an associated deflection yoke which includes horizontal and vertical deflection windings coupled to a source of deflection current at horizontal and vertical scan frequencies and a top and bottom pincushion correction circuit having a saturable reactor with a control winding coupled to the source of deflection current at a horizontal scan frequency and an output winding coupled to a source of deflection current at a vertical scan frequency and to a shunt connected capacitor and impedance, the improvement comprising:

means coupled to said output winding for unbalancing the waveform applied thereto from said source of deflection



current at a vertical scan frequency to provide asymmetric top-bottom pincushion correction, said means of a form to provide a substantially constant crossover point of said waveform.

4,093,896

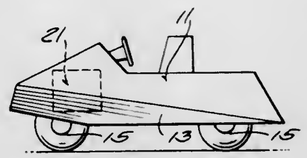
SPEED CONTROL FOR ROTATABLE ELEMENT DRIVEN BY DIRECT CURRENT MOTORS

Gerald N. McAuliffe, Lincoln, Nebr., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Aug. 11, 1976, Ser. No. 713,399

Int. Cl.² H02P *5/46*

U.S. Cl. 318—45 **11 Claims**



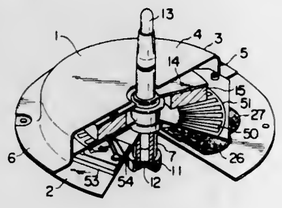
1. A drive control comprising a frame, an element rotatably supported by said frame, a first direct current motor on said frame, means drivingly connecting said first direct current motor to said element with a first speed reducing ratio, a second direct current motor on said frame, means drivingly connecting said second direct current motor to said element with a second speed reducing ratio lower than said first speed reducing ratio, a source of direct current, and a switch mounted on said frame and electrically connected to said source of direct current and to said first and second direct current motors and including means for initially electrically connecting said direct current source to said first direct current motor whereby to drive said element at a slow speed, and for subsequently additionally electrically connecting said source of direct current to said second direct current motor while maintaining electrical connection of said direct current source to said first direct current motor, whereby to drive said element at a fast speed.

4,093,897

ELECTRIC MOTOR

Masahiko Fujita; Toshihiko Gotoh, both of Yokohama, and Tsutomu Nakamura, Toyokawa, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 22, 1976, Ser. No. 735,032
Claims priority, application Japan, Oct. 23, 1975, 50-127768; Jan. 26, 1976, 51-6666; Jan. 26, 1976, 51-6668
Int. Cl.² H02P 5/06
U.S. Cl. 218—138 **11 Claims**



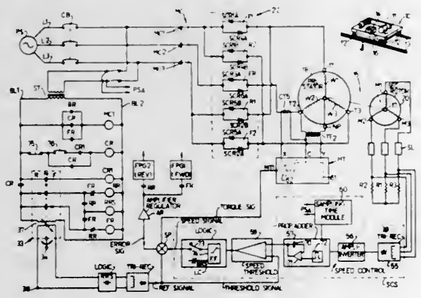
1. An electric motor comprising:
a rotary shaft,
a disk-shaped multi-pole magnet coupled to said rotary shaft and having a plurality of discrete magnet poles,
a pair of drive coils arranged within a magnetic field of said magnet and having drive sections which are linked by magnetic fluxes of said magnet,
means for supplying drive currents to said pair of drive coils to cause them to generate a drive magnetic field,
a speed detection coil arranged within the magnetic field of said magnet and the drive magnetic field of said pair of drive coils for generating a signal having a frequency corresponding to the rotational speed of said magnet,
a cancellation coil arranged within the magnetic field of said drive coil for generating a voltage having a frequency and an amplitude both of which vary with the change in the drive magnetic flux of said drive coils, and
means for adding the voltage generated at said cancellation coil to the signal generated at said speed detection coil to cancel a voltage generated at said speed detection coil due to the change in the drive magnetic flux of said drive coils.

4,093,898

CONTROL SYSTEM FOR REGULATING THE SPEED OF AN ELECTRIC MOTOR

Ronald W. Morters, and Lawrence A. Millonzi, both of Milwaukee, Wis., assignors to Harnischfeger Corporation, W. Milwaukee, Wis.

Filed Jun. 22, 1976, Ser. No. 698,320
Int. Cl.² H02P 1/26
U.S. Cl. 318—227 **12 Claims**



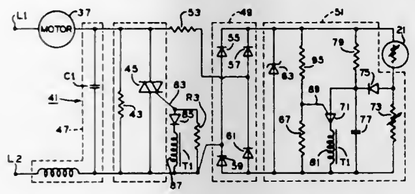
1. Means for ascertaining the instantaneous rotor speed of an alternating current induction motor having a wound rotor and a stator and energizable from a source of alternating current electric power through a controlled rectifier bank connected to said stator comprising:
first means, including a time-controlled sampling module switch, for detecting the instantaneous voltage in said wound rotor at a predetermined point in time and providing an alternating current signal related thereto;
second means for reducing, rectifying and inverting said alternating current signal and for providing a signal related thereto; and
third means for receiving and converting said signal into an analog voltage signal proportional to instantaneous speed.

4,093,899

CIRCUIT AND METHOD FOR CONTROLLING SPEED OF AN ALTERNATING CURRENT MOTOR

Dann W. Denny, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 548,764, Feb. 10, 1975, Pat. No. 4,007,605.
This application Aug. 18, 1976, Ser. No. 715,280
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 **11 Claims**



1. A circuit for controlling the speed of an alternating current motor comprising a gate controlled full wave alternating current switch coupled in series relation with the motor, a phase control circuit coupled in parallel relation with said switch and operable generally for providing signals indicative of the occurrence of preselected conditions, a dropping resistance respectively coupled in series relation with the motor and in parallel relation with said switch, said dropping resistance being by-passed when said switch is conducting in either direction and providing a motor operating current path when said switch is non-conducting, and means for transmitting the indicative signals to the gate of said switch to control the duration of the conduction thereof in either direction and thereby vary the energy delivered to the motor for controlling its speed in accordance with the occurrence of the preselected conditions.

4,093,900

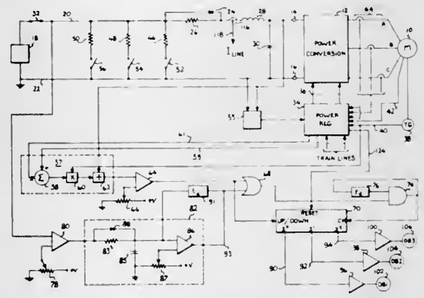
DYNAMIC BRAKE BLENDING FOR AN INVERTER PROPULSION SYSTEM

Allan Barr Plunkett, Scotia, N.Y., assignor to General Electric Company, Erie, Pa.

Filed Aug. 11, 1976, Ser. No. 713,491
Int. Cl.² H02P 3/22
U.S. Cl. 318—370 **10 Claims**

1. In a traction motor propulsion system of the type comprising an adjustable speed a-c motor, a d-c power source, an inverter having d-c terminals connected to said source and a-c terminals connected to said motor, and control circuitry connected to the inverter and responsive to a commanded torque signal and to motor feedback signals for varying a parameter of the alternating voltage at the a-c terminals of the inverter so as to regulate the torque output of the a-c motor, the control circuitry including means for preventing the magnitude of inverter d-c terminal voltage during electrical braking from exceeding a predetermined maximum limit, an improved electrical brake blending system comprising:
a. a plurality of braking resistors and a corresponding plurality of switches having conducting and non-conducting states, each of said resistors being serially connected to a

corresponding one of said switches to thereby form a plurality of braking stages;
b. means connecting each of said braking stages in parallel circuit arrangement with the d-c power source;
c. circuit means responsive to motor torque, motor rotational velocity and inverter terminal voltage and operative during electrical braking when motor torque is less



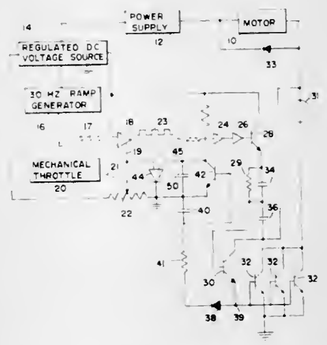
than commanded torque for producing an error signal representative of a change in motor current required to increase motor torque to said commanded torque; and
d. switch control means responsive to said error signal achieving a predetermined value for changing states of selected ones of said switches to alter the combination of braking stages conducting current so as to increase the motor generated current.

4,093,901

DC MOTOR SPEED CONTROL CIRCUIT

Ronald N. Rose, 2701 Terrace View La., Wayzata, Minn. 55391

Filed May 25, 1977, Ser. No. 800,530
Int. Cl.² H01H 7/08
U.S. Cl. 318—476 **9 Claims**



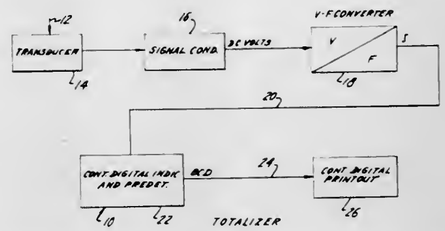
1. A DC power control circuit adapted to control power to a load such as a motor comprising in combination:
output means adapted to be connected to the load;
output switching means connected to said output means;
control switching means connected to said output switching means so as to control the output switching means;
pulse generating means;
manual control means;
pulse width modulating means connected to said pulse generating means and to said manual control means so as to vary the duty cycle of the pulses from the pulse generating means in accordance with the position of the manual control means;
control signal transfer means connected between said pulse width modulating means and said control switching means; and
latching automatic shutdown means connected to said control switching means and to said pulse width modulating means so as to reduce the duty cycle of the pulses to zero in response to excessive current in the control switching means, said automatic means connected to latch on and hold the duty cycle of the pulses at zero until said manual control means is set at zero.

4,093,902

HIGH SENSITIVITY ELECTRONIC INTEGRATING TORQUE RHEOMETER

Leonard W. Mentovay, 16 Fairmount Rd., Parsippany, N.J. 08859, and Alex Palmer, 24 Westwood Dr., Fair Lawn, N.J. 07410

Filed Dec. 29, 1976, Ser. No. 755,359
Int. Cl.² G05B 1/08
U.S. Cl. 318—490 **15 Claims**



1. A mixing control system for elastomeric materials comprising:
a mixer housing forming a mixing chamber therein for receiving said elastomeric materials
at least one rotatable mixing means in the chamber;
a dynamometer coupled to and driving said rotatable mixing means;
torque sensing means for detecting torque exerted by the mixing means; said sensing means providing a torque signal level for controlling said mixing means;
voltage-to-frequency conversion means for processing said signal level and for converting said signal level into a pulse signal in which the pulse frequency varies in correspondence to the amplitude of the signal level;
pulse counting means for continuously and cumulatively counting the pulses of said pulse signal;
display means for displaying the count of said pulse counting means as the value of the integral of said signal level with respect to time; and,
control responsive means automatically responsive to a predetermined integrated value of said display means for controlling the total mixing energy input to the mixing control system.

4,093,903

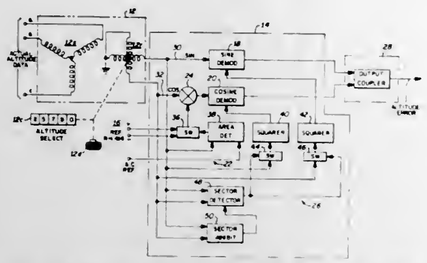
APPARATUS FOR EXTENDING THE LINEAR SIGNAL RANGE OF A ROTARY TRANSFORMER TYPE DEVICE

Ronald E. Thomas, Phoenix, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 31, 1977, Ser. No. 764,327
Int. Cl.² B64C 13/18
U.S. Cl. 318—584 **12 Claims**

1. Apparatus for extending the linear range of a rotary transformer type device including polyphase stator windings and sine and cosine rotor windings comprising,
means responsive to the signal of said sine winding for providing a first output signal proportional thereto between first and second predetermined values thereof,
means for providing a predetermined constant reference signal,
means responsive to the signal of said cosine winding and

said constant reference signal for providing a resultant second output signal proportional to the combination



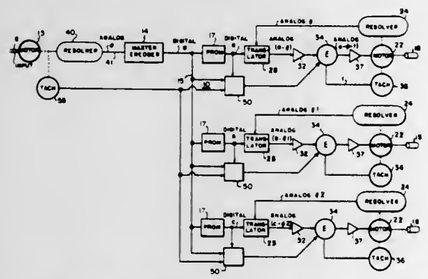
thereof for values of said cosine signal in excess of said first and second predetermined values of said sine signal.

4,093,904

MULTI-AXIS MOTION GENERATOR UTILIZING FEEDFORWARD CONTROL

Robert G. Burig, Allison Park, and Paul F. McNally, Gibsonia, both of Pa., assignors to Contraves Goerz Corporation, Pittsburgh, Pa.

Filed Feb. 4, 1976, Ser. No. 655,072
Int. Cl.[2] G05B *5/01*
U.S. Cl. 318—616 **12 Claims**



1. An electrical positioner for positioning a slave shaft in response to the position of a continuously rotating master shaft comprising:

a master shaft encoder providing a digital master shaft position indication;

position determining means connected to said master shaft encoder and providing a digital slave shaft position in response to the digital master shaft position;

a first digital storage connected to and storing the digital output of the associated position determining means;

a second digital storage device;

a shifting means for shifting the digital signal stored in said first storage device to said second storage device when said master axis position changes by one digital increment;

a pair of digital-to-analog converters connected to said first storage device and said second storage device for converting the digital outputs to analog outputs;

multiplying means for multiplying the outputs of said digital-to-analog converters by the signal related to the velocity of the master axis;

subtractor means for subtracting the analog signals out of said digital-to-analog converters providing a velocity feedforward signal;

the velocity feedforward signal is calculated for each incremental change in the digital master shaft position; and,

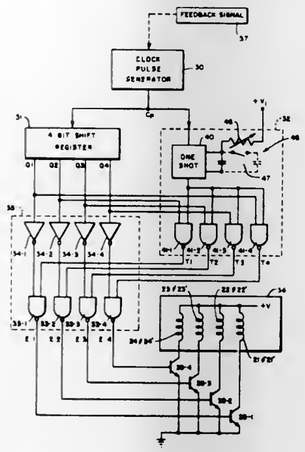
positioning means connected for positioning the slave shaft to the digital slave shaft position from said position determining means as function of the velocity feedforward signal.

4,093,905

STEPPING MOTOR USING EXTENDED DRIVE PULSES

Leopold von Braun, Chicago, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Jun. 1, 1976, Ser. No. 691,678
Int. Cl.[2] H02K *37/00*
U.S. Cl. 318—696 **14 Claims**



1. A method for operating a stepping motor having a plurality of individually energizable phases comprising the steps of:

sequentially energizing each of a plurality of phases for distinctive intervals of time;

the energization interval of each one of the phases overlapping in time with the energization interval of the phase first subsequent thereto for a selected overlap period, the selected overlap period being such that the energization interval of the one phase terminates a selected time prior to the energization of the next subsequent one of the plurality of phases; and

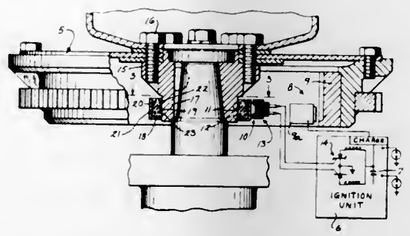
wherein the selected overlap period for a given phase is of a fixed duration and the energization interval for that phase is variable in duration.

4,093,906

PERMANENT MAGNET PULSE GENERATOR AND METHOD OF FORMING AND ASSEMBLY

James Richard Draxler, Fond Du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Nov. 28, 1975, Ser. No. 636,105
Int. Cl.[2] H02K *15/02, 21/22*
U.S. Cl. 322—51 **15 Claims**



1. A trigger pulse generator for coupling to a driven shaft for establishing time spaced ignition control signal pulses separated by essentially zero output levels comprising an annular permanent magnet unit defining the only source of magnetic force in the pulse generator, said unit having a first annular magnet member radially magnetized, said magnet member having first and second circumferentially spaced and circumferentially extended portions, said portions being reversely magnetized whereby the first portion defines a North pole at the outer periphery of the magnet member and a South pole in radial alignment with the North pole, said magnet unit having a second annular magnet member in axially spaced adjacent relation to said first annular magnet member with first and second portions aligned with the first and second portions of the first annular magnet member, said second annular magnet member having said first and second portions oppositely magnetized from that of the first annular magnet member to define the opposite polarity first and second magnetic poles at the periphery of the magnet members to generate an axially directed field adjacent the radial edge of the magnet unit, each of said magnet portions being magnetized to a substantially constant magnetic level about the circumference of the magnet unit to define areas of sharp flux reversal on the periphery between said constant magnetic level in one direction to the said constant magnetic level in the opposite direction.

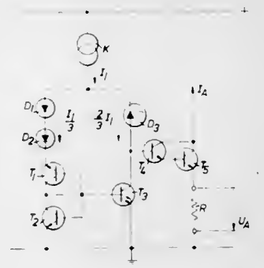
12. The method of forming an annular rotor unit for generating time spaced trigger pulse signals comprising, fixedly attaching a non-magnetized permanent magnet member to a tubular supporting hub, assembling an electromagnetic coil assembly in fixed relation about the periphery of said magnet member, energizng said assembly with a direct current to establish a unidirectional magnetic field about a selected elongated portion of the magnet member with said magnetic field passing radially from said coil assembly through one axial end portion of said magnet member and axially through the hub and returning radially through the opposite axial end portion of said magnet member to the coil assembly and thereby forming a magnetized magnet member, said magnetic field being selected to saturate said magnet member to form permanent magnets of opposite polarization at the opposite axial ends of the annular magnet member, the magnets in said magnet member being magnetized to a constant level about the selected elongated portion, and disassembling of said magnetized magnet member from said electromagnetic coil assembly.

4,093,907

REFERENCE SOURCE FOR PRODUCING A CURRENT WHICH IS INDEPENDENT OF TEMPERATURE

Karl-Diether Nutz, Heilbronn, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Nov. 18, 1976, Ser. No. 743,143
Claims priority, application Germany, Nov. 28, 1975, 2553431
Int. Cl.[2] G05F *1/58*
U.S. Cl. 323—1 **7 Claims**



1. A reference source for producing an output current independent of temperature comprising:

a constant current source;

first and second Zener diodes of different Zener voltage;

two parallel-connected current branches supplied by said current source with each said branch including one of said Zener diodes and at least one of said branches including a plurality of series connected diodes driven in the forward direction;

a current mirror circuit having components in each of said current branches and including a first transistor, whose emitter-collector path is connected in one of said current branches, for producing an output voltage across its collector-emitter path substantiallly determined by the difference in the Zener voltages of said first and second Zener diodes; and

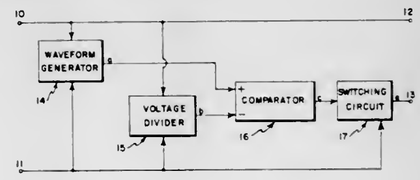
a transistor Darlington circuit to which the output voltage of said first transistor is fed, said Darlington circuit including second and third transistors, with said second transistor having its base connected to the collector of said first transistor, and a resistor, which determines the magnitude of the output current of said reference source, connected in the emitter path of said third transistor; and wherein said transistors of said Darlington circuit and said diodes driven in the forward direction are selected so as to render said output current of said reference source independent of temperature when there is a distribution of currents over said two current branches as forced by said current mirror circuit.

4,093,908

PHASE-CONTROLLED VOLTAGE REGULATOR

William C. Evans, Rochester, N.Y., assignor to Viva-Tech Inc., Rochester, N.Y.

Filed Sep. 13, 1976, Ser. No. 722,632
Int. Cl.[2] G05F *3/04*
U.S. Cl. 323—19 **17 Claims**



16. A method for maintaining at a substantially constant value the RMS voltage applied to a load from an AC power source of sinusoidal waveform, such power source having an RMS value which varies within a predetermined range of values, said method comprising the steps of:

(a) generating a predetermined bipolarity waveform having a period corresponding to the period of said sinusoidal waveform;

(b) comparing said bipolarity waveform with the sinusoidal waveform characteristic of the instantaneous RMS voltage of the source to produce a signal each time the instantaneous algebraic difference of said waveforms first changes sign after the start of each cycle of said sinusoidal waveform; and

(c) utilizing said signal to trigger a phase-controlling switch which controls the RMS voltage applied to the load by interrupting the power applied to the load at the start of each cycle of said power source until said signal is received by said switch.

4,093,909

METHOD AND APPARATUS FOR OPERATING A SEMICONDUCTOR INTEGRATED CIRCUIT AT MINIMUM POWER REQUIREMENTS

Donald L. Watrous, and Daniel W. Dobberphul, both of Liverpool, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 21, 1976, Ser. No. 707,278
Int. Cl.[2] G05F *1/56*
U.S. Cl. 323—22 R **10 Claims**

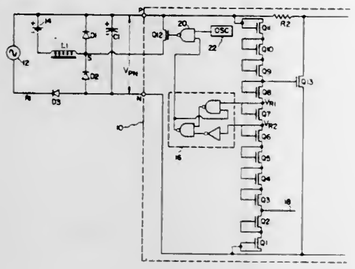
6. In combination a semiconductor integrated circuit adapted to be powered from a battery and a converter having

a charge storage capacitor for providing a filtered DC voltage to said circuit, the improvement comprising:

voltage divider means in said integrated circuit for providing a semiconductor integrated circuit process parameter dependent reference voltage;

comparator means for comparing the magnitudes of said reference voltage and said filtered DC voltage, said comparator means providing an output control signal indicative of the relative magnitudes of said voltages; and

switching means operatively connected to said output control signal for enabling said converter to charge said capacitor and maintain the magnitude of said DC voltage at the minimum value required for reliable circuit operation with minimum power consumption in the integrated circuit.

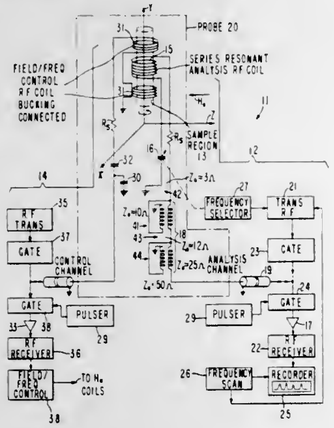


4,093,910

NUCLEAR MAGNETIC RESONANCE PICK-UP CIRCUIT FOR CONTROL OF RESONANCE CONDITIONS

Howard D. W. Hill, Cupertino, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 22, 1977, Ser. No. 770,478
Int. Cl.² G01R *33/08*
U.S. Cl. 324—0.5 AH **2 Claims**



1. In a nuclear magnetic resonance spectrometer of the type having an analysis channel and a control channel coupled in radio frequency magnetic field exchanging relation via separate analyzing and control radio frequency coil means to a common region for containing both an analysis group of nuclear magnetic resonators and a control group of nuclear magnetic resonators for controlling the resonance conditions of both groups, the improvement wherein:

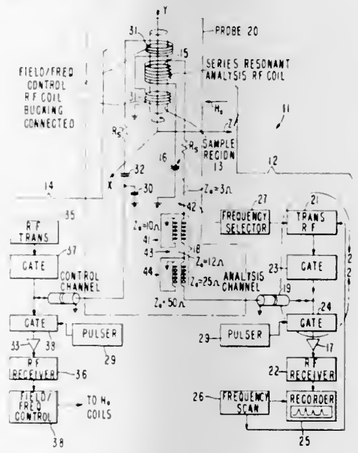
said control radio frequency coil means is formed and arranged relative to said analysis radio frequency coil means so that one of said coil means includes first and second spaced portions wound on a common axis for flow of the radio frequency current therethrough such that the RF magnetic field region produced by said spaced portions of said one coil means are in opposite directions within the region bounded by said other coil means.

4,093,911

NUCLEAR MAGNETIC RESONANCE SPECTROMETER EMPLOYING AN IMPROVED RESONANCE SIGNAL GATING CIRCUIT

Howard D. W. Hill, Cupertino, and John R. Laudermilch, Foster City, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 22, 1977, Ser. No. 770,479
Int. Cl.² G01R *33/08*
U.S. Cl. 324—.5 AH **3 Claims**



1. In a nuclear magnetic resonance spectrometer of the type having a probe circuit means disposed in radio frequency magnetic field exchanging relation with a sample region for containing a group of nuclear magnetic resonators for exciting and detecting resonance of the group of nuclear magnetic resonators, receiver means for receiving and amplifying the resonance signals coupled into said probe circuit means from the resonant group of nuclear magnetic resonators, and a gate circuit means, disposed in circuit with said probe circuit means and said receiver means for gating ON and OFF the flow of electrical signals between said probe circuit means and said receiver means, the improvement wherein:

said gate circuit means includes first and second gate circuit branch means parallel connected to each other and between said probe circuit means and said receiver means, each of said first and second gate circuit branch means including a series connection of a pair of gating diode means, a control node means connected in between each pair of gating diode means for application of a control potential to respective ones of said diode means for biasing said diode means between conductive and nonconductive modes of operation for gating ON and OFF the flow of signals between said probe circuit means and said receiver means; and

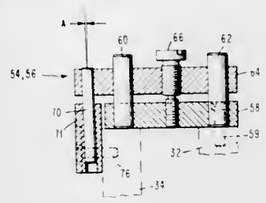
said diode means of said first and second parallel branches being oppositely poled relative to their respective control node means such that transient feedthrough of biasing pulse signals of equal magnetic and opposite sign cancel each other on the signal line gated ON and OFF by said gate means.

4,093,912

NMR MAGNET ASSEMBLY WITH POLE FACE PARALLELISM ADJUSTMENT

Glen P. Double; Vincent N. Kahwaty, both of Poughkeepsie; James D. Randall, Pleasant Valley, and Fritz M. Reinhart, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 20, 1976, Ser. No. 724,798
Int. Cl.² G01R *33/08*
U.S. Cl. 324—.5 MA **12 Claims**



1. In an NMR magnet assembly having a permanent magnet including two spaced cylindrical magnetic cores and a cylindrical hollow flux-return-path casing surrounding said cores, the combination therewith of a pole piece sub-assembly enclosed in said casing and comprising:

two pole pieces supported between said cores and spaced therefrom and from each other, said pole pieces having flat parallel pole faces spaced to provide a gap having a homogeneous magnetic field;

a fixed support connected to said casing and supporting one of said pole pieces in a fixed position relative to said cores;

a pivotable support pivotably connected to said fixed support and supporting the other one of said pole pieces whereby said pole face thereof is pivotable about a pivot with two degrees of freedom of movement; and

two adjustment mechanisms connected between said supports for positioning of said pivotable pole face in accordance with said two degrees of freedom of movement respectively;

each of said adjustment mechanisms comprising a first member movable radially of said pivotable pole face, a differential screw connected between said first member and one of said supports and operative to move said first member radially in response to rotation of said screw, and a second member extending radially between said first member and the other one of said supports, said second member having a slight longitudinal angle of incline for translating radial movement of said first member into pivotal movement of said movable pole face in one of said degrees of freedom of movement.

4,093,913

VACUUM MEASURING IONIZATION APPARATUS CONTROL

Charles D. O'Neal, III, Pepperell, Mass., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Mar. 24, 1976, Ser. No. 670,512
Int. Cl.² G01N *27/00*
U.S. Cl. 324—33 **9 Claims**

1. A controller for a pressure measuring device having a hot cathode, an anode and an ion collector, said controller comprising:

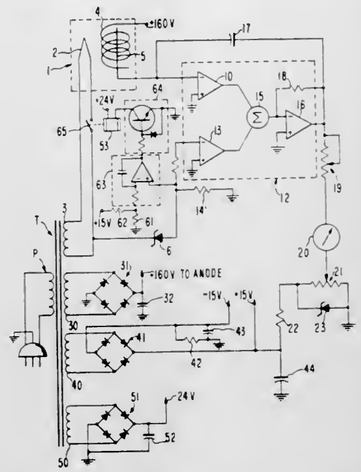
first means for providing an output signal representative of the ion current through the collector;

second means for providing an output signal representative of the electron emission current from the cathode;

means for combining the outputs of said first and second means to provide a representation of a ratio of said outputs;

indicator means responsive to said ratio to give an indication of pressure in the pressure measuring device;

circuit means to energize the cathode to generate emission current, said emission current being responsive to the temperature variation of the cathode with variation of pressure in the device; and



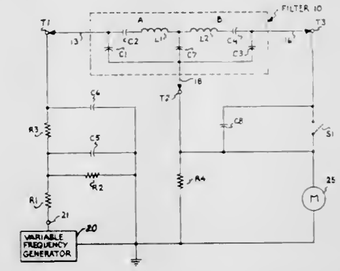
said energizing circuit means being constructed to prevent variation in the emission current in response to variation in ion current and to prevent variation in the emission current by operator control.

4,093,914

METHOD OF MEASURING PARAMETERS OF A CRYSTAL FILTER

Harry J. Peppiatt, and Gerald E. Roberts, both of Lynchburg, Va., assignors to General Electric Company, Lynchburg, Va.

Filed Apr. 6, 1977, Ser. No. 784,970
Int. Cl.² G01R *29/22, 27/26*
U.S. Cl. 324—56 **9 Claims**



7. A method of measuring selected parameters of a crystal filter having a piezoelectric plate, an input electrode on said plate, a common electrode on said plate, and an output electrode on said plate, said method comprising the steps of:

a. applying a band of frequencies to said input electrode relative to a reference point while said output electrode and said common electrode are connected by a short circuit; and

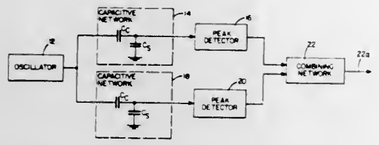
b. determining the frequencies which cause the voltage at said common electrode relative to said reference point to be a maximum and a minimum.

4,093,915

CAPACITANCE MEASURING SYSTEM

Dennis K. Briefer, Berlin, Mass., assignor to Setra Systems, Inc., Natick, Mass.

Continuation-in-part of Ser. No. 648,490, Jan. 12, 1976. This application Jun. 29, 1977, Ser. No. 811,385
Int. Cl.² G01R *27/26*
U.S. Cl. 324—60 R **23 Claims**



1. A capacitance measuring system comprising:

A. an oscillator including means for providing at an output terminal an oscillatory signal relative to a ground potential, said oscillatory signal being characterized by a predetermined peak-to-peak voltage,

B. a first capacitive network and associated first peak detecting network, said first capacitive network including a coupling capacitor and a first sensor capacitor connected in series between said output terminal and said ground potential, said first sensor capacitor having one terminal connected to said ground potential, and said first peak detecting network being connected to the junction between said coupling and first sensor capacitors and including means to generate a first peak signal representative of the peak-to-peak voltage at said junction,

C. A second capacitive network and associated second peak detecting network, said second capacitive network including a coupling capacitor and a second sensor capacitor connected in series between said output terminal and said ground potential, said second sensor capacitor having one terminal connected to said ground potential, and said second peak detecting network being connected to the junction between said coupling and second sensor capacitors and including means to generate a second peak signal signal representative of the peak-to-peak voltage at said junction,

D. combining means coupled to an output terminal of said first and second peak detecting networks for producing an output signal representative of the difference in magnitude of said first and second peak signals.

9. A system for generating a signal functionally related to the capacitive reactance of a sensor capacitor, comprising:

A. a first capacitive network and associated first peak detecting network, said first capacitive network including a first drive capacitor and a first sensor capacitor connected in series between a system input terminal and a first reference potential, and said associated peak detecting network being connected to the junction between said first drive and first sensor capacitors and including means for generating a peak signal representative of the peak voltage at said junction,

B. an oscillator coupled to said system input terminal and having a control terminal, said oscillator including means to generate an oscillatory signal at said system input terminal, said oscillatory signal being characterized by an amplitude proportional to the voltage at said control terminal, and

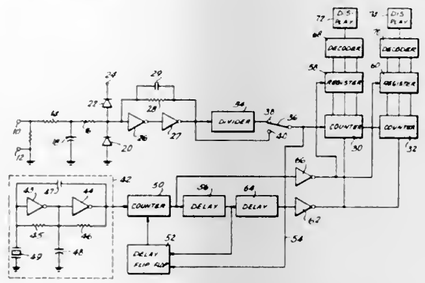
C. feedback network coupled between said first peak detecting network and said control terminal, said feedback network including means responsive to said peak signal and a second reference potential to apply a feedback signal to said control terminal whereby the peak amplitude of the voltage across said drive capacitor is constant.

4,093,916

DIGITAL TACHOMETER

Steven E. Summer, 37 View Rd., Setauket, N.Y. 11785

Filed Oct. 4, 1976, Ser. No. 729,212
Int. Cl.² G01P *3/48*
U.S. Cl. 324—166 **2 Claims**



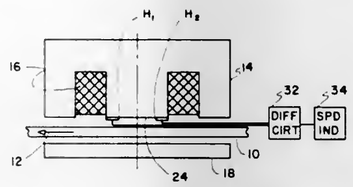
1. A speed measuring arrangement comprising, in combination, a source of pulses occurring at a frequency corresponding to a speed to be measured; counting means connected to said source for counting said pulses; means for generating a predetermined time interval connected to said counting means for actuating said counting means so that said pulses are counted only within said time interval; and means connected between said source of pulses and said time interval generating means for starting said time interval only at a predetermined and constant instant of one of said pulses; the number of pulses counted within said time interval being constant for any predetermined magnitude of the speed being measured, said speed being variable over time.

4,093,917

VELOCITY MEASUREMENT SYSTEM

Walter Haeussermann, Huntsville, Ala., assignor to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 6, 1976, Ser. No. 730,046
Int. Cl.² G01P *3/48*
U.S. Cl. 324—173 **6 Claims**



1. A velocity sensor for measuring the surface speed of a conductive body along a path of movement comprising:

an E-shaped magnetic core having a central pole and two spaced outer poles, the ends of said poles being configured to be closely spaced from the conductive surface of a moving body the speed of which is to be measured, said poles being positioned, in line, along said path of movement of said body;

an energizing coil coupled to said central pole;

first and second Hall effect devices positioned in a spaced relation along said path of movement of said body on the end surface of said central pole of said core, and each said Hall effect device having a bias input and signal output;

bias means for applying a biasing current to said energizing coil and to the bias input of said Hall effect devices; and

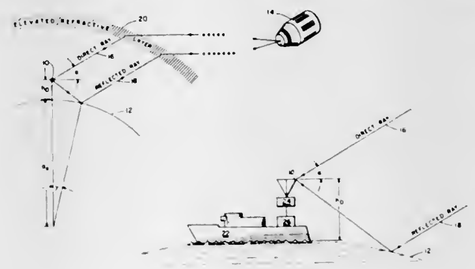
difference means connected to the signal outputs of said Hall effect devices for subtracting the signal outputs and providing a signal indicative of the velocity of a conductive body moving across but spaced from the end surfaces of said poles and said Hall effect devices.

4,093,918

MEANS FOR DETERMINING THE REFRACTIVE INDEX PROFILE OF THE ATMOSPHERE

Herbert V. Hitney, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 16, 1976, Ser. No. 714,868
Int. Cl.² H04B *17/00*
U.S. Cl. 325—67 **6 Claims**



1. A method for determining the refractive index profile of the lower atmosphere comprising the steps of:

(a) observing the signal pattern of a signal received from a satellite transmitter as the satellite moves through low elevation angles over a selected period of time;

(b) calculating a number of hypothetical signal patterns;

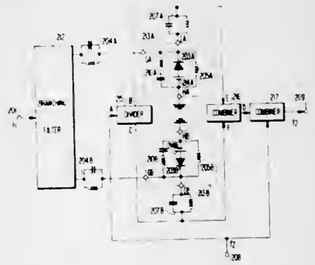
(c) comparing each of said hypothetical signal patterns with said observed signal pattern until one of said hypothetical signal patterns matches said observed signal pattern to within a selected limit of error, each of said hypothetical signal patterns is calculated by hypothesizing a different refractive index profile, the hypothesized refractive index profile of said matching hypothetical signal pattern comprising the refractive index profile to be determined.

4,093,919

CARRIER CONVERTER COMPRISING A VARIABLE IMPEDANCE CIRCUIT PAIR OR AT LEAST ONE BALANCED DIODE BRIDGE

Hiroshi Watanabe, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Aug. 16, 1976, Ser. No. 714,921
Claims priority, application Japan, Aug. 14, 1975, 50-98853; Aug. 14, 1975, 50-98854; Aug. 14, 1975, 50-98855; Aug. 14, 1975, 50-98856; Jan. 19, 1976, 51-5269
Int. Cl.² H03C *1/50*
U.S. Cl. 325—316 **14 Claims**



14. In a carrier converter for converting a first amplitude modulated signal derived by modulating a first carrier signal by a modulating signal to a second amplitude modulated signal derived by modulating a second carrier signal substantially by said modulating signal, comprising a variable impedance circuit having a variable impedance dependent on the amplitude of an input signal, first means for supplying said first amplitude modulated signal as said input signal to said variable impedance circuit, and second means for supplying said second carrier signal to said variable impedance circuit, and a third means operatively coupled to said variable impedance circuit for deriving said second amplitude modulated signal, the improvement wherein:

said variable impedance circuit comprises a diode bridge circuit having a first and a second pair of bridge terminals and being balanced with respect to a first bridge signal supplied to the first pair of bridge terminals and to a second bridge signal supplied to the second pair of bridge terminals, said first pair of bridge terminals being isolated from said second pair of bridge terminals;

said first meamns supplying said first amplitude modulated signal to said first pair of bridge terminals as said first bridge signal and said second means supplying said second carrier signal to said second pair of bridge terminals as said second bridge signal;

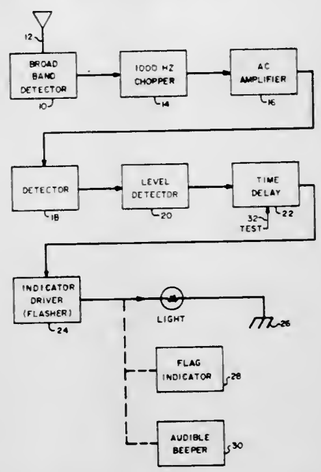
said third means being coupled to said second pair of bridge terminals via said second means, said second carrier signal being applied to said third means.

4,093,920

DELAYED RESPONSE TRANSMITTER INDICATOR

Martin L. Kaiser, 115 Bosley Ave., Cockeysville, Md. 21030

Filed Jun. 29, 1976, Ser. No. 700,919
Int. Cl.² H04B *1/06*
U.S. Cl. 325—364 **2 Claims**



1. A system for detecting the presence of radio frequency energy comprising: means for detecting modulated RF energy from a downed aircraft emergency locator transmitter including;

a. a broad band detector including an LRC peaked crystal detector tuned to 121.5 MHz and secondarily resonant at 243 MHz to receive a modulated RF input;

b. a chopper amplifier fed by said crystal detector including a 1000 Hz chopper and a high gain AC amplifier to produce an AC signal proportional to the RF input; a detector connected to said AC amplifier, said detector being adapted to produce a DC signal proportional in amplitude to the RF input;

c. a level detector fed by said AC amplifier and detector;

d. a time delay fed by said level detector, whereby the ab-

sence of a DC signal from the detector causes the level detector to activate the time delay to zero time and when an RF input occurs the level detector triggers the time delay and the timing process begins;

e. an indicator driver fed by said time delay; and

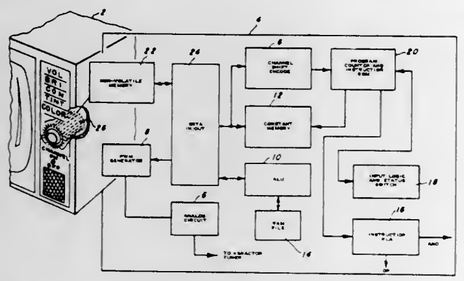
f. indicator means for detecting the output of said indicator driver, said output representing the presence of an RF input.

4,093,921

MICROCOMPUTER PROCESSING APPROACH FOR A NON-VOLATILE TV STATION MEMORY TUNING SYSTEM

Kenneth George Buss, Dallas County, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 17, 1977, Ser. No. 778,401
Int. Cl.[2] H04B *1/26*
U.S. Cl. 325—459 **23 Claims**



1. A broadcast receiver tuning system for tuning said broadcast receiver to a selected frequency comprising:

first means for storing digital tune words responsive to a binary address for outputting a selected said digital tune word,

second means for storing said selected digital tune word and said binary address operably associated with said first means for storing,

a microcomputer operable for selectively changing said digital tune words in said first and second means for storing, and

means for converting said digital tune word stored in said second means for storing into an analog voltage operative to tune said broadcast receiver to said selected frequency.

4,093,922

MICROCOMPUTER PROCESSING APPROACH FOR A NON-VOLATILE TV STATION MEMORY TUNING SYSTEM

Kenneth George Buss, Dallas County, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

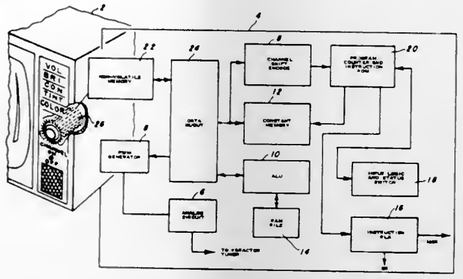
Filed Mar. 17, 1977, Ser. No. 778,400
Int. Cl.[2] H04B *1/26*
U.S. Cl. 325—459 **17 Claims**

1. A method for tuning a broadcast receiver to a selected frequency using a microcomputer comprising the steps of:

generating a binary address for outputting a digital tune word corresponding to said selected frequency from a memory matrix containing a plurality of said digital tune words;

storing said outputted digital tune word and said binary address in a shift register;

updating said digital tune word stored in said shift register by incrementing or decrementing said digital tune word by an increment value read from a data memory matrix; and



converting said digital tune word stored in said shift register into an analog voltage operative to tune said broadcast receiver to said selected frequency.

4,093,923

SIGNAL CANCELLING CIRCUIT

Karl McCormick, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 22, 1976, Ser. No. 753,658
Int. Cl.[2] G11C *27/02*; H04B *15/04*
U.S. Cl. 328—165 **12 Claims**

1. A passive system for cancelling a noise signal while preserving a desired signal having the same frequency, said system comprising:

a sample circuit, said sample circuit being disposed to sample said noise signal;

an enabling circuit coupled to said sample circuit to enable said sample circuit at selected times to store the instantaneous values of said noise signal and block said sample circuit at all other times.

an address means, said address means having N positions and being operable in synchronism with said noise signal;

N storage units, said storage units being disposed to be coupled by said address means to said sample circuit, to sample and store a signal related to the instantaneous amplitude of the noise signal; and

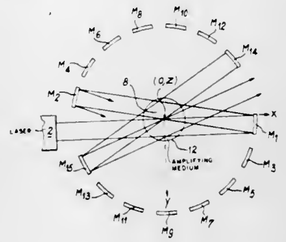
a feedback circuit having a high impedance, said feedback circuit being coupled by said address means to supply the stored signals to a circuit means to cancel said noise signal during time periods when said sample circuit is blocked by said enabling circuit.

4,093,924

DEVICE FOR APPLYING A LASER PULSE DELIVERED BY A LASER OSCILLATOR

Jean-Claude Farcy, Briis-sous-Forges, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 22, 1975, Ser. No. 642,933
Claims priority, application France, Dec. 23, 1974, 74 42592
Int. Cl.[2] H01S *3/081, 3/091*
U.S. Cl. 330—4.3 **6 Claims**



1. A device for amplifying a laser pulse delivered by a laser oscillator, wherein said device comprises:

a light-amplifying medium which is pumped by an auxiliary excitation source and comprises a number of energy levels, one or a number of upper reserve levels, an upper laser level, a lower laser level and one or a number of lower reserve levels, the laser transition being intended to correspond to the laser pulse delivered by the oscillator and to take place between the upper laser level and the lower laser level,

a series of mirrors placed around the amplifying medium to reflect said laser pulse from one mirror to the following mirror of the series of mirrors, wherein the mirrors are so arranged as to ensure that the time interval Δt_1 which elapses between two successive passes of the pulse within the same volume of the amplifying medium is longer than the time interval Δt_2 which is necessary for population transfer between on the one hand the upper reserve level or levels and the upper laser level and on the other hand the lower laser level and the lower reserve level or levels, with the result that the amplifying medium is regenerated by population exchange at the lower and upper levels between each traversal of the pulse through said amplifying medium,

wherein the amplifying medium is placed between two parallel planes which are perpendicular to an axis Oz and wherein said mirrors are oriented so as to ensure that the path of the light pulse between said mirrors is perpendicular to said axis Oz.

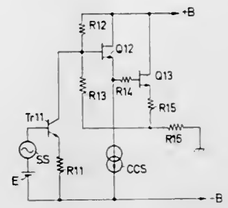
4,093,925

METHOD AND SYSTEM OF DRIVING POWER FIELD EFFECT TRANSISTOR

Kenji Yokoyama, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Nov. 18, 1975, Ser. No. 632,899
Claims priority, application Japan, Jan. 27, 1975, 50-11076; Jul. 8, 1975, 50-83744
Int. Cl.[2] H03F *3/16, 3/21*
U.S. Cl. 330—277 **9 Claims**

1. A method of driving a triode-like junction field effect transistor for increasing its maximum power output: comprising the step of over-driving said transistor by applying thereto



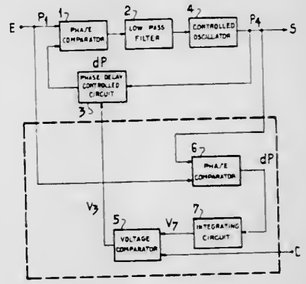
a forward gate-to-source voltage which is greater in the forward biasing direction than zero volts.

4,093,926

SYSTEM FOR ADVANCING AN ELECTRICAL SIGNAL IN PHASE UNDER THE CONTROL OF AN EXTERNAL VOLTAGE MORE ESPECIALLY FOR AN ENGINE OF A MOTOR VEHICLE

Jean Luc Lamarche, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Feb. 23, 1977, Ser. No. 771,324
Claims priority, application France, Feb. 27, 1976, 76 05587
Int. Cl.[2] H03B *3/04*
U.S. Cl. 331—11 **1 Claim**



1. A system for advancing in phase an electrical signal under the control of an external voltage, comprising:

a control oscillator circuit, delivering an output signal of which the frequency is controlled in dependence upon a frequency control voltage;

a phase comparison circuit, with two input terminals delivering said frequency control voltage, and receiving at one of said input terminals the signal to which a phase advance lead is to be applied;

a controlled phase delay circuit included in a return loop connected between the output of said controlled oscillator and the other of said input terminals of the phase comparison circuit, said frequency control voltage thus being dependent upon the phase comparison between the input signal and the delayed signal, by which the output signal of the controlled oscillator circuit is advanced in phase relative to the input signal, by an amount which is dependent upon the value of a phase control voltage, said phase control voltage being provided by said external voltage through a correcting circuit, wherein said correcting circuit is formed by:

a second phase comparison circuit which delivers a correcting voltage in dependence upon the phase comparison between the input signal to be phase-shifted and the output signal of the controlled oscillator circuit;

a voltage comparator-amplifier circuit which respectively receives at its inputs said correcting voltage and the external control voltage, said circuit thus delivering a voltage

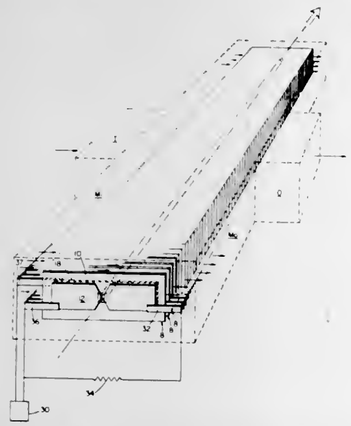
which is dependent upon the difference between the two voltages received, and which constitutes said phase-control voltage applied to said phase-delay controlled circuit, by which the phase delay, introduced by the controlled phase delay circuit, is substantially independent of the frequency of the output signal.

4,093,927

PULSED GAS LASER

Jeffrey Steven Levine, Lexington, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jan. 21, 1976, Ser. No. 650,912
Int. Cl.² H01S *3/096*
U.S. Cl. 331—94.5 PE **14 Claims**



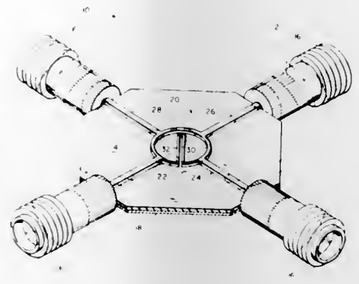
1. In a pulsed gas laser of the transmission line type having first and second co-extending sheetform conductors separated throughout their mutual extent by dielectric, said sheet form conductors having broad oppositely directed faces and relatively thin edges, the first of said conductors having an interruption defining a discharge gap, a lasing gas in said gap, a charging means for applying opposite voltages to the respective conductors, and a discharge means for causing current flow between the conductors, thereby to produce a voltage drop and discharge across said gap for energizing said lasing gas, the improvement comprising a group of said sheet-form transmission lines assembled in face-to-face relationship, in which a said broad face of one of the conductors of any given transmission line in said group lies in a substantially parallel, coextending relationship to a corresponding face of the next adjacent transmission line, each said transmission line having at its discharge gap a radiation transmitting aperture having an optical axis normal to and extending through the planes of the conductors, the second conductors of said transmission lines being electrically continuous past said apertures while being isolated from said apertures to prevent discharge through said apertures between said first and second conductors, the optical axes of said apertures of said transmission lines being aligned to define an optical path normal to the faces of said transmission lines, passing through said lasing gas present at said discharge gaps, and means for causing coordinated discharge of said transmission lines to excite gas at said gaps to form a lasing pulse moving along said optical path.

4,093,928

MICROSTRIP HYBRID RING COUPLER

David Proctor, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 20, 1976, Ser. No. 752,646
Int. Cl.² H01P *5/22*
U.S. Cl. 333—11 **13 Claims**



10. A microwave, microstrip hybrid ring coupler comprising:

a planar dielectric sheet having first and second opposing faces;

a ground plane conductor supported on said dielectric sheet second face;

first and second input-output strip conductor tabs supported on said dielectric sheet first face and defining a first common axis;

third and fourth input-output strip conductor tabs supported on said dielectric sheet first face and defining a second common axis orthogonally disposed relative to said first common axis;

a substantially circular strip conductor connected in common to each said input-output strip conductor and having a pair of ends defining a gap therein; and

first and second parallel-coupled strip conductors for introducing a 180° phase reversal for signals propagating therethrough, each connected to one of said pair of ends, said first and second strip conductors being connected to each other and being entirely disposed on said dielectric sheet first face.

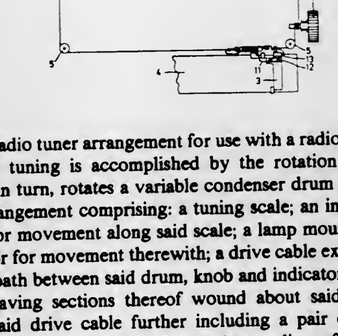
4,093,929

METHOD OF SYNTHESIZING CYLINDRICALLY SYMMETRIC STATIC MAGNETIC FIELDS IN A LOCALLY SATURATED MAGNET AND APPARATUS PROVIDING SAID FIELDS

Frederick R. Morgenthaler, Wellesley Hills, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Nov. 24, 1975, Ser. No. 634,676
Int. Cl.² H01P *1/18, 1/20, 9/30*; H01F *3/10*
U.S. Cl. 333—31 R **22 Claims**

1. Apparatus that comprises, in combination: a magnetic material; and means creating a magnetic bias field H_{BFR} in the region of the magnetic material of sufficient intensity to effect local saturation of the magnetic material, the shape and magnetic characteristics of the magnetic material and the contours of the magnetic bias field H_{BFR} acting, in combination, to provide a spatially non-uniform internal magnetic field H_{IR} of predetermined exacting characteristics within the magnetic material, said means creating a magnetic bias field H_{BFR} comprising a plurality of high permeability magnetic pole pieces



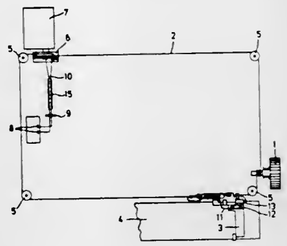
whose surface contours or pole faces are disposed along at least two equipotentials ψ_{iR} of said magnetic bias field H_{BFR}.

4,093,930

RADIO TUNING ARRANGEMENT

Manfred Flügge, Nuremberg, Germany, assignor to Grundig E. M. V. Elektro-Mechanische Versuchsanstalt Max Grundig, Germany

Filed Feb. 28, 1977, Ser. No. 772,519
Claims priority, application Germany, Mar. 16, 1975, 7508023[U]
Int. Cl.² H03J *1/02*
U.S. Cl. 334—86 **5 Claims**



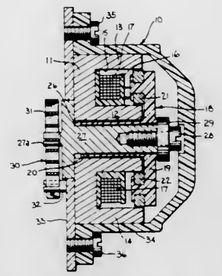
1. A radio tuner arrangement for use with a radio of the type wherein tuning is accomplished by the rotation of a knob which, in turn, rotates a variable condenser drum via a cable, said arrangement comprising: a tuning scale; an indicator disposed for movement along said scale; a lamp mounted to said indicator for movement therewith; a drive cable extending in a closed path between said drum, knob and indicator, said drive cable having sections thereof wound about said drum and knob, said drive cable further including a pair of insulated conductors each having a first end extending off said drum longitudinally and affixed to a terminal post and an opposite end connected to said lamp, said conductors extending off said drum circumferentially to said indicator from opposite sides of said path; said conductors being fixed to an end of said drum and extending beyond said drum end to clamp means positioned between said terminal post and drum whereby to define a torsion section in said cable between said drum end and said clamp means.

4,093,931

MAGNETIC ARMATURE PIECE FOR ROTARY SOLENOID

Alvin P. Fenton, Oostburg, Wis., assignor to Kohler Co., Kohler, Wis.

Filed May 19, 1977, Ser. No. 798,293
Int. Cl.² H01F *7/14*
U.S. Cl. 335—272 **2 Claims**



1. In a rotary solenoid which includes a stationery "E"-shaped electromagnet having a central axial hub with a central axial opening, a pair of opposed axially extending poles and a circular channel between said hub and said poles,

a solenoid coil positioned in said channel about said hub, and an armature assembly having a rotor, an output shaft affixed to the rotor which extends through the axial opening in the hub and a pair of diametrically opposed magnetic poles, the improved armature assembly in which:

(a) the output shaft is formed integral with the rotor;

(b) the poles are joined in a fixed relationship by relatively thin bridges to form a unitary magnetic armature piece; and

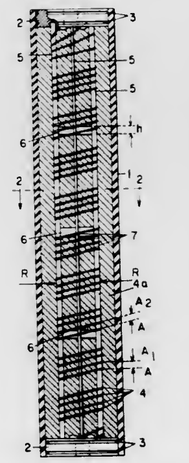
(c) the magnetic armature piece and the rotor are each provided with alignment means which cooperate to properly align the magnetic armature piece on the rotor.

4,093,932

ELECTRIC ALL PURPOSE FUSE

Frederick J. Kozacka, South Hampton, N.H., assignor to Gould Inc., Rolling Meadows, Ill.

Filed Mar. 7, 1977, Ser. No. 775,248
Int. Cl.² H01H *85/04, 85/12*
U.S. Cl. 337—161 **4 Claims**

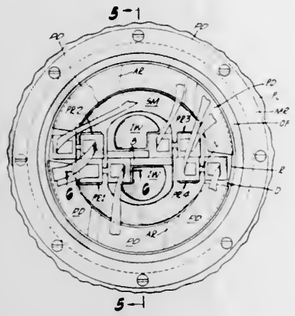


1. A miniature fuse for elevated voltages calling for series

multibreaks for the interruption of small overload currents comprising

(a) a tubular casing of electric insulating material having a length of about 8–15 inches;
(b) a pair of terminal elements closing the ends of said casing;
(c) a granular quartz filler inside said casing;
(d) a plurality of wire-like fusible elements whose cross-sectional area changes periodically conductively interconnecting said pair of terminal elements, said plurality of fusible elements being stampings of sheet metal;
(e) a fusible element support around which said fusible elements are wound substantially helically, said support comprising rods of gas-evolving insulating material; and
(f) the spacing of said plurality of fusible elements being such that initial break formation near the center of said plurality of fusible elements is followed by voltage surges and concomitant electric breakdowns between windings of said plurality of fusible elements and hence formation of series breaks without shortcircuiting and formation of a self-sustained electric discharge between said plurality of fusible elements.

4,093,933
SCULPTURED PRESSURE DIAPHRAGM
Leslie B. Wilner, Palo Alto, Calif., assignor to Becton, Dickinson Electronics Company, San Juan Capistrano, Calif.
Filed May 14, 1976, Ser. No. 686,419
Int. Cl.² H01L *10/10*
U.S. Cl. 338—42 **11 Claims**



1. In a pressure transducer,

a diaphragm composed of a nonmetallic material, said diaphragm having at least two elongated slots separating thick rigid portions therein and forming at least two respective thin flexures joining said thick rigid portions whereby deflection of said diaphragm causes said flexures to bend about axes parallel to their lengths, and

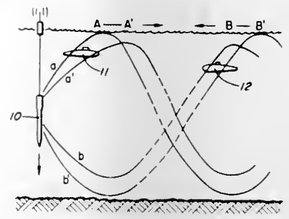
strain sensitive means comprising piezoresistive semiconductive means secured to said diaphragm opposite one of said slots to detect relative movement of parts of the corresponding thin flexure in response to bending thereof to change resistance of said semiconductive means by an amount corresponding to a pressure change.

4,093,934
FREE-FALLING SONOBUOY
Robert J. Urick, Silver Spring, Md., and Robert L. Parris, Annandale, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Apr. 28, 1965, Ser. No. 452,460
Int. Cl.² H04B *11/00*; G01S *9/66*
U.S. Cl. 340—2 **9 Claims**

1. The method of detecting underwater vessels comprising the steps of:

submerging a hydrophone array characterized by its ability to receive sound emanating from vessels in the annular zone defined by a conical pencil of rays upwardly divergent from the array and a hydrophone array characterized by its ability to receive sound emanating from vessels in the annular zone defined by a conical pencil of rays downwardly divergent from the array,

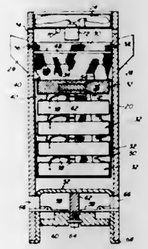
lowering said hydrophone arrays to extreme water depths,



and continuously transmitting signals of any sound waves thereby received to the surface during the lowering of said arrays,

whereby a complete acoustic scan of the entire volume of the sea out to substantial ranges is thus acquired.

4,093,935
EXPANDABLE TRANSDUCER ARRAY
Charles W. Ouellette, Portsmouth, R.I., assignor to Raytheon Company, Lexington, Mass.
Continuation of Ser. No. 682,422, May 3, 1976, abandoned. This application Apr. 29, 1977, Ser. No. 792,439
Int. Cl.² H04B *13/00*
U.S. Cl. 340—8 S **3 Claims**



1. A transducer system comprising:

a housing having an opening in an end thereof;

floatation means secured to said housing at an end thereof opposite said opening for floating said housing in a fluid medium;

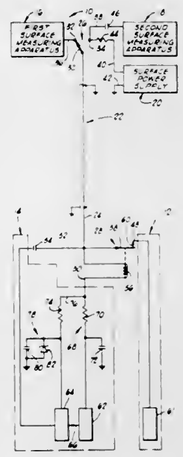
an array of transducer elements arranged along a central axis of said array;

a cap closing said opening for securing said transducer elements within said housing, said cap being released upon impact with said fluid, said transducer elements being slidably secured within said housing to permit their exit via said opening upon said releasing of said cap;

spring means for expanding said array of transducer elements subsequent to their exit from said housing; and

a flexible enclosure extensible through said opening and secured to said housing, said housing surrounding said array for constraining said transducer elements against forces of said spring means to occupy predetermined locations upon the expansion of said array, said enclosure having apertures therein for admission of said fluid to contact said elements for communication of radiation thereto, said spring means comprising spring elements located between said transducer elements and symmetrically positioned about said axis for maintaining said transducer elements in a predetermined orientation relative to said axis.

4,093,936
LOGGING METHOD AND APPARATUS
Howard C. Eberline, Edmond, and Jack L. Moon, Oklahoma City, both of Okla., assignors to Kerr-McGee Corporation, Oklahoma City, Okla.
Filed Dec. 27, 1976, Ser. No. 754,922
Int. Cl.² G01V *1/40*
U.S. Cl. 340—18 CM **12 Claims**



10. A logging method utilizing a first downhole logging device, a second downhole logging device, a first surface measuring apparatus, a second measuring apparatus, a surface power supply and a coaxial cable, comprising the steps of:

establishing electrical continuity between the coaxial cable and the first surface measuring apparatus in a first mode of operation;

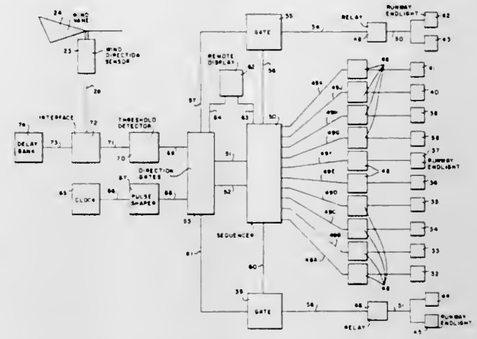
establishing electrical continuity between the first downhole logging device and the coaxial cable in the first mode of operation, electrical continuity being thereby established between the first surface measuring apparatus and the first downhole logging device via the coaxial cable in the first mode of operation;

establishing electrical continuity between the second surface measuring apparatus and the coaxial cable and about simultaneously interrupting electrical communication between the first surface measuring apparatus and the coaxial cable in a second mode of operation;

establishing electrical continuity between the surface power supply and the coaxial cable in the second mode of operation; and

establishing electrical continuity between the second downhole logging device and the coaxial cable in response to electrical continuity being established between the surface power supply and the coaxial cable, thereby establishing electrical continuity between the second surface measuring apparatus, the surface power supply and the second downhole logging device in the second mode of operation.

4,093,937
AUTOMATIC RUNWAY TRAFFIC DIRECTION CONTROL
Max Habinger, P.O. Box D, 500 Leo Ave., Landing, N.J. 07850
Filed May 24, 1976, Ser. No. 689,483
Int. Cl.² G08G *5/00*
U.S. Cl. 340—26 **3 Claims**



1. A bidirectional sequential flashing light system for use in an airport runway lighting system comprising:

an opto electronic wind direction sensing means generating an output signal indicative of the direction,

bidirectional counting means,

said counting means responsive to said sensor output signal to count in a forward or reverse direction,

flashing airport runway light means including a plurality of runway lights,

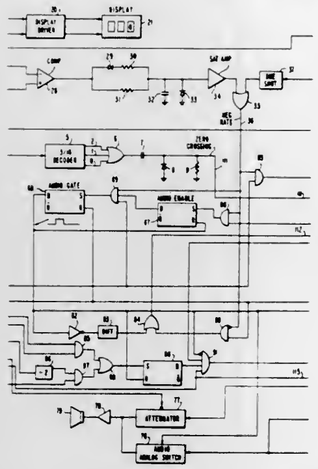
solid state switch activating means responsive to the direction of said bidirectional counting means count,

said light means connected to said switch means whereby the plurality of lights are activated in a sequential order thereby indicating the direction of the wind.

4,093,938
AIRCRAFT ALTITUDE ANNUNCIATOR
Michael A. Argentieri, West Orange, and James Lionetti, Northvale, both of N.J., assignors to Intercontinental Dynamics Corp., Englewood, N.J.
Filed Oct. 18, 1976, Ser. No. 733,180
Int. Cl.² G08G *5/00*
U.S. Cl. 340—27 R **18 Claims**

1. A system for use in an aircraft to announce altitude-related messages, said aircraft having means for generating a signal representative of the aircraft altitude, said system comprising means for storing a plurality of verbal messages, at least some of said messages corresponding to respective aircraft altitudes, means for playing a selected one of said messages, means for selecting one of said messages when the altitude represented by said altitude signal is in a respective range of a first group of ranges, a different range in said first group being associated with each message and all of the ranges being disconnected from each other, means for deriving a negative-rate signal representative of a decreasing altitude, means responsive to the simultaneous derivation of said negative-rate signal and the operation of said message-selecting means for controlling said message-playing means to play the selected message and thereafter for disabling subsequent operation of said message-playing means independent of another operation of said message-selecting means, a second group of ranges all disconnected from each other and all disconnected from the ranges in said first group, the ranges in said first and second groups alternating with each other in the order of increasing altitudes, and means responsive to said altitude signal representing an altitude

in one of the ranges in said second group adjacent the range in said first group in accordance with which the last-played mes-



sage was selected for enabling subsequent operation of said message-playing means.

4,093,939

ACCESSORY FOR A VEHICLE FOR MONITORING ITS OPERATION AND THAT OF ITS DRIVE MEANS

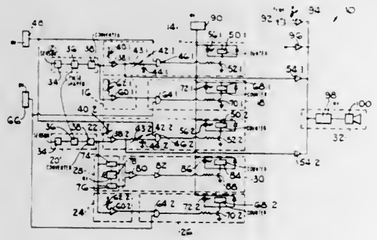
Neville Herbert Mitchell, Johannesburg, South Africa, assignor to Transputer (Proprietary) Limited, Johannesburg, South Africa

Filed Feb. 16, 1977, Ser. No. 769,272

Claims priority, application South Africa, Feb. 18, 1976, 76/0973

Int. Cl.² G08B *19/00*

U.S. Cl. 340—52 F **7 Claims**



1. An accessory for a vehicle having a drive means, the accessory including

a vehicle speed sensing means for sensing the travelling speed of the vehicle and for providing a vehicle speed signal;

a differentiating means for differentiating the vehicle speed signal with respect to time to provide an acceleration signal representative of the linear acceleration of the vehicle;

a vehicle overspeed recording means responsive to the vehicle speed sensing means for recording the amount of time that the vehicle is driven at a speed greater than a predetermined speed;

a vehicle excessive acceleration recording means responsive to the differentiating means for recording the amount of time that the vehicle is accelerated at an acceleration greater than a predetermined value;

a vehicle operating time recording means responsive to the vehicle speed sensing means for recording the amount of time the vehicle is in motion;

a drive means operating speed sensing means for sensing the operating speed of the drive means and for providing a drive means speed signal;

a drive means overspeed recording means responsive to the drive means speed sensing means for recording the amount of time that the drive means is operated at a speed greater than a predetermined speed; and

a drive means operating time recording means responsive to the drive means speed sensing means for recording the amount of time the drive means is in operation.

4,093,940

SYSTEM AND EQUIPMENT FOR QUALITY CHECKING OF A DIGITAL CONNECTION CIRCUIT

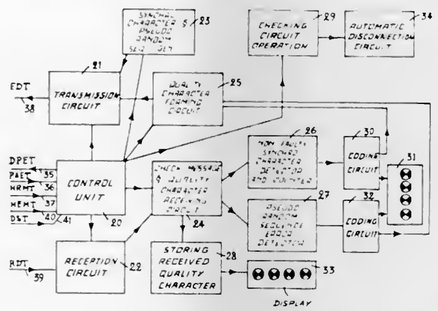
Maurice Maniere, Conflans-Sainte-Honorine, France, assignor to Lignes Telegraphiques et Telephoniques, Paris Cedex, France

Filed Feb. 15, 1977, Ser. No. 768,782

Claims priority, application France, Feb. 27, 1976, 76 05615

Int. Cl.² G08C *25/00*

U.S. Cl. 340—146.1 E **6 Claims**



1. A system for checking the quality of a digital connection circuit comprising:

a first device including transmitting and receiving means connected to the first end of said circuit for respectively transmitting a check message and a quality character sent in a given direction of said circuit under test during transmit cycles assigned to said first device and receiving a check message and a quality character sent in the other direction of said circuit under test during receive cycles assigned to said first device;

a second device identical to the first device including transmitting and receiving means connected to the second end of said circuit for respectively transmitting a check message and a quality character sent in said other direction of said circuit under test during transmit cycles assigned to said second device and coinciding with the receive cycles assigned to the first device and receiving a check message and a quality character sent in the given direction of said circuit under test during receive cycles assigned to said second device and coinciding with the transmit cycles assigned to the first device;

control units respectively connected to the ends of said digital connection circuit including means for periodically switching said first and second devices to thereby reverse transmission and reception;

each of said control units including means for respectively generating, transmitting and receiving a synchronization character having *i* bits repeated *n* times and forming the first part of said check message and further including means for respectively generating, transmitting and receiving a pseudo-random sequence of *p* bits, forming the second part of said check message, each covering one further bit interval immediately following said synchronization character;

store means connected to said control units for storing said received synchronization character, pseudo-random sequence and quality character;

error detector means and coding means connected to said store means, deriving from the errors in said received synchronization characters and pseudo-random sequence a coded result forming the quality character;

display means for displaying the quality character received in each of said device during the receive cycle wherein it is received;

and means for adding said quality character to the check message transmitted by each of said device during the transmit cycle following that wherein it is received.

4,093,941

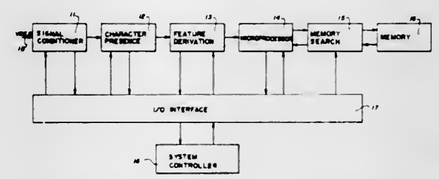
SLOPE FEATURE DETECTION SYSTEM

Larry Wayne Bryan, Arlington; David Paul Himmel, and George William Woster, Jr., both of Dallas, all of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Filed Dec. 9, 1976, Ser. No. 749,200

Int. Cl.² G06K *9/16*

U.S. Cl. 340—146.3 AE **14 Claims**



1. A method of detecting descriptive features of binary images of characters stored in a memory means formed from sensor cell responses generated by a sensor array scanning handprinted and multifont machine printed characters, which comprises:

(a) generating first signals representing the outer boundaries and inner loops of said characters by a vector control means in communication with said memory means;

(b) generating second signals which are vector representations of said boundaries by a trace control means receiving said first signals, each of said representations comprising one of a set of a plurality of equally divergent vectors;

(c) generating a first set of indicia representative of said characters representing averages of selected sets of said second signals by said trace control means;

(d) reducing each character to a one-cell stroke width by said vector control means and generating a second set of indicia representative of reduced ones of said characters from third signals produced by said vector control means tracing the outer boundary of said reduced ones.

4,093,942

MATRIX CIRCUITS

Yasoji Suzuki, Kanagawa; Yoshio Kaneko, Kawasaki, and Yoshihisa Shiotari, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Jun. 4, 1976, Ser. No. 693,121

Claims priority, application Japan, Jun. 5, 1975, 50-67870; Jun. 20, 1975, 50-74375; Jun. 25, 1975, 50-77563

Int. Cl.² H04Q *3/00*

U.S. Cl. 340—166 R **6 Claims**

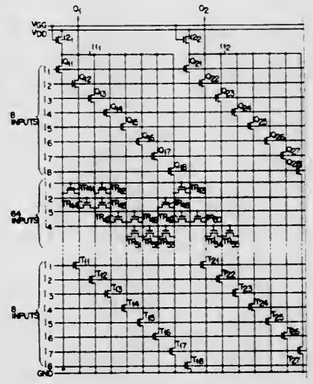
1. A read-only memory matrix circuit comprising:

a first group of input lines, a second group of input lines, a third group of input lines and a plurality of groups of output lines intersecting the input lines of the first, second and third groups to form a matrix array,

the third group of input lines being arranged in the matrix array between the first and second groups of input lines,

each of the plurality of groups of output lines having a common terminal connected to one end of a power source and another common terminal connected to ground,

a plurality of first switching elements, individual ones of the plurality of first switching elements being connected to respective output lines and being selectively driven by first input signals applied to the input lines forming said first group,



a plurality of second switching elements, respective ones of which are driven by the same first input signals applied to the plurality of first switching elements and are connected to the output lines consecutively located next in the matrix array relative to the output lines in which the first switching elements are connected, and

a plurality of third switching elements, individual ones of which form different combinations connected between adjacent output lines and are selectively driven by second input signals applied to the third group of input lines.

4,093,943

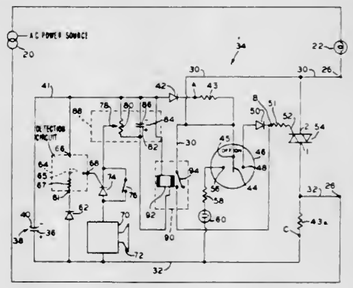
SEQUENTIAL POWER DISTRIBUTION CIRCUIT

Webster B. Knight, 2320 Abbey - No. 6, Fort Wayne, Ind. 46815

Filed Dec. 27, 1976, Ser. No. 754,103

Int. Cl.² G08B *17/10*

U.S. Cl. 340—220 **20 Claims**



1. A power distribution circuit comprising; a power source; a primary load being coupled to and selectively energizable by said source;

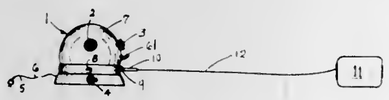
an energy reserve having a predetermined reserve capacity;

first means for coupling said source to said reserve to provide said reserve with a flow of energy with the flow and accumulation of said flow being limited by said capacity when said load is not being energized;

second means for retaining said energy in said reserve when said load is being energized by said source;

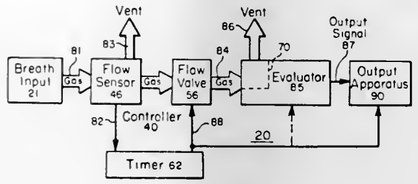
a secondary load being coupled to the energy in said reserve;
third means coupled to said reserve for generating a signal upon the sensing of a predetermined condition;
fourth means coupled to said reserve and secondary load and operable by said signal and said reserve for power coupling said secondary load to said power source upon generation of said signal.

4,093,944
SILENT AWAKENING SYSTEM WITH MEANS ADAPTED TO INDUCE SLEEP
Hrand M. Muncheryan, 1735 N. Morningside St., Orange, Calif. 92667
Filed Feb. 16, 1977, Ser. No. 769,344
Int. Cl.² G04C *23/12*
U.S. Cl. 340—279 **20 Claims**



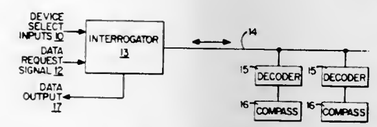
1. A silent awakening system with means adapted to induce sleep in a person, said system comprising: a first means for producing an electrical signal and being energized for quiescent operation thereof from an external source of current, a second means for receiving and directing said electrical signal through an electrical transmission medium to an electrical signal receiving means electrically coupled thereto; said second means having therein a circuit adapted to process said electrical signal into a continuous flow of direct current, and means disposed in said circuit for channeling said direct current into two circuit sections; one of said circuit sections is adapted to conduct said continuous flow of direct current and having therein a control means to vary the current flow therethrough, and the other circuit section having means therein to convert said continuous direct current into recurrent pulsations; electrical means for selecting one of said circuit section at a time and to direct the current from the selected circuit section into a physical aid means in detachable, electrical connection with said electrical means for selecting one of said circuit sections at a time; an electric motive means disposed in said physical aid means and receiving a current from the selected circuit section for producing in said physical aid means a mechanical tremor of varying intensities comprising of two types of actions, one of which being an awakening action produced by said means adapted to convert said continuous direct current into recurrent pulsations, and the other type of action being a sleep-inducing operation produced by said control means by varying the intensity of the current therethrough and thereby the intensity of tremor produced in said physical aid means to suit the user thereof, said two types of mechanical actions occurring independently of each other therein; and, a current outlet means, disposed in the circuit of said second means and connected to receive a current from an external 115-volt source, is provided with a current interrupter in the circuit thereof to produce therein a recurrently interrupted electrical current and to transmit said current to a standard electric lighting means electrically connected to said current interrupter, causing said standard electric lighting means to emit a recurrently flashing light therefrom.

4,093,945
BREATH TESTING SYSTEM
Donald W. Collier, Chicago; Joseph P. Hoppesch, Streamwood, and Anthony C. Mamo, Arlington Heights, all of Ill., assignors to Alcohol Countermeasure Systems, Inc., Sarnia, Canada
Filed Apr. 23, 1971, Ser. No. 136,921
Disclosure was also published under second Trial Voluntary Protest Program on May 29, 1976
Int. Cl. B60k *27/08*; G08b *21/00*
U.S. Cl. 340—279 **34 Claims**



34. A breath alcohol detection system for motor vehicles comprising:
a sensor responsive to exposure to alcoholic vapor in a breath sample for producing a first electrical signal;
input means for communicating breath samples to the sensor;
means responsive to the application of a sample to said input means, for producing a second electrical signal independent of the alcohol content of the sample; and
logic means connected to simultaneously receive the first and second signals for producing an output condition to enable normal vehicle operation only when the combination of the first and second signals indicates a breath sample having less than a predetermined alcoholic content.

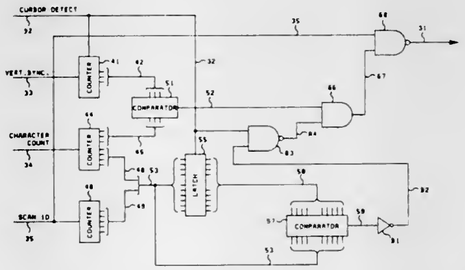
4,093,946
TWO-WIRE, MULTIPLE-TRANSDUCER COMMUNICATIONS SYSTEM
John T. Fowler, Winthrop, Mass., assignor to The Laitram Corporation, Harahan, La.
Filed Mar. 1, 1976, Ser. No. 662,823
Int. Cl.² H04Q *9/00*
U.S. Cl. 340—310 R **10 Claims**



1. A system responsive to data request signals for retrieving data from a selected one of a plurality of data gathering devices remotely located and connected in parallel to a single cable, comprising:
an interrogator responsive to data request signals including:
means for transmitting an address signal along the cable indicative of the particular data gathering device from which data is to be retrieved; and
means for applying a constant signal to the cable after the address signal has been transmitted;
one or more decoders each associated with a corresponding data gathering device and each including:

means for comparing the address signal transmitted along the cable with an identification signal uniquely identifying the decoder to produce an enabling signal upon correspondence thereof for activating the corresponding data gathering device; and
corresponding means responsive to the enabling signal for selectively connecting a low impedance across the cable conductors in response to digital data from the data gathering device;
the digital data from the selected data gathering device being reproduced at the interrogator by detecting the variations in the signal level across the cable produced by the responding means.

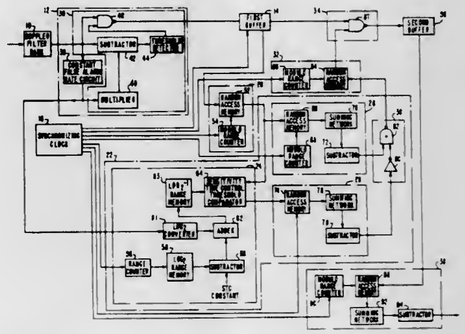
4,093,947
RASTER DISPLAY POSITION DETECTION
Charles C. Habeger, Jr., and Dennis A. Quy, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Filed Dec. 30, 1976, Ser. No. 755,761
Int. Cl.² G06F *3/14*
U.S. Cl. 340—324 AD **29 Claims**



1. In a display system wherein a luminescent display is generated by raster scanning having a plurality of scans in a first direction during each successive scan in a transverse direction which is generally perpendicular to said first direction, said display having at least one row of successive data locations along said first direction of said display, a method for communicating the position of a target data location selected from said data locations, said method comprising:
superimposing over said display a luminescent cursor associated with preselected, periodic, non-successive data locations in each said row of data locations;
shifting each said cursor a preselected number of data locations along each said row thereof during each of a preselected number of preselected scans in said transverse direction to provide display of a cursor associated with each said data location of said display at least once during a preselected cursor cycle;
maintaining a signal message representative of the position of the data location which has most recently had a cursor associated therewith; and
initiating communication of the signal message representative of said target data location in response to the sensing of luminance produced by a cursor associated therewith.

4,093,948
TARGET DETECTION IN A MEDIUM PULSE REPETITION FREQUENCY PULSE DOPPLER RADAR
William H. Long, III, Bowie, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Jun. 8, 1976, Ser. No. 693,988
Int. Cl.² G01S *7/28, 9/02, 9/42*
U.S. Cl. 343—7 A **10 Claims**

1. A pulse doppler radar receiver for detecting the range of a target from received signals which include target returns, a main beam clutter returns, area sidelobe clutter returns and discrete sidelobe clutter returns, said receiver comprising:
means for filtering the main beam clutter returns from said received signals;
means for providing an adaptive threshold signal which varies in response to the amplitude of the area sidelobe clutter returns, said providing means being responsive to said filtering means to remove said area sidelobe clutter returns from said received signals;
means for unfolding the output of said providing means over a predetermined range, said unfolding means being responsive to the output of said providing means to provide an unambiguous range signal;
means for thresholding the unambiguous range signal in response to both the output of said unfolding means and

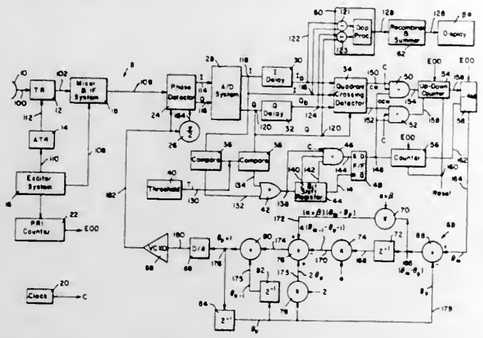


the adaptive threshold signal of said providing means, the threshold being such that the discrete sidelobe clutter returns are rejected over a selected range of said unambiguous range signal;
means for detecting discrete sidelobe clutter returns in the unambiguous range signal of said unfolding means, said detecting means being responsive to said unfolding means and to said thresholding means to provide a blanking signal;
means for blanking the discrete sidelobe clutter returns detected by said detecting means from the output of said providing means, said blanking means being responsive to said detecting means to provide the target returns of the received signals; and
means for determining the range of the target in response to said target returns provided by said blanking means.

4,093,949
CLUTTER TRACKER USING A SMOOTHED DOPPLER FREQUENCY MEASUREMENT
Norol T. Evans, San Pedro, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.
Filed May 26, 1976, Ser. No. 690,330
Int. Cl.² G01S *9/02, 9/42*
U.S. Cl. 343—7 A **13 Claims**

1. A radar clutter tracker system responsive to clutter frequencies, said system having a dual channel delay subsystem, comprising the combination:
a dual channel analog-to-digital converter fed by a pair of quadrature signals;
a first digital circuit electrically connected to the converter;

a second digital circuit electrically connected to the converter; and



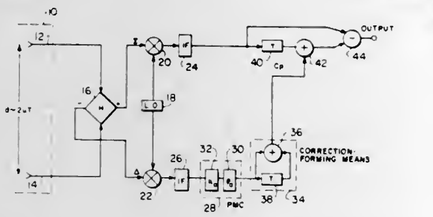
a crossing detector the input of which is electrically connected to the converter and the first and second digital circuits.

4,093,950

MOTION-COMPENSATION ARRANGEMENTS FOR MTI RADARS

Tomos L. ap Rhys, Ellicott City, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 16, 1977, Ser. No. 797,209
Int. Cl.[2] G01S *9/42*
U.S. Cl. 343—7.7 **9 Claims**



1. In radar system of the type wherein search pulses are periodically radiated in a directional beam, a system for compensating backscattered signals for the effects of the radar's motion comprising:

an array antenna for receiving the backscattered signals including first and second sub-arrays for forming similarly-shaped first and second receive beams, the lines of center of said first and second receive beams at the array being separated by a predetermined amount;

first forming means coupled to said first and second sub-arrays for forming sum and difference outputs of the signals received;

first optimization means coupled to receive difference signals corresponding to the difference output of said first forming means for adjusting the difference signals in phase and amplitude;

first correction-forming means receiving the output of said first optimization means as an input, said first correction-forming means delaying its input signal for an interpulse period and adding the delayed input signal to the following input signal to produce a correction signal at its output;

a first delay circuit coupled to receive sum signals corresponding to the sum output of said first forming means as its input, said first delay circuit delaying its input signal for an interpulse period; and

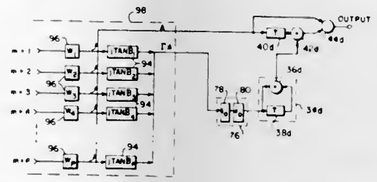
a first addition circuit having a first input coupled to the output of said first correction-forming means and a second input coupled to the output of said first delay circuit, the output of said first addition circuit being a signal which in synchronized in time and phase with the signal in the sum output of said first forming means.

4,093,951

COMPENSATION FOR SIMULTANEOUS PLATFORM MOTION AND ANTENNA SCANNING IN MTI RADARS

Tomos L. ap Rhys, Ellicott City, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 16, 1977, Ser. No. 797,207
Int. Cl.[2] G01S *9/42*
U.S. Cl. 343—7.7 **6 Claims**



1. In a radar system of the type wherein search pulses are periodically radiated in a directional beam, a system for compensating the backscattered signals for the effects of relative motion between the radar and the backscatterer comprising:

an array antenna for receiving the backscattered signals, said antenna including first and second main sub-arrays for forming first and second similarly-shaped receive beams, the distance between the lines of center of said first and second receive beams at the antenna being related to a predetermined linear velocity of the radar and to the interpulse period, the lines of center of said first and second receive beams being parallel, said antenna including first and second auxiliary sub-arrays for forming third and fourth similarly shaped receive beams, the angle between the lines of center of said first receive beam and said third receive beam being related to the angular velocity of the radar and to the interpulse period, the lines of center of said first receive beam and said third receive beam intersecting at the antenna, the angle between the lines of center of said second receive beam and said fourth receive beam being related to the angular velocity of the radar and to the interpulse period, the lines of center of said second receive beam and said fourth receive beam intersecting at the antenna;

first scanning-motion-compensation optimization means coupled to receive the output of said first auxiliary sub-array for adjusting the signals from said sub-array in phase and amplitude;

second scanning-motion-compensation optimization means coupled to receive the output of said second auxiliary sub-array for adjusting the signals from said sub-array in phase and amplitude; and

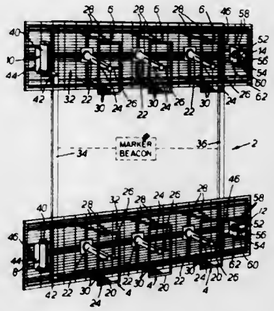
means for generating a delayed compensated signal that is synchronized in time and phase with the sum of the undelayed signals from said first and said second main sub-arrays, said means for generating receiving the outputs of said first main sub-array, said second main sub-array, said first scanning-motion-compensation optimization means, and said second scanning-motion-compensation optimization means as inputs, the output of said means for generating being said delayed, compensated signal.

4,093,952

GUIDANCE SYSTEMS

Frank Howard Taylor, London, England, assignor to Plessey Handel und Investments AG, Zug, Switzerland

Filed Sept. 14, 1976, Ser. No. 723,286
Claims priority, application United Kingdom, Sep. 16, 1975, 37976/75
Int. Cl.[2] G01S *1/10, 1/18*
U.S. Cl. 343—108 R **11 Claims**



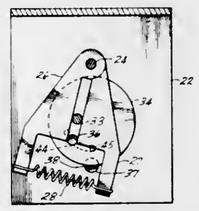
1. A guidance system for aircraft and ships, which system comprises at least two localiser antenna arrangements which are spaced in elevation above a reflecting surface, at least two distance measuring antenna arrangements which are spaced in elevation above the reflecting surface, and at least two glide slope antenna arrangements which are mounted vertically above each other, means for mounting said antenna arrangements on a common support structure such that the localiser antenna arrangements are at a mean height of at least 2½ wavelengths above the reflecting surface and are fed with signals having the same radio frequency but having a phase difference, the distance measuring antenna arrangements are at a mean height of at least 25 wavelengths above the reflecting surface and are fed with signals having the same radio frequency but having a phase difference, and the glide slope antenna arrangements are fed with signals having the same radio frequency but two different frequencies of amplitude modulation to give by reflection from the reflecting surface at least two consecutive glide slopes in the same sense.

4,093,953

CONTROL STICK ASSEMBLY FOR RADIO CONTROL EQUIPMENT

Carl A. Hammons, Vista, and Philip O. Kraft, Oceanside, both of Calif., assignors to Kraft Systems, Inc., Vista, Calif.

Continuation-in-part of Ser. No. 563,380, Mar. 31, 1975. This application Mar. 8, 1976, Ser. No. 664,867
Int. Cl.[2] H04B *7/00*
U.S. Cl. 343—225 **16 Claims**



1. A control stick assembly comprising:

a movable control stick;

first and second movable lever arms;

means for urging the first and second lever arms together;

a normally latched movable member;

a first pin attached to the control stick and disposed between the first and second lever arms, the first pin being movable as the control stick moves to carry the first lever arm away from the second lever arm in opposition to the urging means when the movable member is latched, thereby resisting movement of the control stick;

the normally latched movable member being adapted to track the movement of the first pin when unlatched;

a second pin attached to the normally latched, movable member and disposed between the lever arms, the second pin being movable as the movable member moves when unlatched to permit the urging means to move the second lever arm toward the first lever arm, but being stationary and preventing the urging means for moving the second lever arm toward the first lever arm when the movable member is latched;

means for unlatching the movable member to move the second pin toward the first pin responsive to the urging means; and

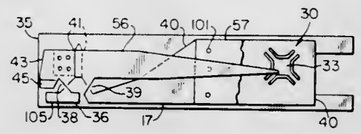
means responsive to the movement of the control stick for producing a signal having a characteristic related to the control stick displacement.

4,093,954

MOTION RECORDER INDICATOR

Richard H. Prewitt, Jr., 439 N. Broadway, Lexington, Ky. 40508, and Richard H. Prewitt, R.R. #3, Lexington, Ky. 40505

Filed Oct. 14, 1975, Ser. No. 622,221
Int. Cl.[2] 33 *147 D*; G01D *9/00, 15/16*; G01B *5/00*; F16F *11/18*
U.S. Cl. 346—7 **16 Claims**



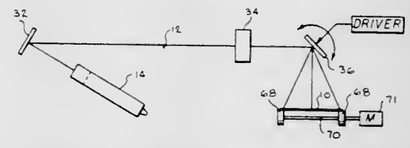
1. An instrument comprising a first and second support means, marking means actuated by movement between said first and second support means, a target for recording the movement between said first and second support means, said target being mounted on said second support means, said marking point engaging said target and attached to a lever comprising a thin flat sheet of material attached to said second support means through a flat flex pivot, said flex pivot formed in said flat sheet by removing material to form a hub and spokes.

4,093,955

WELL-LOGGING CAMERA USING MODULATED LASER LIGHT PATH FOR EXPOSING IN CAMERA PROCESSABLE ELECTROGRAPHIC FILM

Lee Roy Brown, and Thomas M. Davison, both of Houston, Tex., assignors to Sie, Inc., Fort Worth, Tex.

Filed Oct. 8, 1976, Ser. No. 730,743
Int. Cl.[2] G03G *13/06*
U.S. Cl. 354—3 **12 Claims**



1. A camera for producing well logging format with traces on a continuous strip of film in an online capacity from a computer controlled system, comprising:

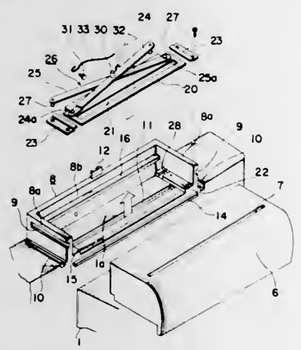
a housing;

a roll of electrophotographic film mounted in the housing;
corona means for charging the film to a controlled level;
a helium neon laser providing a continuous beam of coherent light in the red spectrum;
an acousto-optical modulator producing a modulated light path;
a galvanometer driven oscillating mirror delivering the modulated light to the charged film in the form of a digital image;
developing means presenting the toner to the exposed areas of the film;
edge driving means precisely moving the film through the modulated light path and through the developing means; and
fusing means permanetizing the developed image.

4,093,956
AUTO-PROCESS CAMERA

Toshio Goto, Omiya, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 28, 1977, Ser. No. 782,128
Claims priority, application Japan, Apr. 2, 1976, 51-37911
Int. Cl.² G03B *17/50*
U.S. Cl. 354—86 **4 Claims**

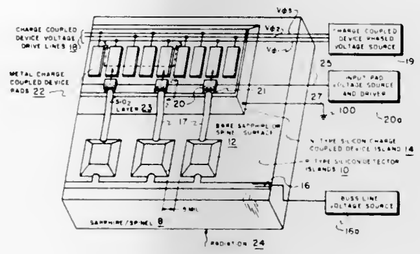


1. In an auto-process camera employing film in the form of individual film units contained in a pack loaded in said camera, forwarding means which subsequent to exposure of each film unit move said film unit separately from said pack via a slit defined in said pack and into engagement with a processing roll unit to cause processing solution to be spread through said film unit to develop a latent image carried by said film unit and simultaneously forward said film unit to the exterior of said camera via an exit slit, the improvement further comprising
a mount portion defining enclosure wall portions and a base portion having defined therein a film unit passage slit which is aligned with said slit defined in said film unit pack;
slidable covering plate means provided in said base portion of said mount portion and movable to a first position in which said plate covers said film unit passage slit and to a second position in which said plate uncovers said slit; and
positioning means connected to said covering plate means and being actuable to move said covering plate to said first position or to said second position.

4,093,957
SOS EXTRINSIC INFRARED DETECTOR AND READ-OUT DEVICE

Gerard J. King, Alexandria, and Joseph F. Martino, Falls Church, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 15, 1976, Ser. No. 705,641
Int. Cl.² H01L *29/78, 27/14*
U.S. Cl. 357—24 **8 Claims**

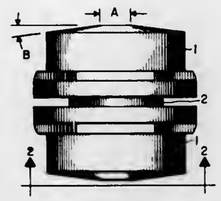


1. An extrinsic silicon infrared detector array and charge-coupled device readout comprising:
a layer of electrical insulator substrate material;
a plurality of extrinsic silicon detectors mounted on the bare surface of one side of said substrate material, wherein said plurality of extrinsic silicon detectors are doped for sensitivity in the infrared wavelength region;
a silicon CCD signal readout structure mounted on the bare surface of said one side of said substrate material in proximity to but isolated from said plurality of extrinsic silicon detectors;
a plurality of input diffusions deposited in said silicon CCD signal readout structure;
a buss line voltage source commonly connected to the input side of all of said plurality of extrinsic silicon detectors;
an insulating layer deposited over all of said silicon CCD signal readout structure except over said plurality of input diffusions;
a plurality of conductive leads electrically connected from an output side of said plurality of extrinsic silicon detectors to said plurality of input diffusions;
a plurality of CCD pads deposited on said insulating layer;
a CCD phased voltage source;
a plurality of CCD voltage drive lines connected between said CCD phased voltage source and said plurality of CCD pads for driving phased voltages across said plurality of CCD pads;
an input CCD pad voltage source and driver; and
a plurality of input structure pads deposited on said insulating layer between said plurality of input diffusions and said plurality of CCD pads, wherein all of said plurality of input structure pads are commonly electrically connected to said input CCD pad voltage source and driver and are intermittently connected to said CCD pads in some selected phasing from each of said plurality of extrinsic silicon detectors wherein said input CCD pad voltage source and driver sequentially switches a voltage on said plurality of input structure pads to readout signals from said plurality of extrinsic silicon detectors caused by infrared radiation coming through said substrate material impinging thereon and injecting said readout signals in the layer of said silicon CCD signal readout structure that is immediately below said intermittently connected CCD pads for signal readout therefrom in some desired mode.

4,093,958
SEMICONDUCTOR DEVICE ASSEMBLY WITH IMPROVED FATIGUE RESISTANCE

Joseph F. Riccio, Jr., Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 9, 1976, Ser. No. 748,791
Int. Cl.² H01L *23/48, 29/44, 29/52*
U.S. Cl. 357—68 **10 Claims**

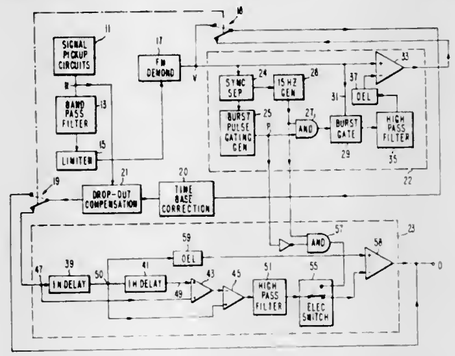


1. An axial-leaded semiconductor assembly comprising conducting studs soldered directly to the major surfaces of a semiconductor chip, each of said studs having a cross-sectional area larger than said major surface and having a tapered extremity away from said surfaces, said assembly being substantially symmetrical about said chip.

4,093,959
CHROMINANCE SIGNAL TRANSCODING APPARATUS

Lee Vern Hedlund, Cinnaminson, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 14, 1977, Ser. No. 777,538
Claims priority, application United Kingdom, Mar. 8, 1977, 11116/77
Int. Cl.² H04N *9/02*
U.S. Cl. 358—4 **7 Claims**

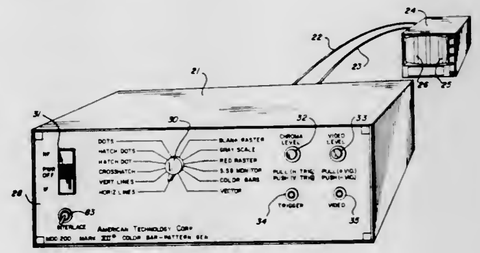


1. Chrominance signal transcoding apparatus, for use with a source of composite video signals representative of successive repetitions of two interlaced image fields constituting a single image frame and comprising a luminance signal component, a chrominance signal component and synchronizing information, including a color burst; said apparatus comprising:
means, responsive to said composite video signal, for identifying the time interval occupied by each image frame;
means, subject to being coupled to the output of said source of composite video signals, for altering the phase of the color burst in response to the output of said time interval identifying means;
circuit means, subject to being coupled to the output of said color burst altering means, including means responsive to the phase of the color burst, for stabilizing the chrominance signal component against spurious frequency variations;
means for effecting signal substitution in response to the detection of a defect in said composite video signal; and
means, subject to being coupled to the output of said circuit means, for altering the phase of the chrominance signal component in response to the output of said time interval identifying means without altering the phase of the color burst.

4,093,960
TEST SIGNAL GENERATING SYSTEM AND METHOD

Earl M. Estes, Canon City, Colo., assignor to American Technology Corporation, Canon City, Colo.

Continuation of Ser. No. 523,775, Nov. 14, 1974, abandoned.
This application Apr. 15, 1976, Ser. No. 677,196
Int. Cl.² H04N *9/62*
U.S. Cl. 358—10 **37 Claims**



16. A test signal generating system for use in servicing color TV receivers, said system comprising:
signal producing means for producing a plurality of output signals of predetermined composition, said plurality of output signals including line-scanning and field-scanning synchronizing signals, said signal producing means including a countdown chain having an input and an output connected with said signal producing means;
combining means for combining said plurality of output signals to produce a composite output signal suitable for producing a predetermined test pattern on a TV receiver connected with said test signal generating system, said test pattern being provided for the purpose of monitoring on the image-producing device of said TV receiver an indication of the magnitude of error in the free-running frequency of the color sync oscillator in said TV receiver, said test pattern being produced by including a suitable chroma signal in the composite output signal during the line-scanning interval, and said chroma signal being suppressed to a lower level by suitable means during the sampling interval when the AFPC circuit in said TV receiver being serviced is enabled; and
an oscillator connected with the input of said countdown chain.

4,093,961
OPTICAL READING APPARATUS WITH SCANNER LIGHT INTENSITY CONTROL

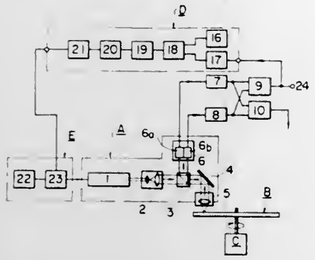
Hitoshi Kanamaru, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 18, 1976, Ser. No. 743,025
Claims priority, application Japan, Nov. 21, 1975, 50-139314
Int. Cl.² H04N *5/84;* **G11B** *7/12*
U.S. Cl. 358—128 **2 Claims**

1. In an optical signal readout apparatus including a source of laser light, a rotary disc record, a photo detector, and an optical scanner for focusing light from the source onto the record and directing light reflected back from the record onto the photo detector, the improvements characterized by:
a. means for extracting the low frequency and d.c. components from the photo detector output signal, said extracted

components being proportional to the average light intensity incident on the photo detector,

b. means for comparing the extracted components with a reference voltage to derive an error signal, and



c. means for regulating the intensity of the source of laser light in response to the error signal, to thereby maintain the light intensity on the photo detector substantially constant.

4,093,962

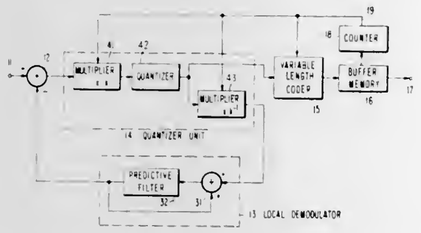
ADAPTIVE PREDICTIVE ENCODER

Tatsuo Ishiguro, and Norio Suzuki, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Dec. 1, 1976, Ser. No. 746,558

Int. Cl.[2] H04N 7/12

U.S. Cl. 358—138 **3 Claims**



1. In a predictive encoder having means responsive to an input signal for producing a predictive error signal, quantizer means responsive to said predictive error signal for producing information codes, means for converting said information codes into variable length codes, a buffer memory for temporarily storing said variable length codes for transmission at a predetermined bit rate, and means operatively coupled to said buffer memory for producing a buffer status signal indicative of buffer occupancy of said buffer memory, wherein the improvement comprises: said quantizer means comprising control means for varying in response to said buffer status signal the amplitude of said predictive error signal relative to quantization levels of said quantizer means.

4,093,963

HORIZONTAL AFC CIRCUIT IN A TELEVISION RECEIVER USABLE WITH A VIDEO SIGNAL RECORDING AND REPRODUCING APPARATUS

Tomoaki Uchida, Iwai, Japan, assignor to Victor Company of Japan Ltd., Yokohama, Japan

Filed Jun. 10, 1976, Ser. No. 694,795

Claims priority, application Japan, Jun. 19, 1975, 50-73781

Int. Cl.[2] H04N 5/04; H03K 5/20; H03F 3/68

U.S. Cl. 358—158 **3 Claims**

1. A horizontal AFC circuit comprising:

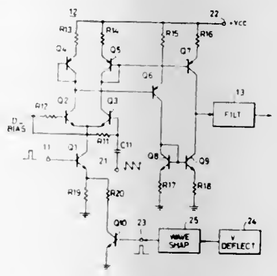
phase detector means supplied with a horizontal synchronizing signal separated from a television video signal and with a comparison signal and carrying out phase comparison, said phase detector means having a transistor supplied at the base thereof with the horizontal synchronizing signal;

filter means for filtering the output of said phase detector means;

horizontal oscillator means supplied with the output of said filter means for oscillating with an oscillation frequency controlled thereby;

horizontal deflection means for forming the output signal of said oscillator means into a horizontal deflection pulse;

wave shaping circuit means responsive to the output pulse of said horizontal deflection means for wave-shaping said output pulse and for supplying the resulting output signal



thereof as said comparison signal to said phase detector means;

means for supplying a control pulse having a pulse width corresponding to a vertical blanking period of the television video signal; and

loop gain control means connected to the emitter of said transistor of said phase detector means in a manner to vary the emitter resistance in accordance with said control pulse, the collector current of said transistor being varied by the resulting variation of the emitter resistance thereof, whereby a DC loop gain and an AC loop gain of the horizontal AFC circuit are simultaneously controlled to be relatively large during occurrence of said control pulse and to be relatively small in a period other than the occurrence of said control pulse.

4,093,964

IMAGE REPRODUCING SYSTEMS

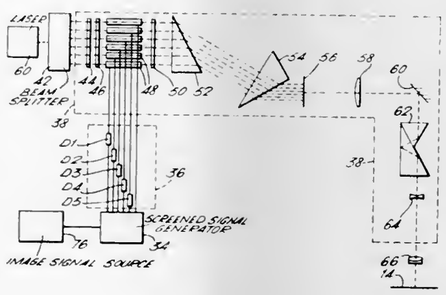
John E. Aughton, London, England, assignor to Crosfield Electronics Limited, London, England

Filed Mar. 1, 1977, Ser. No. 773,211

Claims priority, application United Kingdom, Mar. 3, 1976, 8519/76

Int. Cl.[2] H04N 1/46

U.S. Cl. 358—302 **4 Claims**



1. A half-tone image recording system comprising: means for generating a number of separate parallel beams of radiation which, in cross section, form a line of spaced beams; a support for a recording surface to be treated by exposure to the beams of radiation; means producing relative movement of the recording surface on the one hand and the beams on the other hand, whereby the recording surface is scanned by the beams; modulating means for individually modulating the beams incident at points on the recording surface as required by the image to be reproduced and by the screen density variations required to produce a half-tone image, the modulation being such that some or all of the modulated beams contribute towards the recording of a single half-tone dot; and an optical system for guiding the modulated beams to the recording surface, the optical system including anamorphic means for compressing the line of beams in the direction of the line.

4,093,965

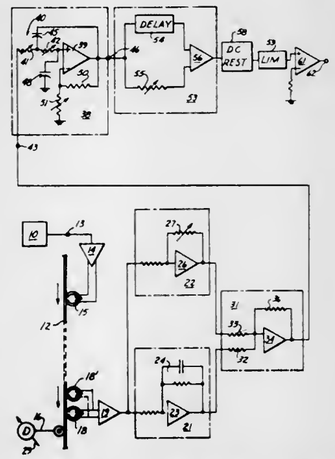
SPEED-SWITCHABLE READBACK SIGNAL EQUALIZATION AND DIRECT-CURRENT RESTORATION

David B. Gish, Upland, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Aug. 16, 1976, Ser. No. 714,926

Int. Cl.[2] G11B 5/45

U.S. Cl. 360—65 **15 Claims**



1. In apparatus for recovering signals read back from a recording medium at different relative recording medium speeds, the improvement comprising in combination:

speed-switchable means for equalizing readback signals over frequency bands having different peak-to-bandedge roll-off regions for different relative recording medium speeds; and

high-frequency equalization means in said speed-switchable means for equalizing readback signals in said peak-to-bandedge roll-off regions, including active low-pass filter means for providing speed-switchable frequency peaking characteristics and speed-switchable cut-off frequency characteristics and for shifting said frequency peaking characteristics and cut-off frequency characteristics in company with each other to said different peak-to-bandedge roll-off regions for different relative recording medium speeds;

said active low-pass filter means including operational amplifier means having input means and output means, a speed-switchable RC network connected to said input and output means, and series-connected first and speed-switchable second resistor means, said first resistor means being connected between said input and output means, and said second resistor means being connected between said input means and a reference potential, with the ratio of the resistance, R_1, of said first resistor means to the resistance, R_2, of said second resistor means being such that R_1/R_2 plus one is at least two; and

said speed-switchable means including means for switching said speed-switchable RC network and second resistor means.

4,093,966

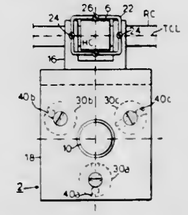
ADJUSTABLE HOLDER PARTICULARLY USEFUL FOR MOUNTING MAGNETIC HEADS

Dennis G. Hall, Wallington, England, assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 29, 1977, Ser. No. 792,380

Int. Cl.[2] G11B 5/56

U.S. Cl. 360—109 **11 Claims**



1. An adjustable holder for a device permitting its adjustment for centering and skew with respect to a reference line, comprising: a supporting member for supporting the device; a mounting member; attaching means attaching the supporting member to the mounting member while permitting relative displacement therebetween; both said supporting member and said mounting member including first, second, and third mutually-engaging coupling elements having axes located to define the corners of a triangle having at least two equal sides, and a centerline passing through the axis of the first coupling element and mid-way between the axes of the second and third coupling elements; the two triangles defined by the coupling element axes of said supporting member and said mounting member being similar, non-congruent triangles having common center-lines; the coupling elements of one member being fixed and the coupling elements of the other member being rotatable about their respective axes and engaging the fixed coupling elements to effect a relative displacement between said supporting member and said mounting member; said rotatable coupling elements having means constraining the relative displacement of the engaging fixed coupling elements to rectilinear paths, with the displacement path of the first coupling elements being substantially parallel to the common center-line of the two triangles, and the displacement paths of the second and third coupling elements being at substantially equal angles to said common center-lines; said second and third mutually-engaging coupling elements being positioned between said first mutually-engaging coupling element and the device to be adjusted; whereby rotating the first rotatable coupling element effects skew adjustment of the device with respect to the reference line, and rotating the second and third rotatable coupling elements in equal and opposite directions effects centering adjustment of the device with respect to the reference line.

4,093,967

MAGNETIC TAPE CASSETTE

Takateru Satou, and Haruo Shiba, both of Saku, Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan

Filed May 17, 1976, Ser. No. 686,825

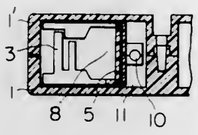
Claims priority, application Japan, May 16, 1975, 50-65512[U]

Int. Cl.[2] G11B 23/08, 15/60

U.S. Cl. 360—132 **4 Claims**

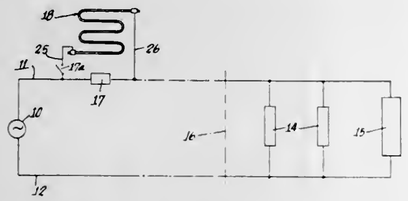
1. In a cassette carrying a record medium, a unitary pressure pad assembly for placing said record medium into sliding

contact with a magnetic head, said unitary pressure pad assembly including pin means for positioning the record medium and pressure pad means for urging the record medium against said magnetic head, the improvement wherein said cassette includes



support means for retaining said unitary pressure pad assembly in place while allowing pivotal movement about an axis parallel to the longitudinal direction of movement of the record medium.

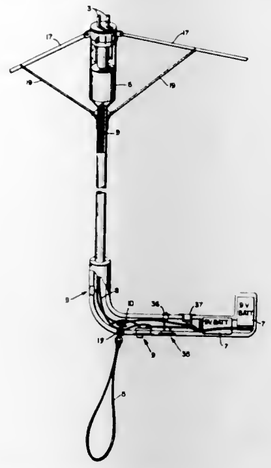
4,093,968
RESISTORS WITH HEAT SINK
Robert D. Shirey, Pittsburgh, Pa., assignor to Emerson Electric Co., St. Louis, Mo.
Filed Nov. 22, 1976, Ser. No. 744,190
Int. Cl.² H02H 7/22
U.S. Cl. 361—58 **9 Claims**



1. A current limiter, comprising:
a continuous length of tubing, formed of a metal which is resistive to the flow of electrical current therethrough, opposite ends of said tubing being adapted for electrical connection in a line of an electrical system for limiting current flow therein,
and non-conducting material of high specific heat in heat transfer relationship with the interior surface of said tubing,
said material being adapted to absorb heat generated by the resistance to current flow in said tubing.

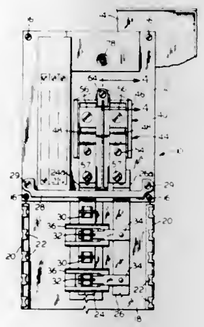
4,093,969
ELECTRIC UMBRELLA
Morris Maynor, Jr., P.O. Box 368, Atlanta, Tex. 75551
Filed Oct. 28, 1976, Ser. No. 736,347
Int. Cl.² H05C 1/06
U.S. Cl. 361—232 **11 Claims**

1. In a conventional umbrella to be used as a high powered electric shocking device, including a handle, a stem, a plurality of staves or ribs, a source of electric power, a voltage amplifier, a switch and spaced contact shocking elements incorporated therein; said handle is attached to one end of said stem while said plurality of ribs are commonly connected to the other end of said stem, said spaced contact shocking elements are attached to said other end of said stem and alternate ribs of said plurality of ribs are electrically connected to said shocking elements; in addition, said source of power and said voltage amplifier are placed within the confines of said handle and are connected to each other; said switch is also placed in said



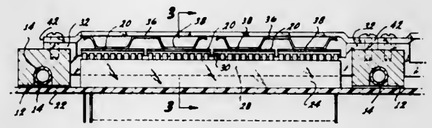
handle and is adapted to connect said power source and said shocking elements when correctly activated.

4,093,970
MAIN LUG ASSEMBLY FOR CIRCUIT BREAKER LOAD CENTERS
Andre J. M'Sadoques, Wolcott, and Robert J. Sabatella, Southington, both of Conn., assignors to General Electric Company, New York, N.Y.
Filed Dec. 27, 1976, Ser. No. 754,553
Int. Cl.² H02B 1/04
U.S. Cl. 361—361 **2 Claims**



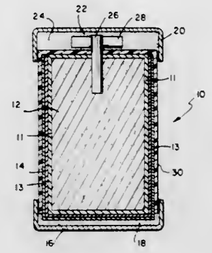
1. A load center comprising, in combination:
A. an enclosure;
B. a pair of spaced, side-by-side, elongated busbars disposed within said enclosure;
C. a series of stab connectors affixed to said busbars at locations distributed along the lengths thereof, said stab connectors individually adapted to accept plug-on electrical connection with a branch circuit breaker;
D. an insulator secured to said enclosure and having openings through which said busbars extend to present therebeyond busbar terminal end portions;
E. a main lug assembly including
1. an insulative mounting block secured to said enclosure,
2. means forming a pair of recesses in said block,
3. a separate conductive strap accommodated in each said recess and affixed to said block,
4. a wire lug affixed to one end portion of each said strap; and
5. means notching said mounting block to expose the other end portion of each said strap as a terminal end portion disposed in lapped relation with an associated one of said busbar terminal end portions, and
6. an insulative barrier wall upstanding from said mounting block intermediate said recesses and extending coextensively with said straps as accommodated therein, said barrier wall rising to a level well above said straps and said wire lugs; and
F. means formed in said terminal end portions of lapped busbars and straps for accepting threaded fasteneres pursuant to perfecting bolted joints therebetween.

4,093,971
D-I-P ON ISLAND
Bing-Lun Chu; Wunnava Venkata Subbarao, both of Piscataway, N.J.; Jack Peale, Scarsdale, N.Y.; Kent McCune, Belle Mead, and Marvin Elroy Steiner, East Brunswick, both of N.J., assignors to Burroughs Corporation, Detroit, Mich.
Filed Dec. 10, 1976, Ser. No. 748,837
Int. Cl.² H05K 7/20
U.S. Cl. 361—382 **6 Claims**



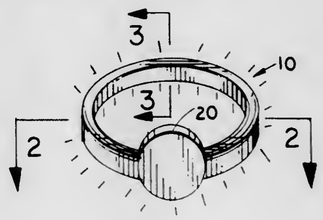
1. A packaging system for electronic equipment comprising at least one island, including:
a plurality of integrated circuit packages of the dual-in-line type,
connector means mounting said packages,
an interconnection medium having electrical conductors thereon,
each of the connector means having a plurality of electrical contacts and operatively connected in a predetermined relationship to said interconnection medium and providing respective electrical paths between said integrated circuit packages and said interconnection medium conductors,
a cooling frame fastened to said interconnection medium configured such that a plurality of sections of thermally conductive material are situated in parallel, spaced apart relationship across the surface of said interconnection medium and containing fluid conduit means for carrying cooling fluid therethrough,
each of said connector means and packages being located in the space between an adjacent pair of said cooling frame sections, but out of engagement with said frame sections,
a cold bar disposed transversely of said frame sections and below the top of said frame sections with means on said bar attached to the top of said frame sections so that said means engages said frame sections in thermal conductive relationship, and
clamping means urging said packages into thermal contact with said cold bar whereby heat generated by said packages is transferred to said cold bar and to the ends of said bar for transfer to said frame sections.

4,093,972
ANODE TERMINATION MEANS FOR AN ELECTRICAL DEVICE COMPONENT
Gerald A. Voyles, Indianapolis, Ind., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.
Continuation of Ser. No. 639,371, Dec. 10, 1975, abandoned.
This application May 5, 1977, Ser. No. 794,299
Int. Cl.² H01G 9/00; H01L 23/28
U.S. Cl. 361—433 **11 Claims**



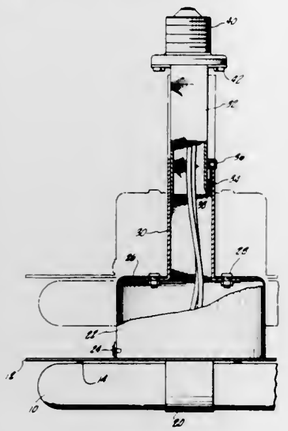
1. A chip type capacitor comprising at least two sides of opposite polarities and a termination means wherein the termination means includes a riser means in electrical contact with at least one of the sides, an elongated metal containing member joined to the riser means, and a metal containing end cap over the riser means having electrically conductive adhesive material therebetween whereby the metal containing end cap is electrically and mechanically coupled to the elongated metal containing member.

4,093,973
ILLUMINATED COSTUME JEWELRY
Ronald Vaagenes, 43429 Proctor Rd., Canton, Mich. 48188
Filed Jun. 22, 1976, Ser. No. 698,290
Int. Cl.² F21L 15/08
U.S. Cl. 362—104 **8 Claims**



1. Costume jewelry comprising:
(a) a transparent body;
(b) means within said body for imparting color thereto at least when illuminated;
(c) illuminating means within said body for causing said body to glow with the desired color;
(d) a battery mounted within said body for energizing said illuminating means;
(e) switching means coupled to said battery and illuminating means; and
(f) wherein said transparent body has a hollow core and said core containing said color imparting means.

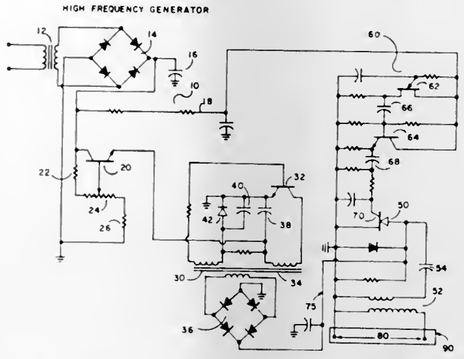
4,093,974
FLORESCENT LIGHT FIXTURE
Kenneth A. Wheeler, 6301 Glade, #315, Woodland Hills, Calif. 91364
Filed Oct. 1, 1976, Ser. No. 728,783
Int. Cl.² H05B 33/02
U.S. Cl. 362—216 4 Claims



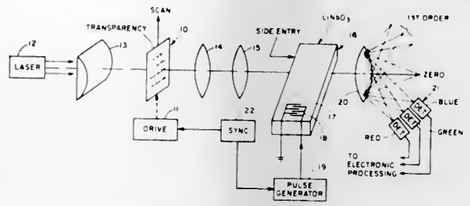
1. A florescent light fixture for installation in a mounting for incandescent bulbs, comprising
- a plug of capable of mating with a standard light socket for incandescent bulbs;
- a transformer box;
- a backing plate including a coupling for a florescent light, said backing plate being mounted to said transformer box; and
- an extensible member including a first shaft and a second shaft, one of said shafts extending into the other of said shafts and being resistively extensible in an axial direction with respect thereto, said plug being mounted at a first end of said extensible member to one end of first shaft and said transformer box being mounted at a second end of said extensible member to one end of said second shaft, said first shaft being rigidly constrained from rotation relative to said second shaft.

4,093,975
HIGH-VOLTAGE APPARATUS FOR SKIN THERAPY
Wallace A. Roberts, 88 N. Main St., Bellingham, Mass. 02019
Filed Jan. 5, 1977, Ser. No. 757,041
Int. Cl.² H02M 5/44
U.S. Cl. 363—27 1 Claim

1. An improved high voltage apparatus for skin therapy comprising:
- a low voltage DC power source having fixed and variable voltage outputs;
- a DC-to-DC converter, having (i) a converter oscillator powered by the variable voltage output of the DC power source, (ii) a converter step-up transformer, the primary winding(s) of which are fed by the oscillator, (iii) a rectifier circuit connected to the secondary winding of the converter step-up transformer, and (iv) a filter capacitor in shunt across the rectifier output;
- an output transformer;
- a second capacitor, connected in series with the output from the DC-to-DC converter and the primary winding of the output transformer;
- a silicon-controlled rectifier, the anode and cathode of which are connected so as to cause discharge of the second capacitor across the primary winding of the output transformer whenever the silicon-controlled rectifier is triggered into conduction by a suitable pulse between its gate and source;
- a second oscillator, powered by the fixed output of the DC power source;
- an emitter-follower amplifier, also powered by the fixed output of the DC power source, the input of which amplifier is connected to the second oscillator and the output of which is connected to the gate of the silicon-controlled rectifier, so as to trigger the rectifier once per cycle of output of the second oscillator; and
- a skin therapy electrode connected to the secondary winding of the output transformer.

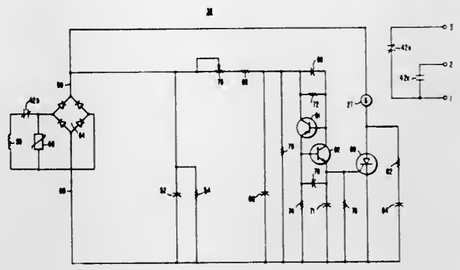


4,093,976
ACOUSTO-OPTIC IMAGE SCANNER
Pankaj K. Das, Cohoes, N.Y., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Aug. 26, 1976, Ser. No. 717,974
Int. Cl.² H04N 9/10, 3/10; G02F 1/11; H04N 5/30
U.S. Cl. 358—53 10 Claims



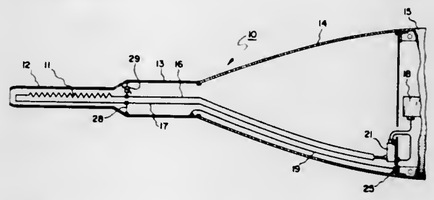
1. A 1-D acousto-optic colored image scanner, comprising in combination
- a piezoelectric crystal;
- means for launching pulses of acoustic surface waves along a planar boundary surface of said crystal;
- means for forming a colored image of the light distribution pattern which is to be scanned within said crystal, the light beam producing said colored image propagating within said crystal in a plane which is parallel and adjacent to said planar boundary surface such that said light beam and said pulses of acoustic surface wave interact with said pulses behaving as a traveling phase grating to diffract said light beam;
- means for Fourier transforming the diffracted light emerging from said piezoelectric crystal; and
- means for detecting the light appearing at the first-order diffracted image locations.

4,093,977
GROUND FAULT PROTECTIVE DEVICE
John T. Wilson, Brighton Township, Beaver County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Jun. 15, 1976, Ser. No. 696,326
Int. Cl.² H02H 3/28
U.S. Cl. 361—44 4 Claims



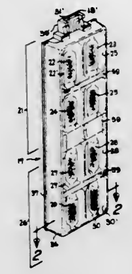
1. A self-powered ground fault protective device, comprising:
- a current transformer secondary coil;
- a latching relay comprising main contacts adapted to control an associated interrupting device;
- amplifying means connected to said coil for triggering said relay;
- rectifier means connected to said secondary coil for powering said amplifying means and said relay; and
- a housing supporting and enclosing said coil, said triggering means, and said relay;
- said relay comprising auxiliary contacts connected in series with said secondary coil and said rectifier means.

4,093,978
METHOD AND APPARATUS FOR PROTECTING ELECTRICAL SYSTEMS FROM LIGHTNING STRIKE EFFECTS
John A. Plumer, Jr., Dalton, Mass., assignor to General Electric Company, Schenectady, N.Y.
Continuation-in-part of Ser. No. 554,127, Feb. 28, 1975, abandoned. This application Dec. 24, 1975, Ser. No. 644,340
Int. Cl.² H05F 3/00
U.S. Cl. 361—118 15 Claims



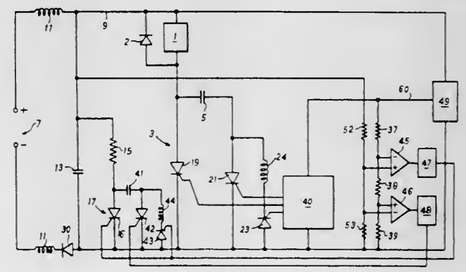
5. A lightning protection device adapted to be connected to an electrical system, said device comprising:
- first and second parallel wound, magnetically coupled inductors, each of said inductors having first and second terminals, said first terminals being the input terminals of said protection device;
- a third inductor having first and second terminals, said first terminal of said third inductor connected to said second terminal of said first inductor, said second terminals of said second and third inductors being the output terminals of said device; and
- a voltage limiting element connected to said first terminal of said third inductor and the second terminal of said second inductor, whereby a voltage or current surge applied to the input terminals of said protective device is reduced substantially at the output terminals.

4,093,979
MULTIPLE FLASH ARRAY
Norman E. Kewley, Pepper Pike, and Andrew Smetana, Mentor, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.
Filed Aug. 4, 1976, Ser. No. 711,615
Int. Cl.² G03B 15/02
U.S. Cl. 362—5 13 Claims



1. A flash lamp unit comprising first and second connector terminals for receiving lamp-firing electrical signals and arranged so that said first terminal is more readily touched than said second terminal when the array is handled by a person, said unit further comprising a flash lamp, an electrically conductive reflector positioned behind said lamp, first and second circuit conductors positioned behind said reflector, means connecting said first circuit conductor to said first connector terminals, and a radiation-actuated switch positioned behind said reflector and bridging across said circuit conductors, said reflector being provided with an opening in front of said radiation-actuated switch, the rear edge of said opening being contoured so as to bring said conductive reflector sufficiently near to only said first circuit conductor for causing electrostatic charges to pass between said first circuit conductor and said conductive reflector.

4,093,980
D.C. ELECTRICAL CIRCUIT MEANS
David Gurwicz, Gateshead, England, assignor to Sevcon Limited, Gateshead, England
Filed Apr. 4, 1977, Ser. No. 784,123
Claims priority, application United Kingdom, Apr. 8, 1976, 14212/76
Int. Cl.² H02M 1/14
U.S. Cl. 363—57 8 Claims



1. In electrical circuit means comprising a load, an SCR pulse controller connected in series with the load and including a commutation capacitor, a transmission line connected to the series path of the load and pulse controller to supply the load with energy from a D.C. source which during interpulse periods effects charging of the commutating capacitor, and a reservoir capacitor shunting the transmission line to limit the voltage to which the commutating capacitor is charged from

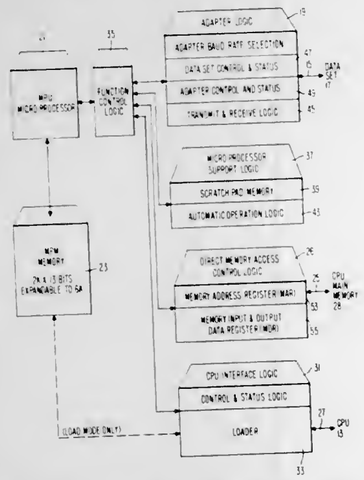
the D.C. source owing to inductance of the transmission line during interpulse periods, the improvement comprising control means for repeatedly discharging the reservoir capacitor during each interpulse period so as to limit the voltage to which during said interpulse periods the reservoir capacitor charges above the voltage of the source.

4,093,981

DATA COMMUNICATIONS PREPROCESSOR

John P. McAllister, Wayne, Pa.; Franklin Theodore Schroeder, Goleta, Calif., and Charles Terrance Stimson, West Chester, Pa., assignors to Burroughs Corporation, Detroit, Mich.

Filed Jan. 28, 1976, Ser. No. 653,087
Int. Cl.² G06F *13/00, 3/00*
U.S. Cl. 364—200 **2 Claims**



1. A data communications preprocessor for processing detailed line procedures between a central processing unit with a main memory and a plurality of data communications lines, each line therein connected to an individually associated data set, said data communications preprocessor comprising:

a plurality of line adapter means, each line adapter thereof individually associated with a data communications line in said plurality of data communications lines for facilitating the data communications therewith;

serial byte microprocessing means for controlling the processing of detailed data communications line procedures on an individual data communication line basis, said serial byte microprocessing means connected between said central processing unit and said plurality of line adapter means, said serial byte microprocessing means including a serial byte microprocessor, a micromemory means for storing control data bytes and a scratch pad memory for storing data communications parameter information relating to each data communications line in said plurality of data communications lines;

direct memory access means for permitting direct transfer of at least one byte of data between said main memory and said micromemory under the control of said serial byte microprocessor; and

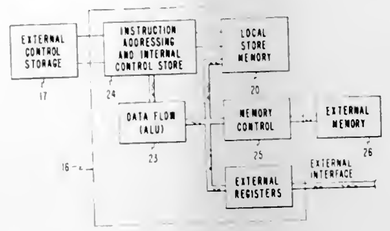
automatic operation means bypassing said serial byte microprocessor and utilizing said direct memory access means for automatically transferring through said direct memory access means at least one byte of data in parallel between said scratch pad memory and said main memory.

4,093,982

MICROPROCESSOR SYSTEM

Dale Arthur Heuer, Stewartville; Phillip Christian Schloss, and Larry Lloyd Schroeder, both of Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 3, 1976, Ser. No. 682,803
Int. Cl.² G06F *13/00*
U.S. Cl. 364—200 **13 Claims**



1. A data processing system including a processor on a single semiconductor chip wherein said processor comprises

a central processing unit;

on-chip control storage;

a plurality of input-output registers;

local scratch pad memory;

memory addressing means for addressing off-chip data store memory;

control storage addressing means; and data path means connecting said central processing unit with said control storage addressing means, said local scratch pad memory and said plurality of input-output registers;

said processing system further comprising an external data store memory connected to at least one of said input-output registers and said memory addressing means and;

supplemental off-chip control storage addressable by said control storage addressing means.

4,093,983

FAST AND NORMAL RATE INSTRUCTION FETCHING

Charles Raymond Masog; Jerome Urban Petrie, both of Rochester, Minn., and Yasutsugu Mishima, Pickering, Canada, assignors to International Business Machines Corporation, Armonk, N.Y.

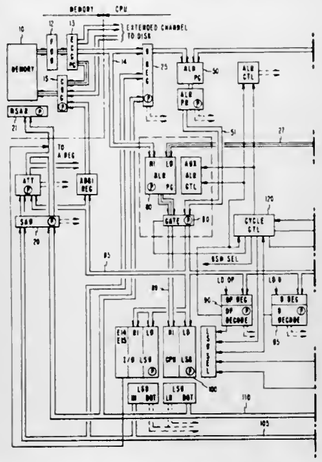
Filed Jun. 15, 1976, Ser. No. 696,446
Int. Cl.² G06F *9/06*
U.S. Cl. 364—200 **11 Claims**

1. In a computer system having fixed length machine cycles and where instructions consisting of a plurality of segments are fetched from storage in a timed relationship to said fixed length machine cycles by fetching segments of an instruction successively to completely fetch an instruction, said instruction including first and second predetermined types of instructions, the improvement comprising:

means for fetching a first segment of an instruction during a first portion of said fixed length machine cycle to enable determination of the type of instruction being fetched,

instruction analyzing means for analyzing said first segment and generating one type of signal when the type of instruction being fetched is analyzed as being said first predetermined type of instruction and generating another type of signal when the type of instruction being fetched is analyzed as being said second predetermined type of instruction, and

means responsive to said instruction analyzing means generating said one type of signal for fetching at least another segment of said instruction during the same fixed length machine cycle that was used for fetching said first segment.

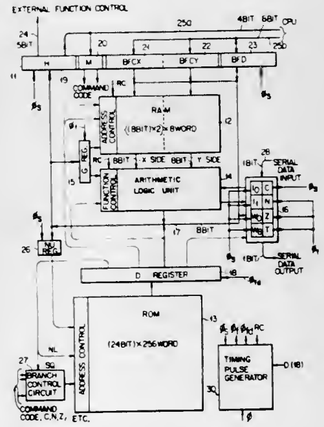


4,093,984

DATA PROCESSING SYSTEM HAVING A CYCLE CONTROL FUNCTION

Masahiko Ono, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sep. 30, 1976, Ser. No. 728,204
Claims priority, application Japan, Sep. 30, 1975, 50-117906
Int. Cl.² G06F *1/04*
U.S. Cl. 364—200 **3 Claims**



1. A data procesing system for processing data arithmetically and transferring the processed data between an input-/output unit and a central processing unit, the data processing system having a cycle control function and comprising:

a register file consisting of registers each to be addressed and being adapted to store transfer data and the results of an arithmetic logic operation;

an arithmetic logic unit for arithmetically processing particular data read out from the register file;

memory means for storing instruction words;

instruction register means for storing an instruction word read out from the memory means during each machine cycle to designate an arithmetic logic operation to be carried out by the arithmetic logic unit;

at least one functional register addressed in the registr file and connected to the instruction register means to designate an arithmetic logic operation to be carried out by the arithmetic logic unit; and

signal generating means for generating a pulse representing the timing at which data are to be stored in each register addressed in the register file and a signal representing one of at least two partial cycles forming the machine cycle,

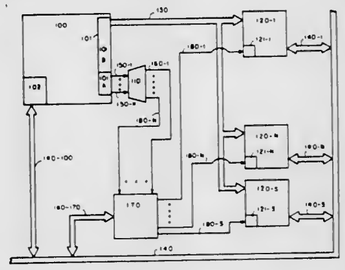
whereby during one partial cycle an arithmetic logic operation is carried out based on the contents of the functional register means in response to a signal which represents the partial cycle and during the other partial cycle an arithmetic logic operation is carried out based on instruction register means in response to a signal which represents the other partial cycle.

4,093,985

MEMORY SPARING ARRANGEMENT

Santanu Das, Stamford, Conn., assignor to North Electric Company, Galion, Ohio

Filed Nov. 5, 1976, Ser. No. 739,356
Int. Cl.² G06F *11/00, 13/00*
U.S. Cl. 364—200 **4 Claims**



3. A digital processor system comprising;

memory means including an integral number, N, of on-line memory modules and one spare memory module, each of the N+1 modules having module enabling means and a plurality of individually addressable words,

a central processor unit (CPU), an address bus and a data bus, both interconnecting the CPU with each of the N+1 modules,

a decoder having a plurality of inputs coupled to the CPU, and N outputs, the decoder being operative to convert binary coded information presented to the decoder inputs to a 1-of-N code at the decoder outputs, and

substitution control means having a first plurality of N inputs respectively coupled to the N decoder outputs, a second plurality of inputs coupled to the CPU, and N+1 outputs respectively coupled to corresponding module enabling means of the N+1 memory modules,

the CPU including means for generating and coupling to the decoder inputs a first portion of a binary coded memory word address designating a particular memory module, means for generating and coupling to the address bus a second portion of a binary coded memory word address designating a particular memory word within a module, means for receiving from the data bus contents of a memory word specified by generated first and second address portions, error control means operative, in conjunction with said means for receiving, to detect any malfunctioning memory module and to generate data identifying a malfunctioning module for presentation to the second plurality of substitution control means inputs,

the substitution control means operative as connected to alter the 1-of-N code appearing at the decoder outputs to indicate instead the selection of the spare module when-

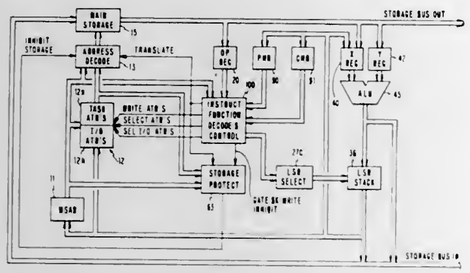
ever the 1-of-N code designates a malfunctioning on-line module previously identified at the second plurality of substitution control means inputs by the error control means of the CPU.

4,093,986

ADDRESS TRANSLATION WITH STORAGE PROTECTION

Ronald Eugene Bodner; Thomas Lee Crooks, and Richard Craig Kiscaden, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,392
Int. Cl.[2] G06F *13/00, 9/20*
U.S. Cl. 364—200 **12 Claims**



1. In a computer system including an addressable selectively operable storage, a central processing unit and I/O devices the improvement comprising

an addressable register,

a source of storage addresses for addressing storage and a special address distinguishable from said storage addresses for storage protection,

means for selectively loading said addressable register with a storage address from said source of storage addresses when said loaded storage address is to address an unprotected storage location or with said special address for storage protection,

means for generating an address translate control signal,

addressing means for addressing said storage and for selectively addressing said addressable register,

means selectively connectable under control of said address translate control signal to said addressable register for passing a storage address to said storage when said addressable register upon being addressed contains a storage address,

means selectively connectable to said addressable register under control of said address translate control signal for generating a storage inhibit signal when said addressable register upon being addressed by said addressing means contains said special address instead of a storage address, and

means for applying said storage inhibit signal to said storage.

4,093,987

HARDWARE CONTROL STORAGE AREA PROTECTION METHOD AND MEANS

Charles Henry Gaudette, Yorktown Heights, and Raymond Charles Williams, Staatsburg, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

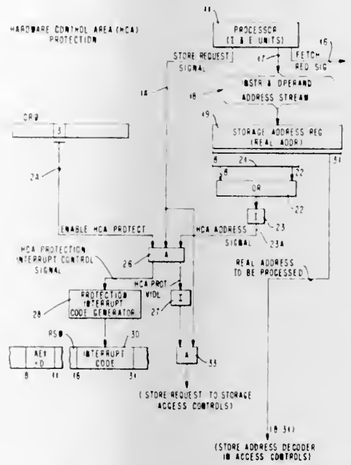
Filed Mar. 24, 1977, Ser. No. 780,937
Int. Cl.[2] G06F *13/00, 9/18*
U.S. Cl. 364—200 **9 Claims**

1. A system for protecting a hardware control area (HCA) in main storage from being erroneously changed by execution of programs in other storage areas assigned to the same protection key as the HCA, in which the programs are segregated into segment windows permitted to store into the HCA, and all program segments outside the windows being prohibited from storing into the HCA, the system comprising

a HCA protection field in a system control register, the field being set to an on state to output a HCA protect state signal which prevents store accesses into the HCA,

means for providing an address stream for the main storage,

detecting means receiving the address stream to detect real addresses for accessing the HCA and generating a HCA access control signal for each detected HCA address,



means for generating a store modify signal for each address making a store access request to the main storage,

first logic circuitry having inputs including: the HCA protect state signal, the HCA access control signal, and the store modify signal; an output of the first logic circuitry providing a HCA protection interrupt control signal when all the inputs are on, and

means for connecting the HCA protection interrupt control signal to processor interrupt circuits to interrupt a current program providing a HCA address responsible for generating a HCA protection interrupt control signal.

4,093,988

HIGH SPEED FREQUENCY RESPONSE MEASUREMENT

Paul F. Scott, Niskayuna, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 8, 1976, Ser. No. 739,628
Int. Cl.[2] G06F *15/34*
U.S. Cl. 364—484 **6 Claims**

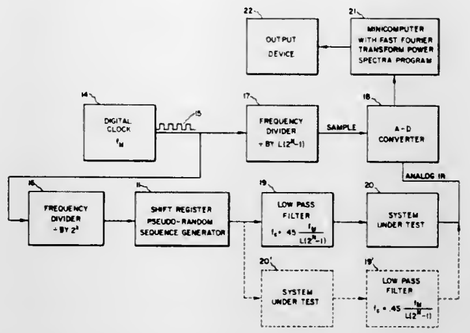
1. A method for high speed frequency response measurement by generating digital data samples from which the power spectra of an output test signal is computed by a Fast Fourier Transform technique, comprising the steps of

deriving a binary sequence generator bit shift signal having a first frequency and also a sampling actuating signal having a second frequency, said first and second frequencies being selected to synchronize and achieve a predetermined ratio between the sequence bit interval and the sampling interval of an output test signal,

supplying said bit shift signal to a binary sequence generator and producing at the output thereof a binary periodic noise signal representing the binary pseudo-random sequence with a period given by $(2^N-1)\Delta T_{seq}$ where N is an integer and ΔT_{seq} is the sequence bit interval equal to the reciprocal of the first frequency,

low pass filtering the binary periodic noise signal to retain frequency components having a substantially equal amplitude,

applying the filtered binary periodic noise signal to a system under test to generate the output test signal, and



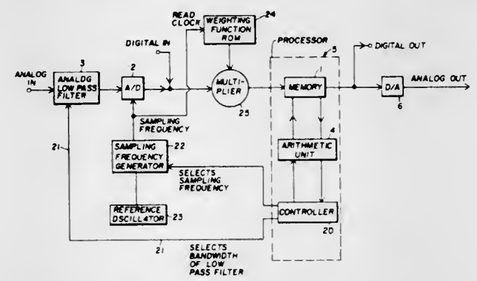
sampling the output test signal at a rate determined by said sampling actuating signal and converting the analog data samples so produced to said digital data samples.

4,093,989

SPECTRUM ANALYZER USING DIGITAL FILTERS

Joseph H. Flink, Monsey, and John Bertrand, Valley Cottage, both of N.Y., assignors to Rockland Systems Corporation, West Nyack, N.Y.

Filed Dec. 3, 1976, Ser. No. 747,053
Int. Cl.[2] G06F *15/34;* G01R *23/16*
U.S. Cl. 364—485 **18 Claims**



1. Spectrum analyzer comprising:

(a) a source of an input signal to be spectrum analyzed, said input signal comprising a plurality of digital input information data blocks, each data block being of a given time duration and each comprising a predetermined number of digital words, each data block representing signal energy with a different frequency range;

(b) means coupled to said source for weighting respective ones of said digital words as a function of a weighting function having a "smooth" function at its end points corresponding to the end points of said data blocks;

(c) means for digitally filtering each of the weighted digital data blocks with a digital filtering means having at least one center frequency falling within the frequency range represented by each of said data blocks, each of the data blocks comprising N samples satisfying the following equation:

$$N > Kf_o/B_n$$

where K is a constant which is a function of the sampling rate and the falloff rate of the skirt of filter characteristics, B_n is the filter bandwidth and f_o is the center frequency of the filter; and

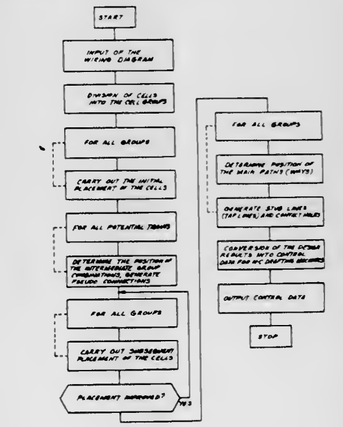
(d) means for effectively changing the bandpass frequencies of said digital filter means during spectrum analysis of said digital information data blocks of said input signal.

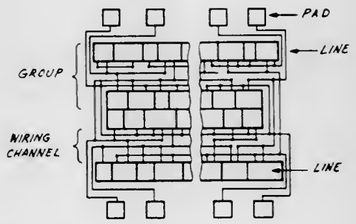
4,093,990

METHOD FOR THE PRODUCTION OF MASK PATTERNS FOR INTEGRATED SEMICONDUCTOR CIRCUITS

Konrad Koller, and Ulrich Lauther, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sep. 22, 1975, Ser. No. 615,357
Claims priority, application Germany, Sep. 23, 1974, 2445368
Int. Cl.[2] G06F *15/20;* H05K *1/04*
U.S. Cl. 364—520 **6 Claims**





1. A method for producing mask patterns for integrated semiconductor circuits, comprising:

dividing a plurality of standard cells into a predetermined number of cell groups of equal space requirements with as few as possible connections required between groups;

positioning each cell within its respective group to provide as few wiring levels as possible to obtain the paths of connection lines in co-ordinate terms;

converting the co-ordinate terms to numerical control data which may be used by a numerically-controlled drafting machine;

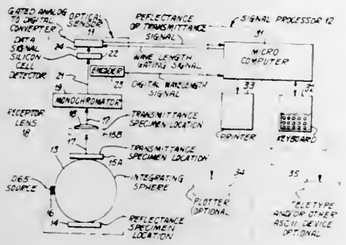
feeding the numerical control data to a numerically-controlled drafting machine; and

drawing a mask with the drafting machine in response to receipt of the control data.

4,093,991
SPECTROPHOTOMETER-DIGITAL DATA PROCESSING SYSTEM FOR APPEARANCE MEASUREMENTS PROVIDING FAST AND ACCURATE STANDARDIZATION, EASE OF USE FOR DIFFERENT APPEARANCE MEASUREMENTS AND FAST RESPONSE

John S. Christie, Jr., McLean; S. Upton Jenkins, Fairfax, and George B. McConnell, Vienna, all of Va., assignors to Hunter Associates Laboratory, Inc., Fairfax, Va.

Filed Jan. 26, 1977, Ser. No. 762,929
Int. Cl.[2] G01N *21/22*; G01J *3/02*; G06F *15/20*
U.S. Cl. 364—525 **33 Claims**



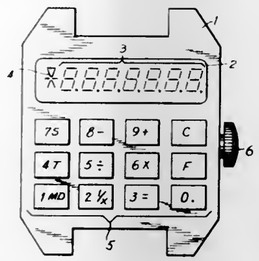
1. A combined single beam scanning spectrophotometer-digital data processing system for appearance measurements including in combination stabilized illumination means, specimen holder means, means for illuminating a specimen to be examined supported by said specimen holder means for its appearance characteristics with said stabilized illumination means and for producing an output single beam of light modulated with appearance characteristics information pertaining to the specimen being examined, visible spectrum scanning monochromator means disposed in said appearance information modulated single beam of light for deriving a plurality of separate different wavelength monochromatic single light beams representative of the appearance characteristics of a specimen being examined, electro-optic detector means disposed in the path of said separate different wave length monochromatic light beams for converting the same to a plurality of separate different electric signals representative of the appearance characteristics of a specimen being examined, analog to digital converter means electrically coupled to said electro-optic detector means for converting the electric signals to digital form, digital encoder means operatively synchronized with said monochromator means for deriving encoded digital electric output signals characteristic of the wave length of each different frequency monochromatic light beam, and digital data processing means responsive to said analog to digital converter means and said digital encoder means for processing said digital electric outputs and deriving output electric signals for display or other use indicative of the appearance characteristics of a specimen being examined.

4,093,992
ELECTRONIC WRISTWATCH

Yoshikazu Kawamura; Akio Shimoi, and Yuichiro Iwai, all of Suwa, Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Nov. 8, 1976, Ser. No. 739,771
Claims priority, application Japan, Nov. 7, 1975, 50-133717
Int. Cl.[2] G06F *7/48, 15/02*; G04B *19/30*
U.S. Cl. 364—705 **37 Claims**

1. An electronic wristwatch comprising, in combination, timing pulse generating means for producing a plurality of time standard signals, timekeeping circuit means coupled to said timing pulse generating means for receiving at least one of said time standard signals, and in response thereto producing timekeeping signals representative of actual time, calculator circuit means coupled to said pulse generating means for receiving at least two of said time standard signals produced by said timing pulse generating means and in response thereto, producing calculating signals representative of calculations performed thereby, digital display means for receiving said timekeeping signals and said calculating signals, said digital display means being adapted to display actual time in response to said timekeeping signals and numerical information representative of said calculations performed by said calculating circuitry in response to said calculating signals, input means adapted to receive at least one of said time standard signals produced by said timing pulse generating means, said input means being adapted to produce functional signals and numerical information signals, said calculating circuit means being adapted to receive said numerical information signals and function signals and in response thereto, produce calculating signals representative of the numerical information and calculating functions, said calculator circuit means including numerical information calculating means for receiving said numerical information signals and programmable control means for receiving said



function signals and in rsponse thereto controlling the calculations performed by said calculating means on said numerical information represented by said numerical information signals applied thereto, so that said calculating means produces signals representative of said numerical information and calculating functions performed thereby, said calculating means further including a plurality of bit-serial register means for storing and processing numerical information in response to said numerical information signals being applied thereto, at least one of said bit-serial register means in said calculator means being coupled to said timekeeping circuit means for storing and processing timekeeping information therein, said timekeeping circuit means including at least one bit-serial timekeeping register means for storing and processing information representative of actual time, said timekeeping signal being a bit-serial signal, said calculator bit-serial register means being adapted to store and transfer said numerical information and calculating signals produced thereby in bit-serial form.

4,093,993
BIT-SLICE TYPE LARGE SCALE INTEGRATED CIRCUIT WITH MULTIPLE FUNCTIONS ON A ONE-CHIP SEMICONDUCTOR DEVICE

Kazuyuki Sato, Koganei, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Aug. 27, 1976, Ser. No. 718,400
Claims priority, application Japan, Aug. 28, 1975, 50-104239
Int. Cl.[2] G06F *1/00*
U.S. Cl. 364—712 **5 Claims**

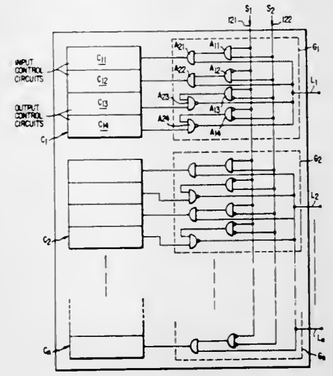
1. A bit-slice type large scale integrated circuit formed on a one-chip semiconductor device comprising:

a plurality of bit-sliced input control circuits with different functions,

a plurality of bit-sliced output control circuits with different functions,

gate circuits including decoding gates and input and output gates, the output terminals of said decoding gates connected with input terminals of said input and output gates for enabling said input and output gates, the output terminals of said input gates connected with said input control circuits and input terminals of said output gates connected with said output control circuits,

signal lines connected for common use with input and output signals to and from said integrated circuit, said signal lines connected with said input and output gates; and,

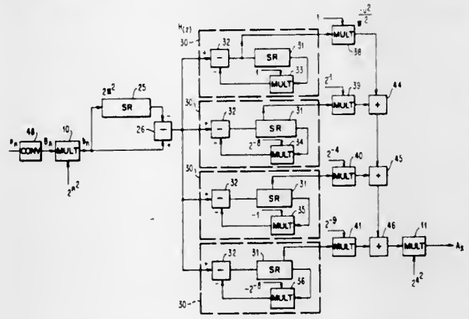


selecting lines connected with the input terminals of said decoding gates for supplying selecting signals thereto to cause said decoding gates to enable said input and output gates, whereby selected connections can be established between said input control circuits and said output control circuits and said signal lines through said input and output gates.

4,093,994
FAST DISCRETE TRANSFORM GENERATOR AND DIGITAL FILTER USING SAME

Henri J. Nussbaumer, LaGaude, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 18, 1977, Ser. No. 779,212
Claims priority, application France, May 21, 1976, 76 16129
Int. Cl.[2] G06F *15/34*
U.S. Cl. 364—726 **5 Claims**



1. An improved generator of the terms of discrete transforms of the so-called Fourier transform family, particularly useful in digital filters and operating to generate a series of blocks of transform terms $[A_K]_{K=0}^{N-1}$ from a series of blocks of N digital samples $[a_n]_{n-0}^{N-1}$, where N is a square of an integer ($N=M^2$), said generator being of the type having an upstream weighting means for providing weighted sample a_n terms and a downstream weighting means for providing transformed terms A_K and having a filter bank comprising M filters placed between said upstream and downstream weighting means, and having adding means for adding the filtered outputs of individual orders of said M filters in said filter bank wherein said improvement comprises:

(a) subtracting means connected to the inputs of each order in said bank of filters for subtracting, term-by-term, from each weighted a_n term which is provided by said upstream weighting means, the said weighted a_n term which preceded it by 2N positions and,

(b) each of the orders of said filters of said bank includes,

an input terminal and an output terminal,

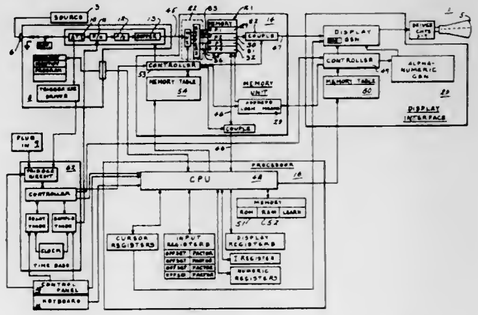
a recursive filtering means having an input and an output and having its input connected to said input terminal of its said order filter in said bank and

a constant coefficient weighting means having an input and output and, having its input connected to the output of the corresponding recursive filtering means of said M filter bank and its output, being the said output terminal for said order of said filter, being connected to said adder means for adding the output of said order of said filter to the outputs of the other said orders of said filters in said bank, the combined output of which is connected to said downstream weighting means.

4,093,995
RANDOM ACCESS MEMORY APPARATUS FOR A WAVEFORM MEASURING APPARATUS

Steven R. Smith, and Frederick A. Rose, both of Fort Atkinson, Wis., assignors to Norland Corporation, Fort Atkinson, Wis.

Filed Mar. 26, 1976, Ser. No. 670,890
Int. Cl.[2] G06F *3/14, 13/06, 3/05*
U.S. Cl. 364—900 **14 Claims**

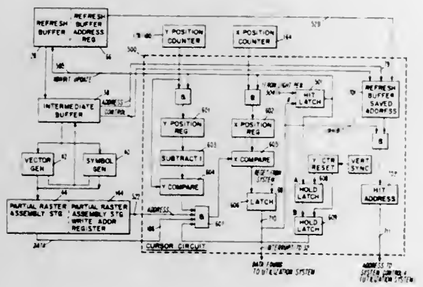


1. In a waveform measuring instrument, comprising a digital random access memory means having a plurality of addressable physical memory cell means, a waveform signal input means connected to said digital random access memory means to sample a waveform signal and digitizing said signal waveform samples into digital representation data and storing said digital representation data in said memory cell means, said random access memory means including a plurality of memory parts, each of said parts including a plurality of said physical memory cell means and an input port means for writing waveform data into said cell means, control means for selectively connecting said signal input means to said input port means and addressing the memory locations for continuously writing into the memory cell means of the parts connected to said input port means in a continuous cyclical writing sequence, said control means including first means for logically connecting said parts into a plurality of individual memory arrays and connecting one of said input port means for storing an independent waveform composite into one of the parts and second means to logically connect said parts into a composite array consisting of two or more of the parts, said composite array being capable of accepting independent waveform representation data in said cyclical sequence for storing an independent waveform composite into said composite array.

4,093,996
CURSOR FOR AN ON-THE-FLY DIGITAL TELEVISION DISPLAY HAVING AN INTERMEDIATE BUFFER AND A REFRESH BUFFER

Walter John Hogan, Fairfax, Va.; Alfred Alexander Schwartz, Leander, Tex., and Joseph Robert Stewart, Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 23, 1976, Ser. No. 679,543
Int. Cl.² G06F 3/14; G06K 15/20
U.S. Cl. 364—900 6 Claims



1. A cursor circuit for a dynamic digital television display device comprising:

a refresh storage for storing encoded data signals ordered by extremal scan line positions and outputting said encoded data signals in synchronism with a line scan of the display device, to a raster assembly storage for storage for video signals;

detection means for generating a signal when positioned at a selected point on said display device containing a coded display element to be accessed;

a coordinate storage means having an input connected to said raster assembly storage and an input connected to said detection means, for storing the "X" and "Y" coordinates of said display element upon receipt of a signal from said detection means; and

comparison means connected to said coordinate storage means and to said refresh storage, for comparing the "X" coordinate for each coded display element with the "X" coordinate value stored in said coordinate storage means during the loading of said video signals in said raster assembly storage for the raster line having a "Y" coordinate equal to the value stored in said coordinate storage means, to identify the coded display element to be accessed in said refresh storage;

said refresh storage including a refresh buffer having an output, connected to receive randomly occurring data signals and sort those signals into groups of ordered data signals ordered by extremal line scan position and also including an intermediate buffer having a first input connected to the output of said refresh buffer for storing said ordered data signals once during each display field and outputting said ordered data signals in synchronism with the line scan of the display device;

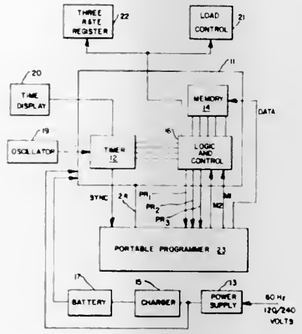
said coded display element to be accessed being identified in the intermediate buffer;

whereby the coded display element to be accessed is identified in said refresh storage.

4,093,997
PORTABLE PROGRAMMER FOR TIME-OF-DAY METERING REGISTER SYSTEM AND METHOD OF USING SAME

Warren R. Germer, Rochester, N.H., assignor to General Electric Company, Somersworth, N.H.

Filed Sep. 17, 1976, Ser. No. 724,040
Int. Cl.² G06F 1/00
U.S. Cl. 364—900 12 Claims



1. A portable programmer for programming a multiple rate electrical energy meter of the type including a first mechanical register for continuously registering the consumption of electrical energy, at least one alternate mechanical register for registering the consumption of electrical energy during preselected time intervals, a sync signal generator for generating a sync signal, a controllable clock for generating signals normally representative of real time, a recirculating storage for storing time data signals representative of a plurality of predetermined times and for storing function data signals representative of control functions to be performed at said predetermined times, a comparator for periodically comparing the signals from said clock with the time data signals, logic circuitry responsive to an output of said comparator and to the function data signals from said recirculating storage for generating at least one function control signal in accordance with the function data signals when a comparison exists between said time data signals and the signals from said clock, and means responsive to said at least one function control signal from said logic circuitry for engaging or disengaging said at least one alternate register in accordance with said at least one function control signal, said portable programmer comprising:

(a) first clock means, operating at a specified frequency, for generating real time signals;

(b) means responsive to said real time signals for displaying real time;

(c) means for setting said first clock means to a predetermined real time;

(d) second clock means for generating high frequency clock signals, said second clock means being stepped by said sync signal from said multiple rate meter at a substantially greater frequency than the operating frequency of said first clock means;

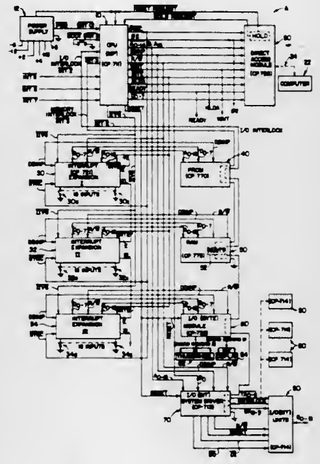
(e) means for comparing the real time signals and the high frequency clock signals from said first and second clock means respectively; and

(f) means for inhibiting the operation of said controllable clock in said multiple rate meter when a comparison exists between said real time signals and said high frequency clock signals.

4,093,998
PROGRAMMING MODULE FOR PROGRAMMABLE CONTROLLER USING A MICROPROCESSOR

David D. Miller, Davenport, Iowa, assignor to Gulf & Western Industries, Inc., New York, N.Y.

Filed Sep. 29, 1976, Ser. No. 727,785
Int. Cl.² G06F 9/00
U.S. Cl. 364—900 9 Claims

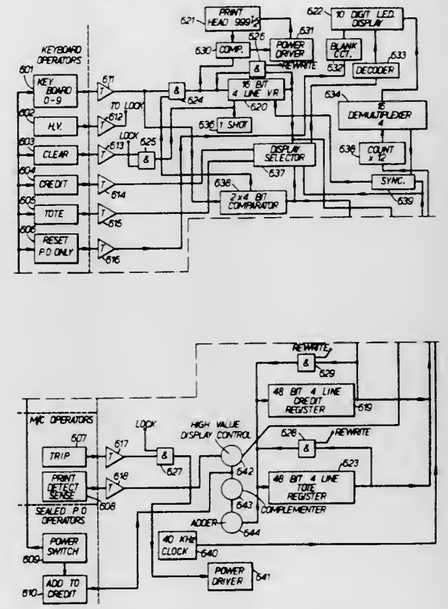


1. A programming module for programming a number of programmable read only memory units secured onto a single memory module for use at a selected location of several locations in a programmable controller using a microprocessor operated on a given logic voltage level and having output address lines, and input/output bi-directional data lines and having means for creating a read signal on a read line and a write signal on a write line, said units being programmable by data at data terminals on said memory units and at locations determined by an address on address terminals of said memory units only when receiving a program voltage at a programming terminal, said programming module comprising: an input side with terminals temporarily connectable with said address lines, said data lines, said read line and said write line during programming of said units; an output side having address terminals, program voltage terminals and data terminals for connection with said single memory module during programming of said units; means for creating a program initiation signal upon receipt of a command signal on a selected one of said address lines; latch means responsive to said initiation signal for latching data on said data terminals and an address in said address terminals; power means supported on said programming module for creating said program voltage, said program voltage being substantially higher than said given logic voltage level; decoding means for directing said program voltage to a selected one of said program voltage terminals, means for connecting said data terminals of said module to said data terminals of said units; means for connecting said address terminals of said module to said address terminals of said units; and, means for connecting each of said program voltage terminals to a programming terminal of one of said memory units.

4,093,999
ELECTRONIC FRANKING MACHINES

Paul Fuller, Romford; John Brian Gillender, Canvey Island; Michael Shacklady, Benfleet, and Samir Basu, Romford, all of England, assignors to Vickers Limited, London, England

Filed Dec. 1, 1976, Ser. No. 746,490
Int. Cl.² G06F 15/28, 3/12, 3/02
U.S. Cl. 364—900 28 Claims



1. In an electronic franking machine comprising:

franking value selection means, operable selectively to provide an electrical input representative of a franking value selected for a desired next franking operation of the machine, for setting the selected franking value into the machine;

a digital electronic input register, having an input connected to said franking value selection means, for receiving and holding said selected franking value;

an electrically adjustable printing device, settable electrically to any selected one of a plurality of different conditions enabling the device to be actuated respectively to print a plurality of different franking values;

setting control circuitry, connected with said input register and said printing device, operable in dependence upon said electrical input to bring about setting of said printing device to the condition in which it is actuable to print said selected franking value;

a digital electronic total register, for holding an accumulated value representative of the sum of the respective franking values used in preceding franking operations of the machine; and

totalling circuitry, connected between said input register and said total register, for effecting addition of said selected franking value held in the input register to said accumulated value; whereby a new accumulated value is provided, to be held in said total register, after printing of said selected franking value, in place of said accumulated value previously held there,

the improvement wherein said machine comprises an electronics unit which houses franking value selection means, said input register, said total register and said totalling circuitry and a separate printing unit which houses the said electrically adjustable printing device and with which said electronics unit is engaged during the operation of the

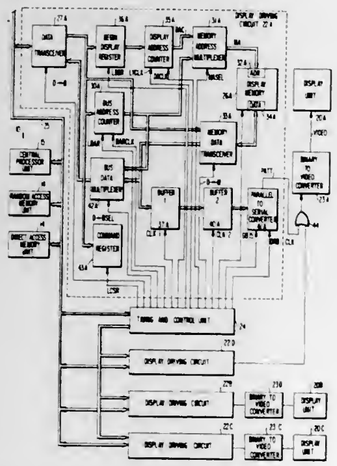
machine, said electronics and printing units being readily separable one from the other and having complementary coupling means for setting up operative electrical connections therebetween when the electronics unit is engaged with the printing unit.

4,094,000

GRAPHICS DISPLAY UNIT

Finn Brudevold, Wellesley, Mass., assignor to Atex, Incorporated, Bedford, Mass.

Filed Dec. 16, 1976, Ser. No. 751,138
Int. Cl.² G06F *3/14*
U.S. Cl. 364—900 **15 Claims**



1. A graphics display unit for providing a visual image that corresponds to input data, said graphics display comprising:

A. matrix display means have a plurality of energizable display positions at intersections on a matrix including a reference display position, individual display positions being selected for energization in a predetermined sequence.

B. memory means connected to said matrix display means, said memory means having a plurality of addressable storage locations for storing binary information that corresponds to the image to be displayed and that defines the energization level for each said display position of said matrix display means, said memory means storing the input data in a portion of said addressable storage locations;

C. addressing means connected to said memory means for generating storage location addresses for all said storage locations in said memory means in an addressing sequence;

D. initial address means connected to said addressing means for storing an initial address that establishes an initial correspondence between one of said storage locations and said reference display position;

E. altering means connected to said initial address means for altering said initial correspondence between said one addressable storage location and said reference display position by changing the initial address thereby to generate a new initial correspondence and relocate the image on said display means; and

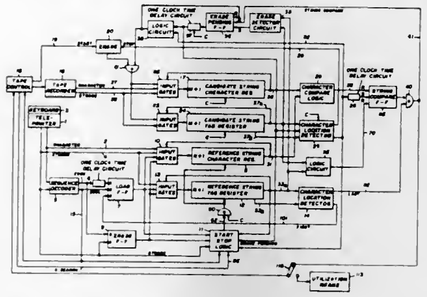
F. timing and control means connected to said addressing means and said matrix display means for maintaining a relative correspondence between the addressing of successive storage locations and the selection of successive display positions by synchronizing the predetermined sequence and the addressing sequence based upon the initial correspondence.

4,094,001

DIGITAL LOGIC CIRCUITS FOR COMPARING ORDERED CHARACTER STRINGS OF VARIABLE LENGTH

Donald E. Miller, Waynesboro, Va., assignor to General Electric Company, Waynesboro, Va.

Filed Mar. 23, 1977, Ser. No. 780,446
Int. Cl.² G06F *7/22*
U.S. Cl. 364—900 **17 Claims**



1. Data processing system comprising a first continuously circulating storage register for storing a candidate string of ordered character signals having a length equal or less than M characters in M + 1 register stages, where M is an integral number equal to or greater than 3, a second circulating storage register circulating upon command for storing a reference string of ordered character signals having a length equal to or less than N characters in N + 1 register stages where N is an integral number equal to or greater than 1 and M − N is equal to or greater than 2, means for comparing a candidate string of character signals stored in said first register with a reference string of character signals stored in said second register to indicate any identity of stored strings of character signals comprising first means for causing said stored strings of candidate and reference character signals to synchronously circulate in their respective registers, means for comparing said last named circulating strings of signals in character serial form to produce a first signal indicative of whether said strings of signals are identical or not, means for sensing that the number of character signals in said circulating candidate string of character signals is greater than the number in said circulated reference string of character signals to produce a second signal, second means responsive to said second signal and to said first signal for delaying circulation of reference character signals in said second register for a sufficient time to cause the relative positions of the candidate and reference character signals in the stages of their respective registers to be shifted by an integral number of stages greater than zero, means for causing said first means, said second means, said means for comparing and said means for sensing to repeatedly perform their function until a first output signal is produced indicative that the strings of signals are identical, and means for utilizing said last named output signal.

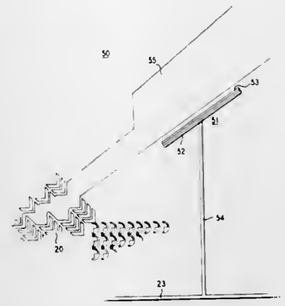
4,094,002

SACRIFICIAL ARC SUPPRESSORS IN MAGNETIC BUBBLE MEMORIES

Andrew Henry Bobeck, Chatham, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 21, 1977, Ser. No. 779,839
Int. Cl.² G11C *19/08*
U.S. Cl. 365—1 **7 Claims**

7. A magnetic bubble memory including a layer of magnetic material in which magnetic bubbles can be moved, said memory including first and second patterns of permalloy and electrically conducting materials separated by an insulating layer, said first and second patterns including portions thereof in close proximity and adapted to define a preferential arcing position therebetween.

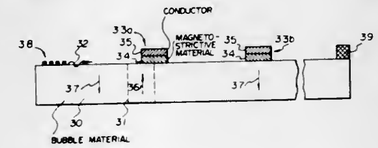


4,094,003

SONIC MAGNETIC DOMAIN SENSOR

Witold Kinsner, Hamilton, and Edward Della Torre, Toronto, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Mar. 29, 1976, Ser. No. 671,144
Int. Cl.² G11C *19/08*
U.S. Cl. 365—7 **12 Claims**



1. A device for sensing a magnetic bubble domain at a predetermined location in bubble supporting material comprising:

magnetostrictive means positioned with respect to said bubble supporting material to be magnetically influenced by the closure field of a bubble domain at said predetermined location;

conductor means in contact with said magnetostrictive means; and

sonic means for launching a sonic wave pulse which propagates past the vicinity of said magnetostrictive means in a predetermined direction for stressing said magnetostrictive means to rotate the magnetization of said magnetostrictive means when magnetically influenced by the closure field of a bubble domain, thereby inducing an electric signal in said conductor means to indicate the presence of the bubble domain.

4,094,004

GAPLESS MAGNETIC BUBBLE EXPANDER-DETECTOR CIRCUIT

Magid Yousri Dimyan, San Diego, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 1, 1976, Ser. No. 737,203
Int. Cl.² G11C *19/08*
U.S. Cl. 365—8 **3 Claims**

1. A bubble domain expansion and detector circuit for expanding and detecting magnetic bubbles moving along a predetermined path in a film of magnetic bubble material comprising:

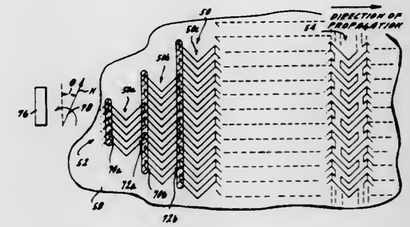
a pattern of elements in an overlay of magnetic material positioned over a film of magnetic bubble material, and defining a bubble propagation path,

said elements being arranged in consecutive rows and defining consecutive stages for advancing domains therethrough in response to consecutive cycles of a magnetic field said rows of elements being without spaces in the direction of propagation,

said magnetic field being capable of magnetizing said elements,

each consecutive stage including a different number of said elements to expand a domain moved therethrough, means for spacing said elements from the bubble material to maintain a gradient between each of said elements and the bubble material in the direction of said propagation paths and,

means defining a detector also operative in response to said field and disposed adjacent one end of said expanding consecutive stages to receive said expanded domains.

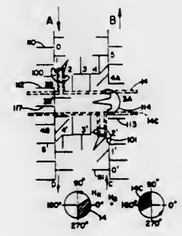


4,094,005

MAGNETIC BUBBLE DATA TRANSFER SWITCH

Thomas T. Chen, Yorba Linda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 21, 1976, Ser. No. 688,651
Int. Cl.² G11C *19/08*
U.S. Cl. 365—16 **13 Claims**



1. An active data switch for magnetic bubble domain systems comprising:

first and second propagation paths;

each of said first and second propagation paths comprising a plurality of passive components;

first and second transfer switch means interposed between said first and second propagation paths;

said first and second transfer switch means forming portions of said first and second propagation paths,

said first and second transfer switch means arranged such that the distance therebetween is different in said first and second propagation paths;

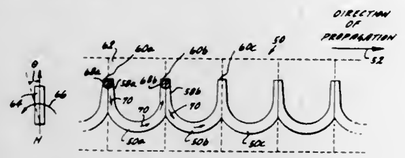
conductor means associated with said first and second transfer switch means to selectively control the operation of said first and second transfer switch means whereby said first and second propagation paths are selectively interconnected by at least one of said first and second transfer switch means during one operating cycle.

4,094,006

GAPLESS MAGNETIC BUBBLE PROPAGATION CIRCUIT

Magid Yousri Dimyan, San Diego, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 1, 1976, Ser. No. 737,206
Int. Cl.² G11C *19/08*
U.S. Cl. 365—39 **3 Claims**



1. A bubble domain propagating circuit for moving magnetic bubble domains along a predetermined path in a film of magnetic bubble material comprising:

a pattern of propagate elements in an overlay of magnetic material,

said magnetic material being positioned over a film of magnetic bubble material and said propagate elements defining the bubble propagation path for advancing said domains therethrough, in response to consecutive cycles of a magnetic field,

said magnetic field being rotated in the plane of said bubble material and being capable of magnetizing said elements,

adjacent elements having ends which will have essentially the same polarity when subjected to said magnetic field in a direction perpendicular to said propagation path, and

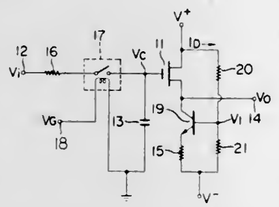
means for spacing said propagate elements from the bubble material to maintain a gradient between each of the elements and the bubble material in the direction of said propagation path.

4,094,007

TEMPERATURE-COMPENSATED ANALOG VOLTAGE MEMORY DEVICE

Shunji Minami, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Nov. 26, 1976, Ser. No. 745,226
Claims priority, application Japan, Dec. 4, 1975, 50-144871; Dec. 12, 1975, 50-148698; Dec. 26, 1975, 50-159391
Int. Cl.² G11C *11/40*
U.S. Cl. 365—45 **8 Claims**



1. A temperature-compensated analog voltage memory device comprising

(a) a MOS field-effect transistor,

(b) analog switching means having one terminal connected to the gate of said MOS field-effect transistor,

(c) a nonpolarized capacitor interconnected between the gate of said MOS field-effect transistor and ground, leakage of said capacitor being prevented by said MOS field-effect transistor and said capacitor,

(d) an NPN transistor having its collector connected to the source of said MOS field-effect transistor, said NPN transistor being used as a constant current source and to make constant drain current of said MOS field-effect transistor,

(e) an output resistor interconnected between the emitter of said NPN transistor and a negative power supply, and

(f) a constant voltage means connected to the base of said NPN transistor,

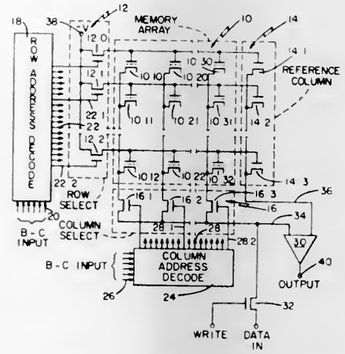
whereby, an input applied to the other terminal of said analog switching means being memorized and transferred output, a non-volatile memory being made.

4,094,008

ALTERABLE CAPACITOR MEMORY ARRAY

George C. Lockwood, Dayton, and Nicholas E. Aneshansley, Centerville, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Jun. 18, 1976, Ser. No. 697,602
Int. Cl.² G11C *11/24, 11/40*
U.S. Cl. 365—149 **3 Claims**



1. A non-volatile semiconductor memory system comprising:

a rectangular array of non-volatile, alterable threshold capacitors disposed on a single semiconductor substrate and comprising a plurality of parallel source stripes formed in the substrate, and a plurality of non-volatile, alterable-threshold capacitor devices formed on said substrate in a plurality of columns each immediately adjacent one of said source stripes, each of said capacitor devices comprising dual gate insulator layers of thin silicon oxide and silicon nitride and a conductive gate element connected in common along each common gate row of said capacitor devices, and each of said capacitor devices being selectably preprogrammed to one of first and second threshold voltage states having associated first lower and second higher capacitance values by application of selected signals to substrate, source stripe and gate element; and

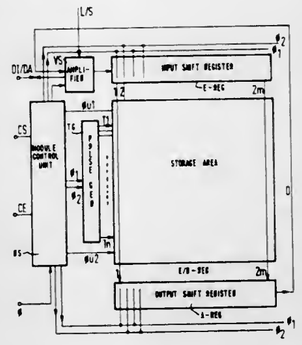
reading means comprising read signal means for applying a read voltage to a selected row of said capacitor devices, reference signal means for supplying a reference signal voltage, at least one differential sensing circuit receiving said reference signal voltage, and coupling means for operatively coupling said differential sensing circuit between a selected one of said source stripes and an output terminal, said read voltage having a magnitude at least equal to said second threshold voltage to couple a charge of first or second magnitude to said source stripe depending on whether the capacitor device associated with said selected row and selected source stripe is in said first or second threshold voltage state, said differential sensing circuit comparing the voltage induced on said selected source stripe by said charge with said reference voltage to produce an output of a first value if said induced voltage is greater than said reference voltage and a second value if said induced voltage is less than said reference voltage.

4,094,009

STORAGE ARRANGEMENT WITH MODULES CONSISTING OF CCD STORES

Peter Schneider, Poecking, and Ernst Goettler, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sep. 21, 1976, Ser. No. 725,337
Claims priority, application Germany, Sep. 26, 1975, 2543023
Int. Cl.² G11C *11/40*
U.S. Cl. 365—183 **10 Claims**



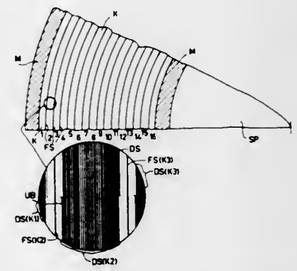
1. A storage arrangement suited for use with CCD stores comprising a CCD storage area having a series-parallel-series arrangement of data flow in which $2m$ parallel shift registers each of length n bits are arranged between an input shift register and an output shift register each being of length m bits; said $2m$ parallel shift registers being constructed with one storage electrode for each storage location using the electrode-per-bit principle; a circular pulse train shift register having a length of n storage locations with said n bits of said circular pulse train shift register each being connected to the gate termial of one of n switching transistors, each of said switching transistors having a first input connected to a supply potential and a second input connected to one of n pulse train lines of said storage area; a circulating charge in said circular shift register being the means whereby each one of said n switching transistors cyclically connects one of said n pulse train lines to said supply potential.

4,094,010

OPTICAL MULTI-CHANNEL DIGITAL DISC STORAGE SYSTEM

Rudiger Pepperl, Pinneberg; Johann Krüger, Quickborn, and Bernhard Hill, Hamburg, all of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 13, 1976, Ser. No. 686,120
Claims priority, application Germany, May 21, 1975, 2522405
Int. Cl.² G11B *21/10, 7/00*
U.S. Cl. 365—215 **15 Claims**



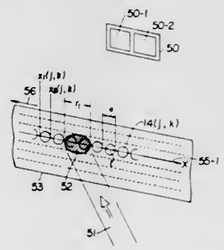
1. A system for the optical storage of information in a plurality of channels, comprising a rotating storage disc divided into a plurality of concentric channel areas, a plurality of concentric guide tracks on the disc, each guide track bordering one of the channel areas, a separate periodically interrupted spiral information track in each channel area on the disc, optical means for sequentially directing a separate control beam of radiation onto each guide track on said disc and for directing a separate information radiation beam onto each spiral information track, a first radial scanning system for substantially uniformly moving the information beam radially along said information track, a second radial scanning system responsive to the interaction of the control beam with the guide track for radially moving both the control and information beams to correct for eccentricity of the guide track, and means connected to said optical means for activating the control beam concurrently with the passage of the information beam into the interrupted portions of the information tracks.

4,094,011

SYSTEM FOR RECORDING AND REPRODUCING HOLOGRAM

Masao Nagao, Fuji, Japan, assignor to Asahi Kasai Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 29, 1976, Ser. No. 671,615
Claims priority, application Japan, Apr. 1, 1975, 50-38567; Aug. 29, 1975, 50-104135; Sep. 22, 1975, 50-113737
Int. Cl.² G11C *13/04*
U.S. Cl. 365—216 **20 Claims**



1. A method for recording information as Fourrier transform holograms which, in reproducing, are read out by relative, continuous scan with a reproducing light beam, comprising the steps of;

preparing information in a form adapted to be recorded as holograms by dividing the original information to be recorded into a number of information groups each consisting of a predetermined number, N, of unit-informations each consisting of a given amount of information, said predetermined number N being at least two,

supplying the prepared information to an information input device having a single or a plurality of unit-information input positions beginning from a first unit-information of a first group sequentially, said plurality of unit-information input positions being arranged on an information input surface without substantially overlapping one another,

exposing each unit-information supplied to said unit-information input position to an object light beam to effect modulation thereof, and

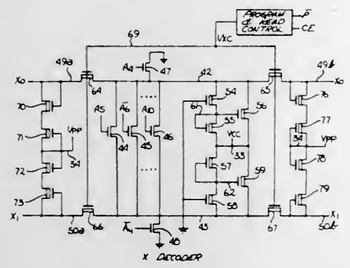
recording each unit-information as a hologram on a recording medium with a plurality of reference light beams one by one or a single reference light beam such that one-to-one different combinations of said single unit-information input position and said plurality of reference light beams or one-to-one different combinations of said plurality of unit-information input positions and said single reference light beam are used in sequence to record a series of holograms aligned on a track of the recording medium.

4,094,012

ELECTRICALLY PROGRAMMABLE MOS READ-ONLY MEMORY WITH ISOLATED DECODERS

George Perlegos, Santa Clara, and Phillip J. Salsbury, Sunnyvale, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Oct. 1, 1976, Ser. No. 728,789
Int. Cl.[2] G11C *11/40, 7/00*
U.S. Cl. 365—226 10 Claims



1. An electrically programmable MOS memory comprising:

a plurality of memory cells, said cells requiring a first potential for reading and a second potential, higher than said first potential, for programming;

input means;

output means, coupled to said plurality of memory cells;

decoding means comprising:

a decoder for receiving a plurality of address signals from said input means and for providing said first potential when said address signals are in a predetermined state, said decoder coupled to said input means;

voltage supply means for providing said second potential;

coupling means comprising a field-effect transistor coupled between said decoder and said voltage supply means, said coupling means including means for applying a first signal to the gate of said transistor during reading and a second signal to the gate of said transistor during programming, said transistor for providing an electrical path during reading, and for providing an electrical path during programming if said address signals are in other than said predetermined state;

said voltage supply means comprising a first and second depletion mode transistor coupled in series, said first transistor having its gate and one of its terminals coupled to said field-effect transistor of said coupling means and said second transistor having its gate and one of its terminals coupled to receive said second, higher potential;

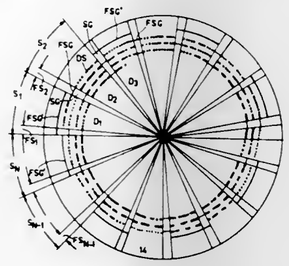
whereby said decoding means may be employed to select cells in said memory for reading and programming.

4,094,013

OPTICAL STORAGE DISK SYSTEM WITH DISK TRACK GUIDE SECTORS

Bernhard Hill, Hamburg; Rudiger Pepperl, Pinneberg, and Johann Krüger, Quickborn, all of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 13, 1976, Ser. No. 686,254
Claims priority, application Germany, May 22, 1975, 2522593; Mar. 3, 1976, 2608715
Int. Cl.[2] G11B *7/00, 21/10;* G11C *13/08*
U.S. Cl. 365—234 21 Claims



1. A storage disk for storing data in spiral or concentric tracks, comprising a disk-shaped storage medium having a recording surface divided into a plurality of equiangular guide sectors; each two of said data storage sectors being separated by a guide sector; said tracks thereby passing successively through data storage sectors and guide sectors; a data block of information being stored in substantially all of the track portions in each of said data storage sectors; guide segments being stored along the track in the guide sectors only adjacent alternate data blocks; the number of data storage sectors being odd to maintain the radial distance between edges of the guide segments substantially euqal to twice the radial distance between data blocks; blank segments being provided along the tracks in the guide sectors and adjacent further alternate data blocks, the tracks thereby containing repetitive successions of a data block, a guide segment, an additional data block and a blank segment.

DESIGNS

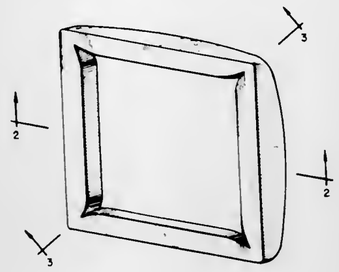
JUNE 6, 1978

248,061

HAMBURGER ROLL

Albert C. Bangert, 162 Oak Manor Dr., York, Pa. 17403

Filed Jan. 8, 1976, Ser. No. 647,632
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—24

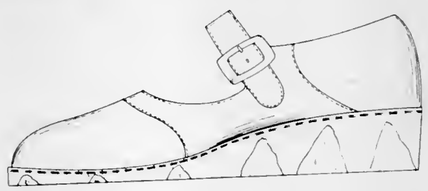


248,062

SHOE

Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 12, 1976, Ser. No. 676,162
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—291

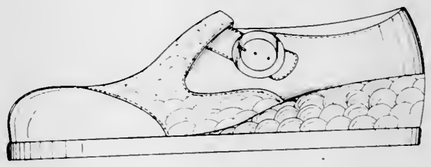


248,063

SHOE

Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 12, 1976, Ser. No. 676,167
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—293

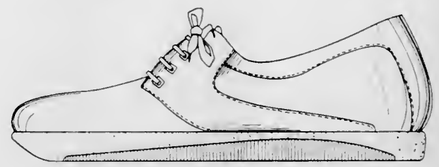


248,064

SHOE

Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 12, 1976, Ser. No. 676,165
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—301

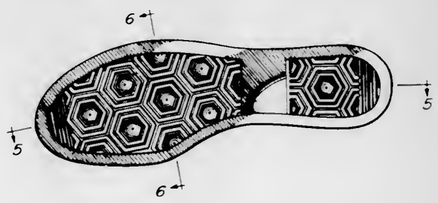


248,065

OUTER SOLE FOOTWEAR

Vijay Batra, 685 Oak St., Brockton, Mass. 02401

Filed Feb. 4, 1976, Ser. No. 655,090
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320

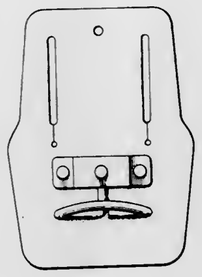


248,066

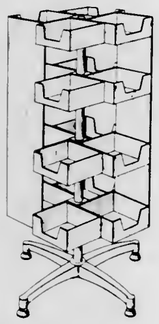
TOOL HOLDER

George Hillinger, 5340 E. Harbor St., Commerce, Calif. 90260

Filed June 30, 1976, Ser. No. 701,429
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400



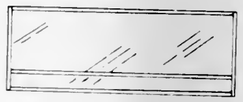
248,067
DISPLAY STAND
William S. Leath, Birmingham, Ala., assignor to Hanes Corporation, Winston-Salem, N.C.
Filed Mar. 21, 1977, Ser. No. 779,820
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—24



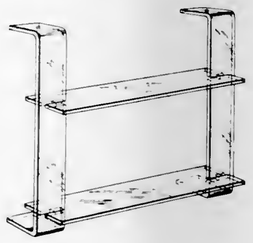
248,068
CHAIR
Hans Roericht, Neue Strasse 44, Ulm, Germany
Division of Ser. No. 633,593, Nov. 19, 1975. This application Apr. 18, 1977, Ser. No. 788,674
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—31

248,069
CONTAINER FOR TOILET TISSUE ROLLS OR THE LIKE
Gwendolyn Robles, 917 Sheridan Ave., Bronx, N.Y. 10451
Division of Ser. No. 561,781, Mar. 25, 1975, Pat. No. Des. 240,682. This application Jan. 28, 1976, Ser. No. 652,978
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—97

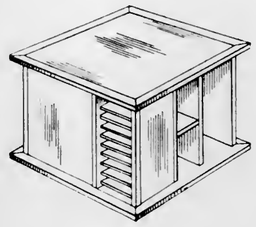
248,070
SHOPPING BAG HOLDER
Philip J. Catanzaro, and Lucy Ann Catanzaro, both of 3726 Lyndale Ave., Baltimore, Md. 21213
Filed Apr. 20, 1977, Ser. No. 789,204
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—131



248,071
WINDOW SHELF FOR PLANTS
Earle G. Simmons, 25 Westchester Way, Warwick, R.I. 02886
Filed May 24, 1976, Ser. No. 689,519
Term of patent 14 years
Int. Cl. D6—*06, 04*
U.S. Cl. D6—137

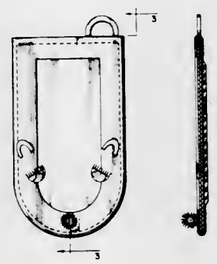


248,072
CABINET
Robert H. Johnson, 701 Laurie Dr., Winthrop Harbor, Ill. 60096
Filed Apr. 26, 1976, Ser. No. 680,366
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—169

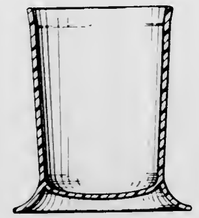


248,073
NESTABLE TABLE
Joseph P. Schneider, 3751 Poppy St., Long Beach, Calif. 90805
Filed Nov. 10, 1975, Ser. No. 630,181
Term of patent 7 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

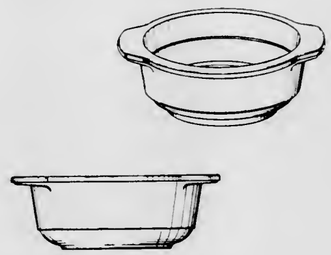
248,074
JAR OPENER/POT HOLDER
Mary Randall, 214 Woodland Dr., East Islip, N.Y. 11730
Filed Jan. 7, 1976, Ser. No. 647,127
Term of patent 3½ years
Int. Cl. D6—*99;* D7—*99*
U.S. Cl. D6—293



248,075
TUMBLER OR THE LIKE
Robert H. C. M. Daenen, Hekelgem, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Oct. 28, 1976, Ser. No. 736,678
Term of patent 14 years
Int. Cl. D7—*15, 01*
U.S. Cl. D7—11

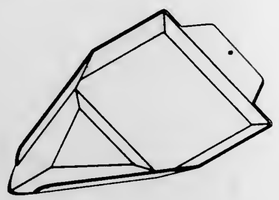


248,076
BOWL
Hubert E. Christian, Phoenix, Ariz., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Aug. 30, 1976, Ser. No. 719,036
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—20

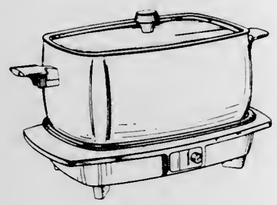


248,077
PLATE OR THE LIKE
Robert H. C. M. Daenen, Hekelgem, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Oct. 28, 1976, Ser. No. 736,681
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23

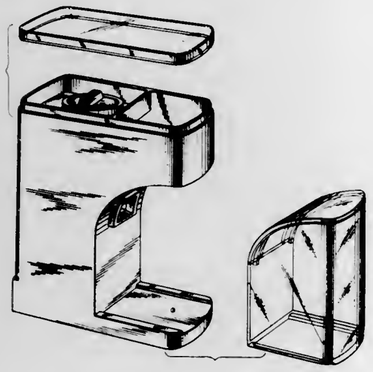
248,078
SORTING TRAY
Casper P. Warnekros, 1410 Clearview Rd., Santa Barbara, Calif. 93101
Filed Apr. 5, 1976, Ser. No. 673,935
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—37



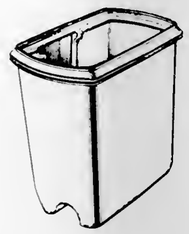
248,079
ELECTRIC COOKING BASE AND VESSEL
David L. Painter, Glenview, Ill., and Norman C. Minsky, West Bend, Wis., assignors to Dart Industries Inc., Los Angeles, Calif.
Filed Sep. 20, 1976, Ser. No. 724,436
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—94



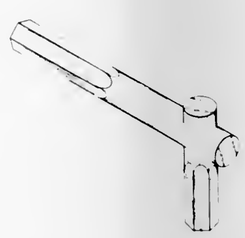
248,080
COFFEE MILL
Husazo Maejima, Tokyo, Japan, assignor to Sachie Ando, Tokyo, Japan
Filed Sep. 9, 1976, Ser. No. 722,056
Claims priority, application Japan, Jul. 7, 1976, 51-21070
Term of patent 14 years
Int. Cl. D7—*04;* D15—*08*
U.S. Cl. D7—155



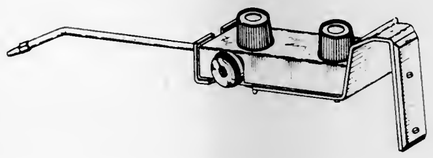
248,081
SQUEEGEE BUCKET
Barry Epstein, 3715 Rawnsdale Rd., Shaker Heights, Ohio 44122
Filed May 13, 1976, Ser. No. 686,078
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—187



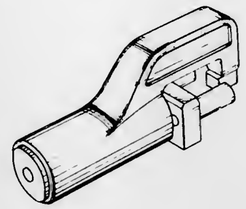
248,082
WRENCH
Floyd James Venable, Jr., Prairie Store, Prairie, Id. 83647
Filed Jul. 7, 1975, Ser. No. 593,617
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—29



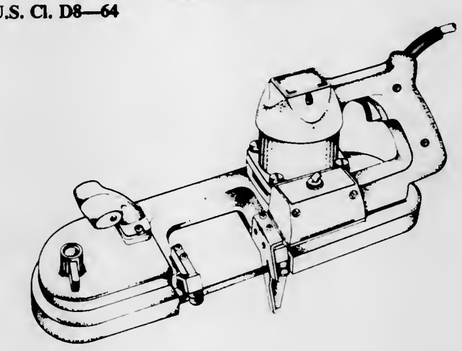
248,083
PORTABLE TORCH
Frank A. Zagara, Pittsford, and John M. Nelson, Rochester, both of N.Y., assignors to Bernzomatic Corporation, Rochester, N.Y.
Filed Nov. 10, 1976, Ser. No. 740,468
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—30



248,084
PULLER TOOL OR SIMILAR ARTICLE
Daniel A. Bruzek, Medford, Minn., assignor to Owatonna Tool Company, Owatonna, Minn.
Filed Nov. 8, 1976, Ser. No. 739,599
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—61



248,085
PORTABLE BAND SAW
Charles R. Stelljes, Fayetteville; Lars Frostad, Syracuse, and Richard H. Chapman, Camillus, all of N.Y., assignors to Rockwell International Corporation, Pittsburgh, Pa.
Continuation-in-part of Ser. No. 515,111, Oct. 16, 1974, abandoned. This application Aug. 29, 1975, Ser. No. 608,855
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—64



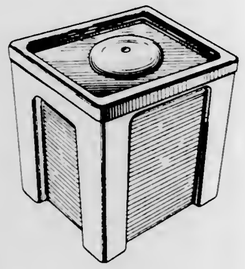
248,086
HIVE TOOL
William T. Maxant, Harvard Rd., P.O. Box 454, Ayer, Mass. 01432
Filed Aug. 6, 1976, Ser. No. 712,350
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—98

248,087
TIE-DOWN HOOK
Elwood Thomas Feldman, 8603 Delegge Rd., Baltimore, Md. 21237
Filed Mar. 8, 1976, Ser. No. 664,702
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—372

248,088
BOTTLE
William James Britt, Greenville, S.C., assignor to Morton-Norwich Products, Inc., Greenville, S.C.
Filed May 28, 1976, Ser. No. 691,062
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—149

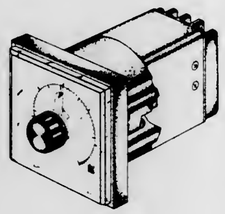
248,089
CONTAINER FOR PILLS
James M. Phillips, 2310 Codding Dr., Modesto, Calif. 95350, and John A. Ormonde, 1016 Atlantic Dr., Modesto, Calif. 95351
Filed May 17, 1976, Ser. No. 686,722
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216

248,090
STORAGE CONTAINER FOR FOOD OR THE LIKE
Theodor Box, 1108 Aileen Rd., Brielle, N.J. 08730
Filed Apr. 7, 1976, Ser. No. 674,634
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—237

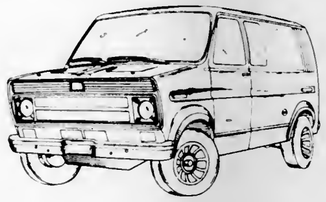


248,091
CARTON COVER
Tom Frydendal, Oslo, Norway, assignor to Elopak A/S, Spikkestad, Norway
Filed Apr. 15, 1976, Ser. No. 677,368
Claims priority, application Norway, Oct. 22, 1975, 7557009
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—267

248,092
MOTOR TIMER
Teizo Fujita, and Toshiro Ohashi, both of Osaka, Japan, assignors to Izumi Denki Company Limited, Osaka, Japan
Filed Aug. 2, 1976, Ser. No. 711,083
Claims priority, application Japan, Apr. 5, 1976, 51-12570
Term of patent 14 years
Int. Cl. D10—*03*
U.S. Cl. D10—40



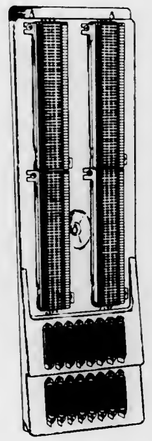
248,093
VAN
Charles W. Cancilier, Palatine, Ill., assignor to C. W. Cancilier Ltd.
Filed Aug. 4, 1977, Ser. No. 821,930
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—99



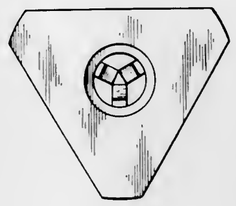
248,094
VEHICLE ROCK GUARD
Chalmer H. Nix, 1991 Austin Hwy., San Antonio, Tex. 78218
Filed Jun. 16, 1976, Ser. No. 696,481
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—190

248,095
MOTOR-CYCLE WHEEL
Toshiyuki Shuzuki, Shimada, and Tadao Suzuki, Iwata, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan
Filed May 18, 1977, Ser. No. 798,238
Claims priority, application Japan, Nov. 27, 1976, 51/46368
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205

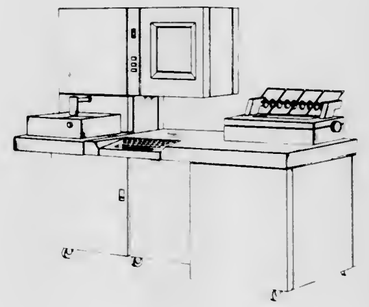
248,096
CONNECTOR PANEL
Lawrence J. Stupay, Endwell, N.Y., assignor to Bunker Ramo Corporation, Oak Brook, Ill.
Filed Mar. 31, 1976, Ser. No. 672,521
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



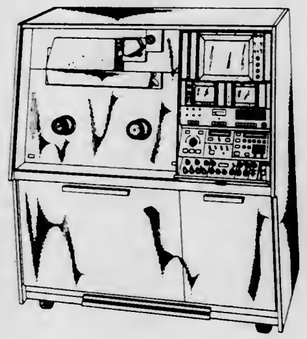
248,097
UNIVERSAL CONNECTOR BLOCK FOR FIBER OPTIC CABLES AND THE LIKE
Richard E. Feinbloom, New York, and Laszlo Endrodi, Jackson Heights, both of N.Y., assignors to Designs for Vision, Inc., New York, N.Y.
Filed Mar. 24, 1977, Ser. No. 780,961
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



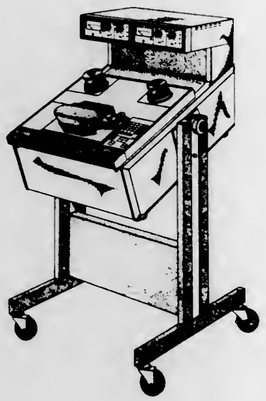
248,098
ANALYTICAL INSTRUMENT SYSTEM
Eugene N. Giancarlo, and James J. Ladue, both of Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Oct. 2, 1975, Ser. No. 619,105
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—40



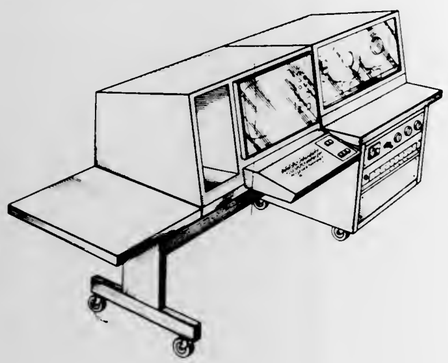
248,099
TAPE TRANSPORT
George A. Wilson, Portola Valley, Calif., assignor to Ampex Corporation, Redwood City, Calif.
Filed Mar. 17, 1976, Ser. No. 667,651
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—41



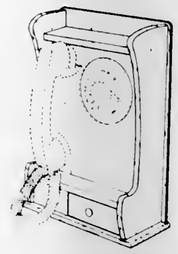
248,100
MAGNETIC TAPE TRANSPORT
Robert W. Bornschlegel, Mountain View, and Francis Arden Farey, Menlo Park, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.
Filed Jun. 16, 1976, Ser. No. 696,684
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—41



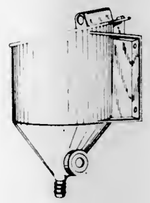
248,101
ELECTRONIC CONTROL AND DISPLAY CONSOLE
John Budd Steinhilber, and Stanley Heins, both of Mill Valley, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.
Filed Oct. 28, 1975, Ser. No. 625,808
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—44



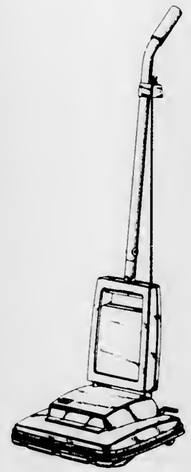
248,102
WALL MOUNT TELEPHONE CASE
Arthur H. Blake, 2931 Randy La., Dallas, Tex. 75234
Filed Jul. 26, 1976, Ser. No. 708,765
Term of patent 14 years
Int. Cl. D14—*03*; D6—*04*
U.S. Cl. D14—61



248,103
POWDER DETERGENT DISPENSER
Spencer Brian Larson, South St. Paul, and Duane Leroy Salmonson, West St. Paul, both of Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.
Filed Dec. 11, 1975, Ser. No. 639,844
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—36

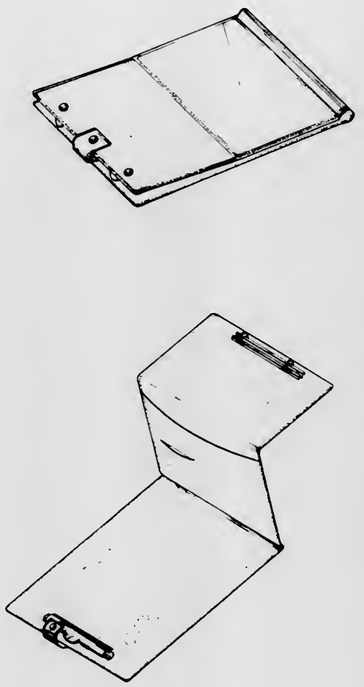


248,104
UPRIGHT VACCUM CLEANER
Earl R. Clowers, Anderson; John C. Davis, Greenwood; Fred E. Pearman, Jr., Five Forks Community, and Don W. Vermillion, Anderson, all of S.C., assignors to The Singer Company
Filed Mar. 10, 1977, Ser. No. 776,153
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—53

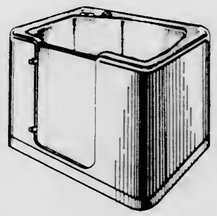


248,105
PAIR OF SPECTACLES
Anthony Shindler, Brookline, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,563
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

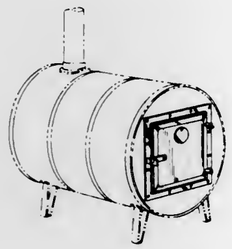
248,106
PRESENTATION FOLDER
William T. Moses, 3215 Stonehenge, Carrollton, Tex. 75006
Filed Mar. 26, 1976, Ser. No. 670,895
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—26



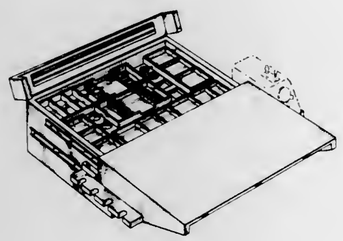
248,107
SIT-UP BATHTUB
Thomas Brengord, and Robert D. Copeland, both of Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.
Continuation-in-part of Ser. No. 302,106, Oct. 30, 1972, abandoned. This application Nov. 5, 1976, Ser. No. 739,336
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



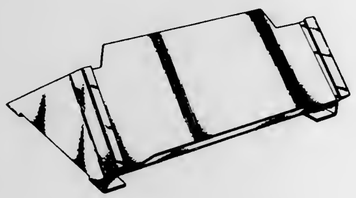
248,108
BARREL HEATER DOOR
Leonard Sotz, 23797 Sprague Rd., Columbia Station, Ohio 44028
Filed Apr. 26, 1976, Ser. No. 672,764
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—128



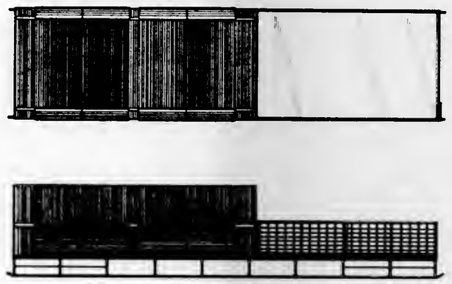
248,109
DENTAL AIDE'S CABINET
Warner J. Ball, Kenbridge, Kenbridge, Va. 23944
Filed Jul. 7, 1976, Ser. No. 703,217
Term of patent 14 years
Int. Cl. D24—*01;* D6—*04*
U.S. Cl. D24—5



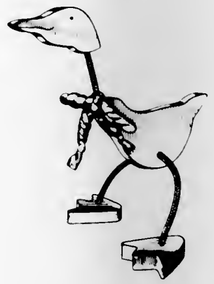
248,110
HOLDER FOR OPTHALMIC INSTRUMENT CONTROL PANEL
John R. Wright, Tonawanda, N.Y., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 19, 1976, Ser. No. 659,434
Term of patent 14 years
Int. Cl. D24—*99;* D6—*04;* D19—*02*
U.S. Cl. D24—31



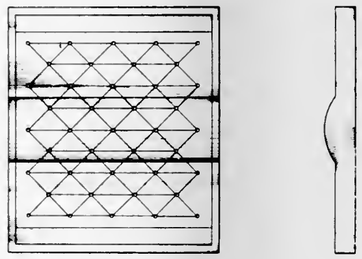
248,111
PORTABLE ANIMAL ENCLOSURE
Neil A. Koster, Rte. 1, Sylvia, Kans. 67581
Continuation-in-part of Ser. No. 704,462, Jul. 12, 1976. This application Mar. 7, 1977, Ser. No. 774,737
Term of patent 14 years
Int. Cl. D30—*01*
U.S. Cl. D30—1



248,112
MARIONETTE DUCK
Loren A. Seggerman, 14675 Adams Rd., Granger, Ind. 46530
Filed Nov. 1, 1976, Ser. No. 737,893
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 B



248,113
GAME BOARD
Straud D. Herriman, 229 Kentucky Ave., Danville, Ill. 61832
Filed Dec. 5, 1975, Ser. No. 638,284
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

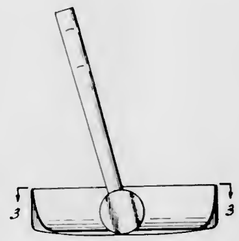


248,114
EXERCISER
Philip Mangiapane, 1201 Roebuck Ct., West Palm Beach, Fla. 33401
Continuation of Ser. No. 523,998, Nov. 15, 1974, abandoned, which is a continuation of Ser. No. 287,798, Sep. 11, 1972, abandoned. This application Dec. 29, 1975, Ser. No. 644,745
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 K

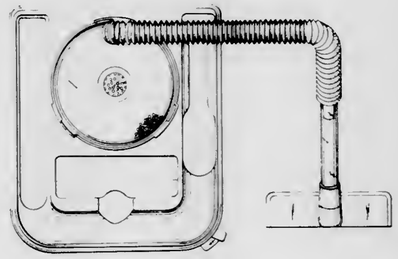
248,115
TOY FIGURE
Erik Peter Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,850
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R

248,116
SET OF CHESSMEN OR SIMILAR ARTICLE
John Zamkovec, c/o Nancy Lavallee, 142 W. 49th St., and Nancy Lavallee, 142 W. 49th St., both of New York, N.Y. 10019
Filed Aug. 5, 1976, Ser. No. 711,988
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 CH

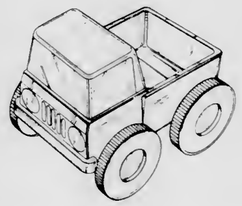
248,117
GOLF PUTTER HEAD
Peter Mondy, 137 W. Naomi, Arcadia, Calif. 91006
Filed Apr. 6, 1976, Ser. No. 674,292
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



248,118
TOY VACUUM CLEANER
Yoshizo Nagasaka, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed May 10, 1976, Ser. No. 684,842
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 R



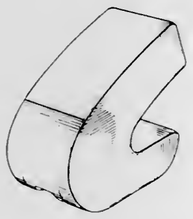
248,119
TOY TRUCK
Donald F. Nix, Hanover Park, and Howard J. Morrison, Deerfield, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed Sep. 16, 1976, Ser. No. 723,740
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



248,120
TORCH OR SIMILAR ARTICLE
Bik Kwan Ho, 50-56 Mong Kok Rd., 3rd Floor, Flat B Sun Mong House, Kowloon, Hong Kong
Filed Jul. 5, 1977, Ser. No. 812,454
Claims priority, application United Kingdom, Mar. 29, 1977, 979472/77
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 A

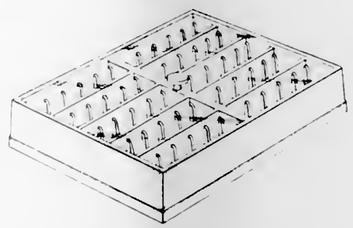
248,121
FRONT DISPLAY PANEL FOR VENDING MACHINES
Walter E. Moore, Bel-Nor, and Albert K. Grethey, Bridgeton, both of Mo., assignors to UMC Industries, Inc., Stamford, Conn.
Filed Jun. 28, 1976, Ser. No. 700,525
Term of patent 14 years
Int. Cl. D20—*01*
U.S. Cl. D52—3 R

248,122
HAND HELD MUSICAL STRING VIBRATION INITIATOR AND SUSTAINER
Gregory S. Heet, 611 Duscommun St., Los Angeles, Calif. 90012
Filed Aug. 24, 1976, Ser. No. 717,507
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A



248,123
CARRYING CARTON FOR SHOES OR THE LIKE
William Jay Cohen, Hingham, Mass., assignor to CITC Industries, Inc., New York, N.Y.
Filed Jan. 23, 1976, Ser. No. 651,957
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D87—1 R

248,124
STORAGE TRAY FOR PHOTOGRAPHIC SLIDES
Glen J. Brown, 386 E. Poppyfields Dr., Altadena, Calif. 91001
Filed Aug. 30, 1976, Ser. No. 718,593
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 D



248,125
TAPESTRY FABRIC OR SIMILAR ARTICLE
Roland Ditzel, Beethovenstrasse 35, 6901 Bammental, Germany
Filed Feb. 13, 1976, Ser. No. 657,972
Claims priority, application Germany, Aug. 15, 1975, 42 AR 348
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D92—1 LL

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF JUNE, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Dresser Industries, Inc.: *See—*
Cope, Geoffrey Wilton, 4,093,079, Cl. 213-62.00A.
Dreyfus, Gerard; and Lewiner, Jacques, to Agence Nationale de Valorisation de la Recherche (ANVAR). Thin structures having a piezoelectric effect, devices equipped with such structures and in their methods of manufacture. 4,093,884, Cl. 310-328.000.
Driscoll, Joseph R., to United States of America, Army. Lithium primary cell. 4,093,784, Cl. 429-101.000.
Droz, Willy; and Beguin, Jean-Luc, to Ebauches SA. Control device for an electronic wrist-watch. 4,092,822, Cl. 58-23.00R.
Drozd, Charles J.: *See—*
Paschal, James P.; Nickel, Donald F.; and Drozd, Charles J., 4,093,878, Cl. 307-291.000.
D'Silva, Themistocles D. J., to Union Carbide Corporation. Process for the preparation of thiosulfenyl carbamoyl halides. 4,093,652, Cl. 260-544.00C.
DSO "Bulgarplod": *See—*
Genchev, Lyubomir Nikolov; Kafedjiev, Iliya Chudomirov; and Klyamov, Kostadin Spirov, 4,092,910, Cl. 99-472.000.
Dual Gebruder Steidinger: *See—*
Steinle, Gunter, 4,093,822, Cl. 179-1.0VL.
Dubovik, Alexandr Ivanovich: *See—*
Suslin, Vladimir Isaakovich; Dubovik, Alexandr Ivanovich; Makeev, Boris Anatolievich; Razdymakha, Pavel Semenovich; and Lekarev, Zinovy Abramovich, 4,093,530, Cl. 204-224.00M.
Duckett, John C.; and Gaworowski, Andrew J., to Dayco Corporation. Compressible printing blanket. 4,093,764, Cl. 428-113.000.
Dufaylite Developments Limited: *See—*
Thwaites, Peter John; and Green, Dennis William, 4,093,818, Cl. 174-48.000.
Dumont, Louis: *See—*
Clapot, Claude; Vial, Jean; and Dumont, Louis, 4,093,444, Cl. 71-92.000.
Dunn, Ronald Lee. Pool table construction and its method of construction. 4,093,216, Cl. 273-6.000.
Du Pont de Nemours, E. I., and Company: *See—*
Apotheker, David, 4,093,583, Cl. 260-33.6AQ.
Clare, Norval D.; and Lemke, Charles H., 4,093,194, Cl. 266-122.000.
Elliott, Steven P., 4,093,595, Cl. 260-47.00C.
Duquette, Lawrence G.: *See—*
Doorakian, George A.; and Duquette, Lawrence G., 4,093,650, Cl. 260-539.00A.
Durant, Graham John; Ganellin, Charon Robin; and Owen, Geoffrey Robert, to Smith Kline & French Laboratories Limited. N-Oxy and N-amino guanidines. 4,093,729, Cl. 424-270.000.
Durant, Graham John: *See—*
Brown, Thomas Henry; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,093,621, Cl. 260-294.80H.
Durenec, Peter, to United States of America, Army. Balanced compressor. 4,092,829, Cl. 60-517.000.
Durenec, Peter, to United States of America, Army. Split-phase cooler with expansion piston motion enhancer. 4,092,833, Cl. 62-6.000.
Dyckerhoff & Widmann Aktiengesellschaft: *See—*
Kern, Georg, 4,092,814, Cl. 52-730.000.
Dyne Corporation: *See—*
Cunningham, Patrick J., 4,092,871, Cl. 74-40.000.
Dziegielewska, Maria: *See—*
Augustyn, Wladyslaw; Dziegielewska, Maria; and Kossuth, Andrzej, 4,093,706, Cl. 423-490.000.
E. Allman and Company Limited: *See—*
Allman, Denis John; and Taylor, Lionel Ivor Alfred, 4,093,107, Cl. 222-23.000.
E. R. Squibb & Sons, Inc.: *See—*
Breuer, Hermann; and Treuner, Uwe D., 4,093,801, Cl. 544-25.000.
Hauck, Frederic P.; Condon, Michael E.; and Fox, Rita T., 4,093,814, Cl. 560-139.000.
Haugwitz, Rudiger D.; and Cruthers, Larry R., 4,093,732, Cl. 424-273.00R.
Wade, Peter C.; and Kissick, Thomas P., 4,093,728, Cl. 424-269.000.
Earth Sciences, Inc.: *See—*
Loest, Kent W.; and Kesler, George H., 4,093,700, Cl. 423-120.000.
Easley, Wayne W.: *See—*
Gaworowski, Andrew J.; and Easley, Wayne W., 4,093,487, Cl. 156-244.160.
Eastman Kodak Company: *See—*
Altland, Henry Wolf; Cowan, Stanley Wray; and Olivares, Ismael Adolfo, 4,093,462, Cl. 96-66.0HD.
Fletcher, George Leland; and Mosehauer, Michael, 4,093,463, Cl. 96-67.000.
Jackson, Winston J., Jr.; and Kuhfuss, Herbert F., 4,093,603, Cl. 260-75.00R.
Masurekar, Prakash S.; and Goodhue, Charles T., 4,093,517, Cl. 195-66.00R.
Schmitz, Alfons F.; and Dixon, Douglas L., 4,093,134, Cl. 242-18.0PW.
Welch, Richard D.; and Iversen, John E., 4,093,493, Cl. 156-358.000.
Eaton Corporation: *See—*
Castillo, Herman B.; and Mueller, Robert S., 4,093,681, Cl. 261-122.000.
Eaton, Manford Leslie. Resilient material which is electrically conductive under pressure. 4,093,563, Cl. 252-513.000.
Eaton, Milton, to General Electric Company. Multi-jet electrode boiler. 4,093,846, Cl. 219-286.000.
Ebauches SA: *See—*
Droz, Willy; and Beguin, Jean-Luc, 4,092,822, Cl. 58-23.00R.
Ebel, Fred H.: *See—*
Landgraf, Glenn A.; and Ebel, Fred H., 4,093,204, Cl. 270-21.000.
Eberhardt, Robert M.; McNana, James Arthur; and Heuer, Dennis M., to All States Plastic Manufacturing Co. Inc. Cable tie gun. 4,093,005, Cl. 140-123.600.
Eberline, Howard C.; and Moon, Jack L., to Kerr-McGee Corporation. Logging method and apparatus. 4,093,936, Cl. 340-18.0CM.
Eckhardt, Gisela; and Eckhardt, Wilfried O., to Hughes Aircraft Company. Liquid-metal plasma valve configurations. 4,093,888, Cl. 313-163.000.
Eckhardt, Wilfried O.: *See—*
Eckhardt, Gisela; and Eckhardt, Wilfried O., 4,093,888, Cl. 313-163.000.
Eckold, Gerd-Jurgen; and Maass, Hans, to Paweck AG. Device for flanging the edges of sheet sections. 4,092,840, Cl. 72-312.000.
Edgerton, Gene A., to United States of America, Navy. Oceanographic sensor with in-situ cleaning and bio-fouling prevention system. 4,092,858, Cl. 73-170.00A.
Edgewater Steel Company: *See—*
Capps, Overton B.; and Milliken, J. Richard, 4,093,299, Cl. 295-14.000.
Edmisten, John H. Method for identifying the load characteristics of a centerfire firearm cartridge. 4,092,924, Cl. 101-426.000.
Edwards, John W. Endless drive system. 4,093,318, Cl. 305-11.000.
Edwards, Robert Harry; Williams, Thomas Alan; and Hall, Kenneth. Ether phosphoric acid compound. 4,093,662, Cl. 260-606.50P.
Egan, Clark J., to Chevron Research Company. Process for base-load and peak-load power generation. 4,092,825, Cl. 60-39.020.
Eggen, Gerardus Theodorus Joseph. Method for manufacturing moulded plastic articles. 4,093,691, Cl. 264-93.000.
Eggert, Frank, to Schlegel (UK) Limited. Edge protector trim strip. 4,092,813, Cl. 52-397.000.
Eguchie, Yoshio: *See—*
Tsutsui, Koichi; and Eguchie, Yoshio, 4,093,674, Cl. 260-830.00P.
Eheim, Franz: *See—*
Hofer, Gerald; Eheim, Franz; and Kopse, Odon, 4,092,964, Cl. 123-139.0AT.
Ehrenreich Photo-Optical Industries, Inc.: *See—*
Weiner, Manfred, 4,093,379, Cl. 355-77.000.
Ehret, Urban: *See—*
Schollhorn, Wolfgang; and Ehret, Urban, 4,093,413, Cl. 425-110.000.
Eichorn, Roger H., deceased; by Lincoln First Bank of Rochester, executor; and Silverberg, Morton, to Xerox Corporation. Imaging apparatus. 4,093,367, Cl. 355-3.00R.
Eisai Co., Ltd.: *See—*
Akatsuka, Shin-Ichiro; Akutsu, Shozo; and Uchida, Michio, 4,093,748, Cl. 426-19.000.
Eisenstein, Stephen Ellis: *See—*
Compton, John William; and Eisenstein, Stephen Ellis, 4,093,418, Cl. 8-142.000.
Ekis, Robert W.: *See—*
Bardash, Manuel L.; Clasen, Carl P.; Scudder, Robert M.; Simon, Lawrence H.; Sorkin, Charles S.; Yavne, Raphael O.; Ekis, Robert W.; and Mintzer, Alfred I., 4,093,153, Cl. 244-3.140.
Electric Power Research Institute, Inc.: *See—*
Glenn, Robert G., 4,093,399, Cl. 416-95.000.
Electro-Nite Co.: *See—*
Cassidy, John E.; and Kraus, Max H., 4,093,193, Cl. 266-87.000.
Elektromekano i Bredaryd AB: *See—*
Larsson, Bertil Ivar, 4,093,163, Cl. 246-476.000.
Eli Lilly and Company: *See—*
Kukolja, Stjepan, 4,093,800, Cl. 544-16.000.
Shields, James E., 4,093,574, Cl. 260-8.000.
Eliseev, Stanislav Borisovich; Butskoi, Jury Alexandrovich; Dmitrievsky, Vladimir Sergeevich; Golubeva, Albina Andreevna; Ozerov, Vladimir Mikhailovich; Volkov, Valentin Stepanovich; and Vasninova-Shipulina, Iya Petrovna. Method of producing pellets from ore concentrates. 4,093,448, Cl. 75-3.000.
Ellendt, Gunther: *See—*
Knofel, Hartmut; and Ellendt, Gunther, 4,093,658, Cl. 260-570.00D.
Elliott Brothers (London) Limited: *See—*
Clews, David George; and Sweeting, David, 4,093,158, Cl. 244-182.000.
Elliott, Steven P., to Du Pont de Nemours, E. I., and Company. Process for preparing polyesters from diphenols and aromatic dicarboxylic acids by direct polymerization. 4,093,595, Cl. 260-47.00C.
Ellis, Donald G. Inflatable insulating apparatus. 4,092,750, Cl. 5-343.000.
Elmo Company, Limited: *See—*
Kato, Masakathu, 4,093,362, Cl. 352-27.000.
Eltra Corporation: *See—*
Miele, Raymond D., Jr.; and Watson, Roy E., 4,092,866, Cl. 73-431.000.
Emerson Electric Co.: *See—*
Carrigan, Erwin R., 4,093,324, Cl. 308-187.100.
Shirey, Robert D., 4,093,968, Cl. 361-58.000.
Emerson, Ralph Waldo; and Shattuck, John R., to Plasmine Corporation, The. Paper coated with ammonia-containing sizing compositions. 4,093,779, Cl. 428-411.000.
Emmett, John Colin: *See—*
Brown, Thomas Henry; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,093,621, Cl. 260-294.80H.

Envirotech Corporation: *See—*
Thomas, Arthur E.; and Pace, E. Alan, 4,092,764, Cl. 19-107.000.
Eppink, Donald L.: *See—*
Miller, John J., Jr.; Eppink, Donald L.; and Loxley, Ted A., 4,093,017, Cl. 164-28.000.
Epstein, Lawrence J. Apparatus for testing reflexes and/or for functioning as a combination lock. 4,093,870, Cl. 307-10.00R.
Erb, Darrell M.: *See—*
Hartman, John M.; and Erb, Darrell M., 4,093,872, Cl. 307-221.00D.
Erb, Lester D.: *See—*
Dahl, Michael M.; and Erb, Lester D., 4,093,755, Cl. 427-299.000.
Erb, Thomas L.: *See—*
Frank, Donald H.; Jeffries, J. Fred; Swanson, Mary C.; Erb, Thomas L.; and Hall, James D., 4,092,980, Cl. 128-2.00A.
Erickson, Charles E.; and Neogi, Amar N., to Precision Cosmet Co., Inc. Composite prosthetic polymeric devices. 4,093,361, Cl. 351-160.000.
Erickson, Gerald, to International Omni-Pak Corporation. Bottle carrier. 4,093,295, Cl. 294-87.200.
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, to SKF Kugellagerfabriken GmbH. Sliding collar. 4,093,053, Cl. 192-98.000.
Erpenbeck, Paul J., to Breneman, Inc. Manual window shade roller cut off knife. 4,092,775, Cl. 30-95.000.
Ertl, John Paul. Method and apparatus for brain waveform examination. 4,092,981, Cl. 128-2.10B.
Erwin, Curtis L., Jr. Fuel measuring and recording systems for combustion devices and method for monitoring fuel flow. 4,092,850, Cl. 73-113.000.
Escher Wyss Limited: *See—*
Guyer, August, 4,093,552, Cl. 210-297.000.
Link, Christoph; and Stotz, Wolf-Gunter, 4,092,916, Cl. 100-174.000.
Escue, Jesse W. Stock winding apparatus. 4,093,143, Cl. 242-75.510.
Eshleman, Robert C. Miniaturized golf game. 4,093,222, Cl. 273-87.00R.
Eshriqui, Salomao. Articulated joint prosthesis. 4,092,740, Cl. 3-1.911.
ESPE Fabrik Pharmazeutischer Praparate GmbH: *See—*
Schmitt, Werner; Purrmann, Robert; Jochum, Peter; and Zahler, Wolf-Dietrich, 4,093,555, Cl. 252-188.30R.
Estes, Earl M., to American Technology Corporation. Test signal generating system and method. 4,093,960, Cl. 358-10.000.
Estradier, Francoise: *See—*
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,093,640, Cl. 260-429.900.
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,093,806, Cl. 544-165.000.
Eszenyl, Ervin: *See—*
Mayer, Gyorgy; Gyori, Janos; Rikker, Mihaly; Banfai, Antal; and Eszenyl, Ervin, 4,093,689, Cl. 264-71.000.
Etablissements Nativelle S.A.: *See—*
Jarreau, Francois Xavier; and Koenig, Jean-Jacques, 4,093,619, Cl. 260-284.000.
Etablissements Tiflex Societe Anonyme: *See—*
Bousquet, Jacques, 4,092,890, Cl. 83-284.000.
Evans, Norol T., to Hughes Aircraft Company. Clutter tracker using a smoothed doppler frequency measurement. 4,093,949, Cl. 343-7.00A.
Evans, William C., to Viva-Tech Inc. Phase-controlled voltage regulator. 4,093,908, Cl. 323-19.000.
EVG Entwicklungs-u. Verwertungs Gesellschaft mbH: *See—*
Gott, Hans; Ritter, Josef; Ritter, Klaus; and Ritter, Gerhard, 4,093,106, Cl. 221-224.000.
Ewers, Marion H., to Air Rotor Development Company, Inc. Patient handling system. 4,092,748, Cl. 5-85.000.
Ewy, Robert J.; and Moore, Robert P., to King Radio Corporation. Acceleration sensitive switch. 4,093,836, Cl. 200-61.530.
Extranuclear Laboratories, Inc.: *See—*
Fite, Wade L.; and Myers, Richard L., 4,093,855, Cl. 250-282.000.
Exxon Research and Engineering Company: *See—*
Ball, Gerald Stuart Morris; and Andrews, Anthony Walter, 4,092,970, Cl. 123-198.00D.
Maas, Edward T., Jr.; Longo, John M.; and Chang, Chin H., 4,093,783, Cl. 429-5.000.
Scher, Herbert I.; Lex, Joseph A.; and Ungar, Israel S., 4,093,766, Cl. 428-165.000.
Vannice, M. Albert; and Garten, Robert L., 4,093,643, Cl. 260-449.00M.
Ezaki, Toshi, to Toyoto Jidosha Kogyo K. K. Protective frame structure for a motor vehicle fuel tank. 4,093,254, Cl. 280-783.000.
Facet Enterprises, Inc.: *See—*
Giometti, Paul Francis, 4,092,870, Cl. 74-7.00R.
Factor, Arnold; Jaquiss, Donald Benjamin George; and Mark, Victor, to General Electric Company. Non-opaque flame retardant polycarbonate composition. 4,093,589, Cl. 260-45.75B.
Fahnenstich, Rudolf; Heese, Joachim; and Lewis, Dyfed, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessier. Fodder for ruminants. 4,093,740, Cl. 424-319.000.
Faivre, Andre: *See—*
Tanguy, Pierre; and Faivre, Andre, 4,092,835, Cl. 62-136.000.
Falk, Curt Gunnar, to Forenade Fabriksverken. Fluid actuated coupling assembly. 4,093,052, Cl. 192-88.00B.
Falkowski, Leonard; Bobrowski, Miroslaw; Buluk, Helena; Bylec, Elzbieta; Cybulska, Barbara; Golik, Jerzy; Kolodziejczyk, Pawel; Pawlak, Jan; Rudowski, Andrzej; Zielinski, Jan; Ziminski, Tadeusz; and Borowski, Edward, to Politechnika Gdanska. Antibiotic derivatives of polyene macrolide group and method of obtaining the same. 4,093,796, Cl. 536-17.000.
Fan, You-Ling; and Farnham, Alford Gailey, to Union Carbide Corporation. Silane end-capped polyarylene polyethers. 4,093,600, Cl. 260-49.000.
Farcy, Jean-Claude, to Commissariat a l'Energie Atomique. Device for applying a laser pulse delivered by a laser oscillator. 4,093,924, Cl. 330-4.300.
Farnham, Alford Gailey: *See—*
Fan, You-Ling; and Farnham, Alford Gailey, 4,093,600, Cl. 260-49.000.
Farrand Optical Co., Inc.: *See—*
La Russa, Joseph A., 4,093,347, Cl. 350-174.000.
Faulkingham, Clifford Henry. Flap positioning assembly. 4,093,112, Cl. 227-150.000.
Fayle, Paul R. Window lock. 4,093,285, Cl. 292-251.000.
Feichtinger, Gerhard: *See—*
List, Hans; Skatsche, Othmar; Greier, Josef; Obermayer, Bertram; Feichtinger, Gerhard; and Wagner, Johann, 4,092,956, Cl. 123-41.740.
Feil, Hendrik J.: *See—*
Ponjee, Johannes J.; and Feil, Hendrik J., 4,093,504, Cl. 156-656.000.
Feist, Wieland; Junghanns, Klaus; and Kunz, Alfred, to Jenoptik Jena G.m.b.H. Angle measuring device with a telescope. 4,093,383, Cl. 356-152.000.
Fellure, James Erwin; and Toth, Endre Lealie, to Arcair Company. Arc length measurement and control by optical scanning. 4,093,844, Cl. 219-124.020.
Feniger, Yale M.: *See—*
Garrett, Richard H., Sr.; and Feniger, Yale M., 4,093,141, Cl. 242-56.900.
Fenton, Alvin P., to Kohler Co. Magnetic armature piece for rotary solenoid. 4,093,931, Cl. 335-272.000.
Ferdinandi, Eckhardt: *See—*
Bagli, Jehan F.; and Ferdinandi, Eckhardt, 4,093,628, Cl. 260-326.12R.
Ferguson, Charles L. Safety device for welding torch. 4,093,191, Cl. 266-48.000.
Ferguson, Gerald D., to United States of America, Navy. Narrow angle, narrow bandwidth optical receiver system. 4,093,384, Cl. 356-186.000.
Ferguson, William C., to Cooper Industries, Inc. Cutting tool. 4,092,776, Cl. 30-253.000.
Fernholz, Hans; Roscher, Gunter; Schmidt, Hans-Joachim; Schmitz, Heinz; and Wunder, Friedrich, to Hoechst Aktiengesellschaft. Process for the preparation of a palladium catalyst. 4,093,559, Cl. 252-443.000.
Ferruti, Paolo; Martuscelli, Ezio; Riva, Fernando; and Provenzale, Luciano. Macromolecular materials suitable for forming antithrombogenic prosthesis and artificial organs and process for preparing same. 4,093,677, Cl. 260-858.000.
Fib-R-Fit Inc.: *See—*
Verdesca, Anthony Fredrick; and Borrajo, Orlando, 4,093,279, Cl. 285-23.000.
Fields, Larry D.: *See—*
Morris, Earl L.; and Fields, Larry D., 4,093,177, Cl. 251-54.000.
Finger, Gunther: *See—*
Hausberg, Gerhard; Hegemann, Karl-Rudolf; Finger, Gunther; Schafer, Hans; and Weissert, Helmut, 4,093,434, Cl. 55-226.000.
Firm Piel & Adey: *See—*
Seybold, Rolf; and Gross, Gerd, 4,093,019, Cl. 164-52.000.
Firmenich S.A.: *See—*
Demole, Edouard P., 4,092,989, Cl. 131-17.00R.
Fischer, Rudolf; and Frey, Rudolf, to Albert-Frankenthal AG. Device for slowing down printing specimen in the folding apparatus. 4,093,203, Cl. 270-20.000.
Fisher, Martin John, to British Hydromechanics Research Association, The. Slotted worktable. 4,092,889, Cl. 83-177.000.
Fisher, Michael H., to Merck & Co., Inc. Derivatives of antibiotic substance milbemycin and processes therefor. 4,093,629, Cl. 260-326.340.
Fisli, Tibor, to Xerox Corporation. System for centrifugally casting a thin film plastic in a replica process for providing multi-faceted polygonal scanners. 4,093,350, Cl. 350-299.000.
Fite, Wade L.; and Myers, Richard L., to Extranuclear Laboratories, Inc. Detector for heavy ions following mass analysis. 4,093,855, Cl. 250-282.000.
Fitzpatrick, John D.; and Smith, Gary L., to General Motors Corporation. Independent suspension system. 4,093,273, Cl. 280-696.000.
Fleischer, Helmut: *See—*
Schneider, Erich; Schnaibel, Eberhard; and Fleischer, Helmut, 4,092,853, Cl. 73-121.000.
Fleischer, Thomas B., to Huyck Corporation. Papermakers belts having ultra-high modulus load bearing yarns. 4,093,512, Cl. 162-348.000.
Fleischfresser, Marvin H.: *See—*
Miller, George A.; and Fleischfresser, Marvin H., 4,093,655, Cl. 260-564.0RF.
Fletcher, George Leland; and Mosehauer, Michael, to Eastman Kodak Company. Water soluble binder overcoat on vesicular element containing N_2-releasing agent. 4,093,463, Cl. 96-67.000.
Fletcher, Orval K. Fluid mill powered vehicle. 4,093,035, Cl. 180-65.0DD.
Fletchic, Donald K.: *See—*
Isaacson, Anson; Morrison, Howard J.; Baer, Ralph H.; Fletchic, Donald K.; and Keller, Albert G., 4,093,832, Cl. 179-100.40D.

Celanese Corporation. Process for making porous metal containing powder coating compositions. 4,093,571, Cl. 260-2.50B.

Gornik, Erich: *See—*
Damen, Theodoor Charlouis; Gornik, Erich; Nguyen, Van-Tran; and Patel, Chandra Kumar Naranbhai, 4,093,344, Cl. 350-147.000.

Goshi Kaisha Mizuno Kogeisha: *See—*
Mizuno, Akira, 4,093,050, Cl. 192-0.049.

Goto, Toshio, to Fuji Photo Film Co., Ltd. Auto-process camera. 4,093,956, Cl. 354-86.000.

Gotoh, Toshihiko: *See—*
Fujita, Masahiko; Gotoh, Toshihiko; and Nakamura, Tsutomu, 4,093,897, Cl. 218-138.000.

Gott, Hans; Ritter, Josef; Ritter, Klaus; and Ritter, Gerhard, to EVG Entwicklungs-u. Verwertungs Gesellschaft mbH. Apparatus for detaching wires cut to length from a disordered bundle of wire. 4,093,106, Cl. 221-224.000.

Gottfried Bischoff Bau Kompl. Gasreinigungs- und Wasserruckkuhlanlagen Kommanditgesellschaft: *See—*
Hausberg, Gerhard; Hegemann, Karl-Rudolf; Finger, Gunther; Schafer, Hans; and Weissert, Helmut, 4,093,434, Cl. 55-226.000.

Gotz, Manfred Karl: *See—*
Sestanj, Kazimir; Immer, Hans Ueli; and Gotz, Manfred Karl, 4,093,713, Cl. 424-177.000.

Gould Inc.: *See—*
Kozacka, Frederick J., 4,093,932, Cl. 337-161.000.
Strybel, Richard V., 4,092,865, Cl. 73-756.000.

Goursky, Vsevolod: *See—*
Henein, Kamal Labib; and Goursky, Vsevolod, 4,093,876, Cl. 307-264.000.

Gowing, Ellis, to St. Francis Hospital, Inc. Cardiopulmonary resuscitation teaching aid. 4,092,788, Cl. 35-17.000.

Gozzo, Franco: *See—*
Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,093,727, Cl. 424-258.000.

Grammatopoulos, Nick G., to Groman Corporation. Plural chamber sheet metal gas burner and method of manufacture. 4,092,975, Cl. 126-41.00R.

Gras, Roger: *See—*
Barraud, Andre; Gras, Roger; and Vandevyver, Michel, 4,093,757, Cl. 427-434.00A.

Grasselli, Robert K.; Suresh, Dev D.; and Miller, Robert C., to Standard Oil Company, The. Molybdate catalysts. 4,093,558, Cl. 252-432.000.

Gravelle, Homer E., to Sundstrand Corporation. Compressor impeller and method of manufacture. 4,093,401, Cl. 416-185.000.

Graybill, Wilmer B.: *See—*
Jeffery, Thomas C.; and Graybill, Wilmer B., 4,092,846, Cl. 73-29.000.

Grayson, John F.; and Groth, Peter K. H., to Standard Oil Company (Indiana). Mineral prospecting by organic diagenesis. 4,093,420, Cl. 23-230.0EP.

Graystone Corporation: *See—*
Allmer, Franz, 4,092,903, Cl. 91-36.000.

Greaves, Jeffrey Chester: *See—*
Burgess, Robin Henry; and Greaves, Jeffrey Chester, 4,093,787, Cl. 526-62.000.

Greco, Carl C.: *See—*
Honig, Milton L.; Greco, Carl C.; and Walsh, Edward N., 4,093,651, Cl. 260-543.00H.

Green Cross Corporation, The: *See—*
Iga, Yoshiro; and Shiga, Masashi, 4,093,608, Cl. 260-112.00B.

Green, Dennis William: *See—*
Thwaites, Peter John; and Green, Dennis William, 4,093,818, Cl. 174-48.000.

Greenwell, Joseph Daniel; Hughes, Charles C.; and Kinney, Robert W., to R. A. Jones & Co. Inc. Magazine and feeder for carton blanks. 4,093,207, Cl. 271-3.100.

Greenwood Mills, Inc.: *See—*
Kasdan, Harvey Lee; and Mead, Donald Carleton, 4,093,866, Cl. 250-563.000.

Gregg, Edmund; and Melocik, Grant C., to Towmotor Corporation. Load moment sensing system for lift trucks. 4,093,091, Cl. 214-673.000.

Gregory, Gordon Ian: *See—*
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 4,093,803, Cl. 544-27.000.

Greier, Josef: *See—*
List, Hans; Skatsche, Othmar; Greier, Josef; Obermayer, Bertram; Feichtinger, Gerhard; and Wagner, Johann, 4,092,956, Cl. 123-41.740.

Greig, Ian Robert Kennedy, to Pilkington Brothers Limited. Glass fiber reinforced cement composite materials. 4,093,471, Cl. 106-99.000.

Greskovich, Charles D.; and O'Clair, Chester R., to General Electric Company. Hot pressing of silicon nitride using magnesium silicide. 4,093,687, Cl. 264-65.000.

Griesch, Dorothee; Schroter, Herbert; Schwagler, Peter; and Stein, Eckehard, to Hoechst Aktiengesellschaft. Methods and apparatus for automatic exposure control. 4,093,375, Cl. 355-68.000.

Griffin, Clyde C.: *See—*
Griffin, J. Curtis; and Griffin, Clyde C., 4,092,936, Cl. 111-1.000.

Griffin, J. Curtis; and Griffin, Clyde C., to Harrington Manufacturing Co. Method and apparatus for seed tape planting. 4,092,936, Cl. 111-1.000.

Grimm, Hermann: *See—*
Meyer, Ernst; Trube, Hans; and Grimm, Hermann, 4,092,907, Cl. 98-40.00A.

Grinberg, Jan: *See—*
Jacobson, Alexander D.; Grinberg, Jan; Braatz, Paul O.; and Bleha, William P., Jr., 4,093,357, Cl. 350-338.000.

Groman Corporation: *See—*
Grammatopoulos, Nick G., 4,092,975, Cl. 126-41.00R.

Groom, Kenneth Dale, to Boeing Company, The. Instrument and panel cooling apparatus. 4,093,021, Cl. 165-1.000.

Groome, Ernest J., to Clupak, Inc. Nip roll for treating web materials. 4,092,917, Cl. 100-176.000.

Grosjean, Jon Paul, to GTE Sylvania Incorporated. Receiver having a phase-locked loop. 4,093,824, Cl. 179-15.0BT.

Gross, Benjamin; and Lee, Wooyoung, to Mobil Oil Corporation. FCC Catalyst section control. 4,093,537, Cl. 208-164.000.

Gross, Gerd: *See—*
Seybold, Rolf; and Gross, Gerd, 4,093,019, Cl. 164-52.000.

Groth, Peter K. H.: *See—*
Grayson, John F.; and Groth, Peter K. H., 4,093,420, Cl. 23-230.0EP.

Grove, George Luther, to Cincinnati Milacron Inc. Wheel clamping device. 4,092,807, Cl. 51-168.000.

Grubbs, Harvey J.: *See—*
Van Auken, Thomas V.; Grubbs, Harvey J.; and Johnson, William R., Jr., 4,092,988, Cl. 131-17.00R.

Grundig E. M. V. Elektro-Mechanische Versuchsanstalt Max Grundig: *See—*
Flugge, Manfred, 4,093,930, Cl. 334-86.000.

Grundmann, Peter: *See—*
Hein, Wolfgang; and Grundmann, Peter, 4,093,108, Cl. 222-401.000.

Grunwald, Frederick A., to Mead Johnson & Company. Process for reducing blood sugar concentration in a mammal. 4,093,741, Cl. 424-321.000.

Gryglas, Stephen. Adjustable two-way cam cleat. 4,092,941, Cl. 114-218.000.

GTE Lenkurt Electric (Canada) Ltd.: *See—*
Pollitt, Glenn A., 4,093,874, Cl. 307-251.000.

GTE Sylvania Incorporated: *See—*
Collette, Robert P., 4,093,895, Cl. 315-371.000.
Grosjean, Jon Paul, 4,093,824, Cl. 179-15.0BT.

Guarino, Carmen F., to Autotrol Corporation. Activated sludge treatment of wastewater. 4,093,539, Cl. 210-17.000.

Guenther, Ernst: *See—*
Dietrich, Ernst; Guenther, Ernst; Hoerauf, Werner; Kissel, Ernst; Linge, Hermann; Neumann, Eckart; and Schaefer, Eberhard, 4,092,784, Cl. 34-13.000.

Guenther, Joachim, to Xerox Corporation. Pre-separated recirculating document copying system. 4,093,372, Cl. 355-50.000.

Gueret, Jean-Louis: *See—*
Morane, Bruno; Hardouin, Yves; and Gueret, Jean-Louis, 4,093,124, Cl. 239-327.000.

Gulf Oil Corporation: *See—*
Hill, Donald R. J., 4,093,692, Cl. 264-95.000.

Gulf Research & Development Company: *See—*
Onopchenko, Anatoli; and Schulz, Johann G. D., 4,093,660, Cl. 260-591.000.

Gulf & Western Industries, Inc.: *See—*
Miller, David D., 4,093,998, Cl. 364-900.000.

Gurtler, Richard Warren; Handy, Robert Maxwell; Keeling, Michael Chancey; and Lesk, Israel Arnold, to Motorola, Inc. Flat plate solar collector. 4,092,977, Cl. 126-270.000.

Gurwicz, David, to Sevcon Limited. D.C. Electrical circuit means. 4,093,980, Cl. 363-57.000.

Gustavsson, Lars G. T.; and Svensson, Sven-Hakan, to AB Bofors. Device for firearm intended for tank which has a barrel supported in a recoil jacket. 4,092,901, Cl. 89-46.000.

Gutierrez, Eddie Nelson: *See—*
Lamberti, Vincent; and Gutierrez, Eddie Nelson, 4,093,634, Cl. 260-346.740.

Guyer, August, to Escher Wyss Limited. Filtration apparatus. 4,093,552, Cl. 210-297.000.

Gyori, Janos: *See—*
Mayer, Gyorgy; Gyori, Janos; Rikker, Mihaly; Banfai, Antal; and Eszenyl, Ervin, 4,093,689, Cl. 264-71.000.

Haag, Werner O.: *See—*
Rodewald, Paul G.; and Haag, Werner O., 4,093,543, Cl. 210-59.000.

Habeger, Charles C., Jr.; and Quy, Dennis A., to Phillips Petroleum Company. Raster display position detection. 4,093,947, Cl. 340-324.0AD.

Habermeier, Jurgen; and Berner, Godwin, to Ciba-Geigy Corporation. Metal salts of N-hydroxyalkylated or N-aminoalkylated branched α-aminoacids. 4,093,639, Cl. 260-429.900.

Habiger, Cyril W.; and Robinson, Tom E., to Caterpillar Tractor Co. Load limiting device. 4,093,092, Cl. 214-674.000.

Habinger, Max. Automatic runway traffic direction control. 4,093,937, Cl. 340-26.000.

Hadi, Ali Sameh Abdel; Menzler, Peter-Michael; and Reinhardt, Johann, to Gesellschaft fur Kernforschung m.b.H. Process for recovering molybdenum-99 from a matrix containing neutron irradiated fissionable materials and fission products. 4,093,697, Cl. 423-2.000.

Haeussermann, Walter, to United States of America, Administrator, National Aeronautics and Space Administration. Velocity measurement system. 4,093,917, Cl. 324-173.000.

Hagan, Joseph Weldon, to Union Carbide Corporation. Thermosetting vinyl chloride polymer powder coatings. 4,093,575, Cl. 260-15.000.

Hahn, Alfred; Steiner, Ernst; and Pospischil, Rudolf, to Siemens Aktiengesellschaft. Primary X-ray diaphragm assembly. 4,093,864, Cl. 250-505.000.

Hain, Paul O., to Champion International Corporation. Automotive exhaust system using filter containing calcium carbonate coating. 4,093,422, Cl. 23-284.000.

Hairgrove, Nelson, Sr. Controller for DC arc welding generators. 4,093,845, Cl. 219-132.000.

Hakes, Gary A.; Shook, Norma G.; Cackley, George W.; Burdette, Stephen D.; and Morris, Hugh C., to Caterpillar Tractor Co. Vehicle steering brake and clutch control. 4,093,048, Cl. 192-13.00R.

Hale, C. Marion. Net holding stanchion assembly. 4,093,224, Cl. 273-95.00H.

Hale, David Jerry, to Brunswick Corporation. Internal combustion engine. 4,092,958, Cl. 123-73.0PP.

Haley, Harold A., to FMC Corporation. Winding method and apparatus for strapping and strapping package. 4,093,146, Cl. 242-158.200.

Hall, Dennis G., to Burroughs Corporation. Adjustable holder particularly useful for mounting magnetic heads. 4,093,966, Cl. 360-109.000.

Hall, James D.: *See—*
Frank, Donald H.; Jeffries, J. Fred; Swanson, Mary C.; Erb, Thomas L.; and Hall, James D., 4,092,980, Cl. 128-2.00A.

Hall, Kenneth: *See—*
Edwards, Robert Harry; Williams, Thomas Alan; and Hall, Kenneth, 4,093,662, Cl. 260-606.50P.

Hall, Luther A. R.; and Gordon, David A., to Ciba-Geigy Corporation. 5-Substituted phosphonate hydantoins and derivatives thereof. 4,093,809, Cl. 548-308.000.

Ham, George E.; and Krause, Ruben L., to Dow Chemical Company, The. Cyclic oligomers of N-substituted aziridines. 4,093,615, Cl. 260-239.0BC.

Hamada, Mitsuharu: *See—*
Takemura, Tooji; Saitoh, Shigeru; and Hamada, Mitsuharu, 4,092,930, Cl. 104-247.000.

Hamanaka, Michito; Sano, Toshio; and Kumura, Noriharu, to Idemitsu Kosan Company Limited. Stirred gas bubble fermenter. 4,093,518, Cl. 195-142.000.

Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Label printing and applying apparatus. 4,092,918, Cl. 101-288.000.

Hammann, Ingeborg: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,093,718, Cl. 424-200.000.

Hammons, Carl A.; and Kraft, Philip O., to Kraft Systems, Inc. Control stick assembly for radio control equipment. 4,093,953, Cl. 343-225.000.

Handy, Robert Maxwell: *See—*
Gurtler, Richard Warren; Handy, Robert Maxwell; Keeling, Michael Chancey; and Lesk, Israel Arnold, 4,092,977, Cl. 126-270.000.

Hannon, Martin J.: *See—*
Gordon, Marvin; Hannon, Martin J.; and George, Henry H., Jr., 4,093,571, Cl. 260-2.50B.

Hansen, Howard C., to Clark Equipment Company. Constraint means for flexible elements. 4,092,997, Cl. 137-351.000.

Hansen, Manfred W.; and Kersting, Emil F., to Sack GmbH. Apparatus for cutting steel sections. 4,092,891, Cl. 83-341.000.

Hapke, Kenyon A., to Bell & Howell Company. Motion picture projector apparatus and high intensity projection arrangement. 4,093,366, Cl. 352-198.000.

Hara, Katsuaki: *See—*
Uyama, Noboru; and Hara, Katsuaki, 4,093,032, Cl. 177-165.000.

Harada, Tatsuo: *See—*
Yabutani, Kunihiro; Ikeda, Kenichi; Hatta, Shigenori; and Harada, Tatsuo, 4,093,743, Cl. 424-324.000.

Hardouin, Yves: *See—*
Morane, Bruno; Hardouin, Yves; and Gueret, Jean-Louis, 4,093,124, Cl. 239-327.000.

Hardy, Edgar E.: *See—*
Parts, Leo P.; and Hardy, Edgar E., 4,093,684, Cl. 264-25.000.

Hargrove, Logan Ezral, to Bell Telephone Laboratories, Incorporated. Optical waveguide having periodic spatial perturbations. 4,093,343, Cl. 350-96.300.

Hari, Stefan; and Roueche, Armand, to Ciba-Geigy Corporation. Trisazo pigments containing two barbituric acid coupling components. 4,093,613, Cl. 260-154.000.

Harley, Alfred H., to Speed-Line Manufacturing Company, Inc. Method for making pipe fitting coverings. 4,093,683, Cl. 264-25.000.

Harnischfeger Corporation: *See—*
Morters, Ronald W.; and Millonzi, Lawrence A., 4,093,898, Cl. 318-227.000.
Wieschel, John E., 4,093,184, Cl. 254-139.100.

Harrington, Colin John: *See—*
Jayne, Gerald John Joseph; Askew, Herbert Frank; and Harrington, Colin John, 4,093,554, Cl. 252-78.300.

Harrington Manufacturing Co.: *See—*
Griffin, J. Curtis; and Griffin, Clyde C., 4,092,936, Cl. 111-1.000.

Harris, Erik Preston; and Keyes, Robert William, to International Business Machines Corporation. Method for fabricating ultra-narrow metallic lines. 4,093,503, Cl. 156-628.000.

Harris, Richard, to Mack and Gooding, a part interest. Swimming pool apparatus. 4,092,746, Cl. 4-172.170.

Harris, Robert F.; and Wagener, Earl H., to Dow Chemical Company, The. Novel onium surfactants. 4,093,663, Cl. 260-607.00B.

Harrison, Reginald William; and Peach, George Albert, to Warne Surgical Products Limited. Method of making surgical catheters and tubes. 4,093,484, Cl. 156-244.130.

Hart, John Peter: *See—*
Geary, Joseph E.; Pelensky, Joseph; and Hart, John Peter, 4,093,753, Cl. 427-21.000.

Hart, Robert J., to Commercial Resins Company. Internal pipe coating apparatus. 4,092,950, Cl. 118-8.000.

Hartless, Ray Lawson; and Trozzolo, Anthony Marion, to Bell Telephone Laboratories, Incorporated. Stabilized polymeric composition in contact with metals. 4,093,774, Cl. 428-379.000.

Hartman, John M.; and Erb, Darrell M., to Hughes Aircraft Company. Charge coupled device with input for direct injection of signal. 4,093,872, Cl. 307-221.00D.

Hartman, Marvis E.: *See—*
Chang, Wen-Hsuan; Dowbenko, Rostyslaw; Hartman, Marvis E.; and Porter, Samuel, Jr., 4,093,673, Cl. 260-824.0EP.

Hartmann, Karl-Heinz; and Mayer, Hans-Gunther, to Albert-Frankenthal AG. Folding device for roller rotating printing presses. 4,093,206, Cl. 270-67.000.

Hartmann, Ludwig; Maahs, Paul F.; Gerking, Luder; Ruzek, Ivo; and Schafer, Eberhard, to Lutravil Spinnvlies GmbH & Co. Multiple-layered non-woven fabric. 4,093,763, Cl. 428-95.000.

Hasenauer, Dieter: *See—*
Sassmannshausen, Gunter; and Hasenauer, Dieter, 4,093,785, Cl. 429-149.000.

Hashimoto, Takashi: *See—*
Araya, Kenzo; and Hashimoto, Takashi, 4,092,919, Cl. 101-53.000.

Haslett, Robert Alan, to Ricardo & Co., Engineers (1927) Limited. I.C. Engines. 4,092,967, Cl. 123-143.00B.

Hatayama, Yoshio: *See—*
Nishikawa, Yasuo; Watanabe, Akira; Sugimoto, Tetsuya; Yabuki, Kazuyasu; and Hatayama, Yoshio, 4,093,561, Cl. 252-466.00J.

Hatta, Shigenori: *See—*
Yabutani, Kunihiro; Ikeda, Kenichi; Hatta, Shigenori; and Harada, Tatsuo, 4,093,743, Cl. 424-324.000.

Hauck, Frederic P.; Condon, Michael E.; and Fox, Rita T., to E. R. Squibb & Sons, Inc. Esters of 4-[3-(substituted amino)-2-hydroxypropoxy]-5,6,7,8-tetrahydro-1,6,7-naphthalenetriols. 4,093,814, Cl. 560-139.000.

Haugwitz, Rudiger D.; and Cruthers, Larry R., to E. R. Squibb & Sons, Inc. Sulfoxide derivatives of benzimidazoles. 4,093,732, Cl. 424-273.00R.

Hauri, Jacques: *See—*
Charransol, Pierre; Hauri, Jacques; and Athenes, Claude, 4,093,827, Cl. 179-15.0AT.

Hausberg, Gerhard; Hegemann, Karl-Rudolf; Finger, Gunther; Schafer, Hans; and Weissert, Helmut, to Gottfried Bischoff Bau Kompl. Gasreinigungs- und Wasserruckkuhlanlagen Kommanditgesellschaft. Gas-scrubber apparatus for blast furnace. 4,093,434, Cl. 55-226.000.

Hauser, Oscar G.; Mannik, Kallis H.; and Whited, Charles A., to Xerox Corporation. Method of transfer. 4,093,457, Cl. 96-1.200.

Haviv, Fortuna; Patchornik, Abraham; and Altman, Janina, to Yeda Research and Development Co., Ltd. Thiocarbamatemethyl-substituted cephalosporin derivatives. 4,093,802, Cl. 544-27.000.

Haviv, Fortuna; and Patchornik, Abraham, to Yeda Research and Development Co., Ltd. Pyridiniummethylaryl-substituted cephalosporin derivatives. 4,093,804, Cl. 544-27.000.

Hayden, Daniel B.: *See—*
Kaplit, Michael; Hayden, Daniel B.; and Smith, George W., 4,093,355, Cl. 350-334.000.

Heckelsberg, Louis F., to Phillips Petroleum Company. Catalytic cracking and dehydrocyclizing of alkanes using alkaline earth oxides promoted with manganese oxide and/or rhenium oxide. 4,093,536, Cl. 208-121.000.

Heckmaier, Joseph: *See—*
Bauer, Johann; and Heckmaier, Joseph, 4,093,791, Cl. 526-200.000.

Hedlund, Lee Vern, to RCA Corporation. Chrominance signal transcoding apparatus. 4,093,959, Cl. 358-4.000.

Heese, Joachim: *See—*
Fahnenstich, Rudolf; Heese, Joachim; and Lewis, Dyfed, 4,093,740, Cl. 424-319.000.

Hefner, Paul, to Stewart, Ralph, a part interest. Rotatable engine supporting apparatus. 4,093,199, Cl. 269-61.000.

Hegemann, Karl-Rudolf: *See—*
Hausberg, Gerhard; Hegemann, Karl-Rudolf; Finger, Gunther; Schafer, Hans; and Weissert, Helmut, 4,093,434, Cl. 55-226.000.

Hein, Paul William: *See—*
Brandt, Richard Thornton; and Hein, Paul William, 4,093,862, Cl. 250-445.00T.

Hein, Wolfgang; and Grundmann, Peter, to Carl Schleicher & Schull. Syringe adapted to overcome a pressure resistance. 4,093,108, Cl. 222-401.000.

Heine, Heinrich; Woditsch, Peter; Bohmann, Theodor; and Rade, Dieter, to Bayer Aktiengesellschaft. Coated stabilized cadmium chalcogenide pigments. 4,093,777, Cl. 428-403.000.

Heinemann Electric Company: *See—*
Nicol, Ronald, 4,093,838, Cl. 200-303.000.

Heinlein, Karl Hans; and Busch, Joachim. Method for processing textile material. 4,093,417, Cl. 8-137.000.

Heinz, David M.; and Whitcomb, Eugene C., to Rockwell International Corporation. Epitaxial, sodium-substituted lithium ferrite films. 4,093,781, Cl. 428-539.000.

Heirbaut, Wilfried Andre, to AGFA-GEVAERT N.V. Process for making polymeric film. 4,093,695, Cl. 264-289.000.

Heller, Jorge: *See—*
Choi, Nam Sok; and Heller, Jorge, 4,093,709, Cl. 424-19.000.

Imbert, Pierre, to Service D'Exploitation Industrielle des Tabacs et des Allumettes. Cigar-like product. 4,092,987, Cl. 131-8.00R.
Immer, Hans U.: *See—*
Abraham, Nedumparambil A.; Immer, Hans U.; and Sestanj, Kazimir, 4,093,610, Cl. 260-112.50R.
Immer, Hans Ueli: *See—*
Sestanj, Kazimir; Immer, Hans Ueli; and Gotz, Manfred Karl, 4,093,713, Cl. 424-177.000.
Imperial Chemical Industries Inc.: *See—*
Miles, David Roy, 4,093,407, Cl. 418-15.000.
Imperial Chemical Industries Limited: *See—*
Bamfield, Peter; Quan, Peter Michael; and Smith, Trevor James, 4,093,646, Cl. 260-508.000.
Burgess, Robin Henry; and Greaves, Jeffrey Chester, 4,093,787, Cl. 526-62.000.
Davis, John Brian; Skilling, Derek; and Wrigley, Nigel Edwin, 4,093,412, Cl. 425-71.000.
Lawes, Norman Edward, 4,093,114, Cl. 220-46.200.
McGrail, Patrick Terence; Smith, Stephen Richard; Bannister, Frederick Robert; and Boutle, David Leonard, 4,093,458, Cl. 96-87.00R.
In Situ Technology, Inc.: *See—*
Terry, Ruel C., 4,093,025, Cl. 166-251.000.
Terry, Ruel C., 4,093,310, Cl. 299-2.000.
Inabayashi, Akira; and Watanabe, Jun, to Toyo Kogyo Co., Ltd.; and Tanaka Instrument Co., Ltd. Electric/manual door lock operating mechanism. 4,093,289, Cl. 292-336.300.
Industrial Electronic Hardware: *See—*
Pittman, Robert B., 4,093,330, Cl. 339-17.0CF.
Industrial Park Machine & Tool Co, Inc.: *See—*
Weskamp, Robert J.; and Barclay, Robert H., 4,093,758, Cl. 428-8.000.
Industrie Pirelli S.p.A.: *See—*
Colombani, Bruno, 4,093,495, Cl. 156-394.000.
Industries et Techniques d'Ameublement: *See—*
Contastin, Andre, 4,093,176, Cl. 249-167.000.
Instytut Chemii Nieorganicznej: *See—*
Augustyn, Wladyslaw; Dziegielewska, Maria; and Kossuth, Andrzej, 4,093,706, Cl. 423-490.000.
Intel Corporation: *See—*
Perlegos, George; and Salsbury, Phillip J., 4,094,012, Cl. 365-226.000.
Vannier, Jerald W.; and Bastian, Gary T., 4,093,873, Cl. 307-223.00R.
Intercontinental Dynamics Corp.: *See—*
Argentieri, Michael A.; and Lionetti, James, 4,093,938, Cl. 340-27.00R.
International Business Development Company: *See—*
Zenzaburo, Iwamoto, 4,092,974, Cl. 126-38.000.
International Business Machines Corporation: *See—*
Bodner, Ronald Eugene; Crooks, Thomas Lee; and Kiscaden, Richard Craig, 4,093,986, Cl. 364-200.000.
Burgers, Gerrit, 4,093,056, Cl. 192-127.000.
Christiana, William R.; and Hevesi, Joseph F., 4,093,132, Cl. 242-7.030.
Double, Glen P.; Kahwaty, Vincent N.; Randall, James D.; and Reinhart, Fritz M., 4,093,912, Cl. 324-.5MA.
Gaudette, Charles Henry; and Williams, Raymond Charles, 4,093,987, Cl. 364-200.000.
Harris, Erik Preston; and Keyes, Robert William, 4,093,503, Cl. 156-628.000.
Heuer, Dale Arthur; Schloss, Phillip Christian; and Schroeder, Larry Lloyd, 4,093,982, Cl. 364-200.000.
Hogan, Walter John; Schwartz, Alfred Alexander; and Stewart, Joseph Robert, 4,093,996, Cl. 364-900.000.
Horr, Andrew Frederick; and White, William Frederick, 4,093,378, Cl. 355-76.000.
Knepper, Ronald William, 4,093,875, Cl. 307-251.000.
Masog, Charles Raymond; Petrie, Jerome Urban; and Mishima, Yasutsugu, 4,093,983, Cl. 364-200.000.
Nussbaumer, Henri J., 4,093,994, Cl. 364-726.000.
Shattuck, Meredith David; and Sincerbox, Glenn Tavernia, 4,093,358, Cl. 350-357.000.
International Flavors & Fragrances Inc.: *See—*
Withycombe, Donald Arthur; Mookherjee, Braja Dulal; Vock, Manfred Hugo; and Vinals, Joaquin Francisco, 4,093,752, Cl. 426-536.000.
International Omni-Pak Corporation: *See—*
Erickson, Gerald, 4,093,295, Cl. 294-87.200.
International Standard Electric Corporation: *See—*
Crick, Aubrey M., 4,093,341, Cl. 350-96.210.
Foord, Stanley G.; and Simpson, Walter E., 4,093,342, Cl. 350-96.230.
Ipco Hospital Supply Corporation (Whaledent International Division): *See—*
Schneiderman, Max, 4,092,986, Cl. 128-303.140.
Irvin Industries, Inc.: *See—*
Landgraf, Glenn A.; and Ebel, Fred H., 4,093,204, Cl. 270-21.000.
Isaacson, Anson; Morrison, Howard J.; Baer, Ralph H.; Fletchic, Donald K.; and Keller, Albert G., to Marvin Glass & Associates. Programmable record changer. 4,093,832, Cl. 179-100.40D.
Ishiguro, Tatsuo; and Suzuki, Norio, to Nippon Electric Co., Ltd. Adaptive predictive encoder. 4,093,962, Cl. 358-138.000.
Ishihara, Takeo; Yamamoto, Hitoshi; and Iiga, Tsuyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Speed changing position regulating device for autobicycles. 4,093,264, Cl. 280-296.000.
Ishino, Fukuya: *See—*
Saito, Kyuta; and Ishino, Fukuya, 4,093,819, Cl. 178-2.00R.
Isono, Tadao, to Nihon Beru-Haueru Kabushiki Kaisha (Bell & Howell Japan, Ltd.). Automatic focus adjusting device. 4,093,365, Cl. 352-140.000.
Isovolta Osterreichische Isolierstoffwerk Aktiengesellschaft: *See—*
Kirsch, Kurt; Hilzensauer, Volkmar; Pflug, Gunther; Wehrmann, Felix; and Maresch, Gerald, 4,093,488, Cl. 156-245.000.
Ito, Shigeyasu: *See—*
Makino, Yoshimi; Uedaira, Satoru; and Ito, Shigeyasu, 4,093,453, Cl. 75-129.000.
Itoh, Shoji: *See—*
Tsuruta, Hidemasa; Itoh, Shoji; Otsuka, Masayuki; and Shimizu, Naoki, 4,093,505, Cl. 159-9.00A.
Itoh, Tsutomu, to Onoda Cement Co., Ltd. Bottle gripper. 4,093,296, Cl. 294-90.000.
ITW-Ateco G.m.b.H.: *See—*
Wibrow, Gunter, 4,093,389, Cl. 403-280.000.
Ivashkova, Nina Efimovna: *See—*
Matskevich, Danil Danilovich; Ivashkova, Nina Efimovna; and Gavrikov, Viktor Vasilievich, 4,092,843, Cl. 73-17.00R.
Iversen, John E.: *See—*
Welch, Richard D.; and Iversen, John E., 4,093,493, Cl. 156-358.000.
Ivins, Raymond W. Powered vehicle jack. 4,093,181, Cl. 254-97.000.
Iwai, Yuichiro: *See—*
Kawamura, Yoshikazu; Shimoi, Akio; and Iwai, Yuichiro, 4,093,992, Cl. 364-705.000.
Iwata, Masao; and Yoshizawa, Hisao, to Hitachi Metals, Ltd. Anisotropic permanent magnet alloy and a process for the production thereof. 4,093,477, Cl. 148-108.000.
J.P. Stevens & Co., Inc.: *See—*
Poore, Thomas C., 4,092,763, Cl. 19-98.000.
J. T. Baker Chemical Co.: *See—*
Baxter, Robert, Jr.; Antoci, Frank J.; Tynes, William J., III; Petrucci, Pasquale M.; and Martin, George F., 4,093,849, Cl. 235-92.0PC.
Jabs, Gert: *See—*
Reischl, Artur; Jabs, Gert; and Gonzalez-Dorner, Alberto Carlos, 4,093,569, Cl. 260-2.5AM.
Jackson, Winston J., Jr.; and Kuhfuss, Herbert F., to Eastman Kodak Company. Copolyesters of terephthalic acid, 1,2-propanediol and 1,4-cyclohexanedimethanol. 4,093,603, Cl. 260-75.00R.
Jacob, Guy Michel, to U.S. Philips Corporation. Method for synthesis of III-V compounds. 4,093,704, Cl. 423-299.000.
Jacobs, Lawrence O'Quinn, to Plastic Products, Inc. Process and apparatus for forming pleats in a draw drape. 4,093,483, Cl. 156-227.000.
Jacobs, Richard L., to Sherwin-Williams Company, The. Production of pulp slurries employing isatoic anhydride. 4,093,509, Cl. 162-158.000.
Jacobson, Alexander D.; Grinberg, Jan; Braatz, Paul O.; and Bleha, William P., Jr., to Hughes Aircraft Company. Cermet interface for electro-optical devices. 4,093,357, Cl. 350-338.000.
Jacobson, Tord, to Telefonaktiebolaget L M Ericsson. Socket contact. 4,093,337, Cl. 339-256.00S.
Jacques, Ronald Harmon. Punching bag for practicing uppercuts. 4,093,212, Cl. 272-76.000.
Jager, Gerhard: *See—*
Metzger, Carl; Jager, Gerhard; and Lurssen, Klaus, 4,093,447, Cl. 71-111.000.
Jahn, Walter: *See—*
Scholz, Hansjurgen; Gimbel, Jurgen; and Jahn, Walter, 4,093,274, Cl. 280-747.000.
James M. Carroll Company: *See—*
Strabala, Joseph Lawrence, 4,093,180, Cl. 251-248.000.
James Mackie & Sons Limited: *See—*
Mackie, Gordon, 4,093,136, Cl. 242-45.000.
Jan, David K.: *See—*
Cavanagh, Robert B., Jr.; and Jan, David K., 4,093,157, Cl. 244-53.00R.
Jansen, Martin B., Jr., to Vetco Offshore Industries, Inc. Method and apparatus for axially loading threaded connectors. 4,093,281, Cl. 285-39.000.
Jaquiss, Donald Benjamin George: *See—*
Factor, Arnold; Jaquiss, Donald Benjamin George; and Mark, Victor, 4,093,589, Cl. 260-45.75B.
Jarreau, Francois Xavier; and Koenig, Jean-Jacques, to Etablissements Nativelle S.A. Method for oxidizing cinchona alkaloids. 4,093,619, Cl. 260-284.000.
Jayne, Gerald John Joseph; Askew, Herbert Frank; and Harrington, Colin John, to Castrol Limited. Hydraulic fluid compositions. 4,093,554, Cl. 252-78.300.
Jayson Corporation: *See—*
Chambers, Clarence G., Jr., 4,092,841, Cl. 72-320.000.
Jean, Olivier A.; and Roussy, Georges. Parallel arrangement of applicator and process for applying microwaves to a material. 4,093,840, Cl. 219-10.55F.
Jeffery, Thomas C.; and Graybill, Wilmer B., to PPG Industries, Inc. Detection of liquid in a gas stream. 4,092,846, Cl. 73-29.000.
Jeffries, J. Fred: *See—*
Frank, Donald H.; Jeffries, J. Fred; Swanson, Mary C.; Erb, Thomas L.; and Hall, James D., 4,092,980, Cl. 128-2.00A.
Jenkins, S. Upton: *See—*
Christie, John S., Jr.; Jenkins, S. Upton; and McConnell, George B., 4,093,991, Cl. 364-525.000.

Jennings, Reuel E.: *See—*
Moliterno, Louis J.; and Jennings, Reuel E., 4,093,839, Cl. 219-8.500.
Jenoptik Jena G.m.b.H.: *See—*
Feist, Wieland; Junghanns, Klaus; and Kunz, Alfred, 4,093,383, Cl. 356-152.000.
Jensen, Marvin E.: *See—*
Nolan, John L.; Nordby, Harvey M.; and Jensen, Marvin E., 4,093,277, Cl. 282-24.00R.
Jerkins, Norman M., to Ashland Oil, Inc. Apparatus for producing carbon black. 4,093,421, Cl. 23-259.500.
Jin, Jung Il; and Yu, Arthur J., to Stauffer Chemical Company. Method for the preparation of polyvinyl chloride by suspension or emulsion polymerization. 4,093,788, Cl. 526-74.000.
Joan Manufacturing Corporation: *See—*
Gangi, Robert J., 4,092,838, Cl. 66-214.000.
Jochum, Peter: *See—*
Schmitt, Werner; Purrmann, Robert; Jochum, Peter; and Zahler, Wolf-Dietrich, 4,093,555, Cl. 252-188.30R.
John E. Mitchell Company: *See—*
Blackburn, James R.; and Smith, Dudley C., 4,093,055, Cl. 192-116.500.
Johns-Manville Corporation: *See—*
O'Malley, Martin Bernard, 4,093,760, Cl. 428-36.000.
Oser, Nathan; and Niedzinski, Edmund John, 4,092,842, Cl. 72-379.000.
Johns, Marvin D., to Dana Corporation. Belleville damper for torque transmitting coupling device. 4,093,054, Cl. 192-106.100.
Johnson & Johnson: *See—*
Turner, Robert B., 4,092,863, Cl. 73-362.0AR.
Johnson, Keith Trevor: *See—*
Davidson, Hugh; Johnson, Keith Trevor; Leggeter, Brian Ernest; and Moore, Anthony John, 4,093,645, Cl. 260-505.00C.
Johnson, Kenneth Frank. Tool for bricklaying. 4,093,172, Cl. 249-19.000.
Johnson, Peter Walton, to Olin Corporation. Noise and fouling reducer for powder-actuated tool. 4,093,110, Cl. 227-9.000.
Johnson, William R., Jr.: *See—*
Van Auken, Thomas V.; Grubbs, Harvey J.; and Johnson, William R., Jr., 4,092,988, Cl. 131-17.00R.
Jolley, Weldon B.: *See—*
Alberts, Albert K.; and Jolley, Weldon B., 4,093,127, Cl. 241-55.000.
Joly, Michel: *See—*
Denninger, Claude; Joly, Michel; and Tabet, Jean-Noel, 4,093,440, Cl. 71-65.000.
Jones, Hale M.: *See—*
Urynowicz, James P.; O'Neill, Daniel R.; Jones, Hale M.; and Painter, Alan, 4,093,148, Cl. 242-182.000.
Jones, Robert L.; Volgenau, Lewis; and Davis, Philip S., to Betz Laboratories, Inc. Method for treating aqueous mediums containing magnesium sulfite trihydrate. 4,093,580, Cl. 260-29.6SQ.
Jones, Rufus V.: *See—*
Kile, Stephen A.; and Jones, Rufus V., 4,093,004, Cl. 138-140.000.
Jones, William A.: *See—*
Murtha, Timothy P.; Jones, William A.; and Zuech, Ernest A., 4,093,671, Cl. 260-668.00R.
Jonsson, Otto Julius, to AB Malmo PAC. Fastener for detachably interconnecting punched documents. 4,093,387, Cl. 402-19.000.
Joschek, Hans-Ingo: *See—*
Reiss, Wolfgang; Joschek, Hans-Ingo; Schnur, Rudolf; Winderl, Siegfried; Dehler, Juergen; and Hoffmann, Herwig, 4,093,668, Cl. 568-855.000.
Joyce, Arthur W., to Dennison Manufacturing Company. Miniaturized harnessing device. 4,092,765, Cl. 24-16.0PB.
Jung, Rolf, to Krauss u. Reichert GmbH & Co. KG Spezialmaschinenfabrik. Cutting-out machine for flat material. 4,092,777, Cl. 30-273.000.
Junghanns, Klaus: *See—*
Feist, Wieland; Junghanns, Klaus; and Kunz, Alfred, 4,093,383, Cl. 356-152.000.
Jungst, Klaus-Peter; and Ries, Gunter, to Gesellschaft fur Kernforschung m.b.H. Superconductor. 4,093,817, Cl. 174-32.000.
Jurgens, Rainer; and Ostertag, Alfred, to Christensen, Inc. Apparatus for making-up and breaking threaded pipe connections. 4,092,881, Cl. 81-57.340.
Jurinke, Rudolf: *See—*
Corbach, Rainer; Steinke, Leo; Benedikt, Walter; and Jurinke, Rudolf, 4,093,887, Cl. 313-140.000.
Kabushiki Kaisha Shikutani: *See—*
Masuda, Taiji; and Mizuno, Hitoshi, 4,093,240, Cl. 277-15.000.
Kabushiki Kaisha Suwa Seikosha: *See—*
Kawamura, Yoshikazu; Shimoi, Akio; and Iwai, Yuichiro, 4,093,992, Cl. 364-705.000.
Kadowaki, Saburo: *See—*
Yoshizawa, Tadao; and Kadowaki, Saburo, 4,093,280, Cl. 285-39.000.
Kaempfen, Adolf. Apparatus for teaching the execution of a ski turn on skis. 4,092,787, Cl. 35-29.00R.
Kafedjiev, Iliya Chudomirov: *See—*
Genchev, Lyubomir Nikolov; Kafedjiev, Iliya Chudomirov; and Klyamov, Kostadin Spirov, 4,092,910, Cl. 99-472.000.
Kahling, Joachim: *See—*
Kruger, Gerd; Keck, Johannes; Noll, Klaus Reinhold; Pieper, Helmut; Ziegler, Harald; Ballhause, Helmut; and Kahling, Joachim, 4,093,734, Cl. 424-274.000.
Kahwaty, Vincent N.: *See—*
Double, Glen P.; Kahwaty, Vincent N.; Randall, James D.; and Reinhart, Fritz M., 4,093,912, Cl. 324-.5MA.
Kaiho, Keisuke: *See—*
Yoshida, Risaburo; Kaiho, Keisuke; Ide, Yusaku; and Hirose, Takeshi, 4,093,424, Cl. 44-3.00C.
Kaiser Aluminum & Chemical Corporation: *See—*
Payne, John R., 4,093,524, Cl. 204-61.000.
Kaiser, Martin L. Delayed response transmitter indicator. 4,093,920, Cl. 325-364.000.
Kalal, Jaroslav; Zurkova, Eva; and Svec, Frantisek, to Ceskoslovanska akademie ved. Polymeric material containing aldehyde groups and the method of its preparation. 4,093,602, Cl. 260-73.00R.
Kalo Laboratories, Inc.: *See—*
Nash, Lawrence H., 4,093,664, Cl. 260-610.00D.
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, to L'Oreal. Double salt of zinc chloride and indamines. 4,093,640, Cl. 260-429.900.
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, to L'Oreal. Indoanilines. 4,093,806, Cl. 544-165.000.
Kamlet, Mortimer J.: *See—*
Gilligan, William H.; and Kamlet, Mortimer J., 4,093,623, Cl. 260-299.000.
Kamyr Aktiebolag: *See—*
Richter, Johan C. F. C., 4,093,506, Cl. 162-17.000.
Richter, Johan Christoffer Fredrik Carl, 4,093,511, Cl. 162-234.000.
Kanamaru, Hitoshi, to Pioneer Electronic Corporation. Optical reading apparatus with scanner light intensity control. 4,093,961, Cl. 358-128.000.
Kanda, Richard, to United States of America, Army. Kilobar range stress gauge. 4,092,856, Cl. 73-141.00A.
Kandler, Joachim; Komorniczyk, Klaus; and Reitz, Mathias, to Hoechst Aktiengesellschaft. Process for inhibiting the corrosion of heavy pulps for heavy media separation of minerals. 4,093,538, Cl. 209-172.500.
Kane, William S.: *See—*
Cardwell, Paul H.; and Kane, William S., 4,093,698, Cl. 423-24.000.
Kaneko, Ryoichi; Nii, Katutosi; Hiroyama, Hiroo; and Okano, Kinpei, to Hitachi, Ltd. Grooved spherical bearing for vertical machines. 4,093,320, Cl. 308-9.000.
Kaneko, Yoshio: *See—*
Suzuki, Yasoji; Kaneko, Yoshio; and Shiotari, Yoshihisa, 4,093,942, Cl. 340-166.00R.
Kanner, Bernard: *See—*
Schilling, Curtis L.; Prokai, Bela; and Kanner, Bernard, 4,093,642, Cl. 544-106.000.
Kantrowitz, Adrian; and Freed, Paul S., to Sinai Hospital of Detroit. Dynamic prosthetic myocardium. 4,092,742, Cl. 3-1.700.
Kao, Jar-lin; and Leonard, John Joseph, to Atlantic Richfield Company. Liquid phase oxidation of unsaturated aldehydes to carboxylic acids with a bismuth catalyst. 4,093,649, Cl. 260-530.00N.
Kao Soap Co., Ltd.: *See—*
Aoki, Shuzo; and Yamasaki, Harumasa, 4,093,776, Cl. 428-402.000.
Kaplit, Michael; Hayden, Daniel B.; and Smith, George W., to General Motors Corporation. Symmetrical internal heater for liquid crystal display. 4,093,355, Cl. 350-334.000.
Kappas, Chris S. Electric trolling motor having planetary gear reduction. 4,092,946, Cl. 115-18.00E.
Karamian, Narbik A. Method for assaying endotoxins. 4,093,381, Cl. 356-51.000.
Karetny, Zinovy Petrovich: *See—*
Frantsenjuk, Ivan Vasilievich; Belyansky, Andrei Dmitrievich; Bobylev, Leonid Semenovich; Karetny, Zinovy Petrovich; Alexandrov, Nikolai Nikitievich; Kulikov, Vasily Ivanovich; Kovalevich, Evgeny Vladimirovich; Tinyakov, Viktor Gurievich; Bolotnov, Alexandr Vladimirovich; Chernov, Jury Alexandrovich; Kolesov, Vladimir Mikhailovich; Svetlakov, Nikolai Matveevich; Burmistrov, Gennady Nikolaevich; and Kuxenko, Jury Grigorievich, 4,093,023, Cl. 165-89.000.
Karinthi, Pierre: *See—*
Galey, Jean; Bentz, Gerard; Karinthi, Pierre; Gilbert, Ghislain; and Devalois, Serge, 4,093,553, Cl. 252-70.000.
Karnowski, Thomas A.; and Shawaluk, Michael W., to Cutler-Hammer, Inc. Ratemeter which calculates the reciprocal of the period. 4,093,850, Cl. 235-92.0TF.
Karsh, Irving, to Bell & Howell Company. Web transporting apparatus and web cartridges. 4,093,151, Cl. 242-198.000.
Kasdan, Harvey Lee; and Mead, Donald Carleton, to Greenwood Mills, Inc. Diffraction pattern amplitude analysis for use in fabric inspection. 4,093,866, Cl. 250-563.000.
Kato, Hideo; Nishikawa, Tomoyasu; and Koshinaka, Eiichi, to Hokuriku Pharmaceutical Co., Ltd. Diazabicycloalkane derivatives. 4,093,630, Cl. 260-326.850.
Kato, Masakathu, to Elmo Company, Limited. Pinch roller moving devices for simultaneous image and sound recording cinecameras. 4,093,362, Cl. 352-27.000.
Katoh, Sadahiko, to Suntory Ltd. Automated apparatus for joining wood plates in side-by-side relation. 4,093,111, Cl. 227-26.000.
Katvala, Victor W.: *See—*
United States of America, National Aeronautics and Space Administration; Goldstein, Howard E.; Leiser, Daniel B.; and Katvala, Victor W., 4,093,771, Cl. 428-312.000.
Katysheva, Nina Vladimirovna: *See—*
Sokol, Iosif Borisovich; Katysheva, Nina Vladimirovna; Belyaev, Vladimir Mikhailovich; Logvinenko, Dmitry Danilovich;

Rikker, Mihaly: *See—*
Mayer, Gyorgy; Gyori, Janos; Rikker, Mihaly; Banfai, Antal; and Eszenyl, Ervin, 4,093,689, Cl. 264-71.000.

Rilett, John Walter. Gas driven motor with buffer space. 4,092,830, Cl. 60-671.000.

Ringer, Karl. Freight-transportation system with road/rail transshipment. 4,093,084, Cl. 214-11.00R.

Rist, Karl Frederick, III, to Minnesota Mining and Manufacturing Company. Film applying device with a straw-hole perforator. 4,092,817, Cl. 53-298.000.

Ritter, Gerhard: *See—*
Gott, Hans; Ritter, Josef; Ritter, Klaus; and Ritter, Gerhard, 4,093,106, Cl. 221-224.000.

Ritter, Josef: *See—*
Gott, Hans; Ritter, Josef; Ritter, Klaus; and Ritter, Gerhard, 4,093,106, Cl. 221-224.000.

Ritter, Klaus: *See—*
Gott, Hans; Ritter, Josef; Ritter, Klaus; and Ritter, Gerhard, 4,093,106, Cl. 221-224.000.

Riva, Fernando: *See—*
Ferruti, Paolo; Martuscelli, Ezio; Riva, Fernando; and Provenzale, Luciano, 4,093,677, Cl. 260-858.000.

Robert Bosch GmbH: *See—*
Corbach, Rainer; Steinke, Leo; Benedikt, Walter; and Jurinke, Rudolf, 4,093,887, Cl. 313-140.000.
Hofer, Gerald; Eheim, Franz; and Kopse, Odon, 4,092,964, Cl. 123-139.0AT.
Schneider, Erich; Schnaibel, Eberhard; and Fleischer, Helmut, 4,092,853, Cl. 73-121.000.

Roberts, Gerald E.: *See—*
Peppiatt, Harry J.; and Roberts, Gerald E., 4,093,914, Cl. 324-56.000.

Roberts, Wallace A. High-voltage apparatus for skin therapy. 4,093,975, Cl. 363-27.000.

Robertshaw Controls Company: *See—*
Asbill, Clarence M., III, 4,093,329, Cl. 339-16.00R.

Robins, Roland K.; O'Brien, Darrell E.; and Novinson, Thomas, to ICN Pharmaceuticals, Inc. 3,5,7-Trisubstituted pyrazolo[1,5-a]pyrimidines. 4,093,617, Cl. 544-281.000.

Robins, Roland K.: *See—*
Revankar, Ganapathi R.; and Robins, Roland K., 4,093,624, Cl. 260-302.00D.

Robinson, Charles Elbert. Fencing stay system. 4,093,187, Cl. 256-49.000.

Robinson, Tom E.: *See—*
Habiger, Cyril W.; and Robinson, Tom E., 4,093,092, Cl. 214-674.000.

Rockland Systems Corporation: *See—*
Flink, Joseph H.; and Bertrand, John, 4,093,989, Cl. 364-485.000.

Rockwell International Corporation: *See—*
Chen, Thomas T., 4,094,005, Cl. 365-16.000.
Heinz, David M.; and Whitcomb, Eugene C., 4,093,781, Cl. 428-539.000.
Thompson, Robert B.; Alers, George A.; and Tennison, Marion A., 4,092,868, Cl. 73-638.000.

Rodewald, Paul G.; and Haag, Werner O., to Mobil Oil Corporation. Decomposition of formic acid in very low concentration. 4,093,543, Cl. 210-59.000.

Roe, Anthony Maitland; Slater, Robert Anthony; and Taylor, Edwin Michael, to Smith Kline & French Laboratories Limited. (3-Alkylamino-2-hydroxypropoxy)-1-hydrazinophthalazines. 4,093,725, Cl. 424-250.000.

Roestel, Jan A.: *See—*
Davis, Gregory A.; Krippner, Kenneth E.; Roestel, Jan A.; Vonk, Gottfried; and Zacher, Albert R., Jr., 4,093,859, Cl. 250-445.00T.

Rohe, Lothar: *See—*
Schmidt, Robert Rudolf; and Rohe, Lothar, 4,093,442, Cl. 71-90.000.

Rohm and Haas Company: *See—*
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 4,093,446, Cl. 71-109.000.
Hurwitz, Marvin J.; and Avery, Noyes L., 4,093,567, Cl. 260-21.00E.
Miller, George A.; and Fleischfresser, Marvin H., 4,093,655, Cl. 260-564.0RF.

Rohr Industries, Inc.: *See—*
Linderman, Duane L.; and Hom, Felix, 4,093,122, Cl. 239-127.300.

Rohringer, Gerhard: *See—*
Perkins, Charles W.; and Rohringer, Gerhard, 4,093,351, Cl. 350-310.000.

Rohrs, Marvin K., to Metalwash Machinery Corporation. Cleaning machine. 4,092,991, Cl. 134-127.000.

Rollei-Werke Franke & Heidecke: *See—*
Prochnow, Claus, 4,093,363, Cl. 352-104.000.

Rolls-Royce Limited: *See—*
Pask, George, 4,092,826, Cl. 60-39.74R.

Romanowski, Robert F., to Qualitrol Corporation. Hot spot thermometer. 4,092,864, Cl. 73-363.000.

Rooklyn, Jack. Construction of metal articles. 4,093,167, Cl. 248-188.000.

Rosch, Hubert J., to Kawasaki Motors Corp. Snowmobile suspension system. 4,093,033, Cl. 180-5.00R.

Roscher, Gunter: *See—*
Fernholz, Hans; Roscher, Gunter; Schmidt, Hans-Joachim; Schmitz, Heinz; and Wunder, Friedrich, 4,093,559, Cl. 252-443.000.

Rose, Frederick A.: *See—*
Smith, Steven R.; and Rose, Frederick A., 4,093,995, Cl. 364-900.000.

Rose, Manning I. Safety circuit and socket construction. 4,093,336, Cl. 339-180.000.

Rose, Ronald N. DC Motor speed control circuit. 4,093,901, Cl. 318-476.000.

Ross, David S., to Sterling Drug, Inc. Method and apparatus for ammonia-nitrogen removal by vacuum desorption. 4,093,544, Cl. 210-59.000.

Ross, R. Charles: *See—*
Cordts, Howard P.; Navin, Robert F.; and Ross, R. Charles, 4,093,768, Cl. 428-287.000.

Ross, Richard D.: *See—*
Wilke, William F.; Hutcheson, Alan G.; and Ross, Richard D., 4,093,223, Cl. 273-94.00R.

Rossi, Giorgio: *See—*
Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,093,727, Cl. 424-258.000.

Roth American, Inc.: *See—*
Tomalinas, William R., Jr., 4,093,208, Cl. 272-52.500.

Roueche, Armand: *See—*
Hari, Stefan; and Roueche, Armand, 4,093,613, Cl. 260-154.000.

Rousseau, Genevieve; and Torelli, Vesperto, to Roussel Uclaf. Novel-17-spirosultines their corresponding hydroxy acids and compositions thereof. 4,093,720, Cl. 424-241.000.

Roussel Uclaf: *See—*
Allais, Andre; Meier, Jean; and Deraedt, Roger, 4,093,724, Cl. 424-250.000.
Rousseau, Genevieve; and Torelli, Vesperto, 4,093,720, Cl. 424-241.000.

Roussy, Georges: *See—*
Jean, Olivier A.; and Roussy, Georges, 4,093,840, Cl. 219-10.55F.

Rowley, James R.; and Majesky, Paul D., to PPG Industries, Inc. Method of loading glass sheets on a collapsible rack for storing or shipping. 4,092,815, Cl. 53-3.000.

RPC Corporation: *See—*
Whiteman, Donald R., 4,093,090, Cl. 214-620.000.

Rubrich, Lawrence M., to Dana Corporation. Fluid control valve. 4,092,999, Cl. 137-504.000.

Ruckert, Hans; and Wildenhain, Barbara, to Hoechst Aktiengesellschaft. Light sensitive o-quinone diazide containing transfer composition. 4,093,464, Cl. 96-91.00D.

Ruckstuhl, Franz: *See—*
Tinnes, Bernhard; and Ruckstuhl, Franz, 4,092,771, Cl. 29-401.00F.

Rudolf, Anton: *See—*
Hudelmaier, Gerhard; and Rudolf, Anton, 4,093,085, Cl. 214-16.00R.

Rudowski, Andrzej: *See—*
Falkowski, Leonard; Bobrowski, Miroslaw; Buluk, Helena; Bylec, Elzbieta; Cybulska, Barbara; Golik, Jerzy; Kolodziejczyk, Pawel; Pawlak, Jan; Rudowski, Andrzej; Zielinski, Jan; Ziminski, Tadeusz; and Borowski, Edward, 4,093,796, Cl. 536-17.000.

Rue, John Rego, to Burrell, Charles A., a part interest. Scooter board. 4,093,252, Cl. 280-87.04A.

Rump, Bjorn Sigurd; and Dereux, Philippe Jean, to Ciba-Geigy AG. Process for printing carpets. 4,093,416, Cl. 8-2.50A.

Runnells, Robert R., to MDT Instrument Company. Dental operating chair with restraining arm supports. 4,093,308, Cl. 297-416.000.

Ruoff, Carl F., Jr.: *See—*
Henry, James L.; and Ruoff, Carl F., Jr., 4,092,854, Cl. 73-133.00R.

Rupinski, Frederick Alexander: *See—*
Landau, John Vernon, Jr.; Hunts, Barney Dean; Rupinski, Frederick Alexander; and Zenger, Alfred John, 4,092,937, Cl. 112-121.110.

Ruppen, Bruno: *See—*
Hottinger, Conrad; Ruppen, Bruno; and Schaffner, Kurt, 4,092,900, Cl. 89-33.00B.

Russell, Walter W.; and Stoetzer, Richard P., to N. T. Gates Company. Plastic container with vent means. 4,093,105, Cl. 220-373.000.

Rutenbeck, Hugo, to August Bilstein, Firma. Vehicle jack. 4,093,182, Cl. 254-126.000.

Ruzek, Ivo: *See—*
Hartmann, Ludwig; Maahs, Paul F.; Gerking, Luder; Ruzek, Ivo; and Schafer, Eberhard, 4,093,763, Cl. 428-95.000.

Rybicki, Robert Charles, to United Technologies Corporation. Cross beam rotor. 4,093,400, Cl. 416-141.000.

Ryobi, Ltd.: *See—*
Morishita, Yasomatsu, 4,093,144, Cl. 242-84.52A.

S&C Electric Company: *See—*
Stranczek, Norman J., 4,093,834, Cl. 200-50.00A.

S&S Corrugated Paper Machinery Co., Inc.: *See—*
Leff, Martin J., 4,093,497, Cl. 156-473.000.

Sabatella, Robert J.: *See—*
M'Sadoques, Andre J.; and Sabatella, Robert J., 4,093,970, Cl. 361-361.000.

Sack GmbH: *See—*
Hansen, Manfred W.; and Kersting, Emil F., 4,092,891, Cl. 83-341.000.

Sagami Chemical Research Center: *See—*
Kojima, Takakazu; and Ohtsuka, Yozo, 4,093,810, Cl. 548-321.000.

St. Francis Hospital, Inc.: *See—*
Gowing, Ellis, 4,092,788, Cl. 35-17.000.

Saint Gobain Industries: *See—*
Coulon, Jean-Claude; and Amannati, Piero, 4,093,439, Cl. 65-65.000.

Saito, Kyuta; and Ishino, Fukuya, to Nippon Telegraph and Telephone Public Corporation. Closed user group facility. 4,093,819, Cl. 178-2.00R.

Saito, Yuichi; and Mayama, Osamu, to Mitsubishi Kinzoku Kabushiki Kaisha. Nickel-base sintered alloy. 4,093,454, Cl. 75-236.000.

Saitoh, Shigeru: *See—*
Takemura, Tooji; Saitoh, Shigeru; and Hamada, Mitsuharu, 4,092,930, Cl. 104-247.000.

Sakai, Takeo: *See—*
Araki, Eimi; Sakai, Takeo; Takai, Seizaburo; and Komori, Sekiro, 4,093,425, Cl. 44-10.00F.

Salem, Nazih M. N. Therapeutic wrap. 4,092,982, Cl. 128-82.100.

Salsbury, Phillip J.: *See—*
Perlegos, George; and Salsbury, Phillip J., 4,094,012, Cl. 365-226.000.

Sampson, Ronald N.; and Sanjana, Zal N., to Westinghouse Electric Corp. Plastic drag reducing surfacing material. 4,093,268, Cl. 280-610.000.

Sand, Leonard B., to Zeochem Corporation. Synthetic zeolite. 4,093,699, Cl. 423-118.000.

Sanders, Edward B.: *See—*
Osdene, Thomas S.; and Sanders, Edward B., 4,093,620, Cl. 260-291.000.

Sanders, Ellsworth E.: *See—*
Stahl, Edward L.; and Sanders, Ellsworth E., 4,093,071, Cl. 206-507.000.

Sandin, Billy F. E., to AB Kalle-Regulatorer. Excess flow valve. 4,093,001, Cl. 137-495.000.

Sandner, Michael Ray: *See—*
Trecker, David John; and Sandner, Michael Ray, 4,093,661, Cl. 260-595.000.

Sandoz, Inc.: *See—*
Sass, Robert N.; and Wie, Chwang Tek, 4,093,710, Cl. 424-44.000.

Sanford, Leon M.; and Wu, Che-Kuang, to Corning Glass Works. Molded glass articles having bulk homogeneity and optical quality surface. 4,093,469, Cl. 106-53.000.

Sanjana, Zal N.: *See—*
Sampson, Ronald N.; and Sanjana, Zal N., 4,093,268, Cl. 280-610.000.

Sano, Toshio: *See—*
Hamanaka, Michito; Sano, Toshio; and Kumura, Noriharu, 4,093,518, Cl. 195-142.000.

Sansho Co., Ltd.: *See—*
Shiro, Sonobe, 4,092,823, Cl. 58-125.00C.

Sarantakis, Dimitrios, to American Home Products Corporation. Somatostatin synthesis. 4,093,609, Cl. 260-112.50S.

Sarkar, Kshitindra Mohan: *See—*
Doyle, Barry N.; Seibt, Willie H.; Sarkar, Kshitindra Mohan; and Benz, Mark R., 4,093,450, Cl. 75-0.5AA.

Sass, Robert N.; and Wie, Chwang Tek, to Sandoz, Inc. Rapid dissolving effervescent granules. 4,093,710, Cl. 424-44.000.

Sassi, Frank V.: *See—*
Mayer, Edward A.; and Sassi, Frank V., 4,092,959, Cl. 123-119.00A.

Sassmannshausen, Gunter; and Hasenauer, Dieter, to Accumulatorenwerk Hoppecke Carl Zoellner & Sohn. Lighter lead storage battery. 4,093,785, Cl. 429-149.000.

Sato, Kazuyuki, to Tokyo Shibaura Electric Co., Ltd. Bit-slice type large scale integrated circuit with multiple functions on a one-chip semiconductor device. 4,093,993, Cl. 364-712.000.

Sato, Masato: *See—*
Tanabe, Yasuo; Toriya, Jun; Sato, Masato; and Shiraga, Ken, 4,093,633, Cl. 260-346.110.

Satou, Takateru; and Shiba, Haruo, to TDK Electronics Co., Ltd. Magnetic tape cassette. 4,093,967, Cl. 360-132.000.

Saucy, Gabriel: *See—*
Chan, Ka-Kong; and Saucy, Gabriel, 4,093,632, Cl. 260-345.500.

Saunders Archery Co.: *See—*
Saunders, Charles A.; and Saunders, Thomas Allen, 4,093,227, Cl. 273-102.10E.

Saunders, Charles A.; and Saunders, Thomas Allen, to Saunders Archery Co. Target with improved shock absorber means. 4,093,227, Cl. 273-102.10E.

Saunders, James Edwin: *See—*
Watson, Kenneth; and Saunders, James Edwin, 4,093,049, Cl. 192-47.000.

Saunders, Thomas Allen: *See—*
Saunders, Charles A.; and Saunders, Thomas Allen, 4,093,227, Cl. 273-102.10E.

Savvin, Sergei Borisovich: *See—*
Bratslavskaya, Alla Lvovna; Makarova, Serafima Borisovna; Mushy, Roman Yakovlevich; Myasoedova, Galina Vladimirovna; Savvin, Sergei Borisovich; and Seraya, Vera Ivanovna, 4,093,792, Cl. 526-200.000.

Sayer, Trevor Anthony, to Burroughs Corporation. Apparatus for use in depositing articles in a receptacle and a sequence controller utilized therein. 4,092,934, Cl. 109-24.100.

Schaefer, Eberhard: *See—*
Dietrich, Ernst; Guenther, Ernst; Hoerauf, Werner; Kissel, Ernst; Linge, Hermann; Neumann, Eckart; and Schaefer, Eberhard, 4,092,784, Cl. 34-13.000.

Schafer, Eberhard: *See—*
Hartmann, Ludwig; Maahs, Paul F.; Gerking, Luder; Ruzek, Ivo; and Schafer, Eberhard, 4,093,763, Cl. 428-95.000.

Schafer, Hans: *See—*
Hausberg, Gerhard; Hegemann, Karl-Rudolf; Finger, Gunther; Schafer, Hans; and Weissert, Helmut, 4,093,434, Cl. 55-226.000.

Schaffner, Kurt: *See—*
Hottinger, Conrad; Ruppen, Bruno; and Schaffner, Kurt, 4,092,900, Cl. 89-33.00B.

Schelkmann, Wilhelm, to Vakuum Vulk Holdings Limited. Method for retreading and repairing vehicle tires. 4,093,481, Cl. 156-95.000.

Scher, Herbert I.; Lex, Joseph A.; and Ungar, Israel S., to Exxon Research and Engineering Company. Three-color high pressure decorative laminate having registered color and embossing. 4,093,766, Cl. 428-165.000.

Schering Corporation: *See—*
Nafissi-Varchei, Mohammed Mehdi, 4,093,731, Cl. 424-270.000.
Neustadt, Bernard R., 4,093,742, Cl. 424-322.000.

Schickfluss, Rudolf: *See—*
Teige, Wolfgang; and Schickfluss, Rudolf, 4,093,585, Cl. 260-40.00P.

Schieber, John R., to Betz Laboratories, Inc. Vapor-type heat exchanger. 4,093,020, Cl. 165-1.000.

Schilling, Curtis L.; Prokai, Bela; and Kanner, Bernard, to Union Carbide Corporation. Surface active silicones. 4,093,642, Cl. 544-106.000.

Schirmann, Jean Pierre; Combroux, Jean; and Delavarenne, Serge Yvon, to Produits Chimiques Ugine Kuhlmann. Process for making azines. 4,093,656, Cl. 260-566.00B.

Schlegel (UK) Limited: *See—*
Eggert, Frank, 4,092,813, Cl. 52-397.000.

Schlenker, Ralph F. Method for separating isotopes. 4,093,427, Cl. 55-17.000.

Schlichthaerle, Gottfried: *See—*
Buechner, Oskar; Schlichthaerle, Gottfried; and Urban, Friedrich, 4,093,795, Cl. 528-481.000.

Schloss, Phillip Christian: *See—*
Heuer, Dale Arthur; Schloss, Phillip Christian; and Schroeder, Larry Lloyd, 4,093,982, Cl. 364-200.000.

Schlumberger Technology Corporation: *See—*
Turcotte, Ronald E.; and Wahl, John S., 4,093,854, Cl. 250-269.000.

Schmid, Frederick, to Crystal Systems, Inc. Process of cutting wafers. 4,092,972, Cl. 125-16.00R.

Schmid, Walter: *See—*
Wilfert, Karl; and Schmid, Walter, 4,093,255, Cl. 280-788.000.

Schmidt, Charles F. Power wrench. 4,093,179, Cl. 251-133.000.

Schmidt, Frank P., to Scott Paper Company. Soft absorbent fibrous web and disposable diaper including same. 4,093,765, Cl. 428-134.000.

Schmidt, Hans-Joachim: *See—*
Fernholz, Hans; Roscher, Gunter; Schmidt, Hans-Joachim; Schmitz, Heinz; and Wunder, Friedrich, 4,093,559, Cl. 252-443.000.

Schmidt, Manfred: *See—*
Riegler, Ernst; and Schmidt, Manfred, 4,093,192, Cl. 266-78.000.

Schmidt, Robert Rudolf; and Rohe, Lothar, to Bayer Aktiengesellschaft. Synergistic herbicidal compositions comprising 3-(benzthiazol-2-yl)-1,3-dimethylurea and a substituted diphenyl ether. 4,093,442, Cl. 71-90.000.

Schmitt, James L.: *See—*
Curley, Francis M.; and Schmitt, James L., 4,093,034, Cl. 180-53.00R.

Schmitt, Werner; Purrmann, Robert; Jochum, Peter; and Zahler, Wolf-Dietrich, to ESPE Fabrik Pharmazeutischer Praparate GmbH. Production of dental models and tooth replacement parts. 4,093,555, Cl. 252-188.30R.

Schmitz, Alfons F.; and Dixon, Douglas L., to Eastman Kodak Company. Method and apparatus to reduce waste yarn during tie-up of yarn winders. 4,093,134, Cl. 242-18.0PW.

Schmitz, Heinz: *See—*
Fernholz, Hans; Roscher, Gunter; Schmidt, Hans-Joachim; Schmitz, Heinz; and Wunder, Friedrich, 4,093,559, Cl. 252-443.000.

Schmon, Franz: *See—*
Ledeen, Howard L.; Schmon, Franz; and Tupker, Willem E., 4,092,877, Cl. 74-625.000.

Schnaibel, Eberhard: *See—*
Schneider, Erich; Schnaibel, Eberhard; and Fleischer, Helmut, 4,092,853, Cl. 73-121.000.

Schneider, David: *See—*
Davis, Paul; and Schneider, David, 4,093,041, Cl. 186-1.00D.

Schneider, Erich; Schnaibel, Eberhard; and Fleischer, Helmut, to Robert Bosch GmbH. Testing rotary movement-electrical signal transducer system, particularly for vehicle wheel anti-block transducer systems. 4,092,853, Cl. 73-121.000.

Schneider, Gerald J. Apparatus for aerial water acquisition and sub-sea aqueduct. 4,092,827, Cl. 60-398.000.

Schneider, Peter; and Goettler, Ernst, to Siemens Aktiengesellschaft. Storage arrangement with modules consisting of CCD stores. 4,094,009, Cl. 365-183.000.

Schneiderman, Max, to Ipco Hospital Supply Corporation (Whaledent International Division). Constant output electrosurgical unit. 4,092,986, Cl. 128-303.140.

Schnur, Rudolf: *See—*
Reiss, Wolfgang; Joschek, Hans-Ingo; Schnur, Rudolf; Winderl, Siegfried; Dehler, Juergen; and Hoffmann, Herwig, 4,093,668, Cl. 568-855.000.

Schoenewaldt, Erwin F.; and Sohar, Paul, to Merck & Co., Inc. Process for preparing monomer of bile acid sequestrant polymer. 4,093,657, Cl. 260-567.60M.
Schoenherr, Leonard H.; and Drablowski, William J., to Schoenherr, Leonard H. Fresh flower support. 4,092,801, Cl. 47-41.120.
Schollhorn, Wolfgang; and Ehret, Urban, to Gebruder Buhler AG. Automated apparatus for molding or die casting. 4,093,413, Cl. 425-110.000.
Scholz, Hansjurgen; Gimbel, Jurgen; and Jahn, Walter, to Daimler-Benz Aktiengesellschaft. Upper fitting of a shoulder strap arranged displaceable in height within a body hollow space. 4,093,274, Cl. 280-747.000.
Schrader, Milford J. Expansible trough apparatus for use in producing polyurethane foam. 4,093,109, Cl. 222-527.000.
Schreiber, Larry Donald, to Deere & Company. Means for retaining a piston on a piston rod. 4,092,904, Cl. 91-395.000.
Schrimpf, Carl F.; and Van Rens, Russel J., to Outboard Marine Corporation. Multistage fluid-actuated diaphragm pump with amplified suction capability. 4,093,403, Cl. 417-246.000.
Schrock, Wilfried; Konig, Hans-Bodo; Preiss, Michael; Metzger, Karl Georg; and Walkowiak, Michael, to Bayer Aktiengesellschaft. Sulfonylimidazolidone substituted cephalosporins, antibacterial compositions containing them, and methods of combatting bacteria employing them. 4,093,722, Cl. 424-246.000.
Schroder, Dieter: *See—*
Sinn, Hartmut; Schroder, Dieter; and Stallmann, Hans, 4,093,118, Cl. 233-26.000.
Schroeder, Franklin Theodore: *See—*
McAllister, John P.; Schroeder, Franklin Theodore; and Stimson, Charles Terrance, 4,093,981, Cl. 364-200.000.
Schroeder, Larry Lloyd: *See—*
Heuer, Dale Arthur; Schloss, Phillip Christian; and Schroeder, Larry Lloyd, 4,093,982, Cl. 364-200.000.
Schroter, Herbert: *See—*
Griesch, Dorothee; Schroter, Herbert; Schwagler, Peter; and Stein, Eckehard, 4,093,375, Cl. 355-68.000.
Schuler, Roland: *See—*
Liptak, Gabor; and Schuler, Roland, 4,093,881, Cl. 310-214.000.
Schulmerich Carillons, Inc.: *See—*
Beach, Ronald O., 4,092,893, Cl. 84-1.110.
Schulz, Johann G. D.: *See—*
Onopchenko, Anatoli; and Schulz, Johann G. D., 4,093,660, Cl. 260-591.000.
Schuppe, Ekkehard: *See—*
Stahl, Kurt-Wilhelm; and Schuppe, Ekkehard, 4,093,550, Cl. 210-198.00C.
Schure, Ralph M.; Kooi, John H.; and Brown, John M., to Unitech Chemical Inc. High peel strength adhesives. 4,093,675, Cl. 260-835.000.
Schurger, Rainer: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,093,053, Cl. 192-98.000.
Schurgin, Herbert L. Contact lens application and removal instrument. 4,093,291, Cl. 294-1.0CA.
Schwab, James J.; and Goodson, David B., to Air Pollution Systems, Incorporated. Apparatus for ionizing gases, electrostatically charging particles, and electrostatically charging particles or ionizing gases for removing contaminants from gas streams. 4,093,430, Cl. 55-107.000.
Schwagler, Peter: *See—*
Griesch, Dorothee; Schroter, Herbert; Schwagler, Peter; and Stein, Eckehard, 4,093,375, Cl. 355-68.000.
Schwalm, Donald J., to Holcroft & Company. Carburizing furnace. 4,093,195, Cl. 266-251.000.
Schwartz, Albert B., to Mobil Oil Corporation. Catalytic cracking process. 4,093,535, Cl. 208-120.000.
Schwartz, Alfred Alexander: *See—*
Hogan, Walter John; Schwartz, Alfred Alexander; and Stewart, Joseph Robert, 4,093,996, Cl. 364-900.000.
Schwartz, Oscar H.; and Le Donne, Daniel A., to Automatic Connector, Inc. Electrical connectors for coaxial cables. 4,093,335, Cl. 339-177.00E.
Schwarzkopf, Anton, to Anton Schwarzkopf, Stahl- und Fahrzeuqbau. Vehicular train. 4,093,080, Cl. 213-75.00R.
Schweitzer, Roy C., to Addressograph-Multigraph Corporation. Lithographic ink supply. 4,092,922, Cl. 101-363.000.
Scott, Dale K.: *See—*
Calvert, Rodney K.; and Scott, Dale K., 4,093,063, Cl. 198-425.000.
Scott, David I., to General Motors Corporation. Ported engine cylinder with selectively hardened bore. 4,093,842, Cl. 219-121.0LM.
Scott, Gerald R.: *See—*
Smith, Garland Y.; and Scott, Gerald R., 4,093,393, Cl. 408-67.000.
Scott Paper Company: *See—*
Schmidt, Frank P., 4,093,765, Cl. 428-134.000.
Scott, Paul F., to General Electric Company. High speed frequency response measurement. 4,093,988, Cl. 364-484.000.
Scudder, Robert M.: *See—*
Bardash, Manuel L.; Clasen, Carl P.; Scudder, Robert M.; Simon, Lawrence H.; Sorkin, Charles S.; Yavne, Raphael O.; Ekis, Robert W.; and Mintzer, Alfred I., 4,093,153, Cl. 244-3.140.
Sealy, Incorporated: *See—*
Klancnik, Alvin R., 4,092,749, Cl. 5-267.000.
Sears, James Kern, to Monsanto Company. Dye solvents for pressure-sensitive copying systems. 4,093,278, Cl. 282-27.500.
Sears Manufacturing Company: *See—*
Carter, John W.; and Koutsky, L. John, 4,093,197, Cl. 267-131.000.
Sedam, Jason K.: *See—*
Mitchell, Charles Ronald; and Sedam, Jason K., 4,093,066, Cl. 198-861.000.
Seefeld, Dean E.: *See—*
Burrough, Donald E.; and Seefeld, Dean E., 4,092,914, Cl. 100-88.000.
Seibt, Willie H.: *See—*
Doyle, Barry N.; Seibt, Willie H.; Sarkar, Kshitindra Mohan; and Benz, Mark R., 4,093,450, Cl. 75-0.5AA.
Seidenberg, Richard L.: *See—*
Mohrman, Richard C.; and Seidenberg, Richard L., 4,093,360, Cl. 351-13.000.
Seko, Maomi; Yamakoshi, Yasumichi; Miyauchi, Hirotsugu; Fukumoto, Mitsunobu; Kimoto, Kyoji; Watanabe, Itaru; and Yokoyama, Shigeo, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for production of perfluorocarbon type cation exchange membrane. 4,093,568, Cl. 260-2.20R.
Sela, Michael; Arnon, Ruth; Maron, Ruth; and Hurvitz, Esther, to Yeda Research and Development Co., Ltd. Immunologic chemotherapeutic agents comprising antigen binding dimers covalently bound to drugs. 4,093,607, Cl. 260-112.00B.
Sen Gupta, Achintya Kumar, to Lever Brothers Company. Purification process. 4,093,540, Cl. 210-23.00F.
Serafin, Joseph W. Lathe attachment for generating spherical surfaces. 4,092,902, Cl. 90-11.00D.
Seragnoli, Enzo, to G. D. Societa Per Azioni. Inner foil wrapping device. 4,092,816, Cl. 53-234.000.
Seraya, Vera Ivanovna: *See—*
Bratslavskaya, Alla Lvovna; Makarova, Serafima Borisovna; Mushy, Roman Yakovlevich; Myasoedova, Galina Vladimirovna; Savvin, Sergei Borisovich; and Seraya, Vera Ivanovna, 4,093,792, Cl. 526-200.000.
Service D'Exploitation Industrielle des Tabacs et des Allumettes: *See—*
Imbert, Pierre, 4,092,987, Cl. 131-8.00R.
Sestanj, Kazimir; Immer, Hans Ueli; and Gotz, Manfred Karl, to Ayerst McKenna & Harrison Ltd. Dipeptide derivatives with central nervous system activity and preparation thereof. 4,093,713, Cl. 424-177.000.
Sestanj, Kazimir: *See—*
Abraham, Nedumparambil A.; Immer, Hans U.; and Sestanj, Kazimir, 4,093,610, Cl. 260-112.50R.
Setnikar, Ivo: *See—*
Sianesi, Enrico; Bonola, Giuseppe; Setnikar, Ivo; and Magistretti, Maria Jose, 4,093,648, Cl. 260-519.000.
Setra Systems, Inc.: *See—*
Briefer, Dennis K., 4,093,915, Cl. 324-60.00R.
Setzer, William C.: *See—*
Sperry, Philip R.; Setzer, William C.; and Damon, Lloyd E., 4,093,474, Cl. 148-2.000.
Seuter, Antonius Maria, Josephus, Hubertus: *See—*
Verriet, Johannes Gerardus; and Seuter, Antonius Maria, Josephus, Hubertus, 4,093,890, Cl. 313-486.000.
Sevcon Limited: *See—*
Gurwicz, David, 4,093,980, Cl. 363-57.000.
Sevec, John B., to United States of America, Energy. Rotation sensor switch. 4,093,835, Cl. 200-61.45M.
Seybold, Rolf; and Gross, Gerd, to Firm Piel & Adey. Method of producing small shaped parts by casting from metal and apparatus for performing the method. 4,093,019, Cl. 164-52.000.
Shacklady, Michael: *See—*
Fuller, Paul; Gillender, John Brian; Shacklady, Michael; and Basu, Samir, 4,093,999, Cl. 364-900.000.
Shafer, Robert E. Portable holder for ribbon-like material. 4,093,138, Cl. 242-55.200.
Shah, Mahesh J.; and Mallozzi, Joseph P., to General Signal Corporation. Apparatus for automatically calibrating and testing smoke detectors. 4,093,867, Cl. 250-576.000.
Shapiro, Warren B.: *See—*
Blackburne, Owen Rodney; and Shapiro, Warren B., 4,093,711, Cl. 424-54.000.
Sharp, Walter M.; and Bergstrom, Gary E., to Business Education Products, Inc. Transcriber having selectable word reproduction rate. 4,093,831, Cl. 179-100.1VC.
Shatila, Mounir A.; VonDerLieth, William H.; Veeneman, John L.; and Thomas, Marion E., to Ampco Foods, Inc. Water nozzle for dough forming apparatus. 4,093,125, Cl. 239-553.300.
Shattuck, John R.: *See—*
Emerson, Ralph Waldo; and Shattuck, John R., 4,093,779, Cl. 428-411.000.
Shattuck, Meredith David; and Sincerbox, Glenn Tavernia, to International Business Machines Corporation. High efficiency electrochromic display device. 4,093,358, Cl. 350-357.000.
Shawaluk, Michael W.: *See—*
Karnowski, Thomas A.; and Shawaluk, Michael W., 4,093,850, Cl. 235-92.0TF.
Sheehan, John C.: *See—*
Commons, Thomas J.; Sheehan, John C.; and Lo, Young-Sek, 4,093,625, Cl. 260-306.70C.
Sheldon-Sodeco Printer, Inc.: *See—*
McInnis, Andrew M.; and Nielsen, Robert A., 4,092,921, Cl. 101-93.210.
Shell Oil Company: *See—*
McCormick, Karl, 4,093,923, Cl. 328-165.000.
Sherman, Robert M.; and Fuerst, Charles O., to Aquaria, Inc. Magnetically coupled aquarium filter. 4,093,547, Cl. 210-169.000.

Sherritt Gordon Mines Limited: *See—*
Doyle, Barry N.; Seibt, Willie H.; Sarkar, Kshitindra Mohan; and Benz, Mark R., 4,093,450, Cl. 75-0.5AA.
Sherwin-Williams Company, The: *See—*
Jacobs, Richard L., 4,093,509, Cl. 162-158.000.
Sherwood Refractories, Inc.: *See—*
Miller, John J., Jr.; Eppink, Donald L.; and Loxley, Ted A., 4,093,017, Cl. 164-28.000.
Shiba, Haruo: *See—*
Satou, Takateru; and Shiba, Haruo, 4,093,967, Cl. 360-132.000.
Shibahara, Masashi: *See—*
Yamashita, Shigeru; Masaki, Kazuo; and Shibahara, Masashi, 4,093,820, Cl. 179-1.00J.
Shields, James E., to Eli Lilly and Company. Somatostatin analogs and intermediates thereto. 4,093,574, Cl. 260-8.000.
Shiga, Masashi: *See—*
Iga, Yoshiro; and Shiga, Masashi, 4,093,608, Cl. 260-112.00B.
Shigyo, Genshichi: *See—*
Kurohiji, Sinichi; Shigyo, Genshichi; and Arai, Nobujiro, 4,092,942, Cl. 114-222.000.
Shimizu, Naoki: *See—*
Tsuruta, Hidemasa; Itoh, Shoji; Otsuka, Masayuki; and Shimizu, Naoki, 4,093,505, Cl. 159-9.00A.
Shimoi, Akio: *See—*
Kawamura, Yoshikazu; Shimoi, Akio; and Iwai, Yuichiro, 4,093,992, Cl. 364-705.000.
Shimokawa, Wataru: *See—*
Murakami, Saburo, 4,092,873, Cl. 74-82.000.
Shimoura, Akira: *See—*
Ono, Junichi; Shimoura, Akira; and Tanaka, Yukiyasu, 4,092,969, Cl. 123-191.00S.
Shiotari, Yoshihisa: *See—*
Suzuki, Yasoji; Kaneko, Yoshio; and Shiotari, Yoshihisa, 4,093,942, Cl. 340-166.00R.
Shiraga, Ken: *See—*
Tanabe, Yasuo; Toriya, Jun; Sato, Masato; and Shiraga, Ken, 4,093,633, Cl. 260-346.110.
Shiraishi, Takeichi: *See—*
Kuroda, Nobuyuki; Nakamura, Toru; Shiraishi, Takeichi; Matsuura, Kazuo; and Miyoshi, Mituji, 4,093,789, Cl. 526-114.000.
Shirey, Robert D., to Emerson Electric Co. Resistors with heat sink. 4,093,968, Cl. 361-58.000.
Shiro, Sonobe, to Sansho Co., Ltd. Timepiece having display cylinders. 4,092,823, Cl. 58-125.00C.
Shmelev, Anatoly Nikolaevich: *See—*
Iljunin, Vladimir Grigorievich; Kuznetsov, Igor Alexeevich; Murogov, Viktor Mikhailovich; and Shmelev, Anatoly Nikolaevich, 4,093,514, Cl. 176-65.000.
Shogren, David K.: *See—*
Zucker, Edwin; Shogren, David K.; and Redden, David N., 4,093,374, Cl. 355-57.000.
Shook, Norma G.: *See—*
Hakes, Gary A.; Shook, Norma G.; Cackley, George W.; Burdette, Stephen D.; and Morris, Hugh C., 4,093,048, Cl. 192-13.00R.
Shroff, Bansi K.; Dekker, Frank; and Nordrehaug, John, to Honeywell Inc. Cartridge tape recorder system and cartridge therefor. 4,093,149, Cl. 242-198.000.
Sianesi, Enrico; Bonola, Giuseppe; Setnikar, Ivo; and Magistretti, Maria Jose, to Recordati S.A. Chemical and Pharmaceutical Company. Therapeutically active benzoic acid derivatives and a process for preparing them. 4,093,648, Cl. 260-519.000.
Sidwell, Robert W.: *See—*
Tolman, Richard L.; Sidwell, Robert W.; and Revankar, Ganapathi R., 4,093,714, Cl. 424-180.000.
Sie, Inc.: *See—*
Brown, Lee Roy; and Davison, Thomas M., 4,093,955, Cl. 354-3.000.
Siegler, Manfred; and Wong, Ted Lee, to General Electric Company. Gas separation system. 4,093,429, Cl. 55-58.000.
Siemens Aktiengesellschaft: *See—*
Bromer, Gunter, 4,092,887, Cl. 83-56.000.
Dietze, Wolfgang; Mittermeier, Richard; and Steinwagner, Gerhard, 4,093,201, Cl. 269-296.000.
Hahn, Alfred; Steiner, Ernst; and Pospischil, Rudolf, 4,093,864, Cl. 250-505.000.
Koller, Konrad; and Lauther, Ulrich, 4,093,990, Cl. 364-520.000.
Schneider, Peter; and Goettler, Ernst, 4,094,009, Cl. 365-183.000.
Silberman, Robert L. Single line telephone hold circuit. 4,093,829, Cl. 179-81.00R.
Sillars, Frederick Stirling, to USM Corporation. Seam soldering mechanism. 4,093,113, Cl. 228-36.000.
Silverberg, Morton: *See—*
Eichorn, Roger H., deceased; Lincoln First Bank of Rochester, executor; and Silverberg, Morton, 4,093,367, Cl. 355-3.00R.
Simich, Emil, to A. J. Gerrard & Company. Press platen wedges. 4,092,912, Cl. 100-3.000.
Simier, Jean Noel: *See—*
Ford, Hugh; Mraz, George J.; and Simier, Jean Noel, 4,093,100, Cl. 220-3.000.
Simko, Paul S., to Bunker Ramo Corporation. Power connector. 4,093,332, Cl. 339-49.00R.
Simo, Miroslav Andrew, to New Archery Products Corp. Arrowhead. 4,093,230, Cl. 273-106.50B.
Simon, Lawrence H.: *See—*
Bardash, Manuel L.; Clasen, Carl P.; Scudder, Robert M.; Simon, Lawrence H.; Sorkin, Charles S.; Yavne, Raphael O.; Ekis, Robert W.; and Mintzer, Alfred I., 4,093,153, Cl. 244-3.140.
Simons, Courtney S.: *See—*
Blanco, Jorge L.; Crnojevich, Ranko P.; and Simons, Courtney S., 4,093,526, Cl. 204-104.000.
Simpson, Walter E.: *See—*
Foord, Stanley G.; and Simpson, Walter E., 4,093,342, Cl. 350-96.230.
Sinai Hospital of Detroit: *See—*
Kantrowitz, Adrian; and Freed, Paul S., 4,092,742, Cl. 3-1.700.
Sincerbox, Glenn Tavernia: *See—*
Shattuck, Meredith David; and Sincerbox, Glenn Tavernia, 4,093,358, Cl. 350-357.000.
Sinclair, William Robert: *See—*
Logan, Ralph Andre; Reinhart, Franz Karl; and Sinclair, William Robert, 4,093,345, Cl. 350-355.000.
Singer Company, The: *See—*
Coughenour, Donald Jay; and Herr, John Addison, 4,092,938, Cl. 112-158.00E.
Knowles, Warren Dean, 4,092,939, Cl. 112-254.000.
Landau, John Vernon, Jr.; Hunts, Barney Dean; Rupinski, Frederick Alexander; and Zenger, Alfred John, 4,092,937, Cl. 112-121.110.
Mindell, Marvin I., 4,093,142, Cl. 242-71.100.
Sinn, Hartmut; Schroder, Dieter; and Stallmann, Hans, to Heraeus Christ GmbH. Centrifuge, particularly for use with automatic analysis apparatus, especially for chemical, biological, or medical use. 4,093,118, Cl. 233-26.000.
Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd.: *See—*
Tryhorn, Donald Wilfred, 4,092,957, Cl. 123-48.00B.
Sjogren, Borje Lennart, to AB Wicanders Korkfabriker. Method of and apparatus for feeding articles. 4,093,062, Cl. 198-380.000.
Skatsche, Othmar: *See—*
List, Hans; Skatsche, Othmar; Greier, Josef; Obermayer, Bertram; Feichtinger, Gerhard; and Wagner, Johann, 4,092,956, Cl. 123-41.740.
SKF Kugellagerfabriken GmbH: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,093,053, Cl. 192-98.000.
Skilling, Derek: *See—*
Davis, John Brian; Skilling, Derek; and Wrigley, Nigel Edwin, 4,093,412, Cl. 425-71.000.
Skornschek, Thomas E.: *See—*
Hughes, Thomas E.; and Skornschek, Thomas E., 4,093,211, Cl. 272-68.000.
Slater, Robert Anthony: *See—*
Roe, Anthony Maitland; Slater, Robert Anthony; and Taylor, Edwin Michael, 4,093,725, Cl. 424-250.000.
Slivenko, Victor, to General Atomic Company. Blood access device. 4,092,983, Cl. 128-214.00R.
Sluyters, Theodorus J: *See—*
Kobayashi, Maasaki; Prelec, Krsto; and Sluyters, Theodorus J, 4,093,858, Cl. 250-424.000.
Smalley, Ned J.; and Whitney, Ralph H., to Owens-Illinois, Inc. Home canning system. 4,093,094, Cl. 215-276.000.
Smetana, Andrew: *See—*
Kewley, Norman E.; and Smetana, Andrew, 4,093,979, Cl. 362-5.000.
Smith, Dudley C.: *See—*
Blackburn, James R.; and Smith, Dudley C., 4,093,055, Cl. 192-116.500.
Smith, Garland Y.; and Scott, Gerald R., to Garland Smith Engineering Co., Inc. Tapping machine. 4,093,393, Cl. 408-67.000.
Smith, Gary L.: *See—*
Fitzpatrick, John D.; and Smith, Gary L., 4,093,273, Cl. 280-696.000.
Smith, George W.: *See—*
Kaplit, Michael; Hayden, Daniel B.; and Smith, George W., 4,093,355, Cl. 350-334.000.
Smith Kline & French Laboratories Limited: *See—*
Brown, Thomas Henry; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,093,621, Cl. 260-294.80H.
Durant, Graham John; Ganellin, Charon Robin; and Owen, Geoffrey Robert, 4,093,729, Cl. 424-270.000.
Roe, Anthony Maitland; Slater, Robert Anthony; and Taylor, Edwin Michael, 4,093,725, Cl. 424-250.000.
Smith, Mervin L., to American Air Filter Company, Inc. Damper assembly for mobile bed scrubber. 4,093,433, Cl. 55-226.000.
Smith, Philip A., to B. F. Goodrich Company, The. Caliper type disc brake. 4,093,043, Cl. 188-73.600.
Smith, Stephen Richard: *See—*
McGrail, Patrick Terence; Smith, Stephen Richard; Bannister, Frederick Robert; and Boutle, David Leonard, 4,093,458, Cl. 96-87.00R.
Smith, Steven R.; and Rose, Frederick A., to Norland Corporation. Random access memory apparatus for a waveform measuring apparatus. 4,093,995, Cl. 364-900.000.
Smith, Trevor James: *See—*
Bamfield, Peter; Quan, Peter Michael; and Smith, Trevor James, 4,093,646, Cl. 260-508.000.
SmithKline Corporation: *See—*
Berges, David A., 4,093,723, Cl. 424-246.000.
Hill, David Taylor, 4,093,719, Cl. 424-215.000.

Wibrow, Gunter, to ITW-Ateco G.m.b.H. Connection and fastening element for connecting workpieces of soft material, especially dowels for pressboards or parts of wood. 4,093,389, Cl. 403-280.000.
Wich, Horst W. Key duplicating machine. 4,092,806, Cl. 51-100.00R.
Wickenberg, Ralph F.; Miller, Donald F.; and Anderson, Lyle R., to Minnesota Mining and Manufacturing Company. Wire retainer. 4,093,334, Cl. 339-107.000.
Widigs, Sven Holger, to Brandstrom, Lars Gosta; and Brandstrom, Karl Peter. Chuck key holder. 4,093,396, Cl. 408-241.00R.
Wie, Chwang Tek: *See*—
Sass, Robert N.; and Wie, Chwang Tek, 4,093,710, Cl. 424-44.000.
Wieschel, John E., to Harnischfeger Corporation. Hydraulic brake system for crane hoist drum. 4,093,184, Cl. 254-139.100.
Wiezer, Hartmut: *See*—
Mayer, Norbert; Pfahler, Gerhard; and Wiezer, Hartmut, 4,093,592, Cl. 260-45.85B.
Wikstrand, Nils, to Moon, Firma. Ski pole. 4,093,250, Cl. 280-11.37Z.
Wild, Edward B.: *See*—
Henricks, John A.; and Wild, Robert E., 4,093,523, Cl. 204-55.00R.
Wild, Robert E.: *See*—
Henricks, John A.; and Wild, Robert E., 4,093,523, Cl. 204-55.00R.
Wildenhain, Barbara: *See*—
Ruckert, Hans; and Wildenhain, Barbara, 4,093,464, Cl. 96-91.00D.
Wildhaber, Ernst. Flexible-disk couplings. 4,092,836, Cl. 64-13.000.
Wilfert, Karl; and Schmid, Walter, to Daimler-Benz Aktiengesellschaft. Passenger motor vehicle. 4,093,255, Cl. 280-788.000.
Wilke, William F.; Hutcheson, Alan G.; and Ross, Richard D. Electronic game apparatus and method. 4,093,223, Cl. 273-94.00R.
Wilkie, Ronald N.; and Mooradian, Arman. Automatic slide stainer. 4,092,952, Cl. 118-58.000.
William H. Rorer, Inc.: *See*—
Diamond, Julius, 4,093,737, Cl. 424-304.000.
Williams, Bernard L.: *See*—
Ziets, George A.; and Williams, Bernard L., 4,093,490, Cl. 156-245.000.
Williams, Patrick Robert, to Temtool Pty., Ltd. Apparatus for sharpening microtome blades. 4,092,805, Cl. 51-85.0BS.
Williams, Raymond Charles: *See*—
Gaudette, Charles Henry; and Williams, Raymond Charles, 4,093,987, Cl. 364-200.000.
Williams, Thomas Alan: *See*—
Edwards, Robert Harry; Williams, Thomas Alan; and Hall, Kenneth, 4,093,662, Cl. 260-606.50P.
Williamson, John Decatur. Speech analyzer for analyzing pitch or frequency perturbations in individual speech pattern to determine the emotional state of the person. 4,093,821, Cl. 179-1.0SC.
Wilner, Lealie B., to Becton, Dickinson Electronics Company. Sculptured pressure diaphragm. 4,093,933, Cl. 338-42.000.
Wilson, Eddie A.: *See*—
Morris, Donald A.; Wilson, Eddie A.; and Little, Eric A., 4,092,804, Cl. 47-66.000.
Wilson, Harold L. Aerator sewage tank. 4,093,549, Cl. 210-195.00S.
Wilson, John T., to Westinghouse Electric Corp. Ground fault protective device. 4,093,977, Cl. 361-44.000.
Wilson, Kenneth J., to Wilson Tool Company. Self-stripping punch and guide assembly. 4,092,888, Cl. 83-140.000.
Wilson, Phillip Steven: *See*—
Mark, Victor; and Wilson, Phillip Steven, 4,093,582, Cl. 260-30.60R.
Wilson Tool Company: *See*—
Wilson, Kenneth J., 4,092,888, Cl. 83-140.000.
Winchell, David A., to Baxter Travenol Laboratories, Inc. Attachable hanger for containers. 4,093,169, Cl. 248-311.300.
Winchell, David A.: *See*—
Fowles, Thomas A.; and Winchell, David A., 4,093,093, Cl. 215-251.000.
Winderl, Siegfried: *See*—
Reiss, Wolfgang; Joschek, Hans-Ingo; Schnur, Rudolf; Winderl, Siegfried; Dehler, Juergen; and Hoffmann, Herwig, 4,093,668, Cl. 568-855.000.
Wing Industries Inc.: *See*—
Marron, Albert J.; and Markowski, Walter J., 4,093,435, Cl. 55-269.000.
Winicov, Murray W.; and Cantor, Abraham, to West Laboratories, Inc. Killing bacterial spores with glutaraldehyde sporicidal compositions. 4,093,744, Cl. 424-333.000.
Winn, Martin; and Kyncl, Jaroslav, to Abbott Laboratories. N-(2-benzimidazolyl)-piperazines. 4,093,726, Cl. 424-250.000.
Wirz, Carl A. Control device for an electronic watch. 4,092,821, Cl. 58-23.0BA.
Witherspoon, John F., to United States of America, Navy. Shock-excursion apparatus for retracting the umbilical plug of a missile. 4,092,898, Cl. 89-1.811.
Withop, Arthur; and Travagli, Roger Emil, to Memorex Corporation. Method of making manganese-zinc ferrite. 4,093,688, Cl. 264-65.000.
Withycombe, Donald Arthur; Mookherjee, Braja Dulal; Vock, Manfred Hugo; and Vinals, Joaquin Francisco, to International Flavors & Fragrances Inc. Flavoring with 2,4,6-triisobutyl-1,3,5-trioxane. 4,093,752, Cl. 426-536.000.
Wize, Gary A., to General Motors Corporation. Seat belt securing device. 4,093,275, Cl. 280-747.000.
Woditsch, Peter: *See*—
Heine, Heinrich; Woditsch, Peter; Bohmann, Theodor; and Rade, Dieter, 4,093,777, Cl. 428-403.000.
Wojciak, Stanley, to Loctite Corporation. Process for microencapsulation of metallocenes. 4,093,556, Cl. 252-316.000.
Wolff Walsrode Aktiengesellschaft: *See*—
Hoppe, Lutz; Boehmer, Branislav; and Behn, Rudolf, 4,093,605, Cl. 260-78.0SC.
Wong, Ted Lee: *See*—
Siegler, Manfred; and Wong, Ted Lee, 4,093,429, Cl. 55-58.000.
Wood, Donald C.; and McLaughlin, Robert L., to DeSoto, Inc. Method for producing a prilled urea bath bead composition. 4,093,745, Cl. 424-358.000.
Wood, Robert A. R., to Teleflex Incorporated. Axial piston pump. 4,092,905, Cl. 91-499.000.
Woster, George William, Jr.: *See*—
Bryan, Larry Wayne; Himmel, David Paul; and Woster, George William, Jr., 4,093,941, Cl. 340-146.3AE.
Wright, George C.; and Goldenberg, Marvin M., to Morton-Norwich Products, Inc. 3-[(4-Chromanylidene)amino]-2-oxazolidinones. 4,093,627, Cl. 260-307.00C.
Wright, George C.; and Goldenberg, Marvin M., to Morton-Norwich Products, Inc. N-arylidene-4-chromanamines. 4,093,799, Cl. 542-422.000.
Wright, Jeremy Corwin: *See*—
Dickson, Thomas David, Jr.; and Wright, Jeremy Corwin, 4,092,769, Cl. 29-234.000.
Wrigley, Nigel Edwin: *See*—
Davis, John Brian; Skilling, Derek; and Wrigley, Nigel Edwin, 4,093,412, Cl. 425-71.000.
Wszolek, Walter Robert, to W. R. Grace & Co. Plastisol composition and container closure gasket made therefrom. 4,093,097, Cl. 215-349.000.
Wszolek, Walter Robert, to W. R. Grace & Co. Plastisol composition and container closure gasket made therefrom. 4,093,098, Cl. 215-349.000.
Wu, Che-Kuang: *See*—
Sanford, Leon M.; and Wu, Che-Kuang, 4,093,469, Cl. 106-53.000.
Wu, Samuel Chinlun; and Holick, Stephen Alan, to Adolph Coors Company. Seamer apparatus. 4,092,940, Cl. 113-29.000.
Wulf, Helmut; and Niemann, Klaus, to Daimler-Benz Aktiengesellschaft. Positive guide mechanism for road vehicles with non-turnable wheels. 4,092,931, Cl. 104-247.000.
Wunder, Friedrich: *See*—
Fernholz, Hans; Roscher, Gunter; Schmidt, Hans-Joachim; Schmitz, Heinz; and Wunder, Friedrich, 4,093,559, Cl. 252-443.000.
Wynkoop, Raymond; Norman, Oscar L.; and Norton, Richard V., to Suntech, Inc. Terephthalic acid process. 4,093,528, Cl. 204-180.00P.
Xerox Corporation: *See*—
Agliata, Thomas P., 4,093,371, Cl. 355-43.000.
Eichorn, Roger H., deceased; Lincoln First Bank of Rochester, executor; and Silverberg, Morton, 4,093,367, Cl. 355-3.00R.
Fisli, Tibor, 4,093,350, Cl. 350-299.000.
Guenther, Joachim, 4,093,372, Cl. 355-50.000.
Hauser, Oscar G.; Mannik, Kallis H.; and Whited, Charles A., 4,093,457, Cl. 96-1.200.
Hewitt, Robert E., 4,093,369, Cl. 355-15.000.
Hudson, Frederick W., 4,092,954, Cl. 118-658.000.
Sohl, Gordon, 4,093,059, Cl. 400-144.200.
Zucker, Edwin; Shogren, David K.; and Redden, David N., 4,093,374, Cl. 355-57.000.
Yabuki, Kazuyasu: *See*—
Nishikawa, Yasuo; Watanabe, Akira; Sugimoto, Tetsuya; Yabuki, Kazuyasu; and Hatayama, Yoshio, 4,093,561, Cl. 252-466.00J.
Yabutani, Kunihiro; Ikeda, Kenichi; Hatta, Shigenori; and Harada, Tatsuo, to Nihon Nohyaku Co., Ltd. Novel benzoic anilide derivative and fungicide containing same. 4,093,743, Cl. 424-324.000.
Yagupolsky, Lev Moiseevich: *See*—
Belous, Viktor Mikhailovich; Yagupolsky, Lev Moiseevich; Alexeeva, Ljubov Antonovna; Sokolov, Sergei Vasilievich; and Ponomarev, Alexei Ivanovich, 4,093,665, Cl. 260-612.00D.
Yamada, Minoru, to Toyota Jidosha Kogyo Kabushiki Kaisha. Carburetion system for preventing engine misfires during gear changes. 4,092,961, Cl. 123-119.0EC.
Yamaguchi, Takashi: *See*—
Oda, Takeshi; Mori, Toshito; and Yamaguchi, Takashi, 4,093,797, Cl. 536-17.000.
Yamaguchi, Yoshichika. Positive cam type compressor. 4,093,408, Cl. 418-92.000.
Yamakoshi, Yasumichi: *See*—
Seko, Maomi; Yamakoshi, Yasumichi; Miyauchi, Hirotsugu; Fukumoto, Mitsunobu; Kimoto, Kyoji; Watanabe, Itaru; and Yokoyama, Shigeo, 4,093,568, Cl. 260-2.20R.
Yamamoto, Hitoshi: *See*—
Ishihara, Takeo; Yamamoto, Hitoshi; and Iiga, Tsuyoshi, 4,093,264, Cl. 280-296.000.
Yamamoto, Yujiro. Piezoelectric multimorph switches. 4,093,883, Cl. 310-317.000.
Yamasaki, Harumasa: *See*—
Aoki, Shuzo; and Yamasaki, Harumasa, 4,093,776, Cl. 428-402.000.
Yamashita, Shigeru; Masaki, Kazuo; and Shibahara, Masashi, to Nihon Hammond Kabushiki Kaisha. Electronic echo generation equipment. 4,093,820, Cl. 179-1.00J.
Yang, Yue-Chyou: *See*—
Lin, Tung-Yen; and Yang, Yue-Chyou, 4,092,811, Cl. 52-224.000.
Yara Engineering Corporation: *See*—
Moll, William F., Jr.; and Botta, Frank J., 4,093,564, Cl. 252-518.000.
Yasukuni, Mitsuo, to Minolta. Lens system with frontal aperture stop. 4,093,348, Cl. 350-206.000.

Yavne, Raphael O.: *See*—
Bardash, Manuel L.; Clasen, Carl P.; Scudder, Robert M.; Simon, Lawrence H.; Sorkin, Charles S.; Yavne, Raphael O.; Ekis, Robert W.; and Mintzer, Alfred I., 4,093,153, Cl. 244-3.140.
Yeda Research and Development Co., Ltd.: *See*—
Haviv, Fortuna; Patchornik, Abraham; and Altman, Janina, 4,093,802, Cl. 544-27.000.
Haviv, Fortuna; and Patchornik, Abraham, 4,093,804, Cl. 544-27.000.
Sela, Michael; Arnon, Ruth; Maron, Ruth; and Hurvitz, Esther, 4,093,607, Cl. 260-112.00B.
Yih, Roy Y.: *See*—
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 4,093,446, Cl. 71-109.000.
Yokohama Rubber Co., Ltd., The: *See*—
Tomoda, Hajime; Mitsuhashi, Kenhachi; and Morikawa, Tuneo, 4,093,014, Cl. 152-362.0CS.
Yokoyama, Kenji, to Nippon Gakki Seizo Kabushiki Kaisha. Method and system of driving power field effect transistor. 4,093,925, Cl. 330-277.000.
Yokoyama, Shigeo: *See*—
Seko, Maomi; Yamakoshi, Yasumichi; Miyauchi, Hirotsugu; Fukumoto, Mitsunobu; Kimoto, Kyoji; Watanabe, Itaru; and Yokoyama, Shigeo, 4,093,568, Cl. 260-2.20R.
Yoshida, Risaburo; Kaiho, Keisuke; Ide, Yusaku; and Hirose, Takeshi, to Toyo Ink Manufacturing Co,, Ltd. Thermogenic compositions. 4,093,424, Cl. 44-3.00C.
Yoshizawa, Hisao: *See*—
Iwata, Masao; and Yoshizawa, Hisao, 4,093,477, Cl. 148-108.000.
Yoshizawa, Tadao; and Kadowaki, Saburo, to Kubota Ltd. Synthetic resinous pipe joint made up in one-piece with a metallic male screw. 4,093,280, Cl. 285-39.000.
Yost, John V. Boat interior and cabin design. 4,092,754, Cl. 9-1.100.
Young, George R.: *See*—
Lund, Norman; and Young, George R., 4,092,943, Cl. 114-222.000.
Yu, Arthur J.: *See*—
Jin, Jung Il; and Yu, Arthur J., 4,093,788, Cl. 526-74.000.
Yulkowski, Leon. Door construction. 4,093,284, Cl. 292-216.000.
Yver, Jacques, to Metallurgie Francaise des Poudres-Metafram. Transfer arm for transferring small or medium sized parts. 4,093,081, Cl. 214-1.0BB.
Zabel, William P. Electronic pipe organ control system. 4,092,895, Cl. 84-345.000.
Zaccagni, Richard F.: *See*—
Maloney, John E., Jr.; and Zaccagni, Richard F., 4,092,808, Cl. 52-11.000.
Zacher, Albert R., Jr., to Artronix, Inc. Tomographic apparatus. 4,093,863, Cl. 250-445.00T.
Zacher, Albert R., Jr.: *See*—
Davis, Gregory A.; Krippner, Kenneth E.; Roestel, Jan A.; Vonk, Gottfried; and Zacher, Albert R., Jr., 4,093,859, Cl. 250-445.00T.
Zacher, Wieland: *See*—
Buechner, Oskar; Geierhaas, Herbert; Gierth, Volker; Mueller, Siegfried; and Zacher, Wieland, 4,093,703, Cl. 423-245.000.
Zaffaroni, Alejandro; Michaels, Alan S.; and Theeuwes, Felix, to Alza Corporation. Osmotic releasing device having a plurality of release rate patterns. 4,093,708, Cl. 424-15.000.
Zahler, Wolf-Dietrich: *See*—
Schmitt, Werner; Purrmann, Robert; Jochum, Peter; and Zahler, Wolf-Dietrich, 4,093,555, Cl. 252-188.30R.
Zahner, John Clarence: *See*—
Weisz, Paul Burg; and Zahner, John Clarence, 4,093,029, Cl. 166-305.00R.
Zavody presneho strojirenstvi, narodni podnik: *See*—
Dokoupil, Ludvik; Hrouda, Oldrich; and Zila, Josef, 4,092,757, Cl. 12-127.000.
Zbryski, William P.: *See*—
Lukac, Frederick S.; and Zbryski, William P., 4,093,472, Cl. 134-104.000.
Zecher, David C., to Hercules Incorporated. Process for inhibiting corrosion of metals in aqueous systems. 4,093,557, Cl. 252-389.00R.
Zenger, Alfred John: *See*—
Landau, John Vernon, Jr.; Hunts, Barney Dean; Rupinski, Frederick Alexander; and Zenger, Alfred John, 4,092,937, Cl. 112-121.110.
Zenzaburo, Iwamoto, to International Business Development Company. Pocket camp stove. 4,092,974, Cl. 126-38.000.
Zeochem Corporation: *See*—
Sand, Leonard B., 4,093,699, Cl. 423-118.000.
Zhukovsky, Sergei Semenovich: *See*—
Lyass, Abram Moiseevich; Zhukovsky, Sergei Semenovich; and Teplyakov, Sergei Dmitrievich, 4,093,467, Cl. 106-38.350.
Ziegler, Harald: *See*—
Kruger, Gerd; Keck, Johannes; Noll, Klaus Reinhold; Pieper, Helmut; Ziegler, Harald; Ballhause, Helmut; and Kahling, Jochim, 4,093,734, Cl. 424-274.000.
Ziegler, Hermann, to Dr. Ing. h.c.F.Porsche Aktiengesellschaft. Holding means for a window, preferably windshield in vehicles. 4,093,304, Cl. 296-84.00D.
Zielinski, Jan: *See*—
Falkowski, Leonard; Bobrowski, Miroslaw; Buluk, Helena; Bylec, Elzbieta; Cybulska, Barbara; Golik, Jerzy; Kolodziejczyk, Pawel; Pawlak, Jan; Rudowski, Andrzej; Zielinski, Jan; Ziminski, Tadeusz; and Borowski, Edward, 4,093,796, Cl. 536-17.000.
Ziets, George A.; and Williams, Bernard L., to Ortho Pharmaceutical Corporation. Method of making vaginal diaphragm. 4,093,490, Cl. 156-245.000.
Zila, Josef: *See*—
Dokoupil, Ludvik; Hrouda, Oldrich; and Zila, Josef, 4,092,757, Cl. 12-127.000.
Ziminski, Tadeusz: *See*—
Falkowski, Leonard; Bobrowski, Miroslaw; Buluk, Helena; Bylec, Elzbieta; Cybulska, Barbara; Golik, Jerzy; Kolodziejczyk, Pawel; Pawlak, Jan; Rudowski, Andrzej; Zielinski, Jan; Ziminski, Tadeusz; and Borowski, Edward, 4,093,796, Cl. 536-17.000.
Zimm-Zamm Aktiengesellschaft: *See*—
Oliver, Robert John, 4,093,225, Cl. 273-95.0AA.
Zitone, Joseph. Auxiliary rider support for jog carts. 4,093,306, Cl. 297-217.000.
ZMC, Inc.: *See*—
Maloney, John E., Jr.; and Zaccagni, Richard F., 4,092,808, Cl. 52-11.000.
Zoecon Corporation: *See*—
Henrick, Clive A.; and Staal, Gerardus B., 4,093,622, Cl. 260-295.00R.
Zucker, Edwin; Shogren, David K.; and Redden, David N., to Xerox Corporation. Multiple range variable magnification reproduction machine. 4,093,374, Cl. 355-57.000.
Zuech, Ernest A.: *See*—
Murtha, Timothy P.; Jones, William A.; and Zuech, Ernest A., 4,093,671, Cl. 260-668.00R.
Zurkova, Eva: *See*—
Kalal, Jaroslav; Zurkova, Eva; and Svec, Frantisek, 4,093,602, Cl. 260-73.00R.
Zwahlen, Gunther; Umsonst, Gerhard; and Laely, Andreas, to Ciba-Geigy Corporation. Process for the mass coloration or whitening of linear polyesters. 4,093,584, Cl. 260-40.00P.

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 6TH DAY OF JUNE, 1978

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Caterpillar Tractor Co.: *See—*
Mitchell, Thomas L., T971,002, Cl. 184-6.140.

Collier, William Wilkinson, to International Business Machines Corporation. Method for synchronizing sets of interacting processes. T971,005, 6-6-78, Cl. 364-300.000.

Dunn, Colin Malcolm Roy, to Imperial Chemical Industries Limited. Foam plastics. T971,004, 6-6-78, Cl. 264-53.000.

Du Pont de Nemours, E. I., and Company: *See—*
Hecht, James L., T971,007, Cl. 426-234.000.
Orphanides, Gus George, T971,003, Cl. 260-326.260.

Hansen, David R., to Shell Oil Company. Foxing primer. T971,008, 6-6-78, Cl. 428-266.000.

Hecht, James L., to Du Pont de Nemours, E. I., and Company. Microwave treatment of package foods. T971,007, 6-6-78, Cl. 426-234.000.

Imperial Chemical Industries Limited: *See—*
Dunn, Colin Malcolm Roy, T971,004, Cl. 264-53.000.

International Business Machines Corporation: *See—*
Collier, William Wilkinson, T971,005, Cl. 364-300.000.

Mangialardi, Gino J., Jr., to United States of America, Agriculture. Lint-cotton reclaiming apparatus for cotton gins. T971,001, 6-6-78, Cl. 19-202.000.

Mitchell, Thomas L., to Caterpillar Tractor Co. Adjustable nozzle. T971,002, 6-6-78, Cl. 184-6.140.

Orphanides, Gus George, to Du Pont de Nemours, E. I., and Company. Synthesis of dimaleimides. T971,003, 6-6-78, Cl. 260-326.260.

Shell Oil Company: *See—*
Hansen, David R., T971,008, Cl. 428-266.000.

Smith, Anthony J., to Tennessee Valley Authority. Purification of phosphoric acid solutions. T971,006, 6-6-78, Cl. 423-321.00R.

Tennessee Valley Authority: *See—*
Smith, Anthony J., T971,006, Cl. 423-321.00R.
Agriculture: *See—*
Mangialardi, Gino J., Jr., T971,001, Cl. 19-202.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF JUNE, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Abbott Laboratories: *See—*
Chittenden, Richard Marion; Bryant, Peter Lorin; and Classen, Charles Carlock, Re. 29,656, Cl. 128-272.300.

Armstrong, William E., to Motorola, Inc. Process and product for making a single supply N-channel silicon gate device. Re. 29,660, Cl. 148-1.500.

Bildner, Heinz Helmut. Radial ski having a profiled running surface. Re. 29,659, Cl. 280-608.000.

Bryant, Peter Lorin: *See—*
Chittenden, Richard Marion; Bryant, Peter Lorin; and Classen, Charles Carlock, Re. 29,656, Cl. 128-272.300.

Chevron Research Company: *See—*
Hendrickson, Yngve Gust; and King, John M., Re. 29,661, Cl. 252-42.700.

Chittenden, Richard Marion; Bryant, Peter Lorin; and Classen, Charles Carlock, to Abbott Laboratories. Additive transfer unit having a slidable piercing member. Re. 29,656, Cl. 128-272.300.

Classen, Charles Carlock: *See—*
Chittenden, Richard Marion; Bryant, Peter Lorin; and Classen, Charles Carlock, Re. 29,656, Cl. 128-272.300.

Hendrickson, Yngve Gust; and King, John M., to Chevron Research Company. Sulfurized metal phenates. Re. 29,661, Cl. 252-42.700.

Husted, Royce H., to Saroy Engineering. Power driven ski. Re. 29,657, Cl. 180-5.00R.

King, John M.: *See—*
Hendrickson, Yngve Gust; and King, John M., Re. 29,661, Cl. 252-42.700.

Minnesota Mining and Manufacturing Company: *See—*
Theissen, Donald R., Re. 29,663, Cl. 428-336.000.

Motorola, Inc.: *See—*
Armstrong, William E., Re. 29,660, Cl. 148-1.500.

RCA Corporation: *See—*
Yocom, Perry Niel, Re. 29,662, Cl. 252-301.40S.

Rous, Benjamin, to Stone Container Corporation. Book carton with improved opener. Re. 29,658, Cl. 206-424.000.

Saroy Engineering: *See—*
Husted, Royce H., Re. 29,657, Cl. 180-5.00R.

Stone Container Corporation: *See—*
Rous, Benjamin, Re. 29,658, Cl. 206-424.000.

Theissen, Donald R., to Minnesota Mining and Manufacturing Company. Moisture-resistant solar control film. Re. 29,663, Cl. 428-336.000.

Yocom, Perry Niel, to RCA Corporation. Rare earth activated lanthanum and lutetium oxy-chalcogenide phosphors. Re. 29,662, Cl. 252-301.40S.

LIST OF PLANT PATENTEES

Ryan, John J. Impatiens plant Maya. 4,258, 6-6-78, Cl. 68.000.

Ryan, John J. Impatiens plant — Navajo. 4,259, 6-6-78, Cl. 68.000.

Ryan, John J. Impatiens plant — Chickasaw. 4,260, 6-6-78, Cl. 68.000.

Ryan, John J. Impatiens plant — Creek. 4,261, 6-6-78, Cl. 68.000.

LIST OF DESIGN PATENTEES

American Optical Corporation: *See—*
Shindler, Anthony, 248,105, Cl. D16-65.000.
Wright, John R., 248,110, Cl. D24-31.000.

American Sterilizer Company: *See—*
Brengord, Thomas; and Copeland, Robert D., 248,107, Cl. D23-55.000.

Ampex Corporation: *See—*
Bornschlegel, Robert W.; and Farey, Francis Arden, 248,100, Cl. D14-41.000.
Wilson, George A., 248,099, Cl. D14-41.000.

Anderson, Victor F., to Shell Oil Company. Shoe. 248,062, 6-6-78, Cl. D2-291.000.

Anderson, Victor F., to Shell Oil Company. Shoe. 248,063, 6-6-78, Cl. D2-293.000.

Anderson, Victor F., to Shell Oil Company. Shoe. 248,064, 6-6-78, Cl. D2-301.000.

Ando, Sachie: *See—*
Maejima, Husazo, 248,080, Cl. D7-155.000.

Ball, Warner J. Dental aide's cabinet. 248,109, 6-6-78, Cl. D24-5.000.

Bangert, Albert C. Hamburger roll. 248,061, 6-6-78, Cl. D1-24.000.

Batra, Vijay. Outer sole footwear. 248,065, 6-6-78, Cl. D2-320.000.

Bernzomatic Corporation: *See—*
Zagara, Frank A.; and Nelson, John M., 248,083, Cl. D8-30.000.

Blake, Arthur H. Wall mount telephone case. 248,102, 6-6-78, Cl. D14-61.000.

Bornschlegel, Robert W.; and Farey, Francis Arden, to Ampex Corporation. Magnetic tape transport. 248,100, 6-6-78, Cl. D14-41.000.

Box, Theodor. Storage container for food or the like. 248,090, 6-6-78, Cl. D9-237.000.

Brengord, Thomas; and Copeland, Robert D., to American Sterilizer Company. Sit-up bathtub. 248,107, 6-6-78, Cl. D23-55.000.

Britt, William James, to Morton-Norwich Products, Inc. Bottle. 248,088, 6-6-78, Cl. D9-149.000.

Brown, Glen J. Storage tray for photographic slides. 248,124, 6-6-76, Cl. D87-1.00D.

Bruzek, Daniel A., to Owatonna Tool Company. Puller tool or similar article. 248,084, 6-6-78, Cl. D8-61.000.

Bunker Ramo Corporation: *See—*
Stupay, Lawrence J., 248,096, Cl. D13-24.000.

C. W. Cancilier Ltd.: *See—*
Cancilier, Charles W., 248,093, Cl. D12-99.000.

Cancilier, Charles W., to C. W. Cancilier Ltd. Van. 248,093, 6-6-78, Cl. D12-99.000.

Catanzaro, Lucy Ann: *See—*
Catanzaro, Philip J.; and Catanzaro, Lucy Ann, 248,070, Cl. D6-131.000.

Catanzaro, Philip J.; and Catanzaro, Lucy Ann. Shopping bag holder. 248,070, 6-6-78, Cl. D6-131.000.

Chapman, Richard H.: *See—*
Stelljes, Charles R.; Frostad, Lars; and Chapman, Richard H., 248,085, Cl. D8-64.000.

Christian, Hubert E., to Dart Industries Inc. Bowl. 248,076, 6-6-78, Cl. D7-20.000.

CITC Industries, Inc.: *See—*
Cohen, William Jay, 248,123, Cl. D87-1.00R.

Clowers, Earl R.; Davis, John C.; Pearman, Fred E., Jr.; and Vermillion, Don W., to Singer Company, The. Upright vaccum cleaner. 248,104, 6-6-78, Cl. D15-53.000.

Cohen, William Jay, to CITC Industries, Inc. Carrying carton for shoes or the like. 248,123, 6-6-78, Cl. D87-1.00R.

Copeland, Robert D.: *See—*
Brengord, Thomas; and Copeland, Robert D., 248,107, Cl. D23-55.000.

Daenen, Robert H. C. M., to Dart Industries Inc. Tumbler or the like. 248,075, 6-6-78, Cl. D7-11.000.

Daenen, Robert H. C. M., to Dart Industries Inc. Plate or the like. 248,077, 6-6-78, Cl. D7-23.000.

Dart Industries Inc.: *See—*
Christian, Hubert E., 248,076, Cl. D7-20.000.
Daenen, Robert H. C. M., 248,075, Cl. D7-11.000.
Daenen, Robert H. C. M., 248,077, Cl. D7-23.000.
Painter, David L.; and Minsky, Norman C., 248,079, Cl. D7-94.000.

Davis, John C.: *See—*
Clowers, Earl R.; Davis, John C.; Pearman, Fred E., Jr.; and Vermillion, Don W., 248,104, Cl. D15-53.000.

Designs for Vision, Inc.: *See—*
Feinbloom, Richard E.; and Endrodi, Laszlo, 248,097, Cl. D13-24.000.

Ditzel, Roland. Tapestry fabric or similar article. 248,125, 6-6-78, Cl. D92-1.0LL.

Economics Laboratory, Inc.: *See—*
Larson, Spencer Brian; and Salmonson, Duane Leroy, 248,103, Cl. D15-36.000.

Elopak A/S: *See—*
Frydendal, Tom, 248,091, Cl. D9-267.000.

Endrodi, Laszlo: *See—*
Feinbloom, Richard E.; and Endrodi, Laszlo, 248,097, Cl. D13-24.000.

Epstein, Barry. Squeegee bucket. 248,081, 6-6-78, Cl. D7-187.000.

Farey, Francis Arden: *See—*
Bornschlegel, Robert W.; and Farey, Francis Arden, 248,100, Cl. D14-41.000.

Feinbloom, Richard E.; and Endrodi, Laszlo, to Designs for Vision, Inc. Universal connector block for fiber optic cables and the like. 248,097, 6-6-78, Cl. D13-24.000.

Feldman, Elwood Thomas. Tie-down hook. 248,087, 6-6-78, Cl. D8-372.000.

Frostad, Lars: *See—*
Stelljes, Charles R.; Frostad, Lars; and Chapman, Richard H., 248,085, Cl. D8-64.000.

Frydendal, Tom, to Elopak A/S. Carton cover. 248,091, 6-6-78, Cl. D9-267.000.

Fujita, Teizo; and Ohashi, Toshiro, to Izumi Denki Company Limited. Motor timer. 248,092, 6-6-78, Cl. D10-40.000.

Giancarlo, Eugene N.; and Ladue, James J., to International Business Machines Corporation. Analytical instrument system. 248,098, 6-6-78, Cl. D14-40.000.

Grethey, Albert K.: *See—*
Moore, Walter E.; and Grethey, Albert K., 248,121, Cl. D52-3.00R.

Hanes Corporation: *See—*
Leath, William S., 248,067, Cl. D6-24.000.

Heet, Gregory S. Hand held musical string vibration initiator and sustainer. 248,122, 6-6-78, Cl. D56-1.00A.

Heins, Stanley: *See—*
Steinhilber, John Budd; and Heins, Stanley, 248,101, Cl. D14-44.000.

Herriman, Straud D. Game board. 248,113, 6-6-78, Cl. D34-5.0SS.

Hillinger, George. Tool holder. 248,066, 6-6-78, Cl. D2-400.000.

Ho, Bik Kwan. Torch or similar article. 248,120, 6-6-78, Cl. D48-24.00A.

Interlego A.G.: *See—*
Tapdrup, Erik Peter, 248,115, Cl. D34-2.00R.

International Business Machines Corporation: *See—*
Giancarlo, Eugene N.; and Ladue, James J., 248,098, Cl. D14-40.000.

Izumi Denki Company Limited: *See—*
Fujita, Teizo; and Ohashi, Toshiro, 248,092, Cl. D10-40.000.

Johnson, Robert H. Cabinet. 248,072, 6-6-78, Cl. D6-169.000.

Koster, Neil A. Portable animal enclosure. 248,111, 6-6-78, Cl. D30-1.000.

Ladue, James J.: *See—*
Giancarlo, Eugene N.; and Ladue, James J., 248,098, Cl. D14-40.000.

Larson, Spencer Brian; and Salmonson, Duane Leroy, to Economics Laboratory, Inc. Powder detergent dispensers. 248,103, 6-6-78, Cl. D15-36.000.

Lavallee, Nancy: *See—*
Zamkovec, John; and Lavallee, Nancy, 248,116, Cl. D34-5.0CH.

Leath, William S., to Hanes Corporation. Display stand. 248,067, 6-6-78, Cl. D6-24.000.

Maejima, Husazo, to Ando, Sachie. Coffee mill. 248,080, 6-6-78, Cl. D7-155.000.

Mangiapane, Philip. Exerciser. 248,114, 6-6-78, Cl. D34-5.00K.

Marvin Glass & Associates: *See—*
Nix, Donald F.; and Morrison, Howard J., 248,119, Cl. D34-15.0AJ.

Maxant, William T. Hive tool. 248,086, 6-6-78, Cl. D8-98.000.

Minsky, Norman C.: *See—*
Painter, David L.; and Minsky, Norman C., 248,079, Cl. D7-94.000.

Mondy, Peter. Golf putter head. 248,117, 6-6-78, Cl. D34-5.0GH.

Moore, Walter E.; and Grethey, Albert K., to UMC Industries, Inc. Front display panel for vending machines. 248,121, 6-6-78, Cl. D52-3.00R.

Morrison, Howard J.: *See—*
Nix, Donald F.; and Morrison, Howard J., 248,119, Cl. D34-15.0AJ.

Morton-Norwich Products, Inc.: *See—*
Britt, William James, 248,088, Cl. D9-149.000.

Moses, William T. Presentation folder. 248,106, 6-6-78, Cl. D19-26.000.

Nagasaka, Yoshizo, to Tomy Kogyo Co., Inc. Toy vacuum cleaner. 248,118, 6-6-78, Cl. D34-15.00R.

Nelson, John M.: *See—*
Zagara, Frank A.; and Nelson, John M., 248,083, Cl. D8-30.000.

Nix, Chalmer H. Vehicle rock guard. 248,094, 6-6-78, Cl. D12-190.000.

Nix, Donald F.; and Morrison, Howard J., to Marvin Glass & Associates. Toy truck. 248,119, 6-6-78, Cl. D34-15.0AJ.

Ohashi, Toshiro: *See—*
Fujita, Teizo; and Ohashi, Toshiro, 248,092, Cl. D10-40.000.

Ormonde, John A.: *See—*
Phillips, James M.; and Ormonde, John A., 248,089, Cl. D9-216.000.

Owatonna Tool Company: *See—*
Bruzek, Daniel A., 248,084, Cl. D8-61.000.

Painter, David L.; and Minsky, Norman C., to Dart Industries Inc. Electric cooking base and vessel. 248,079, 6-6-78, Cl. D7-94.000.

Pearman, Fred E., Jr.: *See—*
Clowers, Earl R.; Davis, John C.; Pearman, Fred E., Jr.; and Vermillion, Don W., 248,104, Cl. D15-53.000.

Phillips, James M.; and Ormonde, John A. Container for pills. 248,089, 6-6-78, Cl. D9-216.000.

Randall, Mary. Jar opener/pot holder. 248,074, 6-6-78, Cl. D6-293.000.

Robles, Gwendolyn. Container for toilet tissue rolls or the like. 248,069, 6-6-78, Cl. D6-97.000.

Rockwell International Corporation: *See—*
Stelljes, Charles R.; Frostad, Lars; and Chapman, Richard H., 248,085, Cl. D8-64.000.

Roericht, Hans. Chair. 248,068, 6-6-78, Cl. D6-31.000.
Salmonson, Duane Leroy: *See*—
Larson, Spencer Brian; and Salmonson, Duane Leroy, 248,103, Cl. D15-36.000.
Schneider, Joseph P. Nestable table. 248,073, 6-6-78, Cl. D6-177.000.
Seggerman, Loren A. Marionette duck. 248,112, 6-6-78, Cl. D34-2.00B.
Shell Oil Company: *See*—
Anderson, Victor F., 248,062, Cl. D2-291.000.
Anderson, Victor F., 248,063, Cl. D2-293.000.
Anderson, Victor F., 248,064, Cl. D2-301.000.
Shindler, Anthony, to American Optical Corporation. Pair of spectacles. 248,105, 6-6-78, Cl. D16-65.000.
Shuzuki, Toshiyuki; and Suzuki, Tadao, to Yamaha Hatsudoki Kabushiki Kaisha. Motor-cycle wheel. 248,095, 6-6-78, Cl. D12-205.000.
Simmons, Earle G. Window shelf for plants. 248,071, 6-6-78, Cl. D6-137.000.
Singer Company, The: *See*—
Clowers, Earl R.; Davis, John C.; Pearman, Fred E., Jr.; and Vermillion, Don W., 248,104, Cl. D15-53.000.
Sotz, Leonard. Barrel heater door. 248,108, 6-6-78, Cl. D23-128.000.
Steinhilber, John Budd; and Heins, Stanley, to Syntex (U.S.A.) Inc. Electronic control and display console. 248,101, 6-6-78, Cl. D14-44.000.
Stelljes, Charles R.; Frostad, Lars; and Chapman, Richard H., to Rockwell International Corporation. Portable band saw. 248,085, 6-6-78, Cl. D8-64.000.
Stupay, Lawrence J., to Bunker Ramo Corporation. Connector panel. 248,096, 6-6-78, Cl. D13-24.000.
Suzuki, Tadao: *See*—
Shuzuki, Toshiyuki; and Suzuki, Tadao, 248,095, Cl. D12-205.000.
Syntex (U.S.A.) Inc.: *See*—
Steinhilber, John Budd; and Heins, Stanley, 248,101, Cl. D14-44.000.
Tapdrup, Erik Peter, to Interlego A.G. Toy figure. 248,115, 6-6-78, Cl. D34-2.00R.
Tomy Kogyo Co., Inc.: *See*—
Nagasaka, Yoshizo, 248,118, Cl. D34-15.00R.
UMC Industries, Inc.: *See*—
Moore, Walter E.; and Grethey, Albert K., 248,121, Cl. D52-3.00R.
Venable, Floyd James, Jr. Wrench. 248,082, 6-6-78, Cl. D8-29.000.
Vermillion, Don W.: *See*—
Clowers, Earl R.; Davis, John C.; Pearman, Fred E., Jr.; and Vermillion, Don W., 248,104, Cl. D15-53.000.
Warnekros, Casper P. Sorting tray. 248,078, 6-6-78, Cl. D7-37.000.
Wilson, George A., to Ampex Corporation. Tape transport. 248,099, 6-6-78, Cl. D14-41.000.
Wright, John R., to American Optical Corporation. Holder for opthalmic instrument control panel. 248,110, 6-6-78, Cl. D24-31.000.
Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Shuzuki, Toshiyuki; and Suzuki, Tadao, 248,095, Cl. D12-205.000.
Zagara, Frank A.; and Nelson, John M., to Bernzomatic Corporation. Portable torch. 248,083, 6-6-78, Cl. D8-30.000.
Zamkovec, John; and Lavallee, Nancy. Set of chessmen or similar article. 248,116, 6-6-78, Cl. D34-5.0CH.

CLASSIFICATION OF PATENTS

ISSUED JUNE 6, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 3
1 4,092,739
1.7 4,092,742
1.911 4,092,740
1.913 4,092,741
13 4,092,743

CLASS 4
7 4,092,744
172.17 4,092,746
286 4,092,747
288 4,092,745

CLASS 5
85 4,092,748
267 4,092,749
343 4,092,750
345 R 4,092,751
4,092,752

CLASS 7
158 4,092,753

CLASS 8
2.5 A 4,093,415
4,093,416
137 4,093,417
142 4,093,418

CLASS 9
1.1 4,092,754
1.2 4,092,755
8 R 4,092,756

CLASS 12
127 4,092,757

CLASS 13
2 R 4,093,816

CLASS 15
180 4,092,758
257 4,092,759

CLASS 16
35 R 4,092,760

CLASS 17
1 E 4,092,761
45 4,092,762

CLASS 19
98 4,092,763
107 4,092,764

CLASS 21
102 R 4,093,419

CLASS 23
230 EP 4,093,420
259.5 4,093,421
284 4,093,422
288 FC 4,093,423

CLASS 24
16 PB 4,092,765
73 MF 4,092,766
230 AL 4,092,767

CLASS 29
156.8 R 4,092,768
234 4,092,769
263 4,092,770
401 F 4,092,771
434 4,092,772
512 4,092,773

CLASS 30
92 4,092,774
95 4,092,775
253 4,092,776
273 4,092,777

CLASS 32
60 4,092,778

CLASS 33
1 SD 4,092,779
139 4,092,780
143 J 4,092,781
174 N 4,092,782
180 R 4,092,783

CLASS 34
13 4,092,784

CLASS 35
1 4,092,785
8 R 4,092,786
17 4,092,788
29 R 4,092,787

CLASS 37
12 4,092,789
71 4,092,790

CLASS 40
36 4,092,791
607 4,092,792

CLASS 42
1 LP 4,092,794
1 ST 4,092,793

CLASS 43
17 4,092,795
44.83 4,092,796
102 4,092,797

CLASS 44
3 C 4,093,424
10 F 4,093,425

CLASS 46
11 4,092,798
52 4,092,799

CLASS 47
1.3 4,092,800
16 4,092,802
41.12 4,092,801
62 4,092,803
66 4,092,804

CLASS 51
85 BS 4,092,805
100 R 4,092,806
168 4,092,807

CLASS 52
11 4,092,808
63 4,092,809
81 4,092,810
224 4,092,811
309.3 4,092,812
397 4,092,813
730 4,092,814

CLASS 53
3 4,092,815
234 4,092,816
298 4,092,817

CLASS 55
8 4,093,426
17 4,093,427
52 4,093,428
58 4,093,429
107 4,093,430
112 4,093,431
138 4,093,432
226 4,093,433
4,093,434
269 4,093,435
4,093,436
487 4,093,437

CLASS 56
341 4,092,818

CLASS 58
23 BA 4,092,821
23 R 4,092,819
4,092,820
4,092,822
125 C 4,092,823

CLASS 60
39.02 4,092,824
4,092,825
39.74 R 4,092,826
398 4,092,827
506 4,092,828
517 4,092,829
671 4,092,830

CLASS 61
45 D 4,092,831
51 4,092,832

CLASS 62
6 4,092,833
123 4,092,834
136 4,092,835

CLASS 64
13 4,092,836
27 NM 4,092,837

CLASS 65
62 4,093,438
65 4,093,439

CLASS 66
214 4,092,838

CLASS 68
19 4,092,839

CLASS 71
65 4,093,440
78 4,093,441
90 4,093,442
4,093,443
92 4,093,444
100 4,093,445
109 4,093,446
111 4,093,447

CLASS 72
275 4,092,875
312 4,092,840
320 4,092,841
379 4,092,842

CLASS 73
17 R 4,092,843
23 4,092,844
28 4,092,845
29 4,092,846
36 4,092,847
86 4,092,848
101 4,092,849
113 4,092,850
114 4,092,851
117.3 4,092,852
121 4,092,853
133 R 4,092,854
134 4,092,855
141 A 4,092,856
144 4,092,857
170 A 4,092,858
194 B 4,092,859
304 R 4,092,860
311 4,092,861
362 AR 4,092,863
362 CP 4,092,862
363 4,092,864
431 4,092,866
609 4,092,867
638 4,092,868
665 4,092,869
756 4,092,865

CLASS 74
7 R 4,092,870
40 4,092,871
41 4,092,872
82 4,092,873
100 R 4,092,874
478 4,092,876
625 4,092,877
801 4,092,878

CLASS 75
0.5 AA 4,093,450
0.5 R 4,093,449
3 4,093,448
43 4,093,451
53 4,093,452
129 4,093,453
236 4,093,454
256 4,093,455

CLASS 81
6 4,092,879
9.5 A 4,092,880
57.34 4,092,881
90 C 4,092,882

CLASS 82
3 4,092,883
5 4,092,884
33 R 4,092,885

CLASS 83
56 4,092,886
4,092,887
140 4,092,888
177 4,092,889
284 4,092,890
341 4,092,891
413 4,092,892

CLASS 84
1.11 4,092,893
319 4,092,894
345 4,092,895

CLASS 85
50 R 4,092,896

CLASS 87
29 4,092,897

CLASS 89
1.811 4,092,898
1.816 4,092,899
33 B 4,092,900
46 4,092,901

CLASS 90
11 D 4,092,902

CLASS 91
36 4,092,903
395 4,092,904
499 4,092,905

CLASS 93
49 R 4,092,906

CLASS 96
1 PE 4,093,456
1 SD 4,093,459
1.2 4,093,457
27 E 4,093,460
36 4,093,461
66 HD 4,093,462
67 4,093,463
87 R 4,093,458
91 D 4,093,464
115 R 4,093,465

CLASS 98
40 A 4,092,907
60 4,092,908

CLASS 99
444 4,092,909
472 4,092,910
483 4,092,911

CLASS 100
3 4,092,912
24 4,092,913
88 4,092,914
93 P 4,092,915
174 4,092,916
176 4,092,917

CLASS 101
53 4,092,919
77 4,092,920
93.21 4,092,921
288 4,092,918
363 4,092,922
415.1 4,092,923
426 4,092,924
467 4,092,925

CLASS 102
204 R 4,092,926
229 4,092,927

CLASS 104
119 4,092,928
173 R 4,092,929
247 4,092,930
4,092,931

CLASS 105
207 4,092,932
366 R 4,092,933

CLASS 106
1.22 4,093,466
38.35 4,093,467
39.7 4,093,468
53 4,093,469
56 4,093,470
99 4,093,471

CLASS 109
24.1 4,092,934

CLASS 110
186 4,092,935

CLASS 111
1 4,092,936

CLASS 112
121.11 4,092,937
158 E 4,092,938
254 4,092,939

CLASS 113
29 4,092,940

CLASS 114
218 4,092,941
222 4,092,942
4,092,943
297 4,092,944

CLASS 115
2 4,092,945
18 E 4,092,946

CLASS 116
114 PV 4,092,948
118 R 4,092,947

CLASS 118
6 4,092,949
8 4,092,950
50 4,092,951
58 4,092,952
642 4,092,953
658 4,092,954

CLASS 123
32 EA 4,092,955
41.74 4,092,956
48 B 4,092,957
73 PP 4,092,958
119 A 4,092,959
4,092,960
119 EC 4,092,961
133 4,092,962
4,092,963
139 AT 4,092,964
140 FG 4,092,965
141 4,092,966
143 B 4,092,967
148 E 4,092,968
191 S 4,092,969
198 D 4,092,970

CLASS 125
16 R 4,092,971
4,092,972

CLASS 126
37 B 4,092,973
38 4,092,974
41 R 4,092,975
63 4,092,976
270 4,092,977
4,092,978
271 4,092,979

CLASS 128
2 A 4,092,980
2.1 B 4,092,981
82.1 4,092,982
214 R 4,092,983
229 4,092,984
272.3 Re.29,656
303.13 4,092,985
303.14 4,092,986

CLASS 131
8 R 4,092,987
17 R 4,092,988
4,092,989

CLASS 133
1 R 4,092,990

CLASS 134
104 4,093,472
127 4,092,991

CLASS 135
3 R 4,092,992

CLASS 136
89 P 4,093,473

CLASS 137
15 4,092,993
65 4,092,994
119 4,092,995
344 4,092,996
351 4,092,997
471 4,092,998
495 4,093,001
504 4,092,999
554 4,093,000
596.2 4,093,002
615 4,093,003

CLASS 138
140 4,093,004

CLASS 140
123.6 4,093,005

CLASS 144
288 A 4,093,006
326 R 4,093,007

CLASS 145
61 EA 4,093,008

CLASS 148
1.5 Re.29,660
2 4,093,474
32 4,093,475
32.5 4,093,476
108 4,093,477

CLASS 149
2 4,093,478

CLASS 150
.5 4,093,009
52 J 4,093,010

CLASS 151
57 4,093,011

CLASS 152
226 4,093,012
240 4,093,013
362 CS 4,093,014

CLASS 156
54 4,093,480
95 4,093,481
210 4,093,482
227 4,093,483
244.13 4,093,484
4,093,485
244.16 4,093,487
244.19 4,093,486
245 4,093,488
4,093,489
4,093,490
309 4,093,491
331 4,093,492
358 4,093,493
394 4,093,495
449 4,093,496
473 4,093,497
494 4,093,498
498 4,093,499
510 4,093,500
577 4,093,494
580 4,093,501
624 4,093,502
628 4,093,503
656 4,093,504

CLASS 157
1.1 4,093,015

CLASS 159
6 W 4,093,479
9 A 4,093,505

CLASS 162
17 4,093,506
18 4,093,507
30 K 4,093,508
124 4,093,016
158 4,093,509

175 4,093,510
234 4,093,511
348 4,093,512

CLASS 164

28 4,093,017
32 4,093,018
52 4,093,019

CLASS 165

1 4,093,020
4,093,021
39 4,093,022
89 4,093,023
170 4,093,024

CLASS 166

251 4,093,025
256 4,093,026
272 4,093,027
281 4,093,028
305 R 4,093,029
315 4,093,030

CLASS 172

372 4,093,031

CLASS 174

32 4,093,817
48 4,093,818

CLASS 176

37 4,093,513
65 4,093,514

CLASS 177

165 4,093,032

CLASS 178

2 R 4,093,819

CLASS 179

1 J 4,093,820
1 SC 4,093,821
1 VL 4,093,822
15 AT 4,093,827
15 BA 4,093,823
15 BS 4,093,825
15 BT 4,093,824
16 EC 4,093,826
18 FC 4,093,828
81 R 4,093,829
99 4,093,830
100.1 VC 4,093,831
100.4 D 4,093,832
100.41 D 4,093,833

CLASS 180

5 R Re.29,657
4,093,033
53 R 4,093,034
65 DD 4,093,035
70 R 4,093,036
77 R 4,093,037
82 R 4,093,038

CLASS 181

229 4,093,039
252 4,093,040

CLASS 186

1 D 4,093,041

CLASS 188

67 4,093,042
73.3 4,093,044
73.5 4,093,045
73.6 4,093,043
273 4,093,046

CLASS 191

12 R 4,093,047

CLASS 192

0.049 4,093,050
13 R 4,093,048
47 4,093,049
87.13 4,093,051
88 B 4,093,052
98 4,093,053
106.1 4,093,054
116.5 4,093,055
127 4,093,056

CLASS 194

1 R 4,093,057
71 4,093,058

CLASS 195

1.8 4,093,515
27 4,093,516
66 R 4,093,517
142 4,093,518

CLASS 198

380 4,093,062
425 4,093,063
485 4,093,064
735 4,093,065
861 4,093,066

CLASS 200

50 A 4,093,834
61.45 M 4,093,835
61.53 4,093,836
150 G 4,093,837
303 4,093,838

CLASS 202

241 4,093,519

CLASS 204

15 4,093,520
43 R 4,093,521
51 4,093,522
55 R 4,093,523
61 4,093,524
98 4,093,525
104 4,093,526
129 4,093,527
180 P 4,093,528
197 4,093,529
224 M 4,093,530
265 4,093,531
271 4,093,532
296 4,093,533

CLASS 206

219 4,093,067
424 Re.29,658
443 4,093,068
455 4,093,069
507 4,093,070
4,093,071
521 4,093,072
606 4,093,073
629 4,093,074

CLASS 208

120 4,093,535
121 4,093,536
164 4,093,537

CLASS 209

73 4,093,075
172.5 4,093,538

CLASS 210

17 4,093,539
23 F 4,093,540
40 4,093,541
54 4,093,542
59 4,093,543
4,093,544
86 4,093,545
150 4,093,546
169 4,093,547
180 4,093,548
195 S 4,093,549
198 C 4,093,550
201 4,093,551
297 4,093,552

CLASS 211

74 4,093,076
189 4,093,078
194 4,093,077

CLASS 213

62 A 4,093,079
75 R 4,093,080

CLASS 214

1 BB 4,093,081
1 PA 4,093,082
7 4,093,083
11 R 4,093,084
16 R 4,093,085
16.4 A 4,093,086
83.26 4,093,087
451 4,093,088
516 4,093,089
620 4,093,090
673 4,093,091
674 4,093,092

CLASS 215

251 4,093,093
276 4,093,094
307 4,093,095
330 4,093,096
349 4,093,097
4,093,098

CLASS 217

72 4,093,099

CLASS 218

138 4,093,897

CLASS 219

8.5 4,093,839
10.55 E 4,093,841
10.55 F 4,093,840
121 EB 4,093,843
121 LM 4,093,842
124.02 4,093,844
132 4,093,845
286 4,093,846
501 4,093,847

CLASS 220

3 4,093,100
22 4,093,101
46.2 4,093,114
67 4,093,102
283 4,093,103
316 4,093,104
373 4,093,105

CLASS 221

224 4,093,106

CLASS 222

23 4,093,107
401 4,093,108
527 4,093,109

CLASS 227

9 4,093,110
26 4,093,111
150 4,093,112

CLASS 228

36 4,093,113

CLASS 229

17 G 4,093,115
40 4,093,116
70 4,093,117

CLASS 233

26 4,093,118

CLASS 235

1 E 4,093,848
92 PC 4,093,849
92 TF 4,093,850
302.2 4,093,851

CLASS 237

12.3 A 4,093,119

CLASS 238

8 4,093,120

CLASS 239

117 4,093,121
127.3 4,093,122
322 4,093,123
327 4,093,124
553.3 4,093,125

CLASS 241

37.5 4,093,126
55 4,093,127
82.5 4,093,128
186 R 4,093,129
245 4,093,130

CLASS 242

6 4,093,131
7.03 4,093,132
18 PW 4,093,133
4,093,134
4,093,135
45 4,093,136
46.4 4,093,137
55.2 4,093,138
4,093,139
56.2 4,093,140
56.9 4,093,141
71.1 4,093,142
75.51 4,093,143
84.52 A 4,093,144
107.4 A 4,093,145
158.2 4,093,146
159 4,093,147
182 4,093,148
192 4,093,150
198 4,093,149
4,093,151

CLASS 244

3.14 4,093,153
3.16 4,093,154
12.4 4,093,155
45 A 4,093,156
53 R 4,093,157
182 4,093,158
187 4,093,159
199 4,093,160

CLASS 246

5 4,093,161
182 B 4,093,162
476 4,093,163

CLASS 248

20 4,093,164
106 4,093,165
126 4,093,166
188 4,093,167
220.4 4,093,168
311.3 4,093,169
359 4,093,170
515 4,093,171

CLASS 249

19 4,093,172
105 4,093,173
120 4,093,174
153 4,093,175
167 4,093,176

CLASS 250

213 A 4,093,852
231 SE 4,093,853
269 4,093,854
282 4,093,855
293 4,093,856
369 4,093,857
424 4,093,858
445 T 4,093,859
4,093,860
4,093,861
4,093,862
4,093,863
505 4,093,864
563 4,093,866
566 4,093,865
576 4,093,867

CLASS 251

54 4,093,177
104 4,093,178
133 4,093,179
248 4,093,180

CLASS 252

42.7 Re.29,661
70 4,093,553
78.3 4,093,554
188.3 R 4,093,555
301.4 S Re.29,662
316 4,093,556
389 R 4,093,557
432 4,093,558
443 4,093,559
455 Z 4,093,560
466 J 4,093,561
511 4,093,562
513 4,093,563
518 4,093,564
522 4,093,565
527 4,093,566

CLASS 254

97 4,093,181
126 4,093,182
134.3 PA 4,093,183
139.1 4,093,184
154 4,093,185
156 4,093,186

CLASS 256

49 4,093,187

CLASS 259

7 4,093,189

CLASS 260

2.2 R 4,093,568
2.5 AH 4,093,572
2.5 AM 4,093,569
2.5 B 4,093,570
4,093,571
2.5 BE 4,093,573
8 4,093,574
15 4,093,575
17 R 4,093,576
21 E 4,093,567
22 CB 4,093,577
28 P 4,093,578
29.4 R 4,093,579
29.6 MH 4,093,581
29.6 SQ 4,093,580
30.6 R 4,093,582
33.6 AQ 4,093,583
40 P 4,093,584
4,093,585
45.75 B 4,093,589
45.8 N 4,093,586
45.8 NE 4,093,587
45.8 R 4,093,588
45.85 B 4,093,592
45.85 H 4,093,591
45.85 P 4,093,593
45.85 S 4,093,590
47 C 4,093,595
47 EP 4,093,594
47 ET 4,093,596
4,093,597
4,093,598
47 R 4,093,599
49 4,093,600
63 UY 4,093,601
73 R 4,093,602
75 R 4,093,603
77.5 CH 4,093,604
78 SC 4,093,605
112 B 4,093,606
4,093,607
4,093,608
112.5 LH 4,093,611
112.5 R 4,093,610
112.5 S 4,093,609
122 4,093,612
154 4,093,613
239 BC 4,093,615
284 4,093,619
291 4,093,620
294.8 H 4,093,621
295 R 4,093,622
299 4,093,614
4,093,623
302 D 4,093,624
306.7 C 4,093,625
307 C 4,093,627
307 FA 4,093,626
326.12 R 4,093,628
326.34 4,093,629
326.85 4,093,630
345.2 4,093,631
345.5 4,093,632
346.11 4,093,633
346.74 4,093,634
346.75 4,093,635
348.29 4,093,636
405 4,093,637
408 4,093,638
429.9 4,093,639
4,093,640
448.2 E 4,093,641
449 M 4,093,643
465 F 4,093,644
505 C 4,093,645
508 4,093,646
515 R 4,093,647
519 4,093,648
530 N 4,093,649
539 A 4,093,650
543 H 4,093,651
544 C 4,093,652
558 A 4,093,653
561 A 4,093,654
564 RF 4,093,655
566 B 4,093,656
567.6 M 4,093,657
570 D 4,093,658
586 R 4,093,659
591 4,093,660
595 4,093,661
606.5 P 4,093,662
607 B 4,093,663
610 D 4,093,664
612 D 4,093,665
615 A 4,093,666
651 F 4,093,669
653.1 R 4,093,670
668 R 4,093,671
674 R 4,093,672
824 EP 4,093,673
830 P 4,093,674
835 4,093,675
857 PG 4,093,676
858 4,093,677
897 A 4,093,678
927 R 4,093,679
966 4,093,680

CLASS 261

122 4,093,681

CLASS 264

0.5 4,093,682
25 4,093,683
4,093,684
28 4,093,685
45.5 4,093,686
65 4,093,687
4,093,688
71 4,093,689
82 4,093,690
93 4,093,691
95 4,093,692
171 4,093,693
246 4,093,694
289 4,093,695
295 4,093,696

CLASS 266

47 4,093,190
48 4,093,191
78 4,093,192
87 4,093,193
122 4,093,194
251 4,093,195

CLASS 267

65 R 4,093,196
131 4,093,197
179 4,093,198

CLASS 269

61 4,093,199
295 4,093,200
296 4,093,201
321 S 4,093,202

CLASS 270

20 4,093,203
21 4,093,204
66 4,093,205
67 4,093,206

CLASS 271

3.1 4,093,207

CLASS 272

52.5 4,093,208
66 4,093,209
67 4,093,210
68 4,093,211
76 4,093,212
118 4,093,213
4,093,214

CLASS 273

1 E 4,093,215
6 4,093,216
26 R 4,093,217
29 A 4,093,218
65 B 4,093,219
73 D 4,093,220
85 G 4,093,221
87 R 4,093,222
94 R 4,093,223
95 AA 4,093,225
95 F 4,093,226
95 H 4,093,224
102.1 E 4,093,227
102.1 G 4,093,228
106.5 B 4,093,230
106.5 R 4,093,229
108 4,093,231
121 A 4,093,232
176 A 4,093,233
200 R 4,093,234
254 4,093,235
255 4,093,236
260 4,093,237
277 4,093,238

CLASS 274

9 R 4,093,152

CLASS 277

3 4,093,239
15 4,093,240
24 4,093,241
58 4,093,242
96.2 4,093,243
153 4,093,244
237 R 4,093,245

CLASS 279

41 A 4,093,246
53 4,093,247

CLASS 280

6.1 4,093,248
11.12 4,093,249
11.37 Z 4,093,250
46 4,093,251
87.04 A 4,093,252
153 R 4,093,256
166 4,093,257
231 4,093,258
240 4,093,260
241 4,093,261
279 4,093,262
289 R 4,093,263
296 4,093,264
438 R 4,093,265
491 R 4,093,266
605 4,093,267
608 Re.29,659
610 4,093,268
615 4,093,269
626 4,093,270
637 4,093,271
686 4,093,272
696 4,093,273
747 4,093,274
4,093,275
755 4,093,259
783 4,093,254
788 4,093,255
789 4,093,253

CLASS 282

24 R 4,093,277
27.5 4,093,278

CLASS 283

1 R 4,093,276

CLASS 285

23 4,093,279
39 4,093,280
4,093,281
114 4,093,282
243 4,093,283

CLASS 290

2 4,093,868

31 4,093,869

CLASS 292

216 4,093,284
251 4,093,285
259 R 4,093,286
317 4,093,287
321 4,093,288
336.3 4,093,289

CLASS 293

15 4,093,290

CLASS 294

1 CA 4,093,291
74 4,093,292
83 R 4,093,293
86.25 4,093,294
87.2 4,093,295
90 4,093,296
99 R 4,093,297
118 4,093,298

CLASS 295

14 4,093,299

CLASS 296

1 S 4,093,300
23 MC 4,093,301
23 R 4,093,302
65 R 4,093,303
84 D 4,093,304

CLASS 297

184 4,093,305
217 4,093,306
385 4,093,307
416 4,093,308

CLASS 299

1 4,093,309
2 4,093,310

CLASS 301

9 DH 4,093,311
37 R 4,093,312

CLASS 303

6 C 4,093,313
24 F 4,093,314
59 4,093,315
100 4,093,316
111 4,093,317

CLASS 305

11 4,093,318
58 R 4,093,319

CLASS 307

10 R 4,093,870
106 4,093,871
221 D 4,093,872
223 R 4,093,873
251 4,093,874
4,093,875
264 4,093,876
270 4,093,877
291 4,093,878

CLASS 308

9 4,093,320
20 4,093,321
23 4,093,322
121 4,093,323
187.1 4,093,324
192 4,093,325

CLASS 310

11 4,093,879
24 4,093,880
214 4,093,881
268 4,093,882
317 4,093,883
328 4,093,884
331 4,093,885

CLASS 312

231 4,093,326
244 4,093,327
333 4,093,328

CLASS 313

54 4,093,886
140 4,093,887
163 4,093,888
229 4,093,889
486 4,093,890

CLASS 315

3 4,093,891
3.5 4,093,892
48 4,093,893
64 4,093,894
371 4,093,895

CLASS 318

45 4,093,896
227 4,093,898
4,093,899
370 4,093,900
476 4,093,901
490 4,093,902
584 4,093,903
616 4,093,904
696 4,093,905

CLASS 322

51 4,093,906

CLASS 323

1 4,093,907
19 4,093,908
22 R 4,093,909

CLASS 324

0.5 AH 4,093,910
.5 AH 4,093,911
.5 MA 4,093,912
33 4,093,913
56 4,093,914
60 R 4,093,915
166 4,093,916
173 4,093,917

CLASS 325

67 4,093,918
316 4,093,919
364 4,093,920
459 4,093,921
4,093,922

CLASS 328

165 4,093,923

CLASS 330

4.3 4,093,924
277 4,093,925

CLASS 331

11 4,093,926
94.5 PE 4,093,927

CLASS 333

11 4,093,928
31 R 4,093,929

CLASS 334

86 4,093,930

CLASS 335

272 4,093,931

CLASS 337

161 4,093,932

CLASS 338

42 4,093,933

CLASS 339

16 R 4,093,329
17 CF 4,093,330
39 4,093,331
49 R 4,093,332
78 4,093,333
107 4,093,334
177 E 4,093,335
180 4,093,336
256 S 4,093,337

CLASS 340

2 4,093,934
8 S 4,093,935
18 CM 4,093,936
26 4,093,937
27 R 4,093,938
52 F 4,093,939
146.1 E 4,093,940
146.3 AE 4,093,941
166 R 4,093,942
220 4,093,943
279 4,093,944
4,093,945
310 R 4,093,946
324 AD 4,093,947

CLASS 343

7 A 4,093,948
4,093,949
7.7 4,093,950
4,093,951
108 R 4,093,952
225 4,093,953

CLASS 346

7 4,093,954

CLASS 350

3.70 4,093,338
4,093,339
6.5 4,093,340
96.21 4,093,341
96.23 4,093,342
96.30 4,093,343
147 4,093,344
162 SF 4,093,346
174 4,093,347
206 4,093,348
288 4,093,349
299 4,093,350
310 4,093,351
312 4,093,352
313 4,093,353
320 4,093,354
334 4,093,355
338 4,093,356
4,093,357
355 4,093,345
4,093,534
357 4,093,358

CLASS 351

1 4,093,359
13 4,093,360
160 4,093,361

CLASS 352

27 4,093,362
104 4,093,363
132 4,093,364
140 4,093,365
198 4,093,366

CLASS 354

3 4,093,955
86 4,093,956

CLASS 355

3 R 4,093,367
3 SC 4,093,368
15 4,093,369
43 4,093,370
4,093,371
50 4,093,372
54 4,093,373
57 4,093,374
68 4,093,375
4,093,376
76 4,093,377
4,093,378
77 4,093,379

CLASS 356

5 4,093,380
51 4,093,381
72 4,093,382
152 4,093,383
186 4,093,384
188 4,093,385

CLASS 357

24 4,093,957
68 4,093,958

CLASS 358

4 4,093,959
10 4,093,960
53 4,093,976
128 4,093,961
138 4,093,962
158 4,093,963
302 4,093,964

CLASS 360

65 4,093,965
109 4,093,966
132 4,093,967

CLASS 361

44 4,093,977
58 4,093,968
118 4,093,978
232 4,093,969
361 4,093,970
382 4,093,971
433 4,093,972

CLASS 362

5 4,093,979
104 4,093,973
216 4,093,974

CLASS 363

27 4,093,975
57 4,093,980

CLASS 364

200 4,093,981
4,093,982
4,093,983
4,093,984
4,093,985
4,093,986
4,093,987
484 4,093,988
485 4,093,989
520 4,093,990
525 4,093,991
705 4,093,992
712 4,093,993
726 4,093,994
900 4,093,995
4,093,996
4,093,997
4,093,998
4,093,999
4,094,000
4,094,001

CLASS 365

1 4,094,002
7 4,094,003
8 4,094,004
16 4,094,005
39 4,094,006
45 4,094,007
149 4,094,008
183 4,094,009
215 4,094,010
216 4,094,011
226 4,094,012
234 4,094,013

CLASS 366

336 4,093,188

CLASS 400

144.2 4,093,059
194 4,093,061
236.1 4,093,060

CLASS 401

219 4,093,386

CLASS 402

19 4,093,387

CLASS 403

46 4,093,388
280 4,093,389
373 4,093,390

CLASS 407

22 4,093,391
48 4,093,392

CLASS 408

67 4,093,393
103 4,093,394
224 4,093,395
241 R 4,093,396

CLASS 415

53 R 4,093,397

CLASS 416

8 4,093,398
95 4,093,399
141 4,093,400
185 4,093,401
236 A 4,093,402

CLASS 417

246 4,093,403
317 4,093,404
343 4,093,405
401 4,093,406

CLASS 418

15 4,093,407
92 4,093,408

CLASS 423

2 4,093,697
24 4,093,698
118 4,093,699
120 4,093,700
228 4,093,701
235 4,093,702
245 4,093,703
299 4,093,704
450 4,093,705
490 4,093,706
626 4,093,707

CLASS 424

15 4,093,708
19 4,093,709
44 4,093,710
54 4,093,711
177 4,093,712
4,093,713
180 4,093,714
4,093,715
4,093,716
195 4,093,717
200 4,093,718
215 4,093,719
241 4,093,720
243 4,093,721
246 4,093,722
4,093,723
250 4,093,724
4,093,725
4,093,726
258 4,093,727
269 4,093,728
270 4,093,729
4,093,730
4,093,731
273 R 4,093,732
274 4,093,733
4,093,734
4,093,735
282 4,093,736
304 4,093,737
309 4,093,738
316 4,093,739
319 4,093,740
321 4,093,741
322 4,093,742
324 4,093,743
333 4,093,744
358 4,093,745

CLASS 425

59 4,093,409
4,093,410
64 4,093,411
71 4,093,412
110 4,093,413
113 4,093,414

CLASS 426

2 4,093,746
4,093,747
19 4,093,748
20 4,093,749
250 4,093,750
407 4,093,751
536 4,093,752

CLASS 427

21 4,093,753
259 4,093,754
299 4,093,755
304 4,093,756
434 A 4,093,757

CLASS 428

8 4,093,758
35 4,093,759
36 4,093,760
43 4,093,761
55 4,093,762
95 4,093,763
113 4,093,764
134 4,093,765
165 4,093,766
194 4,093,767
287 4,093,768
295 4,093,769
306 4,093,770
312 4,093,771
336 Re.29,663
339 4,093,772
365 4,093,773
379 4,093,774
394 4,093,775
402 4,093,776
403 4,093,777
411 4,093,778
4,093,779
458 4,093,780
539 4,093,781
654 4,093,782

CLASS 429

5 4,093,783
101 4,093,784
149 4,093,785

CLASS 526

57 4,093,786
62 4,093,787
74 4,093,788
114 4,093,789
144 4,093,790
200 4,093,791
4,093,792
221 4,093,793
344 4,093,794

CLASS 528

481 4,093,795

CLASS 536

17 4,093,796
4,093,797
48 4,093,798

CLASS 542

422 4,093,799

CLASS 544

16 4,093,800
25 4,093,801
27 4,093,802
4,093,803
4,093,804
106 4,093,642
116 4,093,805
165 4,093,806
183 4,093,807
192 4,093,808
281 4,093,617
344 4,093,616
387 4,093,618

CLASS 548

308 4,093,809
321 4,093,810
342 4,093,811
374 4,093,812

CLASS 560

121 4,093,813
139 4,093,814
246 4,093,815

CLASS 568

766 4,093,667
855 4,093,668

CLASSIFICATION OF DESIGNS

D1—	24	248,061		169	248,072		30	248,083		190	248,094	D16—	65	248,105		5 K	248,114
D2—	291	248,062		177	248,073		61	248,084		205	248,095	D19—	26	248,106		5 SS	248,113
	293	248,063		293	248,074		64	248,085	D13—	24	248,096	D23—	55	248,107		15 AJ	248,119
	301	248,064	D7—	11	248,075		98	248,086			248,097		128	248,108		15 R	248,118
	320	248,065		20	248,076		372	248,087	D14—	40	248,098	D24—	5	248,109	D48—	24 A	248,120
	400	248,066		23	248,077	D9—	149	248,088		41	248,099		31	248,110	D52—	3 R	248,121
D6—	24	248,067		37	248,078		216	248,089			248,100	D30—	1	248,111	D56—	1 A	248,122
	31	248,068		94	248,079		237	248,090		44	248,101	D34—	2 B	248,112	D87—	1 D	248,124
	97	248,069		155	248,080		267	248,091		61	248,102		2 R	248,115		1 R	248,123
	131	248,070		187	248,081	D10—	40	248,092	D15—	36	248,103		5 CH	248,116	D92—	1 LL	248,125
	137	248,071	D8—	29	248,082	D12—	99	248,093		53	248,104		5 GH	248,117			

CLASSIFICATION OF PLANTS

P.—	68	4,258			4,259			4,260			4,261						

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

19—	202	T971,001	260—	326.26	T971,003												
184—	6.14	T971,002	264—	53	T971,004	364—	300	T971,005	423—	321 R	T971,006	426—	234	T971,007	428—	266	T971,008

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,092,793	4,093,149	4,093,911	4,092,948	4,093,117	4,093,750
	4,092,899	4,093,150	4,093,918	4,092,962	4,093,120	4,093,800
	4,092,935	4,093,151	4,093,928	4,093,008	4,093,140	4,093,843
	4,093,382	4,093,167	4,093,933	4,093,112	4,093,143	4,093,943
	4,093,821	4,093,170	4,093,944	4,093,147	4,093,164	4,093,972
	4,093,917	4,093,177	4,093,949	4,093,204	4,093,205	19 :	4,092,837
4 :	4,092,748	4,093,180	4,093,953	4,093,217	4,093,230		4,092,904
	4,092,782	4,093,183	4,093,965	4,093,218	4,093,241		4,093,018
	4,092,810	4,093,185	4,093,974	4,093,228	4,093,247		4,093,197
	4,092,977	4,093,186	4,094,004	4,093,295	4,093,256		4,093,427
	4,093,035	4,093,200	4,094,005	4,093,318	4,093,257		4,093,849
	4,093,174	4,093,213	4,094,006	4,093,432	4,093,259		4,093,998
	4,093,903	4,093,214	4,094,012	4,093,546	4,093,260	20 :	4,092,788
	4,093,958	4,093,215	7 :	4,092,808	4,093,548	4,093,265		4,092,804
5 :	4,092,755	4,093,222	8 :	4,092,750	4,093,664	4,093,277		4,093,179
6 :	Re.29,660	4,093,237		4,092,794	4,093,880	4,093,315		4,093,258
	Re.29,661	4,093,281		4,092,803	13 :	4,093,063	4,093,332		4,093,836
	4,092,745	4,093,286		4,092,940		4,093,066	4,093,352	21 :	4,092,783
	4,092,752	4,093,301		4,093,025		4,093,116	4,093,366		4,092,978
	4,092,769	4,093,302		4,093,026		4,093,252	4,093,376		4,093,191
	4,092,781	4,093,349		4,093,187		4,093,612	4,093,393		4,093,207
	4,092,796	4,093,350		4,093,310	16 :	4,092,785	4,093,410		4,093,220
	4,092,798	4,093,351		4,093,401		4,093,125	4,093,443		4,093,226
	4,092,799	4,093,357		4,093,700	17 :	Re.29,656	4,093,494		4,093,327
	4,092,806	4,093,358		4,093,755		Re.29,657	4,093,510		4,093,594
	4,092,811	4,093,370		4,093,886		4,092,749	4,093,523		4,093,841
	4,092,825	4,093,397		4,093,960		4,092,762	4,093,529		4,093,954
	4,092,827	4,093,409	9 :	4,092,882		4,092,772	4,093,637	22 :	4,092,846
	4,092,858	4,093,429		4,092,920		4,092,780	4,093,675		4,093,526
	4,092,861	4,093,491		4,092,925		4,092,812	4,093,726	23 :	4,093,485
	4,092,868	4,093,524		4,092,947		4,092,855	4,093,745	24 :	4,092,874
	4,092,869	4,093,547		4,093,157		4,092,865	4,093,758		4,092,949
	4,092,871	4,093,606		4,093,400		4,092,878	4,093,778		4,093,097
	4,092,877	4,093,617		4,093,474		4,092,912	4,093,829		4,093,098
	4,092,879	4,093,622		4,093,556		4,092,922	4,093,832		4,093,178
	4,092,884	4,093,624		4,093,579		4,092,932	4,093,834		4,093,224
	4,092,898	4,093,688		4,093,604		4,092,941	4,093,835		4,093,354
	4,092,909	4,093,708		4,093,616		4,092,951	4,093,842		4,093,381
	4,092,911	4,093,771		4,093,715		4,092,966	4,093,899		4,093,473
	4,092,921	4,093,781		4,093,716		4,092,975	4,093,905		4,093,498
	4,092,926	4,093,823		4,093,782		4,092,979	18 :	4,092,895		4,093,515
	4,092,982	4,093,847		4,093,854		4,092,980		4,092,927		4,093,545
	4,092,983	4,093,851		4,093,867		4,092,984		4,092,990		4,093,711
	4,092,993	4,093,856		4,093,970		4,093,005		4,093,046		4,093,766
	4,093,013	4,093,865		4,093,985		4,093,015		4,093,054		4,093,920
	4,093,027	4,093,866	06 :	4,093,154		4,093,024		4,093,216		4,093,934
	4,093,037	4,093,872	10 :	4,093,557		4,093,034		4,093,307		4,093,948
	4,093,072	4,093,873		4,093,583		4,093,068		4,093,331		4,093,950
	4,093,082	4,093,883		4,093,595		4,093,078		4,093,433		4,093,951
	4,093,109	4,093,885		4,093,601		4,093,092		4,093,574	25 :	4,092,765
	4,093,122	4,093,888	11 :	4,093,623		4,093,093		4,093,582		4,092,859
	4,093,123	4,093,892	12 :	4,092,936		4,093,102		4,093,590		4,092,863
	4,093,148	4,093,910		4,092,943		4,093,115		4,093,739		4,092,897
								4,093,741		

4,092,902
4,092,972
4,092,973
4,092,998
4,093,041
4,093,113
4,093,221
4,093,291
4,093,353
4,093,380
4,093,479
4,093,625
4,093,650
4,093,696
4,093,699
4,093,779
4,093,784
4,093,857
4,093,913
4,093,915
4,093,927
4,093,929
4,093,946
4,093,975
4,093,978
4,094,000
26 : 4,092,742
4,092,754
4,092,766
4,092,767
4,092,770
4,092,773
4,092,774
4,092,775
4,092,801
4,092,841
4,092,872
4,092,952
4,092,955
4,092,992
4,092,997
4,092,999
4,093,011
4,093,061
4,093,064
4,093,070
4,093,071
4,093,088
4,093,195
4,093,273
4,093,275
4,093,284
4,093,355
4,093,388
4,093,392
4,093,418
4,093,438
4,093,500
4,093,516
4,093,573
4,093,611
4,093,641
4,093,644
4,093,659
4,093,663
4,093,672
4,093,676
4,093,681
4,093,761
4,093,770
4,093,773
4,093,805
4,093,813
4,093,848
27 : Re.29,663
4,092,817
4,092,862
4,092,888
4,093,033
4,093,038
4,093,073
4,093,129
4,093,168
4,093,236
4,093,261
4,093,303

4,093,333
4,093,334
4,093,901
4,093,982
4,093,983
4,093,986
28 : 4,092,856
4,093,211
4,093,717
29 : 4,092,761
4,093,057
4,093,086
4,093,234
4,093,266
4,093,272
4,093,278
4,093,395
4,093,549
4,093,749
4,093,808
4,093,859
4,093,863
30 : 4,093,199
4,093,445
31 : 4,092,739
4,093,227
4,093,710
4,093,896
32 : 4,093,223
33 : 4,092,894
4,093,932
4,093,997
34 : Re.29,662
4,092,758
4,092,776
4,092,838
4,092,842
4,092,849
4,092,851
4,092,866
4,092,915
4,092,937
4,092,938
4,092,939
4,092,986
4,092,991
4,093,022
4,093,048
4,093,077
4,093,152
4,093,153
4,093,188
4,093,212
4,093,233
4,093,238
4,093,279
4,093,306
4,093,330
4,093,338
4,093,339
4,093,344
4,093,345
4,093,404
4,093,435
4,093,490
4,093,520
4,093,532
4,093,537
4,093,543
4,093,560
4,093,564
4,093,565
4,093,571
4,093,575
4,093,599
4,093,600
4,093,614
4,093,629
4,093,632
4,093,634
4,093,649
4,093,654
4,093,657
4,093,693
4,093,702
4,093,707

4,093,714
4,093,728
4,093,731
4,093,732
4,093,742
4,093,752
4,093,774
4,093,775
4,093,783
4,093,798
4,093,809
4,093,814
4,093,838
4,093,902
4,093,937
4,093,938
4,093,959
4,093,971
4,094,002
35 : 4,093,099
36 : Re.29,658
4,092,743
4,092,744
4,092,753
4,092,768
4,092,791
4,092,836
4,092,864
4,092,870
4,092,886
4,092,954
4,092,959
4,093,009
4,093,012
4,093,074
4,093,079
4,093,101
4,093,132
4,093,142
4,093,161
4,093,165
4,093,194
4,093,209
4,093,231
4,093,235
4,093,276
4,093,287
4,093,326
4,093,335
4,093,347
4,093,356
4,093,360
4,093,364
4,093,367
4,093,369
4,093,371
4,093,372
4,093,374
4,093,379
4,093,405
4,093,457
4,093,461
4,093,462
4,093,463
4,093,465
4,093,469
4,093,476
4,093,493
4,093,497
4,093,503
4,093,512
4,093,517
4,093,581
4,093,586
4,093,587
4,093,588
4,093,589
4,093,596
4,093,597
4,093,598
4,093,618
4,093,627
4,093,642
4,093,651
4,093,687
4,093,701

4,093,736
4,093,744
4,093,753
4,093,762
4,093,772
4,093,788
4,093,799
4,093,824
4,093,826
4,093,868
4,093,875
4,093,893
4,093,895
4,093,900
4,093,908
4,093,909
4,093,912
4,093,916
4,093,973
4,093,976
4,093,987
4,093,988
4,093,989
37 : 4,092,764
4,092,903
4,092,924
4,092,976
4,093,090
4,093,202
4,093,242
4,093,480
4,093,487
4,093,683
4,093,694
4,093,756
4,093,764
39 : 4,092,746
4,092,751
4,092,789
4,092,792
4,092,807
4,092,854
4,092,876
4,092,913
4,092,918
4,092,923
4,092,953
4,092,968
4,093,017
4,093,031
4,093,043
4,093,091
4,093,094
4,093,103
4,093,119
4,093,128
4,093,141
4,093,159
4,093,160
4,093,263
4,093,297
4,093,324
4,093,336
4,093,422
4,093,459
4,093,509
4,093,531
4,093,544
4,093,558
4,093,572
4,093,591
4,093,593
4,093,635
4,093,684
4,093,816
4,093,831
4,093,839
4,093,844
4,093,894
4,093,979
4,094,008
40 : 4,092,844
4,092,848
4,092,950
4,093,004

4,093,420
4,093,536
4,093,667
4,093,671
4,093,705
4,093,815
4,093,936
4,093,947
41 : 4,092,795
4,092,850
4,093,181
4,093,398
4,093,891
42 : 4,092,809
4,092,815
4,092,867
4,092,883
4,092,893
4,092,908
4,092,971
4,093,020
4,093,029
4,093,067
4,093,104
4,093,105
4,093,130
4,093,137
4,093,146
4,093,193
4,093,208
4,093,210
4,093,245
4,093,268
4,093,282
4,093,299
4,093,384
4,093,399
4,093,446
4,093,451
4,093,466
4,093,470
4,093,472
4,093,475
4,093,528
4,093,535
4,093,539
4,093,566
4,093,567
4,093,580
4,093,609
4,093,643
4,093,647
4,093,655
4,093,660
4,093,673
4,093,690
4,093,719
4,093,723
4,093,733
4,093,737
4,093,760
4,093,765
4,093,807
4,093,811
4,093,837
4,093,855
4,093,869
4,093,904
4,093,968
4,093,977
4,093,981
44 : 4,092,786
4,092,857
4,093,935
45 : 4,092,763
4,093,246
4,093,878
46 : 4,093,036
47 : 4,093,010
4,093,028
4,093,134
4,093,298
4,093,603
48 : 4,092,800
4,092,828

4,092,847
4,092,928
4,092,933
4,093,000
4,093,030
4,093,055
4,093,058
4,093,059
4,093,138
4,093,294
4,093,394
4,093,411
4,093,414
4,093,421
4,093,428
4,093,478
4,093,525
4,093,533
4,093,615
4,093,692
4,093,754
4,093,845
4,093,921
4,093,922
4,093,923
4,093,941
4,093,955
4,093,969
49 : 4,092,818
4,093,127
4,093,308
50 : 4,093,378
51 : 4,092,829
4,092,833
4,092,917
4,092,988
4,093,040
4,093,156
4,093,285
4,093,329
4,093,343
4,093,460
4,093,483
4,093,489
4,093,620
4,093,698
4,093,914
4,093,957
4,093,991
4,093,996
4,094,001
53 : 4,092,963
4,093,021
4,093,155
4,093,359
4,093,361
4,093,430
4,093,870
4,093,879
54 : 4,093,652
4,093,661
4,093,678
55 : 4,092,914
4,092,946
4,092,958
4,093,039
4,093,051
4,093,169
4,093,171
4,093,175
4,093,184
4,093,229
4,093,232
4,093,403
4,093,406
4,093,441
4,093,768
4,093,850
4,093,860
4,093,861
4,093,862
4,093,898
4,093,906
4,093,931
4,093,995

1 : 248,067
4 : 248,076
6 : 248,066
248,073
248,078
248,089
248,099
248,100
248,101

248,117
248,122
248,124
12 : 248,114
16 : 248,082
17 : 248,072
248,079
248,093
248,113

248,119
18 : 248,112
20 : 248,111
24 : 248,070
248,087
25 : 248,065
248,086
248,105
248,123

27 : 248,084
248,103
29 : 248,121
34 : 248,062
248,063
248,064
248,090
36 : 248,069
248,074

248,083
248,085
248,096
248,097
248,098
248,110
248,116
37 : 248,104
39 : 248,081

42 : 248,061
248,107
44 : 248,071
45 : 248,088
48 : 248,094
248,102
248,106
51 : 248,109

PLANT PATENTS

6 : 4,258
4,259
4,260
4,261

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

1 : T971,006
10 : T971,003
17 : T971,002
28 : T971,001
36 : T971,005
48 : T971,008
51 : T971,007

U. S. GOVERNMENT PRINTING OFFICE : O - 1978

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Covernment Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

June 13, 1978 Volume 971 Number 2

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $300.00 per annum for first-class mailing, also available as fourth-class mail at $200.00; foreign first-class mailing rates will be furnished upon request; single copies each, $4.00 domestic, $5.00 foreign.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

GENERAL INFORMATION concerning TRADEMARKS, price $1.50 each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

May 2, 1978.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,019,527, Re. S.N. 893,482, Filed Apr. 4, 1978, Cl. 137/115, MODULATING FLOW CONTROL VALVE, Warren H. Brand, Owner of Record: *Yarway Corporation, Blue Bell, Pa.,* Attorney or Agent: Thomas M. Ferrill, Jr., et al., Ex. Gp.: 341

4,035,197, Re. S.N. 885,050, Filed Mar. 9, 1978, Cl. 136/89 CD, CDTE BARRIER TYPE PHOTOVOLTAIC CELLS WITH ENHANCED OPEN-CIRCUIT VOLTAGE, AND PROCESS OF MANUFACTURE, Pranab K. Raychaudhuri, Owner of Record: *Eastman Kodak Company, Rochester, N.Y.,* Attorney or Agent: Dana M. Schmidt, et al., Ex. Gp.: 114

4,057,717, Re. S.N. 896,953, Filed Apr. 17, 1978, Cl. 364/802, TRANSFORMER WITH ACTIVE ELEMENTS, Michel V. Ferry, Owner of Record: *International Business Machines Corporation, Armonk, N.Y.,* Attorney or Agent: Maurice H. Klitzman, et al., Ex. Gp.: 236

Certificates of Correction for the Week of June 13, 1978

Re.29,383	4,031,127	4,055,370	4,067,369
Re.29,474	4,032,430	4,055,386	4,067,454
Re.29,543	4,033,871	4,055,466	4,067,667
D.237,434	4,033,881	4,055,684	4,067,711
D.245,999	4,034,850	4,056,326	4,067,903
3,665,007	4,035,196	4,056,424	4,068,017
3,680,696	4,035,878	4,056,536	4,068,051
3,781,936	4,036,416	4,056,712	4,068,069
3,793,279	4,036,963	4,056,970	4,068,086
3,867,365	4,037,288	4,057,763	4,068,094
3,893,682	4,038,605	4,058,312	4,068,136
3,911,242	4,039,401	4,058,494	4,068,223
3,920,579	4,040,523	4,059,150	4,068,260
3,920,717	4,041,781	4,059,153	4,068,265
3,922,148	4,042,811	4,059,166	4,068,327
3,928,001	4,043,054	4,059,428	4,068,340
3,932,301	4,043,535	4,059,684	4,068,525
3,933,702	4,044,109	4,059,706	4,068,904
3,935,195	4,044,946	4,060,492	4,069,062
3,935,787	4,045,004	4,060,660	4,069,397
3,952,239	4,045,119	4,060,713	4,070,243
3,954,767	4,045,629	4,060,867	4,070,256
3,958,041	4,045,946	4,061,590	4,070,427
3,971,010	4,046,003	4,061,622	4,070,706
3,976,337	4,046,244	4,061,776	4,071,029
3,977,568	4,046,871	4,061,958	4,072,123
3,978,712	4,046,951	4,062,916	4,072,363
3,984,455	4,047,009	4,063,357	4,072,934
3,998,552	4,047,328	4,063,632	4,073,003
4,006,544	4,047,547	4,064,216	4,073,334
4,008,690	4,048,506	4,064,450	4,073,412
4,010,595	4,048,983	4,065,197	4,073,668
4,011,058	4,049,497	4,065,381	4,074,146
4,012,497	4,050,173	4,065,402	4,074,575
4,015,192	4,050,237	4,065,406	4,074,846
4,017,839	4,050,938	4,065,455	4,075,122
4,019,033	4,051,128	4,065,502	4,075,165
4,020,270	4,051,201	4,065,576	4,075,280
4,021,494	4,051,347	4,065,601	4,075,441
4,023,885	4,051,511	4,065,612	4,075,461
4,024,312	4,051,905	4,065,799	4,075,613
4,024,480	4,052,170	4,065,858	4,075,695
4,025,353	4,052,434	4,065,980	4,075,849
4,026,680	4,053,330	4,066,487	4,076,017
4,026,911	4,053,475	4,066,628	4,076,122
4,026,925	4,053,629	4,066,730	4,076,404
4,027,676	4,054,175	4,066,850	4,076,559
4,027,855	4,054,499	4,067,021	4,076,629
4,028,292	4,054,530	4,067,157	4,076,667
4,030,210	4,055,035	4,067,184	4,076,871
4,030,937	4,055,137	4,067,242	

Disclaimers

3,364,929.—*Walter S. Ide,* Eastchester, and *William H. Nickerson,* Tuckahoe, N.Y. METHOD FOR ADMINISTERING MUSCLE RELAXANT DRUG. Patent dated Jan. 23, 1968. Disclaimer filed Apr. 20, 1978, by the assignee, *Burroughs Wellcome Co.*

Hereby enters this disclaimer to all claims of said patent.

3,565,080.—*Walter S. Ide,* Eastchester, and *William H. Nickerson,* Tuckahoe, N.Y. NEUROMUSCULAR BLOCK MONITORING APPARATUS. Patent dated Feb. 23, 1971. Disclaimer filed Apr. 20, 1978, by the assignee, *Burroughs Wellcome Co.*

Hereby enters this disclaimer to all claims of said patent.

3,612,060.—*John E. Colyer,* Longueville, New South Wales, Australia. PERIPHERAL NERVE STIMULATOR. Patent dated Oct. 12, 1971. Disclaimer filed Apr. 20, 1978, by the assignee, *Burroughs Wellcome Co.*

Hereby enters this disclaimer to all claims of said patent.

3,624,484.—*John E. Colyer,* Longueville, New South Wales, Australia. OSCILLATOR OUTPUT CIRCUIT CONFIGURATION. Patent dated Nov. 30, 1971. Disclaimer filed Apr. 21, 1978, by the assignee, *Burroughs Wellcome Co.*

Hereby enters this disclaimer to all claims of said patent.

3,659,285.—*Ralph H. Baer,* Manchester, *William T. Rusch,* Hollis, and *William L. Harrison,* Nashua, N.H. TELEVISION GAMING APPARATUS AND METHOD. Patent dated Apr. 25, 1972. Disclaimer filed Apr. 17, 1978, by the assignee, *Sanders Associates, Inc.*

Hereby enters this disclaimer to claims 1, 2, 5 and 6 of said patent.

3,682,162.—*John E. Colyer,* Longueville, New South Wales, Australia. COMBINED ELECTRODE AND HYPODERMIC SYRINGE NEEDLE. Patent dated Aug. 8, 1972. Disclaimer filed Apr. 20, 1978, by the assignee, *Burroughs Wellcome Co.*

Hereby enters this disclaimer to all claims of said patent.

Patents Available for Licensing or Sale

D. 240,772. JACKET OR SIMILAR ARTICLE. Jerome Williams, 385 Linoleum Way, Pittsburgh, Pa., 15219.

D. 246,769. TIE CLIP. Raymond F. Kozak, Lehigh Plaza Apts. #G-7 2060, Westgate Drive, Bethlehem, Pa. 18018.

3,376,009. READING STAND. Dorothy Domino, 5283 East Huntington, Fresno, Calif. 93727.

3,680,237. OUT-DOOR ILLUMINATED SIGN. John G. Finnerty, 251 De Grand Ave., Teaneck, N.J. 07666.

3,734,970. IMPROVEMENTS IN OR RELATING TO THE PREPARATION OF METHYL-B-PHENYL-ETHYLETHER (OIL OF PADANUS-ODORATISSIMUS), Dr. J. C. Chaterned, Manik Miwas, Lala-Ka-Bazar, Lashkar (lyWallor), Madhya Pradesh, India.

3,785,538. FINGER-ACTUATED SNAP OPEN CAPS FOR BOTTLES, COLLAPSIBLE TUBES AND THE LIKE. Anthony J. Cocozella, 26 Wyman Rd., Braintree, Mass., 02184.

3,884,465. WEIGHT FOR BOWLERS. Leon Milsner, 90 Island Ct., Walnut Creek, Calif. 94595.

3,893,724. GATE LOCKING DEVICE. Frederick A. Reinfield, Box 223, Parkston, S. Dak. 57366.

3,953,983. REFRIGERATION METHOD AND REFRIGERATION APPARATUS FOR CARRYING OUT THE METHOD. Ernst Sander. Correspondence to: Craig & Antonelli, 909 Watergate Office Bldg. 2600 Virginia Ave. NW., Washington, D.C., 20037.

3,981,452. IRRIGATION PIPES WITH DRIPPER UNITS AND METHOD OF ITS MANUFACTURE. Gershon Eckstein. Correspondence to: Perry Carvellas, Esq. 413 N. Washington St., Alexander, Va., 22314.

4,004,820. TRANSPORT CART. Kurt Weber. Correspondence to: Rieter Machine Works, Ltd. CH-8406 Winterthur, Switzerland.

4,031,917. CONSTANT FLOW GAS REGULATOR. Charles De John, 35 Beverly Rd., West Caldwell, N.J.

4,040,817. METHOD FOR THE REDUCTION OF IRON ORES IN A SHAFT FURNACE, ESPECIALLY IN A BLAST FURNACE WITH OIL INJECTION. Correspondence to: Holman & Stern, 2401 15th St. NW., Washington, D.C., 20009.

4,044,476. EDUCATIONAL METHODS AND DEVICES. Jeanette B. Marsh, 1400 North Lake Shore Drive, 14-M, Chicago, Ill., 60610.

4,054,234. COMBINATION GARMENT HANGER. John Thomas, 2105 Tomlinson Ave., Bronx, N.Y. 10461.

4,056,471. ADSORPTION ARRANGEMENT. Chemische Fabrik Uetikon, Switzerland. Correspondence to Michael J. Striker, 360 Lexington Ave., New York, N.Y., 10017.

4,064,835. AIR CONDITIONED PET BED. Ludwig Rabenbauer, 1495 Granville Ave., Pontiac, Mich., 48055.

4,064,880. SANITARY TUBULAR NAPKIN FOR MALES. Dexter J. Logan, P.O. Box 1012, West Covina, Calif., 91793.

4,066,087. PEA SHELLING DEVICE. Rolza J. Rodgers, Centerville, Ga. Correspondence to: Frederick L. Bergert, Crystal Square No. 5, 1755 Jefferson Davis Hwy., Arlington, Va., 22202.

4,067,451. ROLL FLIP MACHINE. William L. Winters, 2516 32nd Ave., N. Birmingham, Ala.

4,075,845. FREEZE/THAW POWER SYSTEM. Milton Frank Allen, 2989 McCully Drive NE, Atlanta, Ga., 30345.

4,076,201. ADJUSTABLE CHAIR SPINDLE ASSEMBLY. Walter E. Hudnall, 2157 W. 236th Place, Torrance, Calif., 90501.

4,079,987. CONTAINER SYSTEM FOR ENTERTAINMENT AND COMMUNICATIONS EQUIPMENT. Daniel T. Bumgardener, 4740 Appian Way #50, El Sobrante, Calif., 94803.

4,082,333. COMBINATION OF INTERLOCKING SECURITY ON CHAIN DOOR GUARDS. Bernard C. Segal, 150–6J Dreiser Loop, Bronx, N.Y. 10475.

4,082,947. SOLAR COLLECTOR AND DRIVE CIRCUITRY CONTROL MEANS. George L. Haywood, Box 2602, Evergreen, Colo., 80439.

The following patents are offered by Philip C. Peterson. Inquiries should be directed to Peterson Boats, Inc., P.O. Box 7405, Chicago, Ill, 60680.

D. 241,978. BOAT.

3,989,002. MOTOR POWERED WATERCRAFT FOR RIDING IN STANDING POSITION.

The following two patents are offered by John O. Richards, 980 Mill Circle, Apt. #99, Alliance, Ohio, 44601.

3,578,840. REVOLVING REFLECTOR.

3,835,507. ROPE HOLDING DEVICE.

The General Electric Company is prepared to grant nonexclusive licenses under the following patents upon reasonable terms to domestic manufacturers.

Applications for licensea may be addressed to the General Electric Company, Appliance Components Business Division, 1635 Broadway, Fort Wayne, Ind., 46804.

3,740,599. DYNAMOELECTRIC MACHINE ASSEMBLY.

3,743,872. DYNAMOELECTRIC MACHINES AND ASSEMBLY OF SAME WITH A CONTROL DEVICE.

3,848,837. MOUNTING ADAPTER MEANS FOR DYNAMOELECTRIC MACHINE.

4,032,807. INSIDE-OUT INDUCTOR MOTOR/ALTERNATOR WITH HIGH INERTIA SMOOTH ROTOR.

4,063,060. METHODS OF MAKING TORSIONAL VIBRATION ISOLATING MOTOR MOUNTING SYSTEMS AND ARRANGEMENTS.

Applications for license under the following patent should be addressed to, Patent Counsel, Drive System Department, General Electric Company, 1501 Roanoke Blvd., Salem, Va., 24153.

3,962,685. DATA PROCESSING SYSTEM HAVING PYRAMIDAL HIERARCHY CONTROL FLOW.

Applications for license may be addressed to Division Patent Counsel, Switchgear & Distribution Transformer Division, General Electric Company, 6901 Elmwood Avenue, Philadelphia, Pa., 19142.

3,663,906. ELECTRICAL CIRCUIT BREAKER WITH MAGNETICALLY ASSISTED CLOSING MEANS.

3,812,404. INCREASING THE INITIAL FLOW RATE IN A RECTIFIER ASSEMBLY EMPLOYING ELECTROMAGNETICALLY-PUMPED LIQUID METAL FOR COOLING.

4,025,886. ELECTRICAL CIRCUIT BREAKER WITH ELECTRO - MAGNETICALLY - ASSISTED CLOSING MEANS.

Application for license may be addressed to the Group Patent Counsel, Major Appliance Business Group, General Electric Company, Appliance Park, Louisville, Ky., 40225.

3,320,777. AUTOMATIC WASHING MACHINE INCLUDING DISPENSING MEANS.

3,727,434. ADDITIVE DISPENSING SYSTEM.

3,736,767. AUTOMATIC ICEMAKER INCLUDING REVERSIBLE MOLD CAVITIES.

3,760,612. ADDITIVE DISPENSING SYSTEM.

3,767,334. HERMETICALLY SEALED COMPRESSOR ASSEMBLY.

3,785,566. SEALING SYSTEM FOR WASHING MACHINE.

3,794,443. WIDE DISPERSON FAN IMPELLER.

3,908,392. DUAL CONTROL COORDINATING APPARATUS FOR A REFRIGERATOR.

3,908,394. WATER-DISPENSING SYSTEM.

3,926,001. HOVABLE DECK FOR A TOP-OPENING FREEZER.

4,062,205. REUSABLE WATER SOFTENER SYSTEM FOR CLOTHES WASHER.

4,066,393. REUSABLE WATER SOFTENER SYSTEM FOR CLOTHES WASHER.

4,068,815. SELF LOCKING SUPPORT MECHANISM.

4,069,596. AIR SEAL ARRANGEMENT IN A CLOTHES DRYER.

Application for license may be addressed to General Electric Company, 100 Woodlawn Avenue, Pittsfield, Mass., 02101.

3,195,082. ELECTRICAL REACTOR.

3,242,879. RAILROAD TRANSPORTATION OF LARGE TRANSFORMERS.

3,349,357. TRANSFORMER CORE REINFORCING PLATE.

3,387,208. IMPEDANCE COMPENSATED HIGH PRECISION ELECTRICAL CAPACITANCE MEASURING BRIDGE.

3,441,885. HV CURRENT TRANSFORMER HAVING RIGID SECONDARY EYE BOLT AND FLEXIBLE PRIMARY CABLES IN HV TANK.

3,528,046. INTERLACED DISK WINDING WITH IMPROVED IMPULSE VOLTAGE GRADIENT.

3,544,847. FLIP-FLOP LIGHTNING ARRESTER WITH REDUCED PROTECTIVE LEVEL.

3,559,457. HYDROGEN DETECTOR.

3,579,165. WINDING CONNCETION FOR SINGLE PHASE TWO LEG ELECTRIC TRANSFORMER.

3,619,708. SURGE VOLTAGE ARRESTER ASSEMBLY HAVING INTEGRAL CAPACITOR MOUNTING AND CONNECTING MEANS.

3,714,318. METHOD OF MAKING A SEALING GASKET.

3,819,301. SINGLE VALVE VAPOR PUSH PUMP.

3,820,466. MAGNETIZED CRANE RAIL TROUGH—ANTICONTAMINANT TROUGH.

3,834,835. DOUBLE VALVE VAPOR PUSH PUMP.

3,859,568. OVERVOLTAGE SURGE ARRESTER WITH IMPROVED VOLTAGE GRADING CIRCUIT.

3,859,569. OVERVOLTAGE SURGE ARRESTER WITH IMPROVED VOLTAGE GRADING CIRCUIT.

3,913,056. VARISTORS WITH PATTERNED ELECTRODES.

4,003,653. METHOD OF PRODUCING COLOR SLIDES FROM BLACK AND WHITE ORIGINALS.

The RCA Corporation offers to grant nonexclusive licenses on reasonable terms and conditions under the patents listed below. Inquiries respecting licenses under RCA patents should be addressed to RCA Corporation, staff vice president, Domestic licensing, 30 Rockefeller Plaza, New York, N.Y., 10036.

4,078,095. SLURRY PROCESS FOR COATING PARTICLES UPON THE VIEWING-WINDOW SURFACE OF A CATHODE-RAY TUBE.

4,078,206. DIFFERENTIAL AMPLIFIER.

4,078,207. PUSH-PULL TRANSISTOR AMPLIFIER WITH DRIVER CIRCUITRY PROVIDING OVERCURRENT PROTECTION.

4,078,212. DUAL MODE FREQUENCY SYNTHESIZER FOR A TELEVISION TUNING APPARATUS.

4,078,247. INVERTER CIRCUIT CONTROL CIRCUIT FOR PRECLUDING SIMULTANEOUS CONDUCTION OF THYRISTORS.

4,079,282. PHOTOTUBE HAVING APERTURED ELECTRODE RECESSED IN CUP-SHAPED ELECTRODE.

4,079,286. GRID HAVING REDUCED SECONDARY EMISSION CHARACTERISTICS AND ELECTRON DISCHARGE DEVICE INCLUDING SAME.

4,079,293. SWITCHED MODE VERTICAL AMPLIFIER WITH ELIMINATION OF FEEDBACK RINGING.

4,079,295. POWER SUPPLY ARRANGEMENT WITH MINIMUM INTERACTION BETWEEN PLURAL LOADS.

4,079,325. MICROWAVE FREQUENCY DISCRIMINATOR.

4,079,411. DIFFRACTIVE PHASE FILTER HAVING NEAR FIELD WAVELENGTH DEPENDENT FOCUSING PROPERTIES.

4,079,424. AUTOMATIC TRANSIENT BEAM CURRENT LIMITER.

4,079,455. MICROPROCESSOR ARCHITECTURE.

4,079,456. OUTPUT BUFFER SYNCHRONIZING CIRCUIT HAVING SELECTIVITY VARIABLE DELAY MEANS.

4,079,522. APPARATUS AND METHOD FOR CLEANING AND DRYING SEMICONDUCTORS.

4,080,539. LEVEL SHIFT CIRCUIT.

4,080,571. APPARATUS FOR MEASURING THE CURRENT-VOLTAGE CHARACTERISTICS OF A TRAPATT DIODE.

4,080,625. PICKUP CIRCUITRY FOR A VIDEO DISC PLAYER WITH PRINTED CIRCUIT BOARD.

4,080,626. DISCONTINUOUS MOTION SPECIAL EFFECTS GENERATOR FOR TELEVISION.

4,080,630. LINE SCAN CONVERTER FOR AN IMAGE DISPLAY DEVICE.

4,080,641. GROUND FAULT DETECTOR.

4,080,722. METHOD OF MANUFACTURING SEMICONDUCTOR DEVICES HAVING A COPPER HEAT CAPACITOR AND/OR COPPER HEAT SINK.

4,080,763. SKYLIGHT FRAME CONSTRUCTION.

4,081,721. CONDUCTION OVERLAP CONTROL CIRCUIT FOR SWITCHED OUTPUT STAGES.

4,081,722. SIGNAL PROCESSOR FOR SWITCHED VERTICAL DEFLECTION SYSTEM.

4,081,758. LOW DISTORTION SIGNAL AMPLIFIER ARRANGEMENT.

Disclaimer and Dedication

4,002,911.—*Godfrey Newbold Hounsfield,* Newark, England. DATA ACQUISITION IN TOMOGRAPHY. Patent dated Jan. 11, 1977. Disclaimer filed Apr. 28, 1978, by the assignee, *EMI Limited.*

Hereby disclaims and dedicates to the Public the entire remaining term of all claims of said patent.

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available form the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the Patent Application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator,
National Technical Information Service.

U.S. DEPARTMENT OF AGRICULTURE

Research Agreements and Patent Branch, General Services Division, Federal Bldg., Agricultural Research Service, Hyattsville, Md. 20782

Patent application 853,717. Precooked Potato Products. Filed Nov. 21, 1977.

Patent 4,055,675. Preparation of Puffed Fruit. Filed Dec. 13, 1976. Patented Oct. 25, 1977. Not available NTIS.

Patent 4,061,094. Magnetic Seed Delivery Autodibble Planter. Filed Aug. 19, 1976. Patented Dec. 6, 1977. Not available NTIS.

Patent 4,072,669. Prenaration of Protein Isolates from Safflower Seeds. Filed Mar. 7, 1977. Patented Feb. 7, 1978. Not available NTIS.

U.S. DEPARTMENT OF COMMERCE

National Technical Information Service
5285 Port Royal Road, Springfield, Va. 22161

Patent application 851,326. Frequency Stabilization Utilizing Multiple Modulation. Filed Nov. 14, 1977.

Patent application 870,384. Frequency Stabilizing System and Method for Beam Type Device. Filed Jan. 18, 1978.

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

National Institutes of Health, Chief, Patents Branch, Westwood Building, Bethesda, Md. 20014

Patent application 823,186. Random Phase Diffuser for Reflective Imaging. Filed Aug. 9, 1977.

Patent application 840,783. Facile Synthesis of 3′-Phosphadenosie 5′-Phosphosulfate (PAPS). Filed Oct. 11, 1977.

Patent 4,030,141. Multi-Function Control System for an Artificial Upper-Extremity Prosthesis for Above-Elbow Amputees. Filed Feb. 9, 1976. Patented June 21, 1977. Not available NTIS.

Patent 4,064,023. Electrochemical Growth of Calcium Hydroxide Crystals from Electrolyte Solutions. Filed Aug. 9, 1976. Patented Dec. 20, 1977. Not available NTIS.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 6, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-3-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-20-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	5-25-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	8-2-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	2-2-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	12-30-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	3-9-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-21-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-7-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-26-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-7-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GRAY, Director. Power Plants; Combustion Engines; Fluid Motors: Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	3-21-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	6-13-77

Expiration of patents: The patents within the range of numbers indicated below expire during May 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 2,981,954 to 2,986,736, inclusive
Plant Patents ..... Numbers 2,055 to 2,066, inclusive

REISSUES

JUNE 13, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,664

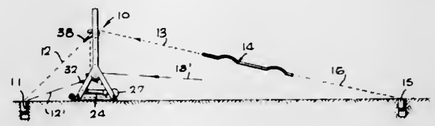
HYDRAULIC PULLEY APPARATUS

Charles Joseph Kuhn, Lujunga, Calif., assignor to Kansas Jack, Inc., McPherson, Kans.

Original No. 3,589,680, dated Jun. 29, 1971, Ser. No. 738,450, Jun. 20, 1968. Application for reissue Sep. 5, 1972, Ser. No. 286,182

Int. Cl.[2] B21D *1/14*

U.S. Cl. 72—444 **8 Claims**



1. A pulley apparatus adapted to rest on a floor comprising:
a frame having a base and an upper vertical stanchion;
attachment means located on said base;
a horizontally oriented hydraulic cylinder connected to said base above said attachment means and having a piston rod axially movable therein and extending out of one end of the cylinder for substantially horizontal reciprocation;
a first pulley rotatably mounted on the end of said piston rod for substantially horizontal reciprocation therewith;
a second pulley rotatably mounted on said frame above said hydraulic cylinder, said first pulley adapted to travel in a direction away from said attachment means and said second pulley;
means connected to said frame adjacent said second pulley adapted for anchoring said frame relative to said floor;
flexible chain means removably connected at one end to said attachment means, said flexible chain means further extending around said first pulley in one direction and around said second pulley in the opposite direction, with the other end adapted to be attached to a workpiece; and
selectively operable lock means mounted on said frame adjacent said second pulley for preventing travel of said chain in a direction toward said workpiece whereby, upon extension of the piston rod, the displacement of the first pulley draws the flexible chain means over the two pulleys causing the end of the flexible chain means attached to the workpiece to be displaced toward the second pulley in a direction opposite that of the first pulley.

Re. 29,665

APPARATUS FOR EJECTING A MIXTURE OF A PLURALITY OF LIQUIDS

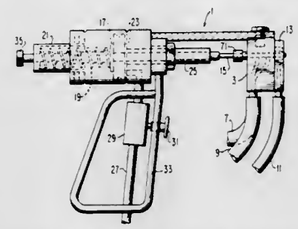
Frederick E. Gusmer, Mantoloking; Carl W. Sundberg, Jr., Chatham, both of N.J., and Joseph E. Hayes, Jr., Woodland Park, Colo., assignors to Gusmer Corporation, Old Bridge, N.J.

Original No. 3,876,145, dated Apr. 8, 1975, Ser. No. 435,685, Jan. 23, 1974. Application for reissue Feb. 24, 1977, Ser. No. 771,810

Int. Cl.[2] B05B *15/02*

U.S. Cl. 239—112 **18 Claims**

1. Apparatus for ejecting a mixture of a plurality of liquids, comprising a mixing chamber having an outlet opening and a plurality of spaced inlets which are spaced different distances from said outlet opening, means for separately introducing different liquids into the chamber through said inlets, a plunger reciprocable in the chamber between forward and rear positions, the differently spaced inlets communicating with the chamber and with each other in said rear position of the plunger, and means sealing against the plunger in the forward position of the plunger to seal said inlets from each other, the forward end of the plunger being forward of all said inlets in said forward position of the plunger and being rearward of all said inlets in said rear position of the plunger, *the surface of one of said plunger and sealing means being an elastic deformable material, said sealing means comprising an annular throat in*



which said plunger reciprocates with an interference fit, said plunger being in sealing contact with said throat in said forward position and exposing all said inlets to each other in said rear position, said forward end of said plunger being disposed on opposite sides of said throat in said forward and rear positions, said inlets being disposed on opposite sides of said throat.

Re. 29,666

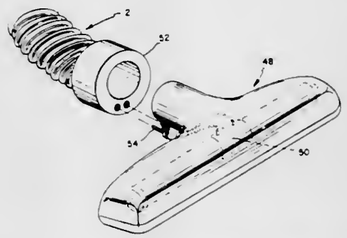
ELECTRICAL CONTACT TERMINAL HAVING IMPROVED WIRE-RECEIVING SLOT

Charles Edward Reynolds, Mechanicsburg, and John Clinton Swartz, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Original No. 3,972,578, dated Aug. 3, 1976, Ser. No. 569,421, Apr. 18, 1975. Application for reissue Feb. 25, 1977, Ser. No. 772,207

Int. Cl.[2] H01R *3/04*

U.S. Cl. 339—15 **4 Claims**



11. In an electrical contact terminal of the type intended for application to one end of a coil spring conductor, said terminal being of the type comprising a conductor-receiving portion and a contact portion, said conductor-receiving portion being generally U-shaped in cross-section and comprising a web and sidewalls, said contact portion extending from said web at one end thereof, said sidewalls having parallel free edges which are remote from said web, each of said sidewalls having a wire-receiving slot means extending therein from its free edge towards said web, the improvement to said terminal comprising:

a reverse fold in each of said sidewalls extending parallel to the axis of said conductor-receiving portion whereby each of said sidewalls comprises a pair of parallel plate-sections connected by one of said folds, said fold in each sidewall constituting said free edge thereof, said slot means in each sidewall comprising a slot in each of said plate-sections, whereby,

upon insertion of an end portion of said coil spring into said slot means, edge portions of said slot means will engage, and establish electrical contact with said wire, and said contact portion will extend from said contact portion parallel to the axis thereof.

Re. 29,667

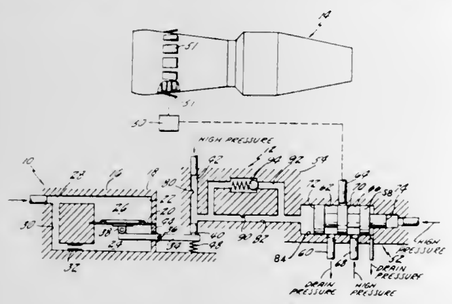
COMPRESSOR SURGE SENSOR

Kermit I. Harner, Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Original No. 3,809,490, dated May 7, 1974, Ser. No. 356,648, May 2, 1973. Application for reissue Apr. 26, 1976, Ser. No. 680,623

Int. Cl.[2] F01D *17/08, 17/20;* **F02C** *9/02*

U.S. Cl. 415—28 **9 Claims**



1. A surge control system for opening a bleed valve of the compressor section of a turbine type power plant so as to prevent or eliminate surge therein comprising means for sensing the pressure at the compressor for producing a signal whenever a predetermined transitory drop in said pressure occurs, an actuator connected to said bleed valve for opening and closing said bleed valve, control means including a servo valve and servo fluid responsive to said signal for controlling said actuator to position it to an open position, a relatively unrestricted flow line for leading said servo fluid [to] *from* said servo valve to position it from a normally closed bleed valve condition to an opened bleed valve condition, said servo valve movable to overtravel null condition when said servo valve is in the opened bleed valve condition, a restricted flow line for conducting said servo fluid [from] *to* said servo valve to position it to its normally closed bleed valve condition, said restricted flow line and overtravel being dimensioned so as to permit said bleed valves to remain open over a predetermined amount of time subsequent to said transition drop in pressure returns to substantially its original value, and said unrestricted flow line being sized to position said servo valve in the opened bleed valve condition at a relatively rapid rate.

Re. 29,668

GLYCINEAMIDES

Joseph G. Lombardino, Niantic, Conn., assignor to Pfizer Inc., New York, N.Y.

Original No. 3,853,862, dated Dec. 10, 1974, Ser. No. 353,607, Apr. 23, 1973. Division of Ser. No. 746,186, Nov. 30, 1976. Application for reissue Mar. 23, 1977, Ser. No. 780,312

Int. Cl.[2] C07D *277/44, 213/75, 273/00*

U.S. Cl. 260—306.8 R **2 Claims**

9. A compound of the formula

$$R_2—NH—CH_2—CO—NH—R_1$$

and the dihydrobromide salts thereof wherein R_1 is selected from the group consisting of phenyl; monosubstituted phenyl wherein said substituent is selected from the group consisting of fluoro, chloro, methyl and methoxy; 2-thiazolyl; 4,5-dimethyl-2-thiazolyl; 2-pyridyl; 6-methyl-2-pyridyl, and 5-methyl-3-isoxazolyl and R_2 is alkyl having from 1 to 3 carbon atoms.

Re. 29,669

PRODUCTION OF 4-HYDROXY-1,2-BENZOTHIAZINE-3-CARBOXAMIDES

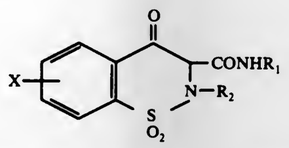
Joseph G. Lombardino, Niantic, Conn., assignor to Pfizer, Inc., New York, N.Y.

Original No. 3,853,862, dated Dec. 10, 1974, Ser. No. 353,607, Apr. 23, 1973. Application for reissue Nov. 30, 1976, Ser. No. 746,186

Int. Cl.[2] C07D *279/02*

U.S. Cl. 544—49 **8 Claims**

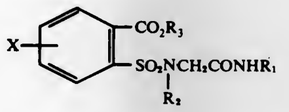
1. A process for the preparation of a compound of the formula:



wherein R_1 is selected from the group consisting of phenyl; monosubstituted phenyl wherein said substituent is selected from the group consisting of fluoro, chloro, methyl and methoxy; 2-thiazolyl; 4,5-dimethyl-2-thiazolyl; 2-pyridyl; 6-methyl-2-pyridyl, and 5-methyl-3-isoxazolyl;

R_2 is alkyl containing from 1 to 3 carbon atoms; and

X is a substituent selected from the group consisting of hydrogen, methyl, methoxy, fluoro, chloro and bromo, which comprises contacting a compound of the formula:



wherein R_3 is alkyl containing from 1 to 3 carbon atoms, with a metal hydride selected from the group consisting of alkali and alkaline earth metal hydrides, in a reaction-inert solvent at 50°–150° C.

Re. 29,670

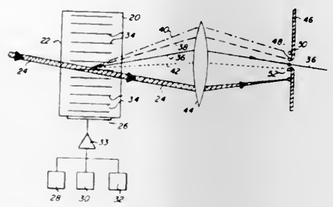
MULTI-COLOR ACOUSTOOPTIC MODULATOR

Richard A. Spaulding, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Original No. 3,783,185, dated Jan. 1, 1974, Ser. No. 221,668, Jan. 28, 1972. Application for reissue Dec. 17, 1975, Ser. No. 641,470

Int. Cl.[2] H04N *5/84, 9/12*

U.S. Cl. 358—4 **29 Claims**



1. An apparatus [including an acoustooptic cell] for [modulating and] diffracting *source* light of different wavelengths [impinging on said cell] into a composite, collinear output beam of light comprising a selected number of the different wavelengths present in said [impinging] *source* light, the [combination] *apparatus* comprising:

an acoustooptic cell [having] *locatable in the path of such source light;*

electrical-to-acoustical transducer means operatively attached [thereto] *to said cell;*

[means for impinging multi-wavelength light upon said cell;]

means for generating a [plurality] *number* of electrical signals [in accordance with a] *corresponding to the* selected number of *wavelengths in the* collinear output [beams] *beam*, each signal being of a *predetermined* different fixed frequency *selected to cause diffraction of at least a portion of light of each of the selected wavelengths along a common output axis;* and

means for applying said electrical signals to said transducer means to form acoustic waves in said cell which diffract said *source* light [impinging on said cell] to form said composite, collinear output beam of light of said selected number of different wavelengths.

PLANT PATENTS

GRANTED JUNE 13, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,262

IMPATIENS PLANT

James C. Mikkelsen, Ashtabula, Ohio, assignor to Mikkelsens Inc., Ashtabula, Ohio

Filed Apr. 12, 1977, Ser. No. 786,849
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of impatiens plant known by the cultivar name Freedom and particularly characterized as to uniqueness by the combined characteristics of low, compact, self-branching characteristics; soft pink flower color, green foliage with distinctive, variegated zones of yellow color; separated top and lower flower petals, with the color in the throat being of a deeper tone than the petals; excellent outdoor growth characteristics, and excellent keeping qualities as a potted plant.

4,263

PEAR TREE

Charles Lyle Kinney, 1356 Siskiyou, Medford, Oreg. 97501

Filed Jul. 19, 1977, Ser. No. 817,101
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—36 **1 Claim**

1. A new and distinct variety of pear tree, substantially as shown and described herein, distinguished principally from its parent, the Regal Red Comice, by being a spur-type tree bearing fruit, having a substantially solid red color throughout the growing season, with little or no purplish tint and having very slight yellowish undercoat when ripe, having substantially thicker and tougher skin, and having a rounded shape more nearly similar to the standard Doyenne Du Comice.

4,264

ROSE PLANT

Ernest Schwartz, Kingsville, Md., assignor to F. Harmon Saville, Rowley, Mass.

Filed Aug. 4, 1977, Ser. No. 821,818
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—9 **1 Claim**

1. A new and distinct variety of rose plant of the miniature class, substantially as shown and described, characterized particularly by high centered, recurrent flowers of attractive coloring borne primarily singly on long stems and having a spiral, circular outline with outer petals which lighten and inner petals which deepen in color on aging so as to produce a two-tone effect and a light lavender pink tonality and a vigorous, upright growing plant.

4,265

ROSE PLANT

Ernest Schwartz, Kingsville, Md., assignor to F. Harmon Saville, Rowley, Mass.

Filed Aug. 4, 1977, Ser. No. 821,783
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—8 **1 Claim**

1. A new and distinct variety of rose plant of the miniature class, substantially as shown and described, characterized particularly by high centered, recurrent flowers of light yellow coloring which are long lasting on the plant until dropping and grown on a vigorous plant with abundant foliage and virtually no thorns which can grow well in reduced light.

PATENTS

GRANTED JUNE 13, 1978

ERRATA

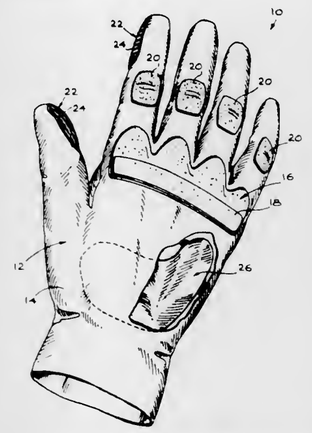
For CLASS	See PATENT NO.
128–294	4,094,020
042–090	4,094,098
072–238	4,094,174
400–161.4	4,094,397
431–202	4,094,632
544–026	4,094,872
544–243	4,094,873
544–258	4,094,874
568–802	4,094,912
568–778	4,094,913
568–862	4,094,914
542–422	4,095,023
526–001	4,095,031
526–011.1	4,095,032
526–090	4,095,033
235–462	4,095,091
235–304.1	4,095,094
235–419	4,095,095
235–463	4,095,096
340–147 MD	4,095,239
358–288	4,095,248

PATENTS

GRANTED JUNE 13, 1978

GENERAL AND MECHANICAL

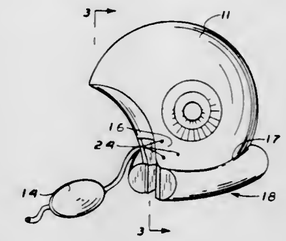
4,094,014
WORKMAN'S GLOVE
Charles W. Schroeder, P.O. Box 125, Star Route, Caliente, Calif. 93518
Filed Oct. 29, 1976, Ser. No. 736,765
Int. Cl.[2] A41D *27/12*
U.S. Cl. 2—161 R **8 Claims**



1. An improved workman's glove, said glove comprising, in combination:
   a. a protective sheath in the shape of a hand with fingers and adapted to cover the hand of a workman, including the fingers thereof;
   b. a first knuckle-protecting pad of extended surface area secured to the outside surface of said sheath and adapted to overlie the knuckles on the back of the hand and be configured with respect thereto;
   c. a plurality of finger knuckle protecting pads of extended surface area secured to the outer surface of said sheath and adapted to overlie the finger knuckles and be configured with respect thereto;
   d. non-slip gripping pads located on and secured to the inside of the thumb and index finger areas of said sheath; and,
   e. a protective palm pad of extended surface area secured to substantially all of the palm area of said sheath, and covering substantially all of the lower part of said palm area.

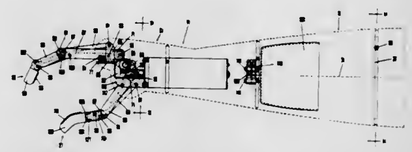
4,094,015
NECK ROLL FOR HELMET
Frank N. Howard, 712 Madison Ct., Apt. 254, Arlington, Tex. 76011
Filed Feb. 7, 1977, Ser. No. 766,392
Int. Cl.[2] A42B *3/02*
U.S. Cl. 2—415 **2 Claims**

1. A neck roll adapted for attachment to a helmet of the type worn by players in contact sports having a face opening and a bottom edge comprising:
   a U-shaped tubular member for encircling the neck of a wearer, said member being formed of a resilient material to serve as a cushion around the neck;
   means at the forward ends of the tubular member projecting upward from said member, said projecting means being provided with fastening means for demountably securing said member to the helmet on each side of the face opening, said projecting means at the forward ends of the tubular member comprising resilient strips adapted to lie against the inner surface of the helmet on each side of the face opening;
   said member being sized and positioned to lie around the bottom edge of the helmet and make firm contact therewith, said tubular member being provided with an upper planar surface engageable in abutting relationship with the bottom edge of the helmet, with the lower surfaces of said tubular member being engageable with portions of the



users shoulder adjacent to the neck and the back of the user's neck;
whereby the neck roll will be free to move with the helmet and head and will protect the neck, spine and associated areas from injury.

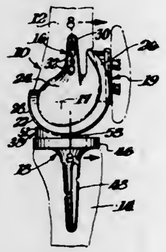
4,094,016
ARTIFICIAL HAND AND FOREARM
Gary Eroyan, 1314 N. Crawford St., Detroit, Mich. 48209
Filed Dec. 4, 1976, Ser. No. 746,794
Int. Cl.[2] A61F *1/06, 1/00*
U.S. Cl. 3—1.1 **20 Claims**



1. An artificial hand and forearm comprising a hollow elongated formed housing of the general shape of the forearm and hand having a longitudinal axis and open at its rear end adapted to receive the stub end of the human forearm;
   with portions of the housing adapted to receive the corresponding upper arm and adapted for securing thereto;
   the housing at its front end having a series of thumb and finger apertures therein;
   a mounting plate anchored within the hand end of the housing;
   a series of elongated finger assemblies including a forefinger assembly adjacent their one ends nested within the hand end of the housing, and inwardly of said one ends pivotally mounted upon said plate upon a transverse axis;
   the other ends of said finger assemblies projecting axially through said finger apertures;
   a thumb assembly spaced from said finger assemblies, adjacent one end nested within the hand end of said housing, and inwardly of its end pivotally mounted upon said plate upon a transverse axis;
   the other end of the thumb assembly projecting axially through said thumb aperture and opposed to the forefinger assembly;
   a rotatable camshaft at its ends journaled upon said plate on a transverse axis and spaced from said finger and thumb assemblies;
   a series of spaced cams secured upon said shaft respectively

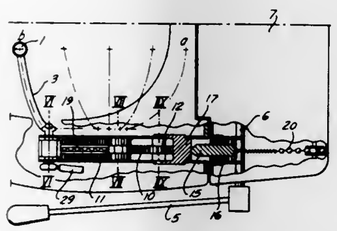
registering with the inner ends of said finger and thumb assemblies;
one cam having a pair of opposed cam surfaces for registry with forefinger and thumb assemblies;
means biasing said finger assemblies into an open position against said cams;
a reversible electric motor within said housing having an axial output shaft;
gear means interconnecting said cam shaft and output shaft;
a power source;
a switch means within said housing; and
an electrical circuit interconnecting said power source, switch means and motor;
whereby the switch means under the control of said arm stub may be activated in one direction for a short period, said cams rotating in one direction moving said finger and thumb assemblies inwardly toward an object gripping position;
deactivating said switch means stopping said fingers to hold said object;
successively activating said switch for a short period in the opposite direction reversing said motor, said cams rotating in the opposite direction permitting said thumb and finger assemblies to move toward a release position, releasing said object, deactivating said switch stopping said fingers in an open position.

4,094,017
KNEE JOINT PROSTHESIS WITH PATELLAR-FEMORAL CONTACT
Larry Stanford Matthews; Herbert Kaufer, and David Ansel Sonstegard, all c/o Howmedica, Inc., 235 E. 42nd St., New York, N.Y. 10017
Filed Feb. 16, 1977, Ser. No. 768,952
Int. Cl.[2] A61F *1/24*
U.S. Cl. 3—1.911 **10 Claims**



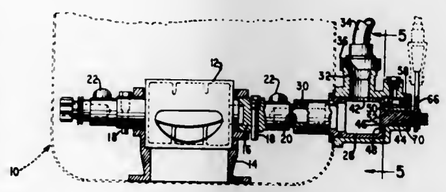
1. A knee joint prosthesis comprising a femoral component, a tibial component, coupling means connecting said femoral and tibial components for movement relative to each other, said coupling means including a pair of spaced substantially spherically curved condyle runners, a femoral attaching means in the top of the femoral component, the tibial component having a base, tibial connecting means on the bottom of the base, the coupling means also including a pair of spheriodally curved spaced parallel concave shoes on the base having upper surfaces intimately mating with the condyle runners for smooth relatively sliding movement between them, a pair of broadly inclined and smoothly merging anterior and superior extensions of the condyle runners on the femoral component, the extensions smoothly merging with each other to form a substantially circular arcuate trough disposed midbetween and parallel to the condyl runners, the trough having a center of curvature slightly posterior and somewhat superior to the center of movement of the femoral component relative to the tibial component, a patellar component, the posterior portion of the patellar component having a concave arcuate ridge for substantially matching the circular trough, the patellar component having a pair of bearing facets on both sides of the ridge which substantially match the lateral sides of the extensions whereby substantially total contact is maintained between the ridge and facets on the patellar component and the trough substantially throughout the entire range of movement of the prosthesis, the femoral and tibial components being made of a biocompatible metal, the bearing facets and ridge of the patellar component being made of a very strong and wear-resistant plastic material, and patellar attaching lugs on the anterior of the patellar component for connecting it to the patella.

4,094,018
BOTTOM DOUCHE FOR FLUSH TOILETS
Johannes Bemthin, Bremerhaven, Germany, assignor to MFB Neuwerk GmbH, Bremerhaven, Germany
Filed Jan. 5, 1976, Ser. No. 646,666
Claims priority, application Germany, Jan. 7, 1975, 2500345
Int. Cl.[2] E03D *9/08*
U.S. Cl. 4—7 **13 Claims**



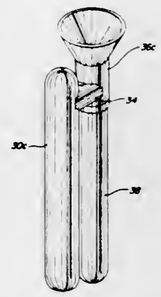
1. A bottom douche for flush toilets comprising opposed arms, one for each side of the toilet, and each arm being supported with one of its ends on the toilet; oppositely disposed, spaced, inwardly and upwardly slanting spray nozzles carried at the free ends of said arms; duct means for passing water through said arms to said nozzles; a handle provided on the toilet, and a linkage connecting said handle and said arms, the said linkage including a rack-and-pinion drive attached to the toilet seat and linking said handle to said arm and nozzles and said rack-and-pinion drive causing the arms to swivel about a horizontal transversal axis by rolling of the said pinion means upon the said rack means, and which linkage further includes a slide surface supporting the pinion means forwardly of said rack means whereby the pinion means after revolving on said rack means exercises a shifting movement in horizontal direction by sliding on said slide surface under the action of said handle.

4,094,019
RETRACTABLE TOILET BOWL ASSEMBLY
Vincent Moore, Fairview, Pa., and Paul N. Levesque, Bristol, Conn., assignors to Altair, Inc., Plymouth, Conn. and American Sterilizer Company, Erie, Pa.
Filed Jul. 29, 1976, Ser. No. 709,941
Int. Cl.[2] E03D *1/00, 3/00, 5/00*
U.S. Cl. 4—312 **7 Claims**



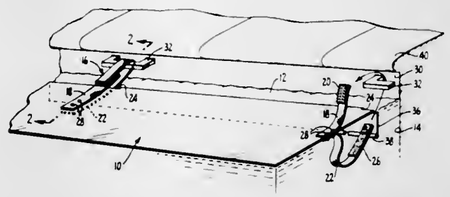
1. In a toilet bowl assembly, a base for rotatably supporting and communicating with an element having a cylindrical surface and for communicating with a sewer gas trap, a toilet bowl having up and down positions and secured to said element and emptying thereinto, a valve element axially aligned with and fixed to said element, means for delivering water from said valve element to said toilet bowl, said valve element in the down position of the toilet bowl communicable with a flushing valve, and a secondary valve element in an alignable and abutting relationship with and communicating with said valve element and operable to deliver wetting action flow when the toilet bowl is moved from its up position.

4,094,020
URINE SPECIMEN COLLECTOR
Howard Franklin, 3365 Chisholm Tr., Boulder, Colo. 80302
Filed Aug. 26, 1976, Ser. No. 717,580
Int. Cl.[2] E03D *13/00*; G01N *1/18, 33/16*
U.S. Cl. 128—294 **17 Claims**



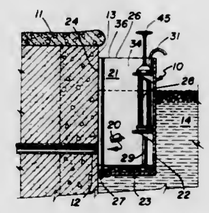
1. A urine specimen collector comprising:
a first tube closed at its lower end and having a mouth at its upper end engageable around the urethral orifice;
a second tube disposed alongside said first tube and open at its lower end;
a duct positioned for passing an overflow of urine from said first tube into said second tube;
and means projecting downwardly within said first tube and having a lower end spaced above the the lower end of said first tube and below said duct for enabling retention of only a subsequent portion of urine flow within said first tube.

4,094,021
SWIMMING POOL COVER
Robert A. Rapp, 5033 Maiden La., Santa Rosa, Calif. 95405
Filed Feb. 3, 1977, Ser. No. 765,419
Int. Cl.[2] E04H *3/16, 3/18*
U.S. Cl. 4—172.12 **1 Claim**



1. A swimming pool cover comprising a flexible pliable plastic sheet having a size and shape to substantially cover the surface of the water within a pool, a plurality of pairs of strap members, each pair having common end portions attached to the sheet and other end portions provided with attachable and disattachable complemental fastening means attachable together to form a closed strap member loop, a clip member for each such loop to secure the same directly to the side wall of the pool below the pool deck, said sheet having means to prevent the movement of air therebeneath when the sheet is in place on the surface of the water in the pool, said means comprising a depending skirt disposed along the periphery of said sheet and adapted to extend downwardly into the pool water while the sheet is supported on the pool water by said strap and clip members, the strap members of each pair being superposed, one above and one below the sheet, rivet means attaching the common ends thereof together, the sheet having a plurality of slots formed therein for the threading therethrough of the strap members below the sheet and subsequent connection of the same to said clip members and attachment together of said complemental fastening means.

4,094,022
APPARATUS FOR THE REMOVAL OF WATER FROM A SWIMMING POOL DUCT
Dominic R. Protano, 10 Woodside Dr., and Ronald L. Conte, 63 Keith Hill Rd., both of Grafton, Mass. 01519
Filed Nov. 22, 1976, Ser. No. 743,685
Int. Cl.[2] E04H *3/16*; E03B *11/00*
U.S. Cl. 4—172.17 **6 Claims**

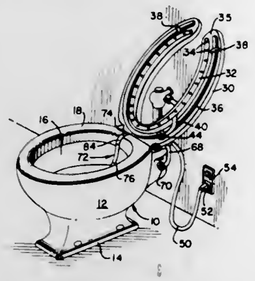


1. Apparatus for use with a swimming pool having an opening on a vertical surface, comprising:
(a) a rear wall adapted to lie in a spaced relationship to the said surface with an upper edge located above the level of the water in the pool,
(b) two side walls extending from the rear wall toward the said surface, each wall having an upper edge located about the level of the water in the pool and a vertical edge adapted to contact the said surface, the side walls being substantially spaced to allow the vertical edges to lie on either side of the opening,
(c) a bottom wall connecting the rear and side walls and having a horizontal edge adapted to engage the said surface beneath the opening,
(d) a pump mounted on the interior of the walls, the pump extending above the upper edges of the walls, and
(e) a continuous sealing strip of elastomer material extending along the vertical edges of the side walls and the horizontal edge of the bottom wall, the rear wall having a vertical plane inner surface located in spaced, parallel relationship with the said pool surface, the side walls having vertical plane inner surfaces that are located in spaced, parallel relationship to each other, each side wall inner surface extending at a right angle to the inner surface of the rear wall to form a corner, the pump being mounted in one of the said corners to form a rigid structure therewith.

4,094,023
VENTILATED TOILET SEAT
Donald L. Smith, P.O. Box 206, Salem, Ill. 62881
Filed Dec. 11, 1975, Ser. No. 639,772
Int. Cl.[2] E03D *9/04*; A47K *13/00*
U.S. Cl. 4—213 **7 Claims**

1. For use with a toilet having a bowl provided with a base formed internally with a discharge passage to be connected to a piping for communication with a sewer line and provided with a trap above said passage and with an upper rim portion on which a seat that is hinged to the bowl is adapted to rest with a normal pool of water being in the bowl above the trap

so as to provide a water seal to prevent any gases from entering into the bowl from the sewer line; a ventilating arrangement for removing odors from the bowl comprising a suction line communicated with the interior of the bowl when the seat is rested on the rim portion, a power driven suction blower unit mounted adjacent the bowl and having an inlet end connected to the suction line and having an outlet and an exhaust tube connected to said outlet and having a portion positioned verti-



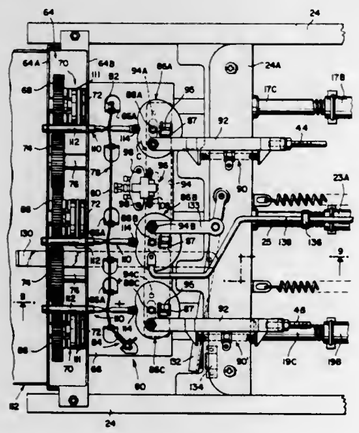
cally within the bowl with said vertical portion having an elbow positioned within the bowl trap and provided with a free terminal outlet portion positioned behind the trap and having opening means disposed in arrangement with the pool of water so as to form a trap in the exhaust tube whereby odors from the bowl are conveyed directly to the discharge passage of the bowl for passage to the sewer line while the normal water pool in the bowl provides a water seal to prevent any sewer gases from entering the exhaust tube through the elbow.

4,094,024

SYSTEM FOR CONTROLLING RELATIVE MOVEMENT OF PORTIONS OF A BED

Roland A. Benoit, Danielson, and Edmund Guillot, Putnam, both of Conn., assignors to InterRoyal Corporation, New York, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,507
Int. Cl.² A61G 7/10
U.S. Cl. 5—66 **11 Claims**



1. System for controlling selective relative positional movement of portions of a bed structure with respect to a main supporting bed base frame which comprises:

a plurality of independently operable individual motion transmission means connectable to such portions of the bed structure for correspondingly effecting the selective relative positional movement thereof with respect to the main supporting bed base frame,

common drive transmission means for driving the motion transmission means,

coupling means actuatable for operatively coupling and uncoupling the individual motion transmission means with the common drive transmission means, and

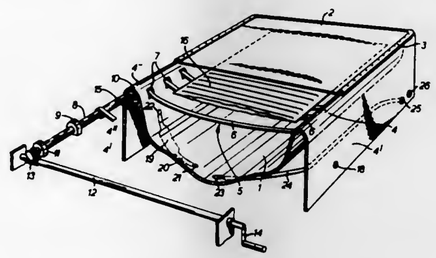
common uniselective control means operatively connected to the coupling means for uniselectively actuating the coupling means for coupling the common drive transmission means with a selective individual motion transmission means and for simultaneously preventing the coupling of the common drive transmission means with the remaining corresponding motion transmission means, said common uniselective control means including a common flexible linear tension means operatively interconnected with the coupling means for limited range actuating displacement for controlling the coupling of such common drive transmission means with only one such motion transmission means at a time, whereby to control such selective relative positional movement.

4,094,025

WATER MATTRESS

Jan Nystad, Amundsvingen 16, 5095 Ulset, Norway

Filed Jul. 12, 1976, Ser. No. 704,556
Claims priority, application Norway, Jul. 30, 1975, 752682
Int. Cl.² A47C 27/08
U.S. Cl. 5—365 **2 Claims**



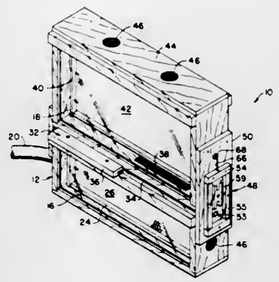
1. In a water mattress assembly, a container having a bottom and upright side walls and an open top and a length and breadth to receive a patient, an elastic, flexible water-tight cover sealed to the side walls and closing the open top of the container to form a water space, a water inlet and a water outlet connected with the water space, a supporting arrangement mounted in the water space for vertical movement toward and away from the cover, the supporting arrangement being essentially coextensive with the cover so that in a raised position the arrangement supports the cover to render the same hard, said supporting arrangement including a plurality of parallel spaced-apart straps extending transversely across the container an inflatable floatable air mattress disposed in the water space between the supporting arrangement and the cover and essentially coextensive with the supporting arrangement and the cover, means maneuverable from outside the container for raising and lowering the supporting arrangement, said means including means for tightening and loosening the straps, whereby upon loosening the straps and inflating the air mattress the latter floats up into engagement with the cover and upon tightening the straps and deflating the air mattress the latter lies on the straps and evens out the spaces between the latter, and means controllable from outside the container for adjusting the degree of inflation of the air mattress, whereby the hardness of the cover may be adjusted between wide limits by varying the vertical position of the supporting arrangement and by varying the degree of inflation of the air mattress.

4,094,026

BEEHIVE

Donald J. Simoni, 177 Pixley St., San Francisco, Calif. 94123

Filed Oct. 13, 1976, Ser. No. 731,964
Int. Cl.² A01K 47/00, 47/06
U.S. Cl. 6—1 **2 Claims**



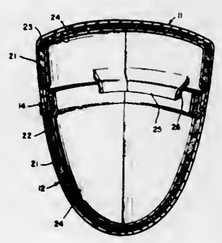
1. An observation beehive comprising a first chamber for enclosing brood nest; a second chamber for enclosing removable honey frame; first and second passageways between said first and second chambers, said first passageway including means for excluding a queen bee and a first gate for blocking and unblocking said first passageway, said second passageway including a second gate having a first closed position and a second open position, and means for permitting one-way passage of bees from said first closed position and a second open position, and means for permitting one-way passage of bees from said second chamber to said first chamber, said second passageway communicating with said one-way passage permitting means, said one-way passage permitting means comprising a tube having a side wall, at least one bee entrance opening and at least one bee exit opening, said tube containing a pair of flexible reeds convergent to said exit opening for permitting a single bee to pass in only one direction, said side wall defining said second gate, said tube further including means for defining a longitudinal slot adjacent said reeds, said second passageway including a lateral opening alignable with said tube slot to allow insertion of a rod transverse of said tube between said reeds.

4,094,027

INTERLOCKING TWO PIECE HULL FOR A CATAMARAN

Eugene G. Vernon, 2622 Crestview Dr., Newport Beach, Calif. 92105

Filed May 9, 1977, Ser. No. 794,726
Int. Cl.² B63B 5/24
U.S. Cl. 9—6 P **2 Claims**



1. A hull for a catamaran, comprising:

a. a first member which has a sidewall that includes a first layer of fiberglass and polyester resin forming the exterior surface of said sidewall and a second layer of fiberglass and polyester resin forming the interior of said sidewall which is mechanically coupled to the first layer to form a structurally strong member, said first member having a band adjacent to its peripheral edge that is indented to form a ledge;

b. a second member which has a substantially vertical sidewall that includes a first layer of fiberglass and polyester resin forming the exterior surface of said sidewall and a second layer of fiberglass and polyester resin forming the interior of said sidewall which is mechanically coupled to the first layer to form a structurally strong member, said second member having the second layer of its said sidewall bent inwardly a slight amount adjacent to its peripheral edge in order that it may rest on said ledge of said first member along which it is joined, the first layer of said sidewall being adapted to rest directly on said ledge of said first member; and

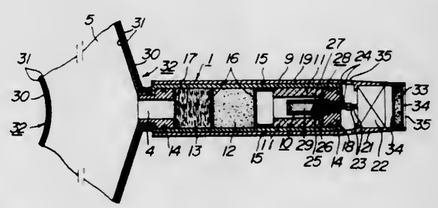
c. a third member which is mechanically coupled to said second member adjacent to its said peripheral edge along the interior surface of said vertical sidewall and which is adapted to be mechanically coupled to the interior surface of said first member and to be secured thereto by a glue.

4,094,028

AUTOMATIC INFLATING LIFESAVING BUOY

Hikaru Fujiyama; Tsuneo Kasama, both of Kawagoe, and Shigenobu Higuchi, Ashikaga, all of Japan, assignors to Nippon Oil and Fats Co., Ltd. and Kokuku Chemical Industry Co. Ltd., both of Tokyo, Japan

Filed Mar. 25, 1977, Ser. No. 781,424
Claims priority, application Japan, Apr. 1, 1976, 51-35126
Int. Cl.² B63C 9/18
U.S. Cl. 9—321 **11 Claims**



1. An automatic inflating lifesaving buoy comprising a gas generating device, an inflatable bag and an electric cell or battery, the gas generating device being provided with the electric cell or battery at the rearward end and the inflatable bag at the forward end, the gas generating device being a substantially hollow body in which an electric ignition device is arranged adjacent to the electric cell or battery and/is electrically connected with the electric cell or battery and surrounded with a gas generating composition, and a spacer provided in contact with and in the forward direction of the gas generating composition, a multi-perforated partition plate provided in contact with or integrated with the spacer, another multi-perforated partition plate provided in the forward direction of the first multi-perforated partition plate and at an appropriate distance to form a chamber wherein a cooling agent is charged, and an outlet for supplying generated gas to the inflatable bag through the second multi-perforated partition plate.

4,094,029

SHOE FASTENER

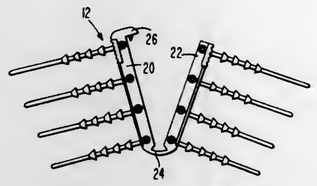
Alfred E. Carlile, 572 Chestnut St., Meadville, Pa. 16335

Filed Apr. 14, 1977, Ser. No. 787,698
Int. Cl.² A43D 5/00; F16G 11/00; A44B 17/00
U.S. Cl. 12—113 **13 Claims**

1. A fastener for a shoe which has opposite flaps with eyelets therein, the fastener comprising

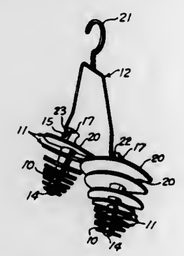
a pair of elongated carriers,

hinge means connecting one ends of the pair of carriers together,
means for releasably securing the carriers together,
the pair of carriers having respective apertures,



flexible string-like members joined to each of the carriers for passing through the eyelets of the shoe and for being received in the respective apertures, and
said flexible string-like members each having a protrusion for interlocking with the respective carrier at the respective aperture.

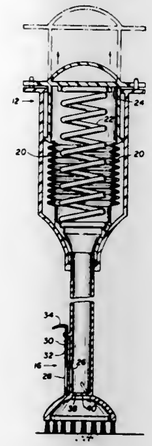
4,094,030
SHOE HANGER
Michel H. Saad, c/o Dana Electronic Computer Co. Inc., Bldg. 105, Spokane, Wash. 99216
Continuation-in-part of Ser. No. 652,625, Jan. 26, 1976, abandoned. This application Jul. 11, 1977, Ser. No. 814,184
Int. Cl.[2] A43D *5/00*; A47F *7/08*; A47J *51/00*
U.S. Cl. 12—116.8 **25 Claims**



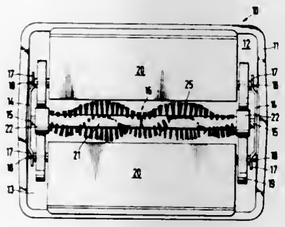
1. A shoe hanger comprising:
elongated core means for longitudinal insertion between the vamp and insole of a shoe;
a plurality of projections resiliently mounted to the core means, each extending substantially transversely outward therefrom for deformable frictional engagement with inwardly facing interior surfaces of a shoe, said projections being spaced apart along the length of the core means;
and support means mounted to said core means;
the height and width across said projections being increased from front to back.

4,094,031
CLEANING APPARATUS FOR SELECTED SMALL AREAS OF A SWIMMING POOL
Alfonso J. Cellini, 11 Wheeler Ct., Deer Park, N.Y. 11729
Filed Dec. 20, 1976, Ser. No. 752,607
Int. Cl.[2] E04H *3/20*
U.S. Cl. 15—1.7 **1 Claim**

1. Cleaning apparatus for a swimming pool comprising an elongated air chamber, said air chamber having a bellows as an integral part thereof, means for venting the air from said air chamber, a spring within said air chamber for maintaining said air chamber in an elongated condition, at least one length of tubing having water-tight means for connecting one end of said tubing to said air chamber, means extending upwardly from said tubing to limit movement of said air chamber in said elongated condition, said spring and said bellows expelling air through said air chamber venting means and said tubing by operating said spring in conjunction with said air chamber, flap means within said tubing for the passage of air and water away from said air chamber and allowing the passing of debris only in the direction toward said air chamber, preventing and retaining said debris from passing away from said air chamber through said tubing when air is expelled through said tubing from the air chamber, and allowing the passage of said air being expelled from said air chamber, and a water-tight, spring loaded sliding trap door on said tubing between said air chamber and said flap means proximate to said/flap means for selectively retaining said debris passing through said tubing.

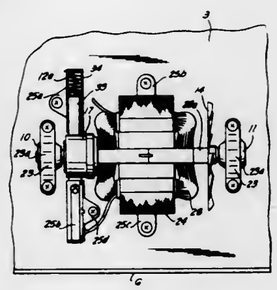


4,094,032
CLEANING DEVICE
Johannes Liebscher, Nassau (Lahn); Rolf G. Schülein, Singhofen, and Waldemar Fobbe, Nassau (Lahn), all of Germany, assignors to Leifheit International Gunter Leifheit GmbH, Nassau (Lahn), Germany
Filed Jan. 21, 1976, Ser. No. 650,942
Claims priority, application Germany, Jan. 24, 1975, 2502763
Int. Cl.[2] A47L *11/33*
U.S. Cl. 15—41 R **14 Claims**



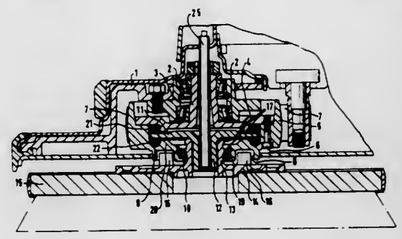
1. In a device for cleaning surfaces, a combination comprising a housing; an elongated cleaning body having a longitudinal axis and including at least two separate cleaning sections each having an elongated shaft and a cleaning portion surrounding said shaft, and means for coaxially connecting said shafts, including a coaxial spherical male end portion of one of said shafts and a coaxial female end portion of the other shaft which includes elastically yieldable wall means embracing said male portion for independent rotation, and engaging behind said male portion with a snap action to prevent axial displacement, of the connected shafts relative to one another; means for mounting said cleaning body in said housing for adjustment of the spacing of said longitudinal axis from a surface to be cleaned, including a generally U-shaped mounting element having two mounting portions extending transversely of, and an elongated connecting portion extending along, the mounted cleaning body and interconnecting said mounting portions, and a bracket affixed to said connecting portion intermediate said mounting portions, those end portions of said shafts that are remote from said male and female end portions being each mounted on one of said mounting portions of said mounting element, and at least one of said male and female end portions being supported on said bracket, for rotation relative thereto and for displacement therewith during the adjustment of said spacing; means for supporting said housing on the surface to be cleaned for movement relative thereto with said cleaning portions of said cleaning sections in contact therewith, including a plurality of wheels mounted on said housing for rotation in engagement with the surface being cleaned; and at least two motion-transmitting means each interposed between at least one of said wheels and one of said cleaning sections and operative for independently rotating the latter about said longitudinal axis in response to the rotation of said one wheel.

4,094,033
CLEANING DEVICE
Klaus Stein, Velbert; Miroslav Aigl, Ennepal, and Gerhard Richter, Wuppertal, all of Germany, assignors to Vorwerk & Co. Interholding GmbH, Wuppertal, Germany
Filed Apr. 30, 1976, Ser. No. 682,173
Claims priority, application Germany, Apr. 30, 1975, 2519155
Int. Cl.[2] A47L *11/33*
U.S. Cl. 15—41 R **15 Claims**



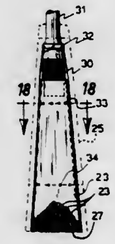
1. In a cleaning device, particularly in a carpet-sweeping device, a combination comprising a housing bounding an internal space; cleansing means mounted on said housing; means for driving said cleaning means, including an electric motor accommodated in said space and having a stator and a rotor having an elongated shaft which has end portions, and means for so mounting said electric motor on said housing that said end portions of said shaft project from said stator, including at least two bearings each interposed between said housing and one of said end portions of said shaft at a distance from said stator; means for advancing a stream of a cooling medium through said space in a direction from one of said bearings toward said electric motor and toward the other of said bearings; and partitioning means located within said housing and including an L-shaped partition which has two arms one of which commences upstream of said electric motor as considered in said direction and extends alongside said electric motor, the other of said arms extending from said one arm transversely of and beyond said shaft between said electric motor and said other bearing, said partition subdividing said space into a first channel for a main stream of the cooling medium and accommodating said electric motor and a second channel for a branch stream of the cooling medium and accommodating said other bearing, for the branch stream to bypass said electric motor and thus remain effective for cooling said other bearing and to join the main stream only after cooling said other bearing and downstream of said electric motor for joint discharge from said space.

4,094,034
FLOOR TREATMENT MACHINES
John Thomas Wilkins, Bushey Heath, and Haydn Frank Mayo, Hazlemere, both of England, assignors to R. G. Dixon & Company Limited, Wembley, England
Filed Mar. 2, 1977, Ser. No. 773,843
Claims priority, application United Kingdom, Mar. 4, 1976, 8742/76
Int. Cl.[2] A47L *11/162*
U.S. Cl. 15—49 R **14 Claims**



1. A floor treating machine comprising in combination:
a chassis;
a drive element within said chassis;
means for rotating said drive element only about a vertical axis passing through said chassis;
a brush mounting member adjacent said drive element and jointly rotatable therewith, said brush mounting member having a substantially horizontal flange provided with an upper and a lower side;
a plurality of resilient elements carried on said drive element engaging said brush mounting member on said upper and lower sides thereof and suspending said brush mounting member on said drive element for limited rocking of said brush mounting member relative to said drive element; and
a brush fixed to said brush mounting member and jointly displaceable therewith, whereby said brush rotates about the vertical axis passing through the chassis while rocking about the axis so as to maximize engagement of said brush with a floor surface.

4,094,035
CURLING BROOM
Fernand Marchessault, 2251 Sherbrooke Street, East, Montreal, Quebec, Canada
Filed Feb. 25, 1974, Ser. No. 445,814
Int. Cl.[2] A46B *3/06*; A63B *67/14*
U.S. Cl. 15—160 **5 Claims**



1. A broom comprising an elongated resilient means, a handle having one end secured to one end of said resilient means, and aligned therewith, fibers made of synthetic material, fixing

means securing said fibers to said one end of said handle, said fibers extending longitudinally of said resilient means, encompassing the latter, and arranged for flexion with said resilient means to be resiliently displaced by the latter, and a low binding loosely surrounding said fibers and maintained against longitudinal displacement relative to said handle, said low binding keeping said fibers against said resilient means, said resilient means including a bundle of coarse fibers of synthetic thermoplastic material, each having a cross-sectional area much larger than the cross-sectional area of the first-named fibers, said low binding loosely stitched through said bundle of coarse fibers, the ends of said coarse fibers secured to said handle being embedded in a solid plug, said plug holding said fiber ends together, and wherein said handle has a tubular portion and said plug and end portions of said coarse fibers embedded in said plug are fitted in said tubular portion and said tubular portion is flattened over said coarse fibers below said plug.

4,094,036

FLOOR CLEANING DEVICE

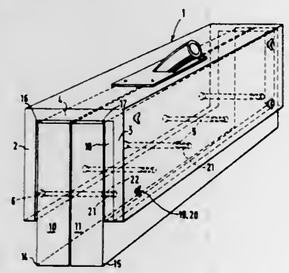
Heinrich Karpp, Fahrenberg 19 A, 4300 Essen, Germany

Filed Dec. 9, 1976, Ser. No. 748,913

Claims priority, application Germany, Dec. 13, 1975, 2556277; Jul. 20, 1976, 2632509

Int. Cl.² A47L *13/11, 13/257*

U.S. Cl. 15—244 R **3 Claims**



1. A device for cleaning surfaces, particularly floors, comprising a plurality of elongated cleaning elements of foam rubber which are symmetrical with reference to their central longitudinal and their central transverse axes, a plurality of cleaning edges extending longitudinally of each of said cleaning element at a predetermined distance from said axes, and a plurality of transverse passages which are distributed along said central longitudinal axes with spacing from one another in the central region of said cleaning element and extend through the latter; means for so receiving said cleaning element that any of said cleaning edges is in an exposed working position for a cleaning movement over a surface to be cleaned, including an elongated one-piece holding member of a generally U-shaped cross section having a bight and two arms rigid with one another and together bounding a recess for so partially accommodating said cleaning element that said passages extend from one to the other of said arms; means for connecting said cleaning element to said holding member, including a plate-shaped mounting member juxtaposable with said one arm within said recess, a plurality of connecting members of a number and distribution corresponding to those of said passages to be respectively received therein and affixed to said mounting member to extend therefrom toward said other arm, and detachable securing means for removably securing said plate-shaped mounting member to said one arm of said one-piece holding member, so that, upon release of said securing means and removal of the unit constituted by said plate-shaped mounting member from said recess and the cleaning element carried thereby, said cleaning element can be reoriented relative to said plate-shaped mounting member to put any other of said cleaning edges thereof into said exposed working position upon reintroduction of said plate-shaped mounting member into said recess; and an actuating handle rigid with said one-piece holding member and operative for moving the same with said plate-shaped mounting member and cleaning element connected thereto over the surface being cleaned with the respective cleaning edges in contact therewith.

4,094,037

WIPING DEVICE

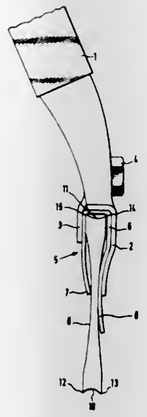
Heinrich Karpp, Fahrenberg 19 A, 4300 Essen 15, Germany

Filed Nov. 24, 1976, Ser. No. 744,606

Claims priority, application Germany, Nov. 26, 1975, 7537550[U]

Int. Cl.² A47L *1/06*

U.S. Cl. 15—245 **8 Claims**



1. A wiping device, particularly for cleaning windows and the like, comprising an elongated wiping blade having a pair of longitudinal marginal portions each having a pair of edges bounding a respective marginal face and spaced a predetermined distance from one another, and a central portion intermediate said marginal portions, said wiping blade having a thickness at said central portion which is smaller than said distance, and said wiping blade tapering in a direction from adjacent each of said marginal faces toward said central portion; a handle; and means for replaceably mounting said blade on said handle in four different orientations in each of which one of said edges is in a working position for use as a wiping edge, including wall means bounding an elongated cavity which is open at least at one longitudinal end thereof, and an elongated slot communicating said cavity with the exterior of said wall means along said cavity, said cavity being adapted to receive either one of said marginal portions of said blade whereas said central portion is accommodated in said slot and the other marginal portion extends beyond said wall means to the exterior thereof for said one edge thereof to be used for wiping.

4,094,038

WINDSCREEN WIPERS FOR AUTOMOBILE VEHICLES

Theodore Hancu, Geneva, Switzerland, assignor to Societe d'Exploitation de Brevets J.B., Fribourg, Switzerland

Filed Dec. 2, 1976, Ser. No. 746,962

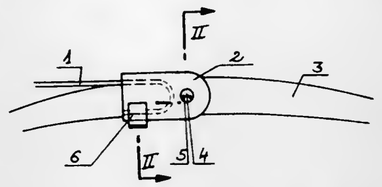
Claims priority, application Switzerland, Jan. 27, 1976, 975/76

Int. Cl.² B60S *1/40*

U.S. Cl. 15—250.32 **7 Claims**

1. A windscreen wiper of the type comprising a pivotal arm and a blade detachably mounted on the free end of the arm, a pin secured to one of said arm and blade and journalled in a

bore formed in the other of said arm and blade, said blade comprising a hook member which laterally projects with respect to the blade and is adapted to cooperate with the arm in the operating position to hold said pin in said bore.



4,094,039

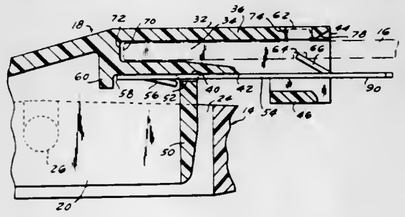
WINDSHIELD WIPER BAYONET CLIP WITH DOUBLE LATCH

Peter G. Waterman, Burlington, and Donald Earl Emmons, Brampton, both of Canada, assignors to Tridon Limited, Burlington, Canada

Continuation-in-part of Ser. No. 678,494, Apr. 20, 1976, abandoned. This application Feb. 4, 1977, Ser. No. 765,697

Int. Cl.² B60S *1/42*

U.S. Cl. 15—250.32 **8 Claims**



1. A connector clip for connecting a bayonet type windshield wiper arm to the superstructure of a windshield wiper assembly, said clip comprising a clip body having a first end portion including means for connecting the clip body to a windshield wiper superstructure and a second end portion adapted to operatively engage the free end of a windshield wiper arm, said second end portion having a top wall and an axially extended recess formed therein below said top wall defining a pocket which is generally complementary to said free end of the windshield wiper arm, for receiving said free end of the windshield wiper arm therein; said clip body including a spring mounting wall located adjacent said recess extending generally perpendicular to the recess and having a slot formed therein, and a relatively flat leaf spring element mounted in said slot and including an integral centrally located resilient tab in said spring adapted to be inserted with said spring through said slot, said tab extending in a downward direction opposite to the direction of insertion of the spring and being positioned to engage said support wall after insertion of the spring to prevent removal of said spring from the clip body, said spring element being located along said recess for engagement with said bayonet arm to aid in holding said arm in the clip; and an abutment wall located in spaced relation to said support wall on the side thereof opposite said pocket for engaging the end of the spring inserted through said slot and preventing movement thereof beyond the abutment wall whereby the spring is captured in a relatively fixed position in the clip body.

4,094,040

HINGE

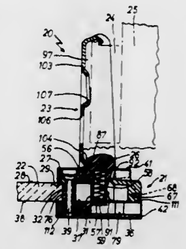
Günter Schmid, Freudenstadt-Dietersweiler, and Christian Schaber, Loosburg, both of Germany, assignors to Hetal-Werke Franz Hettich KG., Alpirsbach, Germany

Filed Jun. 3, 1976, Ser. No. 692,552

Claims priority, application Germany, Jun. 3, 1975, 2524454

Int. Cl.² E05D *5/02*

U.S. Cl. 16—191 **20 Claims**



1. A hinge for mounting a structure such as a frameless glass door or the like on a fixture, said hinge comprising a substantially part-cylindrical body portion which is arranged to be inserted in an opening in the structure, the opening having a cross-section defined by a chord so as to provide, on the cylindrical surface of the body portion, a planar portion which, when the hinge is assembled on the structure is aligned with a longitudinal edge of the structure, said hinge including a pin extending parallel to the body portion and being spaced therefrom such that its axis lies on an imaginary line which passes through the axis of the body portion normal to said chord, to the side of the axis of the body portion remote from said chord, said pin being arranged to be inserted in a bore in the structure, and a connecting member hinged on the body portion and adapted to be mounted on the fixture.

4,094,041

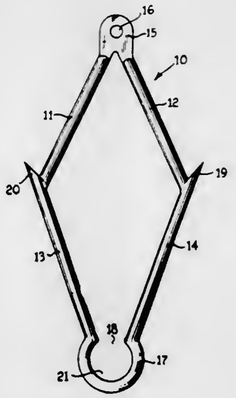
DRESSING HOLDER FOR SMALL GAME

Earl B. Steed, P.O. Box 742, Jacksonville, Ark. 72076

Filed Apr. 18, 1977, Ser. No. 788,181

Int. Cl.² A22B *1/00*

U.S. Cl. 17—44.2 **5 Claims**



1. A holder for facilitating dressing of small game comprising an upstanding diamond-shaped frame adapted for use in a position in which the vertices of the obtuse angles are diametrically opposed and the longitudinal axis of the diamond-shaped frame passes vertically in bisecting relationship with the upper acute angle defined by the upper pair of legs of said frame, a pointed projection extending outwardly and upwardly from

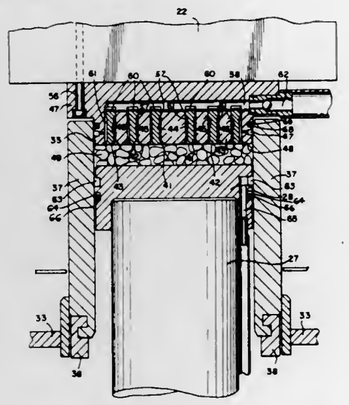
each of the junctions of the upper and lower legs of said frame which define one of said obtuse angles, and a downwardly directed loop portion joined coextensively to transversely spaced lower ends of the downwardly converging lower legs of said frame, the maximum transverse width of the enclosure defined by said loop portion being less than the maximum transverse width of the enclosure defined by said diamond-shaped frame, and the separation of said transversely spaced lower ends being less than the maximum interior transverse width of said arcuate loop portion.

4,094,042

METHOD FOR REMOVING MEAT FROM BONE FRAGMENTS

Roy Settle Rousseau, Bettendorf, IA, assignor to The Kartridg Pak Co., Davenport, Iowa

Division of Ser. No. 505,977, Sep. 3, 1974, Pat. No. 4,025,985.
This application Oct. 15, 1976, Ser. No. 732,766
Int. Cl.² A22C *17/00*
U.S. Cl. 17—46 **5 Claims**



1. A method for removing and recovering meat from a mass of bone fragments comprising the steps of:

compressing said mass in means providing a chamber to form a press cake of substantially reduced volume;

collecting the meat which extrudes from the mass during said compression through an extrusion head having an extrusion block including at least one recess for passing extruded meat from said chamber, and at least one extrusion member interspaced therein; and extendable from and retractable in said recess, said extrusion block and said extrusion member together forming a foraminous surface in said chamber;

extending each said extrusion member from said recess to release residual solid matter retained within the foramina of said foraminous surface; and

removing said press cake from said chamber.

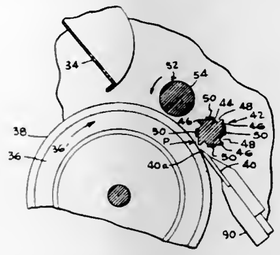
4,094,043

ROLLER GIN WITH GROOVED SQUARE ROTOBAR

Arvel L. Vandergriff, 1701 Heffner St., Corcoran, Calif. 93212

Filed May 9, 1977, Ser. No. 795,182
Int. Cl.² D01B *1/06*
U.S. Cl. 19—53 **21 Claims**

1. A roller cotton gin comprising a ginning roller having a friction surface for conveying lint fibers to a pinch point station and a fixed knife for separating the lint fibers from cotton seed having an upstream facing working edge at the pinch point located substantially tangentially of and in contact with the surface of said ginning roller, a rotary feed blade rotobar member spanning the width of the gin having a center axis and shaped at circumferentially spaced locations to form at least four forwardly facing blade surface formations spanning the gin width having outer edges located to sweep through an arcuate cylindrical path whose diameter is a small fraction of the ginning roller diameter downwardly toward, over and forwardly beyond the edge of the knife and the rotobar member having outwardly facing interconnecting surfaces between the successive blade formation edges shaped to extend from said cylindrical path inwardly to locations nearer to said center axis effectively forming seed-receiving spaces between successive blade surfaces for advancing the seed cotton coactively with the ginning roller surface toward and over the knife edge, means for rotating the ginning roller at a predetermined surface speed, means for feeding seed cotton to the surface of the ginning roller at a location upstream of said knife edge to cause the ginning roller to strip lint from seeds which are restrained by the knife edge and convey the lint to a point of removal, and means for rotating said rotobar member at a speed causing the surface speed of the edges of said blade surfaces to be slightly less than the surface speed of said ginning roller such as to restrain seeds in said seed-receiving spaces during seed advancement over said knife edge from said pinch point toward a release point while the ginning roller strips lint from such restrained seeds and then releasing the seeds from blade restraint at said release point spaced from the pinch point a distance whereby the fiber attached to any incompletely ginned seeds in sufficiently held between the knife and ginning roller to cause return of the incompletely ginned seed to the knife edge before the next blade applies advancing force to the seed, thereby to witdraw substantially all the fibers from the seed so long as sufficient fibers remain attached to the seed to continue drawing the seed back to the pinch point after each release thereof, and a narrow strip-like pad of flexible material fixed on and spanning the axial length of each of said outwardly facing interconnecting surfaces substantially midway between each of the successive blade formation edges to press the seed locks in said seed- receiving spaces between successive blade formation edges against the ginning roller surface immediately upstream of said working edge of said knife and reduce the occurrence of unginned locks.



4,094,044

TENSIONING DEVICE FOR TIGHTENING AND SECURING A HOLDING STRAP

J. O. Coker, 396 Hickory St., Lewisville, Tex. 75067

Filed Aug. 23, 1976, Ser. No. 716,436
Int. Cl.² A44B *21/00*
U.S. Cl. 24—68 CD **1 Claim**

1. A strap tensioning device for tightening and securing a holding strap in a tensioned position comprising:

a bracket means including a pair of spaced apart arm portions,

a pin interconnected between said arm portion adjacent one end thereof,

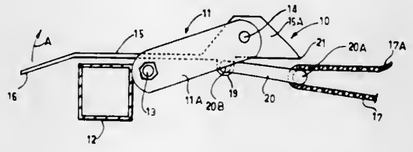
a handle means including a pair of opposed side leg members and a web portion interconnected therebetween,

said web portion having a transverse edge portion at one end and having a reduced extension defined as an extended handle portion disposed opposite to said edge portion,

pivot pin connecting the opposite side leg members of said handle means to the other end of a corresponding bracket arm portion,

a strap ring adapted to receive the free end of a holding strap,

said strap ring having opposed portions defining a ring hinging portion and a strap holding portion, said strap holding portion being disposed contiguous to said transverse edge portion in the tensioned position of said device,



means for pivotally connecting said ring hinging portion to said web portion whereby the pivot means of said strap ring is disposed between the ends of said arm portions in the loosened position of a strap, and

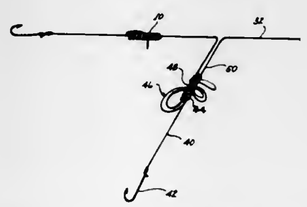
whereby the holding strap is tightened and secured by rotating said handle means approximately 180° so that the pivot means of said strap ring is located beyond the end of said arm portions of said bracket means, and whereby said transverse edge and strap holding portion clamps said strap therebetween upon rotating said handle means toward a tightened position.

4,094,045

COUPLING DEVICE AND METHOD

Curtis A. Stevenson, 3722 E. Pasadena, Phoenix, Ariz. 85018

Filed Apr. 30, 1976, Ser. No. 681,801
Int. Cl.² F16G *11/00*; A01K *91/04*
U.S. Cl. 24—131 C **6 Claims**



1. A coupling device for releasably interconnecting a first length of flexible line having a loop disposed at the connecting end thereof with a second length of flexible line, said coupling device comprising in combination:

a. a continuous uninterrupted coiled spring member for receiving and lockingly gripping segments of the first and second lengths of flexible line intermediate selected ones of the coils of said spring member, said spring member including a central channel extending therethrough;

b. a first coil section for engaging the first and second lengths of flexible line and formed as one part of said continuous uninterrupted spring member, said first coil section defining one part of said central channel, said first coil section including a first terminal coil for penetrably engaging the loop of the first length of flexible line brought through said central channel to said first terminal coil;

c. a second coil section for supporting a folded over section of the second length of flexible line and formed as another part of said continuous uninterrupted spring member, said second coil section defining another part of said central channel, said second coil section including a second terminal coil for supporting the folded over section of the second length of flexible line brought through said central channel in a direction opposite that of the first length of flexible line;

d. a gap disposed intermediate two adjacent coils of said continuous uninterrupted spring member for segregating said first coil section from said second coil section, said gap providing access to penetration intermediate two coils of said first section by the folded over segment of the second length of flexible line extending from said second terminal coil and along the outer periphery of said second coil section;

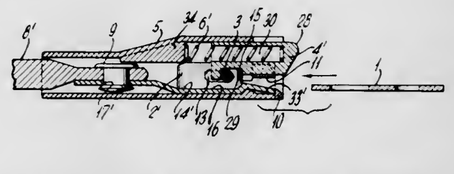
whereby, opposed pulling forces exerted upon the first and second lengths of flexible line compress the coils of said first coil section to grip the loop of the first length of flexible line penetrably engaged by said first terminal coil and the folded over segment of the second length of flexible line disposed intermediate two coils of said first coil section.

4,094,046

SEAT BELT BUCKLE

Juichiro Takada, Tokyo, Japan, assignor to Takata Kojyo Co., Ltd., Tokyo, Japan

Filed Aug. 16, 1976, Ser. No. 714,543
Claims priority, application Japan, Aug. 19, 1975, 50-113475
Int. Cl.² A44B *11/25*
U.S. Cl. 24—230 AK **2 Claims**



1. A seat belt buckle in which a tongue piece (1) is engaged or disengaged with the buckle characterized in that a frame (2) consisting of a base plate (14) and opposed side plate (12) that are directed upwardly from both sides of said base plate (14) has an engaging protrusion (15) and a base surface (16) that will accept said tongue piece (1); slots 13 that are nearly parallel with said base surface (16) are provided in both side plates (12) at near a tip position of said tongue piece (1) that is inserted beyond said engaging protrusion (15), and an elevation preventing pin (3) which prevents the elevating motion of the tongue piece (1) slideably engages and extends between said slots (13), an operation slide member (4') having a recess (29) of a length greater than the width of and engaging said elevation preventing pin, a transversely extending guide plate (11) which is fastened between the two side plates (12) of the frame (2); above the protrusion (15) restricting said slide member to a longitudinal movement; a buckle cover (5) having an exposure hole to expose said operation slide member is mounted on said frame 2, and a spring (6) is provided between said buckle cover (5) and said operation slide member in a manner that said elevation preventing pin (3) is resiliently biased to a forward position; and said operation member is operated to move the elevation preventing pin (3) in the backward direction in order that the tongue piece (1) is disenaged.

4,094,047

SNAP SHACKLE

Gunilla A. Carlsson, Skidbacken 38, S-172 45, Sundbyberg, Sweden

Filed Feb. 11, 1976, Ser. No. 657,314
Claims priority, application Sweden, Feb. 18, 1975, 7501798
Int. Cl.² A44B *13/00*; B64D *17/38*
U.S. Cl. 24—241 R **6 Claims**

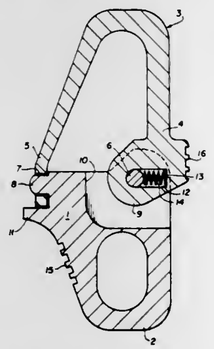
1. Snap shackle comprising:

a stationary fastener body (1) provided with attachment means (2) and locking means (8), and having a slot (10) therein;

a generally U-shaped closure link (3) rotatably mounted to said fastener body (1) via a shaft (6) and rotatable through an angle of about 90 degrees relative to said fastener body (1), said fastener body (1) and said closure link (3) together defining an openable loop which is restricted by at least part of said fastener body (1) and by at least part of said closure link (3), said openable loop being separated from said attachment means (2);

said generally U-shaped closure link (3) having first and second longitudinally extending shanks (4,5) which are adapted to be bridged by at least part of said fastener body (1), said first shank (4) being at one end rotatably and linearly laterally displaceably mounted in said fastener body (1) via said shaft (6), said one end of said first shank being further provided with bearing means (9) which is guided in said slot (10) to permit rotational movement of said first shank through an angle of about 90 degrees as well as linear and lateral displacement of said first shank relative to said fastener body (1), and said second shank (5) at one end being provided with locking means (7) for selective engagement with said locking means (8) of said fastener body (1), said locking means being disengagable by a lateral movement of said link relative to said fastener body;

said shaft (6) being fixedly connected to one of said fastener body and closure link (3), an elongated laterally disposed groove (12) being provided in the other of said fastener



body (1) and closure link (3), said shaft (6) passing through said groove (12), and wherein a spring (14) is arranged in said groove (12) between said shaft (6) and one end of said groove (12) to bias said shaft (6) toward the other end of said groove (12) and to permit said linear lateral displacement of said closure link (3) relative to said fastener body (1);

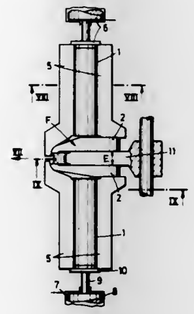
said first shank (4) at its said one end being further provided with a manually engagable first pressure surface (16) extending outwardly of said fastener body (1) in the lateral direction of said U-shaped closure link (3), said fastener body (1) having a manually engagable second pressure surface (15) on the opposite side of said shaft (6) and spaced laterally and longitudinally away from said shaft (6) in the direction away from the closure link (3), said first pressure surface (16) facing away from said second pressure surface (15) and said pressure surfaces being oriented for application of a compressive force therebetween to simultaneously laterally displace and rotate said closure link (3) in the opening direction relative to said fastener body (1), whereby upon manual application of a compressive force substantially perpendicular to said pressure surfaces said first pressure surface (16) is displaceable towards said fastener body (1) to displace said one end of said second shank (5) away from said fastener body (1) to bring said locking means (7) of said second shank (5) and said locking means (8) of said fastener body (1) out of engagement with one another, thereby permitting said closure link (3) to rotate at least partially under the influence of said compressive force through an angle of about 90 degrees relative to said fastener body (1) to an open position to open said openable loop.

4,094,048

METHOD OF HEAT FORMING OF WORKPIECES

Gerhard Broder, Dusseldorf, Germany, assignor to Franz Berrenberg, Haan, Germany

Filed Nov. 17, 1976, Ser. No. 742,646
Claims priority, application Germany, Sep. 25, 1976, 2643340
Int. Cl.² B21K *1/08*
U.S. Cl. 29—6 **3 Claims**



1. A method for heat shaping of workpieces with at least two secondary form elements lying nonsymmetrically to the axis of the main form elements and spaced slightly from one another, particularly crankshafts, comprising the steps of

heating rod shaped starting material in the range of secondary elements to be formed thereon,

axially compressing the heated rod shaped starting material and producing one enlarged material concentration in common for all secondary form elements which subsequently are to be produced,

drop-forging the material concentration and producing the two secondary form elements axially spaced from one another by an enlarged spacing relative to a final form and final spacing to be produced, forming an intermediate shape having the secondary form elements connected by an integrally adjoining necked down form part,

trimming the intermediate shape,

axially compressing the adjoining necked down form part lying between the secondary form elements into a final enlarged cylindrical shape with simultaneous calibration of the final spacing between the secondary form parts, thereby producing the final form and final spacing,

performing the compressing of the adjoining necked down form part lying between the secondary form elements as well as the simultaneous calibration of the final spacing between the secondary form parts by inserting a floating gauging saddle therebetween and axially compressing the main form elements.

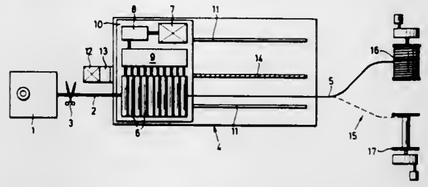
4,094,049

CASTING ROLLING MILL FOR WIRE

Ali Bindernagel, Wermelskirchen, Germany, assignor to Friedrich Kocks GmbH, Dusseldorf, Germany

Filed Aug. 20, 1976, Ser. No. 716,189
Claims priority, application Germany, Sep. 6, 1975, 2539697
Int. Cl.² B21B *15/00*; B23P *19/02*; B22D *11/124*
U.S. Cl. 29—33 C **5 Claims**

1. A continuous casting and rolling plant for wire, particularly non-ferrous wire, comprising a continuous casting unit continuously casting a strand of metal to be formed, replaceable coiling means spaced from the casting unit, a rolling means intermediate the casting unit and coiling means having a roll pass line receiving said strand for conversion to wire, said rolling unit being movable selectively from a position adjacent said casting unit to a position adjacent said coiling unit and back to the position adjacent the casting unit, means adjacent the casting unit for selectively severing the strand, means acting on the rolling unit each time the strand is cut moving said rolling unit toward the coiling means at substantially the



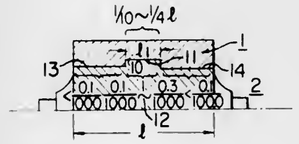
rate of advance of the cast strand with the rolling unit operating at normal operating speed, means for replacing the coiling means each time a coil is completed, means for attaching a wire end from the rolling unit to the coil means and means for reversing the rolling unit to move it back to a position adjacent the casting unit with the strand continuing to pass through the roll pass line for conversion to wire.

4,094,050

BACKUP ROLL OF THE BUILT-UP TYPE

Hiroshi Goto, Muroran, Japan, assignor to The Japan Steel Works, Ltd., Tokyo, Japan

Filed Feb. 14, 1977, Ser. No. 768,616
Int. Cl.² B21B *31/08*
U.S. Cl. 29—129.5 **6 Claims**



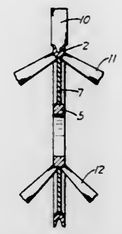
1. In a backup roll of the built-up type comprising an arbour and a sleeve which is shrinkage-fitted on said arbour, the combination of an inward stepped shrinkage-fitting portion and outward shrinkage-fitting portions provided on the shrinkage-fitting surface formed between the outer surface of said arbour and the inner surface of said sleeve, said inward stepped shrinkage-fitting portion being formed on substantially a mid portion of said shrinkage-fitting surface by an annular protrusion around said arbour having a limited length of substantially one tenth to one fourth of the axial length of said shrinkage-fitting surface and an annular dent around said sleeve of a size corresponding to said protrusion, said outward shrinkage-fitting portions being formed on said shrinkage-fitting surface at both sides of said inward stepped shrinkage-fitting portion so as to extend to the outer ends of said shrinkage-fitting surface, the shrinkage ratio of said inward stepped shrinkage-fitting portion being a value which can afford a torque transmission between said arbour and said sleeve and the shrinkage ratio of said outward shrinkage-fitting portions being less than that of said inward shrinkage-fitting portion.

4,094,051

METHOD OF MAKING SHEAVES

Homer J. Woolslayer; Cecil Jenkins, and Robert D. Woods, all of Tulsa, Okla., assignors to Lee C. Moore Corporation, Tulsa, Okla.

Filed May 16, 1977, Ser. No. 797,333
Int. Cl.² B21K *1/42*
U.S. Cl. 29—159 R **3 Claims**



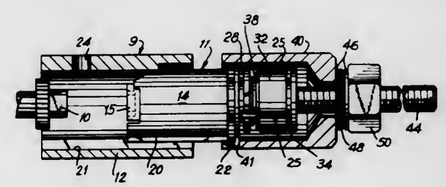
1. A method of making a set of wire line sheaves to be mounted side by side on a common axis, comprising selecting a plate of substantially the same thickness as the maximum width of the desired sheave rims, cutting from the plate a series of adjoining concentric rings all having substantially the same radial thickness, cutting from plate material circular hubs all of the same size for the sheaves, cutting from plate material annular web plates each having a central opening for receiving one of said hubs, the outer diameters of said web plates being different from one another with each adapted to fit in a different one of said rings, assembling each ring with a web plate and hub and welding them together to form a sheave, and forming a circumferential groove in the periphery of each ring to form a grooved rim for receiving a wire line.

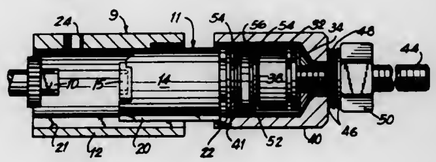
4,094,052

LOCK REMOVAL TOOL

George V. Iaccino, New Rochelle, N.Y., assignor to Lock Technology, Inc., New Rochelle, N.Y.

Filed May 25, 1977, Ser. No. 800,319
Int. Cl.² B23P *19/04*
U.S. Cl. 29—263 **9 Claims**





6. A tool for removing a lock cylinder from a lock housing, the cylinder being of the type having a shell with a plug rotatably mounted therein, said plug having a circular flange projecting out from the forward end of the shell, said tool comprising:

a cylindrical inner member having forward and rearward longitudinal portions, said forward portion having an overall diameter less than that of said rearward portion,

said forward and rearward portions having first and second circumferential grooves cut thereon, respectively, the overall diameter of said flange being substantially equal to one of the overall diameters of said forward and rearward portions;

a hollow outer shell having an axial bore extending from one end thereof, said outer shell having a wall at its other end provided with an opening therein, the diameter of the bore being a predetermined amount greater than the overall diameter of said rearward portion;

coupling means for joining said inner member to said flange, said coupling means being formed with means at its ends for engaging one of the first and second circumferential grooves on said cylindrical inner member and the underside of said flange, respectively; and

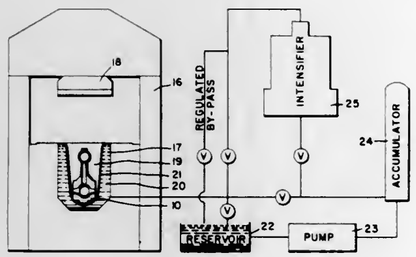
means for drawing said cylindrical inner member into the bore of said outer shell toward the other end of said outer shell, said drawing means extending out through said opening in the other end of said outer shell in operative engagement therewith and being connected to the end of the rearward portion of said inner member, whereby when said coupling means engages a selected one of the first and second grooves and the underside of said flange, and said drawing means is operated, said inner member transmits an outwardly directed force onto the lock cylinder through said coupling means and said flange to withdraw the cylinder from the housing when said outer shell is maintained stationary with respect to the housing.

4,094,053

FORGING PROCESS

Elbert K. Weaver, Westboro, Mass., assignor to Wyman-Gordon Company, Worcester, Mass.

Filed May 21, 1976, Ser. No. 688,620
Int. Cl.² B22F *3/24, 1/00*
U.S. Cl. 29—420 **3 Claims**



3. A process for forming a workpiece of a predetermined shape from powdered metal, comprising the steps of:

(a) forming a semi-rigid liner of heat-decomposible material having generally the said shape, the liner being formed of a foamed polymer,

(b) adding a quantity of said powdered metal into the liner,

(c) providing the liner with a liquid-impervious sealing element which completely envelops it,

(d) isostatically compacting the sealing element, the liner and the contents,

(e) heating the liner and contents to cause decomposition of the liner and sintering the contents, and

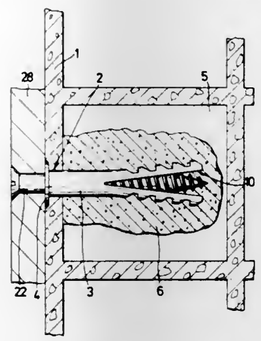
(f) forging the contents, wherein the sealing element is a thin elastomer bag in which the liner is enclosed, which bag is removed before the liner and contents are heated.

4,094,054

METHOD OF SECURING AN OBJECT TO A LOW-STRENGTH SUPPORT STRUCTURE

Artur Fischer, Weinhalde 34, Tumlingen, Germany

Continuation-in-part of Ser. No. 616,072, Sep. 23, 1975, abandoned. This application Oct. 1, 1975, Ser. No. 617,832
Claims priority, application Germany, Oct. 3, 1974, 2447189
Int. Cl.² B23P *3/00, 19/04*
U.S. Cl. 29—460 **6 Claims**



1. A method of installing an expansion anchor member in a low-strength support structure having internal cavities bounded by walls, comprising the steps of providing an anchoring hole in the support structure; inserting a leading end portion of an expansion anchor member having an internal passage and leg portions into the hole so that a leading end region of the passage communicates with an internal cavity of the structure; providing an injection device with a source of quick-setting substance; inserting the injection device into a trailing end region of the passage; only partially filling the internal cavity with the quick-setting substance by actuating the injection device and injecting the quick-setting substance through the passage to the circumambient region of the leading end portion of the expansion anchor member at a rate such that hardening of the quick-setting substance begins upon the emergence of the substance into the internal cavity and is completed upon the partial filling of the same, so that the quick-setting substance forms about the leading end portion of the expansion anchor member a plug which prevents withdrawal of the expansion anchor member from the anchoring hole and relative to the internal cavity, said plug surrounding the leading end portion of the anchor member but being spaced from the walls of a respective cavity; removing the injection device from the passage of the anchor member; and screwing a mounting screw into the passage of the anchor member only after the injected quick-setting substance is hardened, so that the leg portions move apart from one another by a limited distance and the screw becomes secured in the anchor member.

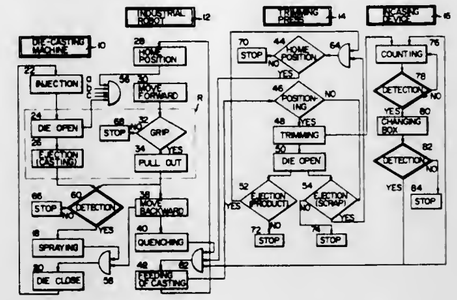
4,094,055

AUTOMATIC WORKING METHOD OF CASTINGS

Toshiki Morimoto, Kawasaki, Japan, assignor to Mitsui Mining and Smelting Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1977, Ser. No. 782,367
Int. Cl.² B22D *17/32*
U.S. Cl. 29—527.6 **15 Claims**

1. An automatic working method of castings which comprises the operation of a casting machine including the steps of spraying a release agent, injecting raw material into a casting die, opening the casting die, and ejecting a casting from the casting die; the operation of an industrial robot having an arm restoring said robot to its original position, advancing the robot arm, gripping the casting by the robot arm, pulling out the casting from the casting die by the robot arm, retracting the robot arm, quenching the casting, and transferring the quenched casting to the succeeding trimming press; the operation of the trimming press including restoring the press to its original position, setting the casting in a prescribed position relative to the trimming press, separating the upper and lower press die members, removing the trimmed casting from the trimming press and discharging scrap from the trimming press; detecting whether the casting is properly set in the trimming



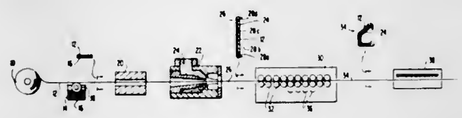
press for trimming; removing the casting from the trimming press without trimming, in case the casting fails to be properly set; detecting whether the casting machine, industrial robot and trimming press are carrying out the prescribed steps under a normal condition; and immediately stopping the machine which has been found by the detecting step to present a failure to perform any of the prescribed steps included in the operation of said machine.

4,094,056

DECORATIVE TRIM STRIP

Shinji Takeda; Shoji Kobayashi, and Yutaka Watanabe, all of Kariya, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 2, 1977, Ser. No. 773,757
Claims priority, application Japan, Aug. 20, 1976, 51-99481
Int. Cl.² B21D *5/06;* B29F *3/00*
U.S. Cl. 29—527.2 **7 Claims**



1. A process for forming a decorative strip comprised of an elongated metal strip and a thermoplastic portion affixed thereto, comprising the steps of:

(a) supplying and transporting a continuous length of said metal strip;

(b) extruding thermoplastic material onto said strip while transporting said strip, said strip being at least partially surrounded by said material;

(c) forming said material around said strip to a first predetermined cross sectional shape, said shape including at least one longitudinal groove in said material; and

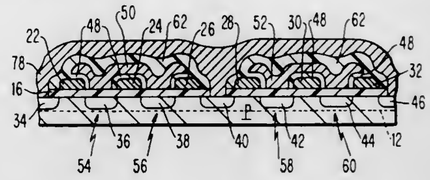
(d) sequentially shaping said strip and said material surrounding said strip by bending said strip and said material to a second predetermined cross sectional shape, said strip being bent longitudinally at a location adjacent the root of said groove, thereby closing said groove, said shaping step including heating of said thermoplastic material to induce fusion of said material where said material on one side of said groove is in contact with material on the other side of said groove.

4,094,057

FIELD EFFECT TRANSISTOR LOST FILM FABRICATION PROCESS

Arup Bhattacharyya, and Ronald Silverman, both of Essex Junction, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,907
Int. Cl.² H01L *21/26*
U.S. Cl. 29—571 **12 Claims**



1. A method for forming an electrical circuit in an isolated pocket of semiconductor material including a transistor having a control electrode and at least one current carrying electrode comprising the steps of:

forming a thin insulator at the surface of said semiconductor material,

depositing a masking material on said insulator,

selectively etching said deposited mask material to define a plurality of openings in said mask,

depositing an anodizable conductive material in the openings defined in said mask material,

anodizing the surface of said anodizable material,

selectively removing the remainder of said mask material,

forming source and drain regions in said semiconductor material, and

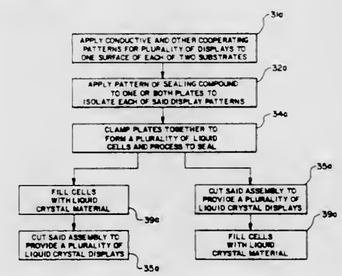
depositing conductive material to form an electrical connection to one of said source and drain regions.

4,094,058

METHOD OF MANUFACTURE OF LIQUID CRYSTAL DISPLAYS

Akira Yasutake, and Shigemitsu Kiso, both of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jul. 23, 1976, Ser. No. 708,027
Int. Cl.² G02F *1/13*
U.S. Cl. 29—592 R **9 Claims**



1. The method of forming a plurality of individual crystal displays which comprises the steps of applying a conductive pattern to one surface each of a pair of substrates, said pattern cooperating when the substrates are face to face to form said plurality of displays, providing sealing means on at least one of said surfaces prior to bringing said surfaces together and in a pattern isolating each of said plurality of displays to form a plurality of display cells, filling said cells with liquid crystal material, sealing said cells by bringing said substrates together and cutting said substrates to form said displays.

4,094,059

METHOD FOR PRODUCING COMPOSITE SUPERCONDUCTORS

Kyoji Tachikawa, Tokyo, and Kikuo Itoh, Yokohama, both of Japan, assignors to National Research Institute for Metals, Japan

Filed Sep. 15, 1975, Ser. No. 613,274
Claims priority, application Japan, Sep. 18, 1974, 49-106631
Int. Cl.² H01B *12/00*; H01V *11/00*
U.S. Cl. 29—599 **17 Claims**

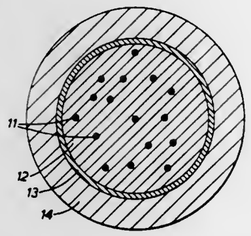
1. In a method for producing V_3Ga superconductors which comprises forming a composite of a core portion and a sheath portion surrounding said core portion, said sheath portion being composed of a gallium-containing alloy selected from the group consisting of copper-gallium, silver-gallium and copper-silver gallium alloys, and said core portion being composed of a vanadium metal selected from the group consisting of vanadium and vanadium alloys containing from 0.1 to 10 atomic percent of titanium, zirconium or hafnium; elongating said composite; and heat-treating the resulting elongated composite to form a V_3Ga layer between said sheath and core portions; the improvement comprising including a continuous portion of aluminum or an aluminum alloy in said composite prior to elongating the same, wherein said continuous portion of aluminum or aluminum alloy is provided between said sheath and core portions and completely surrounds and is in contact with said core portion at the beginning of said heat-treating, and wherein said aluminum or aluminum alloy diffuses into said sheath portion by said heat treatment and promotes the formation of V_3Ga.

4,094,060

SUPERCONDUCTING MEMBERS AND METHODS OF MANUFACTURE THEREOF

Peter Emil Madsen, Didcot; John Philip Charlesworth, Witney, and Derek Armstrong, Wallingford, all of England, assignors to United Kingdom Atomic Energy Authority, England

Continuation of Ser. No. 383,476, Jul. 30, 1973, abandoned. This application Jun. 9, 1975, Ser. No. 584,905
Claims priority, application United Kingdom, Aug. 4, 1972, 36637/72
Int. Cl.² H01V *11/14, 11/00*
U.S. Cl. 29—599 **5 Claims**



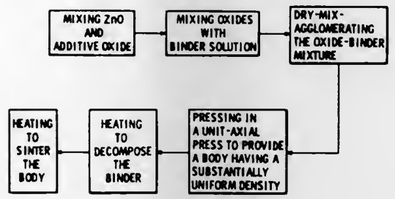
1. A method of manufacturing a superconducting member, which method comprises the steps of forming an alloy consisting essentially of a carrier material and at least one element from the group consisting of aluminium, gallium, indium, silicon, germanium, gold, platinum, antimony, rhodium, zirconium, palladium, osmium, ruthenium, cobalt, thallium, lead, arsenic, bismuth, iridium and tin; contacting the alloy with a base material consisting essentially of niobium or vanadium; consolidating into a unitary structure components comprising the alloy and the base material together with a metal, which is eventually to provide stabilisation, a barrier material consisting essentially of tantalum or molybdenum being present and positioned to protect the said metal from diffusion thereinto of any of the other components; mechanically working the said unitary structure to form a wire therefrom, and heat treating the said wire to cause a solid state reaction between the base material and the element or elements from the said group to form a superconducting compound therewith, the carrier material being so selected as to be substantially non-reactive with the base material under the heat treatment and the barrier material being so selected and positioned as to prevent permeation therethrough of the element from the said group and to be insoluble in and substantially non-reactive with the said metal, and the heat treatment temperature being controlled for avoiding melting of the alloy in contact with the base material at any stage during reaction.

4,094,061

METHOD OF PRODUCING HOMOGENEOUS SINTERED ZNO NON-LINEAR RESISTORS

Tapan K. Gupta, Monroeville, and William D. Straub, Penn Hills Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 12, 1975, Ser. No. 631,297
Int. Cl.² H01C *7/02*
U.S. Cl. 29—612 **9 Claims**



1. A method of making a homogeneous, sintered, resistor body, having a substantially uniform density, which can exhibit nonlinear V-I characteristics, comprising the steps of:

(A) mixing:

(1) a solid particle composition admixture of 75 mole % to 98 mole % of small, finely divided ZnO and 2 mole % to 25 mole % of a small, finely divided additive compound effective to produce non-linearity characteristics within the body, with

(2) an aqueous binder solution comprising an organic, water soluble binder that will decompose at temperatures of between about 150° to about 600° C leaving no carbon residue, wherein the weight ratio of solid particles:binder is between about 100:1 to about 100:10, to provide a mixed particle-binder slurry, and then

(B) simultaneously drying, mixing and agglomerating the slurry to form a mass of larger spherical particles, the agglomerated particles having an average particle size of between about 0.5 micron to about 500 microns diameter, and at least 50 wt.% of the agglomerated particles have an average particle size between 25 microns to about 500 microns, said particles containing binder, ZnO and additive compound distributed therethrough, and then

(C) pressing a mass of the agglomerated particles in a uniaxial press, at between about 36 kg./sq. cm. to about 1,500 kg./sq. cm., to provide a body having a substantially uniform density, and then

(D) heating the pressed body:

(1) first at a temperature of between 25° and about 600° C, at a temperature rate increase of between 10° C/hr. to about 45° C/hr., effective to slowly decompose and remove the binder, and then

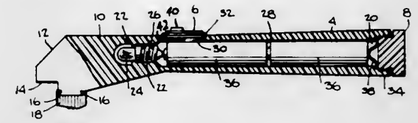
(2) between about 625° to about 1,400° C, at a temperature rate increase of between about 75° C/hr. to about 150° C/hr., for a time effective to sinter together the particles of the pressed body, thereby forming a homogeneous sintered body having a substantially uniform density, exhibiting non-linear V-I characteristics.

4,094,062

ILLUMINATED RAZOR

Sotirios Papanikolaou, 407 Church St., Hasbrook Heights, N.J. 07604

Filed Mar. 4, 1976, Ser. No. 663,980
Int. Cl.² B26B *19/46*
U.S. Cl. 30—34 R **5 Claims**



1. A razor having a head and a handle on the head comprising:

(a) means for mounting a razor blade on the front of the head;

(b) a razor blade mounted on the front of the head facing outwardly from the head and the handle;

(c) an electrical circuit entirely within the handle of the razor;

(d) a power source in the electrical circuit;

(e) a light bulb in the circuit;

(f) a razor head formed of transparent material having a rear surface arranged at an angle between 30° and 60° to the axis of the razor handle for directing the light from the bulb to the area above the razor blade in the direction which the razor blade faces;

(g) a coating of an opaque reflective substance on the rear surface of the razor head;

(h) a switch in the circuit; and

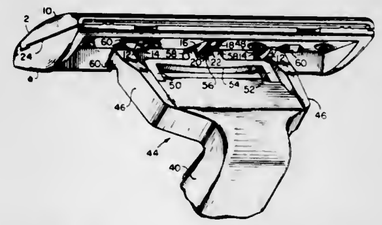
(i) means for sealing the electrical circuit from water.

4,094,063

RAZOR ASSEMBLY WITH PIVOTALLY MOUNTED CARTRIDGE

Robert Anthony Trotta, Winthrop, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Dec. 15, 1976, Ser. No. 750,958
Int. Cl.² B26B *21/06, 21/22*
U.S. Cl. 30—47 **2 Claims**



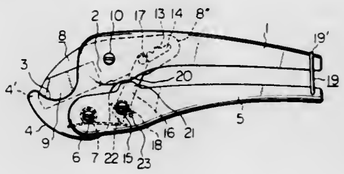
1. Razor assembly comprising a shaving unit and a handle, said shaving unit having platform means, blade means, first pivotal mounting means for pivotally connecting said shaving unit to said handle, and cam means for receivng a biasing force from said handle, said handle including a head portion having arm means with second pivotal mounting means complemental to said first pivotal mounting means and a resilient member anchored at either end thereof to said head portion, said resilient member comprising first and second legs upstanding from said head portion and a bridge portion extending between the first and second legs and otherwise removed from said head portion, said resilient member bridge portion being in engagement with said shaving unit cam means for exerting said biasing force thereon, said handle comprising a single molded plastic unit.

4,094,064

SHEARING TOOL FOR SYNTHETIC RESIN TUBES

Hideichi Nishikawa, and Masaharu Sakamoto, both of Tsu, Japan, assignors to Matsuzaka Iron Works, Inc., Tsu, Japan

Filed Apr. 14, 1977, Ser. No. 787,577
Claims priority, application Japan, Apr. 16, 1976, 51-48576[U]; Dec. 9, 1976, 51-164945[U]
Int. Cl.² B26B *13/00*
U.S. Cl. 30—92 **2 Claims**



1. In a shearing tool for synthetic resin tubes comprising:

an upper handle portion;

a lower jaw connected to the leading end of said upper handle portion by means of an intermediate neck portion integral with the upper handle portion, said upper handle portion being formed with an opening extending from the forward portion of said handle portion to the leading end of the lower jaw;

a lower handle portion pivoted at the leading end to said lower jaw;

a shearing blade pivoted to said upper handle portion withing said opening, said shearing blade being formed at the rear portion positioned between said upper and lower handle portions with a guide slot, said guide slot including a series of notches along one side edge of the slot and a planer side edge along the opposite or other side edge of the slot;

a rocking bar pivoted at one end to the lower handle portion and including at the other end of the rocking bar a pin freely received in said guide slot for selectively engaging said series of notches formed on the slot, said rocking bar being adapted to urge said shearing blade toward said lower jaw when said upper and lower handle portions are pivoted toward each other by a gripping force applied to the handle portions;

a spring for urging said pin to engage in said series of notches;

a return spring for urging said lower handle portion away from said upper handle portion to the initial position when said gripping force is released from the upper and lower handle portions;

a friction washer provided about said pivot connection of said shearing blade to said upper handle portion within said opening for applying friction force to the side of the blade so as to hold the blade in position; and

a pin provided on said lower handle portion for engaging said rocking bar so as to stop the bar against rocking; characterized in that said pivoting of said shearing blade to said upper handle portion is in an intermediate position of the length of said blade, said planar side edge of the guide slot formed in the blade being disposed in an inclination with respect to the cutting edge of said shearing blade in the counterclockwise direction, said upper and lower handle portions being fabricated from light metal having a U-shaped cross-section, both of said rear portions of said shearing blade and said rocking bar being disposed between two walls of U-shaped cross-section of said handle portions, said lower jaw being formed with an arcuate tube receiving recess on the upper surface of the jaw, and

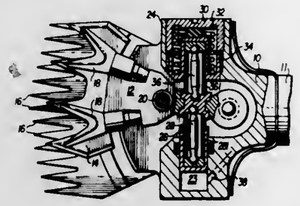
thereby the user being able to shear said tubes by applying gripping force with one hand to the handle portions.

4,094,065

ANIMAL SHEARING DEVICE

William R. C. Geary, 4/18 Kensington Rd., South Yarra, Victoria, Australia (3141)

Filed Dec. 7, 1976, Ser. No. 748,203
Int. Cl.[2] B26B *19/24, 19/34*
U.S. Cl. 30—210 **8 Claims**



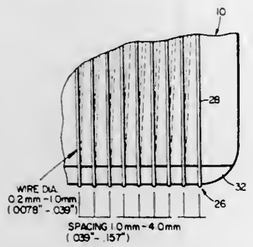
1. A shearing device comprising a body provided with a pivoted arm for oscillating a cutter across the face of a comb fixed to the body, a hydraulic cylinder arranged laterally on the body at one side of the pivoted arm and forwardly of the pivotal axis thereof, a plunger in the cylinder, a connecting rod extending between the plunger and the arm so as to transmit inward movements of the plunger to the arm and thereby displace the latter towards the opposite side of the body, means for attaching a hydraulic supply tube to the body thereby to connect the interior of the cylinder to hydraulic pulse generating apparatus, a second cylinder on the body at the opposite side of the pivoted arm and in coaxial alignment with the firstmentioned cylinder, a plunger in said second cylinder, and a second connecting rod extending between the lastmentioned plunger and the arm thereby to displace the latter towards the firstmentioned side of the body when the secondmentioned plunger is moved inwardly; each connecting rod having a semi-spherical head at each thereof which is seated in a correspondingly shaped socket on the respective plunger or pivoted arm, and the connecting rods are maintained in engagement with the coacting socket by the inward pressures constantly exerted on the opposed plungers.

4,094,066

SURGICAL RAZOR BLADE WITH INTEGRAL GUARD

Donald S. Daniel, Jr., 102 Windsor Way, Richmond, Va. 23221

Filed Mar. 8, 1977, Ser. No. 775,475
Int. Cl.[2] B26B *21/54*
U.S. Cl. 30—346.58 **1 Claim**



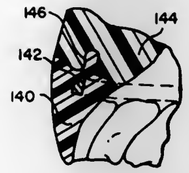
1. A surgical razor blade with an integral guard for its cutting edge in the form of a plurality of spiral windings of thread being of flexible material capable of being pressed against the blade cutting edge under pressure in shaving contact with the normally unshaven areas of the skin without severance of the thread, said thread having a diameter within the range of 0.2 mm to 1.0 mm, said windings extending around the cutting edge of the blade in a uniformly spaced manner and the spacing between adjacent windings being selected from the group consisting of 1.0 to 2.0 mm; 2.0 to 3.0 mm and 3.0 to 4.0 mm, and wherein said blade is sterile and is packaged in such condition for one time use only.

4,094,067

METHOD FOR PRODUCING ARTIFICIAL DENTURE

Mitchell M. Hazar, 3120 N. Rose Cir., Phoenix, Ariz. 85018

Filed Jul. 15, 1976, Ser. No. 705,570
Int. Cl.[2] A61C *13/00*
U.S. Cl. 32—2 **2 Claims**



1. A method for producing a denture comprising: forming a generally U-shaped assembly of prosthetic teeth, bonding said U-shaped assembly of teeth into a generally U-shaped hard base structure; providing a terminus of said hard base structure disposed a short distance rearwardly of the incisor areas of said assembly of prosthetic teeth; mechanically and removeably connecting a soft deflectable formable layer onto said hard U-shaped base by means of resilient plugs projecting from said soft deflectable formable layer and removably received in sockets in said hard U-shaped base; inserting said hard U-shaped base and deflectably formable layer into a patient's mouth and finger forming said deflectable formable layer into close proximity to the edentulous areas of the patient's mouth; then removing said base and deflectably formed layer and placing a hardenable orally curable material in impressionable form on the soft deflectably formed layer; then unitarily reinserting the base and layer and curable material into the human individual's mouth and impression forming the curable impressionable material into impression conformance with said edentulous gum area of the patient's mouth and allowing the curable impressionable material to cure over the deflectably formable layer and bond thereto, to form a liner which conforms intimately to the features of the edentulous gum areas of the mouth, thereby forming a fitted denture module; then making a first impression model of one side of said fitted denture module; then making a second impression model of the opposite side of said fitted denture module; then removing the impressionable material and soft deflectably formed layer from the hard U-shaped base assembly of prosthetic teeth, then casting uncured denture base resin in a formable form between said second impression model and with said first impression model with the U-shaped hard base structure imbedded therein; and allowing said uncured denture base resin to cure in bonded relationship to said hard base structure to form said denture.

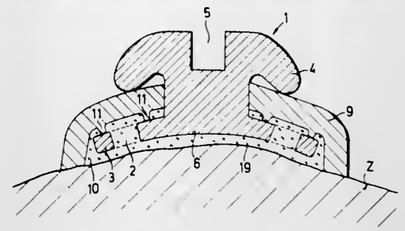
4,094,068

ORTHODONTIC BRACKET ASSEMBLY

Karl Schinhammer, Iserlohn-Letmathe, Germany, assignor to Scheu-Dental Inh. Rudolf Scheu Herstellung & Vertrieb Von Dentalbedarf, Letmathe, Germany

Filed Jul. 16, 1976, Ser. No. 705,898
Claims priority, application Germany, Aug. 1, 1975, 2534368
Int. Cl.[2] A61C *7/00*
U.S. Cl. 32—14 A **11 Claims**

1. An orthodontic assembly including an orthodontic bracket which is particularly adapted for use by being first mounted with a transfer matrix upon a positive model of a tooth which is to have said bracket ultimately applied thereto after removal of said bracket from said positive model, said assembly comprising a bracket base defining on said orthodontic bracket a surface for fastening said bracket upon a tooth, bracket wings extending laterally from said base of said bracket and defining therebetween a slot adapted to receive therein a regulating arch, a self-adhesive strip removably adhered on one side thereof to said fastening surface of said bracket base and adapted to have its opposite side removably adhered to a model tooth, and a protective foil extending between said



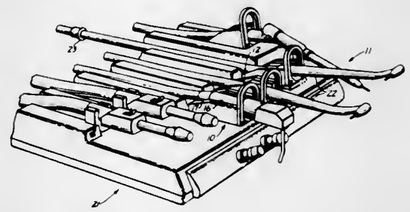
bracket wings and said bracket base and also extending to said adhesive strip in surrounding relationship with said bracket base, said protective foil being arranged to prevent penetration of the material forming said transfer matrix to the space between said bracket base and said bracket wings when said bracket is being mounted upon said positive tooth model with said transfer matrix.

4,094,069

DENTAL INSTRUMENT RETRACTION DEVICE

Raymond Cope, 3541 Springvally Rd., Birmingham, Ala. 35223

Filed Feb. 10, 1977, Ser. No. 767,498
Int. Cl.[2] A61C *1/14*
U.S. Cl. 32—22 **3 Claims**



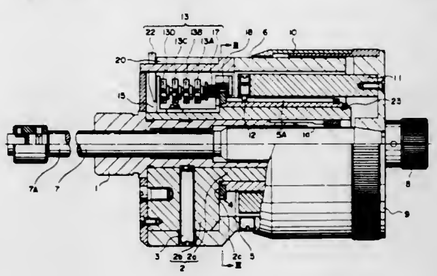
1. A dental instrument retraction device comprising in combination: an elongated tubular recess structure forming a seat for alternately holding a body of an instrument and a tube anchored to a rearward portion of an instrument and the recess structure including bottom wall structure and side wall structures extending upwardly therefrom, and there being formed forward and rearward ports adjacent the seat and an open structure-free space above each of the seat and the forward and rearward ports, and there being formed an inwardly-directed retaining abutment substantially at said rearward port positioned and of a size such that a structure of a predetermined size larger than a cross-section of said tube anchored to a rearward portion of an instrument is prevented from further rearward retraction thereby providing for limiting rearward retraction of the anchored tube, and there being formed an inwardly-directed overhang from at least one of said side wall structures substantially above said seat and said forward and rearward ports, the inwardly-directed overhang being of a predetermined dimension sufficiently great to prevent dropping into said seat a structure of said predetermined size larger than said cross-section of said tube anchored to said rearward portion of said instrument and said overhang being limited to a maximum dimension such that the tube having said cross-section is enabled to drop into each of said seat and said forward and rearward ports, and said forward port being of a predetermined width at least as large as a width of said structure having said predetermined size such that the object is retractable rearwardly into the forward port beneath said overhang into said seat and held retainably against said retaining abutment; and a through-passage structure having at least one side support wall and an arch barrier-structure extending laterally from the side support wall, the barrier-structure extending above a through-space aligned with and in juxtaposition to said forward port, the barrier-structure being at a height above said overhang sufficient for travel of said tube of said cross-section substantially along an upper face of said overhang, and said through-space of said barrier-structure being of a width at least as large as said predetermined size, and the through-passage structure being mounted in fixed relationship relative to said recess structure; and said tube adapted to have a dental instrument operatively attached to a forward end thereof, the tube being of a tube cross-section sufficient for travel to and fro through each of said forward and rearward ports and downwardly past the overhang into said seat; and retainer structure mounted on said tube and being adapted for positioning at different alternate positions axially along said tube; the retainer structure having a width cross-section of said predetermined size larger than the cross-section of the tube such that when the tube is advanced axially forwardly the retainer structure rides on top of said overhang to a location forward thereof, and when thereafter the tube is retracted axially rearwardly the retainer structure may be directed upwardly by flipping the tube upwardly above said overhang, and alternately when the tube is not flipped during retraction thereof, the retainer structure is drawn through said forward port into said seat against said retaining abutment.

4,094,070

MICROMETER HEAD WITH DOUBLE COUNTER

Tetsunori Tanada, Kure, Japan, assignor to Kabushiki Kaisha Mitutoyo Seisakusho, Tokyo, Japan

Filed Aug. 23, 1976, Ser. No. 716,649
Claims priority, application Japan, Sep. 23, 1975, 50-130623[U]
Int. Cl.[2] G01B *5/00*
U.S. Cl. 33—166 **2 Claims**



1. A micrometer head comprising:
a tubular body including a central sleeve fixed to the body and having an axial opening with female threads,
a spindle having male threads engaging said female threads of the body, said spindle being movable axially of the body upon rotation of the spindle,
said tubular body having a generally cylindrical exterior and defining chamber means between said spindle and said exterior,
said spindle further comprising a circular end, and a tubular member secured to said end and extending axially into said body, said tubular member extending around said central sleeve,
a gear within said body, and adjacent said chamber means,
means restraining said gear from axial movement with respect to said body,
a collar mounted for rotation with respect to said central sleeve and between said sleeve and said tubular member of the spindle, said gear being fixed to said collar for rotation

with the collar, and drive means connecting said tubular member to said collar for rotating said collar in response to rotation of the tubular member and spindle, while permitting axial displacement of the spindle and tubular member with respect to the body,

a first digital counter mounted in said chamber means to indicate the displacement of said spindle in a first direction relative to said body, said first counter having a zero-reset mechanism,

a second digital counter mounted in said chamber means on the same side of the axis of the body as said first counter, to indicate the displacement of said spindle in a second direction relative to said body, said second counter having a zero-reset mechanism,

gear means connecting said first counter to said gear for operating the first counter to indicate axial displacement of said spindle in a first direction with respect to said body, and

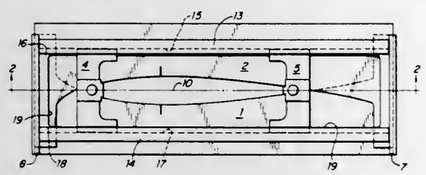
second gear means connecting said second counter to said gear for operating the second counter to indicate axial displacement of said spindle in a second direction with respect to said body.

4,094,071

ADJUSTABLE TEMPLATE FOR TAPERED AIRFOIL RIB PROFILES

James J. Denaro, 543 Bedford St., Concord, Mass. 01742

Filed Nov. 11, 1976, Ser. No. 740,869
Int. Cl.² B41K *1/32*; G01B *3/14*
U.S. Cl. 33—174 B **9 Claims**



1. An adjustable template for defining a rib profile of an airfoil comprising in combination:

a. a frame;

b. a first template defining an upper rib profile and a second template defining a lower rib profile, said first and second templates being slideably engaged within said frame so that each is independently slideable in a direction transverse to the chord of said rib to thereby define the rib profile; and,

c. means for defining an edge of said rib profile, said means comprising a slide assembly engaged within the frame and slideable along the chord of said rib profile.

9. An adjustable template for defining rib profiles of a tapered airfoil, comprising:

a. a first template defining an upper rib profile;

b. a second template defining a lower rib profile;

c. means for holding said first template and said second template in juxtaposition to each other to define a rib profile, said means for holding comprising a hinged connection allowing the first template to pivot with respect to the second template; and,

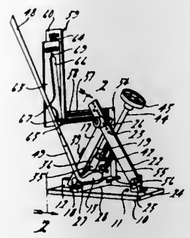
d. means for defining a trailing edge for said rib profile, said means comprising a slide member slidable along at least one of said templates in a direction generally parallel to the chord of said rib profile.

4,094,072

GOLF CLUB FIXTURE

C J Erb, 22621 Beech, Dearborn, Mich. 48124

Filed Feb. 11, 1977, Ser. No. 767,804
Int. Cl.² G01B *5/24*
U.S. Cl. 33—174 F **15 Claims**



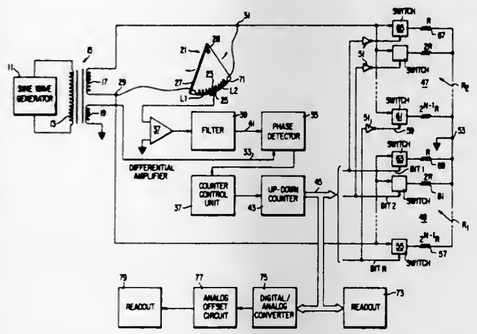
1. In a fixture for use with a typical golf club known as an iron having a head connected to a hosel interfitting coaxially with the lower end of a shaft, the head comprising a plane forward face having a plurality of parallel horizontal score lines thereon and terminating outwardly at a toe spacing a bottom sole and a top edge, the combination of a guide having an indexing surface defining a plane for receiving said head to position said forward face in a predetermined angular alignment with respect to said fixture with said face flush with said surface, horizontal indexing means for providing a reference line capable of visual alignment with a parallel portion of one of said horizontal score lines to enable the positioning of the score lines of said head in alignment with said reference line, and clamping means for clamping said head in a fixed position in said fixture after said head has been placed in a properly aligned position.

4,094,073

ANGLE DETECTOR

Gilbert T. Parra, Sunnyvale, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 10, 1976, Ser. No. 740,457
Int. Cl.² G01C *9/06*
U.S. Cl. 33—366 **9 Claims**



1. An angle detector comprising:

a capacitive pickup member;

an inductive element suspended as a pendulum and angularly movable past the capacitive pickup element, the inductive element divisable into two parts L_1 and L_2 formed between the electrical center of the capacitive pickup element and the two ends of the inductive element in accordance with the angular displacement of the inductive element with respect to the capacitive pickup element;

a digitally positionable potentiometer electrically shunting the inductive element to form the remaining two parts R_1 and R_2 of a bridge circuit;

an alternating current source connected to the bridge circuit to provide an alternating current signal therein, no current flowing from the inductive element to the capacitive pickup element when the bridge circuit is balanced;

means connected to the capacitive pickup element and responsive to the flow of current thereto from the inductive element for generating an error signal;

a phase detector connected to the error signal generating means for detecting the phase difference between the error signal and the alternating current signal to indicate the phase difference; and

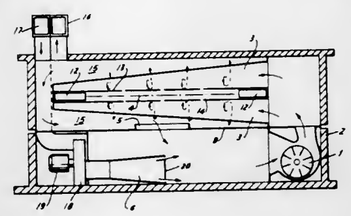
means responsive to the indicating of the phase difference for digitally positioning the potentiometer to balance the bridge circuit and null the error signal.

4,094,074

METHOD AND ARRANGEMENT FOR DRYING ARTICLES

Alfons Schrader; Waldemar Schreiner, and Anton Gessner, all of Remscheid-Lennep, Germany, assignors to Buttner-Schilde-Haas AG, Krefeld-Uerdingen, Germany

Filed Oct. 4, 1976, Ser. No. 729,144
Claims priority, application Germany, Oct. 4, 1975, 2544589
Int. Cl.² F26B *3/00*
U.S. Cl. 34—33 **10 Claims**



10. Method of drying articles in a drying arrangement, particularly a tenter, comprising conveying articles to be dried in a path through the drying arrangement; heating air in the drying arrangement to a temperature of approximately 250° C; directing the heated air into contact with the articles to be dried by circulating air with cross-flow blower means in direction transversely of the path at a velocity of 40 m/sec and at a pressure of 100 mm water column measured at 20° C.

4,094,075

SYSTEMS FOR DRYING PARTICULATE MATERIAL

Peter M. Caruso, 558 Cherry St., Galesburg, Ill. 61401

Filed Mar. 21, 1977, Ser. No. 779,868
Int. Cl.² F26B *21/06*
U.S. Cl. 34—72 **10 Claims**

1. A system for drying moisture-entrained particulate material, comprising:

means defining a pressurizable chamber for receiving the material to be dried, said chamber having an inlet and an outlet;

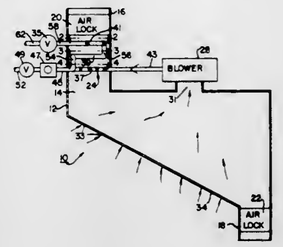
inlet means for enabling the material to be dried to flow into said chamber via said inlet;

outlet means for enabling the dryed material to flow out of said chamber via said outlet;

fluid means disposed within said chamber for dispersing the material within said chamber between said inlet and said outlet;

heat exchanging means for heating the material to be dried flowing into said chamber;

compressing means for drawing air through said chamber to remove moisture from the material and for compressing the moisture-entrained air for heating it; and



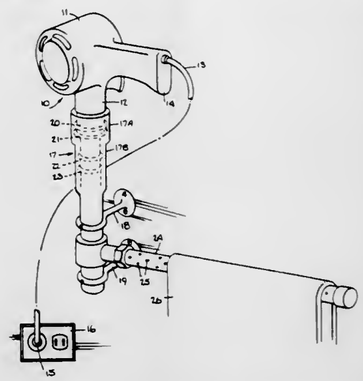
means for guiding the flow of heated moisture-entrained air from said compressing means to said heat exchanging means to supply heat to it.

4,094,076

FIXTURE FOR PORTABLE HAIR DRYER

Floyd M. Baslow, 100 Lafayette St., New Bethlehem, Pa. 16242

Filed Nov. 19, 1976, Ser. No. 743,469
Int. Cl.² F26B *19/00*
U.S. Cl. 34—90 **9 Claims**



1. A fixture adapted to cooperate with an electrically-operated portable hair dryer having a tubular nozzle from which a stream of hot air is emitted, said fixture serving as a storage holster for the hair dryer when it is not in use and as a fabric dryer for which the hair dryer supplies the necessary hot air, said fixture comprising:

A an upright holster section supported in an upright position against a wall and constituted by a rigid tube whose upper end is formed into an open socket for nesting the nozzle of the hair dryer in a manner causing substantially all of the hot air stream emitted from the nozzle to be projected into the tube, said holster holding said portable hair dryer in readiness for immediate withdrawal for drying hair, and

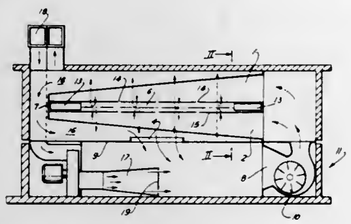
B a hollow rack section attached to said holster section and communicating with the tube for supporting a fabric article to be dried, said rack section having perforations therein whereby when the hair dryer in the holster section is activated, the resultant stream of hot air is conducted by the holster section to the rack section and emitted through said perforations to provide hot air jets to dry the article.

4,094,077

DRYER ARRANGEMENT

Alfons Schrader; Waldemar Schreiner, and Anton Gessner, all of Remscheid-Lennep, Germany, assignors to Buttner-Schilde-Haas AG, Krefeld, Uerdingen, Germany

Filed Oct. 4, 1976, Ser. No. 729,143
Claims priority, application Germany, Oct. 4, 1975, 2544590
Int. Cl.² F26B *13/00*
U.S. Cl. 34—155 **7 Claims**



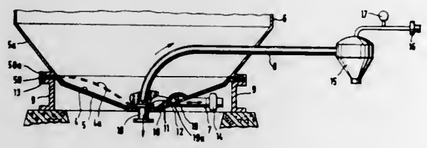
1. An apparatus for drying articles, particularly a tenter, comprising a housing having an interior; means subdividing said interior into two compartments, including a partitioning wall; means for conveying articles to be dried in an elongated path through one of said compartments; means for directing a plurality of streams of drying air against the articles, including a pair of discharging arrangements juxtaposed with one another across said path so as to bound a gap extending along said path from two opposite sides thereof and each including a plurality of channel elements successively arranged at a predetermined spacing from one another along, and each extending transversely of, said path, and having outlet ports facing said path, and means for feeding the drying air into said channel elements of said discharging arrangements for the drying air to emerge through said outlet ports of said channel elements and impinge against the articles from both of said two sides; and means for guiding the flow of the drying air away from the articles after the impingement thereagainst, including at least one side wall extending longitudinally of said path between said discharging arrangements to close said gap at least at one transverse side thereof, a plurality of air outlet passages formed between each adjacent two of said channel elements and each having a main portion of a predetermined flow-through cross-sectional area and an inlet port open into said gap, means for partially obstructing each of said outlet passages at said inlet port thereof, and an elongated discharge outlet extending longitudinally of said path and centrally through said partitioning wall and communicating with said outlet passages of said discharging arrangements and with the other compartment of said housing.

4,094,078

PARTICLE FEEDING AND TREATING SYSTEM

Adolf Lesk, and Wolfgang Hagelelt, both of Osterburken, Germany, assignors to Ingenieur-Boero, Osterburken, Germany

Filed Mar. 17, 1976, Ser. No. 667,822
Claims priority, application Germany, Mar. 19, 1975, 2511996
Int. Cl.² F26B *21/06*
U.S. Cl. 34—181 **13 Claims**



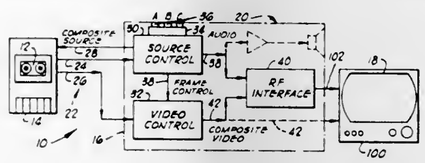
1. A feeding apparatus comprising, in combination:
a vessel having a floor;
means for withdrawing fluent particulate material from said vessel adjacent said floor;
a flexible support lining in said vessel on said floor defining therewith a generally closed variable-volume space and constituted as a gas-impervious foil formed with a multiplicity of throughgoing holes and a gas-pervious textile sheet bonded to said foil over said holes; and
blower means for injecting a gas into said space and thereby flexing said lining, whereby said material is loosened by said gas passing through said holes in the foil and disseminating through said sheet.

4,094,079

SINGLE MEDIUM AUDIO-VISUAL TEACHING MACHINE

Loyd G. Dorsett, Norman, Okla., assignor to Dorsett Educational Systems, Inc., Norman, Okla.

Filed Apr. 5, 1977, Ser. No. 784,737
Int. Cl.² G09B *5/06*
U.S. Cl. 35—8 A **8 Claims**



1. In an audio-visual teaching machine for use with a source record comprising an audio portion, a video control portion having video display pulses entrained therein, and a source control portion having a control pulse entrained therein in one of a predetermined number of response states, the teaching machine including:
a source record playback unit including a playback portion for receiving the source record, providing a composite source output signal having an audio portion corresponding to the audio portion of the source record, a video control portion corresponding to the video control portion of the source record, and a source control portion corresponding to the source control portion of the source record; and a pause control portion for interrupting the operation of the playback portion thereof in response to a pause signal applied thereto;
an audio output unit for providing an audible output signal in response to an audio signal applied thereto; and,
a video display unit for providing a visual output signal in response to a composite video signal applied thereto;
the improvement comprising:
a source control unit means connected to the source record playback unit, the source control unit means including a response control portion having a plurality of actuatable response input elements, each response input element providing a response input signal in a predetermined one of the response states in response to the actuation thereof, the source control unit means for receiving the source control portion of the composite source output signal, detecting the control pulse entrained in the source control portion, initiating production of the pause control signal for application to the pause control portion of the source record playback unit in response to detecting a control pulse having one of a selected plurality of the response states, receiving each of the response input signals provided by the response input elements upon actuation thereof, comparing the response state of the detected control pulse and the response state of the received response input signal, and terminating production of the pause signal when the response state of the detected control pulse is equal to the response state of the received response input signal;
a video control unit connected to the source record playback unit and to the video display unit, the video control unit comprising:
an asyncronous interface circuit means connected to the source record playback unit, the asynchronous interface circuit means for receiving the video control portion of the composite source output signal, detecting the video display pulses entrained in the video control portion, providing an input data signal having input data pulses entrained therein corresponding to the detected video display pulses, and providing an input clock signal having an input clock pulse entrained therein in response to detecting a predetermined number of the video display pulses;
a timer circuit means for providing an output clock signal having output clock pulses entrained therein at a predetermined output clock rate, providing an end-of-scan-line signal having end-of-scan-line pulses entrained therein at a predetermined end-of-scan-line rate, and providing an end-of-field signal having end-of-field pulses entrained therein at a predetermined end-of-field rate;
a memory control circuit means connected to the asynchronous interface circuit means and to the timer circuit means, the memory control circuit means for receiving the input data signal, the input clock signal and the output clock signal, storing each input data pulse entrained in the received input data signal at a predetermined storage location in response to receiving each input clock pulse entrained in the input clock signal, and providing a video output signal having a video data pulse entrained therein corresponding to the input data pulse stored at a predetermined storage location in response to each output clock pulse entrained in the output clock signal;
a video processing circuit means connected to the memory control circuit means, to the timer circuit means, and to the video display unit, the video processing circuit means for receiving the video output signals, the end-of-scan-line signal, and the end-of-field signal, producing a horizontal sync pulse in response to receiving each end-of-scan-line pulse entrained in the end-of-scan-line signal, producing a vertical synch pulse in response to receiving each end-of-field pulse entrained in the end-of-field signal, and adding the horizontal and vertical sync pulses to the received video output signal for application to the video display unit as the composite video signal; and,
means connected to the source record playback unit and to the audio output unit for receiving the audio portion of the composite source output signal and applying the received audio portion to the audio output unit as the audio signal.

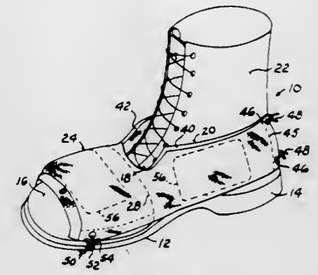
4,094,080

BOOT OR SHOE HEATING DEVICE

James J. Sanders, 9409 S. Hillcrest Dr., Oklahoma City, Okla. 73159

Filed May 2, 1977, Ser. No. 793,095
Int. Cl.² A43B *7/02*; A41D *17/00*; A61F *7/06*
U.S. Cl. 36—2.6 **1 Claim**

1. A footwear heating device, comprising:
a superposed pair of elongated fabric sheet material sections adapted to overlie and be secured, in a partial wraparound fashion, to the toe and vamp areas of a shoe or boot, said sections being stitched together to form a plurality of pockets;
a like plurality of flameless heaters disposed within said pockets;
a plurality of eyelets secured to the respective stitched together end portions of said sections;
a plurality of flexible strands extending through and joining oppositely disposed cooperating pairs of said eyelets in one said end portion;
a toe clip comprising a U-shaped rod adapted to extend transversely across the depending surface of the toe portion of a shoe or boot,
said toe clip having arcuately curved legs forming a pair of closed loops; and,



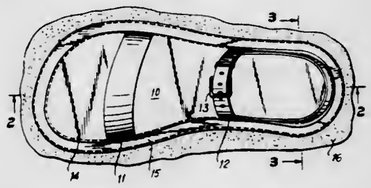
other flexible strands joining said closed loops to cooperating eyelets in the other said end portion.

4,094,081

BEACH SANDAL

Joseph Reiner, 30 Sutton Pl.; Kenneth Vigluicci, 103 Crest Rd., and Michael Reiner, 30 Sutton Pl., all of Toms River, N.J. 08753

Filed Apr. 11, 1977, Ser. No. 786,745
Int. Cl.² A43B *5/04*
U.S. Cl. 36—116 **1 Claim**



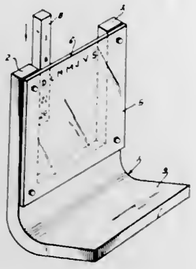
1. A beach shoe for walking on sand surfaces, comprising:
a non-pivotable, flat sole surface in the general shape of the user's foot;
a continuous wall projecting substantially perpendicular to the sole surface and integrally-formed therewith and extending about and adjacent to the periphery of said surface, said wall terminating in a flat rim for contact with the sand and defining an unobstructed cavity in the bottom surface of the sole extending from the toe to the heel section of said sole, said peripheral wall being tapered from its widest portion adjacent to said sole surface, to its narrowest portion in contact with the sand surface, the depth of said cavity, defined by said projecting wall surface, being sufficient to prevent the bottom of said sole surface from contracting; and
means on the top of the sole surface for securing the sole to the user's foot, said means including a foot pad secured to the top of said sole surface, a first strap coupled to said foot pad for engagement over the toes of the user, and a second strap having a buckle-and-belt arrangement for securement over the user's ankle.

4,094,082

PERPETUAL CALENDAR

Pedro Nicolas Cannarozzo, Tinogasta 3174, Buenos Aires, Argentina

Filed Sep. 30, 1976, Ser. No. 728,400
Claims priority, application Argentina, Oct. 7, 1975, 260713
Int. Cl.[2] G09D *3/00*
U.S. Cl. 40—107 3 Claims



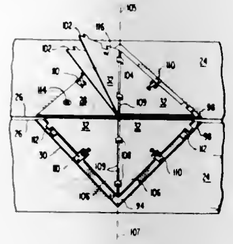
1. A perpetual calendar, comprising in combination, a frame defining an enclosure which is open at its top, and including two substantially upright, spaced and elongated prisms facing each other and each having a rear surface, a front surface and a bottom surface; a substantially upright rear sheet spanning said spaced prisms and being connected to the rear surfaces of said prisms; an at least partially transparent, substantially upright front sheet spanning said spaced prisms in such a manner that said front sheet is spaced a substantially constant distance from said rear sheet and being connected to the front surfaces of said prisms; a J-shaped unitary curviform first support having a substantially constant horizontal breadth and including a curved portion intermediate a substantially horizontally extending rectilinear portion and a substantially upright rectilinear portion having a free horizontally directed end face, the free end face being unitarily bonded to the bottom surfaces of said spaced prisms and extending from one prism to the other; and a substantially rectilinear, upright second support having an upper end face and a lower end face, said second support longitudinally extending below and in substantially the same plane as said rear sheet, and having a top end face and a bottom end face, the top end face being unitarily bonded with the substantially upright rectilinear portion of said first support and the bottom end face being located in a horizontal plane in which the horizontally extending rectilinear portion of said first support lies, the substantially horizontally extending rectilinear portion of said first support having an elongated substantially horizontally extending upper surface, whereby writing instruments and the like can be supported in a horizontal position on this upper surface, said front sheet being rectangular, and the curved portion of said curviform first support curves outwardly relative to said front sheet and away from the horizontally extending rectilinear portion; and further comprising seven elongated prismatic bodies removably mounted within the enclosure defined by said frame and provided with indicia representing the days of the month, each prismatic body is a column having a length equal to the vertical distance between the free end face of the substantially upright rectilinear portion of said first support and the top of said front sheet, said front sheet being provided with indicia representing the days of the week, the indicia being located in such a manner that each of them are above the indicia represented on each of said prismatic bodies, said seven prismatic bodies completely filling the enclosure defined by said frame, and each of said prismatic bodies having lateral sides equal to the lateral sides of said prisms, said rear sheet having an upright length which is less than the upright length of said front sheet, so as to facilitate removal of said prismatic bodies.

4,094,083

VEHICLE PLACARDING APPARATUS

Harry Fund, Chicago, Ill., assignor to Modular Products, Chicago, Ill.

Division of Ser. No. 714,840, Aug. 16, 1976, Pat. No. 4,058,918.
This application Jul. 20, 1977, Ser. No. 817,429
Int. Cl.[2] G09F *21/04*
U.S. Cl. 40—536 5 Claims



1. An apparatus for providing changeable placarding for a roll-up vehicle door formed of a plurality of articulated, rigid rectangular door sections, consecutively hinged along horizontal axes, comprising:

a first base member for attachment to a first rectangular door section;

a second base member for attachment to a second rectangular door section adjacent the first rectangular door section;

a first plurality of generally congruent, right triangular plates;

first mounting means for pivotally attaching each of the first plurality of plates to the first base member, so that the plates are pivotable about a common axis approximately parallel with parallel congruent edges of each of the plates;

a second plurality of generally congruent, right triangular plates;

second mounting means for pivotally attaching each of the second plurality of plates to the second base member, so that the plates are pivotable about a common axis approximately parallel with parallel congruent edges of each of the plates; and

manually operable means on said first and second base members for clipping the triangular plates to their respective base members to retain the plates in a plane approximately parallel to the plane of the door sections to which the respective base members are attached;

said triangular plates having indicia and being located such that surfaces of four triangular plates facing outwardly simultaneously are adapted to collectively define a diamond-shaped area bearing an inscription, split at the horizontal axis along which the first and second door sections are hinged and split at the common pivoting axes.

4,094,084

CURVED PRISM ORNAMENT

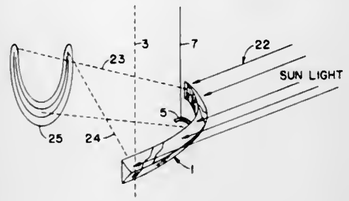
Fred Allen DaMert, P.O. Box 36, Oakland, Calif. 94604

Filed May 3, 1976, Ser. No. 682,886
Int. Cl.[2] G09F *19/02*
U.S. Cl. 40—613 7 Claims

1. An optical ornament comprising:

an elongate arcuate transparent member shaped like a prism which has been curved about an exterior axis perpendicular to its length; and

suspension means located midway between the ends of said member so that said member may be pivotally suspended in a horizontal attitude, said suspension means comprising a finger extending from a radially inner surface of said member; and, whereby said member may rotate freely in response to air currents.

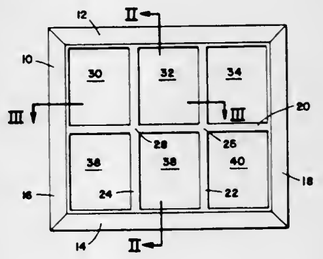


4,094,085

PICTURE FRAME APPARATUS

Ronald M. Nolan, Jr., 5739 Roanwood Way, Concord, Calif. 94521

Filed Aug. 2, 1976, Ser. No. 710,782
Int. Cl.[2] G09F *1/12*
U.S. Cl. 40—152.1 6 Claims



1. A picture frame apparatus for displaying a plurality of baseball cards, photographs, or the like, comprising:

a frame portion including a top edge strut having a top edge flange formed thereon, a bottom edge strut, and first and second side edge struts wherein said edge struts are defined such that said frame portion extends away from a wall or other structure at a fixed angle when said frame portion is affixed thereto, as a function of the distance from the outer perimeter of said frame portion, with the outer perimeter of each edge strut coming in contact with said wall or other structure, said top edge flange formed such that one surface thereof will lie flush against said wall or other structure when the outer perimeter of said edge strut abuts thereto;

hanger means including mounting plate means, means for affixing said mounting plate to said wall or other structure, hook means attached to said mounting plate means, said hook means defined in a shape such that said top edge flange will mate therewith to thereby removably affix said frame portion and associated strut means to said hook means, wherein said hook means comprises a plurality of hooks each said hook including two surfaces which engage to define an angle therebetween which is substantially identical to the angle existing between said top edge flange and the body of said top edge strut such that said top edge flange and strut will mate securely with each hook; and

strut means comprising at least one strut interconnecting two of said edge struts such that a plurality of window openings are defined within said frame portion thereby;

said struts including elongated slot defining means positioned adjacent each said window opening such that a card, photograph, or the like may be seated therein to thereby position the card or the like in said opening, said elongated slot defining means comprising:

i. two opposite front flange portions, one positioned on either side of said window opening and oriented to face one with the other in a common plane, said front flange portions defining thereby left and right edges of said window opening;

ii. two opposite rear flange portions, one positioned on either side of said window opening and oriented to face one with the other in a common plane, said rear flange portions being positioned in parallel and behind said opposite front flange portions, such that, between said front and rear flange portions, two elongated slots are defined thereby, one each along each side of said window openings said rear flange portions sized such that said card or the like is enabled to be slid into said elongated slots without impediment; and

iii. base means positioned at the bottom of said window opening and defining thereby the bottom edge of said window opening, said base means acting to stop the card or the like from exiting through the bottom of said elongated slots.

4,094,086

ADJUSTING DEVICE FOR DOUBLE-BARRELLED GUNS

Georges A. Gevers, Liege, Belgium, assignor to Fabrique Nationale Herstal S.A. en abrege FN, Herstal, Belgium

Filed Nov. 15, 1976, Ser. No. 741,987
Claims priority, application Belgium, Jan. 22, 1976, 254770
Int. Cl.[2] F41C *21/06*
U.S. Cl. 42—1 R 6 Claims

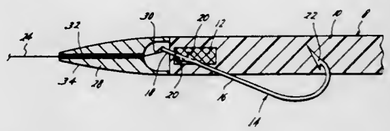
1. Adjusting device for double-barrelled guns, comprising two elements provided with accessory parts located between the barrels, one of these parts forming an axially extending incline for the other which acts as a wedge, one at least of aforesaid elements being movable axially with respect to the other.

4,094,087

FISHING LURE AND HOOK

Jerry W. Carpenter, 713 Western Ave., Orange, Tex. 77630

Filed Feb. 4, 1977, Ser. No. 765,571
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.24 4 Claims



1. The combination of a fishing lure and a fishing hook,

the fishing hook comprising:

an eye for attachment to a fishing line,

a shank,

a hook, and

at least one barb on the shank adjacent and extending toward the eye,

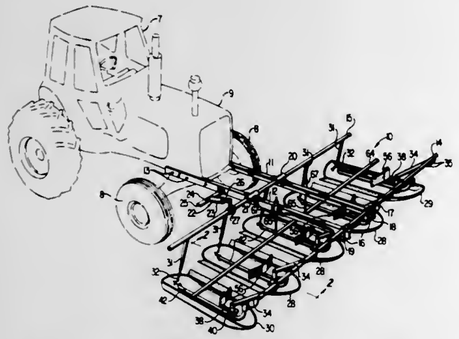
the fishing lure comprising:

a lure body of flexible, plastic material inert to water simulating bait and having action in the water, and

a fibrous material embedded within the leading end of the lure body; and

the shank of the fishing hook extending through the leading end of the lure body,
the barb disposed within the fibrous material, and
the hook hooked into the plastic material of the lure body downstream from the fibrous material,
whereby, the lure body is restrained by the barb within the fibrous material from movement away from the eye and down the shank of the fishing hook as the fishing lure and hook are pulled through the water by the fishing line.

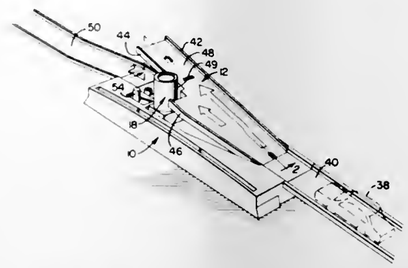
4,094,088
MOBILE INSECT COLLECTING AND DESTROYING APPARATUS
Robert C. Harrell, 616 N. St. John, Dyersburg, Tenn. 38024
Filed Nov. 15, 1976, Ser. No. 741,694
Int. Cl.² A01M *1/20*
U.S. Cl. 43—144 **14 Claims**



1. Tractor mountable apparatus for collecting and destroying insects from multiple rows of growing plants comprising a supporting frame including a pair of transversely spaced longitudinal support members mountable upon the front end of a tractor to project forward thereof, and a pair of front and rear longitudinally spaced transverse pan support and vine agitator members carried by the longitudinal support members, a plurality of open top elongated metal pans directly below the front transverse pan support and vine agitator member to receive bugs therefrom, suspension means for suspending said metal pans from said pair of transverse support members at spaced intervals so that said pans move adjacent the ground between the rows of plants as the apparatus moves along the plant rows, burner means in each of said metal pans for heating said pans and for burning insects falling into said pans, each of said pans having also separate vine agitator means mounted above and transversely across the pan for agitating the side branches of adjacent plants along which the pan moves, and for knocking insects into the pan, said suspension means including yieldable independent suspension means for each of said pans permitting each of said pans to swing rearwardly and upwardly when encountering a stone or other low lying ground object, and motor operated means for selectively raising and lowering all of said pans simultaneously.

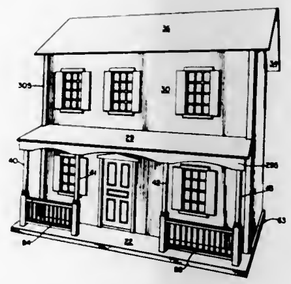
4,094,089
JUMPING RAIL
Hiroshi Sano, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Jan. 4, 1977, Ser. No. 756,701
Claims priority, application Japan, Apr. 22, 1976, 51/50387[U]
Int. Cl.² A63H *18/16*
U.S. Cl. 46—1 K **10 Claims**

1. A jumping rail, comprising a base having an upper surface, a platform having an upper surface, means mounting said platform to said base to move between a first position wherein said platform upper surface is aligned with said base upper surface and a second position wherein one end of said platform is raised upwardly from said base, means urging said platform to said second position, a striking member projecting upwardly from said base beyond said upper surfaces, means mounting said striking member to said base to move between a first



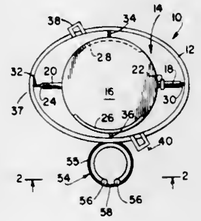
position wherein said striking member engages said platform retaining said platform in its first position and a second position wherein said striking member is disengaged from said platform permitting said platform to move to its second position, means urging said striking member to its first position, and releasable means maintaining said platform in its first position regardless of the position of said striking member.

4,094,090
DOLL HOUSE
Harry E. Walmer, 721 N. Overlook Dr., Alexandria, Va. 22305
Filed Feb. 11, 1977, Ser. No. 767,959
Int. Cl.² A63H *3/52*
U.S. Cl. 46—19 **8 Claims**



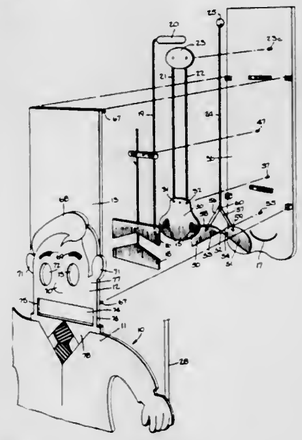
1. An easily assembled knock-down doll house having a front porch construction with columns, the parts of which are fitted together and held together only with pegs comprising:
a. a generally rectangular first floor member comprising left, right and front grooves in the top surface thereof, at least one intermediate groove in said surface parallel to said left and right grooves, and a series of in-line holes disposed forward of said front groove;
b. a front wall member having a size and shape to have its bottom edge engage said front grooves of said first floor member, comprising vertical L-shaped side beams, a top horizontal beam member disposed on the inner front wall containing at least one vertical slot, and a horizontal L-shaped beam member disposed on the outer side at an intermediate position;
c. left and right side walls, having respective sizes and shapes to have their front edges engage said L-shaped beams of said front wall and their bottom edges engage said respective left and right grooves of said first floor, each of said side walls containing a top, inner horizontal beam member having an inward side groove, an inner second horizontal beam member having an inward side groove and disposed between said side wall top beam and the lower edge of said side wall, inwardly angled top edges, and a slot disposed at the terminus of said angled top edges;
d. at least one intermediate wall member adapted to have its lower edge engage a respective said intermediate groove in said first floor and a said vertical slot of said front wall top beam member, comprising an intermediate horizontal slot extending forwardly from the rear edge;
e. a second floor member adapted to have its side edges engage said grooves of said inner second beam members of said side walls and comprising a stairwell near the front edge and at least one horizontal slot extending rearwardly from the front edge, said slot adapted to engage said horizontal slot of said intermediate wall member;
f. a third floor member adapted to have its side edges engage said grooves of said inner top beam members of said side walls, and comprising a beam member disposed along the rear edge having at least one slot disposed on the underside thereof adapted to engage the top edge of a said intermediate wall member;
g. front and rear roof panels each comprising a horizontal beam member disposed along the underportion of one edge containing a slot near each end, said panels being constructed and arranged to adapt said roof beams to enter said terminus slots of said side walls and to adapt the slots of said beams to receive the edge of said terminus slots with said respective roof beams disposed adjacent to each other and said panels disposed along said angled edges of said side walls;
h. a porch roof panel member adapted to have its rear portion be disposed on said L-shaped beam member of said front wall member comprising, a rear horizontal beam member having a longitudinal downwardly protruding lip, and a front horizontal beam member having a series of in-line holes disposed along the under side thereof;
i. a series of vertical porch columns having respective sizes and shapes adapting them to be disposed between said front portion of said porch panel member and said first floor member with each column having its bottom portion disposed in one of said first floor series of holes and its top portion disposed in one of said porch front beam member series of holes;
j. a plurality of pegs adapted to be inserted in holes contained in said beams, grooves, wall and floor members at their junctures with each other for retaining said assembled structure together.

4,094,091
INTEGRALLY FORMED PLASTIC SPINNER TOY UNIT WITH MEANS FOR ATTACHING SAME TO A SUPPORT
Sam Kupperman, Chicago, and Dennis Kupperman, Glenview, both of Ill., assignors to R B Toy Development Co., Skokie, Ill.
Filed Feb. 17, 1977, Ser. No. 769,704
Int. Cl.² A63H *33/40*
U.S. Cl. 46—53 **11 Claims**



1. A one piece molded plastic unit, comprising a frame member, a spinner positioned within said frame member and spaced therefrom, a pair of journal pins extending outwardly of said spinner, means connecting said spinner to said frame member for ready removal therefrom, said frame member including means for supporting said journal pins, and attachment means connected to said frame for attaching same to a support, said attachment means extending exteriorly of said frame member and molded integrally therewith, whereby detachment of said spinner from said frame member followed by mounting of said journal pins in said supporting means rotatably mounting said spinner in said frame.

4,094,092
TWO DIMENSIONAL ANIMATED CHARACTER
Morey Bunin, New York, N.Y., assignor to Aniforms, Inc., New York, N.Y.
Filed Mar. 17, 1975, Ser. No. 559,013
Int. Cl.² A63H *7/00*
U.S. Cl. 46—126 **9 Claims**

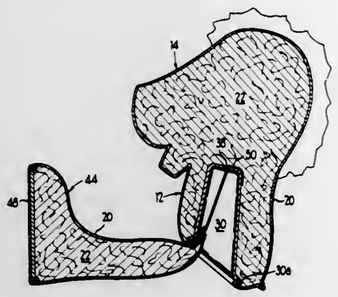


6. An animated puppet, comprising:
means for supporting a plurality of facial features of said puppet;
a mouth background means having a mouth feature thereon;
said puppet including a portion through which said mouth feature may be viewed from the front of said puppet.
means for varying the display of said mouth feature, said varying means including a pair of plates mounted in front of said mouth background means at a location which covers the field of view of at least a portion of said mouth feature;
control means connected to said plates for moving said plates between a first position which exposes the full mouth feature and a second position which covers the sides of said mouth feature to expose only a small central portion thereof;
whereby the movement of said plates provide the simulation of a broad smile of said puppet.

4,094,093
DOLL HAVING SELF-SUPPORTING SITTING AND STANDING POSITIONS
Bette M. Kaelin, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.
Filed Aug. 18, 1976, Ser. No. 715,526
Int. Cl.² A63H *3/02*
U.S. Cl. 46—160 **4 Claims**

1. A doll, comprising:
a torso portion;
a pair of legs; and
means for securing the legs to the torso for movement between a self-supporting standing position and a self-supporting sitting position, said means comprising a receiver mounted within the torso of the doll for accepting and concealing a substantial length of the legs to permit the

doll to be supported by said legs in a standing position while permitting movement of said legs outwardly relative to said receiver to support the doll in a sitting posi-



tion, and a flexible strap for each leg, one end of each strap being secured to the top of the respective leg and having the other end of the strap secured within the receiver.

4,094,094

SOUND MAKING MOVABLE TOY

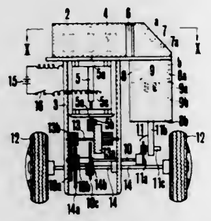
Tasuku Ono, Tokyo, Japan, assignor to Stiron Chemical Industry Co. Ltd., Tokyo, Japan

Filed Jan. 25, 1977, Ser. No. 762,411

Claims priority, application Japan, Oct. 4, 1976, 51-133988[U]

Int. Cl.² A63H *5/00*

U.S. Cl. 46—232 **3 Claims**



1. A sound making movable toy which is provided with a sound making device and driving wheels driven by a driving power source, said sound making device comprising: a blowing chamber being provided with a sounding aperture and a fan driven by said driving power source; a main resonance chamber adjoining said blowing chamber and communicating with said sounding aperture; a tubular resonance control chamber one side end of which communicates with said main resonance chamber and the other end of which is opened; a piston reciprocating within said resonance control chamber with sealed engagement; and a crank mechanism consisting of a movable crank rod and a rotating crank piece, one end of said rotating crank piece being connected to an end portion of a rotary shaft which is rotated by said driving power source by way of a series of gears and the other end of said rotating crank piece being pivoted to one end of said movable crank rod, and the other end of said movable crank rod being pivoted to the center of the outer surface of said piston; thereby various pitch sounds being produced by changing the resonant volume of a resonance space with the reciprocation of said piston.

4,094,095

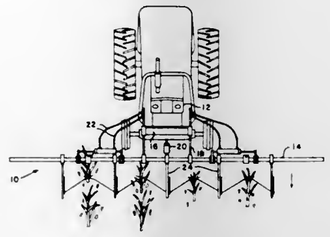
METHOD AND APPARATUS FOR USING ELECTRICAL CURRENT TO DESTROY WEEDS IN AND AROUND CROP ROWS

Willis G. Dykes, Vicksburg, Miss., assignor to Lasco, Inc., Vicksburg, Miss.

Filed May 9, 1977, Ser. No. 795,087

Int. Cl.² A01M *21/00*

U.S. Cl. 47—1.3 **14 Claims**



4. A machine for destroying weeds growing in and around crop rows without destruction of crops growing therein, comprising;

(a) a vehicle adapted to travel in a given direction,

(b) a source of high-voltage electricity mounted on and movable with said vehicle,

(c) means for connecting said high-voltage source of electricity to ground,

(d) a plurality of conductive spring members,

(e) means for mounting said conductive spring members so that they are disposed in generally horizontal planes, and

(f) means for providing a larger dwell time of contact between said spring members and relatively flexible weeds than the dwell time of contact between said spring members and relatively stiff crop plants, so that weeds contacted by said spring members generally receive sufficient electrical energy to result in destruction thereof while crop plants do not receive sufficient electrical energy to result in destruction thereof, said means comprising a first portion of each spring member having an end connected to said mounting means and making a first angle α with respect to a line along said direction of travel of said vehicle, and a second portion of each spring member having a free end and making a second angle Θ with respect to a line along said direction of travel of said vehicle, said second angle β being substantially greater than said angle α, and said connected end adapted to be disposed between rows of crops as said vehicle travels in said given direction; and wherein the length of said first portion of each spring member is significantly greater than the length of said second portion of each spring member; and wherein each spring member has a spring constant such that relatively stiff crop plants will deflect said spring member while relatively flexible weeds will not deflect said spring member.

4,094,096

FLOWER HOLDER

Phillip H. Huyssen, 407 Lakeland Dr., Hot Springs, Ark. 71901

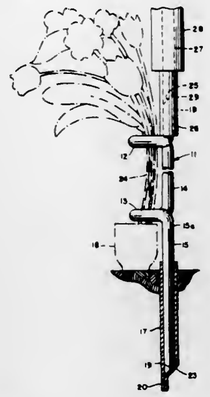
Filed Jun. 3, 1977, Ser. No. 803,230

Int. Cl.² A01G *5/00*

U.S. Cl. 47—41.13 **8 Claims**

1. A flower holder comprising a standard having a pair of vertically-spaced loops for receiving the stems of flowers, said standard having a lower end portion projecting downwardly below said lower loop, and a mounting tube having a length substantially less than said lower end portion and slidably

receiving said lower end portion, said lower end portion terminating in a beveled end face and said mounting tube having an



angled lower end wall for engaging said end face and restraining rotation of said standard.

4,094,097

METHOD FOR PREPARING A PESTICIDALLY RESISTANT RHIZOBIUM AND AGRONOMIC COMPOSITION THEREOF

Martin Alexander, and Oluwasuyi Odeyemi, both of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Sep. 10, 1976, Ser. No. 722,318

Int. Cl.² C12K *1/02, 3/00*; A01C *1/06, 21/00*

U.S. Cl. 47—57.6 **8 Claims**

1. A method for the preparation of a bacteria preparation intended for inoculation of leguminous seed, which preparation contains a fungicide resistant strain of Rhizobium, which strain has good infecting and nitrogen-fixing abilities in symbiosis with plants of the leguminosea family which method comprises:

cultivating, in the presence of a Rhizobium medium and an amount of a selected fungicide sufficient to kill at least 90% of the Rhizobium culture initially present, a culture of Rhizobium bacteria of selected strain and inoculation group having good infecting and nitrogen-fixing ability, whereby bacteria strains and sensitive to said amount of said fungicide are killed; subjecting the residual fungicide resistant bacteria to at least one additional cultivation step, as above, in the presence of an increased amount of said fungicide; and recovering a Rhizobium strain having increased resistance to said fungicide; said fungicide being selected from agricultrually useful legume seed or soil fungicides which adversely affect the Rhizobium bacteria being cultivated.

8. A leguminous seed having coated thereon a symbiotically-compatible, fungicide-resistance Rhizobium strain produced by the process of claim 1.

4,094,098

LOADING BLOCK FOR MUZZLE-LOADING GUN

Charles R. Gourley, 1131 Neelys Bend Rd., Madison, Tenn. 37115

Filed Apr. 4, 1977, Ser. No. 783,985

Int. Cl.² F41C *27/00*

U.S. Cl. 42—90 **3 Claims**

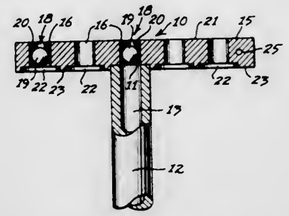
1. A muzzle-loading device for a gun having a muzzle, comprising:

(a) an elongated block having a top face, a bottom face, and a vertical dimension,

(b) a plurality of longitudinally spaced, cylindrical shot holes extending vertically through said block and opening through said top face, each of said shot holes having a uniform diameter substantially equal to the caliber of the muzzle of a gun to be loaded,

(c) each of said shot holes having a height great enough to receive a charge for the gun muzzle,

(d) a plurality of cylindrical locater recesses formed in said



bottom face, equal in number to said shot holes, each locater recess having a uniform diameter substantially equal to the outer diameter of the muzzle of a gun to be loaded, so that each of said recesses is adapted to snugly and coaxially receive said gun muzzle for loading, and

(e) each of said locater recesses being vertically coaxially aligned with, and opening into, a different shot hole.

4,094,099

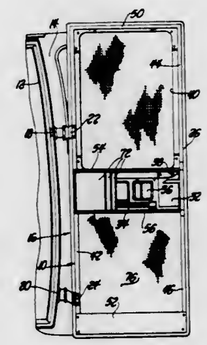
SCREEN DOOR ASSEMBLY

Alexander A. Birch, 915 Phillips Ave., Clawson, Mich. 48017

Filed Jan. 14, 1977, Ser. No. 759,325

Int. Cl.² E06B *9/00*

U.S. Cl. 49—163 **4 Claims**



1. A screen door hinged for cooperation with and activation seperate from another closure door, said screen door comprising;

a peripheral frame including a full length hinge supported side rail, a second laterally spaced and relatively parallel side rail having an interruption between its ends, and cross rails connecting the outer and inner ends of said second side rail to said first mentioned side rail for providing relatively seperate upper and lower screen receptive sections,

a member for bridging the interruption in said second side rail received and offset inwardly between the inner ends of said second side rail,

a like inwardly offset member provided on said full length hinge supported side rail,

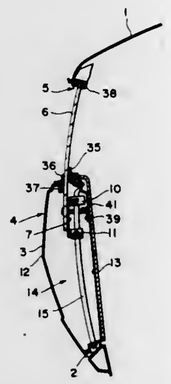
and a pair of structural reinforcement members provided on said inner disposed cross rails and between the ends of said offset members for boxing the opening provided between said two screen receptive portions and structurally reinforcing said screen door at the mid-section thereof.

4,094,100

FREE MOVEMENT PREVENTING DEVICE FOR WINDOW GLASSES OF AUTOMOBILES

Ryoichi Fukumoto, Nagoya, and Toshiro Igarashi, Hoi, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 29, 1976, Ser. No. 709,599
Claims priority, application Japan, Jul. 29, 1975, 50-105513[U]
Int. Cl.² E05F *11/38*
U.S. Cl. 49—348 10 Claims



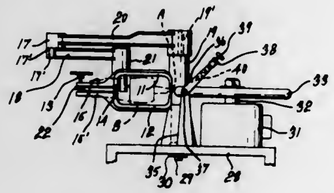
1. In an automotive vehicle including panel means which has at least one window opening and a window glass mounted in said panel means for movement substantially in a vertical direction between a closed position wherein the window glass closes the window opening and an open position wherein the window opening is fully opened and weather strips mounted along said window opening on each side of said window glass, the improvement comprising window glass mounting means including window glass support bracket means secured to the window glass, substantially vertically extending guide rail means stationarily disposed in said panel means, guide follower means for slidably connecting said bracket means to said guide rail means and for guiding said window glass along said guide rail means, power means for moving said window glass in the vertical directions, and pressing means secured to a part of said panel means spaced substantially below the weather strips mounted along said window opening to be in continuous frictional contact with only the inside of said window glass and to continuously limit the rotation of a lower part of said window glass toward the inside of said automotive vehicle.

4,094,101

ICE-SKATE SHARPENER

Bertrand Robinson, 4455 de la Naudiere Street, Montreal, Canada

Filed Apr. 1, 1977, Ser. No. 783,897
Claims priority, application United Kingdom, Apr. 1, 1976, 13178/76
Int. Cl.² B24B *53/06*
U.S. Cl. 51—5 D 3 Claims



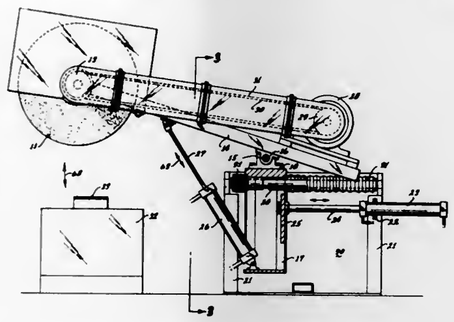
1. In an ice-skate sharpening machine including a frame, a grinding wheel rotatable about a rotation axis, a motor to rotate said wheel, a diamond bit for dressing said wheel, an arm pivoted to said frame about a pivot axis perpendicular to said rotation axis and carrying said bit in a position facing the peripheral face of said grinding wheel, so arranged that pivoting of said arm back and forth will dress said grinding wheel peripheral face along an arc of a circle lying in a plane containing said rotation axis, the improvement consisting in an ice-skate clamp comprising a bracket, a pair of jaws each pivoted on said bracket about a jaw pivotal axis lying in a plane perpendicular to said rotation axis and each having a straight jaw face for engaging an ice-skate blade, means to close and open said jaws and retain the same in adjusted pivotal position, so that said jaw clamping faces are always equally distant on each side of a datum plane perpendicular to said rotation axis and passing through said pivotal axis of said arm, means to adjust and set the position of said bracket in a direction parallel to the rotation axis of said grinding wheel, means supporting said bracket for universal movement in said datum plane, said jaws each having a U-shape to encircle an ice-skate, said ice-skate blade contacting jaw faces being located at the free edge of one leg of said U-shaped jaws, while said pivotal connection is located at the free edge of the other leg of said U-shaped jaws, and wherein said means to close and open said jaws include an extension for each jaw projecting away from the ice-skate blade contacting faces relative to said jaw pivotal axis, a threaded bushing carried by the outer end of each extension, said bracket having a leg extending between said jaw extensions, an adjusting screw having an intermediate portion rotatably mounted in the outer end of said bracket leg, means to prevent axial movement of said screw relative to said bracket leg, said screw having threads of opposite pitch on each side of said central portion respectively engaging the threaded bushing of the jaw extensions whereby rotation of said screw in one direction will open said jaws equally away from said datum plane and rotation of said screw in the opposite direction will close said jaws equally towards said datum plane.

4,094,102

OSCILLATING CUT-OFF SAW

Robert Lavern Lauze, deceased, late of Paramount, Calif., and by Vicki Suzanne Brown, administrator, 5731 Mangrum Dr., Huntington Beach, Calif. 92649

Filed Apr. 18, 1977, Ser. No. 788,555
Int. Cl.² B24B *27/04*
U.S. Cl. 51—33 R 7 Claims



1. A power saw comprising:
a stationary bed having four upright posts, two of which are disposed at the two rear corners of a rectangle and the other two at the forward corners;
a pair of parallel and horizontal disposed rods, each of which is mounted by its ends near the top of two of said posts so that said rods extend fore and aft;
a relatively narrow frame having a top edge and a pair of opposing and alligned beams extending outwardly from said frame at said top edge thereof;

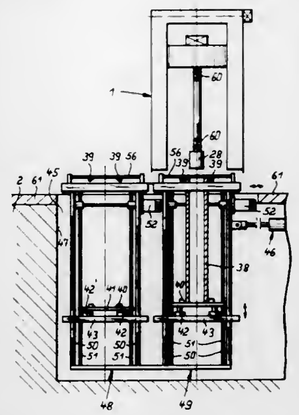
a pair of bearing means, each of which is fixed to one of said beams and make sliding 360° bearing contact around and with a respective one of said rods so that said frame depends from and between said rods;
a horizontally disposed axle mounted on the top edge of said frame and disposed perpendicularly to said rods;
a boom mounted on and disposed to rotate about ssid axle so that one end of said boom extends forward of said axle and the other end extends rearwardly of said axle;
a rotatable saw, rotatably mounted on the forward end of said boom;
a motor mounted on the rear end of said boom and having means for coupling energy to said saw to rotate said saw;
a first fluid piston and cylinder assembly, horizontally disposed and having one end directly engaging said frame and the other end fixed to said stationary bed for moving said frame along said rods; and
a second fluid piston and cylinder assembly having one end coupled to said boom and the other end coupled to said frame near the lowest portion thereof for maximum vertical movement of said saw by maximum stroke of said second assembly.

4,094,103

WORKPIECE-HOLDING FIXTURE FOR HONING MACHINE

Günter Ebelt, Westerholt, Germany, assignor to Maschinenfabrik Gluckauf Beukenberg G.m.b.H., Gelsenkirchen, Germany

Filed Feb. 7, 1977, Ser. No. 765,944
Claims priority, application Germany, Feb. 6, 1976, 2604602
Int. Cl.² B24B *33/02*
U.S. Cl. 51—34 F 8 Claims



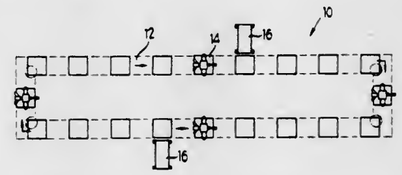
1. A machine for honing a recess in a workpiece with a honing tool, said machine comprising:
means for rotating said tool and for simultaneously reciprocating said tool in a predetermined vertical direction;
a receiving station displaceable transverse to said direction adjacent said tool and having a pair of clamping stations each provided with
a lower table formed with a lower aperture,
centering formations for said workpiece around said lower aperture,
means for vertically displacing said lower table,
an upper abutment plate formed with a throughgoing upper aperture vertically in line with said lower aperture, and
centering formations for said workpiece around said upper aperture and directed toward said lower table;
means at each of said stations for holding a respective workpiece with its respective recess directed at said tool;
means for displacing said frame between a pair of positions in each of which a respective one of said stations is aligned in said direction with said tool; and
means for displacing said upper plates transverse to said direction into and out of position with the respective upper apertures aligned vertically with said lower aperture.

4,094,104

FINISHING MACHINE

Arthur S. Zerfahs, Elk Grove, and Robert J. Jurin, Chicago, both of Ill., assignors to Synergetics, Inc., Milwaukee, Wis.

Filed Oct. 7, 1976, Ser. No. 730,306
Int. Cl.² B24B *19/14, 41/00*
U.S. Cl. 51—76 R 15 Claims



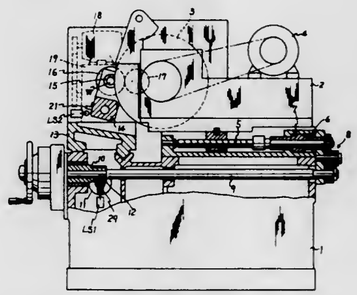
1. A finishing machine having a plurality of work stations including a continuously moving conveyor mechanism, a plurality of work piece fixtures traveling with said conveyor, each fixture having rotatable means holding a work piece, drive means in each fixture adapted to rotate said rotatable means to position the work piece for said work stations, said drive means including a follower mechanism translationally moveable with respect to said rotatable means in a direction transverse to the direction of movement of said conveyor, said machine including stationary guide means near said conveyor contactable against said follower mechanism whereby said guide means will cause translational movement of said follower mechanism with respect to said rotatable means and will actuate said drive means to position the work piece as the fixture travels on the conveyor.

4,094,105

CAM GRINDING MACHINE WITH WORKPIECE SPEED CONTROL

Shiro Hatanaka, Toyota; Tsuyoshi Tamesui, Okazaki, and Tsuneharu Matsuura, Kariya, all of Japan, assignors to Toyoda-Koki Kabushiki-Kaisha and Toyota Jidosha Kogyo Kabushiki Kaisha, both of Japan

Filed Jun. 8, 1977, Ser. No. 804,596
Claims priority, application Japan, Jun. 18, 1976, 51-72563
Int. Cl.² B24B *17/00, 5/42*
U.S. Cl. 51—101 R 7 Claims



1. In a cam grinding machine having a wheel head for rotatably carrying a grinding wheel, a rocking table being pivotable toward and away from said wheel head, a work support mounted upon said rocking table and provided with a rotatable

work spindle for supporting a cam to be ground, a work drive mechanism including a master cam and a cam follower for imparting rotational and rocking movements, synchronized with each other, respectively, to said work spindle and said rocking table, so as to generate a predetermined contour on said cam, a speed-switchable drive motor for driving said work drive mechanism selectively at fast and slow speeds, and feed means for infeeding one of said wheel head and said rocking table toward the other to cause said grinding wheel to grind said cam roughly in a first grinding step and thereafter finely in a second grinding step, the improvement of which comprises:

detecting means for generating a switch signal when the infeed movement of said one of said wheel head and said rocking table is switched from said first grinding step to said second grinding step;

delay means responsive to said switch signal for generating a speed-down signal when said work spindle is rotated at least one revolution after receiving said switch signal; and

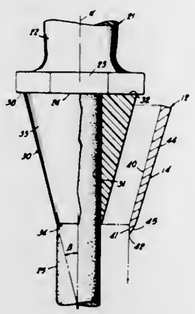
a motor control circuit connected with said drive motor and said delay means for controlling said drive motor to switch the operational speed of said work drive mechanism from said fast speed to said slow speed in response to said speed-down signal.

4,094,106

HONING DEVICE

Thomas D. Harris, Jonesboro, Ga., assignor to Southern Saw Service, Inc., Atlanta, Ga.

Filed Oct. 8, 1976, Ser. No. 730,781
Int. Cl.² B24D *15/06*
U.S. Cl. 51—214 **4 Claims**



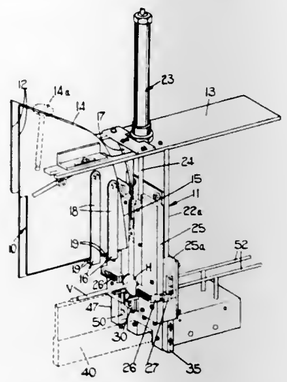
1. A honing device comprising, a handle, an elongated generally cylindrical hone secured by its proximal end to and projecting from said handle, said hone having an exposed and unobstructed peripheral sharpening surface extending from the vicinity of said handle throughout substantially its entire length to its distal end, and a knife guide disposed between said handle and said exposed surface of said hone, said guide having a large major base adjacent to said handle and a small minor base adjacent to said exposed surface of said hone, the surface of said guide tapering toward said hone from its major base adjacent to said handle to its minor base adjacent said surface for establishing the angle at which the cutting edge portion of a knife will pass unimpeded axially from the guide to and thence axially along the length of said exposed surface of said hone, said guide at its minor base being of approximately the same diameter of said hone.

4,094,107

FEED MECHANISM FOR USE IN A CENTERLESS GRINDING MACHINE

Frederick Henry Naul, Coventry, England, assignor to TRW Valves Limited, Bilston, England

Filed Jan. 14, 1977, Ser. No. 759,275
Claims priority, application United Kingdom, Jan. 14, 1976, 1284/76
Int. Cl.² B24B *47/20*
U.S. Cl. 51—215 CP **12 Claims**



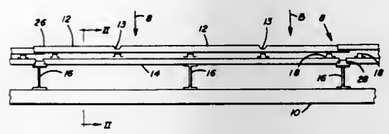
1. A feed mechanism for feeding a workpiece from a first position to a second position, comprising a drive member reciprocatable between said first and second positions, a carriage engaged with said drive member and movable relative thereto, locking means for selectively locking said carriage to said drive member for movement therewith, a clamp assembly having movable jaws adapted to grip said workpiece, said clamp assembly being carried by said carriage, actuating means operative to open and close the jaws of said clamp assembly in accordance with relative movement between said drive member and said carriage, and releasing means for rendering said locking means inoperative when said drive member is adjacent said first and second positions respectively so as to permit relative movement between said drive member and said carriage and cause said actuating means to open or close said jaws, said releasing means including a positive stop with which said carriage is engagable when said drive member approaches said second position so that the workpiece is gripped by said clamp assembly at said first position and released by said clamp assembly at said second position while said drive member is moved in one and the same direction.

4,094,108

CONTROLLED DESTRUCTIVE PANEL ASSEMBLY

Harley D. Scott, Wexford, Pa., assignor to Cyclops Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 681,820, Apr. 30, 1976, Pat. No. 4,050,204. This application Jul. 1, 1977, Ser. No. 812,119
The portion of the term of this patent subsequent to Sep. 27, 1994, has been disclaimed.
Int. Cl.² E04H *9/00*
U.S. Cl. 52—1 **4 Claims**



1. A wall panel construction comprising:

A. a plurality of spaced, horizontal structural girts secured to vertical, structural columns;

B. liner panels extending between each three girts with vertically adjacent panels terminating at end girts of the three in slightly spaced relationship;

C. a plurality of spaced, horizontal subgirts secured to the liner panels with certain of the subgirts positioned on either side of the end girts;

D. corrugated exterior panels extending between each of the three girts so that the corrugations are parallel to the vertical, structural columns and connected to the subgirts with vertically adjacent panels overlapping in unattached relationship, the corrugated exterior panels having a plurality of notches positioned on the exterior panel transverse of said corrugation and aligned midway between the horizontal structural girts;

E. a clip having angular flanges and secured to said end girts between the adjacent spaced liner panels, the fanges of said clip pinching the adjacent liner panels against the end girts;

F. means to attach the liner panels to a middle girt of the three girts;

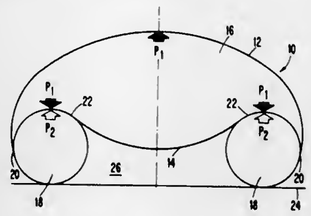
whereby an external force of predetermined magnitude against the wall panel construction causes the adjacent liner panels to deform about the middle girt as the liner panels pivot about and release from the clip flanges while simultaneously the overlapping, exterior panels pivot and release at their overlapping ends.

4,094,109

CONSTRUCTION OF HOUSES OR SIMILAR BUILDINGS BY MEANS OF AN INFLATABLE STRUCTURE

François Prouvost, 53, av. Montaigne, Paris, France (75008)

Filed Feb. 22, 1977, Ser. No. 770,848
Int. Cl.² E04B *1/34*
U.S. Cl. 52—2 **11 Claims**



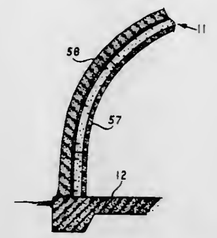
1. An inflatable support structure for constructing houses or similar buildings comprising an upper membrane and a lower membrane connected hermetically to each other along a peripheral zone thereof wherein the dimensions of the upper membrane are larger than the corresponding dimensions of the lower membrane and the upper and lower membranes form a first pressure chamber constituting an inflatable envelope, a second inflatable pressure chamber fixed to the basis of said first pressure chamber, said pressure chambers being formed of a suitable material for their utilization as support and framing in the construction of houses or similar buildings of concrete or similar or analogous materials, and wherein said first pressure chamber is inflated to a pressure lower than that of said second pressure chamber.

4,094,110

BUILDING SYSTEM AND METHOD

Luther I. Dickens, Radford, Va., and William C. Nanny, San Francisco, Calif., assignors to Radva Plastics Corporation, Radford, Va.

Filed Mar. 24, 1976, Ser. No. 670,057
Int. Cl.² E04B *1/32*
U.S. Cl. 52—80 **5 Claims**



1. A method of building fabrication comprising the steps of

(a) attaching together a plurality of expanded plastic panels with reinforcing strips bonded thereto to form a building shell having integral walls and roof;

(b) said panels having wire mesh mounted on the outer faces thereof in offset relation thereto and lacing together the wire mesh of contiguous panels to form a wire mesh covering on said shell;

(c) applying wet concrete to the exterior of said shell on said mesh to form an integral concrete wall and roof of a building with the shell attached thereto, and

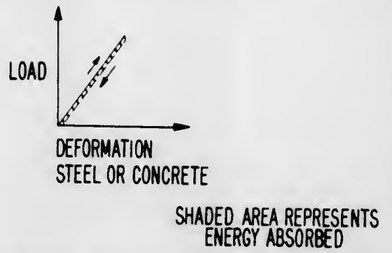
(d) applying a plaster coating to the interior of said shell to completely seal said panels between concrete and plaster as an insulating core of the resultant building.

4,094,111

STRUCTURAL STEEL BUILDING FRAME HAVING RESILIENT CONNECTORS

Patrick J. Creegan, KM. 5 Carretera A, Masaya Apart. 4397, Managua D. N., Nicaragua

Continuation-in-part of Ser. No. 558,975, Mar. 17, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,264
Int. Cl.² E04B *1/98*
U.S. Cl. 52—167 **10 Claims**



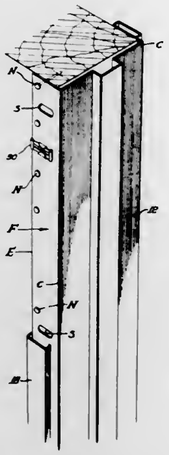
1. A building comprising: a frame having a plurality of frame members of structural metal, each frame member having a surface in face-to-face sliding engagement with the surface of an adjacent frame member, there being a number of holes through each frame member and terminating at said surface thereof, the holes of each frame member being aligned with corresponding holes of the adjacent frame member; and a resilient connector for each pair of aligned holes, respectively, of a corresponding pair of frame members, each connector including a bolt having a head at one end and a nut threaded on the opposite end, and resilient sleeve means surrounding the bolt, each connector extending through a respective pair of aligned holes with the head of the corresponding bolt engaging one frame member and the corresponding nut engaging the other frame member and forcing the corresponding surfaces into said face-to-face sliding engagement with each other.

4,094,112

METAL DOOR FRAME AND TRIM CLIP

Edward A. Smith, 6641 W. 6th St., Los Angeles, Calif. 90048, and Robert L. Day, 1518 Grismer St., Burbank, Calif. 91504

Filed Jul. 23, 1974, Ser. No. 491,102
Int. Cl.[2] E06B *1/04*
U.S. Cl. 52—211 **8 Claims**



1. In a door frame structure:

(a) a frame part having a flange extending from a corner with the body of the flange adapted to lie flat along a wall surface adjoining a wall opening; said flange having a distal edge that deviates from parallelism with said corner;

(b) said flange having a series of integrally formed longitudinally spaced discrete clip registers each located at the same constant predetermined dimensionally controlled distance from said corner;

(c) a series of molding clips fitted and rigidly secured at said clip registers respectively; and

(d) a trim molding member attached to said flange by said molding clips;

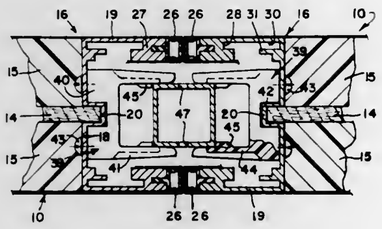
(e) the distal edge of said flange having a series of preformed notches of variable depths interfitting corresponding ends of said clips to assist in accurate location thereof.

4,094,113

MODULAR WALL PANEL STRUCTURE

Wayne W. Good, Sturgis, Mich., assignor to Harter Corporation, Sturgis, Mich.

Filed Sep. 30, 1976, Ser. No. 728,433
Int. Cl.[2] E04B *2/74*
U.S. Cl. 52—222 **11 Claims**



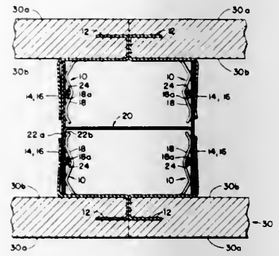
1. A wall panel module having a rectangular frame comprising outwardly open side channels with laterally outwardly extending resilient outer edges adapted for abutting the resilient outer edges of like modules to form a vertical partition wall and the like having a resilient butt joint spacing apart the interfacing edges of adjoining panels, a vertical spline in at least one side channel having a width not exceeding the lateral depth of said channel and movable laterally therein to clear the outer edge of said channel, the web of said channel having a longitudinal internal rib, clip means mounted on said rib for releasably holding said spline in a position medial of said outer edge, and said spline being engageable by traversing a resilient edge of said channel for moving said spline laterally in said channel.

4,094,114

DETACHABLE WALL MOUNTING SYSTEM

Gerald C. Burcham, P.O. Box 285, Mountain View, Calif. 94040

Filed Aug. 26, 1976, Ser. No. 717,826
Int. Cl.[2] E04B *5/52*
U.S. Cl. 52—489 **2 Claims**



1. A system for supporting a plurality of side-by-side individually detachable wall panels in a wall plane comprising:

(a) a plurality of vertically disposed support studs each having at least one flange portion oriented perpendicular to said wall plane;

(b) a bead formed on a surface of said flange portion and extending vertically along said flange surface substantially the entire length thereof;

(c) a plurality of panel retaining clips each having a panel attachment portion formed for piercing an edge of one of said wall panels and a stud attachment portion formed for slideable insertion onto said stud flange; and

(d) a barb formed on said stud attachment portion of each of said clips, said barb being oriented toward said wall plane for positive interlocking engagement behind said bead when said clip is slideably inserted onto said flange, whereby forces exerted on said clip in a direction transverse to said wall plane and away from said stud act to further reinforce said positive interlocking engagement.

4,094,115

SELF-COMPENSATING SIDING OR ROOFING STRIP

Paul Naz, 20502 Harper, Harper Woods, Mich. 48225

Filed Jan. 27, 1977, Ser. No. 762,847
Int. Cl.[2] E04D *3/362*
U.S. Cl. 52—521 **10 Claims**

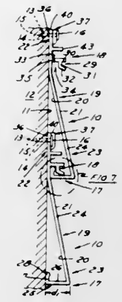
1. An integrally formed, interlocking strip for use as siding, roofing and the like to cover surface areas of buildings comprising:

a generally rectangular panel having an interior surface, an exterior surface, an upper end portion, a lower end portion and a generally flat intermediate central portion between said upper and lower end portion, said upper end portion being generally coplanar with said intermediate central portion and the interior surface of said upper end portion being integrally contiguous with the interior surface of said intermediate central portion;

a first spacing and interlocking assembly integral with and extending outwardly from said exterior surface of said panel and disposed a first distance from the distal end of said upper end portion for spacing the lower end portion of a later installed strip while operatively engaging same for interlocking purposes;

a second spacing and interlocking assembly integral with and extending outwardly from said interior surface of said panel adjacent said lower end portion thereof for spacing said lower end portion a second spaced distance away from the surface of said building being covered while operatively engaging said exteriorly extending first assembly of a previously installed strip for interlocking said strips together one above the other; and

only a portion of said upper end portion disposed between said first assembly and the distal end of said upper end portion including corrugation means extending from said upper distal end toward and terminating short of said first distance, said corrugation means having alternate ridge and valley portions adapted to engagably receive fastening means therethrough for fixedly securing said strip to the surface of said building being covered, said corrugation means cooperating with said building surface being covered and said fastening means for (1) compensating for expansion and contraction of said strips with changing weather conditions and (2) achieving a spring-type buckle washer effect for maintaining a tight fit therebetween thereby preventing said strips from working lose and eliminating rattling and the like.

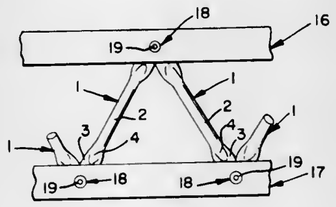


4,094,116

WEB TUBE WITH SEPARATED END WALLS

Tyrell T. Gilb, Berkeley, Calif., assignor to Simpson Manufacturing Co., Inc., San Leandro, Calif.

Filed Jun. 6, 1977, Ser. No. 803,443
Int. Cl.[2] E04C *3/292*
U.S. Cl. 52—693 **1 Claim**



1. In medium and heavy series composite wood chord and metal web member trusses having double wood members for the top and bottom chords and joint means including transverse bores formed in said chords, a metal joint connector connected to said chord and formed with an opening therethrough in registration with said transverse bores in said chord and a single metal pin at each of said joints inserted through said bores in said chords and said opening in said metal joint connector the improvement comprising:

a. a plurality of tubular metal web members formed from an open ended cylindrical metal tube formed with openings at both ends connected to said chords by said pins; and

b. said tubular metal web members are formed with:

1. an elongated tubular body portion;

2. a smoothly tapered and unshouldered transition portion including a bulb section integrally connected to said body portion and flat side portions on both sides of said bulb section;

3. a smooth sided, unshouldered flattened end portion formed adjacent the transition portion with a pin opening therethrough;

4. said walls of said tubular member are separated from one another in said transition portion and said flattened end portion between said opening and said body portion; and

5. said walls of said distal ends of said tubular web members beyond said openings are in touching contact for maintaining the separation of said walls between said opening and body portion.

4,094,117

METHOD AND TIE BAR FOR THE FORMATION OF ANCHORAGES

Giovanni Torti, Pavia, and Andrea Tomiolo, Milan, both of Italy, assignors to Ing. Giovanni Rodio & C. Impresa Costruzioni Speciali S.p.A., Italy

Filed Nov. 22, 1976, Ser. No. 743,918
Claims priority, application Italy, Nov. 26, 1975, 29665 A/75
Int. Cl.[2] E21D *20/2*
U.S. Cl. 52—698 **8 Claims**

1. A method of forming an anchorage for a plurality of cables subject to tensioning, comprising excavating the ground to form a hole, arranging a plate in a plane substantially perpendicular to the axes of said cables adjacent the common ends thereof and securing the plate to the cables, coating the length of each of said cables spaced from the ends engaged with the plate with an insulating sheath having a low friction characteristic so that cables may slide, enclosing the plate and the uncoated portions of the cables in the vicinity of the plate and the ends of the cables with a large resinous mass of a size smaller than the width and depth of the hole, inserting the cables with the resinous mass into the hole, leaving a remaining space in the hole around the sides, top and bottom of the mass, and injecting mortar into the remaining space so as to form a mortar bulb around, above and below the resinous mass in said cables and permitting it to harden.

4,094,118

METHOD AND APPARATUS FOR FEEDING OF ROWS OF BLOCKS

Hans Lingl, Sr., Neu-Ulm, Ludwigsfeld, Germany, assignor to Lingl Corporation, Paris, Tenn.

Filed Oct. 8, 1976, Ser. No. 731,095
Int. Cl.[2] E04G *21/22*; E04D *1/35*
U.S. Cl. 52—747 **10 Claims**

1. Apparatus for fabricating a vertical block wall section having a width W, comprising

(a) a first conveyor belt system, said first conveyor belt

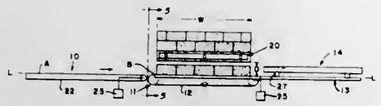
system having an upper transporting surface thereof that is generally horizontal and at a horizontal level L, and at least W in length,

(b) a second conveyor belt system disposed as a continuation of said first conveyor belt system and having an upper transporting surface thereof that is generally horizontal and is normally disposed at the horizontal level L, and is at least W in length,

(c) a third conveying system disposed as a linear continuation of said second conveyor belt system, said third conveying system including a track that is generally horizontal and at a horizontal level L,

(d) a wheeled pallet disposed on said track and movable with respect thereto and at least W in length,

(e) track means formed with said second conveyor belt system, said track means including two separate track



rails, one disposed on either side of the conveyor belt of said second conveyor belt system and so disposed with respect to said second conveyor belt system that when said pallet cooperates with said track means said pallet is disposed above the upper transporting surface of said second conveyor belt,

(f) means for vertically moving said second conveyor belt system so that a row of blocks disposed thereon may be elevated at least a vertical distance great enough to allow said pallet to be disposed in cooperation with said track means and beneath a row of blocks when the row of blocks is in the vertical position to which it may be elevated, and

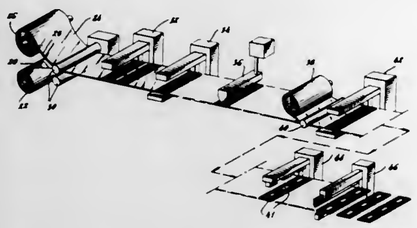
(g) means for selectively holding rows of blocks in an elevated position to which they are movable by said vertically moving means.

4,094,119

METHOD OF MAKING A PRODUCT FOR DISPENSING A VOLATILE SUBSTANCE

William E. Sullivan, Columbia, S.C., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.

Filed Mar. 18, 1977, Ser. No. 778,855
Int. Cl.² B65B *29/00*; A24F *25/00*
U.S. Cl. 53—4 **10 Claims**



1. A method of producing a product for holding and dispensing a volatile substance in vapor form into the environment, said method comprising the steps of:

A. providing a backing material;

B. placing a reservoir material, capable of holding the volatile substance, in close proximity to the backing material;

C. placing a material permeable to the volatile substance in close proximity to the reservoir material;

D. supplying the volatile substance to the reservoir material to be held thereby; and

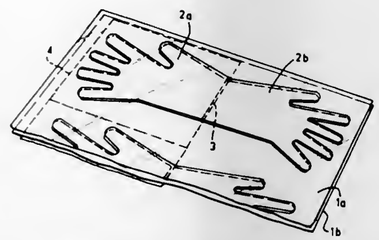
E. fusing the backing, reservoir and permeable materials together in a pattern defining a closed loop periphery to seal the reservoir material between the backing and permeable materials, said fusing step compressing and sealing the reservoir material to prevent transfer of the substance through the fused periphery.

4,094,120

METHOD OF MANUFACTURING A PAIR OF PLASTIC GLOVES AND PACKAGING THEM WITHIN A SHEET OF WRAPPING MATERIAL

Antonin Goncalves, Groslay, France, assignor to L'Oreal, Paris, France

Filed Nov. 22, 1976, Ser. No. 743,629
Claims priority, application France, Jan. 14, 1976, 76 00825
Int. Cl.² B65B *63/04*
U.S. Cl. 53—21 FW **8 Claims**



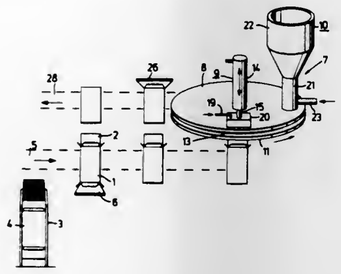
1. A process of making and wrapping a pair of plastic gloves in a sheet of wrapping material comprising, the steps of, positioning at least two superposed sheets of plastic material in superposed relation to a sheet of flexible wrapping material, welding edge to edge and cutting out a flat member from said plastic sheets of an outline to form said pair of gloves connected together along a cuff region, said step of positioning further comprising positioning the wrapping material only under that part of the superposed plastic sheets which forms a first one of said gloves upon cutting and welding, adhering said first glove to said wrapping material during said step of cutting and welding, forming a weakened tear line through the cuff region of said member, folding said gloves over each other, and then folding the assembly of the wrapping sheet and the two gloves into a package.

4,094,121

METHOD AND APPARATUS FOR PACKING PRODUCTS IN SUBSTANTIALLY OXYGEN FREE ATMOSPHERE

Bo Olov Ganholt, Vallingby, Sweden, assignor to Esseltepac Aktiebolag, Jarfalla, Sweden

Filed Dec. 14, 1976, Ser. No. 750,397
Claims priority, application Sweden, Dec. 12, 1975, 7514648
Int. Cl.² B65B *31/00*
U.S. Cl. 53—22 R **12 Claims**



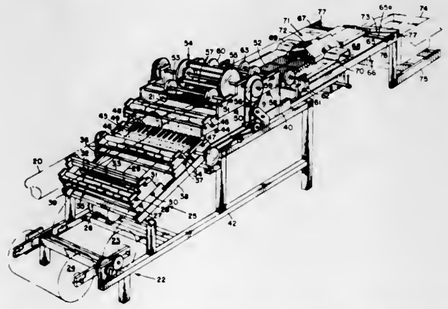
1. A method of packing products, without vacuum suction or compression and in a substantially oxygen free atmosphere, in bottom closed containers of cardboard, plastic, glass, tin or the like, said method comprising mounting a bottom-closed container in a substantially air tight condition on a holder funnel; forcing a piston in sealed engagement with the inner sides of the container down through the container to the bottom thereof so that air which is present in the container is forced up to the upper side of the piston; withdrawing the piston from the container to thereby exhaust the air which is present above the piston; introducing a protective gas underneath the piston simultaneously with the withdrawal of the piston and without subjecting the interior of the container to the influence of air as the container is filled with the product to be packed; and thereafter transfering the container to a station for sealing and closing the container after the same is filled with the product and the protective gas, said container being maintained under substantially air tight conditions by the holder funnel during the entire filling operation and during at least an initial portion of the sealing operation.

4,094,122

APPARATUS FOR HANDLING EXTRUDABLE SUBSTANCES

Raymond S. Edmunds, Jr., 817 Eventide Dr., San Antonio, Tex. 78209

Filed Jun. 3, 1977, Ser. No. 803,050
Int. Cl.² B65B *63/00*
U.S. Cl. 53—23 **22 Claims**



1. A method of handling and individually wrapping packages of a continuously extruded substance, said method including the following steps:

dispensing a wrapping material by dispensing means;

receiving and cutting said wrapping material into sheets by first roller means;

overlapping said sheets received from said first roller means by second roller means;

depositing said extruded substance along said overlapped sheets;

cutting said extruded substance at least at the point of overlap of said sheets with a perpendicular cutter;

separating said sheets with said extruded substance thereon;

wrapping said sheets around said extruded substance thereon to form a wrapped package; and

conveying said package to a container.

4,094,123

METHOD AND APPARATUS FOR THE ALIGNMENT OF ELONGATED ARTICLES

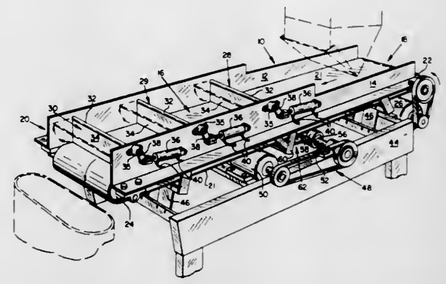
Bayard L. Carlson, Wilsonville, Oreg., assignor to Amfac Foods, Inc., Portland, Oreg.

Filed Mar. 7, 1977, Ser. No. 774,804
Int. Cl.² B65B *1/22, 35/56*
U.S. Cl. 53—24 **36 Claims**

25. A process for aligning multiple articles comprising:

depositing a batch of said articles onto the upstream end of a trough which is divided into a series of compartments by multiple transverse barriers;

moving said batch through said trough toward the downstream end thereof; and



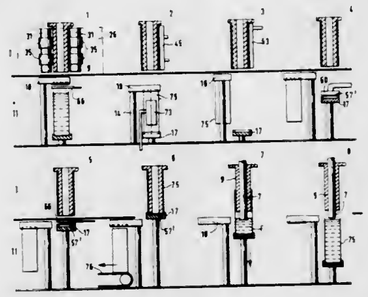
alternately bunching up said articles of said batch against a downstream barrier whereby said articles tend to move into alignment with said barrier and dispersing the articles in said trough without substantially changing their alignment in relations to said barrier.

4,094,124

PROCESS AND APPARATUS FOR THE MANUFACTURE OF FILLED, CLOSED CONTAINERS

Billy Ljungcrantz, Chatel-St.Denis, Switzerland, assignor to La Coulaz, Switzerland

Filed Jan. 27, 1977, Ser. No. 763,139
Claims priority, application Switzerland, Jan. 27, 1976, 999/76
Int. Cl.² B65B *1/02, 3/02*
U.S. Cl. 53—29 **24 Claims**



1. In a process for manufacturing filled, closed containers made of a foldable material and having a tubular wall section of any cross-section, a bottom and a lid, wherein the material for the wall section, the bottom and the lid is fed in separately and the container is filled and closed with the lid after fixing the container bottom in place, the combination of process steps comprising:

(a) providing a first rotating tier located at a first level of operation,

(b) providing a second rotating tier located at a second level of operation, and

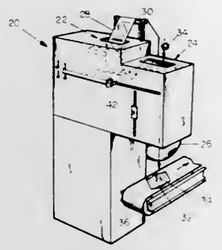
(c) effecting at least one of the operations of shaping and welding the tubular wall section and the attaching of the bottom and lid to said wall section in said first rotating tier and effecting the remaining operations in said second rotating tier.

4,094,125

PACKAGING MACHINE

Larry C. Gess, 13345 Dunlap Rd., LaSalle, Mich. 48145

Filed Nov. 1, 1976, Ser. No. 737,602
Int. Cl.[2] B65B *5/02, 43/00*
U.S. Cl. 53—29 16 Claims



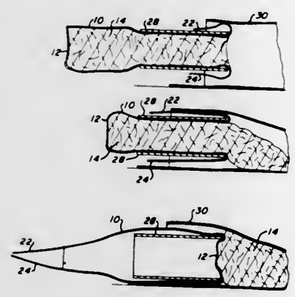
7. A method for making packages sequentially from a length of plain flexible tubing, said method comprising maintaining the tubing flat with the tubing positioned in a given plane, advancing the tubing lengthwise with the leading edge transversely sealed and stopping the advance, forming a sealed strip transversely across the tubing at a distance from the sealed leading edge at a first station, severing the tubing on the leading edge side of the sealed strip, transferring the severed section to a second station to one side of the first station in a direction parallel to the plane of the tubing, opening the severed edges of the section at the second station, depositing an article in the section at the second station, closing the severed edges at the second station, forming a transverse seal across the section near the severed edges at the second station, and discharging the package from the second station.

4,094,126

METHOD FOR FILLING DOWN GARMENTS

George D. Lamb, Longmont, Colo., assignor to Camp 7, Longmont, Colo.

Filed Jun. 27, 1977, Ser. No. 810,523
Int. Cl.[2] B65B *1/00, 29/00, 39/00*
U.S. Cl. 53—35 2 Claims



1. The method of inserting down in garment compartment having one open side, and in which a tubular plastic film packet of down is provided with the down quantity necessary for the down compartment, comprising:

(a) placing the down packet in an essentially rigid tube,

(b) opening one end of the down packet,

(c) placing the open end of the down packet into a garment down compartment, and

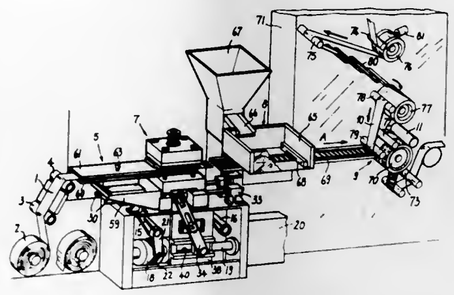
(d) pulling the tubular packet back over the rigid tube from the compartment outwardly to turn the same inside-out and deposit the down in the garment compartment.

4,094,127

APPARATUS FOR FORMING, FILLING AND CLOSING PLASTICS TRAYS

Andrea Romagnoli, Via Madonna dei Boschi, 18, S. Lazzaro di Savena (Prov. of Bologna), Italy

Filed Nov. 29, 1976, Ser. No. 745,939
Int. Cl.[2] B65B *41/18, 47/02*
U.S. Cl. 53—51 1 Claim



1. An apparatus for manufacturing blister packs comprising means for continuously entraining a web of thermodeformable plastic material at a constant speed along a horizontal path, a carriage slidingly supported along said path and parallel thereto, heating means for heating the web consisting of a pair of superimposed plates mounted on said carriage between which the web is led, forming means mounted on said carriage downstream from said heating means for forming product containing cells on said web, means for driving the carriage with reciprocating motion comprising an advance stroke in the web direction during which the carriage reaches and maintains the same speed of the web for a time sufficient to enable the forming means to engage with the latter and to form the cells and a return stroke opposite the web direction after the cells have been formed, a filling station located along said path downstream from said forming means for filling the cells formed in the web, a cell closing station for applying a metal strip over the filled cells, said strip being provided with wordings relative to the nature of the product contained in the cells, said wordings being spaced apart by a distance slightly less than the longitudinal dimension of the packs, means for detecting the position of said wordings with respect to the relative cells and a stretching device controlled by said detecting means so as to cause elongation of the strip when the wordings are in misalignment with the relative cells and to restore alignment of the wordings with the relative cells wherein according to the improvement the stretching device is of the type comprising a plurality of stationary parallel bars having edges transversely and alternately engaging the opposite faces of said metal strip so as to deviate it according to a zig-zag path, a pair of rollers arranged upstream and downstream from said bars on which the metal strip is partially wound and braking means controlled by said detecting means for braking the roller arranged upstream and causing the strip to be put under tension and to elongate by sliding on said bars.

4,094,128

AUTOMATIC BAGGING MACHINE

Vincent N. Vulcano, New York, N.Y., and Maurice W. Friedman, 548 Barnard Ave., Woodmere, N.Y. 11598, assignors to Maurice W. Friedman, Woodmere, N.Y.

Filed Sep. 10, 1976, Ser. No. 722,322
Int. Cl.[2] B65B *57/00, 5/04*
U.S. Cl. 53—52 44 Claims

44. Apparatus for automatically placing garments into garment bags including:

a. means for locating a garment at a loading station;

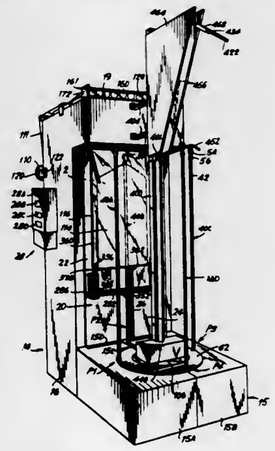
b. means for transporting said garment from its location at said loading station, to an operative station, to an unloading station;

c. means for supplying a length of tubular material;

d. means for forming a garment bag from the tubular material over a garment located at the operative station;

e. means for sensing said garment bag so that it has a length corresponding to the length of the garment comprising gripping means to grip the edge of the tubular material and means to move the gripping means, and

f. control means for actuating the means of paragraphs (a) through (e) in sequence, as a function of the presence of a garment at the operative station;



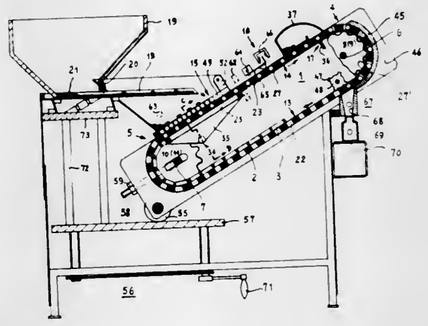
wherein the sensing means determines the presence of a garment at the operative station and further including means for mounting a photoelectric detection means for movement relative to gripping means between a position at which the photoelectric detection means and the gripping means are adjacent each other and a position at which the photoelectric detection means and the gripping means are distant each other, and means for moving the photoelectric detection means from its distant position to its adjacent position upon initiation of movement of the gripping moving means in a downward direction.

4,094,129

COUNTING AND FILLING APPARATUS FOR TABLETS, DRAGEES OR SIMILAR ELEMENTS

Hans List, Laustrasse 51, 7 Stuttgart 70, Germany

Filed Aug. 1, 1977, Ser. No. 820,788
Int. Cl.[2] B65B *57/10, 57/20*
U.S. Cl. 53—54 51 Claims



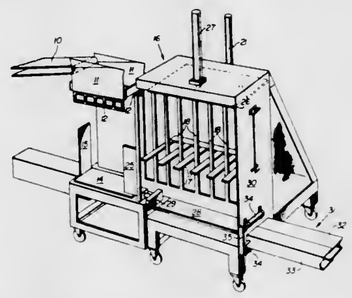
1. A counting and filling apparatus for tablets, dragees or similar elements, comprising, in combination, a plurality of elongated counting bars having longitudinal side faces and being each provided with cutouts spaced from each other in the longitudinal direction of each bar and each extending transversely through the respective bar; carrier elements carrying said bars substantially normal to said carrier elements with the side faces of the bars closely adjacent and parallel to each other and forming with said bars an endless receiving and transporting unit; front and rear reversing means over which said endless unit is guided to form between said reversing means substantially planar upper and lower runs; means to move said unit in an endless path about said reversing means; means for filling said cutouts in said bars during movement of the latter along said upper run with said element; scanning means at said upper run downstream of said filling means for scanning the presence or absence of elements in each of said cutouts of each counting bar; means downstream of said scanning means and controlled by the latter and cooperating with those bars in which said scanning means senses the absence of an element in at least one cutout of the respective bar; and boundary means directly below said counting bars travelling along said upper run for preventing elements in said cutouts to fall out of the latter.

4,094,130

APPARATUS FOR COMPRESSING AND PACKAGING ARTICLES

Norman Kelly; William T. Fletcher, both of Sarnia; Derek J. Holden, Camlachie, and James J. Welsh, Sarnia, all of Canada, assignors to Fiberglas Canada Limited, Toronto, Canada

Filed Jul. 13, 1977, Ser. No. 815,356
Claims priority, application Canada, Apr. 19, 1977, 276433
Int. Cl.[2] B65B *63/02, 13/20*
U.S. Cl. 53—124 D 18 Claims



1. Apparatus for compressing and packaging articles, comprising:

means for receiving the articles in succession and depositing the articles in a first position in successive batches each comprising a stack of the articles;

a compression chamber;

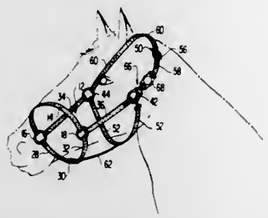
means for displacing the batches in succession from said first position to a second position in said compression chamber;

means for displacing a first one of the batches from the second position to a third position in said compression chamber to allow the displacement of the next succeeding batch from the first position to the second position;

means for compressing the first batch and the next succeeding batch together in said compression chamber; and

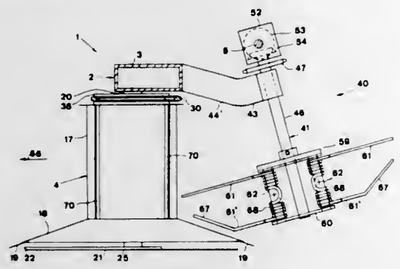
means for applying to the compressed batches retaining means for retaining the batches in their compressed condition.

4,094,131
ANIMAL HALTER
Sylvia C. McElvey, Box 107, Middleburg, Va. 22117
Filed Dec. 12, 1975, Ser. No. 640,193
Int. Cl.[2] B68B *1/02*
U.S. Cl. 54—24 3 Claims



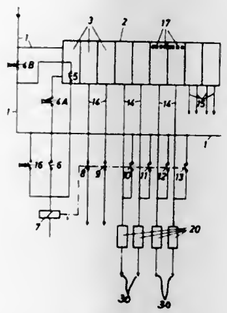
1. An animal halter comprising a crown member for positioning behind the ears and across said animal, band means for surrounding the nose of said animal, cheek strap means for attaching said band means to said crown member on opposite sides of said halter, means extending from one side of said halter to the other and positioned to pass beneath the head of said animal rearwardly of said band means, and means for releasably holding said crown member intact on said animal, said releasably holding means being operative to disunite said crown piece upon the imposition of a force on said halter which is less than that otherwise needed to break the halter, and means for inactivating said releasable means, said means for releasably holding said crown member comprising a relatively weak strap portion in said crown member, and said means for inactivating said releasable means comprising a member adapted for releasable connection in a bridging position across said relatively weak strap portion of said crown member to relieve stress on said relatively weak strap portion.

4,094,132
MOWER-CONDITIONER
Frans J. G. C. Decoene, Zedelgem, Belgium; Cornelis G. M. Muijs, Vougeot, France; Roger H. Van Eecke, Blankenberge, and Marc G. Vansteelant, Zedelgem, both of Belgium, assignors to Clayson N.V., Zedelgem, Belgium
Filed Oct. 18, 1976, Ser. No. 733,631
Claims priority, application United Kingdom, Oct. 23, 1975, 43506/75
Int. Cl.[2] A01D *49/00*
U.S. Cl. 56—14.4 19 Claims



1. A mower-conditioner comprising:
a chassis adapted to be moved across a field;
transversely-extending rotary mower means mounted to the chassis, the mower means having at least one pair of oppositely-rotated side-by-side extending cutter units for cutting standing crop and for conveying cut crop rearwardly; and
a pair of rotary units mounted to the chassis and rearwardly of each pair of cutter units of the mower means for receiving cut crop from the cutter units, for conditioning said crop and for widely spreading and depositing said crop in a fluffy pattern on the field; and each rotary unit being rotatable about a generally upright axis and with one rotary unit of each pair being located closer to the mower means than the other rotary unit of the pair.

4,094,133
METHOD AND APPARATUS FOR CONTROLLING AN OPEN-END SPINNING MACHINE
Edwin Furrer, Winterthur, Switzerland, assignor to Rieter Machine Works Limited, Winterthur, Switzerland
Filed Jun. 25, 1976, Ser. No. 700,061
Claims priority, application Switzerland, Jul. 16, 1975, 9298/75
Int. Cl.[2] D01H *1/32*
U.S. Cl. 57—34 R 8 Claims

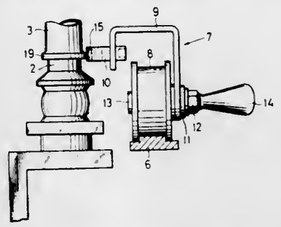


1. In a method of controlling the start-up, the normal spinning operation and the stopping of all spinning positions of an open-end spinning machine comprising an electronic control unit supplied with power from a power source via a power line, and control circuits extending from the electronic control unit to devices which influence the operation of the spinning positions, the improvement comprising maintaining the normal spinning operation of the spinning positions of the open-end spinning machine in case of failure of the electronic control unit by continuing to supply power for the normal spinning operation from said power source to at least some of said control circuits.

4. An apparatus for controlling the start-up, the normal operation and the stopping of all spinning positions of an open-end spinning machine comprising an electronic control unit, a power supply line for delivering power to the electronic control unit, control circuits extending between the electronic control unit and the spinning positions for influencing the operation of such spinning positions, a relay provided with a self-holding contact, a switch connecting the relay with the electronic control unit, first contact means and second contact means, said relay being operatively connected with the first contact means for opening at least some of said control circuits and with said second contact means for connecting at least some of said control circuits with the power supply line.

4,094,134
THREAD END CUTTING APPARATUS IN SPINNING MACHINE
Nakanishi Kazuo, Ujishi, Japan, assignor to Murata of America Inc., Charlotte, N.C.
Filed May 14, 1976, Ser. No. 686,398
Int. Cl.[2] D01H *11/00*
U.S. Cl. 57—56 1 Claim

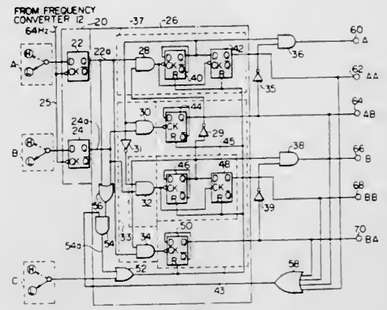
1. A thread end cutting apparatus in combination with a fine spinning machine, which fine spinning machine includes a row of rotatable spindles and in combination with a separate bobbin mounted on each of the respective spindles having an annular metal fitting on one end thereof and wherein the leading end of thread to be wound on a bobbin on rotation of the associated spindle is placed between the bobbin and spindle as the bobbin is sleeved over the spindle and wherein the leading end of the thread so placed between a bobbin and spindle is passed over the metal fitting prior to being wound on the bobbin, which cutting apparatus includes a guide bar positioned adjacent the row of spindles and parallel thereto and a cutter device mounted on the guide bar for movement therealong parallel to the row of spindles, which cutter device includes a support arm extending longitudinally of the bar, a roller adjacent each end of the support arm, shafts rotatably mounting the rollers, each roller having a peripheral configuration whereby the roller is guided along the bar on engagement of the roller with the bar and movement of the cutting device longitudinally of the bar, screw means securing the shafts to the support arm at



the opposite ends thereof, a U-shaped body portion having a pair of leg portions with free ends and a connecting portion, the free end of one of the leg portions of which is secured to the support arm, a cutting member secured to the free end of the other leg portion of the U-shaped body portion, said cutting member including a plurality of L-shaped attachments secured thereto in spaced apart relation longitudinally of the bar, a pair of leaf springs connected to each attachment providing cutting surfaces extending longitudinally of the bobbins in spaced apart relation longitudinally of the bar with the cutting device positioned on the bar for movement therealong, said cutting surfaces being adapted to resiliently engage the annular metal fittings on the bobbins on movement of the cutting device along the bar to engage and cut the leading end of the thread placed between the bobbin and spindle.

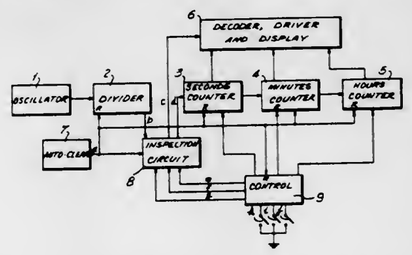
4,094,135
SWITCH CONTROL UNIT FOR ELECTRONIC TIMEPIECE
Yasushi Nomura, Tokorozawa, and Shigeru Morokawa, Higashiyamato, both of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan
Filed May 24, 1976, Ser. No. 689,021
Claims priority, application Japan, May 26, 1975, 50-61945; Aug. 14, 1975, 50-98808
Int. Cl.[2] G04C *3/00*
U.S. Cl. 58—23 R 12 Claims

1. A switch control unit for an electronic timepiece comprising:
a first control switch adapted to provide a first output pulse when actuated;
a second control switch adapted to provide a second output pulse when actuated;
a first memory circuit connected to said first control switch and including circuit means for storing said first output pulse when said first control switch is actuated before said second control switch is actuated, the circuit means of said first memory circuit generating a first output in response to said first output pulse stored in the circuit means of said first memory circuit;
a second memory circuit connected to said second control switch and including circuit means for storing said second output pulse when said second control switch is actuated before said first control switch is actuated, the circuit means of said second memory circuit generating a second output in response to said second output pulse stored in the circuit means of said second memory circuit; and
discrimination gate means including a first gate responsive to said first output and said second output pulse for thereby generating a first output signal representative of a first



sequence of actuations of said first and second control switches, and a second gate
responsive to said second output and said first output pulse for thereby generating a second output signal representative of a second sequence of actuations of said first and second control switches.

4,094,136
ELECTRONIC TIMEPIECE INSPECTION CIRCUIT
Hitomi Aizawa, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan
Filed Dec. 22, 1976, Ser. No. 753,129
Claims priority, application Japan, Dec. 24, 1975, 50-154284
Int. Cl.[2] G04C *3/00*
U.S. Cl. 58—23 R 9 Claims



1. In an electronic timepiece having oscillator means for producing a high frequency time standard signal, a divider means for receiving said high frequency time standard signal and producing a lower frequency time standard signal in response thereto, timekeeping counter means for producing timekeeping signals representative of actual time in response to said lower frequency time standard signal being applied thereto, and display means for displaying time in response to said timekeeping signals being applied thereto, the improvement comprising auto-clear means coupled to said timekeeping counter means and said divider means for detecting a power-on condition and in response thereto for applying a reset pulse signal to said counter means and divider means to reset the counts thereof, and first inspection means coupled intermediate said divider means and timekeeping counter means, said first inspection means being adapted to receive said reset signal and in response thereto apply a first inspection signal to said display means until said lower frequency time standard signal is applied to said inspection means at a predetermined interval of time after said reset signal is applied to said inspection means so

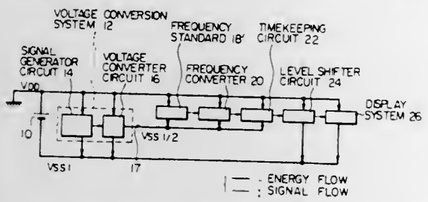
that a first inspection of said display means is effected during said predetermined interval of time.

4,094,137

VOLTAGE CONVERSION SYSTEM FOR ELECTRONIC TIMEPIECE

Shigeru Morokawa, Higashiyamato, Japan, assignor to Citizen Watch Company Limited, Tokyo, Japan

Filed Sep. 22, 1976, Ser. No. 726,013
Claims priority, application Japan, Sep. 27, 1975, 50-116620
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 A **39 Claims**



1. An electronic timepiece having a power source, comprising:

a frequency standard;

a frequency converter coupled to said frequency standard to divide an output frequency of said frequency standard to provide output pulse signals;

a timekeeping circuit driven by said output pulse signals;

display means for displaying the contents of said timekeeping circuit; and

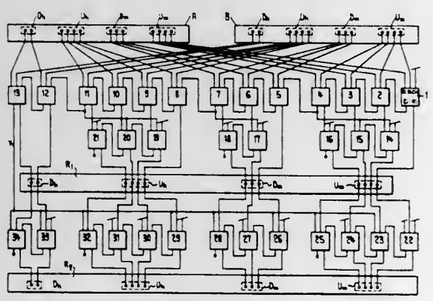
a voltage conversion system coupled to the power source to provide a lower output voltage than that of the power source to operate at least one of said frequency standard, frequency converter, timekeeping circuit and display means at the lower output voltage from said voltage conversion system, said voltage conversion system including a plurality of electric energy storage means, and means for switching connections of said plurality of electric energy storage means relative to the power source for thereby providing said lower output voltage.

4,094,138

ELECTRONIC CHRONOGRAPH

Fernand Chetelat, Cortaillod, and Pierre Hersberger, Neuchatel, both of Switzerland, assignors to Ebauches S.A., Neuchatel, Switzerland

Filed Jul. 24, 1975, Ser. No. 598,691
Claims priority, application Switzerland, Aug. 9, 1974, 11303/74
Int. Cl.² G04F *8/00*
U.S. Cl. 58—39.5 **7 Claims**



1. An electronic chronograph for calculating the difference between two intervals of time, each decimal digit of which is represented as a binary word, comprising

a subtracting circuit including a plurality of functionally similar subtracting units connected to form a plurality of sets of parallel groups, each group representing a decimal digit and comprised of a plurality of parallel subtracting units, said subtracting circuit comprised of

a first set of said subtracting units including a group of subtracting units for each word for producing the time differences between each corresponding word of said intervals of time, the subtracting unit of highest significance of each group having a carry-over output, and

a second set of said subtracting units including groups of subtracting units interconnected each with a group of said first set, each group of said second set having a control input of at least one of its subtracting units connected to said carry-over output of the corresponding group of said first set of subtracting units for subtracting a correcting cipher from each of said differences whenever said carry-over output has a carry-over signal such that each group has its own correcting cipher based on the resultant decimal digit to which that group corresponds and hence at least two groups have different correcting ciphers,

said first and second sets of subtracting units having first groups of outputs delivering a first corrected time difference,

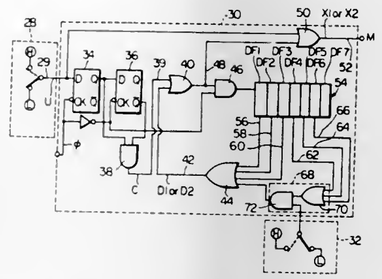
whereby said first output groups represent the time difference between said intervals when said subtrahend is less than said minuend, and the complement of said set of output groups represent the time difference between said intervals when said subtrahend is greater than said minuend.

4,094,139

DISPLAY CONTROL CIRCUIT FOR ELECTRONIC TIMEPIECE

Yasushi Nomura, Tokorozawa, and Yasuhiko Nishikubo, Iruma, both of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Sep. 10, 1976, Ser. No. 722,242
Claims priority, application Japan, Sep. 12, 1975, 50-110649; Oct. 21, 1975, 50-142541[U]; Oct. 28, 1975, 50-146070[U]
Int. Cl.² G04B *19/30*
U.S. Cl. 58—50 R **6 Claims**



1. In an electronic timepiece having a frequency standard, a frequency converter connected to the frequency standard, a time counter providing a time information signal in response to a low frequency signal from the frequency converter, a decoder providing decoded outputs in response to the time information signal, an electro-optical display device responsive to the decoded outputs to provide a display of time information, and a switching gate coupled between the decoder and the electro-optical display device and normally assuming a first state to inhibit the supply of said decoded outputs to said electro-optical display device and operative to assume a second state to allow the supply of said decoded outputs of said electro-optical display device to cause said display device to display said time information, the improvement comprising:

a first external control switch to provide an output signal when actuated;

a second external control switch to provide a control signal when actuated; and

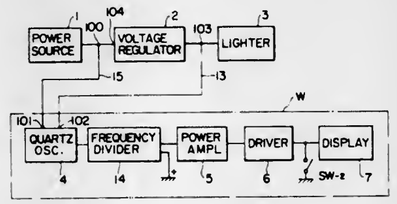
a display control circuit responsive to said output signal to render said switching gate to assume its second state for thereby causing said electro-optical display device to display said time information, said display control circuit including a timer circuit composed of a first section of flip-flops for setting a predetermined length of time in response to said output signal generated upon actuation of said first external control switch and a second section of flip-flops coupled to said first section of flip-flops, first gate means having first inputs coupled to outputs of said flip-flops of said first section and a second input coupled to outputs of the flip-flops of said second section, and second gate means coupled between the outputs of the flip-flops of said second section and said second input of said first gate means, said second gate means responsive to said control signal for passing the outputs of the flip-flops of said second section to the second input of said first gate means which consequently produces an output for a time interval in addition to said predetermined length of time.

4,094,140

TIMEPIECE-GAS LIGHTER ASSEMBLY

Hideki Ohue, 3-6-13, Kitaurawa, Urawa-shi, Saitama-ken, and Masatoshi Katayama, 1-650, Higashiohnari, Ohmiya-shi, Saitama-ken, both of Japan

Filed Aug. 24, 1976, Ser. No. 717,342
Int. Cl.² G04B *37/12*
U.S. Cl. 58—152 R **6 Claims**



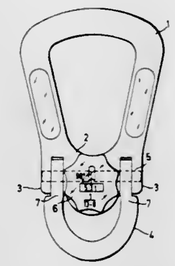
1. A unitary electronic digital display watch and liquefied gas-fueled lighter comprising a casing, a watch module mounted within said casing comprising a quartz oscillator, a digital display means for displaying a digital output, and circuit means for interconnecting said quartz oscillator with said digital display means for providing a readout representing the time, a d.c. power source connected to said watch module, and a first switch means connected to said watch module for interconnecting said power source with said watch module, a blocking oscillator, a second switch means for interconnecting said d.c. power source to said blocking oscillator, a step-up transformer having a primary winding and a secondary winding, said primary winding provided at the output of said blocking oscillator, said secondary winding connected to a spark-gap ignition circuit, said spark-gap ignition circuit comprising a pair of electrodes spaced apart to form a spark-gap, means for amplifying a pulse output across said secondary winding to a high-voltage pulse across said spark-gap of sufficient magnitude to ignite an ignitable gas appearing across said spark-gap, means for providing an ignitable gas across said spark-gap, diode means connected between said secondary winding and said pair of electrodes for preventing said high-voltage pulse from passing to said quartz oscillator, and means for positioning said digital display means and said spark-gap in said casing such that the light emitted by the ignited gas across said spark-gap is applied to said digital display means for providing a visual readout of said digital display means.

4,094,141

TERMINAL CHAIN LINK WITH BUILT-IN INDICATOR

Friedhelm Rehbein, Ober-Oesbern, Germany, assignor to August Thiele, Kalthof, Germany

Continuation of Ser. No. 592,047, Jun. 30, 1975, abandoned. This application Jan. 18, 1977, Ser. No. 760,469
Claims priority, application Germany, Mar. 12, 1974, 2411725
Int. Cl.² F16G *15/04*
U.S. Cl. 59—93 **10 Claims**



1. A terminal chain link with built-in indicator, comprising a link body having two arm portions each formed with a recess and having an end section, and a brace portion of one-piece with said arm portions and extending between said end sections of the latter, said link body having an interior passage extending through said arm portions and said brace portion, said link body also having a polygonal shield portion having equiangularly spaced vertices and inwardly curved edge portions intermediate said vertices, said shield portion being of one-piece with said brace portion of said link body and having opposite sides which lie along a plane in which said arm portions lie and bear information as to load factor and other analogous information, said shield portion having a transverse dimension in direction normally of the plane exceeding that of said end sections of said arm portions and that of said brace portion so as to both reinforce the link body in the region of said brace portion weakened by said passage, and also make the load-bearing characteristic of the chain link readily determinable whereby the one-piece construction of said arm portions, said brace portion and said shield portion strengthens the chain link; a shackle having spaced end portions each insertable into a respective one of said recesses and each having an interior bore which registers with said passage upon insertion of said end portions into said recesses; and a bolt extending through said registering bores and passage for pivotally connecting said shackle with said link body for movement in a path which is remote from said shield portion so as to prevent mechanical interference with the latter during pivoting movement of said shackle.

4,094,142

TURBINE SYSTEM METHOD AND APPARATUS

William C. Pfefferle, Middletown, N.J., assignor to Engelhard Minerals & Chemicals Corp., Iselin, N.J.

Continuation of Ser. No. 519,289, Oct. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 227,420, Feb. 18, 1972, abandoned. This application Sep. 20, 1976, Ser. No. 724,654
Int. Cl.² F02C *7/22*
U.S. Cl. 60—39.03 **8 Claims**

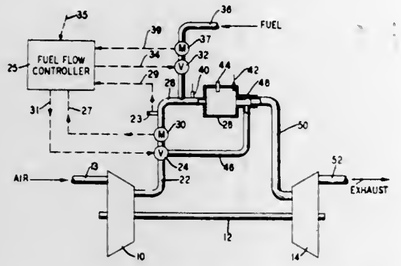
2. A method for operating a gas turbine by combusting, over a period of operation of said turbine during which variations occur in the fuel demand or in the combustion air temperature, carbonaceous fuel which when burned with a stoichiometric amount of air has an adiabatic flame temperature above about 3,300° F, comprising:

(a) forming an intimate admixture of said fuel and said combustion air, while controlling the ratio of said fuel to said combustion air in said admixture to maintain the adiabatic

flame temperature of said admixture, despite said variations, at about a preselected value in the range of about 2,500° to about 3,300° F;

(b) introducing said admixture into a combustion zone wherein combustion is proceeding under essentially adiabatic conditions with formation of combustion products in the combustion zone;

(c) mixing said fuel-air admixture with combustion products so formed to bring said admixture above its instantaneous auto-ignition temperature within said combustion zone, thereby combusting the fuel-air admixture at an approximately constant temperature in the range of about 2,500° F to about 3,300° F over a period of turbine operation in which the rate of introducing fuel into the combustion zone is varied, the velocity of the fuel-air admixture for



combustion being above the maximum flame-propagating velocity of the admixture at or upstream of the inlet to the combustion zone;

(d) simultaneously removing combustion products from said combustion zone;

(e) combining a sufficient amount of cooler, additional air with the combustion products so removed to provide a combined gas at a substantially lower temperature, wherein the temperature of the combined gas is maintained essentially constant at a temperature within the range of about 1,100° to about

2,700° F over a period of turbine operation in which the amount of fuel introduced into the combustion zone is varied; and

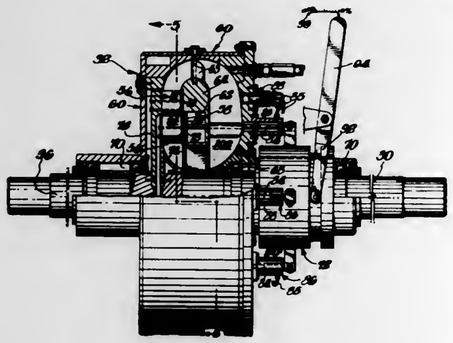
(f) passing the combined gas to a turbine as a motive fluid.

4,094,143

VARIABLE TORQUE HYDRAULIC CLUTCH

William R. Schlegel, and Harry E. Mayhew, Jr., both of Wilmington, Del., assignors to All American Industries, Inc., Thomaston, Conn.

Filed Dec. 13, 1976, Ser. No. 750,264
Int. Cl.² F16D *33/02*
U.S. Cl. 60—352 **9 Claims**



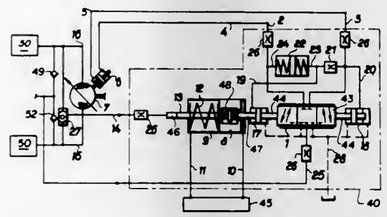
1. A variable torque hydraulic radially comprising a casing having a toroidal cavity and an inner wall containing a liquid, a rotatable input shaft mounted upon the casing, an input rotor blade ring disposed within the casing and connected to the input shaft, a rotatable output shaft mounted on the casing, an output rotor blade ring disposed within the casing peripherally adjacent the input rotor blade ring and connected to the output shaft whereby the output rotor ring is caused to rotate in response to rotation of the input rotor ring, the input and output rotor blade rings each including an annular array of substantially rdially disposed rotor blades, a toroidal flow-control ring disposed in the casing which is separated from the inner wall by a surrounding space having short and long circumferences, the flow-control ring being disposed adjacent the sides of the rotor blade rings whereby liquid flowing through them is circulated within the casing in directions parallel to the shorter circumference of the space surrounding the flow-control ring and back through the rotor blade rings, an annular recess in the flow-control ring adjacent one of the rotor blade rings, an annular blocking plate means constructed and arranged to be capable of closing off the flow through one of the rotor blade rings, translating means connected to the annular blocking plate means for moving it from a position in the annular recess withdrawn from the liquid circulating through the rotor blade rings to a position disposed outside the annular recess which blocks the flow of liquid from circulating through one of the rotor blade rings whereby the force transmitted through the clutch is varied, and the annular blocking plate means comprises an annular channel having a pair of legs which are disposed on both sides of the blades on one of the annular rotor rings to block off flow through the blades.

4,094,144

HYDRAULIC PRESSURE REGULATING ARRANGEMENT

Pavel Italy; Ondrej Kilik; Jozef Barancok, all of Nova Dubnica, and Anton Miski, Dubnica nad Vahom, all of Czechoslovakia, assignors to Strojarske a metalurgicke zavody, Dubnica nad Vahom, Czechoslovakia

Filed Mar. 16, 1977, Ser. No. 778,136
Int. Cl.² F16H *39/46*
U.S. Cl. 60—445 **6 Claims**



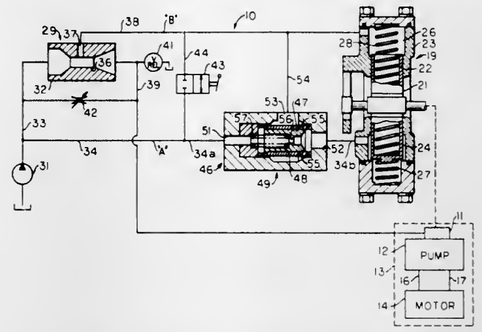
1. An arrangement for automatically controlling hydraulic pressure, comprising: a hydrostatic pump having an inlet and outlet pressure conduit, a servocylinder coupled to said hydrostatic pump and having a control piston to control the fluid volume thereof, a slide valve having an inlet conduit, a piston, and first and second outlet conduits, a control cylinder having a control pressure inlet and outlet, a piston within said control cylinder connected to the piston of said slide valve, a spring within said control cylinder acting on said piston thereof in one direction, a plunger connected to said control cylinder piston, a double acting return valve connected between the inlet and outlet pressure conduits of the hydrostatic pump, said return valve controlling via a pressure conduit the position of said plunger, the first and second outlet conduits of the slide valve being connected to the servocylinder of the hydrostatic pump.

4,094,145

UNDERSPEED ACTUATOR FOR A HYDROSTATIC TRANSMISSION HAVING A SHUNT VALVE

Cyril W. Habiger, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 16, 1977, Ser. No. 807,277
Int. Cl.² F16H *39/46*
U.S. Cl. 60—447 **4 Claims**



1. In a control system for controlling the displacement of a first pump driven by a prime mover, comprising:

control means for adjusting the displacement of said first pump;

an underspeed actuator having a piston, first and second actuating chambers at opposite ends of said piston, and a biasing means, said piston being connected to the control means and movable between a first position at which said first pump is at minimum displacement and a second position at which said first pump is at maximum displacement, said biasing means urging the piston toward the first position and said piston being movable between said first and second positions in response to pressure differential in said first and second chambers;

signal means for controllably developing first and second control signals in response to the operating speed of the prime mover, said signal means having a first conduit for delivering said first control signal to said first chamber and a second conduit for delivering said second control signal to said second chamber; and

shunt valve means connected to the first and second conduits for passing fluid expelled from the first chamber to the second chamber in response to said flow of fluid expelled from the first chamber exceeding a preselected flow rate.

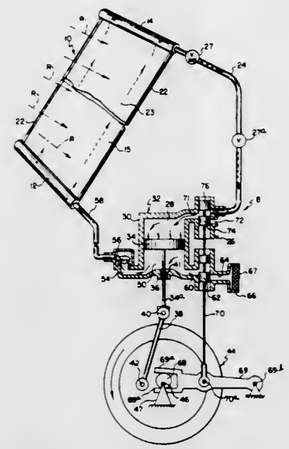
4,094,146

SOLAR ENGINE

Earl O. Schweitzer, 29353 Luxona Rd., Wickliffe, Ohio 44092

Filed May 7, 1976, Ser. No. 684,115
Int. Cl.² F03G *7/02*; F02C *1/04*
U.S. Cl. 60—641 **6 Claims**

1. A solar engine comprising a thin-walled pressure vessel capable of containing and heating air by means of solar energy, and a diaphragm air motor connected to said vessel and adapted to be driven by a mass of heated air from said vessel, said air motor including a housing defining a chamber having a movable diaphragm therein dividing said chamber into spaced chamber portions, one of said portions comprising air pump means adapted for pumping a substantially equal mass of cool air into said vessel as compared to the first mentioned mass of heated air, said air motor having excess power output means capable of doing work, and including check valve means on the output side of said pump means and the intake side of said vessel, for preventing reverse flow of air from said intake side in a direction toward said pump means, said diaphragm being secured adjacent its periphery to said housing, and including a generally central head portion to which a rod is secured, said rod extending exteriorly of said housing, and adapted for coupling to means for doing work, the central sections of the interior surface of said housing that are disposed in confronting relation to said head portion being of a configuration to generally snugly receive said head portion in generally engaged relation in the respective maximum stroke positions of said rod and attached head portion, the interior surface sections of said housing laterally of said central sections being generally convex, and engaging the portions of said diaphragm outwardly from said head portion in generally surface-to-surface relation in said respective maximum stroke positions of said rod and attached head portion, for increasing the efficiency of said engine.

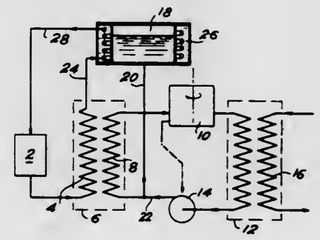


4,094,147

CIRCUIT FOR THE SUPPLY OF CONDENSABLE FLUID TO A SOLAR ENGINE

Thierry Alleau, Saint-Ismier, and Robert Moracchioli, Grenoble, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 8, 1977, Ser. No. 775,476
Claims priority, application France, Mar. 11, 1976, 76 07005
Int. Cl.² F03G *7/02*; F01K *3/00*
U.S. Cl. 60—641 **3 Claims**



1. An improved circuit for the supply of a condensable fluid to a solar engine comprising a primary circuit in which a first liquid is circulated, and comprising at least one solar collector and an evaporator having primary and secondary portions and a secondary circuit in which a condensable fluid is circulated, said secondary circuit including the secondary portion of said evaporator, an oulet for said evaporator supplying a solar engine coupled with a condenser, an oulet for said condenser connected by a re-supply pump to an inlet of said secondary portion of said evaporator, said re-supply pump being coupled with said engine, wherein said secondary circuit comprises a

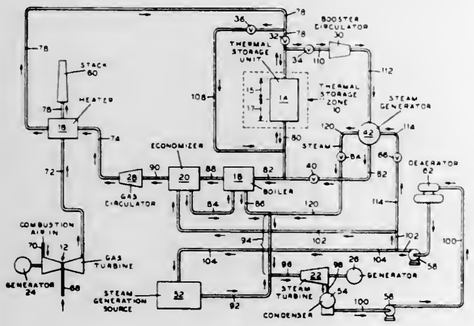
start-up storage tank located at a higher level than said evaporator and connected by a pipe to said secondary circuit at a point in said secondary circuit between said engine and said pump and including said secondary portion of said evaporator, and regulating means for said storage tank for bringing the fluid therein to a temperature lower than the temperature of the condensable fluid within said evaporator.

4,094,148

THERMAL STORAGE WITH MOLTEN SALT FOR PEAKING POWER

Hazen E. Nelson, Acton, Mass., assignor to Stone & Webster Engineering Corporation, Boston, Mass.

Filed Mar. 14, 1977, Ser. No. 777,458
Int. Cl.[2] F01K *3/00, 23/10*
U.S. Cl. 60—652 **13 Claims**



1. In a process for the generation of electrical power wherein coil is gasified and these gases are burned to produce a stream of heated fuel gases which are introduced into an electrical power generation zone to generate electrical power during peak and non-peak electrical power demand periods and wherein heated exhaust gases are released from said electrical power generation zone, the improvement which utilizes the heat released by said exhaust gases to generate increased electrical power during peak demand periods comprising:

(i) passing a heat exchange gas in contact with said heated exhaust gases to heat said heat exchange gas with heat released by said exhaust gases;

(ii) introducing said heated heat exchange gas into a thermal storage zone wherein during non-peak demand periods a portion of the heat released by said heated heat exchange gas is stored in said thermal storage zone for use during peak demand periods;

(iii) passing said heat exchange gas discharged from said thermal storage zone into a first steam generation zone wherein the remaining portion of heat of said heated heat exchange gas is utilized to generate steam for producing electrical power during non-peak demand periods;

(iv) during peak demand periods admixing said heated heat exchange gas from step (i) with additional heat exchange gas;

(v) introducing said admixture into said thermal storage zone to heat said admixture with the heat stored in said thermal storage zone;

(vi) passing the heated admixture discharged from said thermal storage zone into a second steam generation zone wherein the heat of said admixture is utilized to generate steam for producing increased electrical power during peak demand periods;

(vii) recirculating a portion of the admixture discharged from said second steam generation zone back into said thermal storage zone to heat said recirculated admixture with the heat stored in said thermal storage zone;

(viii) directing the remaining portion of the admixture discharged from said second steam generation zone into said first steam generation zone to generate steam for producing electrical power;

(ix) heating the admixture discharged from said first steam generation zone with said exhaust gases; and

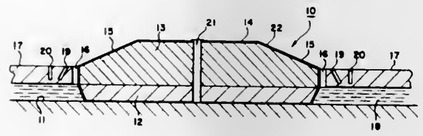
(x) admixing said recirculating portion of admixture of step (vii) with said heated admixture of step (ix) and introducing same into said thermal storage zone.

4,094,149

OFFSHORE STRUCTURE IN FRIGID ENVIRONMENT

Gene D. Thompson, Denver, Colo., and Hans O. Jahns, Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Jul. 30, 1976, Ser. No. 709,975
Int. Cl.[2] E02B *3/00*
U.S. Cl. 61—1 R **22 Claims**



1. A method for constructing a structure in an arctic offshore environment comprising:

forming an artificial ice island extending from the sea floor to above the surface of the water; and

installing a caisson entirely through said island to below said sea floor, said caisson being formed in two parts, one part extending through said island to said sea floor and the other part extending from said sea floor to below said sea floor, said caisson being separable at said sea floor upon movement of said island.

4,094,150

COMPOSITION OF MATTER USEFUL FOR EARTHEN FORMATION TREATMENT

William J. Clarke, Ridgewood, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Apr. 15, 1976, Ser. No. 677,355
Int. Cl.[2] C08L *35/00*
U.S. Cl. 61—36 C **7 Claims**

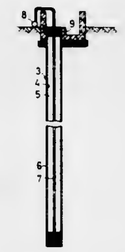
1. A method for treating earth formations around the joints of underground pipes and concrete foundations comprising injecting into the earth formation a gel-forming composition comprising an aqueous solution containing from about 5% to about 20%, by weight, based on the total weight of the solution of a mixture of (A) from about 80% to 99.5%, by weight, of monomeric acrylamide and correspondingly (B) from about 20% to 0.5% by weight of monomeric N,N'-methylenebisacrylamide wherein the percentages by weight of said monomers total 100%, and (C) from about 4% to 20%, by weight, of an unfired natural diatomaceous earth, 80% of which has a particle size between about 2μ and 10μ the percentage by weight of said diatomaceous earth being based on the total weight of the solution and (D) an effective amount of a polymerization catalyst, whereby fluid loss from the gelled composition into the earth formations is substantially reduced.

4,094,151

ANTI-FREEZING METHOD AND APPARATUS FOR GROUND SURROUNDING LIQUIFIED GAS STORING UNDERGROUND TANK

Hiroshi Fujita, Tokyo; Munetaka Kubota, Hino; Takashi Makita, Yokosuka, and Yukishige Takahashi, Mitaka, all of Japan, assignors to Kajima Kensetsu Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 19, 1977, Ser. No. 788,960
Int. Cl.[2] E02D *27/38;* F17C *13/10*
U.S. Cl. 61—36 A **6 Claims**



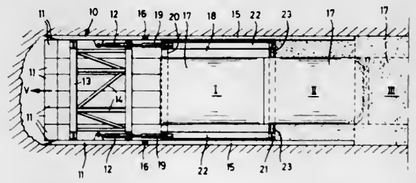
1. Apparatus for warming ground about an underground cryogenic storage tank comprising: a vertically disposed water impermeable envelope embedded in the ground adjacent to said tank, said envelope being filled with granular material; a source of water for said envelope; water conveying means in said envelope extending from the upper to the lower portion of said envelope; said water conveying means being in communication at its lower end with the interior of said envelope and being in communication at its upper end with water impelling means adapted to move water through said envelope; and means to dispose of excess water from said envelope.

4,094,152

APPARATUS FOR LAYING A PIPE LINE

Hans Jütte, Dortmund-Brechten, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Lunen, Germany

Filed Apr. 27, 1977, Ser. No. 791,487
Claims priority, application Germany, May 21, 1976, 2622671
Int. Cl.[2] E21D *5/12*
U.S. Cl. 61—41 A **7 Claims**



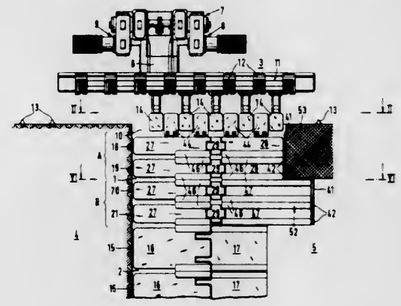
1. An apparatus for use in laying a pipe line composed of individual pipe sections arranged end-to-end; said apparatus comprising an advanceable shield for excavating an open trench and for supporting the walls thereof, said shield being composed of a plurality of longitudinally displaceable elongate drive members, frame means for supporting and guiding the drive members and ram means for effecting relative movement between the frame means and the drive members to effect advancement of the trench, supplementary elongate members connected to the drive members for supporting the trench walls rearwardly of the shield, an open frame supporting the supplementary members and serving to receive the individual pipe sections and adjustable means for connecting said open frame to the frame means and for effecting relative displacement therebetween, wherein the length of the supplementary members is substantially greater than the length of the open frame so as to extend rearwardly thereof and the length of the supplementary members is at least twice the length of one of the pipe sections.

4,094,153

BREAST ROOF SUPPORT SYSTEM FOR LONGWALL MINING

Günter Blumenthal, Westerhold; Karlheinz Bohnes, and Peter Marr, both of Bochum, all of Germany, assignors to Bochumer Eisenhütte Heintzmann GmbH & Co., Germany

Filed Dec. 9, 1976, Ser. No. 748,911
Claims priority, application Germany, Oct. 15, 1976, 2646563
Int. Cl.[2] E21D *15/44*
U.S. Cl. 61—45 D **11 Claims**



1. A prop system for supporting the roof of a breast extending laterally from a mine and having a face side at a working area and a stowage side at a stowage area, said system comprising:

at least three similar props one of which is relatively close to said mine, one of which is relatively far from said mine, and one of which is flanked by the other two props, said props each including

a lower floor-engaging part elongated longitudinally generally parallel to said mine,

a roof-engaging upper part extending generally parallel to the respective lower part and having a pair of opposite ends extending longitudinally past the respective lower part, and

means for displacing each upper part vertically relative to the respective lower part;

means extending longitudinally between adjacent props for displacing each prop longitudinally generally parallel to said mine relative to the other props for stepping of said props along said breast parallel to said mine;

an upright and transversely extending solid shield on each of said props extending transversely to said mine between the respective upper and lower parts at the ends thereof turned toward said stowage side; and

an upright and longitudinally extending solid shield extending longitudinally generally parallel to said mine between the upper and lower parts of the prop furthest from said mine, said transverse and longitudinal shields together partitoning said stowage area off from said working area.

4,094,154

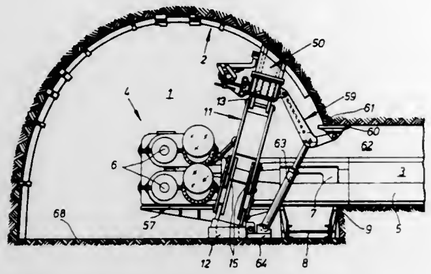
ROOF PROP APPARATUS AND METHOD FOR LONGWALL MINING

Gunter Blumenthal, Westerholt; Karlheinz Bohnes, and Peter Marr, both of Bochum, all of Germany, assignors to Bochumer Eisenhutte Heintzmann GmbH & Co., Bochum, Germany

Filed Dec. 9, 1976, Ser. No. 748,912
Claims priority, application Germany, Oct. 15, 1976, 2646562
Int. Cl.[2] E21D *15/44*
U.S. Cl. 61—45 D **19 Claims**

1. A roof-propping apparatus for longwall mining wherein the mine roof is supported by a succession of arches each in

turn supported at one mine wall by a respective leg, said apparatus comprising: a pair of similar frames each having an elongated upper part juxtaposable with said arches and a lower part supported on the mine floor, said upper parts extending parallel next to each other; a plurality of discrete holders each engageable between said upper parts and said arches; means for



expanding said holders and bracing said holders between either of said upper parts and respective arches; means for displacing said frames relative to each other in the direction of elongation of said upper parts; and a support platform mounted on one of said frames adapted and constructed to support mining equipment.

4,094,155

MINE ROOF SUPPORT

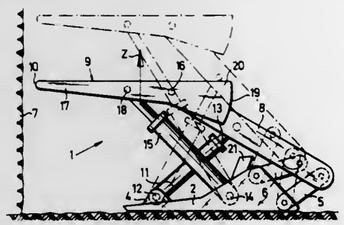
Günter Blumenthal, Westerholt; Gustav Neu, Bochum, and Hans-Ferdinand Bemmerl, Hern, all of Germany, assignors to Bochumer Eisenhutte Heintzmann GmbH & Co., Bochum, Germany

Filed Jan. 21, 1977, Ser. No. 760,949

Claims priority, application Germany, Feb. 3, 1976, 2603953

Int. Cl.² E21D *15/44*

U.S. Cl. 61—45 D **18 Claims**



1. A mine roof support for an underground mine gallery comprising elongated sole plate means integral in the longitudinal direction thereof and adapted to engage the floor of a mine gallery; a rear shield having a lower and an upper end; link means connecting said rear shield in the region of the lower end thereof to said sole plate means; a roof shield having a front end adapted to be directed towards the face of the mine gallery and an opposite rear end; pivot means connecting said roof shield intermediate the ends thereof to the upper end of said rear shield, with a portion of said roof shield between said pivot means and said front end thereof considerably longer than the portion between said pivot means and the opposite rear end of said roof shield; at least one extensible and collapsible prop means between said sole plate means and the portion of said roof shield means which is located forwardly of said pivot means; and at least one additional extensible and collapsible prop means between said sole plate means and said rear shield means.

4,094,156

METHOD AND APPARATUS FOR DRIVING SHEET PILES INTO THE GROUND

Fritz Dumont, Dortmund-Persebeck, Germany, assignor to Baugesellschaft Klammt KG, Hagen, Germany

Filed Mar. 6, 1974, Ser. No. 448,764

Claims priority, application Germany, Mar. 10, 1973, 2312032; Feb. 9, 1974, 2406283

Int. Cl.² E02D *7/26*

U.S. Cl. 61—53.5 **14 Claims**

1. A method of driving a sheet pile into the ground comprising driving a sheet pile into the ground and boring a hole adjacent said sheet pile, at least one part of the boring step being performed at a time when the pile is already in a partially driven-in state, said hole being of such distance from the pile as to provide at least partial space for the soil displaced by the pile.

4,094,157

ANCHORING APPARATUS FOR ANCHORING A MINING INSTALLATION

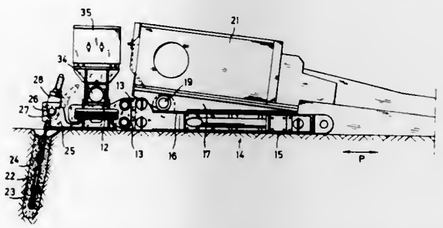
Werner Karsten, Gelsenkirchen, and Helmut Erwien, Lunen, both of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Germany

Filed Dec. 3, 1976, Ser. No. 747,434

Claims priority, application Germany, Dec. 5, 1975, 2554690

Int. Cl.² E21D *20/00, 21/02*

U.S. Cl. 61—63 **14 Claims**



1. Anchoring apparatus for anchoring a mining installation to the floor of a mining excavation, said apparatus comprising:

(a) an anchor beam;

(b) an anchoring element for anchoring in a borehole in said mining excavation floor; and

(c) a tensioning device for prestressing the anchoring element, said tensioning device comprising:

(i) a pivot bearing rigidly attached to said beam;

(ii) a support member pivotally mounted in said pivot bearing which permits pivoting of the support member about an axis parallel to the longitudinal axis of said anchor beam;

(iii) a connection member connected to said anchoring element; and

(iv) adjustment means for adjusting the position of said connection member with respect to said support member.

4,094,158

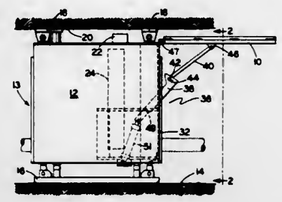
LOADING GATE FOR MINE ROOF BOLTER APPARATUS

Richard W. LeVere; Joseph M. Vocaturo, both of Trenton, and James L. Finney, Cranbury, all of N.J., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed May 27, 1977, Ser. No. 801,269

Int. Cl.² E21C *11/02*

U.S. Cl. 61—63 **13 Claims**



1. In combination with a mine roof bolter apparatus having an access opening in an end wall thereof for loading and unloading said apparatus, a door forming a protective canopy attached to said apparatus above said access opening for protective of personnel loading or unloading said apparatus; said door when in a closed position extending substantially the entire length of the access opening; and

means engaging said mine roof and floor for fixedly mounting the mine roof bolter apparatus therebetween.

4,094,159

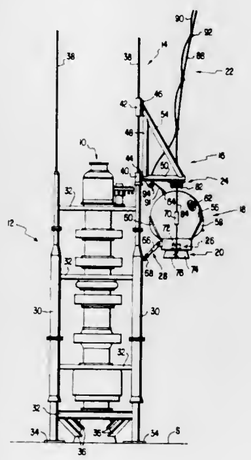
SUBMERSIBLE CHAMBER

Frederic L. Hettinger, Jupiter, Fla., assignor to Perry Oceanographics, Inc., Riviera Beach, Fla.

Filed Jun. 10, 1976, Ser. No. 694,833

Int. Cl.² B63C *11/40*

U.S. Cl. 61—69 R **9 Claims**



1. Diving apparatus comprising:

(a) a guide member system extending from a location at the seabed where work is to be performed and the sea surface and including member disposed laterally of the work location;

(b) a normally negatively buoyant bell assembly including a positively buoyant bell and a negatively buoyant ballast weight removably connected thereto;

(c) sliding frame means movable vertically along said guide member system beneath the sea surface between an upper position at the sea surface and a lower position sufficiently above the subsea surface to permit vertical movement of the bell assembly to the vicinity of the work location, the frame means being temporarily stationary at said lower position by abutment with a portion of said guide member system; and

(d) bell assembly moving means connected between said bell assembly and said frame means for moving said bell assembly between a lower position adjacent the subsea surface work location and an upper position adjacent said frame means when the latter is in its lower position.

4,094,160

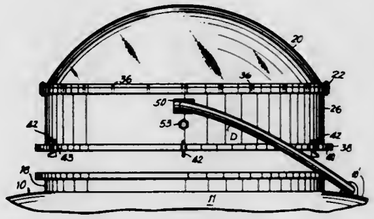
DIVING BELL WITH TRANSPARENT DOOR FOR PANORAMIC VIEWING

Andre Galerne, Larchmont, N.Y., assignor to International Underwater Contractors, Inc., Bronx, N.Y.

Filed May 9, 1977, Ser. No. 795,112

Int. Cl.² E05C *1/00*

U.S. Cl. 61—69 R **3 Claims**



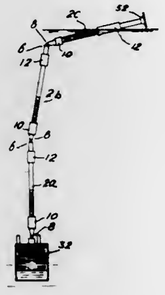
1. In a diving bell having a hollow frame in which is defined a cut-out portion; an improvement comprising a transparent closure adapted for being positioned in front of said cut-out portion and moveable between an opened position and a closed position; and means mounting said transparent closure in front of said cut-out portion so that said transparent closure is in alignment with said cut-out portion when said transparent closure is in its closed position, whereby panoramic observations may be made from within the bell; said transparent closure comprising a transparent, hemispherical portion having a circular end portion; a hollow cylindrical extension having a first end for supporting said circular end portion of said hemispherical portion thereon, and a second end spaced from said first end; and means mounting said circular end portion of said hemispherical portion on said first end of said hollow cylindrical extension; said means mounting said circular end portion on said first end comprising: a flange positioned about said first end of said hollow cylindrical extension, said flange and circular end portion of said hemispherical portion each having a canted surface of the same angle; and an annular ring positioned on said flange in a direction away from said second end of said hollow cylindrical extension, said annular ring having a canted surface that is perpendicular to the canted surface of said flange, said annular ring engaging said hemispherical portion adjacent said circular end portion, whereby the canted surfaces of said flange and said annular ring hold said circular end portion of said hemispherical portion so that said hemispherical portion is supported therein.

4,094,161

SUBMERGED APPARATUS AND METHOD FOR SUBMERSING THE SAME

Michel Moinard, Bizanos; Michel Leturcq, Rueil Malmaison, and Catherine Delcroix, Puteaux, all of France, assignors to Societe Nationale Elf Aquitaine, Paris, France

Filed May 7, 1976, Ser. No. 684,086
Claims priority, application France, May 7, 1975, 75 14447
Int. Cl.[2] E02D *23/02*
U.S. Cl. 61—95 **10 Claims**



1. A method for submersing and positioning a structure in a body of water through a series of separate and consecutive submersion stages so as to cause said structure to come to rest on the floor of said body of water, said method comprising the steps of:

(a) separately bringing to a location near the surface of the body of water above the submersion site said structure and a plurality of columns having several float means for ballast, said structure and columns being unattached to one another;

(b) positioning said structure which includes ballast means above the submersion site;

(c) acting on the ballast means of said structure in order to submerge said structure until its top is near the surface of the body of water and the apparent weight of said structure is reduced to about zero;

(d) pivotally attaching the top of said submerged structure to one end of a first of said plurality of columns;

(e) acting on the float means of said first column for pivotally displacing said attached one end of said first column downward until the column is brought into a vertical, submerged position in the water with the other end of said first column being close to the surface of the body of water, said structure being further submerged vertically downward at the submersion site by the pivotal displacement of said first column;

(f) pivotally attaching said other end of the first submerged column near the surface of the water to one end of a second column;

(g) acting on the float means of said second column for pivotally displacing said attached one end of said second column downward until the second column is brought into a vertical, submerged position in the water with the other end of said second column being close to the surface of the body of water, said structure and said first column being further submerged vertically downward at the submersion site by the pivotal displacement of said second column; and

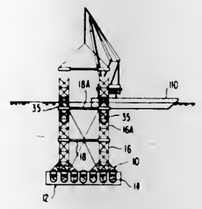
(h) maintaining the pressure within said structure at a value substantially equal to the pressure of the water surrounding said structure during each successive submersion stage.

4,094,162

METHOD FOR INSTALLING AN OFFSHORE TOWER

John W. Allee, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Filed Jun. 21, 1977, Ser. No. 808,520
Int. Cl.[2] E02B *17/00*
U.S. Cl. 61—96 **6 Claims**



1. A method of installing a tower at a worksite in a body of water, comprising the steps of:

floating to the worksite a tower subassembly comprising a base, a plurality of upright, open-trussed initial leg segments and flotation means;

floatingly disposing open-trussed add-on leg segments in the vicinity of said worksite;

ballasting said flotation means to partially immerse said subassembly so that buoyant jacking units disposed within and connected to respective ones of said initial leg segments floatingly support said subassembly, with top portions of said initial leg segments projecting above the water surface;

mounting add-on leg segments onto said leg portions projecting above the water surface;

while suspending said subassembly from said jacking units, lowering said subassembly so that said jacking units enter said add-on leg segments as said add-on leg segments pass downwardly therearound;

repeating said mounting and lowering steps until said base is supported on the floor of the body of water;

lifting said jacking units from the top ends of said uppermost add-on leg segments; and

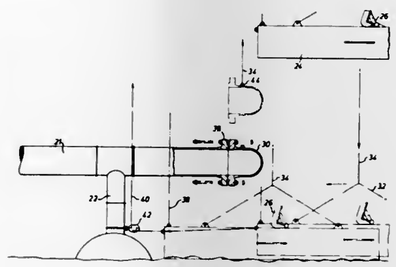
installing a work platform thereupon above the water surface.

4,094,163

OFFSHORE STRUCTURE AND METHOD

John William Ells, Bexleyheath; Ian David Parker, Basingstoke, and David Baird Langley Walker, London, all of England, assignors to The British Petroleum Company Limited, London, England

Filed Jun. 4, 1976, Ser. No. 692,771
Claims priority, application United Kingdom, Jun. 13, 1975, 25355/75
Int. Cl.[2] F16L *1/04;* B23Q *3/00*
U.S. Cl. 61—111 **8 Claims**



1. A method of aligning and connecting two pipes at an underwater location, each pipe having a flange at the terminus thereof, wherein at the commencement of the method the first pipe is supported in a stationary position beneath the surface of the water and the second pipe is positioned above the surface of the water, which method comprises:

(i) attaching an anchoring tool having a substantially flat portion to the flange of said first pipe so that the flat portion of said anchoring tool engages said flange thereby protecting said flange from damage during the connecting procedure, said anchoring tool having means for anchoring a plurality of guide wires at spaced apart locations from said flange;

(ii) anchoring a plurality of guide wires to the attached anchoring tool;

(iii) attaching a guide tool to the second of said pipes to engage said guide wires and said anchoring tool, said guide tool and said anchoring tool having cooperating means for aligning said pipes so that engagement of the anchoring tool with the guide tool aligns and axially spaces apart said pipes;

(iv) lowering said attached guide tool from above the surface of the water along said guide wires into engagement with said anchoring tool so that said pipes are aligned and axially spaced apart prior to being joined together;

(v) removing the anchoring tool and the guide tool and joining the two pipes together; and

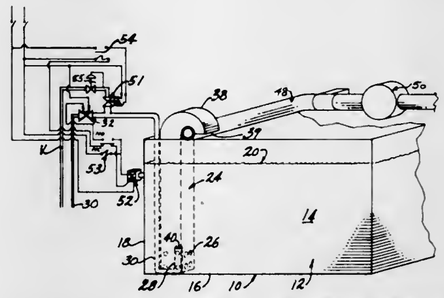
(vi) fastening the two pipes in a fluid tight relationship.

4,094,164

METHOD AND APPARATUS FOR REDUCING THE TEMPERATURE OF A FLUID

Louis T. Cope, Grayson, Ga., assignor to H & T Enterprises, Inc., Grayson, Ga.

Filed Feb. 18, 1976, Ser. No. 659,122
Int. Cl.[2] F25C *1/00;* F28C *1/00;* B01F *3/04;* F25D *3/12*
U.S. Cl. 62—74 **9 Claims**



1. In a method for reducing the temperature of a fluid: supplying pressurized liquid gas and releasing said gas beneath the fluid permitting same to become a moving gas within said fluid, directing said gas thru said fluid to reduce the temperature, and providing a vapor sweep cycle to prevent accidental formation of solid CO_2 in the supply lines including, in response to an unwanted pressure drop, supplying a small amount of vapor to maintain the pressure above a specified amount until all liquid has been discharged, and discontinuing said vapor upon the reaching of the desired pressure.

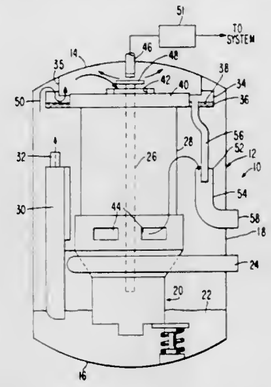
4,094,165

LOSS HEAT SUPPRESSION APPARATUS AND METHOD FOR HEAT PUMP

Francis J. Sisk, Apollo, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Nov. 19, 1976, Ser. No. 743,422
Int. Cl.[2] F25B *1/00*
U.S. Cl. 62—115 **12 Claims**

1. A compressor unit for a heat pump system comprising: a casing; a compressor mounted in the casing and having an inlet and a vapor outlet communicating with the interior of the casing to direct discharge vapor therinto; a motor within the casing and coupled to the compressor for driving the same, the motor having a housing provided with air gaps therethrough; means coupled with the casing for directing pressurized liquid from the system into the casing; means coupled with the directing means for spraying the liquid into the path of travel of the



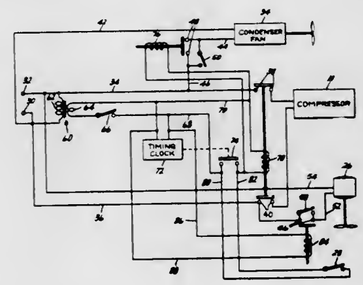
discharge vapor therefrom to de-superheat the discharge vapor, the motor having an opening permitting the discharge vapor to flow thereinto and through the air gaps thereof to cool the same and to re-superheat the vapor; and means for receiving the liquid and the re-superheated vapor to cause entrainment of the liquid in the vapor for flow to the system.

4,094,166

AIR CONDITIONING CONTROL SYSTEM

James B. Jerles, Tierra Verde, Fla., assignor to Electro-Thermal Corporation, Pensacola, Fla.

Filed Mar. 23, 1977, Ser. No. 780,665
Int. Cl.[2] F25B *41/00*
U.S. Cl. 62—158 **13 Claims**



1. An air conditioning system for maintaining ambient room air within a desired temperature range comprising:

a heat exchanger,

selectively activated energy transfer means for cooling said heat exchanger,

motor operated fan means for forcing a stream of air through said heat exchanger,

timer means for alternately activating said energy transfer means for a preselected first period of time and deactivating said energy transfer means for a preselected second period of time,

control means for activating and deactivating said timer means and said motor operated fan means in response to ambient room air temperatures above and below, respectively, a predetermined level and for activating and deactivating said energy transfer means during said second

timer period in response to the temperature of the air from said motor fan means on the downstream side of said heat exchanger being above and below, respectively, a predetermined level,

the ratio of said first and second periods remaining constant regardless of the ambient temperature responded to by said control means.

4,094,167

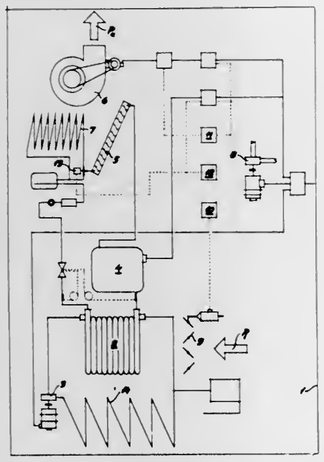
HEAT PUMP ASSEMBLY

Henning Brinch Madsen, Greve Strand, Denmark, assignor to Svenska Geotherm Aktiebolag, Karlstad, Sweden

Filed Mar. 4, 1976, Ser. No. 664,028

Int. Cl.² F25B *27/02, 13/00;* **F25D** *11/00*

U.S. Cl. 62—238 **4 Claims**



1. An assembly for dehumidifying air, comprising a heat pump system including a compressor, an evaporator, a condenser and a thermostatic expansion valve; a brine liquid system forming a closed system and including means for circulating the brine liquid in the system and means for maintaining the brine liquid at a temperature below the dew point of the air; a heat exchanger for heat exchange between the air to be dehumidified, the brine liquid and the evaporator, said heat exchanger forming a cooling surface; and means for passing air to be dehumidified past the cooling surface and from the cooling surface to the condenser.

4,094,168

ICE MAKING REFRIGERATION SYSTEM

George F. Hamner, and Richard M. Hamner, both of Tuscaloosa, Ala., assignors to Precision Fabricators, Inc., Albany, Ga.

Filed Jan. 26, 1977, Ser. No. 762,477

Int. Cl.² F25C *1/12*

U.S. Cl. 62—347 **5 Claims**

1. In an ice making refrigerating system adapted to be cycled alternately through a freezing phase and an ice harvesting phase and including a compressor, a condenser and an evaporator having a closed refrigerant chamber with an ice forming surface thereon for applying a substance to be frozen during the freezing phase,

(a) an accumulator tank above and externally of said refrigerant chamber,

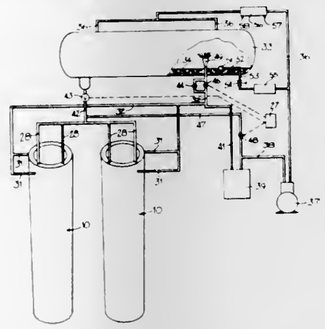
(b) valve means communicating said accumulator tank with said refrigerant chamber and disposed to deliver liquid refrigerant by gravity flow to said refrigerant chamber during the freezing phase,

(c) a suction conduit communicating the upper portion of said accumulator tank with the suction side of said compressor for separating liquid from vapor and returning vaporized refrigerant to said compressor,

(d) a vapor-liquid return conduit communicating an upper portion of said refrigerant chamber with said accumulator tank and disposed to convey vaporized refrigerant and liquid refrigerant from said refrigerant chamber to said accumulator tank,

(e) conduit means communicating the discharge side of said compressor with said condenser,

(f) conduit means communicating the liquid side of said condenser with said vapor-liquid return conduit downstream of said refrigerant chamber so that high pressure makeup liquid replaces the liquid evaporated in the refrigeration process and is delivered from the condenser to said vapor-liquid return conduit in the general direction of flow of refrigerant therethrough to form a mixture of said liquid delivered from the condenser and said vaporized



refrigerant and liquid refrigerant delivered from said refrigerant chamber and to aid in conveying said mixture toward said accumulator tank,

(g) valved means for conveying hot gaseous refrigerant under pressure from the discharge side of said compressor to said refrigerant chamber during the harvesting phase to warm said ice forming surface and displace refrigerant from said refrigerant chamber to said accumulator tank; and

(h) control means in said vapor-liquid return conduit downstream of the point said conduit means communicates the liquid side of said condenser with said vapor-liquid return conduit for restricting flow through said vapor-liquid return conduit during the harvesting phase to maintain a predetermined pressure in said vapor-liquid return conduit and allow liquid to pass from said refrigerant chamber to said accumulator tank when a predetermined pressure is reached in said vapor-liquid return conduit.

4,094,169

EXPANDER-COMPRESSOR TRANSDUCER

Lawrence Jay Schmerzler, 539 Laurel Pl., South Orange, N.J. 07079

Continuation of Ser. No. 59,306, Jul. 29, 1970, abandoned. This application Nov. 21, 1973, Ser. No. 417,958

Int. Cl.² F25B *1/02;* **F04B** *17/00*

U.S. Cl. 62—498 **2 Claims**

1. An expander-compressor transducer for expanding refrigerant fluid from a high pressure source into a low pressure heat absorbing heat exchanger while simultaneously precompressing the same fluid stream drived from the low pressure heat absorbing heat exhanger for delivery through suitable conduit heat exchangers to the suction side of the high pressure source, comprising

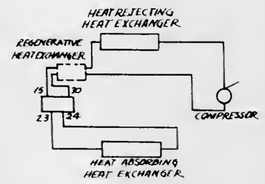
a body member enclosing a chamber for confinement of a refrigerant fluid.

fluid responsive piston means arranged to oscillate in said chamber and dividing said chamber into an expansion chamber at one end and a compression chamber at the other end,

return spring control means in said compression chamber for locating said piston means into initial start-up position,

fluid control regulating means for permitting flow of refrigerant fluid into and out of said expansion chamber and into said compression chamber, and

check valve means for permitting refrigerant flow out of said



compression chamber whenever the pressure in said compression chamber is higher than the fluid pressure immediately downstream of said check valve means.

thereby effecting oscillatory movement of said fluid responsive piston means within said chamber, causing concurrently the refrigerant fluid stream to expand in said expansion chamber and to compress in said compression chamber, and producing simultaneously a cooling effect and a work output.

4,094,170

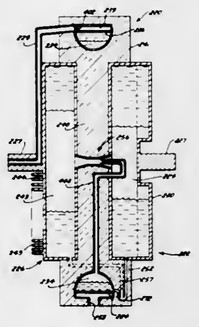
ROTARY THERMODYNAMIC APPARATUS

Frederick W. Kantor, 523 W. 112th St., New York, N.Y. 10025

Division of Ser. No. 461,452, Apr. 16, 1974, Pat. No. 3,981,627, which is a division of Ser. No. 864,112, Oct. 6, 1969, Pat. No. 3,808,828, which is a continuation-in-part of Ser. No. 608,323, Jan. 10, 1967, Pat. No. 3,470,704. This application Sep. 16, 1976, Ser. No. 723,733

Int. Cl.² F25B *3/00*

U.S. Cl. 62—499 **8 Claims**



1. A thermodynamic apparatus comprising a rotor, means for rotating said rotor, conduit means in said rotor having a pair of closed working fluid flow loops, one of said loops having a first heat transfer chamber, the other of said loops having a second heat transfer chamber, said conduit means including a third heat transfer chamber forming a common section for each of said loops, said loops sharing a common flow point at a location situated radially outwardly from the largest radial location of any free liquid surface in any of said chambers, means for removing heat from said third chamber, and means in said conduit for creating a difference in fluid vapor pressure in said second and third chambers whereby said fluid is adapted to discharge heat by condensation in said third chamber and absorb heat in said second chamber.

8. A thermodynamic apparatus comprising, a rotor, means for rotating said rotor, conduit means in said rotor having a pair of closed working fluid flow loops, one of said loops having a first heat transfer chamber, the other of said loops having a second heat transfer chamber, said conduit means including a third heat transfer chamber forming a common section for each of said loops, means for removing heat from said third chamber, and means in said conduit for creating a difference in fluid vapor pressure in said second and third chambers whereby said fluid is adapted to discharge heat by condensation in said third chamber and absorb heat in said second chamber; said working fluid comprising a pair of immiscible fluids, one of said fluids flowing through said one loop and the other of said fluids flowing through said other of said loops and having a density different from the density of said one fluid, said fluids being separated in their liquid forms at the periphery of said third chamber by the centrifugal effects of said rotor, and means in said loops for separately returning said one fluid to said first chamber and said other fluid to said second chamber.

4,094,171

METHOD OF KNITTING A SWEATER BLANK

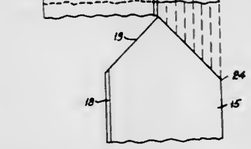
Frank Robinson, Breaston, England, assignor to Courtaulds Limited, London, England

Filed Aug. 19, 1977, Ser. No. 825,972

Claims priority, application United Kingdom, Aug. 24, 1976, 35155/76

Int. Cl.² A41B *9/06*

U.S. Cl. 66—176 **3 Claims**



1. A method of knitting a blank for a sleeved jacket or cardigan having overlapping front body panels, on a knitting machine with opposed needle beds containing independently operable needles, said method including the steps of

(a) knitting a set of sleeve fabrics for the blank on the two opposed needle beds, and

(b) knitting a set of body fabrics for the blank on the two opposed needle beds, the body fabrics comprising two front body panels and a rear body panel, the method also including,

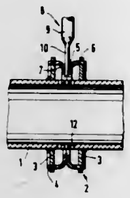
(c) the step, in knitting one of said sets of fabrics, of taking needles out of action progressively on both needle beds in an inwards direction from both ends of the bank of operative needles of the knitting machine, and holding loops on the needles taken out of action, and

(d) the step, in knitting the other of said sets of fabrics, of bringing the needles made inactive progressively back into knitting action in outwards directions towards the ends of the bank of operative needles of the machine thereby causing wales of the sleeve fabrics to be inclined to wales of the body fabrics in the blank, and further including

(e) the step, in knitting the body fabrics, of knitting one of

said front body panels before the other, casting one body panel at least partly off the needles before knitting the other body panel and knitting said other body panel partly on needles already used to knit said one body panel to form a garment blank with overlapping front panels.

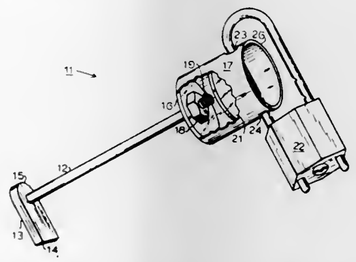
4,094,172
DEVICE FOR ADDING AND/OR REMOVING FLUID MEDIA IN A ROTATING DRUM
Hans F. Arendt, Bleichinsel, 712 Bietigheim, Wuertt., Germany
Filed Jun. 30, 1976, Ser. No. 701,370
Claims priority, application Germany, Aug. 30, 1975, 2538694
Int. Cl.[2] D06F *39/08*
U.S. Cl. 68—58 **7 Claims**



1. A device for adding and/or removing fluid media in a rotatable drum, comprising:
(a) a rotatable drum of hollow cylindrical configuration defined by a wall;
(b) a pair of annular flange members attached to the outer periphery of the drum and spaced apart to define an annular space extending around the drum;
(c) an elastically yielding sealing member attached to each of said flange members in annular relationship with said drum, each sealing member extending inwardly into said annular space and terminating in a sealing lip, with the respective sealing lips abutting against one another to form a seal in a generally radially extending plane;
(d) at least one fluid media passageway extending through the wall of the drum in the region between the flange members; and
(e) means positioned in said sealing plane for spreading said sealing lips apart, said lip-spreading means comprising a conduit having a generally flattened mouthpiece with a cross-sectional shape having its leading and trailing edges converging to a taper, said lip-spreading means extending into said annular space from the exterior to effect communication with the annular space, said fluid media passageway effecting communication between the annular space and the interior of the cylindrical drum.

4,094,173
VEHICLE LOCK
Jack H. Brown, 10457 Mazatlan Way, Poway, Calif. 92064
Filed Mar. 9, 1977, Ser. No. 775,712
Int. Cl.[2] E05B *65/12*
U.S. Cl. 70—237 **1 Claim**

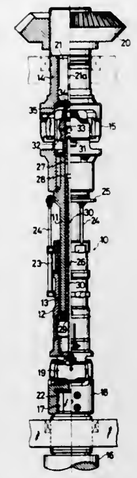
1. An anti-theft device for releasably locking an engine block of a motor vehicle to an abutting transmission, the transmission having a housing with a plurality of bolt holes disposed in the peripheral portion thereof and the engine block having a plurality of registered bolt holes in marginal flanges integral with the engine block, comprising:
a bolt having a head portion on one end and a threaded portion on its other end, said bolt receivable in one of said engine block and transmission housing registered bolt holes and having a length so as to project therefrom, said head portion having a flat end and an arcuate end opposite said flat end;
a cup member having a closed end, a cylindrical wall extending upwardly from said closed end and an open end at the top of said cylindrical wall, said closed end having an aperture for receiving said threaded portion of said bolt;
a nut threadably received on said threaded end portion of said bolt and being disposed within said cup member and spaced from its open end, said nut being capable of being tightened on said threaded portion to draw the bottom closed end of said cup into engagement with the flanges of the engine block;
spaced inwardly from the open end of said cup are a pair of apertures with one aperture being on the opposite side of the cylindrical wall from the other aperture;
a padlock having one of its shackles passing through said opposing aperture in said cylindrical wall thereby preventing a tool such as the socket of a socket wrench set from being inserted on to said nut;



said cup cylindrical wall being free from any additional aperture that would give access to said nut by a tool utilized to tighten or loosen said nut; and
a floating disc disposed within said cup member between the threaded end of said bolt and the shackle of the padlock that passes through the apertures in the cylindrical wall, said floating disc having a diameter slightly smaller than the interior diameter of said cup member, said floating disc being restricted in rotation due to abutment with the threaded end of said bolt and the shackle when attempts are made to pivot it thereby preventing insertion of a special probe into said cup in order to gain access to said threaded nut.

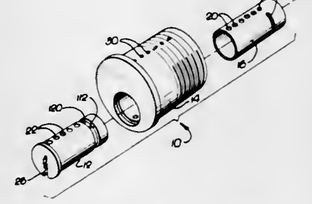
4,094,174
DRIVE MECHANISM FOR VERTICAL ROLLING MILLS
Hiroji Okuda, Nara, and Hiroyoshi Narikiyo, Yaoshi, both of Japan, assignors to Koyo Seiko Company Limited, Osaka, Japan
Filed Jul. 25, 1977, Ser. No. 818,958
Claims priority, application Japan, Apr. 5, 1977, 52/39306
Int. Cl.[2] B21B *31/08*
U.S. Cl. 72—238 **4 Claims**

1. A drive mechanism for vertical rolling mills, comprising:
a drive shaft section comprising an inner shaft and an outer sleeve shaft which are axially slidably fitted together,
a universal joint which connects one end of said drive shaft section to the drive side, said universal joint having its fitting yoke fixedly fitted on a drive shaft element,
a universal joint which connects the other end of said drive shaft section to the neck of a working roll, said joint having its coupling adapted to be mounted on and dismounted from said roll neck in such a manner as to permit the transmission of torque,
an extensible operating mechanism attached between said inner shaft and said outer sleeve shaft, said mechanism being adapted to mount said coupling on and dismount it from the roll neck by extending and collapsing the drive shaft section,
a spring contained in the drive shaft section, said spring acting in a direction in which it reduces the length of the drive shaft section, and
fixing means provided between said drive shaft section and said drive universal joint for fixing said drive shaft section and said universal joint together when the drive shaft



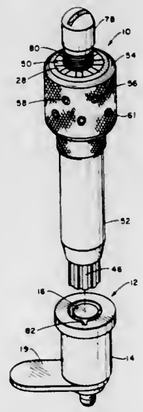
section is reduced in length and for canceling said fixing by the extension of the drive shaft section.

4,094,175
INTERNAL TUMBLER LOCK KEY CHANGE SYSTEM
Julius Pechner, 16010 Blackhawk St., Granada Hills, Calif. 91344
Filed Dec. 20, 1976, Ser. No. 752,084
Int. Cl.[2] E05B *25/00*
U.S. Cl. 70—364 A **23 Claims**



1. A pin tumbler cylinder lock comprising:
an external housing,
a cylindrical opening therein,
a plug rotatable within said cylindrical opening,
said housing and plug having a row of axially aligned locking bores therein,
a key slot in said plug in alignment with said bores,
each of said locking bores having space for springs, wafers, and locking tumbler pins adapted to be positioned and sized to permit the plug to be operated with an operating predetermined key to lock and unlock the lock when the operating key is inserted into the slot, said springs being adapted to bias said pins toward the key slot,
said housing having a row of axially aligned auxiliary bores angularly offset from and transversely aligned with respective locking bores,
each of said auxiliary bores adapted to have springs and master wafers therein, said springs being adapted to bias said master wafers inwardly toward the plug,
a relatively thin-walled shutter sleeve fitted for rotation in said cylindrical opening in said housing,
said plug being fitted within said shutter sleeve for rotation therein and therewith,
a row of axially aligned locking bores in said shutter sleeve in respective radial and axial alignment with the locking bores in said housing and said plug,
first means within the housing and the shutter to prevent rotation of the shutter during operation of the lock when said operating key rotates the plug to lock and unlock the lock, and
second means within the housing, the shutter, and the plug actuated by a lock-combination-changing predetermined key to permit said lock-combination-changing predetermined key to rotate the plug and the shutter in the housing from the operating position of the lock to a combination-changing position of the lock by respectively aligning said locking bores in the plug and shutter with said auxiliary bores in the housing.

4,094,176
PICK FOR TUBULAR CYLINDER LOCKS
Donald R. Hughes, 2600 Brower Ave., Simi Valley, Calif. 93065
Filed Sep. 12, 1977, Ser. No. 832,279
Int. Cl.[2] E05B *19/20*
U.S. Cl. 70—394 **11 Claims**



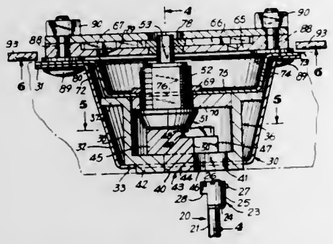
1. A pick for tubular cylinder locks comprising:
a substantially cylindrical first member having a front end and a back end interconnected by a side wall, said front end having a hollow interior chamber;
a plurality of elongated spaced apart pins slideably mounted within grooves located within said side wall of said first member;
confining means maintaining said pins in connection with said first member;
head locatable within said hollow interior chamber of said first member, said head having an internal recess for connection with the rotatable cylinder portion of a lock, said pins connecting with said head being movable in respect thereto, whereby said head is connected to a cylinder portion with each said pin in contact with a lock tumbler and upon slight axial in and out movement of said head the said pins act against said tumbler and said pins are moved axially.

4,094,177
TAMPER-RESISTANT LOCK AND KEY ASSEMBLY
John F. Wellekens, 41 Crescent Ave., New York, N.Y. 10301
Filed Aug. 16, 1977, Ser. No. 825,022
Int. Cl.[2] E05B *17/14*
U.S. Cl. 70—423 **11 Claims**

1. An improved, tamper-resistant lock and key assembly of the type including a generally hollow cylinder, a circular, pin-type tumbler mechanism housed within said cylinder and defining therewith an annular keyway, into which a key may be inserted a fixed distance to permit rotation thereof between

a release and locking position, and a key including a post and a generally cup-shaped bit having a generally circular base secured to one end of said post and extending generally radially outwardly therefrom and a generally cylindrical sidewall secured to said base and extending generally axially outwardly from said end of said post, said sidewall having a bitting formed on the outer end thereof, the improvement comprising:

said key bit having a notched portion formed therein inwardly of said bitting thereof; and



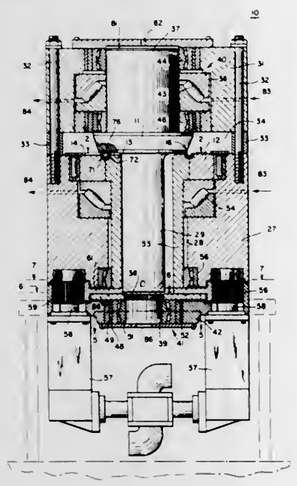
means for obstructing direct access of said key bit to said keyway, said means including an obstruction member spaced above and generally overlying said keyway, which necessitates laterally shifting of said key bit therebelow to effect alignment thereof with said keyway, said member including an abutment shoulder spaced above and overlying a portion of said keyway, which is configured and dimensioned to mate with said notched portion of said key to permit alignment of said bitting of said bit with said keyway.

4,094,178

METHODS FOR CONTINUOUS EXTRUSION

Francis Joseph Fuchs, Jr., Princeton Junction, N.J., assignor to Western Electric Co., Inc., New York, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,611
Int. Cl.² B21C *31/00*; B21B *45/02*
U.S. Cl. 72—41 **32 Claims**



1. A method of continuously deforming an elongated workpiece of indefinite length to produce an elongated product of indefinite length, said method comprising the steps of:

(a) providing, in a location adjacent to a deforming agency, a rotary first member and a moveable second member, the first and second members being so disposed that a radially extending first surface on the first member, said radially extending first surface being oriented to intersect an axis of the first member, faces a second surface on the second member; and

(b) gripping the elongated workpiece between said radially extending first surface of the first member and said second surface of the second member; while

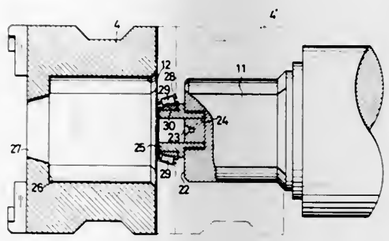
(c) rotating the first member about said axis and simultaneously moving the second member in such direction as to advance the elongated workpiece toward and into the deforming agency, whereby an elongated product is produced.

4,094,179

DRIVING DEVICE FOR HIGH SPEED ROLLING MILLS AND THE LIKE

Hiroji Okuda, Nara, Japan, assignor to Koyo Seiko Company Limited, Osaka, Japan

Filed Jul. 25, 1977, Ser. No. 818,959
Claims priority, application Japan, Apr. 19, 1977, 52/50028
Int. Cl.² B21B *31/08*
U.S. Cl. 72—238 **4 Claims**



1. A driving device for high speed rolling mills and the like, comprising:

two shaft members on the drive and driven sides, respectively, adapted for rotation as a unit as by a spline connection and axially extensibly coupled together,

a spring interposed between said two shaft members and acting in a direction which lengthwise extends said two shaft members,

a coupling connected to said driven shaft member by a joint member and loosely fitted on a driven shaft element, said coupling having a fitting hole of large diameter at the center of the inner bottom surface thereof,

a cylindrical body projecting from the end surface of said driven shaft element coaxially with the center hole thereof and adapted to enter said fitting hole when the coupling and the driven shaft element are fitted together, said cylindrical body cooperating with said fitting hole to define an annular space therebetween, and

a number of taper rollers interposed between said fitting hole and said cylindrical body, said taper rollers being supported for arrangement in said annular space by suitable retaining means and serving to bring the axes of the coupling and the driven shaft element into alignment with each other when the coupling and the driven shaft element are fitted together.

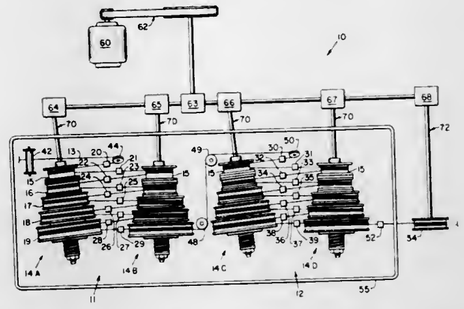
4,094,180

MULTIPLE STAGE WIRE DRAWING MACHINE

Evan Griffiths, Newington, Conn., assignor to Amtel, Inc., Providence, R.I.

Filed May 18, 1977, Ser. No. 798,266
Int. Cl.² B21C *1/10, 1/12*
U.S. Cl. 72—280 **13 Claims**

1. In a multiple stage wire drawing machine having at least one pair of rotatable multiple step capstan assemblies, each having an input drive shaft and a plurality of draw capstans of increasing diameter, in aligned generally parallel relationship for drawing a wire back and forth through successive wire drawing stages respectively, a final stage draw capstan for a final wire drawing stage, a plurality of drawing dies of decreasing die diameter for said successive and final drawing stages respectively for drawing a wire to successively smaller sizes respectively, a machine drive motor, and transmission means connecting the drive motor to the input drive shaft of each multiple step capstan assembly and to the final stage draw capstan for driving the input drive shafts and the final stage draw capstan at fixed relative angular rates of rotation in accordance with the relative diameters of the respective draw capstans and the dies at the respective drawing stages, the



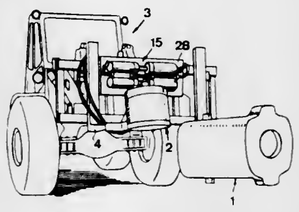
improvement wherein the plurality of draw capstans of increasing diameter of each multiple step capstan assembly are independently rotatably mounted on the respective input drive shaft in axially spaced coaxial relationship, and wherein each multiple step capstan assembly comprises adjustable slip coupling means providing a slip drive between the respective input drive shaft and each draw capstan rotatable thereon for driving the capstan with an established slip drive torque, the adjustable slip coupling means being adjustable for establishing the slip drive torques between the input drive shaft and the draw capstans respectively.

4,094,181

METHOD IN DESTRUCTING CHILLS AND A DEVICE FOR CARRYING OUT THE METHOD

Torsten Boris Joel Westberg, Slojdgatan 4,, 811 00 Sandviken, Sweden

Filed Sep. 29, 1975, Ser. No. 617,838
Claims priority, application Sweden, Oct. 9, 1974, 7412664
Int. Cl.² B21D *31/04*
U.S. Cl. 72—325 **8 Claims**



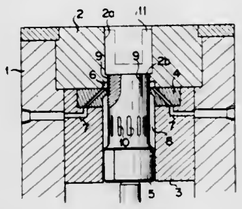
1. A method for destructing chills, characterized in that a tool comprising at least two reciprocally movable parts is introduced into the cavity of the chill, and that said parts are set in motion relative to each other substantially across the length of the chill, preferably by one part being pushed out from the other part so as to squeeze apart the walls of the chills or portions thereof, said tool, during operation, being supported on a vehicle.

4,094,182

DIE APPARATUS FOR PRESS MACHINE

Shohei Kusada, and Tomoyoshi Kaneko, both of Komatsu, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Jan. 24, 1977, Ser. No. 761,626
Claims priority, application Japan, Jan. 23, 1976, 51.005595
Int. Cl.² B21D *45/00*
U.S. Cl. 72—344 **3 Claims**



1. A die apparatus for press machine comprising

a die set having a piercing hole formed therein,

a cylindrical plate having a hole formed therein disposed within said die set,

a die disposed on said cylindrical plate within said die set, said die having a die hole formed therein, and

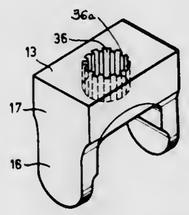
a knockout slidably disposed within said cylindrical plate, said knockout having a plurality of first grooves formed in the upper part thereof and a plurality of second grooves formed in the lower part thereof, whereby compressed air may be introduced through the piercing hole in said die set, the hole in said cylindrical plate and the plurality of second grooves in said knockout into the die hole for blowing off lubricant and particles deposited in the die hole when said knockout is raised and wherein particles of residual oil may be leaked out through the plurality of first grooves to the outside of said die when said knockout is lowered.

4,094,183

METHOD OF FABRICATING A SUBSTANTIALLY U-SHAPED BODY AND APPARATUS FOR THE PERFORMANCE THEREOF

Karl Mettler, Buchs, Switzerland, assignor to Press- & Stanzwerk AG, Eschen, Liechtenstein

Filed Dec. 6, 1976, Ser. No. 747,795
Claims priority, application Switzerland, Dec. 19, 1975, 16489/75
Int. Cl.² B21D *22/00*
U.S. Cl. 72—356 **6 Claims**



1. A punch and die arrangement for extruding two legs for a substantially bifurcated part of a Cardan joint from a substantially parallelpiped-shaped blank having four side surfaces and two end surfaces comprising:

a first die and a first punch cooperating with one another for the partial extrusion of the legs from the blank to form pre-formed extruded legs;

a second die and a second punch cooperating with one

another for bringing the pre-formed legs into their final shape;

the first die and the first punch confining part of the four side surfaces and one end surface of the blank in order to prevent deformation of such surfaces;

each cooperating die and punch limiting a hollow compartment composed of a large substantially parallelpiped-shaped part and two small substantially parallelpiped-shaped parts;

the large part of the hollow compartment formed by the first die and the first punch serving for the reception of the blank;

the large part of the hollow compartment formed by the second die and the second punch serving for the reception of the blank having the partially extruded legs formed in the two small parts of the hollow compartment of the first punch and the first die;

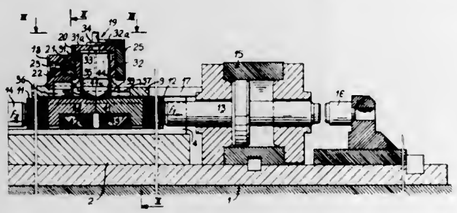
both of the two small parts of each hollow compartment of both dies and punches serving for forming and confining the legs to be extruded from the blank.

4,094,184

MACHINE FOR FORMING JOINING PIPES

Alain Edouard Plegat, Asnieres, France, assignor to Societe Anonyme des Usines Chausson, Asnieres, France

Filed Sep. 30, 1975, Ser. No. 618,052
Claims priority, application France, Oct. 16, 1974, 74 34835
Int. Cl.² B21D *41/02*
U.S. Cl. 72—392 **9 Claims**



1. A machine for forming one end of a pipe to be particularly used for heat exchangers so as to exhibit a substantially oblong opening, said oblong opening having a major axis forming any angle with respect to the longitudinal axis of said pipe, the machine comprising a fixedly mounted holder maintaining the pipe on whole periphery thereof in a position in which the end of the pipe which is to be formed is free and extends in a horizontal plane; two complementary or mating shaping pins adapted to be inserted into said free end of the pipe only; and pin supporting and driving means from which said pins protrude for moving said two pins on a trajectory in opposite directions for a distance corresponding to the deformation to be given to said end of the pipe; the machine further comprising at least one fixed die placed opposite at least one of the pins on the trajectory thereof.

4,094,185

DOUBLE-ENDED HEADING PUNCH

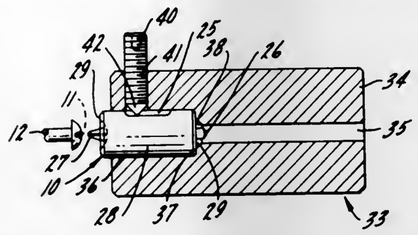
William Hsien-Kuang Wang, Burlington, Canada, assignor to Procor Limited, Oakville, Canada

Filed Jul. 5, 1977, Ser. No. 812,928
Int. Cl.² B21D *31/00*
U.S. Cl. 72—477 **7 Claims**

1. A double-ended heading punch that produces a driving-tool engaging recess in an end of a metal blank by a single blow delivered at room temperature, comprising:

(a) a hardened steel punch member having an enlarged generally cylindrical, central body portion terminating in opposed, flat annular shoulders; a recess-forming projection at each end of said punch member extending beyond its associated shoulder along the longitudinal centroidal axis of said punch member; a groove in the surface of said body portion between said shoulders;

(b) a holder for said punch member having an opening passing longitudinally through its center; said opening including an enlarged chamber at one end defining a ledge on the interior of said holder surrounding said opening; said chamber receiving said punch member with one shoulder of said punch member abutting said ledge and the projection surrounded by said one shoulder extending into said opening; the opposite shoulder of said punch member and its associated projection extending beyond the end of said holder; and



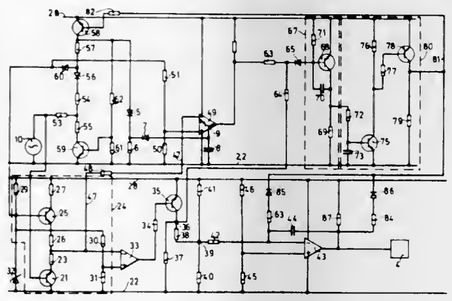
(c) means for securing said punch member in said holder comprising a tapped hole extending transversely through said holder into said chamber; and a threaded member screwed into said hole and extending into said slot and bearing against said punch member.

4,094,186

MIXTURE CONTROL MONITOR APPARATUS

Wolf Wessel, Oberriexingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 25, 1977, Ser. No. 772,151
Claims priority, application Germany, Feb. 28, 1976, 2608245
Int. Cl.² G01N *31/00*; F02M *7/00*
U.S. Cl. 73—1 G **10 Claims**



1. A method for monitoring the operation of an oxygen sensor in a fuel control system comprising the steps of:

applying a test voltage to said oxygen sensor;

applying the output voltage from said sensor to at least two voltage comparator circuits and comparing it with set point values associated, respectively, with the upper and lower nominal values of said sensor in normal operation thereof;

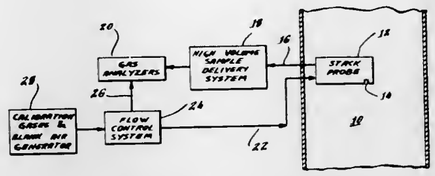
applying the output signal from said comparator circuits to a timing circuit for enabling a switch which changes the operation of the fuel injection system from closed loop control based on oxygen sensor signals to open loop forward control based on signals from transducers of engine variables.

4,094,187

STACK GAS ANALYZING SYSTEM WITH CALIBRATING/SAMPLING FEATURE

Anatole Joseph Navarre, Jr., Houston, Tex., assignor to Champion International Corporation, Stamford, Conn.

Filed Jul. 22, 1977, Ser. No. 818,161
Int. Cl.² G01N *1/22*
U.S. Cl. 73—1 G **23 Claims**



1. For use in an effluent analyzing system having one or more analyzers for detecting the levels of suspected constituents, a calibration/sampling system including:

a. a chambered probe including a first inlet for receiving effluent samples, a second inlet and an outlet;

b. sample delivery means connected to the outlet for transferring the contents of said chambered probe to the analyzers at a predetermined rate of flow;

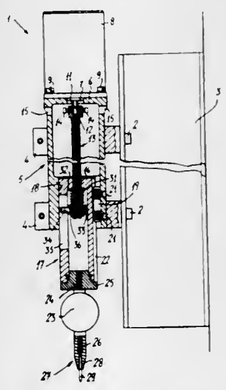
c. a calibrating fluid supply connected to the second inlet for selectively supplying known concentrations of fluids at a rate of flow greater than the rate established by said sample delivery means to force effluent from the chambered probe thereby permitting the analyzers to selectively receive calibrating fluid samples through the probe to the exclusion of effluent fluid samples.

4,094,188

APPARATUS FOR MONITORING THE APPLICATION OF A FORCE TO A SOLID BODY

François C. Bellouin, Mennecy, and Jean G. Dremierre, Ballancourt sur Essonne, both of France, assignors to Societe Nationale des Poudres et Explosifs, France

Filed Dec. 10, 1976, Ser. No. 749,253
Claims priority, application France, Dec. 16, 1975, 75 38474
Int. Cl.² G01N *3/42*
U.S. Cl. 73—81 **16 Claims**



16. A method of measuring the adhesivity or roughness of a material which comprises:

a. applying a measuring contact piece to the material under a predetermined force and during a predetermined period,

b. applying a tensile force to the measuring contact piece to cause it to be displaced at a constant velocity in the direction opposite to that in which the said force is applied,

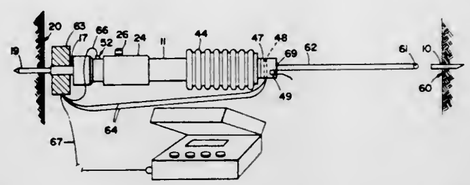
c. measuring the maximum tensile force at the moment when the measuring contact piece is separated from the specimen.

4,094,189

MICRO-CREEPMETER

Shosei Serata, 1229 8th St., Berkeley, Calif. 94710

Filed Mar. 24, 1977, Ser. No. 780,800
Int. Cl.² G01B *7/16*
U.S. Cl. 73—88 E **9 Claims**



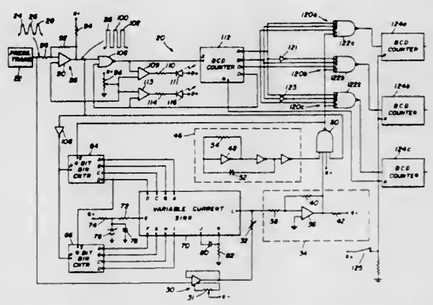
1. A device for quickly determining micro-creep velocity by accurately measuring relative displacement between two objects, comprising a housing; a linear variable displacement transformer disposed within said housing; anchoring means for securing said housing to one of said objects, said transformer having translatable core means disposed within the sensing field of said transformer; and means for joining said transformer core means to the other of said objects, including a piston rod slidably disposed within said housing, said transformer core means extending from the inner end of said piston rod, and wire connection means including temperature compensating wire means extending between said piston rod and said other object.

4,094,190

COMPRESSION MEASURING APPARATUS

James A. Jindrick, Kenosha, Wis., assignor to Snap-on Tools Corporation, Kenosha, Wis.

Filed Sep. 26, 1977, Ser. No. 836,597
Int. Cl.² G01M *15/00*
U.S. Cl. 73—115 **30 Claims**



11. Apparatus for measuring peak compression in each of a plurality of compression chambers of an internal combustion engine, said apparatus comprising means for producing a sequence of compression pulses respectively corresponding to the compressions in the chambers, comparator means coupled to said transducer means and being responsive to current caused by the compression pulses exceeding a threshold level to produce an enable signal, circuit means including a clock for producing a sequence of clock pulses at a frequency many times the frequency of the compression pulses, said circuit means having an output and a control input coupled to said comparator means, said circuit means being responsive to said enable signal to couple clock pulses to said output and being responsive to the absence of said enable signal to isolate the clock pulses from said output, feedback counter means coupled

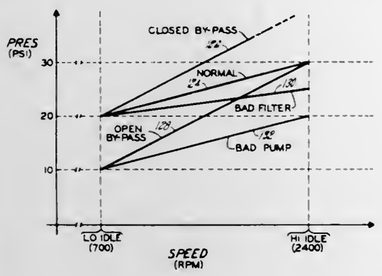
to the output of said circuit means for counting clock pulses coupled therethrough, said feedback counter means having a reset input coupled to receive the compression pulses and being reset after the peak of each compression pulse, a variable current sink coupled to said feedback counter means and being operative to drain a quantity of current that increases with the number of clock pulses applied thereto, said variable current sink being coupled to said transducer means and in parallel with said comparator means and being operative to divert current therefrom in accordance with the value of said sink, the commencement of a compression pulse causing current to said comparator means to be greater than said threshold level to enable said circuit means to couple the clock pulses to the output thereof, said feedback counter means counting the clock pulses to increase the current diverted by said variable current sink and thereby decrease the current to said comparator means below said threshold level to preclude additional clock pulses from being coupled to the output of said circuit means, whereupon current into said comparator means again increases above said threshold level to cause said circuit means then to couple to the output thereof additional clock pulses which are further counted by said feedback counter means to increase the current diverted by said variable current sink, said circuit means thereby being periodically enabled to couple to the output thereof clock pulses until the amplitude of the compression pulse reaches a peak and begins to decrease, means for producing a sequence of a plurality of gating signals corresponding in number to the number of compression chambers and respectively corresponding to the compression pulses, a plurality of counting channels coupled in parallel and corresponding in number to the number of chambers of which the compression is to be measured, each channel having a signal input coupled to the output of said circuit means and a control input coupled to said gating signal producing means, each channel being rendered operative by a gating signal to count the clock pulses and to store such count, and annunciator means coupled to said counting channels for expressing information in accordance with the counts stored therein.

4,094,191

FUEL PUMP DIAGNOSTICS FOR INTERNAL COMBUSTION ENGINE

Henry E. Goetsch, Broadbrook, and Henry J. Mercik, Jr., Enfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 25, 1977, Ser. No. 781,095
Int. Cl.² G01M *15/00*
U.S. Cl. 73—118 **8 Claims**



1. In a method of diagnosing an engine fuel system of the type having a fuel pressure-regulating bypass valve, which is normally closed to provide fuel at full pump pressure at low speeds, and opens proportionally to bypass fuel to limit the pressure thereof at higher speeds, the steps of:

operating the engine at substantially a low idle speed and at substantially a high idle speed;

at each of said speeds, measuring the pressure of fuel provided to the bypass valve by a pump; and

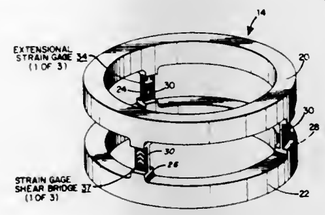
providing a manifestation of the fact that the bypass valve is stuck in the open position if the pressure measured at said high idle speed is substantially the normal rated high idle speed fuel pressure for the engine under test and the pressure measured at said low idle speed is lower than the normal rated low idle speed fuel pressure for the engine under test.

4,094,192

METHOD AND APPARATUS FOR SIX DEGREE OF FREEDOM FORCE SENSING

Paul C. Watson, Arlington, and Samuel H. Drake, Lexington, both of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Sep. 20, 1976, Ser. No. 724,623
Int. Cl.² G01L *5/16*
U.S. Cl. 73—133 R **28 Claims**



1. A six-degree of freedom force sensor, comprising:

a first section;

a second section;

three physically distinct and separate intermediate sections spaced apart from one another, each of the intermediate sections being disposed between and connecting the first and second sections;

means for measuring shear strain in each of the intermediate sections and producing an output signal representative thereof; and

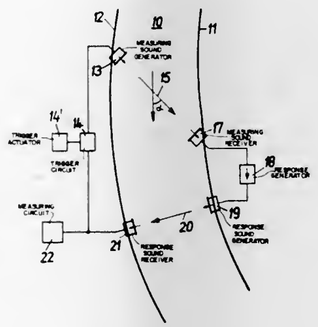
means for measuring extensional strain in each of the intermediate sections and producing an output signal representative thereof.

4,094,193

ACOUSTIC SYSTEM FOR MEASURING THE SPEED OF CURRENTS IN A BODY OF WATER

Manfred Gerlach, Bremen, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed May 6, 1977, Ser. No. 794,660
Claims priority, application Germany, Jun. 24, 1976, 2628336
Int. Cl.² G01P *5/00*; G01F *1/66*
U.S. Cl. 73—170 A **9 Claims**



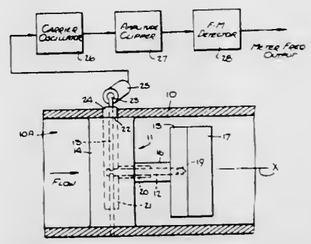
1. In a system for measuring the speed of flow of a current in a body of water, which system includes a first electroacoustic transducer disposed in the body of water along one side of the current and a second electroacoustic transducer disposed in the body of water along the opposite side of the current, each transducer having an electrical signal terminal and presenting a directional acoustic signal radiation pattern, the transducers being located at respectively opposite ends of a first path extending through the water, across the current and oblique to the direction of current flow and each transducer being oriented so that the axis of its radiation pattern extends along the first path toward the other transducer, the improvement comprising: a third electroacoustic transducer disposed in the body of water along the opposite side of the current and a fourth electroacoustic transducer disposed in the body of water along the one side of the current, each of said third and fourth transducers having an electrical signal terminal and presenting a directional acoustic signal radiation pattern, and each of said third and fourth transducers being located at respectively opposite ends of a second path extending through the water and across the current and being oriented so that the axis of its radiation pattern extends along the second path toward the other one of said third and fourth transducers; response generator means located at the opposite side of the current and having an input and an output and arranged to produce an electrical response pulse at its output upon appearance of an electrical signal pulse at its input; first connecting means connecting the input of said response generator means to the electrical signal terminal of one of said second and third transducers and connecting the output of said response generator means to the electrical signal terminal of the other one of said second and third transducers for causing receipt of an acoustic pulse by said one of said second and third transducers to result in the emission of an acoustic pulse into the water by said other one of said second and third transducers; trigger circuit means located at one side of the current and having an input and an output and arranged to produce an electrical trigger pulse at its output upon appearance of an electrical signal pulse at its input; second connecting means connecting the input of said trigger circuit means to the electrical signal terminal of one of said first and fourth transducers and connecting the output of said trigger circuit means to the electrical signal terminal of the other one of said first and fourth transducers for causing receipt of an acoustic pulse by said one of said first and fourth transducers to result in the emission of an acoustic pulse into the water by said other one of said first and fourth transducers, said other one of said first and fourth transducers and said one of said second and third transducers being located at respectively opposite ends of one of said paths, while said one of said first and fourth transducers and said other one of said second and third transducers being located at respectively opposite ends of the other one of said paths, whereby the other one of said first and fourth transducers constitutes a first measuring sound generator for emitting an acoustic pulse into the water along its respective path in response to each electrical trigger pulse applied to its signal terminal from the outpt of said trigger circuit means, said one of said second and third transducers constitutes a first measuring sound receiver for applying an electrical signal pulse to the input of said response generator means in response to each acoustic pulse incident thereon, said other one of said second and third tranducers constitutes a first response sound generator for emitting an acoustic response pulse into the water in response to each electrical response pulse applied to its signal terminal from the output of said response generator means, and said one of said first and fourth transducers constitutes a first response sound receiver for applying an electrical signal pulse to the input of said trigger circuit means in response to each acoustic pulse incident thereon; and means connected in said system for evaluating the repetition rate at which acoustic pulses are produced by said first measuring sound generator to provide an indication of the current flow speed.

4,094,194

SENSING SYSTEM FOR VORTEX-TYPE FLOWMETERS

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Company, Warminster, Pa.

Filed Feb. 14, 1977, Ser. No. 768,414
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **4 Claims**



1. A noise-rejecting sensing system for a vortex-type flowmeter adapted to measure the flow rate of a fluid passing therethrough by generating fluidic pulses whose frequency which varies within a low-frequency range is a function of flow rate, said system comprising:

A. a sensor constituted by a variable reactance element included in the frequency-determining circuit of a carrier oscillator generating a relatively high-frequency carrier signal;

B. means to apply said fluidic pulses to said sensor to vary the reactance thereto to thereby frequency- and amplitude-modulate said carrier signal in accordance with said fluidic pulses;

C. means to maintain the amplitude of said frequency-modulated carrier signal at a substantially constant level to produce a frequency-modulated carrier signal, said means to maintain the amplitude at a substantially constant amplitude level being constituted by means overdriving said carrier oscillator to produce an output signal of constant amplitude regardless of the shift in frequency; and

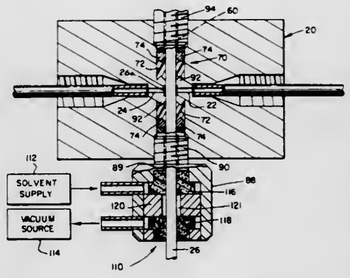
D. demodulator means responsive to said frequency-modulated carrier to produce a noise-free, low-frequency output signal indicative of the flow rate.

4,094,195

NOVEL SEAL AND APPARATUS INCLUDING SAME

David R. Friswell, Holliston, and Lawrence J. Finn, Millis, both of Mass., assignors to Waters Associates, Inc., Milford, Mass.

Filed Feb. 25, 1977, Ser. No. 772,144
Int. Cl.² G01N *1/10*
U.S. Cl. 73—422 GC **6 Claims**



1. In a liquid sample injection apparatus of the type comprising a sample loop, means to supply discrete samples to said loop from a first end thereof and means to supply solvent from the second end thereof to push said sample out of said injection apparatus at an injector outlet port, and wherein said apparatus

also comprises means to supply solvent through a conduit bypassing said sample loop and thence to said injector outlet port at the same side at which said sample loop is emptied into said outlet port, the improvement wherein

(a) said means to supply discrete samples to said loop comprises a sampling conduit that forms part of said sample loop and is moveable in a vertical channel between a sample-intake position and a sample-discharge position,

(b) wherein said sampling conduit comprises a discharge orifice on one side thereof which, in the sample-discharge position, is adapted to discharge fluid into said outlet port and

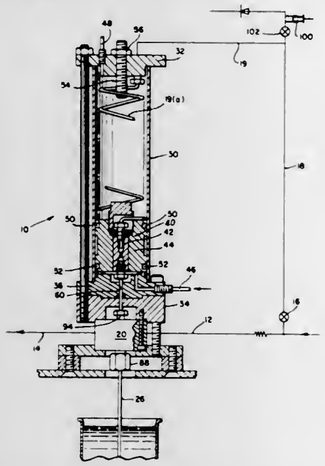
(c) wherein said sampling conduit comprises a plug member below said discharge orifice to seal said channel when said sampling conduit is in the raised position, and

(d) wherein a pair of fluid seals is maintained between said sampling conduit and the walls of said vertical channel at a position above and at a position below said outlet port, each said seal comprising: (i) a sleeve of compressible resin about said conduit and within the walls of said channel, (ii) stress rings mounted adjacent above and below each of said sleeves, said stress rings each having a protrusion facing the adjacent sleeve to indent the axial upper and lower extremities of each of said sleeves toward each other when each sleeve is compressed between the rings to form a sealing contact between said sample-intake conduit and said walls, and (iii) means to compress each sleeve between a pair of said stress rings.

4,094,196
SAMPLE INJECTION WITH AUTOMATIC CLEANING OF SAMPLING CONDUIT

David R. Frisweli, Holliston, Mass., assignor to Waters Associates, Inc., Milford, Mass.

Filed Feb. 25, 1977, Ser. No. 772,145
Int. Cl.² G01N *1/14*
U.S. Cl. 73—422 GC **14 Claims**



1. In a liquid sample injection apparatus of the type comprising a sample loop, means to supply discrete samples to said loop from a first end thereof and means to supply solvent from the second end thereof to push said sample out of said injection apparatus at an injector outlet port, and wherein said apparatus also comprises means to continuously supply solvent through a conduit by-passing said sample loop and thence to said injector outlet port at the same site at which said sample loop is emptied into said outlet port, the improvement

wherein said means to supply discrete samples to said loop comprises a sampling conduit that forms part of said sample loop and is moveable in a vertical channel between a sample-intake position and a sample-discharge position,

wherein said sampling conduit comprises a discharge orifice on one side thereof which, in the sample-discharge position, is adapted to discharge fluid into said outlet port

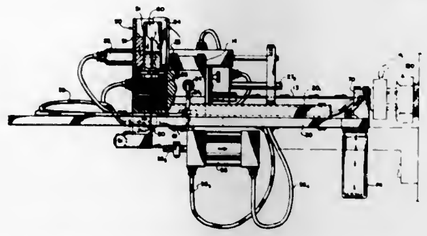
wherein said sampling conduit comprises a plug member below said discharge orifice to seal said channel when said sampling conduit is in the raised position, and

wherein said means to supply solvent through a conduit bypassing said sample loop includes an annular passage proximate said orifice when said orifice is in its sample-discharge position.

4,094,197
SEMI-AUTOMATIC AND AUTOMATIC FLUID INJECTORS

Rano J. Harris, Sr., 1945 Carolyn Sue Dr., Baton Rouge, La. 70815; Rano J. Harris, Jr., 5443 Stonewall Dr., Baton Rouge, La. 70816, and Julius P. Averette, Jr., 4332 Delaware, Baton Rouge, La. 70805

Filed Jul. 21, 1977, Ser. No. 817,817
Int. Cl.² G01N *1/12*
U.S. Cl. 73—423 A **23 Claims**



1. A fluid injector, or apparatus, for use in withdrawing a fluid specimen from a fluid specimen containing septum type vial, for accurately measuring, and then injecting in preselected quantity into a medium which, in combination, comprises

(a) a fluid injector sub-assembly, inclusive of

a barrel,

a hollow needle mounted on an end of the barrel providing an opening from the dispensing end of said needle through said needle and barrel, and

means for opening said barrel to permit flow of fluid specimen through said barrel and needle, and closure to interrupt said flow,

(b) an injector feed sub-assembly, inclusive of

a fixed probe assembly comprising

a gas supply conduit with gas inlet and gas outlet means,

a fluid specimen supply conduit with fluid specimen inlet means, and outlet means connected to the barrel and operatively associated with the means of said fluid injector sub-assembly which opens and closes said barrel to the flow of said fluid specimen, and

means for puncturing the septum of the fluid specimen containing vial so that the gas and fluid specimen supply conduits can enter into and lie within the vial,

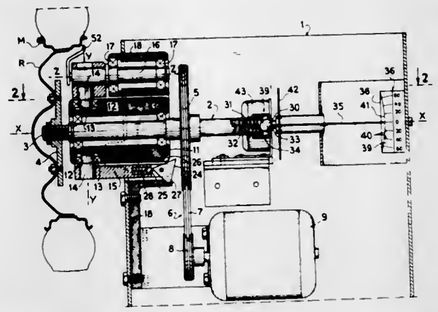
(c) a magazine sub-assembly, inclusive of

means adapted to carry a fluid specimen containing vial in an inverted position with its septum side faced downwardly, in reciprocatable fashion, such that on downward movement the septum portion of the vial can be impaled upon and pierced by the puncturing means of said fixed probe assembly such that the gas and fluid specimen supply conduits lie within the vial, the fluid contents of the vial can be pressurized by injection of gas into the vial via the gas inlet conduit and fluid specimen transported via the fluid specimen outlet to the barrel, whereby on the ingress of an initial portion of the fluid specimen the barrel and needle can be purged and cleaned, an accurately measured portion of the fluid specimen can then be trapped, and then injected on insertion of the dispensing end of the needle into said medium.

4,094,198
MACHINE FOR BALANCING A BODY OF REVOLUTION

André Moulinoux, Marnes-la-Coquette, France, assignor to Facom, Morangis, France

Filed Jun. 1, 1977, Ser. No. 802,585
Claims priority, application France, Jun. 4, 1976, 76 17003
Int. Cl.² G01M *1/16*
U.S. Cl. 73—460 **12 Claims**



1. In a machine for balancing a body of revolution, such as a vehicle wheel, comprising a housing, a shaft mounted in the housing to rotate about a horizontal axis and also to oscillate about a vertical axis which intersects said horizontal axis and is located near to a first end of the shaft, mounting means for mounting the body of revolution provided adjacent to said first end for rotating said body about said horizontal axis, driving means for driving the shaft in rotation, an elongated indicator member, a ball articulation mounting the idicator member on a second end opposed to said first end of said shaft so that the indicator member is in the extension of said shaft, a measuring scale disposed adjacent to an end of the indicator member opposed to said articulation, and means for deviating the indicator member and adapted, in the course of rotation of the shaft, to come momentarily in contact with the indicator member at a predetermined place in the length thereof so as to achieve a deviation of the indicator member with respect to the scale which is a function of the magnitude of the unbalance of the body of revolution, the ball articulation being provided with means for ensuring the remanence of said deviation; the improvement comprising arranging said deviating means in the form of a cam mounted to rotate about an axis which is parallel to the axis of the shaft and associated with driving means, the cam having a radially outermost portion capable of coming momentarily in contact with the indicator member in the course of a revolution of the cam and the peripheral speed of the cam being approximately equal but of opposite direction to that of the indicator member.

4,094,199
ACCELEROMETER

Frederick V. Holdren, Redmond; Hans W. Hugli, Bellevue; John M. Kubler, Bellevue; Martin E. Larson, Bellevue, and Michael M. Van Schoiack, Bellevue, all of Wash., assignors to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Jul. 6, 1976, Ser. No. 702,781
Int. Cl.² G01P *15/08*
U.S. Cl. 73—517 B **37 Claims**

8. A servoed accelerometer comprising:

a housing configured in a generally cylindrical shape;

a one-piece support frame secured within said housing;

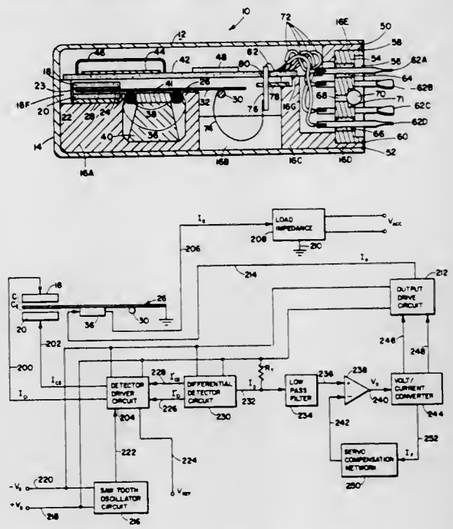
a pendulum including a paddle at one end;

support means secured to said support frame, including an axle, for supporting said pendulum generally parallel to the cylindrical axis of said housing wherein said axle is secured transversely to said pendulum;

a pair of spaced parallel capacitor plates secured within said housing wherein said paddle is located in a space parallel relationship between said plates and movable transversely to the plane of said plates in response to acceleration forces perpendicular to the surface of said paddle;

restoring means, including a magnetic assembly secured to said support frame and a torque coil secured to said pendulum, for moving said paddle to a predetermined position between said plates;

a generally rectangular shaped circuit support member secured to each end within said support frame above and generally parallel to said pendulum; and



an electronic circuit secured to one side of said circuit support member and electrically connected to said capacitor plates, said pendulum and said torque coil effective to generate a restoring current in said torque coil for moving said paddle to said predetermined position when said paddle has moved closer to one or another of said plates in response to an acceleration force.

4,094,200
METHOD AND EQUIPMENT FOR MAKING ROLL AND PITCH DATA INPUTS INTO A PILOTING INSTRUMENT

Pierre Andre Chombard, Boulogne-sur-Seine, France, assignor to Societe Francaise d'Equipements pour la Navigation Aerienne S.F.E.N.A., Velizy-Villacoublay, France

Continuation-in-part of Ser. No. 448,022, Mar. 4, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,218
Claims priority, application France, Mar. 5, 1973, 7307784; Oct. 7, 1974, 74 33661
Int. Cl.² G01C *19/02, 19/00;* G08G *5/00*
U.S. Cl. 74—5 R **13 Claims**

1. Apparatus for facilitating the piloting of aircraft comprising

a gyroscopic horizon including a vertical instrument gyroscope with a built-in erector means, and pitch and roll indicator means,

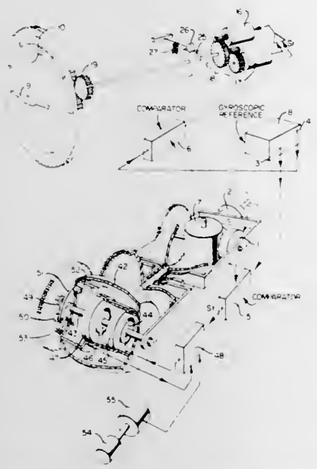
transducer means to transmit electrical signals proportional to pitch and roll changes attached on the pitch and roll suspension axes of said vertical instrument gyroscope,

gyroscopic reference means having stable gyroscopic means and pitch and roll electrical transducer means attached to said gyroscopic means,

first comparator means connected to receive and compare the signals and produce a signal output proportional to the difference in signals from said pitch electrical transducer

means of said gyroscopic reference means and said pitch transducer means of said vertical instrument gyroscope,

second comparator means connected to receive and compare the signals and produce a signal output proportional to the difference in signals from said roll electrical transducer means of said gyroscopic reference means and said



roll transducer means of said vertical instrument gyroscope,

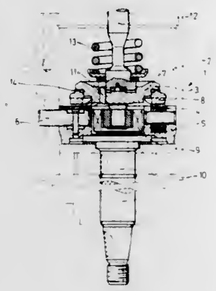
pitch and roll operating means to cause the movement of said pitch and roll indicator means in accordance with said signal outputs from said first and second comparator means.

4,094,201

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

Franz Eheim, Stuttgart, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed May 12, 1976, Ser. No. 685,652
Claims priority, application Germany, May 21, 1975, 2522373
Int. Cl.² F02M *41/2, 59/44;* F16H *25/12*
U.S. Cl. 74—56 **4 Claims**



1. In a fuel injection pump for an internal combustion engine, including: a rotatable drive shaft; a reciprocating and simultaneously rotating pump plunger; and a cam drive mechanism engageable with the pump plunger, said cam drive mechanism including: a two part cam disk; and roller means engageable with the cam disk for imparting to the cam disk, and pump plunger, a displacement in the reciprocating direction of the pump plunger, said two part cam disk, comprising:

a support member manufactured of an elastic material which exhibits a high degree of core toughness, said support member having coupling means for coupling to the drive shaft, thereby producing rotation of the cam drive mechanism and the pump plunger; and

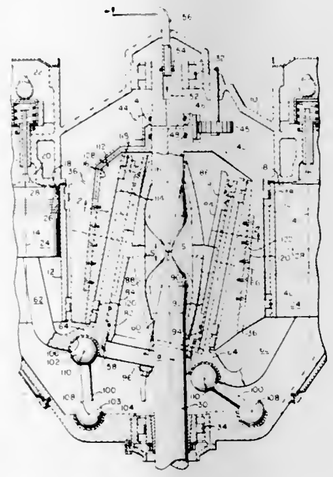
a cam ring bonded to the support member, and manufactured of a casehardened wear-resistant material.

4,094,202

PISTON STROKE VARYING MECHANISM FOR EXPANSIBLE CHAMBER ENERGY CONVERSION MACHINES

Yves Jean Kemper, Birmingham, Mich., assignor to Vadetec Corporation, Troy, Mich.

Filed Nov. 3, 1976, Ser. No. 738,704
Int. Cl.² F16H *23/00*
U.S. Cl. 74—60 **13 Claims**



1. An expansible chamber energy conversion machine comprising:

a frame;

a torque transmitting member supported by said frame for rotation about a first axis;

means including a piston to define a working fluid chamber on said frame, said piston being reciprocable on a second axis through a stroke distance to establish relatively large and small chamber volumes, said chamber having an end face fixed relative to said frame and spaced from said piston by a clearance distance when said piston is positioned to establish said small chamber volume;

transmission means drivably interconnecting said piston and said torque transmitting member, said transmission means including a nutatable member having a third axis intersecting said first axis at an angle to establish a point of axes intersection, said third axis being revolvable about said first axis, and extension means having one end connected to said nutating member and another end connected to said piston; and

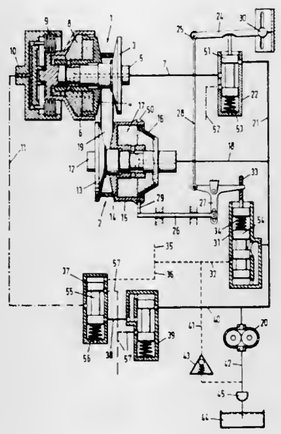
means for modifying said angle of first and third axes intersection to vary the stroke distance of said piston and to shift the locus of piston reciprocation for controlling said clearance distance in accordance with selected working chamber operating parameters, said last mentioned means comprising swivel means movable with said nutating member in a generally circular path about a fourth axis intersecting said point of axes intersection, the diameter of said path in a plane containing said first and second axes being proportional to the stroke distance of said piston.

4,094,203

INFINITELY VARIABLE DRIVE METHOD AND APPARATUS

Petrus Henricus van Deursen, Deurne, and Hemmo Hermannes Johannes Ludoph, Heeze, both of Netherlands, assignors to Van Doorne's Transmissie B.V., Netherlands

Filed Feb. 2, 1977, Ser. No. 765,055
Claims priority, application Netherlands, Feb. 9, 1976, 7601287
Int. Cl.² F16H *55/52*
U.S. Cl. 74—230.17 F **3 Claims**



1. A transmission assembly for transmitting a torque from a drive motor to a driven apparatus, with an infinitely variable transmission ratio, comprising:

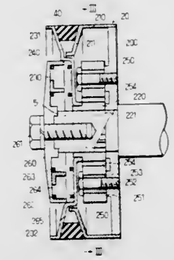
an input shaft adapted to receive the output of the drive motor, first and second V-shaped pulleys, a hydraulically operable clutch, the clutch being operatively connected to transmit torque between the input shaft and the first pulley, an output shaft, the output shaft being connected to the second pulley, an endless transmission member or belt wound around the first and second pulleys, each of said pulleys comprising a pair of facing, conical pulley halves, assembled for rotation about a common axis, means associated with each of the first and second pulleys for adjusting the distances between the respective pulley halves thereof, said adjusting means being responsive to hydraulic fluid pressure, a pump for supplying hydraulic fluid under pressure to control said adjusting means, the pump being driven by the input shaft, a hydraulic control line operatively connected between the pump and the clutch for supplying hydraulic fluid to the clutch to effectuate clutch operation, a reducing valve, and a control valve operable in response to the fluid pressure supplied thereto, the reducing valve and control valve being operatively connected to the hydraulic control line to control the pressure of the fluid supplied to the clutch, whereby the clutch is engaged and the transmission driven only when the belt wound around the pulleys is tensioned by means of sufficient fluid pressure and the clutch is disengaged, in the absence of sufficient fluid pressure, disconnecting the drive motor from the transmission.

4,094,204

DRIVING APPARATUS AND METHOD

Akinori Yamamoto, Kariya, and Masumi Kato, Toyoake, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 30, 1976, Ser. No. 710,151
Claims priority, application Japan, Aug. 9, 1975, 50-96822
Int. Cl.² F16H *55/52, 5/46;* F16D *43/02*
U.S. Cl. 74—230.17 E **4 Claims**



1. A driving apparatus comprising:

a driving shaft to be connected with a driving power source;

a driving belt pulley connected to said driving shaft;

a driven shaft to be connected to a driven unit;

a driven belt pulley connected to said driven shaft; and

a V belt on said driving and driven belt pulleys to link them together, wherein at least one of said belt pulleys comprises:

a pulley disk secured to said driving or driven shaft for rotating integrally with said shaft;

a generally cylindrical first pulley plate secured to the periphery of said pulley disk at one end thereof, said first pulley plate having a first slope portion at the other end thereof;

an outer straight spline formed on said driving or driven shaft;

a slidable helical gear having an inner straight spline engaging with said outer straight spline, said helical gear rotating integrally with said shaft but slidable relative to said shaft along said splines;

a generally dish-like second pulley plate fixed to said helical gear for rotating and sliding integrally with said helical gear,

a second slope portion formed on the periphery of said second pulley plate and facing on said first slope portion of said first pulley plate for forming with said first slope portion a V shaped annular groove in which said V belt is disposed, the width of said annular groove being changed by the slide of said second pulley plate;

an end plate fixed to said shaft;

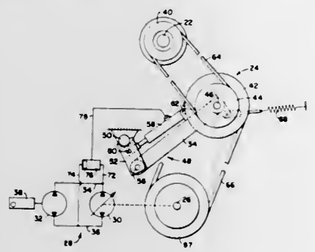
at least one return spring interposed between said end plate and said second pulley plate for biasing said second pulley plate and hence said helical gear; and

at least one weight having a foot portion rotatably supported on said driving disk, said foot portion having at the periphery thereof a helical gear portion engaging with said helical gear, said weight rotating with said shaft and being revolved relative to said disk by the centrifugal force acting thereon thereby to shift said helical gear against the force of said return spring, whereby the width of said annular groove and hence the effective diameter of at least one of said pulleys is changed in response to the rotational speed of said driving power source to change the speed ratio of said driven shaft to said driving shaft.

4,094,205
COMBINED BELT AND HYDROSTATIC VEHICLE DRIVE

Charles Edward Cook, Hampton, Ill., assignor to Deere & Company, Moline, Ill.

Filed Apr. 25, 1977, Ser. No. 790,444
Int. Cl.² F16H *7/12*
U.S. Cl. 74—242.1 FP **10 Claims**



1. In a self-propelled vehicle having a power source, a belt drive means connected to and driven by the power source, a variable ratio hydrostatic drive including a pump, connected to and driven by the belt drive means, a motor, and a hydraulic conduit means connecting the pump to the motor, and means connecting the motor to the vehicle drive wheels, the improvement comprising: a belt tensioning means associated with the belt drive means and including a belt engaging element shiftable in opposite directions to respectively increase or decrease the belt tension in the belt drive means; a hydraulic actuator operatively connected to the belt engaging element for exerting a force thereon that urges the element in a tension increasing direction; and means operatively connecting the hydraulic actuator to the conduit means of the hydrostatic drive so that the force exerted by the hydraulic actuator and consequently the belt tension is responsive to the pressure in the conduit means.

4,094,206
GEAR TRANSMISSION

Yoshitaka Sogo, and Shuichiro Ida, both of Toyota, Japan, assignors to Tokyo Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Sep. 18, 1975, Ser. No. 614,528
Claims priority, application Japan, Apr. 2, 1975, 50-39236
Int. Cl.² F16H *3/04, 3/08*
U.S. Cl. 74—360 **5 Claims**

1. A gear transmission comprising:

(a) a transmission case having front and rear end walls;

(b) an input shaft and an output shaft rotatably and coaxially disposed within said transmission case, said input shaft extending through said front end wall and said output shaft extending through said rear end wall of said transmission case;

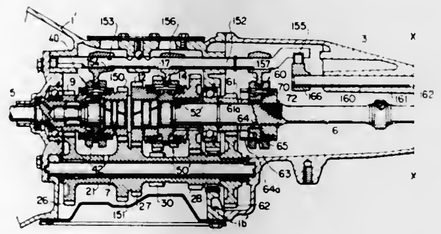
(c) a countershaft rotatably disposed within said transmission case and parallel to said input and output shafts, said countershaft extending through said rear end wall of said transmission case;

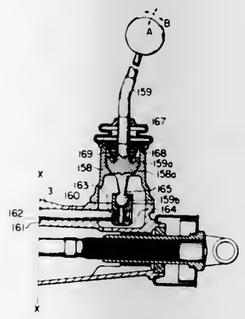
(d) first and second drive gears housed in said transmission case, said first drive gear being mounted on said input shaft and meshed with said second drive gear mounted on said countershaft for transmitting torque from said input shaft to said countershaft;

(e) a plurality of pairs of transmission gears of different gear ratios housed in said transmission case for obtaining different speed ratios of said input shaft to said output shaft, the first gear of each transmission gear pair being rigidly mounted on said countershaft and the corresponding second gear of each pair rotatably mounted on said output shaft, and wherein said pairs include a first speed gear rotatably fitted on said output shaft rearwardly from said first drive gear, a second speed gear rotatably fitted on said output shaft between said first drive and first speed gears, said first and second speed gears being meshed with corresponding first and second speed gears fixedly mounted on said countershaft, and a reverse speed gear rotatably fitted on said output shaft rearwardly of said first speed gear and operatively engaged with the corresponding reverse speed gear fixedly mounted on said countershaft;

(f) a plurality of transmission synchronizer assemblies mounted within said transmission case on said output shaft and selectively engageable with said first drive gear and said transmission gears rotatably mounted on said output shaft for coupling said gears to said output shaft, and wherein said assemblies include

(i) a first assembly mounted between said first drive gear and said second speed gear rotatably fitted on said output shaft, said first assembly comprising a first clutch hub fixed to said output shaft, a first spline element fixed to said first drive gear, a second spline element fixed to said second speed gear rotatably fitted to said output shaft, a first slidable sleeve splined over said first clutch





hub for axial movement and engagement with said first or second spline elements, a first synchronizer ring adjacent to said first spline element, a second synchronizer ring adjacent to said second spline element, springs, and a plurality of shifting keys biased by said springs and interposed between said first clutch hub and said first sleeve; and

(ii) a second assembly mounted on said output shaft between said first speed gear and reverse speed gear rotatably fitted on said output shaft, said second assembly comprising a second clutch hub attached to said output shaft, a third spline element fixed to said first speed gear rotatably fitted to said output shaft, a fourth spline element fixed to said reverse speed gear rotatably fitted to said output shaft, a second slidable sleeve splined over said clutch hub for axial movement and engagement with said third or fourth spline elements, a synchronizer ring adjacent to said third spline element, second springs, and a plurality of shifting keys biased by said second springs and interposed between said second clutch hub and said second sleeve;

(g) an overdrive mechanism mounted outside and adjacent to said rear end wall of said transmission case including

(i) first and second overdrive gears continuously meshed with each other, said first overdrive gear being rigidly mounted on that portion of said countershaft adjacent to and extending through said rear wall, and said second overdrive gear being rotatably mounted on that portion of said output shaft adjacent to and extending through said rear wall and being formed with a boss portion extending in the direction remote from said rear wall, and

(ii) an overdrive synchronizer assembly comprising a spline element rigidly mounted on said output shaft rearwardly of said second overdrive gear and adjacent said boss portion remote from said rear wall, a synchronizing ring, a clutch hub integrally secured to said boss portion, a slidable sleeve spline-coupled to said overdrive clutch hub and selectively actuated for axial movement rearwardly to mesh with said overdrive spline element for coupling said second overdrive gear to said output shaft, springs, a plurality of shifting keys biased by said overdrive springs and interposed between said overdrive clutch hub and sleeve, and a stopper plate interposed between said overdrive clutch hub and said second overdrive gear for maintaining said overdrive shifting keys between said overdrive clutch hub and sleeve, and wherein the gear ratio of said first and second overdrive gears are such that when said second overdrive gear is coupled to said output shift, said output shaft is rotated at a higher rotational speed than said input shaft; and

(h) a gear shift mechanism for selectively actuating one of said transmission synchronizer assemblies or said overdrive synchronizer assembly for changing the speed ratio of said input shaft to said output shaft as said gear transmission is shifted from one gear position to another, and wherein the position of said gear shift mechanism in the gear shift pattern for actuating said overdrive synchronizer assembly is opposite to the position of said gear shift mechanism for actuating the one of said transmission synchronizer assemblies obtaining the highest transmission gear ratio, and wherein said gear shift mechanism includes

(i) a gear shift lever having first, second, third, reverse, overdrive and neutral positions;

(ii) a first-and-reverse gear fork shaft and a second-and-third gear fork shaft for axial displacement, said shafts being parallel to each other and lateral to said first and second synchronizer assemblies;

(iii) a first shift fork coupled to said slidable sleeve of said first synchronizer assembly and to said second-and-third gear fork shaft, and a second shift fork coupled to said slidable sleeve of said second synchronizer assembly and to said first-and-reverse gear fork shaft;

(iv) means for retaining said first-and-reverse gear fork shaft in a neutral, first, or reverse gear position, and means for retaining said second-and-third gear fork shaft in a neutral, second or third gear position;

(v) means for preventing simultaneous axial displacement of said fork shafts;

(vi) an overdrive gear fork shaft for axial displacement parallel and adjacent to said first-and-reverse and second-and-third gear fork shafts;

(vii) an overdrive shift fork coupled to said slidable sleeve of said overdrive synchronizer assembly and to said overdrive fork shaft;

(viii) means for limiting the axial displacement of said overdrive fork shaft;

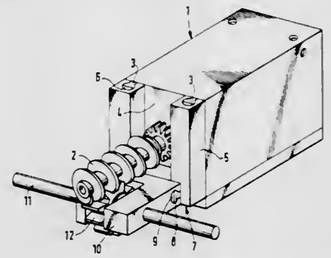
(ix) means for retaining said overdrive fork shaft in a neutral or overdrive gear position; and

(x) internal selection means responsive to the position of said gear shift lever for selectively engaging one of said gear fork shafts for moving one of said slidable sleeves into engagement with one of said first drive, transmission or overdrive gears.

4,094,207
DRIVE ARRANGEMENT PARTICULARLY FOR A TOY MODEL

Artur Fischer, Weinhalde 34, D-7244 Waldachtal 3 (Tumlingen), Germany

Filed Feb. 4, 1977, Ser. No. 765,801
Claims priority, application Germany, Feb. 12, 1976, 7603968[U]
Int. Cl.² F16H *1/16*
U.S. Cl. 74—425 **6 Claims**



1. A drive arrangement, particularly for a toy model assembled of component parts, comprising a housing having a wall; motor means housed in said housing and having a drive screw extending through said wall; a gear wheel adapted to mesh with said drive screw and being mounted on an axle; a first connecting portion provided on said wall and being elongated in a first direction, said first connecting portion comprising elongated undercut projections mounted on said wall of said housing; an adapter member engageable with and movable over said undercut projections of said first connecting portion in said first direction so as to be mounted on said wall of said housing, said adapter member having a recess for passage of said drive screw therethrough; a second connecting portion provided on said adapter member and being elongated in a second direction substantially normal to said first direction; and an axle supporting member supporting said axle of said gear wheel, said axle supporting member being engageable with and movable over said second connecting portion, in said second direction so as to be mounted on said adapter member and thereby on said wall of said housing in a position in which said gear wheel meshes with and is driven by said drive screw.

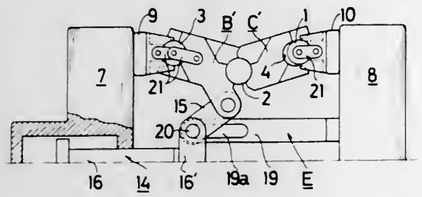
4,094,208
TOGGLE MEANS

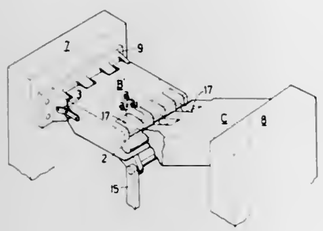
Shigeru Tsutsumi, No. 1165, Toyama-cho, Yonezawa-shi, Yamagata-ken, Japan

Filed Dec. 8, 1975, Ser. No. 638,250
Claims priority, application Japan, Dec. 12, 1974, 49-142018
Int. Cl.² G05G *1/04*
U.S. Cl. 74—520 **6 Claims**

1. Toggle means mounted between two relatively movable members comprising supports on each of said members, cylindrical shaft engageable with each of said supports, said supports having partial circular end portions engaging the respective cylindrical shaft, each of said supports having opposed projections spaced from one another along the transverse width of the respective support, said spaced projections defining spaced, extended circular portions engageable with the respective cylindrical shaft, whereby the respective shaft is engageable by said partial circular end portion and the extended circular portions of the spaced projections of the supports, first compression links engageable with one of said shafts, second compression links engageable with the other of said shafts, a third cylindrical shaft engageable between said

first and second compression links, said compression links having transverse partial circular end portions engaging the respective cylindrical shaft, each of said compression links having opposed projections spaced from one another along the transverse width of said end portions, said spaced projections defining spaced, extended circular portions engageable with the respective cylindrical shaft, whereby the respective shaft is engageable by said circular end portions and the extended



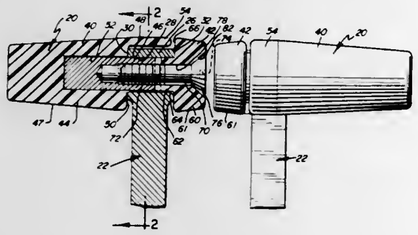


circular portions of the spaced projections of the compression link, said compression links having generally flat and parallel upper and lower faces, said spaced projections on said compression links generally forming continuations of said faces, and means defining sloping surfaces disposed in the spaces between said spaced projections of said compression links, said sloping surfaces extending from said circular end portion of said compression links to the respective face of the compression links.

4,094,209
LEVER KNOB

Richard Van Rossem, Canton, and Michael B. Hyde, Pekin, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 17, 1977, Ser. No. 778,653
Int. Cl.² G05G *1/10*
U.S. Cl. 74—543 **15 Claims**

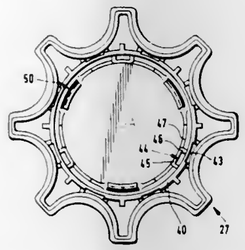


1. In a knob assembly carried by an end portion of an actuating lever, said knob assembly comprising a pair of shaped members, each member having a projecting portion, said projecting portions being seated in an opening in said end portion of the lever from opposite sides thereof, a fastener extending between said projecting portions of said members to secure said members to opposite sides of said lever, and means extending outwardly from one of said members in overlapping relationship to an exposed end of said lever whereby said end of the lever is protected from contact by the hand of an operator.

4,094,210
KNOB FOR SEAT-ANGLE ADJUSTER OF MOTOR-VEHICLE SEAT

Egon Wirtz, Remscheid-Lennep, and Klaus Berghaus, Wuppertal, both of Germany, assignors to Keiper KG, Remscheid-Hasten, Germany

Division of Ser. No. 544,780, Jan. 28, 1975, Pat. No. 3,976,327, and Ser. No. 572,300, Mar. 28, 1975, Pat. No. 3,966,253. This application Jul. 6, 1976, Ser. No. 702,857
Claims priority, application Germany, Jul. 4, 1975, 7521224[U]
Int. Cl.² G05G *1/10*; B60N *1/02*
U.S. Cl. 74—553 **8 Claims**



1. In combination with an automotive-vehicle seat-angle adjustment device having a pair of hinge parts and means including an adjustment member rotatable about an axis and having a periphery formed with a plurality of radially outwardly open recesses for varying the relative position of said hinge parts, a knob having

an annular collar closely surrounding said periphery,

a plurality of entrainment formations projecting radially inwardly from said collar into respective recesses, and

a plurality of radially outwardly deflectable hooks each engaging axially through a respective recess with said member, said hooks alternating with said formations around said periphery and each having a stem engaging through the respective recess and a hook head engaging behind said member, whereby said hooks and said formations can transmit force angularly between said member and said knob.

4,094,211
HYDRAULIC SYSTEM FOR AN AUTOMATIC TRANSMISSION OF AN AUTOMOTIVE VEHICLE

Helmut Espenschied, Ludwigsburg, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 18, 1976, Ser. No. 715,433
Claims priority, application Germany, Aug. 20, 1975, 2537006
Int. Cl.² B60K *41/18*
U.S. Cl. 74—868 **15 Claims**

1. A system comprising:

a source of pressurized fluid;

a pressure-operated load;

an engine having an accelerator pedal;

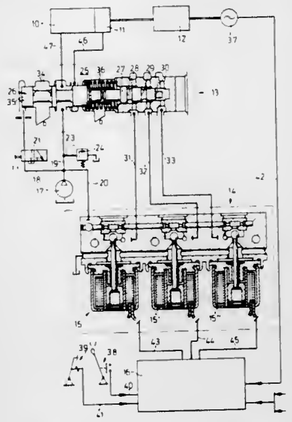
a valve connected between said source and said load and having a valve body displaceable to control the flow of said fluid to said load and having a plurality of binarily stepped pilot surfaces;

means defining a pressurizable chamber at each of said surfaces;

a plurality of solenoid valves each between said load and a respective one of said chambers;

clock means for periodically generating a "shift" signal;

electrical circuit means connected to said pedal and said solenoid valves for electrically energizing said solenoid valves in accordance with pedal position, said circuit means being connected to a source of electricity and being switchable through a plurality of steps, said circuit means being responsive to said "shift" signal and maintaining electrical contact between at least a one of said solenoid



valves and said source of electricity while moving through said steps;

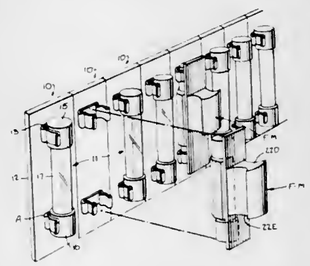
means for generating an output representing engine speed; and

means for comparing said output with a reference value and for generating an error signal controlling said means for generating said "shift" signal.

4,094,212
FUSE-MATE

Irving Hyams, Philadelphia; Harold S. Koch, Plymouth Meeting, and Herman Aafjes, Hatfield, all of Pa., assignors to Fischer & Porter Company, Warminster, Pa.

Filed Apr. 7, 1977, Ser. No. 785,526
Int. Cl.² B25B *27/14*
U.S. Cl. 81—3.8 **5 Claims**



1. A fuse mate of insulating material adapted to be coupled to a cartridge-type fuse having a fuse wire disposed within a cylindrical casing whose ends are enclosed by terminal caps, said caps being engageable by the spring clips of a fuse holder, said mate facilitating the insertion or extraction of said fuse and comprising:

A a shield dimensioned to protectively cover said fuse and having a length which is at least equal to that of the fuse so as to overlie the caps and the spring clips;

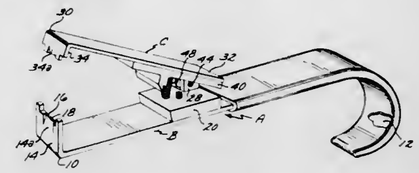
B a pair of elongated resilient jaws projecting from the underside of said shield, said jaws having an inlet opening which is normally narrower than the diameter of the casing, the inlet opening being dilatable to permit the jaws to clamp onto and to conform to said casing, said jaws having a length substantially shorter than that of said shield so as to be in contact with the casing between said end caps; and

C a block on the outside of said shield forming a handle for said fuse mate, said shield, said jaws and said block being integral with each other and being fabricated from a single molded piece of synthetic plastic material.

4,094,213
COMBINED WIRE CUTTER AND INSULATION REMOVER

Marion W. Bradley, Magalia, Calif., assignor to Farinon Electric, San Carlos, Calif.

Filed Jul. 18, 1975, Ser. No. 597,238
Int. Cl.² H02G *1/12*
U.S. Cl. 81—9.5 R **1 Claim**



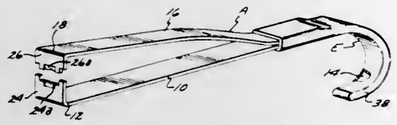
1. A device for stripping a cylindrical electrical insulating sheath that is formed from a highly resilient and compressible material from a wire to expose a bare end portion of the latter that is of predetermined length, said device being of the type that includes: first and second elongate rigid members that each have first and second end portions, said second member overlying said first member; pivot means that pivotally connect said first end portion of said second member to said first member intermediate said first and second end portions of the latter; spring means that at all times tend to maintain said second member in a first angular position relative to said second member, but permitting said second member to be pivoted to a second position where said second end portions of said first and second members lie in a common plane; first and second cutters disposed said predetermined length from said second end portions of said first and second members and so supported from said first and second members as to slidably engage one another as said second member moves from said first to said second position and in so doing cutting said insulation sheath and wire situated therebetween; first and second rigid extensions extending towards one another and defining said second end portions of said first and second rigid members, said first and second extensions including first and second transverse edges of substantial width that are separated by a distance greater than the diameter of said sheath when said second member is in said first position; with said device being characterized by first and second semi-cylindrical aligned recesses formed in said first and second transverse edges of said first and second extensions, said first and second recesses each having a diameter slightly larger than the diameter of said bare wire, and said first and second recesses being of sufficient widths that when said second member is moved to said second position, said first and second recesses compress a cylindrical section of said sheath therebetween to have such a thin wall that said thin wall may be broken and a portion of said sheath that has been cut to said predetermined length by said first and second cutters may be slid from an end portion of said wire that is also of said predetermined length by moving said device longitudinally relative to said wire in an appropriate direction with said second member in said second position; and first and second engageable means on said first and second extensions that slidably interlock to maintain said first and second recesses in alignment as said first and second recesses pressure contact said insulation sheath to form said thin wall cylindrical section.

4,094,214

WIRE INSULATION STRIPPING DEVICE

Marion W. Bradley, Paradise, Calif., assignor to Farinon Electric, San Carlos, Calif.

Filed Jul. 18, 1975, Ser. No. 597,240
Int. Cl.[2] H02G *1/12*
U.S. Cl. 81—9.5 R **1 Claim**



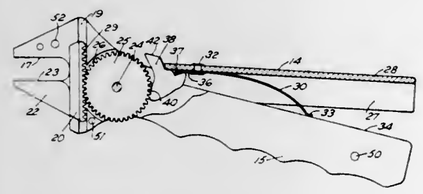
1. A device for stripping a cylindrical electrical insulating sheath that is formed from a highly resilient and compressible material from an end portion of a wire to expose the bare metal electrical conductor of the latter, said device of the type that includes: first and second elongate members that each have first and second end portions, said second member overlying said first member and angularly disposed relative thereto, said first end portions lying in a common plane, said second end portion of said second member bonded to said first member; first and second rigid extensions extending towards one another and defining said first end portions of said first and second rigid members, said first and second extensions including first and second transverse edges of substantial width that are separated by a distance greater than the diameter of said sheath when said second member is in a first position relative to said second member, with said device being characterized by first and second semi-cylindrical aligned recesses formed in said first and second transverse edges of said first and second extensions, said first and second recesses each having a diameter slightly larger than the diameter of said bare wire, and said first and second recesses of sufficient widths that when said second member is moved to a second position relative to said first member, said first and second recesses compress a cylindrical section of said sheath therebetween to have such a thin wall that said thin wall may be broken and a portion of said sheath slid from said wire to expose a bare end portion of the latter when said device is moved longitudinally relative to said wire in an appropriate direction with said second member in said second position; and first and second rigid engageable means on said first and second extensions that slidably interlock to maintain said first and second recesses in alignment as said first and second recesses pressure contact said insulation sheath to form said thin wall cylindrical section.

4,094,215

PLIER WRENCH

Robert H. Hudson, 103 Valley St., Seekonk, Mass. 02771

Filed Apr. 1, 1977, Ser. No. 783,816
Int. Cl.[2] B25B *13/14, 13/22*
U.S. Cl. 81—127 **2 Claims**



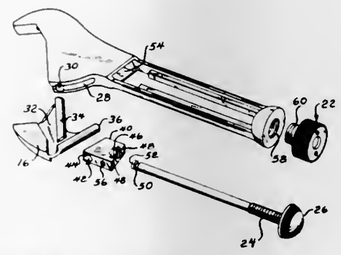
1. A wrench comprising an elongated body portion having a fixed jaw at one end, a movable jaw slidable in said body portion for cooperation with the fixed jaw and having a rack, a gear rotatably mounted on a pin in the body portion meshing with the rack and of a size and at a position to protrude beyond the side of the body portion, a lever pivotally mounted on said pin, said lever having a locking tab in the plane of said gear and with a thumb portion protruding beyond the side of the body portion adjacent said gear and resiliently urged into engagement with said gear so that when the lever is swung toward the body the gear rotates and the rack slides the movable jaw toward the fixed jaw, said gear and said thumb portion being exposed for simultaneous manual engagement by a single finger so that when the tab is disengaged from the gear, the gear may be manually rotated to adjust the position of the movable jaw.

4,094,216

RAPIDLY ADJUSTABLE TOOL

Carl D. Jackson, 102 E. Falcon Run, Pendleton, Ind. 46064

Filed Mar. 4, 1977, Ser. No. 774,333
Int. Cl.[2] B25B *13/16*
U.S. Cl. 81—156 **7 Claims**



1. An adjustable tool comprising:
at least two tool parts, each having a work engaging surface,
said parts being interconnected such that said work engaging surfaces are relatively movable;
an elongated rotary and reciprocal, threaded actuator operatively associated with said parts such that upon rotation or reciprocation of said actuator, relative movement between said parts will occur;
a tool base, mounting said parts and said actuator; and
a clutch on said base and receiving said actuator for selectively engaging or disengaging the threads on said actuator, said actuator being substantially freely reciprocable within said base when said threads are disengaged to allow rapid relative movement between said surfaces to occur to effect rapid adjustment of the relative positions of said surfaces, said actuator being rotatable when said threads are engaged to effect fine adjustment or and/or the application of clamping force by said surfaces, said clutch comprising a housing surrounding said actuator, said housing including a first component secured to said base and a second component rotatable on said first component, a pair of split nuts generally radially movable within said housing and about said actuator, and cam means on said housing and said split nuts for effecting bidirectional radial movement of said split nuts within said housing upon relative rotary movement between said components.

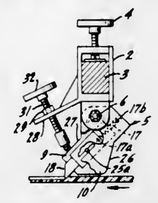
4,094,217

SAFETY SLITTER FOR THERMOPLASTIC SHEET

Roger Edsel Exline, Parkersburg, W. Va., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Jun. 28, 1977, Ser. No. 810,696
Int. Cl.[2] B26D *3/08*
U.S. Cl. 83—6 **1 Claim**

1. An improved, automatically retractable safety slitter for cutting thermoplastic sheet as it exits from the sheet die of an extruder comprising a housing, a cutter blade mounted in a holder, a recess in said housing of a length greater than the length of said holder for slidably and retractably receiving said holder, an elongated slot in said housing having detent means, an elongated pin secured to said holder and extending transversely through said elongated slot, tension spring means between said holder and said housing adapted to be relaxed when said holder is in its retractable position within said recess, said



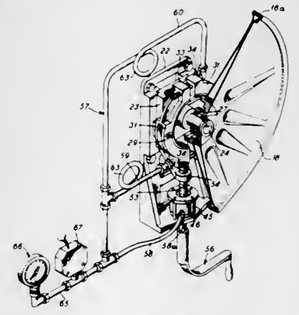
pin being adapted to rest in said detent when a cutting force is applied to said blade and to disengage from said detent when no force is applied to said blade.

4,094,218

HYDRAULIC SYSTEM FOR TENSIONING BAND SAW BLADES

Richard J. Flanigan, and Robert Duane Hooton, both of McMinnville, Tenn., assignors to Houdaille Industries, Inc., Buffalo, N.Y.

Filed Jan. 31, 1977, Ser. No. 764,000
Int. Cl.[2] B27B *13/14;* B23D *55/10;* B27B *13/08*
U.S. Cl. 83—62.1 **15 Claims**



1. In a machine having spaced wheels driving a band trained therearound and at least one wheel being shiftable relative to another wheel to control tension of the band, the improvements of a closed hydraulic conduit having fluid sealed therein, adjustable means supported on fluid from said conduit adapted to be set to position said one wheel and simultaneously load said sealed fluid, hydraulic brake means for said one wheel biased to open position with loaded fluid from said conduit, and means biasing said brake means to closed position for stopping rotation of said one wheel whenever fluid pressure in said conduit falls below a predetermined minimum.

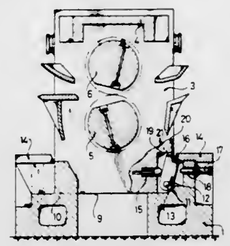
4,094,219

SHEARING ARRANGEMENT

Wolfgang Fabian; Werner Plumer; Theodor Sevenich, and Heribert Zehnter, all of Dortmund, Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed May 16, 1977, Ser. No. 797,062
Claims priority, application Germany, May 20, 1976, 2622558
Int. Cl.[2] B26D *1/40, 7/26*
U.S. Cl. 83—345 **10 Claims**

1. A shearing arrangement for cutting moving bars, comprising: shear stands; two counter-rotating knife drums rotatable in said shear stands; a base plate; said shear stands being spaced from each other and being located on said base plate; a disconnectable yoke, said shear stands being connected to each other above said knife drums by said disconnectable yoke; said two knife drums being mounted directly in said shear stands, each shear stand being a single piece member; quick-disconnect coupling means, said shear stands being inserted into said base plate and being connected to said base plate by said quick-disconnect coupling means; said coupling means engaging recesses at the bottom of said shear stands, said coupling means having elements brought together by weight of said shear stands when installing said shear stands into said base plate;



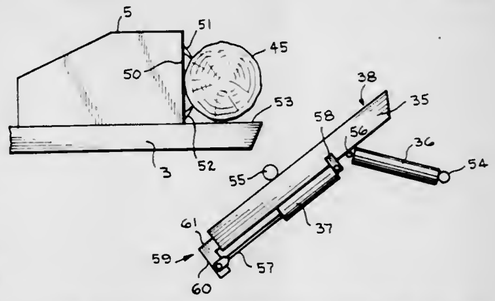
spring means; said elements of said coupling means being spread by said spring means after said shear stands have been installed into said base plate, the spreading of said elements being increased by an upward force which can develop during a shearing process so that said shear stands are prevented from tilting in said base plate; and means in said base plate for relieving pressure on said elements before said shear stands are lifted from said base plate.

4,094,220

SAWMILL METHOD AND APPARATUS

Roy R. Pryor, and Harold A. Pryor, both of P.O. Box 26, Woodville, Tex. 75979

Filed May 16, 1974, Ser. No. 470,338
Int. Cl.[2] B27B *31/02, 31/04*
U.S. Cl. 83—712 **11 Claims**



1. Apparatus for manipulating a sawlog and the like, comprising
an elongate striking member arcuately movable about a pivot point adjacent one end thereof and to and from abutting engagement with said sawlog and further having a sidewall aperture adjacent the other end thereof directed generally toward said sawlog,
an elongate support member longitudinally movable in said striking member to and from said aperture therein, and
log engaging member pivotally mounted on said support member for rotation between a first position extending through said sidewall aperture in said striking member toward said sawlog and a second folded position within said striking member and displaced from said sidewall aperture.

4,094,221

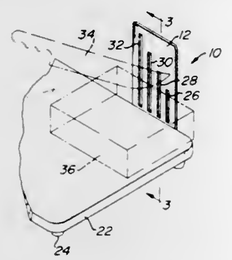
CUTTING BOARD ATTACHMENT

Charles E. Jacoby, 2142 Covington Ave., Bethlehem, Pa. 18017

Filed Oct. 12, 1976, Ser. No. 731,264
Int. Cl.[2] B26D *4/42*
U.S. Cl. 83—762 **7 Claims**

1. Apparatus for attachment to a support surface to facilitate the use of a discrete knife as a lever for cutting hard objects

comprising a fulcrum support member, said member being a L-shaped plate with one leg adapted to be vertically disposed along side a cutting block, means on the other leg of said member for facilitating attachment of said member to a cutting block, means on said one leg providing a plurality of discrete



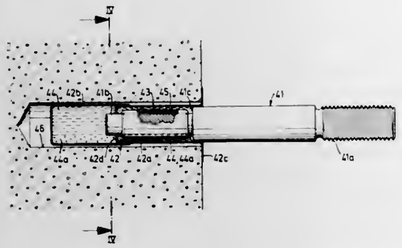
fulcrums at different elevations for contact with the upper edge of a cutting blade while receiving therein the tip of the blade so that the cutting blade can be used as a lever pivotable downwardly about the fulcrums during a cutting action, said fulcrums being spaced transversely across the width of said one leg of said support member.

4,094,222

ADHESIVELY SECURED ANCHOR BOLT

Gusztav Lang, Nüremberg, and Wolf Kuhlmann, Munich, both of Germany, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed Jun. 4, 1976, Ser. No. 692,929
Claims priority, application Germany, Jun. 9, 1975, 2525579
Int. Cl.² E04B *1/48;* F16B *13/04*
U.S. Cl. 85—63 **1 Claim**



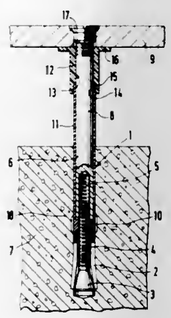
1. An anchor assembly comprising an anchor bolt and an adhesive material for securing the anchor bolt in a prepared borehole, the adhesive material comprising at least a first component and a second component with one of said components effecting the hardening action when they are mixed together, a cartridge containing one of said first and second components, said cartridge formed of a destructible material, wherein the improvement comprises that said anchor bolt has an axially extending shank, at least a portion of the other one of said first and second components disposed on said shank, a destructible protective sheath enclosing said at least one portion of the other one of said first and second components deposited on said shank, said shank having a first end arranged to be inserted first into the prepared borehole and an oppositely directed second end, a collar formed on said shank intermediate the first and second ends thereof, said collar extending radially outwardly from said shank transversely of the axial direction thereof, said cartridge having an inner surface spaced outwardly from said shank and the outer circumferential periphery of said collar disposed in continuous contact with the inner surface of said cartridge, said shank has a first portion extending from the first end of said shank toward the second end thereof to a point intermediate the ends of said shank and a second portion extending from the end of said first portion intermediate the ends of said shank toward the second end of said shank, said first and second portions being co-axial and said second portion having a larger diameter than said first portion, said collar being formed on the end of said second portion connected to said first portion said protective sheath located on said first portion of said shank, said cartridge laterally enclosing said first portion of said shank and extending in the axial direction of said shank from the first end of said shank away from the second end thereof, a stripping plate mounted on the first portion of said shank adjacent the first end thereof and extending transversely of the axial direction of said shank, said cartridge comprising a cap laterally enclosing said stripping plate and extending in the axial direction of said shank from the first end of said shank away from the second end thereof, and a sleeve secured to said stripping plate radially outwardly from the said first portion and laterally enclosing said first portion of said shank and fitted closely about the end of the second portion of said shank adjacent to said first portion, and the opposite end of said sleeve from said stripping plate having a radially outwardly directed flange extending transversely of the axis of said shank and said flange arranged to extend outwardly beyond the diameter of the prepared borehole into which the anchor assembly is inserted.

4,094,223

MOUNTING DEVICE FOR USE IN MASONRY AND THE LIKE

Artur Fischer, Weinhalde 34, D-7244 Tumlingen, Waldachtal 3, Germany

Filed Jan. 21, 1977, Ser. No. 761,537
Claims priority, application Germany, Jan. 24, 1976, 2602635
Int. Cl.² F16B *13/06*
U.S. Cl. 35—77 **11 Claims**



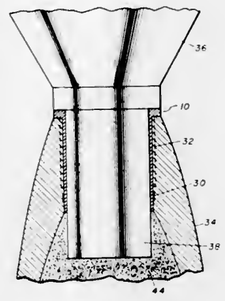
1. A mounting device in combination with a masonry structure and the like, comprising an expandable member received in a hole of said structure; an expander member adapted to expand at least a leading end of said expandable member; a shaft member having a first portion located in said hole and connected with said expander member, and a second portion outwardly projecting from said hole in a first direction from said structure towards an object being mounted and carrying said object at a distance from said structure; and a sleeve-shaped element of a corrosion-resistant material enclosing said first portion of said shaft member located in said hole and also enclosing said second portion of said shaft member outwardly projecting from said hole over a length corresponding to said distance, said sleeve-shaped element having a section abutting against said object to keep it at said distance from said structure.

4,094,224

THREAD PROTECTOR AND SEAL

Joseph C. Homko, Oxford, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 20, 1977, Ser. No. 817,305
Int. Cl.² F42B *33/02*
U.S. Cl. 86—31 **7 Claims**



1. A thread protector and seal device for use in automated nose end funnel loading of a projectile with explosive materials, which comprises:

a tubularly shaped body member having a plurality of parallel longitudinally disposed flexing slots extending through the bottom end of said body member, annular seal grooves disposed in an interior and an exterior wall of said body member, a plurality of transversely disposed seal through holes positioned in the bottom end of said body member, and an integrally disposed flange located on an upper end of said body member; and

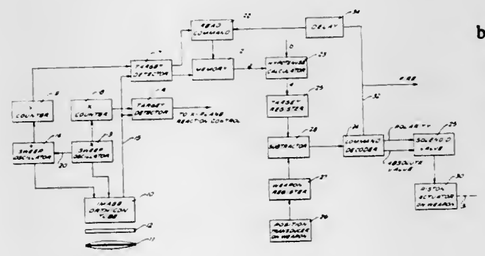
molded compliant means located in said interior and exterior seal grooves for preventing injury to internal threads in the nose end of said projectile during funnel loading and for preventing explosive materials from flowing upward into said internal thread area of said projectile.

4,094,225

TARGET DETECTING AND LOCATING SYSTEM

Eugene C. Greenwood, 468 Prospect 250 Colton, Newport Beach, Calif. 92660

Filed Feb. 3, 1969, Ser. No. 795,844
Int. Cl.² H04N *3/00*
U.S. Cl. 89—41 L **14 Claims**



13. A system for detecting and locating a source of radiation comprising:

detector means sensitive to incoming radiation for generating a signal indicative of the receipt thereof;

filter means positioned between said source and said detector means for passing radiation of only a selected frequency;

means for scanning said detector means along first and second orthogonal axes;

means responsive to said scanning means for generating first and second signal indicative of the instantaneous scan direction of said detector means along said first and second orthogonal axes, respectively; and

utilization means responsive to the occurrence of a radiation indicating signal and said first and second direction indicating signals for indicating the instantaneous direction to a received source of radiation, wherein said system is operative to aim a weapon in the direction of said source of radiation, said weapon being movable in two orthogonal directions under the control of a pair of variable members connected between first and second stationary points and said weapon, and wherein said utilization means comprises:

means responsive to said first and second signals for determining the required length of said variable members to aim said weapon in the direction of said source and for generating third and fourth signals indicative thereof;

means for generating fifth and sixth signals indicative of the instantaneous actual length of said variable members; and

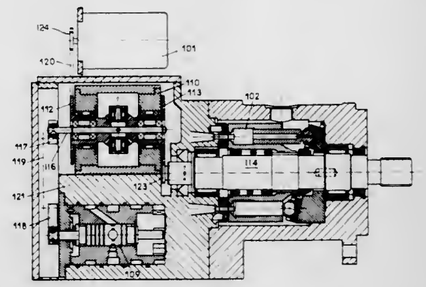
means responsive to said third through sixth signals for determining the difference between the actual and required lengths of said members and for generating an error signal as a function thereof, said weapon adapted to be moved to reduce said error signal to zero.

4,094,226

HYDRAULIC CONTROL APPARATUS WITH FEEDBACK

Jacques Faisandier, 32 Bd Felix Faure, 92320 Chatillon-sur-Bagneux, France

Filed May 25, 1976, Ser. No. 689,796
Claims priority, application France, May 26, 1975, 75 16265
Int. Cl.² F15B *9/12*
U.S. Cl. 91—39 **5 Claims**



1. A hydraulic control apparatus having a mechanical feedback system, said apparatus comprising:

means providing an input signal in the form of a shaft rotation;

hydraulic motor means for generating an output signal commensurate with said input signal, said output signal being in the form of a change in the position of an output shaft of said hydraulic motor means;

differential comparator means for comparing said input and output signals, said comparator means including a pair of differential gears and bevel gear means coupled to two said differential gears, said comparator means also including a rotatable output shaft on which said bevel gear is mounted;

valve means for controlling the delivery of operating fluid to said hydraulic motor;

first transmission means connecting said input signal generating means to one of said differential gears of said comparator means;

second transmission means coupling the output shaft of said hydraulic motor means to the other of said differential gears of said comparator means;

first crank means, said first crank means including an adjust-

able length first crank arm connected at a first end to the output shaft of said comparator means;

second crank means, said second crank means including a second adjustable length crank arm connected at a first end to said valve means for effecting control of said valve means; and

connecting rod means interconnecting the second ends of said first and second crank arms of said first and second crank means.

4,094,227

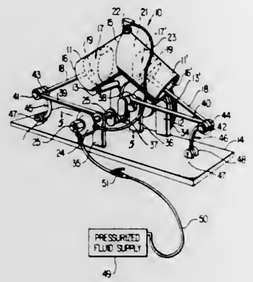
FLUID MOTOR

Samuel A. King, P.O. Box 6, Alturas, Fla. 33820

Filed Jun. 6, 1977, Ser. No. 803,934

Int. Cl.² F01L *33/02;* F01B *7/04*

U.S. Cl. 91—180 **3 Claims**



1. An opposed piston fluid motor comprising a pair of angularly related cylinders having adjacent ends rigidly joined in a common plane oblique to the axis of each cylinder and remote open ends, a base, means mounting said pair of cylinders spaced above said base with said common plane in which the adjacent ends of the cylinders lie perpendicular to the base, and with the cylinders inclined downwardly from said common plane toward said base in the manner of an inverted V, a pair of pistons, there being a different one of said pistons reciprocably mounted in each of said cylinders, a separate piston rod for each piston, each of said piston rods extending outwardly through the open end of a cylinder and having an inner end pivotally connected to one of the pistons and an outer end located outside of the cylinder in which the piston reciprocates, a pair of oscillating arms, each arm having one end pivotally supported from said base and another end pivotally connected to the outer end of one of the piston rods, means mounting each of said oscillating arm to oscillate about an axis parallel to said common plane and in a plane normal to said common plane, a crank shaft, means rotatably mounting said crankshaft above said base to rotate about an axis parallel to said base and lying in said common plane, said crankshaft having a pair of axially displaced cranks, angularly displaced 180° from each other, a pair of connecting rods having opposite ends, one of said connecting rods having one end pivotally connected to one of said cranks and an opposite end pivotally connected to the pivot connection between one of said piston rods and one of the oscillating arms, the other connecting rod having one end pivotally connected to the other of said cranks and having an opposite end pivotally connected to the pivot connection between the other of said piston rods and the other of said oscillating arms, a fly wheel mounted on said crankshaft to rotate therewith, said pistons each having a working face, the working faces of said pair of pistons facing each other within said cylinders, an expansible working chamber within said cylinders between the working faces of the pistons, a fluid port communicating with said expansible working chamber at the adjacent ends of said cylinders, a fluid control valve means for cylically admitting pressurized fluid to said expansible working chamber and exhausting exhaust fluid from said expansible working chamber, and fluid conduit means connecting said fluid control valve means with said fluid port, said control valve means being operatively connected to said crankshaft.

4,094,228

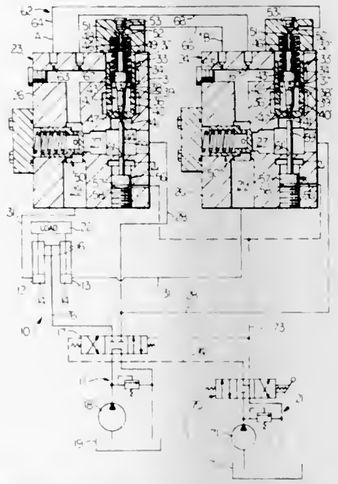
FLUID SYSTEM HAVING LOAD PRESSURE EQUALIZING VALVE ASSEMBLIES

Lawrence F. Schexnayder, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 6, 1977, Ser. No. 804,195

Int. Cl.² F15B *11/22*

U.S. Cl. 91—411 B **11 Claims**



1. In a fluid system having a source of fluid, a control valve, first and second hydraulic jacks each having a load supporting end connected to the source of fluid through the control valve, the improvement comprising:

first and second pilot operated valve assemblies positioned between the control valve and the load supporting ends, each vavle assembly having

a housing having a chamber formed therein,

a first check valve positioned in said chamber and being movable between a first position at which communication between the associated load supporting end and the control valve is blocked and a second position at which the associated load supporting end is in fluid communication with the control valve,

a second check valve associated with the first check valve and being movable between a first position at which communication between the chamber and the control valve is blocked and a second position at which the chamber is in fluid communication with the control valve,

first piston means for urging the second check valve toward the first position, and

second piston means for initially moving the second check valve to the second position and for subsequently moving the first check valve to the second position; and

signal means for sensing the load pressure in the load supporting ends and for delivering first and second control signals to the first piston means of the respective first and second valve assemblies.

4,094,229

FLUIDIC REPEATER

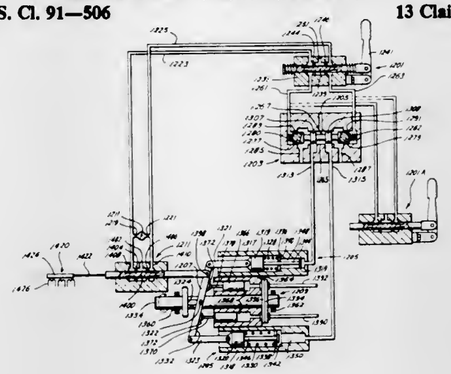
Willie B. Leonard, 5902 Royalton, Houston, Tex. 77036

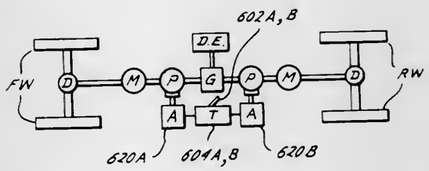
Continuation-in-part of Ser. No. 521,036, Nov. 5, 1974, Pat. No. 4,046,059, which is a continuation-in-part of Ser. No. 489,829, Jul. 18, 1974, Pat. No. 3,988,966. This application Oct. 15, 1975, Ser. No. 622,760

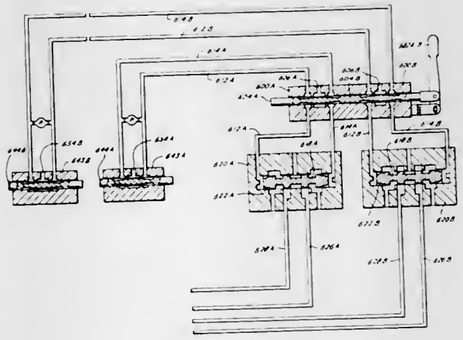
The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.

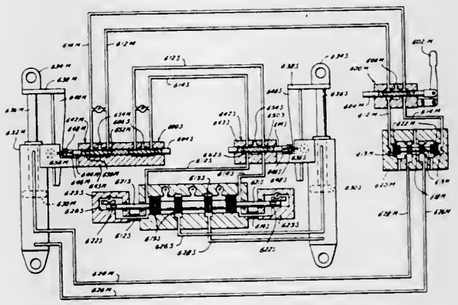
Int. Cl.² F01B *13/04, 3/02;* F15B *13/16*

U.S. Cl. 91—506 **13 Claims**









1. Fluidic repeater comprising:

transmitter means for providing fluid at variable pressure, said transmitter means including a first transmitter having (a) passage means for conveying the variable pressure fluid and from which the variable pressure fluid is provided, (b) source connection means for connecting said passage means to a source of pressurized fluid, (c) restrictor means for restricting fluid flow from said source connection means to said passage means so that fluid supplied to said passage means from such source has a drooping pressure versus rate of flow characteristic, (d) transmitter reservoir connection means for connecting said passage means to a rservoir means having a pressure less than that of such source, and (e) transmitter obstructor means for variably obstructing flow through said transmitter reservoir connection means;

a responder including

(a) an output member,

(b) primary means for providing a supply of fluid, said primary means including a primary cylinder and a primary piston movable axially in said primary cylinder, said primary cylinder being connected to said passage means for relative axial movement of said primary piston and primary cylinder in response to variation in the pressure of the fluid of said transmitter passage means, the supply of fluid being in accordance with the relative positions of said primary cylinder and primary piston, and

(c) secondary means for mechanically displacing said output member in an amount dependent upon the supply of fluid provided by said primary mans, said secondary means including a plurality of secondary cylinders each such secondary cylinder connected to said primary means and having a secondary piston movably disposed therein; and

feedback means for variably venting fluid from said passage means to the reservoir means having a pressure less than that of the source to stop displacement of said output member, the extent of venting of said feedback means being variable according to the position of at least one of the secondary pistons of said responder with respect to the secondary cylinder within which such one of the secondary pistons is disposed and being independent of the time rate of the displacement of said output member, said feedback means including feedback reservoir connection means for connecting said passage means to the reservoir means and feedback obstructor means for variably obstructing flow through said feedback reservoir connection means,

a portion of said feedback reservoir connection means being separate from a portion of said transmitter reservoir connection means at least to the extent tht the flow obstructed by said feedback obstructor means is separate from the flow obstructed by said transmitter obstructor means.

4,094,230

SELF-ALIGNING AND END FIXITY CONNECTOR FOR CONNECTING A HYDRAULIC CYLINDER PISTON ROD TO ITS RESPECTIVE SECTION IN A MULTI-SECTION TELESCOPIC BOOM ASSEMBLY

William E. Wright, and Huber D. Bock, Jr., both of Hagerstown, Md., assignors to Walter Kidde & Company, Inc., Clifton, N.J.

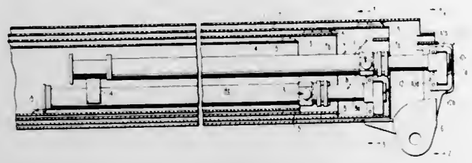
Continuation of Ser. No. 511,606, Oct. 3, 1974, abandoned. This application Jan. 18, 1977, Ser. No. 760,323

Int. Cl.² F01B *7/20, 1/00*

U.S. Cl. 92—51 **6 Claims**

1. A self-aligning and end fixity connector for connecting a hydraulic cylinder piston rod to its respective section in a

multi-section telescopic boom assembly comprising, a hydraulic cylinder mounted within one section of a multi-section boom assembly, a member connected to the cylinder and trunnioned to the boom section for pivotal movement only relative thereto, a piston rod slidably mounted in said cylinder, a piston on one end of said rod disposed within said cylinder, a block member rigidly connected to the free end of said piston rod, a pair of spaced, parallel, depending plate members secured to the side faces of said block, said depending plate members being positioned adjacent the inwardly facing surfaces of the side walls of another section of said multi-section boom assembly, a rectangular frame member having integral end and side walls secured to each inwardly facing side wall, each rectangular frame member and the respective inwardly facing side wall forming a recess receiving a respective depending plate member, each depending plate member on the free end of the piston rod being rectangular, the side edges of each depending plate member engaging the corresponding side edges of the frame to prevent rotation of the piston rod about a horizontal transverse axis, the end edges of each depending plate member being spaced from the corresponding ends of the frame member to thereby provide a clearance for permitting a floating action of the rod in a vertical plane only, whereby the connection points of the cylinder and piston to their respective boom sections are maintained in alignment with each other, with the opposite ends of the piston rod substantially fixed against rotational movement about a horizontal transverse axis, thereby increasing the column loading capacity of the rod and associated boom section.

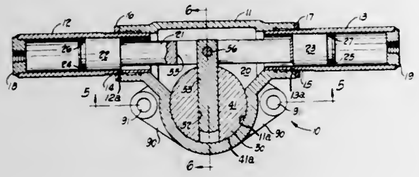


4,094,231

ROTARY ACTUATOR AND METHODS OF FABRICATION

Paul Carr, Massillon, Ohio, assignor to Flo-Tork, Inc., Orrville, Ohio

Continuation-in-part of Ser. No. 477,763, Jun. 10, 1974, abandoned. This application Jun. 2, 1975, Ser. No. 582,401
Int. Cl.² F01B 9/00
U.S. Cl. 92—128 **5 Claims**



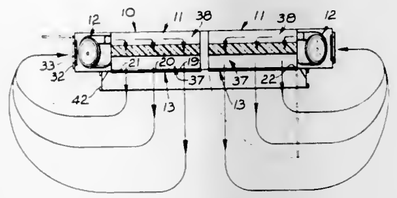
1. A fluid actuator, comprising:
(a) a housing structure defining a pair of spaced piston receiving portions and a communicating chamber;
(b) the housing having an opening communicating with one of the receiving portions;
(c) an output shaft structure journalled in the housing structure and having a slotted portion positioned in the chamber;
(d) the slotted portion including walls which define a shaft slot;
(e) a piston and lever assembly including:
(i) a piston structure movably carried by the housing structure and having a pair of end portions each in an associated one of the receiving portions, the piston structure also including a central portion which interconnects the end portions and which defines a piston slot;
(ii) a lever member having one portion in the piston slot and pivotally connected to the piston structure, and another portion slidably engaging the shaft slot walls to drivingly interconnect the piston structure and the output shaft structure; and
(f) the lever member having an end extending into the piston slot, the piston slot being of sufficient size to permit the entire length of the lever member to be nested therein, the housing opening being of a size to permit the piston and lever assembly to be inserted therethrough for positioning in the housing structure.

4,094,232

CLEAN AIR ZONE

Frederick Hugh Howorth, Chorley, England, assignor to Howorth Air Engineering Limited, Farnworth, Bolton, England

Continuation-in-part of Ser. No. 568,614, Apr. 16, 1975, Pat. No. 4,009,647. This application Jan. 13, 1977, Ser. No. 758,926
Claims priority, application United Kingdom, May 8, 1976, 19024/76
The portion of the term of this patent subsequent to Mar. 1, 1994, has been disclaimed.
Int. Cl.² F24F 9/00
U.S. Cl. 98—36 **9 Claims**



2. Apparatus for providing a clean air zone comprising:
a plurality of air delivery means,
a plurality of air supply means for supplying sterile air to the air delivery means,

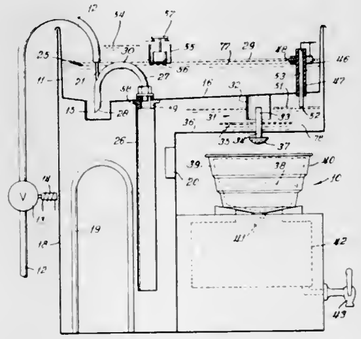
a first central one of the air delivery means being adapted to supply air at a first velocity,
and a second outer one of the air delivery means being adapted to supply air at a second velocity lower than the first velocity,
the different air delivery means having different permeabilities for attaining the desired flow velocity differential.

4,094,233

AUTOMATIC COFFEE MAKER WITH INLET WATER CONTROL MEANS IN RESPONSE TO COLD WATER AND HOT WATER LEVELS

John C. Martin, Springfield, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.

Filed Oct. 12, 1976, Ser. No. 731,716
Int. Cl.² A47J 31/00
U.S. Cl. 99—305 **11 Claims**



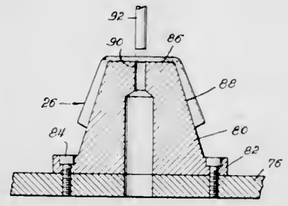
1. In brewing apparatus comprising, a cold water basin, an inlet water line for supplying cold water to said basin from a source under pressure, a valve in said inlet water line, means for opening said valve to cause cold water to flow into said basin, means for closing said valve when said cold water basin is filled to a predetermined shutoff level, a hot water tank under said basin, means for heating water in said tank, a cold water inlet from said tank to brew coffee extract, and means for closing said valve in the event that the water in said tank rises to a predetermined level therein, the improvement wherein said cold water inlet includes siphon means arranged to start when said shutoff level is reached by water supplied at or above a predetermined pressure and likely to start when water is supplied at a pressure below said predetermined pressure and said shutoff level is not reached whereby water continues to flow into said tank, said means for withdrawing hot water from said tank includes siphon means, and said means for closing said valve includes probe means adapted to be energized by water in said basin and water in said tank respectively.

4,094,234

FILTER PAPER CUP FOR A PERCOLATOR AND PROCESS FOR MAKING THE SAME

Wallace E. Olney, and Robert G. Wright, both of Portage, Mich., assignors to Brown Company, Kalamazoo, Mich.

Filed May 13, 1976, Ser. No. 686,111
Int. Cl.² A47J 31/08
U.S. Cl. 99—310 **6 Claims**



1. In a percolator for brewing coffee comprising a cylindrical basket concentric with a tubular wand, the combination therewith of a filter paper cup having a flat annular bottom coextensive with and lying flat on the bottom of said basket and having an integral upstanding steam and heat-set sidewall only at the outer periphery of said annular bottom, said upstanding sidewall being fluted with accordian pleat-type flutes and said flutes being under compression by the fact that said upstanding sidewall normally flares outwardly when unconfined by said basket, but is constrained to a vertical position by said basket, in which the filter paper is composed essentially of bleached cellulose fiber from chemically processed wood pulp, is uncalendered, is unsized, is creped from about 6 to about 15 percent, and has a basis weight between about 28 and about 40 pounds, in which the sidewalls of the filter cup have at least 1 flute every 15°, and in which said flutes are steam and heat set by heating the cups to a temperature of about 400° to 420° F to a moisture content between about 3 and about 6 percent while the sidewall is constrained in a cylindrical position, and substantially only the outermost apices of said flutes are substantially entirely in contiguous relationship with the inner wall of said basket into which said paper filter cup is placed.

5. A filter paper cup adapted for use in a percolator having a cylinderical basket concentric with a tubular wand comprising an annular bottom having an integral upstanding steam and heat-set wall only at the outer periphery of said annular bottom, said upstanding wall flaring outwardly and being fluted with accordian pleat-type flutes, and in which the filter paper is composed essentially of bleached cellulose fiber from chemically processed wood pulp, is uncalendered, is unsized, is creped from about 6 to about 15 percent, and has a basis weight between about 28 and about 40 pounds, in which there is at least one flute for every 15°, and in which said flutes are steam and heat set by heating the cup to a temperature of about 400° to 420° F, steaming with moist steam of about 90 percent quality, and then dried at a temperature of about 400° to 420° F to a moisture content between about 3 and about 6 percent while the sidewall is constrained in a cylindrical position, the outermost apices of said flutes being rectilinear so that, when the filter cup is inserted into the cylindrical basket of said percolator with the annular bottom of said filter cup being

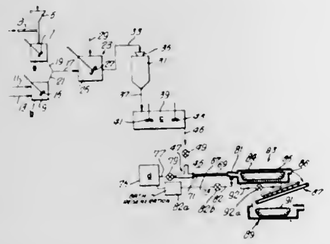
coextensive with and resting on the bottom of said basket and extending from said tubular wand to the outer wall of said cylindrical basket, substantially only the outermost apices of said flutes will be in substantially entirely contiguous relationship with said inner wall.

4,094,235

APPARATUS FOR THE PRODUCTION OF TEXTURED PRODUCTS

Francois Castaigne, Cap Rouge; Marcel Boulet, Ste-Foy; Rene R. Riel, Ste-Foy, and Eric Liber, Ste-Foy, all of Canada, assignors to Universite Laval, Sainte-Foy, Canada

Filed Jul. 31, 1974, Ser. No. 493,455
Int. Cl.² A23J *3/00*
U.S. Cl. 99—450.1 **1 Claim**



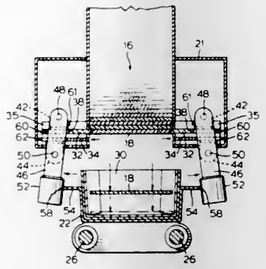
1. Apparatus for producing protein fibers which comprises
(a) a first mixer for producing a dispersion of sodium alginate,
(b) a second mixture for producing a dispersion of proteins,
(c) a third mixer for mixing the two dispersions obtained in (a) and (b),
(d) ducts to feed said two dispersions into said third mixer,
(e) a disintegrator for homogenizing said two dispersions and for breaking off small lumps therein, and a duct to connect said third mixer to said disintegrator,
(f) a ballast tank to receive homogenized dispersion from said disintegrator and a duct to connect said ballast tank to said disintegrator,
(g) a pump connected to said ballast tank by means of a duct,
(h) at least one spinning tube leading away from said pump, and a spinneret at the end of said spinning tube,
(i) a T-shaped tubular member provided with a first, a second, and a third opening, said spinning tube extending through the first opening inside the T-shaped tubular member and thereafter bending towards the second opening of said T-shaped tubular member,
(j) said second opening being provided with a coagulating tube for each spinning tube, the end of said spinning tube with said spinneret inserted inside said coagulating tube,
(k) a tank to contain a coagulation liquid and a duct and pump assembly to feed said coagulating liquid through said third opening into said T-shaped tubular member,
(l) a slowing down unit to receive filaments which have been precoagulated and picked up in said coagulating tubes, said slowing down unit to prevent crushing of the filaments in the next unit,
(m) said next unit comprising a coagulation bath and a conveyor in said coagulation bath for moving the filaments along therein and providing a final coagulation thereof, and
(n) a duct to recirculate the coagulating bath in said tank defined in (k) and means along said duct for monitoring and regenerating acids and salts in said coagulating bath.

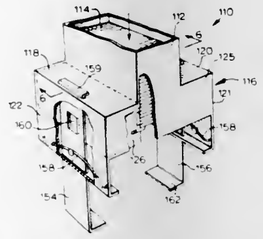
4,094,236

ICE-CREAM SANDWICH FORMING APPARATUS

Gordon W. Holmes, Mississauga, and Roy W. Nelham, Cheltenham, both of Canada, assignors to R. Nelham & Associates Incorporated, Willowdale, Canada

Filed Sep. 7, 1976, Ser. No. 720,576
Int. Cl.² A23P *1/00*; B65G *59/06*
U.S. Cl. 99—450.4 **4 Claims**





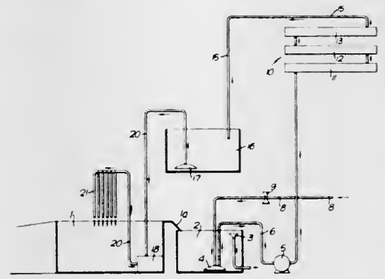
1. An ice-cream sandwich making machine including
stack holding means for holding a substantially vertical stack of face-abutting edible wafers of rectangular shape;
dispensing means located at the lower end of said stack holding means for controlled dispensing of said wafers one at a time downwardly from said stack thereof;
said stack holding means being a vertically-aligned chute of cross-sectional dimension substantially that of said wafers and having an open lower end for the feeding of said wafers to said dispensing means;
said dispensing means comprising a box-like frame member having openings in the upper and lower faces thereof for receipt of wafers from said chute and for passage of wafers downwardly through and out of said dispensing means;
said dispensing means further comprising plate support means located in said frame member and first and second pairs of plate means;
each member of said pairs of plate means being mounted for sliding movement in said support means, the individual members of each pair being in horizontal alignment;
one member of the first pair of plates being vertically spaced above the one member of said second pair a distance slightly greater than the thickness of one of said wafers and the other member of the first pair of plates being vertically spaced above the other member of said second pair a distance slightly greater than the thickness of one of said wafers,
first spring biasing means operatively associated with each member of said first pair of plates for biasing said first pair of plates towards each other to suspend said stack of wafers,
spring engaging means engaging said first spring biasing means at the end thereof remote from said first pair of plates,
second spring biasing means operatively associated with each of said spring engaging means for biasing said spring engaging means away from each other and the respective member of said first pair of plates to cushion the force applied to said first pair of plates by said first spring biasing means upon movement of said spring engaging means into greater biasing relationship with said first spring biasing means,
third spring biasing means operatively associated with each member of said second pair of plates normally biasing said second pair of plates away from each other; and
actuation means operably associated with said dispensing means.

4,094,237

APPARATUS FOR THE TREATMENT OF BRINE

Patrick Brian Riordan, 92 Roselawn, Castleknock, Dublin, Ireland

Filed Dec. 12, 1975, Ser. No. 640,144
Claims priority, application Ireland, Dec. 12, 1974, 2564/74; Feb. 25, 1975, 390/75
Int. Cl.² A23L *3/28*
U.S. Cl. 99—451 **5 Claims**



1. In combination with a bacon curing machine, apparatus for treating contaminated brine from said bacon curing machine comprising a collecting tank for the contaminated brine, means for directing contaminated brine from said machine to said tank, a filter located in said collecting tank and adapted to receive said contaminated brine and having a filtrate outlet in fluid connection with the inlet of at least one ultra-violet liquid irradiating device, supply means for mixing substantially contaminated fresh brine with the contaminated brine in the collecting tank whereby the ultra-violet transmission value of the contaminated brine is increased, said supply means directing a stream of said substantially uncontaminated fresh brine onto the back of said filter so as to back-wash the filter, means for passing the mixture of brines through the ultra-violet liquid purifying device, and means for thereafter returning the irradiated brine to said bacon curing machine.

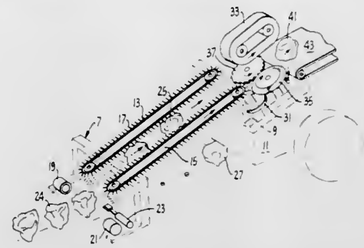
4,094,238

LETTUCE HARVESTER

Charles D. Striplin, Concord, Calif., assignor to Striplin Machine & Engineering Company, Benecia, Calif.

Filed Oct. 20, 1975, Ser. No. 623,969
Int. Cl.² A23N *15/00*
U.S. Cl. 99—643 **1 Claim**

1. A lettuce trimming machine for trimming the stem of a lettuce head substantially even with the bottom of the head comprising in combination:
a. a pair of counterrotating flat guage wheels separated by about the width of a lettuce stem,
b. a crowder belt mounted over said guage wheels,
c. means for rotating said guage wheels and said crowder belt in synchronism whereby a lettuce head is propelled forward with the bottom of the head pressed firmly against said guage wheels,
d. a rotary cutting knife mounted adjacent said guage wheels,
e. an impaling blade mounted for rotation substantially even the said rotary cutting knife, said impaling blade having sharp teeth inclined in the direction of rotation,



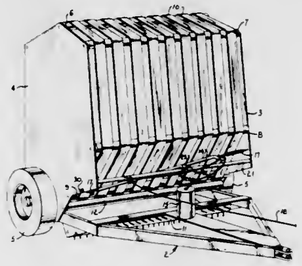
f. means for rotating said knife and said blade whereby,
g. the teeth of said blade engage and impale the stem of a head of lettuce and positively force it into said knife.

4,094,239

APPARATUS FOR CUTTING HAY BALER TWINE

John Leroy Murr, R.F.D., Laplata, Mo. 63549

Filed Oct. 1, 1976, Ser. No. 728,523
Int. Cl.² B65B *13/02*
U.S. Cl. 100—5 **8 Claims**



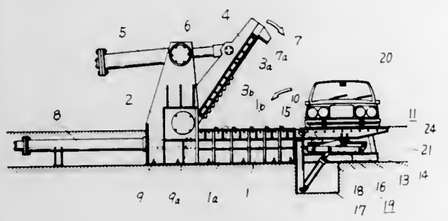
1. An apparatus for wrapping a large round bale formed in a large round bale forming machine comprising:
a. frame means of said large round bale forming machine;
b. means operably associated with said frame means for containing a supply of wrapping material;
c. a material directing member adapted to dispense said material;
d. means for mounting said member to said frame means in the vicinity of said large round bale;
e. means operably associated with said member for moving said member whereby material is dispensed from said member along a path in the vicinity of the round bale under conditions wherein said member is moving in such way as to feed said material around said bale;
f. cutting means having no moving parts positioned along said path for cutting said material solely upon said material being directed against said cutting means by said directing member, said material being fed unimpededly from said supply to said material directing member and unimpededly from said member to said bale for wrapping.

4,094,240

MACHINE FOR SHEARING AND COMPRESSING SCRAP METALS

Masao Suzuki, 880 Sezaki-cho, Soka-shi, Saitama-ken, Japan

Filed Jul. 9, 1976, Ser. No. 703,761
Claims priority, application Japan, Apr. 8, 1976, 51-042563
Int. Cl.² B30B *15/08*
U.S. Cl. 100—97 **5 Claims**



1. A machine for shearing and compressing scrap materials comprising:
a pair of spaced apart plates to define a carriage,
a base connected to said carriage and disposed between said pair of spaced apart plates,
said base having a U-shaped cross-section to define a cavity for receiving the scrap material,
an arm pivotally connected at one end to said carriage, said arm having a limb connected at its other end,
a drive motor means connected to said arm for driving said arm toward and away from said base,
complementary blades connected to said arm and to said base along the respective edges thereof to effect a shearing action on the material adapted to be supported on said base as said arm is pivoted toward said base,
a ram slideably mounted along said base,
a drive means for actuating the drive of said ram for successively compressing said material between said ram and said limb, and ejecting said compressed material,
a supply table pivotally mounted to said base,
a linkage assembly connected to said supply table for pivoting said table relative to said base between an operative raised position and an inoperative lowered position,
an actuating means connected to said linkage assembly for activating said linkage assembly for moving said supply table between operative raised position and inoperative lowered position,
and a put-out table connected to said linkage assembly for receiving the compressed material as said ram pushes the compressed material onto said put-out table whereby said put-out table functions to eject the compressed scrap material as said supply table is raised to position other scrap material to be compressed onto said base.

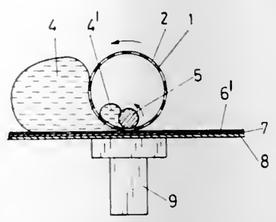
4,094,241

PERFORATED DOCTOR ROLL

Edgar Kössler, Schachterlweg 24/52, A-9020 Klagenfurt, Austria

Filed Aug. 23, 1976, Ser. No. 716,687
Claims priority, application Austria, Aug. 29, 1975, 6665/75
Int. Cl.² B41F *15/44*
U.S. Cl. 101—120 **2 Claims**

1. An apparatus for applying ink to a substrate comprising: bearing means disposed beneath said substrate; a stencil having openings in the desired pattern arranged in superimposed relationship to said substrate; a doctor roll contacting said stencil under a positive contact pressure; a first ink supply located in front of said doctor roll, said doctor roll applying ink from said first ink supply through the openings of said stencil; wherein: said doctor roll being defined as a rigid hollow tube having a plurality of perforations about its periphery, said perforations being adapted to reduce hydrodynamic pressure in said first ink supply, whereby part of the ink from said first ink supply enters the interior of said rigid hollow tube through said perforations to form a second inner ink supply;



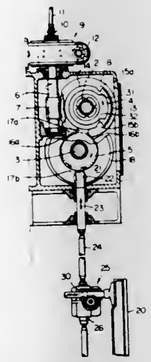
said doctor roll being further defined by a rod-shaped member disposed in said hollow tube, said rod-shaped member providing a second internal doctor roll for said second ink supply.

4,094,242

LIFTING DEVICES FOR FLAT SCREEN PRINTER

Shiro Ichinose, 11-8,4-Chome, Shinohara Kita-machi, Nada-ku; Kobe-shi, Hyogo-ken, Japan

Filed Jun. 14, 1976, Ser. No. 695,392
Int. Cl.² B41F *15/08, 15/44*
U.S. Cl. 101—123 **4 Claims**



1. An automatic screen printing machine comprising a transporting mechanism for supporting thereon a material to be printed and transporting it continuously or intermittently to a printing operation zone, a flat screen disposed in the printing operation zone above a running passage for the material to be printed, a squeegee member disposed above said screen to squeeze out a printing paste or ink onto the material to be printed through said screen, and a lifting device disposed in said operating zone for causing the material to be printed to come into contact with the screen during a printing step and of separating the material from the screen during a non-printing period by moving vertically at least one of said transporting mechanism and said squeegee member and screen relative to each other by means of a lifting member; said lifting device comprising a lifting cam mechanism and a gear mechanism for driving intermittently said lifting cam mechanism and restraining intermittently said lifting cam mechanism, said gear mechanism comprising a first partially toothed wheel including a toothed large diameter circumferential portion and a non-toothed small diameter circumferential portion, said partially toothed wheel being continuously driven and rotated by driving means connected therewith and a second partially toothed wheel including at least one toothed circumferential portion and at least one projected portion having a concave face capable of engaging the non-toothed smooth circumferential portion of the first partially toothed wheel, said first and second partially toothed wheels disposed adjacent to and in operable contact with each other such that the first and second partially toothed wheels are intermittently engaged with each other and are intermittently restrained by each other whereby engagement of the teeth of said first partially toothed wheel with the teeth of said second partially toothed wheel, drives and causes the second partially toothed wheel to rotate, and engagement of the projected portion of said second partially toothed wheel with the non-toothed smooth circumferential portion of said first partially toothed wheel, restrains the rotation of the second partially toothed wheel; said lifting cam mechanism including a cam and said second partially toothed wheel wherein said cam is fixed to said second partially toothed wheel to rotate together and said cam mechanism is operably connected to said lifting member whereby the rotation of said second partially toothed wheel and said cam causes the lifting member to be lifted or lowered and to be held at an elevated position or a lowered position by restraint of the rotation of said second partially toothed wheel.

4,094,243

DEVICE FOR ADJUSTING FORM ROLLERS PROVIDING AUTOMATIC COMPENSATION FOR CHANGE IN PACKING THICKNESS

Rolf Braun, Offenbach, Germany, assignor to Roland Offsetmaschinenfabrik Faber & Schleicher AG., Germany

Filed Jun. 20, 1977, Ser. No. 808,083
Claims priority, application Germany, Jun. 23, 1976, 2627963
Int. Cl.² B41L *27/36*
U.S. Cl. 101—349 **7 Claims**

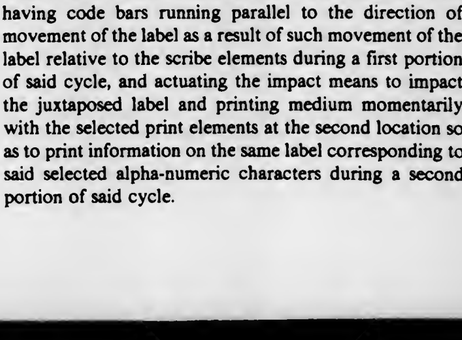
1. In a printing press, the combination comprising a frame, a plate cylinder journaled in the frame and mounting a printing plate with a layer of packing interposed between the cylinder and the plate, a cooperating cylinder journaled in the frame running in engagement with the plate, the plate cylinder having at least one form roller having a bearing at a peripheral position substantially spaced from said cooperating cylinder, an eccentric bushing interposed between the plate cylinder and the frame rockable from a reference position t an adjusted position for increasing the spacing between the axes of the plate cylinder and its cooperating cylinder as necessary to accommodate an increase in the thickness of the packing, a cam sector rockably mounted at the end of the plate cylinder having a spirally curved segment for radially supporting the form roller bearing with respect to the plate and mounted for rocking movement for camming the roller relatively away from the axis of the plate cylinder, the cam sector being rotatively coupled to the eccentric bushing for rocking movement in unison therewith accompanied by relative wiping action between the curved segment and the roller bearing, the spiral slope of the curved segment being such that the degree of rocking of the eccentric bushing necessary to accommodate a predetermined increase in packing thickness causes a total outward throw at the form roller equal to the movement of the plate cylinder axis toward the form roller plus an amount equal to the added thickness of the packing.

4,094,244

HAND-HELD BAR CODE LABEL MARKING DEVICE

Richard A. Edwards, Alameda, and Cecil G. Olson, Castro Valley, both of Calif., assignors to Dymo Industries, Inc., San Francisco, Calif.

Filed Dec. 22, 1976, Ser. No. 753,422
Int. Cl.² B41J *1/44*
U.S. Cl. 101—66 **23 Claims**



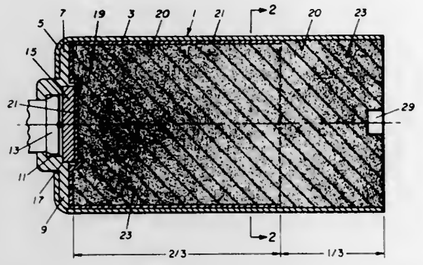
1. A label marking device for printing selected bar code and alpha-numeric character information upon a label, said device comprising:
a frame;
a printing station on the frame;
a supply of labels;
a printing medium;
a plurality of scribe elements mounted on the frame for location of selected scribe elements, corresponding to selected bar code character information, at a first location at the printing station;
a plurality of print elements mounted on the frame for location of selected print elements, corresponding to selected alpha-numeric character information, at a second location at the printing station, the second location being adjacent to and spaced from the first location;
pressure means mounted on the frame for placement at the first location;
impact means mounted on the frame for placement at the second location; and
actuating means on the frame capable of actuation through a cycle of operation for moving a label, from the supply, together with a portion of the printing medium juxtaposed with the label, between the pressure means and the selected scribe elements at the first location while urging the pressure means to press and continue to urge the juxtaposed label and printing medium against the scribe elements while the scribe elements remain stationary so as to scribe information on the label in the form of a bar code having code bars running parallel to the direction of movement of the label as a result of such movement of the label relative to the scribe elements during a first portion of said cycle, and actuating the impact means to impact the juxtaposed label and printing medium momentarily with the selected print elements at the second location so as to print information on the same label corresponding to said selected alpha-numeric characters during a second portion of said cycle.

4,094,245

PARACHUTE FLARE HAVING A VARIABLE BURN RATE

Joseph R. Matura, Ironia, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 2, 1977, Ser. No. 793,007
Int. Cl.[2] F42B *4/28*
U.S. Cl. 102—35 **8 Claims**



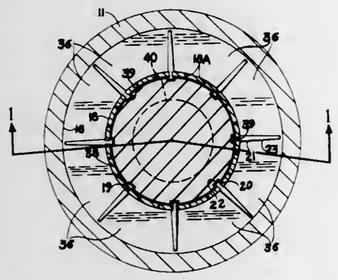
1. A parachute flare having a variable burn rate comprising:
an elongated container having a closed end and an open end;
a thin liner of uniform burn-inhibiting, heat-insulating material coating the inner surface of said closed end and at least the first third of the inner side wall of said container, starting at said closed end; with the opposite end of said liner spaced substantially from said open end to leave a substantial bare area of said side wall adjacent to said open end;
a mass of substantially-iniform, combustible, illuminating material completely filling said container and in contact with said liner and said bare area; and
means for igniting said illuminating material at said open end;
whereby said flare can be transported to a given altitude over an area to be illuminated, where it is ignited and burns at a given intensity for a first predetermined time, during a first portion of its fall, and then burns at a substantially lower intensity for a second predetermined time, during a second portion of its fall.

4,094,246

FLUID STABILIZING INSERT FOR PROJECTILES

Bruce W. Travor, Holland, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 8, 1975, Ser. No. 638,724
Int. Cl.[2] F42B *13/14*
U.S. Cl. 102—66 **3 Claims**



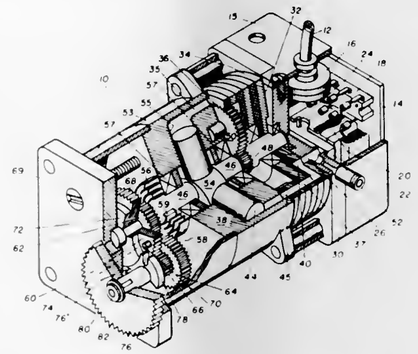
1. In a spin stabilized projectile having a main projectile body and a forwarded nose member secured thereto, said body containing a burster tube and a controlled liquid arrangement for minimizing rotational spin loss of the projectile,
a cellular structure within said body and extending radially outward of said burster tube, said cellular structure having a plurality of longitudinally extending contoured ribs defining elongated chambers containing portions of said liquid, said cellular structure including a substantially cylindrical slotted tube surrounding said burster tube, the sidewall of said slotted tube having a plurality of circumferentially spaced longitudinally extending slots, each of said ribs having a head portion, a blade portion and an intermediate reduced neck portion, each of said neck portions extending longitudinally within a corresponding one of said tube slots, each of said rib head portions having a width larger than that of its corresponding slot and each head portion extending inwardly adjacent to its corresponding slot.

4,094,247

SWITCH ACTUATOR

Albertus E. Schmidlin, Caldwell, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 23, 1977, Ser. No. 771,214
Int. Cl.[2] F42C *15/00*
U.S. Cl. 102—228 **5 Claims**



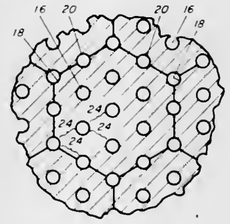
1. A switch actuator for safing and arming a missile:
a housing;
optical transducer means fixedly disposed in one end of said housing for converting a coded optical input pulse signal into a coded electrical signal of the same signature as said optical signal;
amplifier means electrically coupled to said optical transducer means for generating an amplified coded electrical output signal in response to said coded electrical signal;
solenoid means having a magnetically operated flapper valve member pivotally connected therewith, said solenoid means being electrically coupled to said amplifier means for converting said amplified coded electrical signal into a reciprocating mechanical motion of said flapper valve member;
pneumatic supply cover means proximately positioned adjacent to said solenoid means, said pneumatic supply cover means having two pneumatic passageways transversely diametrically disposed therethrough, for alternatively generating, in cooperation with said solenoid means, a coded pneumatic output pulse from each of said pneumatic passageways;
rotating valve plate means operatively disposed adjacent said pneumatic supply cover means, for mechanically decoding each of said coded pneumatic output pulses into sequential pressure pulses;
pneumatic piston-cam type prime mover means having a pneumatic input pneumatically connected to the output of said rotating valve plate means, said prime mover means being gear-connected to said rotating valve plate means to rotate said valve plate means at ⅛ of the prime mover means speed;
geneva movement means having a driver gear assembly and a follower assembly, said geneva movement means being gear connected to said prime mover means, said geneva driver gear assembly rotating at ⅛ the prime mover means speed, said geneva movement means requiring full 270° rotation of said driver gear assembly prior to said switch actuator being placed in an intermediate arming position, and requiring two additional complete turns before said driver gear assembly causes said follower assembly to make a complete revolution which will then place said missile in an armed condition; and
biasing means operatively disposed on said prime mover means intermediate said geneva movement means and said primer mover means for returning said switch actuator to a fail-safe position when said optical transducer means fails to receive a coded optical signal of a specific signature for a given duration.

4,094,248

HIGH PACKING DENSITY PROPELLANT GRAINS

Sidney S. Jacobson, Chester, N.J., assignor to The United States of America as represented by Secretary of the Army, Washington, D.C.

Filed Apr. 21, 1977, Ser. No. 789,598
Int. Cl.[2] F02K *9/02*
U.S. Cl. 102—100 **4 Claims**



1. A propellant charge which comprises:
a plurality of extruded polygonally longitudinal shaped propellant grains, said grains having a plurality of equally spaced internal perforations longitudinally disposed therethrough, a plurality of longitudinally disposed external vertex grooves in parallel alignment with said internal perforations, and a plurality of semi-circular longitudinally disposed external grooves located at the midpoint of each polygonal side, said semi-circular grooves being in parallel alignment with said internal perforations and said external vertex grooves, said plurality of internal perforations vertex grooves, and said semi-circular grooves each being separated by a web of equal thickness.

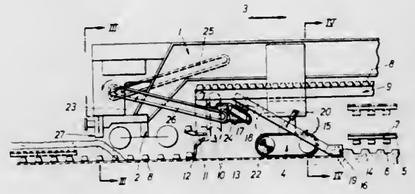
4,094,249

APPARATUS FOR LAYING TRACK

Josef Theurer, Vienna, and Manfred Brunninger, Linz, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Dec. 13, 1976, Ser. No. 749,885
Claims priority, application Austria, Feb. 2, 1976, 723/76
Int. Cl.[2] E01B *27/11, 29/06*
U.S. Cl. 104—6 **4 Claims**

1. An apparatus for laying track comprised of rails and ties on a ballast bed, comprising the combination of
(a) an elongated bridge-like carrier frame having a rear end,
(b) a rear undercarriage for moving the carrier frame in a working direction on the track rails, the undercarriage supporting the carrier frame adjacent the rear end thereof,
(c) another undercarriage supporting the carrier frame adjacent the rear undercarriage and retractably arranged on the carrier frame for selective engagement with the ballast bed for moving the carrier frame in the working direction on the ballast bed in the absence of a track for the rear undercarriage,
(d) an endless scraper conveyor chain vertically adjustably mounted on the carrier frame and including a transversely extending stringer arranged for engagement with the ballast bed upon vertical adjustment of the conveyor chain for planing the ballast bed and conveying excess ballast from the planed ballast bed, the stringer of the conveyor chain being arranged in front of the other undercarriage,
(e) conveyor means mounted on the carrier frame and arranged to convey ties in a direction opposite to the working direction to the planed ballast bed behind the other undercarriage and comprising a mechanism for laying successive ones of the conveyed ties spacedly on the planed ballast bed between the other undercarriage and the rear undercarriage, and
(f) a ballast conveyor moving in a path arranged to enable the ballast conveyor to receive the excess ballast and to convey the excess ballast in a direction opposite to the working direction to the rear end of the carrier frame where the ties have been laid on the planed ballast bed, a transversely extending portion of the path of the ballast conveyor intersecting the path of the conveyor means in the region of the mechanism.

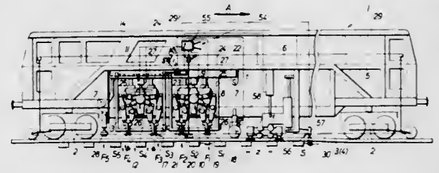


4,094,250

MOBILE TRACK TAMPING MACHINE

Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Mar. 22, 1976, Ser. No. 669,207
Claims priority, application Austria, Jun. 20, 1975, 4773/75
Int. Cl.[2] E01B *27/17*
U.S. Cl. 104—12 **12 Claims**



1. A mobile track tamping machine for substantially simultaneously tamping ballast underneath five successive track ties resting on the ballast, the ties having elongated edges extending transversely of the track and two ends extending in the direction of the track, the elongated edges of adjacent ones of the ties defining cribs therebetween, which comprises
(a) a machine frame; and
(b) two like tamping tool assembly units mounted on the machine frame for vertical movement, each tamping tool assembly unit being a structural unit including
(1) a carrier for the tamping tools mounted on the machine frame for vertical movement and adjustably spaced from each other in the direction of the track,
(2) no more than four tamping tools immersible in the ballast and arranged on the carrier in two like pairs of vibratory tamping tools spaced from each other in the

direction of the track, the spacing being such that each pair of tools is in vertical alignment with a respective one of two successive ones of the cribs whereby the tamping tools of each pair may be immersed in the respective crib upon vertical downward movement of the carrier,

(3) a pivot mounting each one of the tamping tools on the carrier for reciprocation of the tamping tools of each pair in opposite directions towards and away from a respective one of the elongated edges of an adjacent one of the ties, the pivots of each of the pairs of tamping tools being spaced from each other in the track direction less than one crib width, and the pairs of tamping tools having tamping jaws for immersion in the ballast whose closest spacing in the track direction is smaller than the average size of the ballast,

(4) a common drive for vibrating the two pairs of tamping tools arranged on the carrier centrally with respect to the pairs of tamping tools,

(5) a drive for independently reciprocating each of the tamping tools about their pivots, and

(6) a drive arranged centrally with respect to the pairs of tamping tools for vertically moving the carrier with the tamping tools;

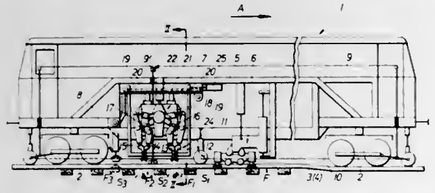
(c) the spacing of the tamping tool assembly unit carriers being such that the pairs of tamping tools may be immersed in four successive ones of the cribs upon the vertical movement of the carriers.

4,094,251

MOBILE TRACK TAMPING MACHINE

Josef Theurer, Vienna, Austria, assignor to Frank Plasser Bahnbaummaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Mar. 22, 1976, Ser. No. 669,208
Claims priority, application Austria, Jun. 20, 1975, 4774/75
Int. Cl.² E01B *27/17*
U.S. Cl. 104—12 **14 Claims**



1. A mobile track tamping machine for substantially simultaneously tamping ballast underneath three successive track ties resting on the ballast, the ties having elongated edges extending transversely of the track and two ends extending in the direction of the track, the elongated edges of adjacent ones of the ties defining cribs therebetween, which comprises

(1) a machine frame; and

(2) a tamping tool assembly mounted on the machine frame and including

(a) a carrier for the tamping tools mounted for vertical movement on the frame,

(b) no more than four tamping tools immersible in the ballast and arranged on the carrier in two pairs of vibratory tamping tools spaced from each other in the direction of the track, the spacing being such that each pair of tools is in vertical alignment with a respective one of two successive ones of the cribs whereby the tamping tools of each pair may be immersed in the respective crib upon vertical downward movement of the carrier,

(c) a pivot mounting each one of the tamping tools on the carrier for reciprocation of the tamping tools of each pair in opposite directions towards and away from a respective one of the elongated edges of an adjacent one of the ties, the pivots of each of the pairs of tamping tools being spaced from each other in the track direction less than one crib width, and the pairs of tamping tools having tamping jaws for immersion in the ballast whose closest spacing in the track direction is smaller than the average size of the ballast,

(d) a common drive for vibrating the two pairs of tamping tools arranged on the carrier centrally with respect to the pairs of tamping tools,

(e) a drive for independently reciprocating each of the tamping tools about their pivots, and

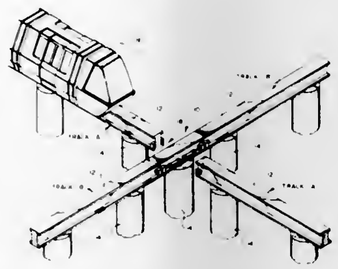
(f) a drive arranged centrally with respect to the pairs of tamping tools for vertically moving the carrier with the tamping tools.

4,094,252

SELF-CONTROLLED ON-GRADE MONORAIL TRACK SWITCH AND METHOD

Hendrik Pater, 4154 Parkview Dr., Salt Lake City, Utah 84117; G. Earl Torgersen, Salt Lake City, and Fritz R. Brunner, Murray, both of Utah, assignors to Hendrik Pater, Salt Lake City, Utah

Filed Apr. 22, 1976, Ser. No. 679,266
Int. Cl.² E01B *7/00*
U.S. Cl. 104—130 **20 Claims**



18. An automated mass transit switching system comprising in combination:

a plurality of converging tracks;

at least one vehicle adapted to travel on said tracks, said vehicle causing a control signal to be transmitted along the tracks ahead of it so as to sense any open portion of track ahead of it, said vehicle automatically stopping in response to an open portion of track sensed; and

a junction switch disposed between the ends of said converging tracks, said junction switch comprising:

means for sensing the approach of any oncoming vehicle by detecting the electric signal originating with the vehicle;

means for moving the switch into alignment with the path of the nearest oncoming vehicle in response to the vehicle originated signals;

means for disabling said moving means when the track is in alignment with the path of the nearest oncoming vehicle until said nearest oncoming vehicle has passed the switch; and

means for securing the switch in alignment position.

4,094,253

RAILWAY TRUCK FLOATING PEDESTAL WEAR LINER

Paul E. Gage, Wyomissing, Pa., assignor to The Polymer Corporation, Reading, Pa.

Filed Jul. 26, 1976, Ser. No. 708,661
Int. Cl.² B61F *5/30, 5/50, 17/36;* F16C *33/20*
U.S. Cl. 105—225 **4 Claims**

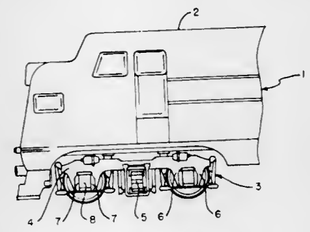
1. In a pedestal truck for railroad locomotives including:

a pair of spaced-apart, vertically-disposed pedestal legs that define a jaw open at its lower end;

a journal box mounted within the jaw in vertical sliding relationship to the pedestal legs;

a pedestal tie bar extending between the ends of the pedestal legs closing the lower end of the jaw;

generally channel-shaped pedestal liners made from tough, wear-resistant plastic mounted on each of the pedestal legs with the bight of the channels facing the journal box and



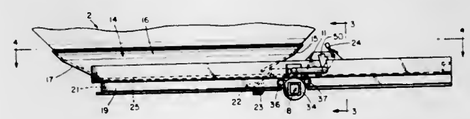
interposed as bearing surfaces between the journal box and the pedestal legs and with the sides of the channels extending over a portion of the side faces of the pedestal legs; the improvement comprising mounting the pedestal liners in sliding frictional engagement with the journal box on one side and the pedestal legs on the other side.

4,094,254

LOCK FOR RAILWAY HOPPER CAR GATE RAILWAY CAR GATE LOCK

Clarence J. Koranda, 5042 Lawn Ave., Western Springs, Ill. 60558

Filed Dec. 27, 1976, Ser. No. 754,835
Int. Cl.² B61D *7/20, 7/26, 49/00;* F05B *65/18*
U.S. Cl. 105—282 P **7 Claims**



1. In a lock for a railway hopper car gate in which a hopper outlet chute defines a discharge opening with a sliding plate gate operating in the opening and an undercarriage structure having a pair of spaced side frame means supporting the gate for sliding movement relative the opening, the improved gate lock comprising an elongated lock shaft extending between and projecting through guide slots formed in both side frame means with one of the frame means also being formed with a locking opening, handle support means associated with each side frame means, a handle fixed to each of the shaft ends with each handle having a return leg supported by its associated handle support means for transverse and pivoting movement relative each frame means whereby an initial pivoting movement of the lock shaft about both return legs and a subsequent transverse movement of the lock shaft by operation of either handle effects an engagement of one of the return legs into the locking opening to thereby lock the gate.

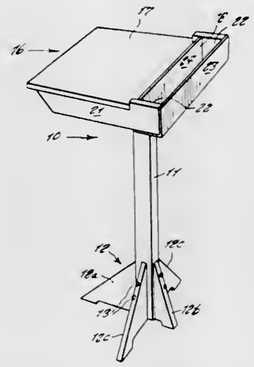
4,094,255

ARTIST'S PALETTE, PAINT AND ACCESSORY STAND

Nathan J. Zaccaria, 257 Glen Ave., Palisades Park, N.J. 07650

Filed Feb. 7, 1977, Ser. No. 766,232
Int. Cl.² A47B *85/00*
U.S. Cl. 108—25 **9 Claims**

1. An artist's palette, paint and accessory stand, comprising in combination an upright pedestal post, feet means secured around a lower end of said post, and a platform unit including a horizontal table top, a box-like tray adjacent one side edge of said table top, and a cross-beam attached to the underneath side of the table top and extending from said tray to proximate



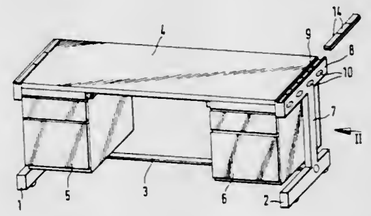
the opposing side-edge of the table top, said cross-beam being attached to an upper end of said post.

4,094,256

WORK TABLE HAVING LINES EMBODIED THEREIN

Manfred Hölper; Günter Schertel, and Egon Kösters, all of Pohlheim, Germany, assignors to VOKO Franz Vogt & Co., Pohlheim, Germany

Filed Jun. 7, 1976, Ser. No. 693,173
Claims priority, application Germany, Jun. 7, 1975, 2525498
Int. Cl.² A47B *35/00, 77/08*
U.S. Cl. 108—50 **10 Claims**



1. A work table having a work surface thereon, comprising:

a pair of horizontally spaced and hollow side supports each having adjacent their upper ends a cross piece, said cross pieces being parallel with each other and supporting said work surface adjacent the lateral edges thereof;

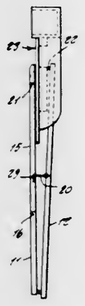
a channel in each of said cross pieces which extend parallel with said lateral edges of said work surface, at least one of said channels having at least one opening therein for guiding electrical wires therethrough from the interior of said cross piece to the exterior thereof;

a cavity in each of said side supports for housing said electrical wires, said cavity extending along the height thereof and communicating with at least one of said channels in said cross pieces; and

electrical socket means connected in electrical circuit with said electrical wires and mounted in said opening in at least one of said channels in at least one of said cross pieces.

4,094,257
FOLD UP ARTIST PALETTE, PAINT AND ACCESSORY STAND

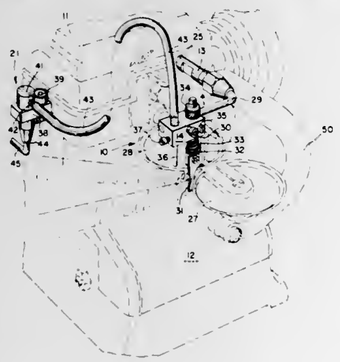
Nathan J. Zaccaria, 257 Glenn Ave., Palisades Park, N.J. 07650
Filed May 2, 1977, Ser. No. 792,664
Int. Cl.[2] A47B *3/00*
U.S. Cl. 108—115 **6 Claims**



1. A fold up artist palette, paint and accessory stand comprising, in combination: a base having a flat lower surface and front and rear sides; a single leg pivotally connected to said front side of said base; a brace pivotally connected to said rear side of said base; coupling means for detachably coupling an upper end of said brace to an intermediate portion of said leg, said coupling means comprising a bifurcated member having a support surface between the bifurcation; and a stud member fitting into said bifurcated member and having a cooperating surface engaging said support surface, said bifurcated member being positioned on one of said brace or leg, and said stud member being positioned on the other, whereby secure engagement is maintained in an assembled condition while permitting easy separation thereof for disassembly; and a stand top pivotally connected to the upper end of said leg and in assembled condition lying parallel to said lower base surface.

4,094,258
FUR GUIDE FOR A FUR-SEWING MACHINE

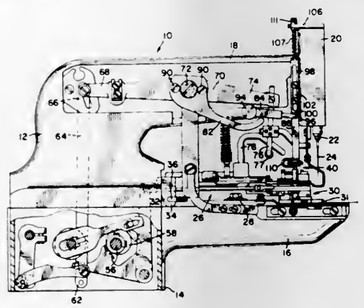
Caesar Bonis, Barkers Point Rd., Sands Point, N.Y. 11024
Filed Oct. 29, 1976, Ser. No. 736,891
Int. Cl.[2] D05B *23/00, 35/00*
U.S. Cl. 112—20 **11 Claims**



1. A sewing guidance system installable in the conventional cover of the head of a fur-sewing machine, said sewing guidance means comprising a fur-sewing machine head, a head cover, a rocker arm, said rocker arm rotatably mounted in said head cover, said rocker arm adapted to rotate to a sewing guide position and to rotate away from said sewing guide position, said rocker arm including spring means, said spring means normally biasing said rocker arm away from said sewing guide position, means to hold said rocker arm in said sewing guide position, means on said rocker arm to mount a fur guide and a blower nozzle, air compression means, means connecting said air compression means with said nozzle, means to actuate said air compression means, cam means on said rocker arm adapted to selectively interact to release said rocker arm from said sewing guide position, cam means in said head adapted to selectively interact with said rocker arm cam means when said rocker arm is held in said sewing guide position to effect said rocker arm release, means to selectively rotate said rocker arm to said sewing guide position, motor means, said motor means adapted to selectively actuate said sewing machine, said motor actuating means and air compression actuating means being a single foot pedal, said air compression means being individually actuatable first, another foot pedal means to rotate said rocker arm to said sewing guide position, said other foot pedal means including means to actuate said cam means in said head to interact with said rocker arm cam means to release said rocker arm from said sewing guide position, and said means to hold said rocker arm in sewing guide position being two-part interlockable means, one part of said interlockable means being on said rocker arm and the other part of said interlockable means being in said head cover, said two-part interlockable means including a detent and a grasp means.

4,094,259
BUTTON ORIENTATING LIFTING MECHANISM

Roy W. Fletcher, Riverdale; Robert W. Volkmann, Arlington Heights, and Anthony D. Forte, Chicago, all of Ill., assignors to Union Special Corporation, Chicago, Ill.
Filed Apr. 29, 1977, Ser. No. 792,376
Int. Cl.[2] D05B *3/14*
U.S. Cl. 112—110 **12 Claims**



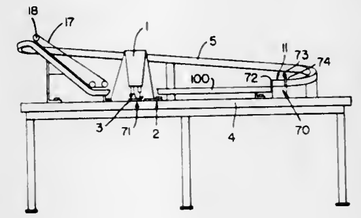
1. A cyclically operated sewing machine having a work support means, a clamp means mounted for movement toward or away from said work support means, lever means operable in timed relation to the sewing cycle to move said clamp means away from said support means, means secured to said clamp means for delivering articles to and removing them from the sewing station including orientating means vertically movable with respect to said delivery and removal means wherein the improvement comprises:

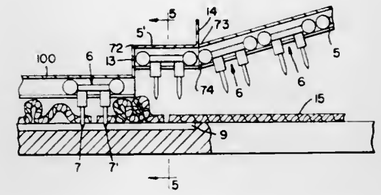
member means connectable to said orientating means and carried by said sewing machine for vertical sliding movement relative thereto; and

actuator means secured to said lever means and angularly responsive to movement thereof and operative to effect movement of said member means for effecting placement of said orientating means in timed relation to the sewing cycle.

4,094,260
METHOD AND APPARATUS FOR AUTOMATIC SEWING

Johann Otto Kleinschmidt, Karlsruhe, and Wolfgang Niem, Leonberg, both of Germany, assignors to Union Special G.m.b.H., Stuttgart, Germany
Filed Aug. 12, 1976, Ser. No. 713,949
Claims priority, application Germany, Aug. 14, 1975, 2536260; Jun. 5, 1976, 2625503; Jun. 5, 1976, 2625504
Int. Cl.[2] D05B *27/04*
U.S. Cl. 112—121.15 **35 Claims**





1. In combination with a sewing machine mounted on a table top having stitch forming instrumentalities, a feed mechanism for feeding material workpieces to said stitch forming instrumentality, and an edge guide means for guiding an edge of said workpieces to said stitch forming instrumentalities, an apparatus mounted on said table top being selectively operable to continuously feed workpieces to said instrumentalities, comprising:

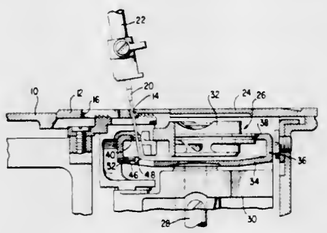
guide rail means, a portion of which passes through said stitch forming instrumentalities;

means carried by and guided through said stitch forming instrumentalities by said guide rail means and adapted to secure a plurality of workpieces together so that the movement imparted to said workpieces by said feed mechanism means continuously draws the next succeeding workpiece into the stitch forming instrumentalities to be sewn.

4,094,261
ADJUSTABLE NEEDLE GUARD

Stanley J. Ketterer, Jamesburg, and William J. Edwards, Cranbury, both of N.J., assignors to The Singer Company, New York, N.Y.
Filed Mar. 22, 1977, Ser. No. 779,957
Int. Cl.[2] D05B *55/06*
U.S. Cl. 112—228 **4 Claims**

1. A rotary loop taker for a sewing machine having a reciprocatory needle operating in a path for cooperating with said loop taker, said loop taker including a cup-shaped body formed by a bottom wall, a vertical side wall extending from said side wall, a loop seizing beak formed in said annular wall, a resilient rib member formed in said bottom wall, said rib member being spaced from said vertical side wall and disposed at a location substantially beneath said loop seizing beak, and means for deflecting said rib member away from said vertical side wall for adjusting the position of said rib member relative to the operating path of said needle and causing the rib member to be



in a position for deflecting the needle away from said loop seizing beak.

4,094,262
ICECRAFT

Tilo Riedel, Wielandstrasse 6, D-8051 Eching, Germany
Filed Mar. 25, 1977, Ser. No. 781,446
Claims priority, application Germany, Mar. 26, 1976, 2612984
Int. Cl.[2] B63B *35/00*
U.S. Cl. 114—43 **10 Claims**

1. An icecraft comprising:

a rigid support board capable of supporting a person and having an outer periphery and a pair of opposite faces;

a plurality of runners directed generally parallel to one another and spaced apart on one of said faces in such a manner that said board can stand on said runners, said board being displaceable in a normal direction of travel on ice via said runners and said runners being arranged with two of said runners spaced transversely apart perpendicular to said direction and one of said runners spaced in said direction from said two runners;

means including a pivot connecting said one runner to said board for pivoting relative to said board about an axis generally perpendicular to said faces and caster-fashion generally ahead of said one runner in said direction;

an articulated sail-surfing mast projecting from the other of said faces; and

a sail secured to said mast and constituting therewith a standard sail-surfing rig.

4,094,263
HEEL COMPENSATION SYSTEM

Paul M. Marcil, 12117 Phillips Ave., Lynwood, Calif. 90262
Filed Jul. 19, 1976, Ser. No. 698,040
Int. Cl.[2] B63B *15/00*
U.S. Cl. 114—91 **2 Claims**

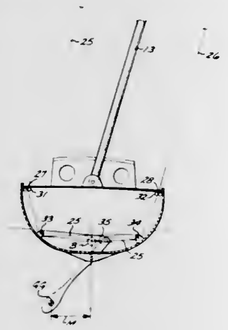
1. In a sailboat assembly including a hull, a mast disposed from said hull, a plurality of fore and aft stays and lateral stays

disposed between said mast and said hull for providing support to said mast and a ballasted keel disposed on the underside of said hull, the improvement comprising:

pivotal support means formed on the upper surface of said hull for engaging the lower end of said mast, said pivotal support means having a first axis of pivotal motion aligned in common with the juncture of said fore and aft stays within said hull;

a plurality of first pulleys disposed within said hull respectively along lateral edges thereof for engaging corresponding ones of said lateral stays;

a plurality of second pulleys disposed within said hull in substantial corresponding longitudinal alignment below said first pulleys for engaging said lateral stays directed from opposite ones of said first pulleys;



pivotal attachment means interposed between said hull and said ballasted keel including a second axis of pivotal motion aligned in substantial parallel alignment with said first axis, said pivotal attachment means including a pivot rod extending longitudinally in a pocket formed on the underside of said hull, said pivot rod being secured to said keel in rotation; and,

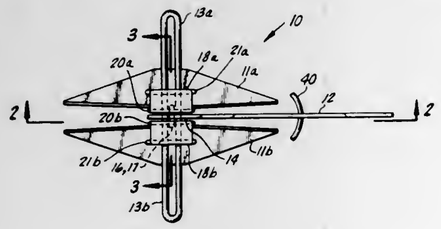
articulating means extending from said keel into said hull to be attached thereat to said lateral stays extending from said second pulleys, said articulating means including an arm secured to said pivot rod in the interior of said hull to extend radially therefrom, whereby lateral articulation of said mast is accompanied by an opposite articulation of said keel.

4,094,264

QUICK-RELEASE, SURE-SET ANTI-FOULING ANCHOR

Richard W. Nickerson, P. O. Box 294, and Thomas R. Nickerson, P. O. Box 654, both of Frazier Park, Calif. 93225

Filed Jul. 28, 1977, Ser. No. 820,044
Int. Cl.² B63B *21/24*
U.S. Cl. 114—304 **2 Claims**



1. A quick-release marine anchor comprising:

an attachment means;

a shank with an enlarged end portion on the extremity thereof opposite the attachment means;

said end portion axially cut-out to form a control means the forming edges of the cut-out control means being cam-like;

two flukes shaped like truncated triangles, one located on each end of the shank with the bases thereof parallel to the control means of the shank;

two U-shaped anti-roll rods or stocks attached at right angles to the center of the flukes and joined within the control means of the shank so that vertical forces applied to the shank cause the rod farthest from the enlarged end of the shank to engage the cam surfaces of the control means positioning the base of the flukes in parallel relationship with the shank;

two support rods joining the flukes at the center of the bases thereof and passing through the cut-out control means of the shank so that forces applied to the shank cause the rods to engage the control means cam surfaces positioning the base of the flukes at an angle greater than 30° and less than 40° on either side and parallel with the shank, such support rods being larger in diameter and located at right angles to the plane of the anti-roll rods one being above and one below said plane;

circular support and anti-fouling rings attached to the center of the base of each fluke the anti-roll and support rods passing through the center of said rings;

at least two plates mounted on each of the circular support rings parallel to the flukes which plates shield the cam-like control means and rods passing therethrough and act as tripping palms to form guide and support surfaces for movement of the anchor into the holding position and reversing the holding position;

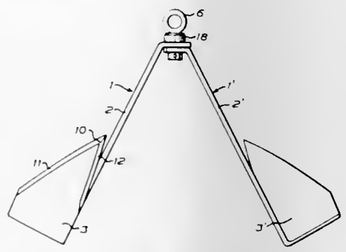
an arcuate anti-fouling rod attached to the shank just above the upper end of the flukes to protect the mechanism from engagement with marine vegetation.

4,094,265

DEVICE IN COLLAPSIBLE ANCHORS

Arvid Isaksson, N-Torngatan 17, Lidkoping, Sweden (S-531 00)

Filed Feb. 24, 1977, Ser. No. 771,517
Claims priority, application Sweden, Mar. 3, 1976, 7603000
Int. Cl.² B63B *21/44*
U.S. Cl. 114—307 **7 Claims**



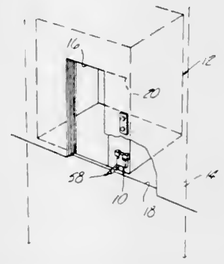
1. A device in preferably collapsible anchors of the type having two flukes, said flukes being mounted on two shanks making an angle with each other, and each fluke, which has a sharp point, being fixed to the shank in such a manner that the major portion of the surface of said fluke is located at the side of and, in the operative position outside, each respective shank and spreads out in an inclined plane located transversely of the longitudinal direction of the shank, wherein there are provided, at the ends of the both shanks opposite said flukes, inclined portions with through-holes; wherein a bolt, suitably provided with a ring for an anchor line or chain, extends through the holes; wherein the bolt, which is intended to rest with an end abutment against one outer side of the mutually adjacent, inclined portions, is provided with a resilient means inserted under tension between an opposing abutment provided on the bolt and the other outer side of the mutually adjacent portions and holding said portions together in a parallel position; wherein an end portion extending radially from the bolt hole of one inclined portion is located at a greater distance from said bolt hole than an opposing abutment surface adjacent and connected to the second inclined portion, and wherein said opposing abutment surface is located and designed such that said extending end portion is movable out of and into locked position upon the shifting of said extending end portion of said one inclined portion in a direction away from said second inclined portion against the action of said resilient means.

4,094,266

ELEVATOR AUDIBLE SIGNALING DEVICE

Donald P. Artt, 37090 Jordan, Mt. Clemens, Mich. 48043

Filed Apr. 21, 1977, Ser. No. 789,613
Int. Cl.² B66B *3/00*
U.S. Cl. 116—64 **4 Claims**



1. An audible signaling device for an elevator car of the type having an access opening and a door slideably carried by said elevator car across said opening and movable from a closed position to an opened position, said audible signaling device comprising:

a housing means having a gong;

a striker carried by said housing means and operable upon engagement to strike said gong;

a magnetic responsive lever biased arm pivotally mounted in said housing for engaging said striker to cause said striker to strike said gong, said lever arm being movable when brought adjacent to a magnet;

said magnet comprising at least one permanent magnet mounted on a floor for actuating said lever arm to move toward engagement with said striker, means on said housing means coacting with the lever arm for maintaining said lever arm in a pivoted position while said lever arm is adjacent said magnet;

said housing means being mounted to said door of said elevator car such that, upon opening of said elevator car door, said lever is moved adjacent said magnet and activated to strike said striker, said magnet being so positioned that said lever remains in said pivoted position until said door commences to close.

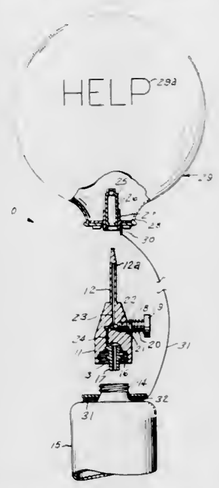
4,094,267

DISTRESS SIGNAL DEVICE

John Davis, Jr., Rte. 1, Box 172D, Eatonville, Wash. 98328

Filed Apr. 14, 1977, Ser. No. 787,441
Int. Cl.² G09F *9/00*
U.S. Cl. 116—124 B **1 Claim**

1. A distress signal device, comprising a colored balloon, a fitting secured to said balloon, with a cord secured fixedly thereto, a slidable sleeve secured within said fitting for the passage of helium gas for inflating said balloon, a cylinder removably received on a tank containing said helium gas, said cylinder including an extending stem having a passageway therein, which intersects with a side port, and said side port, when said stem is received within said slidable sleeve, aligns with a port of said slidable sleeve for the passage of said helium gas into said balloon and a screw shaft is threaded into said cylinder at right angles to said passageway, said screw shaft having a knob for controlling its lateral travel, which will cover and uncover a passageway leading to an offset and



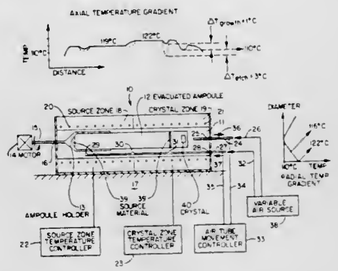
connecting passageway in the base of said cylinder, and said base of said cylinder includes a washer and a hollow stem for entering the neck of said tank containing said helium gas.

4,094,268

APPARATUS FOR GROWING HGI_2 CRYSTALS

Michael M. Schieber; Israel Beinglass, and Giora Dishon, all of Jerusalem, Israel, assignors to United States Department of Energy, Washington, D.C.

Division of Ser. No. 681,639, Apr. 29, 1976, Pat. No. 4,030,964.
This application Mar. 30, 1977, Ser. No. 782,875
Int. Cl.² B01J *17/30;* C01G *13/04*
U.S. Cl. 118—49.1 **4 Claims**



1. An apparatus for vapor phase growth of mercuric iodide crystals comprising: a horizontally extending furnace divided into two distinct temperature zones and having a central heating box extending through said temperature zones, means for independently controlling the temperature of each of said temperature zone, an evacuated ampoule containing purified mercuric iodide source material rotatably located in said heating box of said furnace and positioned substantially equally in each of said temperature zones, means connected to said ampoule for rotating same, air supply means comprising a tube extending into said heating box along the length of said ampoule and having a plurality of axially spaced radially inwardly directed outlets for providing spaced axial airflows along said ampoule, air tube means extending into said heating box for providing a radial airflow about at least one end of said ampoule, means for varying air flowing through said air supply means to provide controllably variable airflows along the

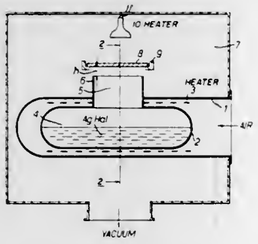
length of said ampoule, and means for varying air flowing through said air tube means, and means for axially moving said air supply means in a direction axially away from said one end and said air tube means in an opposite directions axially away from said one end.

4,094,269

VAPOR DEPOSITION APPARATUS FOR COATING CONTINUOUSLY MOVING SUBSTRATES WITH LAYERS OF VOLATIZABLE SOLID SUBSTANCES

Yordan Petrov Malinovski; Stefan Todorov Bakardjiev, and Georgi Mirchev Martinov, all of Sofia, Bulgaria, assignors to Zlafop pri Ban, Sofia, Bulgaria

Division of Ser. No. 586,429, Jun. 12, 1975. This application Nov. 18, 1975, Ser. No. 632,916
Claims priority, application Bulgaria, Jun. 14, 1974, 26894
Int. Cl.² C23C *13/12*
U.S. Cl. 118—49.1 **5 Claims**



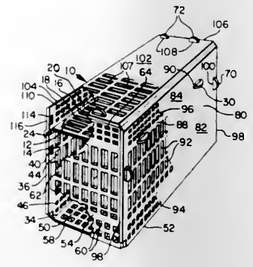
1. Apparatus for the continuous production of volatizable solid material-coated substrates which comprises wall means adapted for connection to a vacuum producing means and defining an essentially closed chamber in which the vacuum is produced by said vacuum producing means, crucible support means forming a part of said wall means and defining a recess therein, an elongated and closed crucible formed of material which is inert when heated to an elevated temperature mounted to the crucible support means outside of said chamber and substantially within said recess, the walls of the crucible support means being generally spaced from the walls of said crucible, said crucible having a rectangular neck portion extending upwardly through the crucible support means and into the chamber terminating in a restricted, rectangular outlet opening into the chamber for discharging vapor from said crucible therethrough, the interior of the crucible thereby communicating with the vacuum while the exterior of the crucible lies substantially completely outside said chamber and the transverse cross-sectional area of the elongated crucible being at least five times the cross-sectional area of the crucible outlet so that a direct collimated and rectangular beam of vapor of said solid material issues from the restricted outlet, radiant heating means located in the crucible support means and outside of the chamber for substantially uniformly heating the exterior of the crucible to vaporize solid material located therein and substrate support means located within the chamber for supporting a moving substrate during travel over said rectangular outlet of the crucible, the substrate supporting means being positioned so that the surface of the substrate passing over the outlet will be located not more than 10 mm from the outlet whereby a layer of the material completely free from impurities can be continuously deposited on the surface of the moving substrate.

4,094,270

FISH EGG INCUBATING DEVICE

David W. Whitlock, Bartlesville, Okla., assignor to Federation of Fly Fishermen, El Segundo, Calif.

Filed Oct. 22, 1976, Ser. No. 735,001
Int. Cl.² A01K *61/00, 63/00*
U.S. Cl. 119—3 **4 Claims**



1. A device for incubating spherical fish eggs and for providing a protective rearing area for fry hatched from such eggs comprising:

a closed container having an upper egg incubating chamber, and a lower fry rearing chamber separated by a horizontal dividing wall,

said upper portion of said container being defined by said dividing wall and a top, side and end walls,

said dividing wall being provided with a plurality of apertures having a width slightly less than the diameter of said eggs but greater than the smallest dimension of the fry which hatch from said eggs,

said side, end and top walls having a plurality of apertures therein of a width less than the smallest dimension of the newly hatched fry to inhibit the entrance of predators and the escape of fry whereby escaping fry will tend to move when hatched through said dividing wall aperture into said lower fry rearing chamber,

said lower fry rearing chamber being defined by said dividing wall, side, bottom, and end walls,

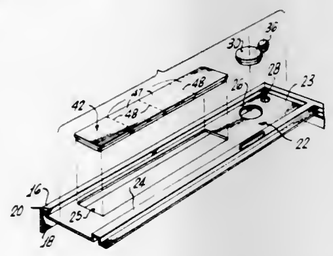
said fry rearing chamber side, bottom and end walls having a plurality of apertures therein of sufficiently narrow width to inhibit the entrance of predators, but sufficiently wide to permit the escape of the fry after absorption of the egg sac and attainment of a free swimming state.

4,094,271

AQUARIUM BACKSTRIP

Anthony Louis, 437 Grinnell Dr., Burbank, Calif. 91501

Filed Nov. 1, 1976, Ser. No. 737,542
Int. Cl.² A01K *63/00*
U.S. Cl. 119—5 **5 Claims**



1. An aquarium top backstrip having, in combination:

a body adapted to be supported in a position overlying a portion of an aquarium;

means defining a plurality of openings extending through said body for receiving aquarium equipment; and

a plurality of plastic covers for said openings sized and shaped to close the openings when installed on said body, said covers having plate-like top members at least as large as the openings to be closed thereby, and means on the undersides of the covers for fitting into the openings and holding the covers tightly but releasably in place on said body;

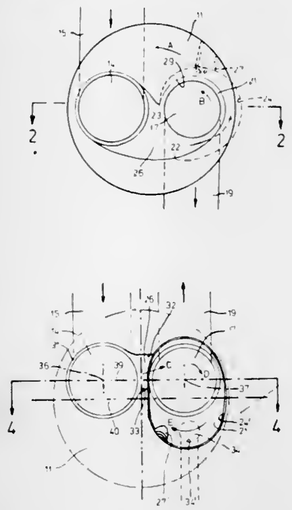
at least one of said covers including means extending across the cover and weakening the cover along at least one preselected break line, whereby the cover may be separated into at least two sections to produce a partial cover for the associated opening held in place in the opening by said means on the underside thereof, and a replaceable cover for the remainder of the opening, and said sections may be rearranged in the associated opening to expose and cover different portions of the opening.

4,094,272

EXTERNALLY IGNITED FOUR CYCLE INTERNAL COMBUSTION ENGINE

Michael G. May, Bel Air, CH 1180 Rolle, Switzerland

Continuation-in-part of Ser. No. 545,023, Jan. 29, 1975, Pat. No. 4,000,722. This application Nov. 10, 1975, Ser. No. 630,624
Claims priority, application Italy, Jan. 24, 1975, 19596 A/75
Int. Cl.² F02B *3/00*
U.S. Cl. 123—30 D **13 Claims**



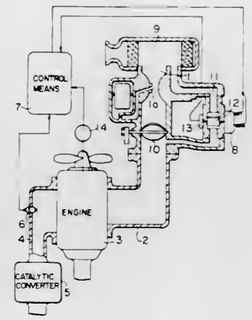
1. An internal combustion engine, the combination comprising a cylinder head, an inlet valve and an outlet valve including respective face portions and respective stem portions having respective axes which terminate in spaced relation relative to the bore of a cylinder of the engine, a piston moving in reciprocation in said cylinder, a single chamber at least surrounding said face portion of said outlet valve and lying at least substantially within the extended geometrical surface defined by the path of said piston, and a passage leading from said face portion of said inlet valve to the said chamber surrounding the said outlet valve, so that in said chamber will be created near the end of the compression stroke a substantially single gaseous swirl flow, which is substantially parallel to the area of the piston top opposite said chamber, and further comprising a spark plug disposed in the side wall of said chamber and located in proximity to that side of the terminus of said passage which is nearest to the center of said swirl flow.

4,094,273

AIR-FUEL RATIO ADJUSTING SYSTEM

Tadashi Hattori, Okazaki, and Takamichi Nakase, Gamagori, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Jun. 24, 1976, Ser. No. 699,606
Claims priority, application Japan, Jul. 14, 1975, 50-86565
Int. Cl.² F02B *3/00*; F02M *7/12, 23/04*
U.S. Cl. 123—32 EE **4 Claims**



1. An air-fuel ratio adjusting system for an internal combustion engine comprising:

a carburetor connected to an intake manifold of an internal combustion engine and including a main passage and a bypass passage for supplying an air-fuel mixture to said engine;

said main passage being provided with a main valve for controlling the amount of the air-fuel mixture to be supplied to said engine, and said bypass passage being provided with a bypass valve for adjusting the air-fuel ratio of said air-fuel mixture by controlling the amount of air flowing therethrough;

a pulse motor coupled to said bypass valve for driving the same;

air-fuel ratio sensing means mounted in an exhaust manifold of said engine for sensing the air-fuel ratio of the mixture supplied to said engine;

pulse generating means for generating a first and a second train of pulses, the frequency of said first train of pulses being higher than that of said second train of pulses;

detecting means for detecting operational conditions of said engine; and

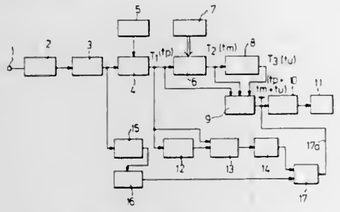
circuit means connected to said air-fuel ratio sensing means, pulse generating means and said detecting means for supplying said first train of pulses to said pulse motor both when said engine is operated under the no-load and when the air-fuel ratio detected by said air-fuel ratio sensing means exceeds a predetermined value so as to drive said pulse motor in a closing direction of said bypass valve at a speed determined by said first train of pulses, said circuit means supplying said second train of pulses to said pulse motor both when said engine is operated under the no-load and when the air-fuel ratio detected by said air-fuel ratio sensing means is below said predetermined value so as to drive said pulse motor in an opening direction of said bypass valve at a speed determined by said second train of pulses, whereby said bypass valve is driven in such a manner that the moving speed of said bypass valve in the opening direction is slower than that in the closing direction when said engine is under the no-load operation.

4,094,274

FUEL INJECTION CONTROL SYSTEM

Susumu Harada, Oobu, and Masakazu Ninomiya, Kariya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 4, 1976, Ser. No. 711,603
Claims priority, application Japan, Aug. 8, 1975, 50-96879
Int. Cl.[2] F02B *3/00*
U.S. Cl. 123—32 EL **9 Claims**



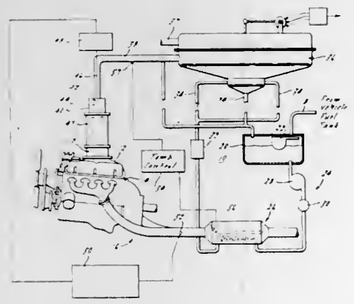
1. A method for controlling fuel injection in an internal combustion engine which includes means for generating fuel injection control pulses whose duration depends on engine parameters, comprising the steps of:
determining a reference pulse duration;
determining a reference rpm;
comparing the control pulse width with said reference pulse duration;
comparing the engine rpm, with said reference rpm;
interrupting fuel supply to the engine when the control pulse duration is less than said reference pulse duration and the engine rpm is greater than said reference rpm.

4,094,275

VAPORIZED LIQUID FUEL DELIVERY AND METERING SYSTEM

James E. Auiler, Ann Arbor; Douglas R. Hamburg, Birmingham; James E. Hyland, Trenton, and David F. Moyer, Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 23, 1976, Ser. No. 660,281
Int. Cl.[2] F02M *31/08*
U.S. Cl. 123—34 A **12 Claims**



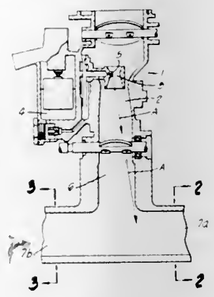
1. A fuel delivery and metering system for use in conjunction with an internal combustion engine having a source of fuel, which fuel is a liquid under standard temperature and pressure conditions, comprising in combination:
coarse liquid fuel delivery means communicating with the source of liquid fuel;
heating means in fluid communication with said delivery means operative to substantially completely vaporize liquid fuel delivered to said heating means by said delivery means;
vapor reservoir means spaced apart from, and in fluid communication with, said heating means operative to define a variable volume vapor storage space for receipt of said storage of vapor generated by said heating means, further operative to maintain the vapor stored therein at substantially atmospheric pressure;
means responsive to the volume of vapor within the vapor storage space operative to control said delivery means whereby the generation and supply of vaporized liquid fuel may be controlled to maintain a predetermined volume of vapor within the vapor storage space;
carburetor means in fluid communication with said vapor reservoir means operative to receive vaporized liquid fuel from said vapor storage and further operative to mix the fuel vapor with air to establish a combustible air/fuel mixture; and
means cooperative with said vapor reservoir means for maintaining the air/fuel ratio of the combustible mixture established by said carburetor means substantially constant for variations in the rate of establishment of the combustible mixture.

4,094,276

INTAKE MANIFOLD FOR INTERNAL COMBUSTION ENGINE

Akihisa Nakamura, Tokyo; Takashi Umemoto, Tokorozawa, and Sakuji Arai, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 16, 1976, Ser. No. 677,669
Claims priority, application Japan, Apr. 24, 1975, 50-49087
Int. Cl. F02b *75/18*
U.S. Cl. 123—52 M **6 Claims**



1. An intake manifold for delivering an air-fuel mixture to an internal combustion engine having a plurality of cylinders, comprising: a first pipe leading from a mixture source for supplying air-fuel mixture to one of the engine cylinders, a second pipe leading from the same mixture source for supplying air-fuel mixture to another cylinder of the engine, the pipes having substantially the same constant internal cross sectional area, with smooth internal contours without discontinuities, the pipes each being non-circular in cross section, one of the pipes having an asymmetrical internal sectional contour in which the lower portion thereof is smaller than the upper portion thereof, the other pipe having an asymmetrical internal sectional contour in which the lower portion thereof is larger than the upper portion thereof.

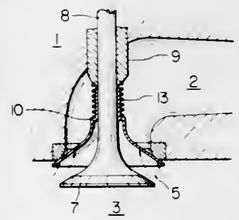
4,094,277

INTAKE VALVE MECHANISM FOR PREVENTING BACK FLOW OF EXHAUST GAS

Kenji Goto, and Daisaku Sawada, both of Susono, Japan, assignors to Tokyo Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jun. 9, 1976, Ser. No. 694,445
Claims priority, application Japan, Jun. 24, 1975, 50-076441
Int. Cl.[2] F01L *1/28*
U.S. Cl. 123—52 MF **6 Claims**

1. An intake valve mechanism for preventing the back-flow of gases from a combustion chamber of an internal combustion engine out of an intake port of the chamber, said intake valve mechanism comprising:
(a) poppet valve means for alternately opening and blocking the intake port, said poppet valve means including an intake valve having a stem and further having a disc portion mounted on one end of said stem, said poppet valve means further including a valve guide for supporting said stem to allow said disc portion to selectively open and block said intake port of the engine;
(b) back-flow valve means positioned between said poppet valve means and said intake port for blocking said intake port in response to pressure in the combustion chamber, said back-flow valve means including a back-flow prevention valve having a hollow base and further having an expanded portion mounted on one end of said base, said hollow base being mounted concentric to said stem to allow said expanded portion to slide back and forth between said intake port and said disc portion, said disc



portion of said intake valve extending parallel said expanded portion of said back-flow prevention valve, said intake port including a recessed seat to receive said expanded portion; and
(c) means for continuously biasing said back-flow valve means toward said disc portion of said poppet valve means, said biasing means having sufficient strength to prevent said back-flow valve means from blocking said intake port when said poppet valve means is open until the pressure in the combustion chamber reaches a predetermined value, said biasing means including a spring positioned concentric to said hollow base of said back-flow prevention valve, said spring being proportioned for biasing said expanded portion substantially against said disc portion when said poppet valve means is closed, and for leaving a gap between said expanded portion and said disc portion under conditions of back-flow pressure when said poppet valve means is open.

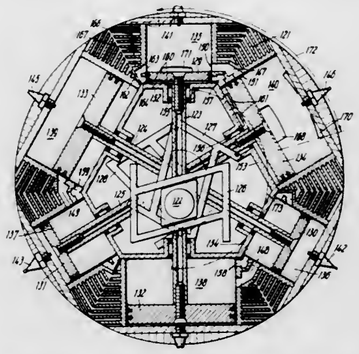
4,094,278

TWO-STROKE COMBUSTION ENGINES

Walter Franke, Hittfelder Kirchweg 22, 2105 Seevetal 3, Germany

Division of Ser. No. 443,922, Feb. 19, 1974, Pat. No. 3,981,280. This application Jan. 13, 1976, Ser. No. 648,652
Claims priority, application Germany, Feb. 19, 1973, 2308127
Int. Cl.[2] F02B *75/20, 57/00*
U.S. Cl. 123—59 EC **7 Claims**

1. A two-stroke internal combustion engine comprising: working cylinder means; auxiliary cylinder means; working piston means reciprocally operable within said working cylinder means; auxiliary piston means reciprocally operable within said auxiliary cylinder means; working chamber means defined by said working cylinder means on one side of said working piston means; auxiliary working chamber means defined by said auxiliary cylinder means on one side of said auxiliary piston means; ignition means provided in both said working chamber means and said auxiliary working chamber means; first inlet port means and first outlet port means in both said working cylinder means and said auxiliary cylinder means, said first inlet and first outlet port means for each being controlled, respectively, by movement of said working piston means and said auxiliary piston means; first channel means connecting said first outlet port means of said working cylinder means with said first inlet port means of said auxiliary cylinder means to effect transfer of all of the exhaust gasses in said working chamber means into said auxiliary working chamber means at the end of a power stroke of said working piston means; said auxiliary piston means operating to effect compression within



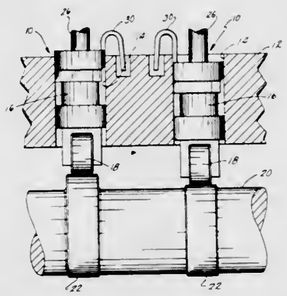
said auxiliary working chamber means of the total exhaust gas quantity thus transferred from said working chamber means; said ignition means operating to effect ignition of said compressed exhaust gasses within said auxiliary working chamber means thereby to effect a power stroke of said auxiliary piston means as a result of said ignition of said exhaust gasses.

4,094,279

DUCTILE IRON ROLLER TAPPET BODY AND METHOD FOR MAKING SAME

Kenneth E. Kueny, North Muskegon, Mich., assignor to Johnson Products Div. of Sealed Power Corporation, Muskegon, Mich.

Filed May 7, 1976, Ser. No. 684,250
Int. Cl.[2] F01L *1/14*
U.S. Cl. 123—90.51 **6 Claims**



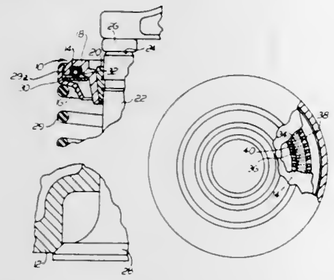
1. In a roller tappet of the type including a central valve lifter body having a bifurcated end supporting a roller, the body being adapted for reciprocating movement within a bore formed in a cast iron engine block, wherein the improvement comprises:
said body being formed from nodular iron.

4,094,280

VALVE ROTATING DEVICE

Stanley H. Updike, Painesville, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed Jul. 6, 1976, Ser. No. 703,071
Int. Cl.[2] F01L *1/32*; F16K *29/00*
U.S. Cl. 123—90.3 **8 Claims**



5. A valve rotator for rotating a spring biased valve about the axis of the stem of the valve in an internal combustion engine, said valve rotator comprising:

(a) a body to be located coaxial with the valve stem, attached to and rotatable with the valve stem, said body having an annular groove therein;

(b) a valve spring retainer coaxial with and adjacent said body and adapted for contact with the valve biasing spring;

(c) a garter spring disposed in said annular groove, said garter spring comprising a series of coils;

(d) a Belleville washer located between said garter spring and said valve spring retainer and which applies a force on the coils tending to tilt the coils when said body and said valve spring retainer move axially toward each other;

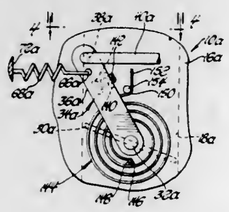
(e) means located internally of the coils of said garter spring and extending coextensively therewith, said means engaging said coils and increasing the axial load capacity of said garter spring and clamping the coils of the garter spring between said Belleville washer and said body to minimize distortion of said coils as well as to minimize oscillation of the garter spring coils upon axial loading of the garter spring due to said body and said valve spring retainer moving axially toward each other.

4,094,281

RESILIENT THROTTLE STOP MEANS

Milton J. Kittler, 48 Casablanca Est's., Scottsdale, Ariz. 85253

Division of Ser. No. 522,236, Nov. 8, 1974, Pat. No. 4,016,842. This application Sep. 20, 1976, Ser. No. 724,556
Int. Cl.[2] F02D *11/02*; G05G *5/04*
U.S. Cl. 123—98 **7 Claims**



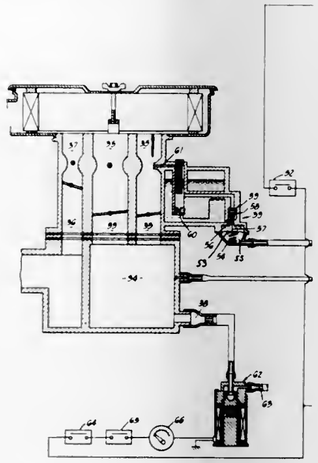
1. Resilient throttle stop apparatus for use in combination with a combustion engine wherein said engine comprises an intake structure, induction passage means, formed in said intake structure, and throttle valve means for controlling flow through said induction passage means, said throttle stop apparatus comprising first resilient means, second resilient means, said induction passage means being fixedly secured to and supported by said engine, said first resilient means being operatively connected to said throttle valve means as to apply thereto a first resilient force for urging said throttle valve means in a closing direction, and said second resilient means being effective regardless of whether or not said engine is operating to at times exhibit an added resilient resistance force resisting further opening movement of said throttle valve means by associated throttle lever means after said throttle valve means has been opened to a preselected degree, said second resilient means said induction passage means said throttle valve means and said connecting means all being commonly supported by said engine, said second resilient means comprising torsion spring means preloaded as to cause said added resilient resistance force to be of a preselected minimum value upon initiation of said further opening movement, wherein said spring means comprises a generally angularly deflectable end, and wherein said throttle lever means operatively engages and angularly deflects said deflectable end upon said initiation of said further opening movement.

4,094,282

IGNITION TIMING CONTROL APPARATUS FOR ENGINE DURING WARM-UP

Teruyuki Nakano, Tokyo, and Syoichi Otaka, Miyoshi, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 23, 1977, Ser. No. 771,107
Claims priority, application Japan, Feb. 25, 1976, 51-20431[U]
Int. Cl.[2] F02P *5/12*
U.S. Cl. 123—117 A **5 Claims**



1. In an ignition timing control device for an internal combustion engine during warm-up, the engine having an intake passage, the combination of: an ignition timing device for the engine, an actuator for said device having two vacuum chambers separated by a flexible diaphragm, first means including a first valve for subjecting the first of said chambers to atmospheric pressure or to suction pressure from said engine intake passage, second means including a second valve for subjecting the second of said vacuum chambers to atmospheric pressure or to suction pressure from said intake passage, a first temperature responsive mechanism controlling operation of said first valve so that below a first predetermined temperature said first valve causes suction pressure to be introduced into said first chamber, a second temperature responsive mechanism controlling operation of said second valve so that above a second predetermined temperature said second valve causes suction pressure to be introduced into said second chamber, whereby increasing engine temperature during warm-up first causes

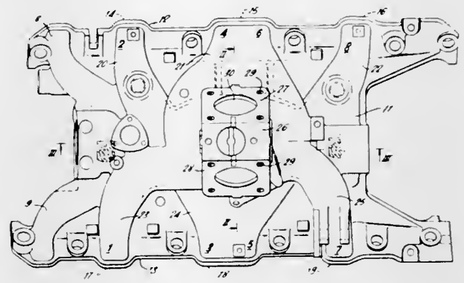
differential pressure across said diaphragm to advance the ignition timing, then equalizes pressure across said diaphragm to place the ignition timing at a value between retard and advance, and finally causes differential pressure across said diaphragm to retard the ignition timing.

4,094,283

INTERNAL COMBUSTION ENGINE

Douglas Leslie Sutton, Solihull, England, assignor to British Leyland UK Limited, London, England

Filed Aug. 20, 1976, Ser. No. 716,208
Claims priority, application United Kingdom, Aug. 19, 1975, 34360/75
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **5 Claims**



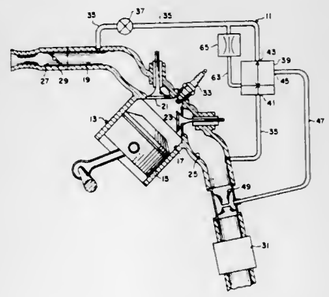
1. An internal combustion engine incorporating a plurality of carburetters mounted on the engine by way of a common structural member having a primary duct for each carburetter to allow the passage of fuel/air mixture from a carburetter to the engine and a secondary duct for liquid through the member characterised by the provision of a third duct in the member in the vicinity of, and defining a path in heat exchange relationship with, the primary duct; a pipe linking the third duct upstream of the heat exchange path to an exhaust manifold of the engine; and a passage downstream of the heat exchange path linking the third duct to the primary duct at a region in the primary duct which is downstream of the heat exchange path.

4,094,284

EMISSION CONTROL SYSTEM

William Fred Gesell, Huron, Ohio, assignor to Eltra Corporation, Toledo, Ohio

Filed Oct. 21, 1975, Ser. No. 624,494
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **43 Claims**



1. An emission control system for an internal combustion engine, the combination comprising:

a fluidic amplifier having a supply port and an outlet port,

a recirculation passageway for connecting the supply port of said fluidic amplifier to a source of exhaust gas having a pressure variable in accordance with the operation of the internal combustion engine and for connecting the outlet port to an intake manifold for recirculating exhaust gas through the engine,

said fluidic amplifier having a power jet chamber in fluid communication with the supply port and a receiver chamber in fluid communication with the outlet port,

said fluidic amplifier having wall means defining an intermediate space between a receiver chamber and the power jet chamber with the nozzle portion of the power jet chamber directed toward the receiver chamber,

said fluidic amplifier having a vent chamber opening into the intermediate space and in fluid communication with a vent port for venting to a relatively low fluid pressure so as to create a differential pressure with the power jet chamber to form a relatively high velocity stream of recirculating exhaust gas acting as a beam for passage through the intermediate space to the receiver chamber with the amount of recirculated exhaust gas varying in accordance with the pressure of the exhaust gas supplied to the supply port,

low pressure means for generating a low pressure relative to the pressure of the exhaust gas being supplied to the inlet port of said fluidic amplifier,

said low pressure means being in the form of a venturi disposed in the exhaust system of the internal combustion engine, and

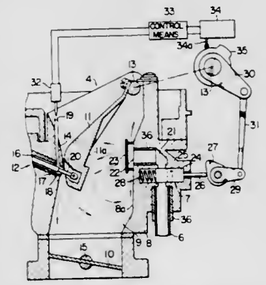
a vent passageway connecting the vent port of said fluidic amplifier to said low pressure means.

4,094,285

GAS MIXTURE FEED SYSTEM FOR INTERNAL COMBUSTION ENGINE

Yoshishige Oyama, Katsuta; Takao Teranishi, Hitachi, and Teruo Yamauchi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 5, 1976, Ser. No. 712,089
Claims priority, application Japan, Aug. 8, 1975, 50-95809
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **11 Claims**



1. A gas mixture feed system for an internal combustion engine wherein said gas mixture feed system comprises:

a carburetor including an intake passageway; a throttle valve in said intake passageway, a movable air valve in the intake passageway upstream of said throttle valve, fuel jet means adjacent said air valve for supplying fuel into fresh air passing thereby, and fuel metering means between a fuel supply source and said fuel jet means and controlled by said air valve;

intake passageway means communicating the outlet of said intake passageway with the internal combustion engine; and

exhaust gas recirculating means for recirculating the exhaust gas from said internal combustion engine to the intake passageway, said exhaust gas recirculating means having an outlet opening disposed in a wall surface of said intake

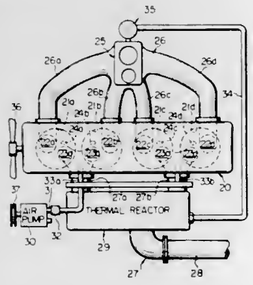
passageway between said air valve and said throttle valve such that the exhaust gas is fed into the air-fuel mixture downstream of said air valve and said fuel jet means.

4,094,286

INTERNAL COMBUSTION ENGINE AND METHOD OF REDUCING TOXIC COMPOUNDS IN THE EXHAUST GASES THEREFROM

Hiroshi Kuroda, Tokyo; Yasuo Nakajima, Yokosuka; Yoshimasa Hayashi, and Shin-ichi Nagumo, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed Aug. 24, 1976, Ser. No. 717,408
Claims priority, application Japan, Aug. 25, 1975, 50-103243; Aug. 25, 1975, 50-103244
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **8 Claims**



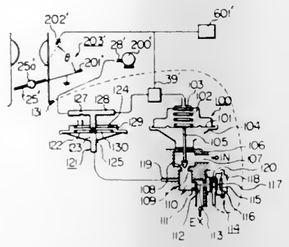
1. A multiple-cylinder spark-ignition internal combustion engine comprising exhaust-gas cleaning means in the exhaust system; mixture control means by which the ratio of the weight of inactive compounds in the mixture gases produced in the combustion chamber of each of the engine cylinders during each cycle of operation of the cylinder to the weight of the fuel component in the air-fuel mixture inducted into the combustion chamber is maintained within a range between about 13.15:1 and about 22.5:1, each of said engine cylinders having a bore diameter less than 95 millimeters and a bore volume less than 600 millimeters and effective to provide a compression ratio within the range between about 8.0:1 and about 10.5:1, said mixture control means including an exhaust gas recirculation system operative to recirculate the exhaust gases from the exhaust system into the intake manifold of the engine at a rate providing a recirculated exhaust gas ratio which is varied in accordance with such characteristics as are indicated by closed-loop isoplethic curves in terms of the revolution speed and load of the engine and which peaks up during normal steady-state operating conditions of the engine; and an ignition system which includes in the combustion chamber in each of the engine cylinders, a spark plug having a firing point which is located at a distance within a range between about 2 millimeters and 7 millimeters from the internal surface of a wall portion of a combustion chamber in which the spark plug is mounted, said spark plug being disposed so that the volume of the space enclosed within a spherical envelope having a radius r in the combustion chamber about the firing point of said spark plug occupies at least 35 percent of the clearance volume of the combustion chamber, wherein said radius r is given, when measured in meters, by the relation $r = (\theta.Vc)/(6N)$ where θ is the degree of spark advance in terms of crankshaft rotation angle before the top dead center, Vc is the combustion rate in meters per second of the combustible charge in the combustion chamber and N is the revolution speed in rpm of the engine within a predetermined range.

4,094,287

EXHAUST GAS RECIRCULATION SYSTEM

Hidetaka Nohira, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 13, 1976, Ser. No. 750,141
Claims priority, application Japan, Sep. 7, 1976, 51-106212
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **7 Claims**



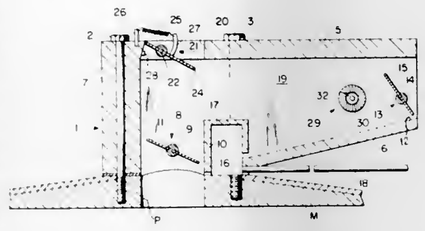
1. An improved exhaust gas recirculation system for recirculating exhaust gases to an intake system through exhaust gas recirculating valve means operated in response to a vacuum in the intake system in an internal combustion engine, wherein the improvement comprises an intake system vacuum operated valve means which controls the amount of the exhaust gases to be recirculated therethrough in response to the intake system vacuum and a vacuum pump operated valve means which additionally controls the amount of the exhaust gas controlled by said first mentioned valve means in response to a vacuum of an engine-driven or an electrically-driven vacuum pump which always produces a vacuum above a predetermined value during the driving of the vehicle.

4,094,288

CARBURETOR FOR ENGINES USING DIESEL FUEL

William E. Davis, 762 Lindo La., Port St. Lucie, Fla. 33452

Filed Dec. 18, 1975, Ser. No. 642,053
Int. Cl. F02m *13/06*
U.S. Cl. 123—127 **3 Claims**



1. A carburetor comprising, a housing including walls defining a passageway extending from a first air inlet to and through a throat portion adapted for attachment to the intake manifold of an internal combustion engine, an engine control valve mounted in said throat portion and operable to vary the effective opening therethrough, a first damper pivoted in said first air inlet and operable to vary the effective opening thereof, a fuel control valve mounted to one wall of said housing, downstream of said first damper and upstream of said engine control valve, and operable to introduce atomized fuel into said passageway, manually controlled means positively and directly interconnecting said engine control valve and said fuel control valve for conjoint actuation thereof, pump means supplying diesel fuel to said fuel control valve at pressures of the order of 300 psi, there being a second air inlet in and through the walls of said housing and opening into said passageway downstream

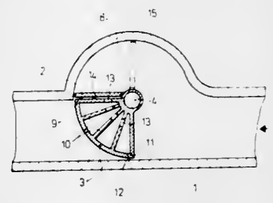
of said fuel control valve and upstream of said engine control valve, a damper plate having a center line, means mounting said damper plate in said second air inlet for pivoting from a first position obturating the same, to a second position, the pivot axis of said plate being offset from its center line, thus urging said plate to second position by differential absolute pressures within and without said housing, and resilient means connected with said plate and urging the same to first position against the urge of differential pressure.

4,094,289

APPARATUS FOR IMPROVED PRECONDITIONING OF A FUEL-AIR MIXTURE

Wolf Wessel, Oberriexingen, and Volkhard Stein, Stuttgart, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Nov. 4, 1976, Ser. No. 738,924
Claims priority, application Germany, Dec. 12, 1975, 2555997
Int. Cl.² F02M *29/00*
U.S. Cl. 123—141 **8 Claims**



1. Apparatus for improved preconditioning of the fuel-air mixture in the induction tube of a mixture compressing and externally ignited internal combustion engine with an arbitrarily manipulatable throttle valve, which cooperates with a coaxially arranged, induction tube contained, preconditioning device pivotable against a restoring force by means of the induction air quantity, further characterized in that the induction tube contains an integral laterally extending chamber having an arcuate interior surface into which the throttle valve and a multiple vaned pivotal throttle valve can be rotated.

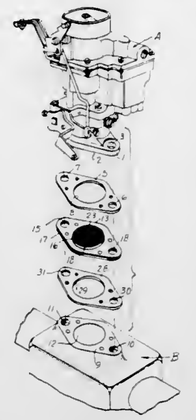
4,094,290

FUEL ATOMIZER

William Odell Dismuke, Memphis, Tenn., assignor to Courtney C. Pace, Washington, D.C.; Ulle C. Linton, Rockville, Md. and Casey C. Pace, Jackson, Miss., part interest to each

Filed Jun. 6, 1974, Ser. No. 477,106
Int. Cl.² F02M *29/00*
U.S. Cl. 123—141 **1 Claim**

1. A fuel atomizer to be mounted between an internal combustion engine carburetor and intake manifold comprising superimposed metal plates having at least one common central opening, a pair of superposed screens fixedly connected to said plates and extending across said central opening and said screens having portion spaced apart at said central opening and a plurality of balls freely positioned between said spaced apart portions of said screens in the space therebetween, wherein said plates have oppositely raised rims around said opening and



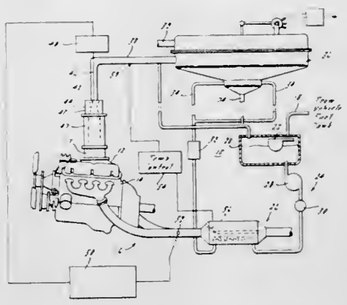
said screens have marginal edges extending in between said rims.

4,094,291

APPARATUS FOR MIXING A VAPORIZED LIQUID FUEL WITH AIR

Douglas R. Hamburg, Birmingham, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Feb. 23, 1976, Ser. No. 660,310
Int. Cl.² F02M *29/00*
U.S. Cl. 123—141 **5 Claims**



1. A carburetor for mixing a vaporized liquid fuel with air to establish a combustible air/fuel mixture for delivery to an engine comprising in combination:

a carburetor body;

metering venturi means within said body communicating on an upstream end with a source of air and adapted to generate, in use, a low pressure zone having a pressure indicative of the rate of air flow therethrough;

vapor delivery nozzle means situated within the low pressure zone defined by said venturi means and having a vapor delivery orifice operative to deliver a stream of vaporized liquid fuel to the low pressure zone in response to air flow therethrough;

air swirl inducing means situated dowstream from said venturi means arranged to intercept air flowing through said venturi means and operative to cause air flowing through said venturi means to acquire a component of motion at an angle to the direction of flow whereby air flowing therethrough may become a swirling air mass;

said air swirl inducing means including means defining an

aperture in alignment with the vapor delivery nozzle operative to permit a stream of vaporzied liquid fuel issuing from said delivery nozzle to pass therethrough without substantial contact with the air swirl inducing means; and

mixing section means downstream from said swirl inducing means for fluid communication with the engine;

said mixing section means having surface wall portions operative to define a mixing space whereby the swirling air mass and the vaporized liquid fuel may be mixed to establish a combustible air/fuel mixture prior to introduction into the engine;

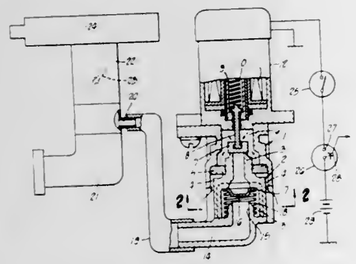
said swirling mass being operative to prevent contact between the vaporized liquid fuel and the surface wall portions of the mixing section means.

4,094,292

HOT STARTER SYSTEM FOR ENGINES

Tadao Takagi, Saitama; Toru Yagi, Tokyo; Mitsuo Ehara, Saitama, and Tatsumi Yamada, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1977, Ser. No. 770,903
Claims priority, application Japan, Feb. 25, 1976, 51-20427[U]
Int. Cl.[2] F02M *23/04*
U.S. Cl. 123—179 G **8 Claims**



1. A starter means for internal combustion engines in a heated state and of the type having an air-fuel mixture intake passage downstream of a throttle valve provided in a carburetor, the starter means comprising: means forming a supplemental air induction passage communicating with the intake passage; a normally closed first valve for controlling flow of the supplemental air into the induction passage; a heat responsive means for opening the first valve to permit flow of supplemental air through the induction passage to the intake passage on starting of the engine, thereby reducing the richness of the air-fuel mixture therein; and a normally open second valve interposed in the induction passage, the second valve being movable toward a closed position in response to vacuum intensity in the intake passage on complete firing of the engine, thereby to reduce and close off flow of supplemental air through the induction passage to the intake passage, as the richness of the air-fuel mixture therein is reduced.

4,094,293

ENGINE PREOILER AND LUBRICANT RESERVOIR

John W. Evans, Rte. 41, Sharon, Conn. 06069

Filed Apr. 16, 1976, Ser. No. 677,590
Int. Cl.[2] F01M *1/00*
U.S. Cl. 123—196 S **9 Claims**

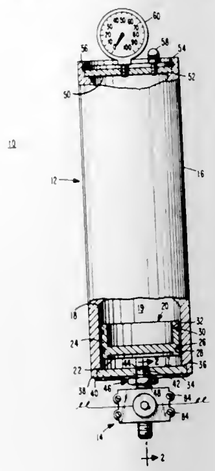
1. A preoiler and lubricant reservoir assembly useable to lubricate and internal combustion engine when the engine's oil pressure is below a specified level, said assembly comprising:

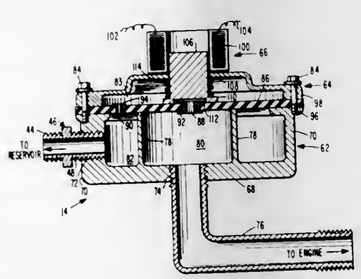
a reservoir, said reservoir being an elongated cylinder, said cylinder having an internal slidable piston, said reservoir storing a quantity of lubricant when said engine oil pressure is above said specified level;

a pressure sensing means for sensing said engine's oil pressure;

means for forcing said lubricant from said reservoir when said oil pressure falls below said level; and

valve means communicating with said reservoir, said valve means allowing unrestricted flow of said lubricant from said reservoir to the engine when the engine's oil pressure is below the specified level, said valve means further





restricting lubricant flow to said reservoir during increasing oil pressure in said engine while said pressure is below said specified level, and said valve means allowing unrestricted lubricant flow to said reservoir once said oil pressure in the engine has risen above said specific level, said valve means including actuating means for controlling said valve means in response to said engine oil pressure sensed by said pressure sensing means.

4,094,294

BALL PROJECTING DEVICE

Richard Speer, Ware Neck, Va. 23178

Filed Jan. 31, 1977, Ser. No. 764,197
Int. Cl.[2] F41F *1/04*
U.S. Cl. 124—56 **26 Claims**

1. In a pneumatic device for projecting a ball, the device comprising a ball-directing tube defining a generally tubular inner space, gas pressure supply means operatively connected to a first end of the tube to provide gas under pressure thereto, means for feeding a ball to the tube for movement in a direction from the first end toward the second end, and detent means in the tube for transiently restraining the movement of a ball therethrough, the improvement comprising:

providing as the detent means a pneumatically operated detent means, the detent means comprising:

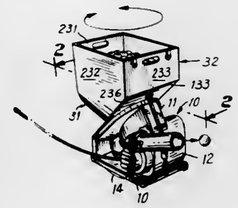
an inflatable, elastically biased membrane within said tube, the membrane having a first inflated configuration extending into the tubular inner space, so as to define a substantially pressure-tight detent volume, and being biased towards the inflated configuration, so as to constrict the tubular inner space and thus restrain the movement of a ball therethrough;

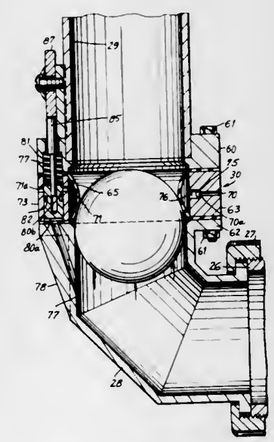
pressure valve means between the detent volume, and the atmosphere;

bias means operatively connected to the pressure valve means and acting to move the pressure valve means into a closed position;

a pressure-responsive means operatively connected to the pressure valve means and acting against the bias means, tending to move the valve means into an open position; and

a pressure chamber and a pressure-connecting means between the pressure-responsive means and the pressure





chamber, the pressure in such chamber being increased when a ball is in place in the tubular inner space and being restrained by the detent membrane, while gas under pressure is being provided to the first end of the tube, whereby at a predetermined pressure in the pressure chamber, the pressure valve means is moved into the open position, so as to substantially immediately permit the deflation of the membrane when a ball is pressed thereagainst and permit passage of the ball therethrough.

10. A pneumatic device for projecting a ball, the device comprising an air box; and gas pressure flow means located therewithin; a ball projection barrel supported on said air box and having an outer portion through which the balls are projected and an inner portion in fluid flow connection with said air box; ball feed channel means extending to the barrel; and a ball feeding means for feeding balls, one at a time, to the feed channel, the feeding means comprising:

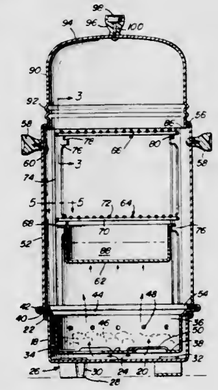
a chamber having side walls disposed in a substantially vertical direction and a floor, a portion of the floor being inclined to the horizontal at an angle in the range of from about 35° to about 50°; a feeder disk having a plurality of openings formed therethrough, the disk being rotatably connected to and disposed above the inclined floor surface and being substantially parallel thereto, the floor surface having a ball feed opening so positioned as to be in register with the openings through the disk at the apogee of each opening as the disk rotates; drive means for rotating disk; a raised central portion on the disk extending outwardly and upwardly into the chamber and having a circumferential side surface; a ledge member supported from a side wall surface of the chamber, and having a shelf surface extending outwardly above the upper portion of the disk so that the outer edge of the ledge shelf surface extends along a line forming a chord of the disk and of a disk opening when such opening is in register above the ball feed opening; a transverse ledge surface extending downwardly from the outer edge of the shelf surface, towards the disk; and movable sealing means for the ball feed opening capable of permitting a ball to be fed from the feeder disk when the disk opening is in register with the feeder opening and of sealing the opening after feeding of a ball, whereby pressure in the air box can be increased to a desired pressure for ejecting the ball.

4,094,295

CHARCOAL AND WATER SMOKER AND COOKER

Burl Boswell, and Heyman J. Manhein, both of Shreveport, La., assignors to Bosman Industries, Inc., Shreveport, La.

Filed Jun. 28, 1976, Ser. No. 700,136
Int. Cl.[2] A47J *37/04*; F24B *3/00*
U.S. Cl. 126—25 R **7 Claims**



1. A charcoal-water smoker and cooker comprising a vertically disposed housing comprising a separable main body, supporting base and lid oriented in vertically superimposed relation with the base disposed under the main body and the lid supported on the main body, said base including a fuel receiving pan, said main body including a water pan and a grille disposed above the water pan for receiving food items, said water pan being spaced inwardly of the periphery of the main body to enable passage of smoke and heat upwardly between the pan and main body with the heat vaporizing water in the pan for smoking and cooking the food items on the grille, handle means adjacent the upper end of the main body to enable the main body and lid along with the water pan and grille to be lifted off of the base as a unit with the fuel receiving pan remaining stationary thereby enabling the supply of fuel to be replenished without disturbing the water pan, grille and food items thereon from their position in the main body, the major weight components of the main body including the water pan and grille being disposed so that the center of gravity of the combined unit is substantially below the handle means in order to facilitate retention of the lifted unit in verti-

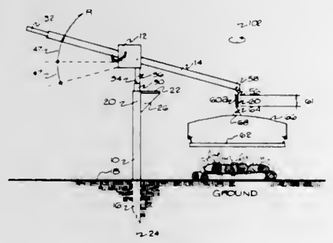
cal orientation, said base including a base pan having supporting legs thereon, said fuel receiving pan being in the form of a liner adapted to receive a quantity of charcoal and supported in concentric spaced relation to the base pan and including a generally horizontal outwardly extending peripheral flange overlying and supported on the base pan with the bottom of the liner spaced from the bottom of the base pan, said liner including openings in the bottom and peripheral wall thereof to provide passage for combustion supporting air, the bottom of said base pan including combustion supporting air inlet means therein, said main body including a lower edge freely resting on the flange of the charcoal receiving liner generally in vertical alignment with the upper edge of the base pan.

4,094,296

PORTABLE ADJUSTABLE OUTDOOR COOKING ACCESSORY

George Beagley, 7545 W. 3100 South, Magna, Utah 84044

Filed Mar. 14, 1977, Ser. No. 777,345
Int. Cl.² F24B *3/00*
U.S. Cl. 126—30 **12 Claims**



1. A portable adjustable cooking accessory comprising:
a stake member having a first end formed into a point and a second end formed with a flange extending substantially normally to the longitudinal axis of said stake member;
first adapting means secured to the second end of said stake member to extend axially away therefrom;
second adapting means removably and cooperatively associated with said first adapting means to permit said second adapting means to rotate about said axis;
an adjustment member secured to said second adapting means, said adjustment member being comprised of a first plate having a plurality of apertures formed therein in accordance with a preselected pattern;
a pin sized to coact with said apertures for removable positioning in a selected aperture;
an elongated arm member pivotally secured to said plate and having a handle on one end and a first hook adapted to its other end;
a chain having links sized to coact with said first hook;
a second hook adapted to one end of said chain to extend below said first hook; and
a cooking utensil suspended from said second hook.

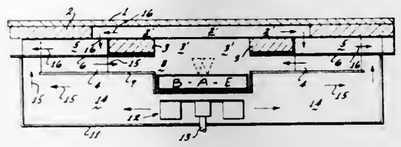
4,094,297

CERAMIC-GLASS BURNER

Earle W. Ballentine, 127 Lomita St., El Segundo, Calif. 90245

Continuation-in-part of Ser. No. 654,113, Feb. 2, 1976, abandoned, which is a continuation-in-part of Ser. No. 518,473, Oct. 29, 1974, abandoned. This application Jun. 16, 1976, Ser. No. 696,793
Int. Cl.² F24C *3/04*
U.S. Cl. 126—39 J **22 Claims**

1. A ceramic-glass burner for heating a cooking pan, comprising:
a stoichiometric burner means having particularly spaced apertures for discharging free turbulent jets; a ceramic glass plate above said burner means the linear spacing of these apertures being equal to 2.4 to 2.5 times R d_o T_{RG}/T_{RA} wherein R is the stoichiometric air-to-gas ratio for the fuel gas, d_o is the aperture diameter; means including the glass plate and the burner means for defining a mixing chamber and a combustion chamber between said burner means and said plate;
the free turbulent jets of gaseous fuel being discharged from the stoichiometric burner means into the mixing chamber at the temperature T_{RG} for entraining combustion air entering the mixing chamber for combustion after ignition of the stoichiometric mixture in the combustion chamber above the mixing chamber thereby producing combustion products which have a maximum temperature;



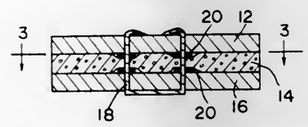
counterflow recuperator means having an upper section and a lower section, the upper section having fins in heat exchange relation with said combustion products so that heat captured by the fins of the upper sections of the counterflow recuperators is transferred to fins of the lower section being disposed in the flow path of the combustion air entering the mixing chamber means, so that the combustion air is preheated to the temperature T_{RA}; and
means for forcing the combustion air to flow through the lower section of the counterflow recuperator means into the mixing chamber.

4,094,298

SEPARATOR IN ELECTROCHEMICAL HEATING ELEMENT

Frederick P. Kober, Bayside, N.Y., assignor to Chem-E-Watt Corporation, Racine, Wis.

Filed Nov. 19, 1976, Ser. No. 743,187
Int. Cl.² F24J *1/04*
U.S. Cl. 126—263 **11 Claims**



1. In an electrochemical heat-generating element of the type having two electrode layers, including an anode and a cathode, a separator layer of porous, absorbent material therebetween, and electrically conductive connector means extending through said electrode and separator layers, the improvement comprising annular spacer means interposed between said electrode layers, said connector means extending through said annular spacer means, whereby to limit compression of said separator layer.

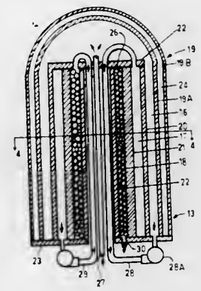
4,094,299

HELIOTHERMODYNAMIC SYSTEM

Percy Voelker, 455 Grant Ave., Brooklyn, N.Y. 11208

Filed Oct. 28, 1975, Ser. No. 626,368
Int. Cl.² F24J *3/02*; B64B *1/50*
U.S. Cl. 126—270 **8 Claims**

1. A heliothermodynamic system for harnessing solar energy comprising:
a balloon adapted to be floated in the upper reaches of the atmosphere where the atmospheric absorptions of solar energy is minimized,
means for maintaining said balloon inflated,
means for maintaining said balloon in spaced relationship relative to earth,
said balloon having a transparent portion for transmitting solar light into the interior of said balloon,
a light reflector covering an internal portion of said balloon opposite said transparent portion for concentrating the incident reflected solar radiation toward a focal area thereof,
and a heat receiver located in the focal area of said light reflecting portion of said balloon,



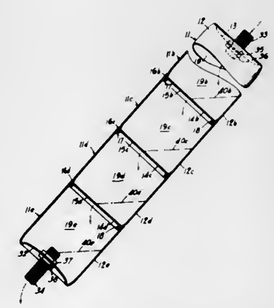
said heat receiver comprises a solar boiler having a plurality of nested, serially connected heating stages including an inner most stage and an outermost stage, and solar radiation absorption means disposed in said innermost stage of said nested heating stages,
and a light transmitting jacket means enclosing said nested stages to define an outermost heating stage, surrounding said nested stages,
said jacket means including a pair of spaced apart light transmitting jackets wherein the space between said jackets defines an area of negative pressure.

4,094,300

SOLAR HEAT COLLECTOR

Sam W. Young, 1305 White Rd., Opelika, Ala. 36801

Filed Jun. 21, 1976, Ser. No. 697,917
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **7 Claims**



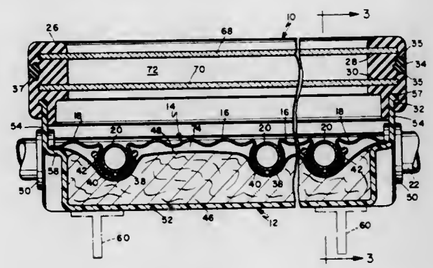
1. A solar collection comprising, a plurality of metal soft drink or beer cans of the type which have body portions and tops across the ends of said body portions, the tops having openings therein formed when the cans were opened, each of said cans having an open bottom received by the top of the next adjacent can for forming a series of connected juxtaposed tandem coaxial cans defining successive compartments of a tubular body closed throughout its length and in which said tops of said cans form longitudinally spaced generally radially extending baffles which, when said tubular body is inclined with said openings being respectively spaced above the lowermost inside portions of the adjacent body portions, successive spillways for liquid fed by gravity from the uppermost can of said series and permit the liquid to collect in successive compartments while cascading down through said successive compartments.

4,094,301

SOLAR COLLECTOR PANEL

Edward Fredrick Sorenson, 998 Barrett, Chula Vista, Calif. 92011, and Edward Fredrick Sorenson, Jr., 10136 Swanton Dr., Santee, Calif. 92071

Filed Mar. 19, 1976, Ser. No. 668,441
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **10 Claims**



1. A solar collector panel comprising:
a heat absorbing surface,
plural heat collector tubes in the heat conducting relationship with said heat absorbing surface,
manifold tubes connected to the opposite ends of said heat collector tubes,
said heat absorbing surface and said heat collector tubes being mounted on a base,
said base having an upper vertical edge,
at least one glass panel,
a seal molding secured over the upper edge of said base and positioning said glass panel above said heat absorbing surface,
said heat absorbing surface comprising means including a plurality of sheet sections having part cylindrical end flanges for producing a spring action against said heat collection tubes and holding said sheet sections in position on said tubes,
substantially U-shaped clips secured over the junctions of at least one of said flanges and holding said sheet sections in heat conducting relationship with said heat collector tubes.

4,094,302

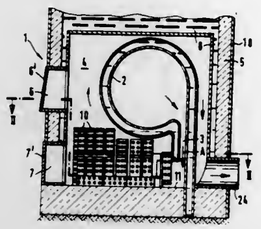
FURNACE WITH HEAT STORAGE ELEMENTS

Eduard Rohr, Magenwil, Switzerland, assignor to Ed. Rohr AG, Magenwil, Switzerland

Filed Jul. 23, 1976, Ser. No. 708,218
Claims priority, application Switzerland, Jul. 29, 1975, 9841/75
Int. Cl.² F24H *7/04*
U.S. Cl. 126—400 **12 Claims**

1. Furnace and boiler unit having a housing (**18**), a fire box (**2**) within the housing, an exhaust connection (**24**) leading from the housing, and a combustion gas chamber (**4**) located in the housing,
openings (**6**) formed in the housing and providing access to the combustion gas chamber, and doors (**6'**, **36'**, **44'**, **46'**) closing off the openings, and comprising
heat storage elements (**10**) located in the combustion gas chamber (**4**, **34**) and positioned therein in the path of flow

of the combustion gases to increase the flow resistance to the combustion gases, said heat storage elements (10) having a size which is smaller than the largest opening (6: 36, 37, 44, 46) providing access to the combustion gas chamber (4, 34) to allow introduction and removal of the



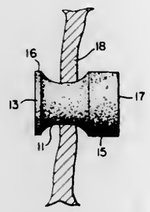
heat storage elements (10) into and from the combustion gas chamber (4, 34), the heat storage elements (1) including a metallic housing (16) formed with openings (12) in at least a portion thereof, and a compact mineral material of high thermal capacity located within said metallic housing (16).

4,094,303

TYMPANIC MEMBRANE VENT

Douglas W. Johnston, Longwood, Fla., assignor to Glasrock Products, Inc., Atlanta, Ga.

Filed Feb. 16, 1977, Ser. No. 769,398
Int. Cl.[2] A61B 19/00; A61F 1/18
U.S. Cl. 128—1 R **10 Claims**



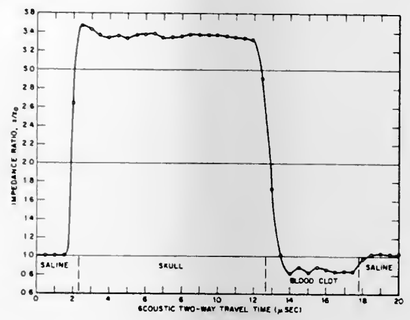
1. A tympanic membrane vent comprising a piece of porous hydrophobic material having pores therein and of a size and shape to be inserted through and held in place extending through the tympanic membrane of the human ear, said piece having a first end surface adapted to be positioned in the middle ear space, a second end surface adapted to be positioned in the ear canal, and exterior side surfaces extending between said end surfaces adapted to engage the tympanic membrane when said piece is in place extending through the tympanic membrane, said end surfaces and said side surfaces defining a closed three-dimensional volume, the interior enclosed by said end surfaces and said side surfaces being filled with said porous material, said pores being interconnected to permit air passage through said interconnected pores between the ear canal and the middle ear space when said piece is in place extending through the tympanic membrane, said pores having a size small enough so that the hydrophobicity of the material prevents passage of water therethrough from the ear canal into the middle ear space when water under atmospheric pressure in said ear canal comes in contact with said piece.

4,094,304

METHOD AND APPARATUS FOR MEASUREMENT OF ACOUSTIC IMPEDANCE TRANSITIONS IN MEDIA SUCH AS HUMAN BODIES

Hubert A. Wright, Jr., Lexington, Mass., assignor to Bolt Beranek and Newman Inc., Cambridge, Mass.

Continuation of Ser. No. 298,027, Oct. 16, 1972, abandoned.
This application Aug. 5, 1974, Ser. No. 494,907
Int. Cl.[2] A61B 10/00
U.S. Cl. 128—2 V **17 Claims**



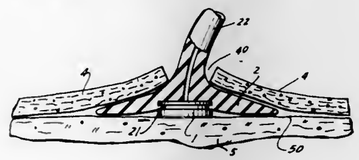
1. Apparatus for identifying and diagnosing parts within the human and animal bodies that comprises means for illuminating at least a portion of a body with acoustic impulse wave energy outgoing along a predetermined direction, whereby the wave energy is returned back in substantially the opposite direction from the body portion as a result of reflection therefrom, means responsive to the outgoing and returning wave energy to produce a resulting reflection impulse-response function, means for integrating the said reflection impulse-response function to provide a measure of impedance transitions in the body portion and means for correlating the same with body portion properties to identify the nature of said body portion.

4,094,305

METHOD AND AN ARRANGEMENT FOR CONTINUOUSLY MEASURING THE PARTIAL PRESSURE OF A GAS IN A SAMPLE

Manfred Kessler, Dortmund-Solde, Germany, assignor to Max Planck Gesellschaft, Munich, Germany

Filed Aug. 6, 1976, Ser. No. 712,248
Claims priority, application Germany, Apr. 23, 1976, 2617766
Int. Cl.[2] A61B 5/00
U.S. Cl. 128—2 E **13 Claims**



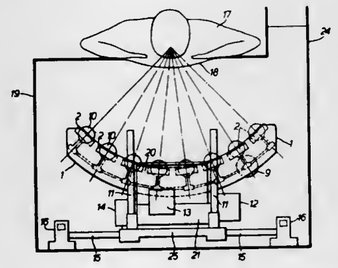
1. An arrangement for continously measuring the partial pressure of oxygen dissolved in blood flowing through muscle tissue which is covered by a skin layer, a combination comprising a support probe having first and second sides which are respectively adapted to engage the underside of the skin layer and the surface of the muscle tissue so that said probe is fixedly held in position against the muscle tissue; and a polarographic cell mounted at said second side and having a gas-measuring part adapted to firmly engage said muscle tissue so as to generate a signal indicative of the amount of gas being diffused from said muscle tissue, said probe further including a tubular section connected to said first side thereof, said first side of said probe comprising tapered wall surface portions which diverge in direction from said tubular section towards said muscle tissue so that said tapered wall surface portions are adapted to be positioned in sealing engagement with the underside of said skin layer.

4,094,306

APPARATUS FOR ULTRASONIC EXAMINATION

George Kossoff, Northbridge, Australia, assignor to The Commonwealth of Australia, c/o The Department of Health, Phillip, Australia

Filed Apr. 28, 1976, Ser. No. 681,037
Claims priority, application Australia, May 1, 1975, PC1443
Int. Cl.[2] A61B 10/00
U.S. Cl. 128—2 V **5 Claims**



1. Apparatus for use in the ultrasonic examination of an object, said apparatus comprising:

a housing adapted to be filled with a liquid coupling medium, said housing having a substantially horizontal upper surface and being provided with an aperture in said surface;

a flexible coupling membrane covering said aperture in a liquidtight seal;

transducer means contained within said housing and adapted to be immersed in said coupling medium, said transducer means comprising means for transmitting pulses of ultrasonic energy through said aperture into an object positioned adjacent said aperture and means for receiving echoes of said pulses of ultrasonic energy reflected through said aperture by acoustic impedance discontinuities within the object; and

an open storage header tank for said liquid coupling medium in communication with said housing and the atmosphere to maintain the pressure of said coupling membrane constant during flexing of the membrane.

4,094,307

METHOD AND APPARATUS FOR AIDING IN THE ANATOMICAL LOCALIZATION OF DYSFUNCTION IN A BRAIN

David N. Young, Jr., 2039 Navahoe Trail, Okemos, Mich. 48864

Filed Feb. 24, 1977, Ser. No. 771,683
Int. Cl.[2] A61B 5/04
U.S. Cl. 128—2.1 B **25 Claims**

1. A method for determining the specific anatomical localization of dysfunction in temporal lobe epilepsy comprising the steps of:

placing a plurality of electrodes with respect to physical areas of the subject's brain;

generating a pseudorandom, repeatable, broadband visual stimulus;

summing the broadband visual stimulus on the retina and associated neural networks of the subject;

amplifying the electrical analog response signal measured by each of the placed electrodes;

recording the amplified analog response signal from each electrode;

resynthesizing the broadband visual stimulus;

cross-correlating the resynthesized broadband visual stimulus with the recorded analog response signal for each placed electrode to obtain at least a first, second and third order Wiener kernel representation thereof;

limiting the bandwidth of the visual stimulus by masking out those portions which produce non-significant electrical analog responses;

summing the bandwidth-limited visual stimulus on the retina and associated networks of the subject;

amplifying the bandwidth-limited electrical analog response signal measured by each of the placed electrodes;

recording the amplified bandwidth-limited electrical analog response signals from each electrode;

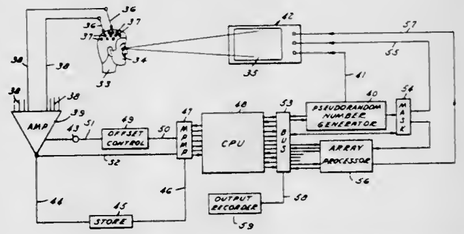
resynthesizing the bandwidth-limited visual stimulus;

cross-correlating the resynthesized bandwidth-limited visual stimulus with the stored bandwidth-limited analog response signal for each electrode to recompute at least a first, second and third order Wiener kernel representation thereof;

synthesizing an optimal kernel-defined visual stimulus Λ for each of said electrodes by multiplying the resynthesized bandwidth-limited visual stimulus by the recomputed Wiener kernel representation of the system;

presenting an optimal Λ-defined visual stimulus to the subject for each placed electrode;

summing the Λ-defined visual stimulus on the retina and associated neural network of the subject;



determining which of the Λ-defined visual stimuli produced neurophysiologically significant responses in the subject; and

utilizing the known locations of those placed electrodes whose Λ-defined visual stimuli produced said significant responses and the nature thereof to specifically isolate the anatomical location of the dysfunction.

18. A system for synthesizing a set of "*n*" discrete optimal visual stimuli, one optimal visual stimulus for each different and distinct brain area being examined, for use in determining the anatomical localization of brain dysfunction, said system comprising:

means for generating a pseudorandom input signal having the general characteristics of Gaussian white noise;

means responsive to said input signal for displaying a color video visual stimulus representation thereof, said visual stimulus being displayed so that it may be summed on the retina and associated neural network of the subject whose brain is being examined;

a plurality of "*n*" individual electrodes, one of said electrodes being disposed adjacent each of said different and distinct brain areas to be examined for monitoring the electrical spikes and slow potential response produced in said areas when said subject observes said displayed visual stimulus;

high impedance, low noise amplifier means having "*n*" channels, each of said channels being coupled to a different and distinct one of said "*n*" electrodes for amplifying the spikes and slow potential electrical analog response signals therefrom;

means for storing the amplified output of each of said "n" channels;

computational means responsive to said storage means and to said input signal-generating means for cross-correlating a resynthesized input signal with said stored electrical analog response signal for computing a Wiener kernel representation of the response from each of said electrodes for determining which portions of said input signal gave rise to insignificant responses;

means responsive to a determination of which portions of said input signal were responsible for insignificant responses for masking out the subsequent generation thereof so as to limit the bandwidth of any subsequently generated input signals;

said computational means being responsive to the resynthesized subsequently regenerated bandwidth-limited input signal and to the subsequently stored electrical analog response signals measured by said electrodes in response to the subject's observation of the displayed bandwidth-limited visual stimulus resulting from said bandwidth-limited input signal for cross-correlating to obtain a recomputed Wiener kernel representation of the output of each of said electrodes; and

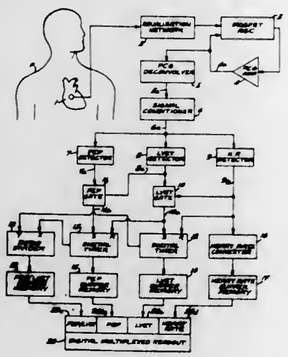
array processor means responsive to said recomputed Wiener kernel representation of the output of each of said electrodes and to the resynthesized bandwidth-limited input signals for multiplying same to produce an optimal input signal for each of "n" electrodes which can be supplied to said display means for displaying an optimal visual stimulus for testing each of said different and distinct brain areas being examined to anatomically localize brain dysfunction.

4,094,308

METHOD AND SYSTEM FOR RAPID NON-INVASIVE DETERMINATION OF THE SYSTOLIC TIME INTERVALS

Denny Charles Cormier, Coral Gables, Fla., assignor to Cormier Cardiac Systems, Inc., Miami, Fla.

Filed Aug. 19, 1976, Ser. No. 715,895
Int. Cl.[2] A61N 5/02
U.S. Cl. 128—2.05 R **18 Claims**



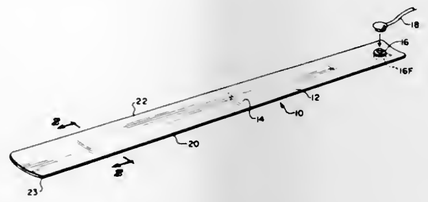
1. In a method for the non-invasive determination of cardiac performance by measuring the systolic time intervals (STI), the steps of transducing the heart sounds into an electrical phonocardiogram signal, subjecting the phonocardiogram signal to an inverse filtering system specifically matched in accordance with formulae equivalent to TRW(*t*) for detection of cardiac valvular events as derived from fundamental biophysical parameters of the heart for extraction of said systolic time interval events from the phonocardiogram signal, extracting systolic time interval events from the phonocardiogram signal after thus being subjected to said inverse filtering system, electrically measuring intervals between said systolic time interval events, and finally indicating said systolic time intervals for interpretation as indicia of cardiac performance.

4,094,309

MEDICAL ELECTRODE

Robert M. Grzenia, 9717 S. Homan Ave., Evergreen, Ill. 60642

Filed Mar. 7, 1977, Ser. No. 774,858
Int. Cl.[2] A61B 5/04
U.S. Cl. 128—2.06 E **10 Claims**



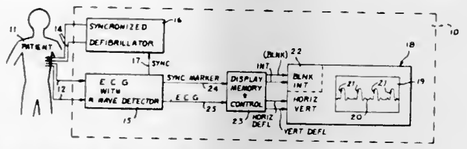
1. A medical electrode for contacting the limb of a patient comprising a bi-stable spring elongated generally flat member having an outer surface and an inner surface and having two stable states, one in which it is generally linear and the other in which it is coiled about itself, with its inner surface facing inward, such member having a natural coiled state of a size smaller than the limb and being of such a length as to substantially encircle the limb, and means for attaching an electrical lead to the member, said member being constructed such that an electrically conductive path exists from at least a portion of the inner surface of said member to and through said electric lead attaching means to any electrical lead attached thereto, and said member having the property of naturally assuming the coiled state from the linear state in response to slight change in its shape.

4,094,310

APPARATUS FOR ENHANCED DISPLAY OF PHYSIOLOGICAL WAVEFORMS AND FOR DEFIBRILLATION

Robert A. McEachern, Wellesly, and George A. Cavigelli, Lexington, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Oct. 4, 1976, Ser. No. 729,442
Int. Cl.[2] A61B 5/04
U.S. Cl. 128—2.06 G **19 Claims**



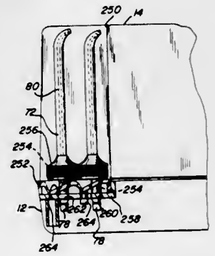
1. In a system for displaying a physiological waveform, means for generating an electrical signal representative of a particular physiological waveform; means for generating an electrical signal indicative of the occurrence of a preselected event in timed relation to said physiological waveform signal; a cathode ray tube; and display control means responsive to said physiological waveform signal and to said event signal for controlling the display by said cathode ray tube, said display control means including means for providing time-successive samples of said physiological waveform signal, a recirculating memory for the storage of a successive plurality of waveform samples, means for entering data representative of said event signal in said memory in the same said time relation with said waveform samples as said event bears to said physiological waveform signal, means responsive to said successive waveform samples in memory for controlling the deflection of the beam of said cathode ray tube in at least one coordinate direction to provide a trace representative of said waveform and means responsive to said stored event date for variably controlling the intensity of the beam of said cathode ray tube as a primary modulation of the waveform trace to provide a visibly distinguishable event marker and for secondarily modulating said primary modulation of said waveform trace to further enhance display of the event marker.

4,094,311

DENTAL SYRINGE

Raymond A. Hudson, Ft. Collins, Colo., assignor to Teledyne Industries, Inc., Ft. Collins, Colo.

Filed Apr. 21, 1977, Ser. No. 789,453
Int. Cl.[2] A61H 9/00
U.S. Cl. 128—66 **7 Claims**



1. In a hygienic appliance having means for delivering liquid under pressure through a hose to a detachable elongated nozzle and including a base assembly together with a removable cover therefor, the improvement comprising:

a shelf assembly supported on said base assembly for slidable movement between a first position concealed within said cover when the latter is in place and a second position projecting outwardly from said base assembly when said cover is removed;

means defining an opening in said shelf assembly receptive of one end of said nozzle to hold the latter in an upright position;

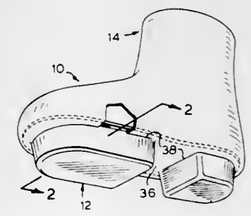
and means included within said shelf assembly for effecting an outward tilt of the upper end of said nozzle away from said base assembly when said shelf assembly is moved to said second position.

4,094,312

WALKING BOOT FOR SURGICAL LEG CAST

Francis Whyte, 2 Cascade Dr., Halifax, Nova Scotia, Canada

Filed Dec. 13, 1976, Ser. No. 749,916
Int. Cl.[2] A61F 5/04
U.S. Cl. 128—83.5 **11 Claims**



1. A boot, for use with a surgical plaster of Paris leg cast, comprising:

a shoe formed of a sheet member of substantially rigid, weight supporting material having an outline substantially similar to the profile of the underside of a foot, a pair of wells of similar depth formed in the sheet member, one well being located in the forward portion of the sheet member and of an area substantially covering the weight bearing area of the sole portion of the foot, the other well being located in the rearward portion of the sheet member and of an area substantially covering the weight bearing area of the heel portion of the foot, the edge portion of the sheet material forming a peripheral flange; and

a flexible upper constructed and arranged to receive therein the foot portion of the cast, the lower periphery of the upper being inturned to form a bottom having apertures therein to receive the wells of the shoe whereby the wells project downwardly through the apertures.

4,094,313

INTRA-UTERINE DEVICE AND TOOL FOR INSERTION OF SAME

Takeo Komamura, 4-9-11 Nishigahara, Kitaku, Tokyo; Tadao Okamoto, 1-12-8 Kohinata, Bunkyoku, and Atsumi Ishihama, 3-6-30 Kagano, Morioka, all of Japan

Filed Oct. 29, 1976, Ser. No. 737,017
Claims priority, application Japan, Jun. 13, 1975, 50-79399[U]; Jul. 16, 1975, 50-5097816[U]
Int. Cl.[2] A61F 5/46
U.S. Cl. 128—130 **13 Claims**

1. An intrauterine device comprising a stem, a plurality of arms integrally formed with said stem and projecting from opposite sides thereof, the stem-remote ends of said arms being free, there being a line of integration of each of said arms with said stem about which the respective arms are flexible, said arms being biased for normally presenting the longitudinal axes thereof at an angle of less than 90° to the longitudinal axis of said stem and within the plane of said stem, the line of integration of each arm forming an angle of less than 90° with the longitudinal axis of said stem whereby upon flexure the outer portions of said arms will depart from the plane of said stem.

4,094,314

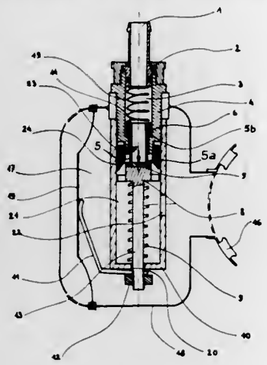
PRESSURE REGULATOR FOR BREATHING APPARATUS

Jacques Le Cornec, Saint Esteve, France, assignor to Gilles Atlan, Marseilles, France

Filed Jun. 10, 1976, Ser. No. 694,819
Claims priority, application France, Jun. 30, 1975, 75 20858
Int. Cl.[2] A62B 7/00
U.S. Cl. 128—142.2 **6 Claims**

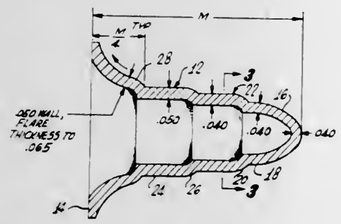
1. A pressure regulator for a breathing apparatus comprising: a hollow casing, a semi-rigid, deformable membrane mounted in said casing and separating the casing into first and second compartments; said casing having openings formed therein providing communication between said first compartment and the exterior of the casing; and a mouthpiece and a low pressure air inlet conduit connected to said second compartment; a regulating valve located in said second compartment for controlling the delivery of air from said inlet conduit to said second compartment, said valve including a valve seat; a valve head, a sealing pellet mounted in said valve head, a control rod having a first end secured to said valve head and a second free end, opposite said first end, and return spring means for maintaining said pellet sealingly applied against said valve seat; a lever located in said second compartment having

one end operatively connected to the free end of said control rod and an opposite end operatively connected to said semi-rigid membrane for automatically displacing said control rod and said valve head away from said valve seat when the pressure in said first compartment is greater than the pressure in said second compartment, said regulating valve including a cylindrical chamber mounted in said second compartment in communication with said inlet conduit, said valve head and control rod slidably mounted in said cylindrical chamber, a nozzle slidably mounted in said cylindrical chamber for sliding movement coaxial with said valve head, said nozzle having axially opposed front and rear ends with said front end facing said valve head and defining said valve seat and said rear end



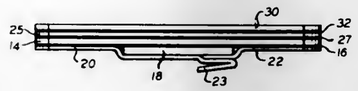
including a hollow piston having two opposite front and rear faces located within said cylindrical chamber; said cylindrical chamber having two opposite ends including a rear end connected to said inlet conduit for low pressure air and a front end forming an abutment for the front face of the piston, whereby when said inlet conduit is supplied with compressed air the rear face of said piston is subjected to the pressure of the air in said chamber and the piston is maintained in a fixed position with its front face in abutment against the front end of said cylindrical chamber by said pressure, and when the inlet conduit is not connected to compressed air the rear face of the piston is no longer subjected to pressure and the piston retracts inside said chamber and draws back the nozzle and valve seat.

4,094,315
EAR PLUG
Charles Leight, 118 S. Orlando Ave., Los Angeles, Calif. 90048
Filed Oct. 29, 1976, Ser. No. 736,885
Int. Cl.[2] A61F *11/02*
U.S. Cl. 128—152 **1 Claim**



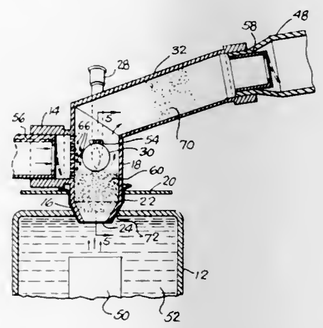
1. An ear plug for insertion into an ear canal which includes:
a plurality of hollow cylindrical members of progressively larger diameters sizes, the smallest of said cylinders being closed at its free end, and each cylinder being connected to the next larger cylinder by a transition member;
the wall thickness of said cylindrical members being varied from the thinnest in said smallest cylinder to the thickest in said largest cylinder; and
a hollow conical member open at both ends with its smaller end connected to the largest of said cylindrical members by a transition member, said conical member having a thickness greater than any of said cylindrical members and a mechanical strength sufficient to enable it to be grasped to remove said ear plug from the ear whereby, the wall thickness of said cylindrical members is such as to prevent the collapse of said cylindrical members while permitting said cylindrical members to conform to the shape of an ear canal and said transition members act to stiffen said cylindrical members.

4,094,316
ADHESIVE BANDAGE WITH REUSABLE APPLIQUE
Eric Nathanson, 2618 Batchelder St., Brooklyn, N.Y. 11235
Filed Aug. 26, 1976, Ser. No. 717,600
Int. Cl.[2] A61L *15/00;* **A41H** *27/00;* **B32B** *35/00*
U.S. Cl. 128—156 **7 Claims**



1. A combined adhesive bandage and applique comprising:
an adhesive tape having an adhesive coating on at least one face thereof;
a bandage pad smaller in area than said tape secured by the adhesive coating to a central portion of said tape;
a decorative applique clothing patch strip dimensioned of an area substantially congruent to that of said adhesive tape, and formed with a continuous web of material having a pressure sensitive reusable adhesive layer along one entire surface of said web releasably secured with respect to said tape on the side thereof opposed to the side of the tape to which said bandage is secured.

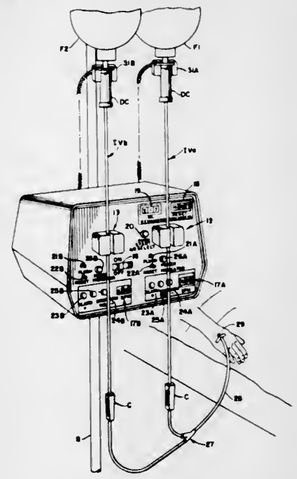
4,094,317
NEBULIZATION SYSTEM
Richard D. Wasnich, 2408 Halekoa Dr., Honolulu, HI. 96821
Filed Jun. 11, 1976, Ser. No. 694,957
Int. Cl.[2] A61M *11/00*
U.S. Cl. 128—194 **16 Claims**



1. A nebulization system adapted to provide a nebulized aerosol for inhalation therapy of a patient to be treated, which comprises:
an interaction chamber having a reservoir means positioned near the bottom thereof for containing a small amount of liquid to be nebulized;
ultrasonic nebulizer means disposed below said reservoir means and said interaction chamber for nebulizing said small amount of liquid into an aerosol to be received by said interaction chamber;

means positioned within said interaction chamber above said nebulizer means for initially maintaining the position of said aerosol therebelow for increasing the concentration thereof and for causing the larger particles of said aerosol to be impacted thereon and thereby be recovered by renebulization;
outlet conduit means in communication with said interaction chamber for receiving said aerosol and including means for delivering same to the patient upon commencement of inspiration by said patient; and
air inlet conduit means in communication with said interaction chamber including means for providing air flow behind said aerosol after commencement of inspiration by said patient.

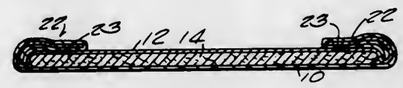
4,094,318
ELECTRONIC CONTROL MEANS FOR A PLURALITY OF INTRAVENOUS INFUSION SETS
George K. Burke; Robert J. LeFevre, both of Bethlehem, and Robert E. Thomas, Wind Gap, all of Pa., assignors to Burron Medical Products, Inc., Bethlehem, Pa.
Filed Jul. 9, 1976, Ser. No. 703,907
Int. Cl.[2] A61M *31/31*
U.S. Cl. 128—214 E **23 Claims**



23. A multiple intravenous infusion means for independently and consecutively controlling flow of separate intravenous fluids through a plurality of intravenous infusion sets, including: a plurality of intravenous infusion sets; valve means associated with each set; valve operating means for opening and closing each valve means at a preselected rate; selector means for enabling one valve operating means and disabling the other; and alarm means associated with at least one of said valve operating means for detecting deviations between the actual rate of delivery of fluid and the selected rate and operative in response to a deviation to operate said selector means to disable the valve operating means associated with the alarm condition and to enable the alternate valve operating means, whereby in the event of an alarm condition occurring in one of the sets, intravenous fluid automatically continues to be supplied through another set.

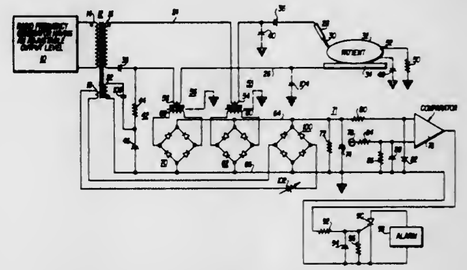
4,094,319
SANITARY PAD WITH MULTIPLE END FOLDS
Curt G. Joa, Box 1121, Boynton Beach, Fla. 33435
Filed Nov. 1, 1976, Ser. No. 737,750
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—284 **5 Claims**

1. In a disposable sanitary pad which includes a top sheet, a back sheet, and an absorbent pad sandwiched therebetween, the absorbent pad being shorter and narrower than the back sheet, the improvement comprising plural folds in the opposing end margins of said back sheet and including corresponding first folds in which the end margins of the back sheet are doubled back over themselves to form waistbands extending



beyond the ends of the absorbent pad and corresponding second folds in which the waistbands thus formed are folded back over the end margins of the absorbent pads, thus to reduce the length of the folded sanitary pad to the approximate length of said absorbent pad.

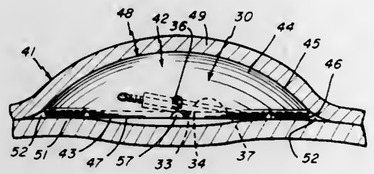
4,094,320
ELECTROSURGICAL SAFETY CIRCUIT AND METHOD OF USING SAME
David W. Newton, and Frank A. Alford, both of Boulder, Colo., assignors to Valleylab, Inc., Boulder, Colo.
Filed Sep. 9, 1976, Ser. No. 721,821
Int. Cl.[2] A61B *17/36;* **A61N** *3/00*
U.S. Cl. 128—303.14 **15 Claims**



1. An electrosurgical generator comprising
a radio frequency generator;
an electrosurgical instrument having an active electrode suitable for application to a patient;
an active lead connected between said generator and said active electrode for conducting current from said generator to said active electrode;
a patient electrode adapted for connection to said patient to provide a low impedance path for current from said active electrode;
a patient lead connected between said generator and said patient electrode for conducting current from said patient electrode back to said generator; and
a safety circuit means for detecting only an excess of active lead current with respect to patient lead current to thereby indicate a discontinuity in a patient circuit including said patient electrode and said patient lead;
the level of the output signal from said radio frequency generator being adjustable and said safety circuit means detecting an excess of current in the active lead with respect to current in the return lead and including threshold means for indicating an alarm condition when the active lead current exceeds the patient lead current by a threshold level established by said threshold means, said threshold means including compensating means for dynamically varying said threshold level, said compensating means being responsive to adjustments in the output signal level of said generator to make said safety circuit means responsive to expected differences of said active and patient lead currents under normal conditions to thereby both provide a sensitive threshold in a variety of condi-

tions and to offset the tendency of said signal adjustments to prematurely generate said alarm condition when there is no danger to said patient.

4,094,321
SHALLOW, DOME-SHAPED PACER WITH BOTTOM STORAGE MEANS FOR CATHETER
Rudolph Muto, 24 Williams St., Andover, Mass. 01810
Filed Feb. 7, 1977, Ser. No. 765,888
Int. Cl.[2] A61N *1/02*
U.S. Cl. 128—419 P **11 Claims**

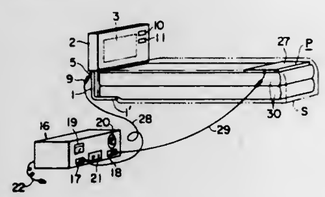


1. A heart pacer of the type having a casing with a power supply and pulsation control circuitry therewithin and having a catheter connector socket with a clamp screw operable therein for removably receiving a catheter prong, said pacer characterized by:

a hollow casing of shallow dome configuration, enclosing said power supply and pulsation control circuitry, said casing having a substantially flat, planar, bottom wall and a shallow domed, top wall, said top, domed wall having tapered edges, merging a juxtaposition with the periphery of said flat bottom wall, in an arcuate cross-section of small radius of curvature;

and catheter storage means in the exterior surface of said bottom wall of said casing, for releasably receiving an extra length of said catheter when said pacer is implanted in a human body.

4,094,322
THERAPEUTICAL APPARATUS USING ELECTRIC FIELD
Katsumasa Hara, Tokyo, Japan, assignor to Hakuju Institute for Health Science Co., Ltd., Tokyo, Japan
Filed Jun. 18, 1976, Ser. No. 697,365
Int. Cl.[2] A61N *1/40*
U.S. Cl. 128—419 N **4 Claims**

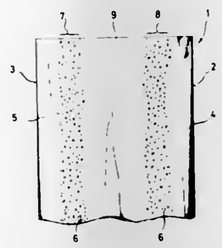


1. A therapeutical apparatus using electric field comprising a main electrode arranged at the head end of a support surface on which a patient lies, a further electrode arranged at the foot end of said support surface, insulated conductors, connected to the respective electrodes, for enabling a voltage having an AC component to be applied to the electrodes, a monitoring means for enabling monitoring of the continuity of an electrical circuit formed by said main electrode and the said conductors connected thereto when a voltage is applied to said main electrode, said monitoring means being disposed adjacent to the main electrode and being connected in a circuit which includes said electrodes and which is completed through the body of the patient when the patient contacts the further electrode and said monitoring means, said monitoring means comprising a conductive plate and an insulating plate connected to the face of the conductive plate and adapted to be contacted by the patient, and a detecting means, operative respective to the monitoring means being touched by the patient, arranged between the conductive plate and the main electrode, said detecting means comprising an indicator device which is energized when a said voltage is being applied to said main electrode and which is not energized when a voltage is not being applied to said main electrode to thereby enable faults to be detected in the said circuit formed by the main electrode and the conductors.

4,094,323
SMOKING ARTICLE AND METHOD
Thomas Cecil Frazier, Hopewell; John Thomas Ashworth, Richmond; Richard Douglas Chumney, Jr., Mechanicsville, all of Va., and René Wilhelm Meyre, Reidsville, N.C., assignors to American Brands, Inc., New York, N.Y.
Filed Feb. 9, 1976, Ser. No. 656,264
Int. Cl.[2] A24B *3/18*; A24D *1/06*
U.S. Cl. 131—8 R **10 Claims**

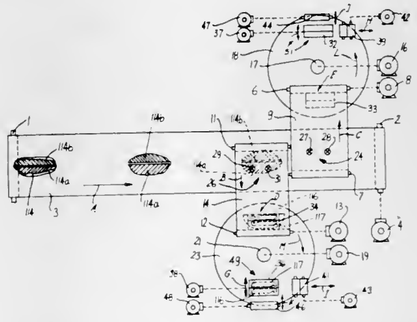
1. The method of making expanded and fiberized tobacco stem and stalk materials having increased filling capacity and suitable for use as filler in smoking articles comprising conditioning said stem and stalk materials by adjusting the moisture content to a level of at least about 10 to about 50% by weight while maintained at a temperature of about 115° to 170° C. and a pressure of about 10 to 100 psig for a period of from 0.1 to 5 minutes and mechanically fiberizing the thus treated materials while it is under a pressure of about 10 to 100 psig between fiberizing surfaces maintained from about 0.05 to 0.3 inch apart such that the materials are fiberized and expanded when exposed to ambient conditions.

4,094,324
PERFORATED CIGARETTE TIPPING PAPER
Otto Bolsinger, and Ingolf Seckelmann, both of Herne, Germany, assignors to Deutsche Benkert GmbH & Co., K.G., Herne, Germany
Filed Apr. 14, 1976, Ser. No. 676,984
Claims priority, application Germany, Jul. 12, 1975, 2531285
Int. Cl.[2] A24D *1/02*
U.S. Cl. 131—10 A **4 Claims**



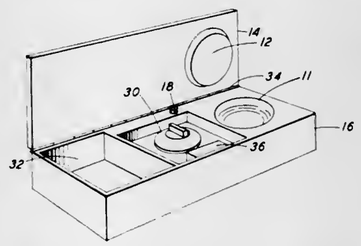
1. In a cigarette having at one end, an air permeable filter having a defined porosity along the exterior thereof, a cigarette tipping paper receivable on the exterior of the filter to form a filter tip having a porosity approaching that of the filter alone, said tipping paper having a width in excess of the length of the filter and a length which is at least as great as the circumference of the filter, said paper having at least one perforated zone which is arranged in the longitudinal direction of the paper and having a width corresponding to a fraction of the width of the paper, said zone being bordered by first and second unperforated edge strips which receive the tobacco containing portion of the cigarette and the lips of the user, respectively, said perforated zone containing a plurality of minute perforations normally invisible to the naked eye and formed by high tension spark erosion, said perforations being irregular in shape, size and location within said zone and present in a sufficient number to provide a porosity to the zone for establishing the porosity of the filter tip inclusive of the tipping paper at that approaching the porosity of the filter alone.

4,094,325
METHOD AND APPARATUS FOR MAKING WRAPPERS FOR CIGAR BUNCHES
Helmut Stoffers, Geesthacht, and Rudolf George, Hamburg, both of Germany, assignors to Hauni-Werke Korber & Co. KG, Hamburg, Germany
Filed Aug. 19, 1976, Ser. No. 715,693
Claims priority, application Germany, Sep. 2, 1975, 2538964
Int. Cl.[2] A24C *1/00, 1/04*
U.S. Cl. 131—21 R **27 Claims**



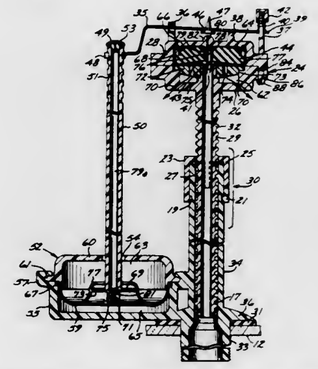
1. A method of making wrappers for cigar bunches or the like, comprising the steps of monitoring the outlines of tobacco leaves, including comparing the outlines of leaves with the outline of a satisfactory wrapper and producing signals when said comparing step indicates that a monitored leaf is capable of yielding at least one satisfactory wrapper; and utilizing said signals for the cutting of wrappers from the respective leaves.

4,094,326
FIRE PROOF CIGARETTE BOX
Robert Newman, 1891 Oakland Ave., Wantagh, N.Y. 11793
Filed Sep. 8, 1976, Ser. No. 721,206
Int. Cl.[2] A24F *19/10*
U.S. Cl. 131—234 **3 Claims**



1. An ashtray comprising: a housing; a removable cover fitted thereto for closing the ashtray and thereby snuffing out lit combustible material in the ashtray; audible alarm means having a wind-up spring type alarm including a timing mechanism, a bell and a hammer for striking the same; and alarm interrupter means within said housing including a spring urged plunger, a pivoted link, and a damper cushion, said spring urged plunger cooperating with said cover on one end thereof, the other end of said plunger contacting one end of said pivoted link, the other end of said pivoted link having said damper cushion secured thereto, the closing of said cover urging said plunger which then pushes said one end of the pivoted link causing said damper cushion to diminish the audible signal of said bell.

4,094,327
FLUID CONTROL DEVICE
Anthony R. Brandelli, 2418 W. 256th St., Lomita, Calif. 90717
Filed Feb. 7, 1977, Ser. No. 766,356
Int. Cl. F16k *21/18*
U.S. Cl. 137—403 **29 Claims**



1. A liquid level responsive valve for mounting in a tank having bottom wall inlet and outlet ports which comprises:

a valve housing having a cover member received on a bottom plate member defines an interior chamber, the latter having an inlet port, valve seat means thereabout, and outlet port means for discharging into said tank;

a vertical, liquid conduit with a first end in open communication with said tank inlet port and supporting said valve housing at an elevated position, about the full liquid level, in said tank;

a valve closure member contained within said valve housing and moveable between open and closed registration with said valve seat means;

valve member actuator means extending from the chamber of said valve housing exteriorly thereof;

a flexible valve actuator arm with one end secured for pivotal movement to the exterior of said housing and interconnected with said valve closure member to move said member between said open and closed positions upon pivotal movement of said actuator arm;

an actuator housing formed of a cover plate member received on a cup member for mounting on the fllor of said tank;

a flexible diaphragm peripherally sealed to the inner walls of said actuator housing and extending thereacross to subdivide said housing into superior and subjacent chambers;

a central aperture in said cover plate member of said housing;

a vertical vent conduit extending through said central aperture and vertically coextensive with said liquid inlet conduit, centrally carried on said flexible diaphragm in open communication with said subjacent chamber;

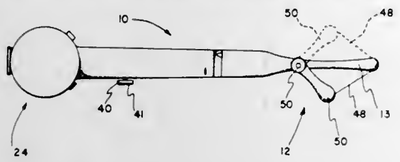
liquid vent means opening said superior chamber to said tank; and

attachment means securing the free end of said actuator lever arm to the upper end of said vertical vent conduit.

4,094,328
DENTAL FLOSS MANIPULATING INSTRUMENT
Gerald E. Ray, Rte. 1, Wake Forest, N.C. 27587
Filed Jul. 8, 1976, Ser. No. 703,638
Int. Cl.[2] A61C *15/00*
U.S. Cl. 132—91 **1 Claim**

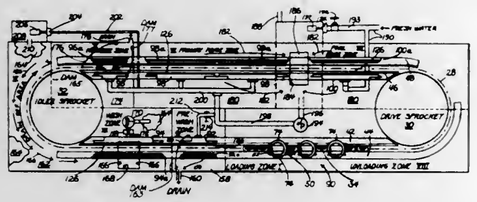
1. A dental floss manipulating instrument comprising: an

elongated handle means; a fork means at one end of said handle and including a central prong having a base portion adjacent said handle disposed in general longitudinal alignment with such handle; an elongated side prong pivotably connected at one end to the base portion of said central prong and being releasably pivotable from one side of said central prong to the



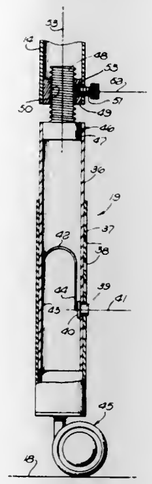
other with an extreme limit of travel of approximately 90°, 45° on either side of said central prong; and means for tensioningly attaching a strand of dental floss between said central prong and said side prong whereby said instrument can be readily manipulated to dispose the floss between the teeth of the user of the same regardless of which side of the mouth is being flossed.

4,094,329
APPARATUS FOR WASHING AND SANITIZING CONTAINERS
Grover C. Evans, P.O. Box 1124, Little Rock, Ark. 72203
Filed May 27, 1977, Ser. No. 801,165
Int. Cl.² B08B 3/02
U.S. Cl. 134—56 R **8 Claims**



1. Apparatus for washing and sanitizing containers comprising:
- a housing having a plurality of treatment zones comprising: wash, pre-rinse, primary rinse, and final rinse zones disposed successively along a predetermined path between loading and unloading zones;
- a conveyor orbitally movable along said path, said conveyor comprising a plurality of container supports each adapted to hold a container in upside down condition for movement successively through said treatment zones;
- spray means in each of said treatment zones positioned to spray inside and outside walls of a container on said conveyor;
- liquid conduit means connecting the spray means in the final rinse zone to a source of fresh water under pressure;
- means for collecting and combining liquid sprayed in both said primary rinse zone and said final rinse zone and directing such combined liquid to a common reservoir;
- first pump and conduit means for using rinse water at least a second time by directing it from said common reservoir to the spray means in said pre-rinse and primary rinse zones; and
- second pump and conduit means for recycling sanitizing solution between a sanitizing solution reservoir and the spray means in the wash zone.

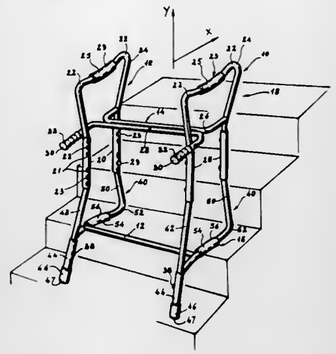
4,094,330
WALKER
Slosson B. Jong, 20722 Hunter La., Huntington Beach, Calif. 92646
Filed Jan. 14, 1977, Ser. No. 759,458
Int. Cl.² F16M 13/08
U.S. Cl. 135—67 **6 Claims**



1. A walker comprising:
- a frame structure having handle portions to be gripped by the two hands of a user, and having a plurality of downwardly projecting support legs;
- individual ones of said legs including a lower removable extension assembly having a lower part and an upper part in the form of a tube telescopically interfitting with said lower part for longitudinal essentially vertical adjustment of the lower part relative to the upper part, a detent element carried by one of said parts and releasably receivable within any of a plurality of detent openings in the other part to releasably retain the parts in differently adjusted positions providing a coarse length adjustment for the individual legs, and a screw having a lower portion secured within an upper portion of said second part in fixed relation thereto and having a threaded shank projecting upwardly beyond said second part;
- said individual legs also including a third part above said removable extension assembly, and a nut received within a lower portion of said third part in fixed relation thereto and threadedly and adjustably engaged with said shank of said screw for relative rotary adjusting movement about a generally vertical axis and providing a threaded adjustment between said second and third parts longitudinally of the individual leg lengths finer than and between the coarse settings of the detent elements.

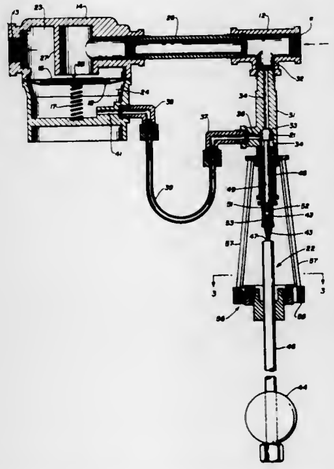
4,094,331
DUAL PURPOSE WALKING FRAME FOR HANDICAPPED PERSONS
Peter Rozsa, Mazal Dagim 11, Old Jaffa, Jaffa, Israel
Filed Feb. 16, 1977, Ser. No. 769,151
Int. Cl.² F16M 13/08; A61H 3/00
U.S. Cl. 135—67 **8 Claims**

1. A dual purpose invalid walking frame for use on walking surfaces and on stairs comprising:
- first support means defining at least three support points lying in two vertically separated planes and arranged to engage two stair surfaces;
- second support means defining at least three support points lying in a plane and arranged to engage a walking surface, said first and second support means being fixedly joined together in a rigid configuration to define generally opposite ends of a frame;
- first handle means disposed on said frame at a location suitable for supporting the hands of a person descending stairs when said frame is positioned in a first orientation wherein said first support means are oriented downwardly and in stair engagement;



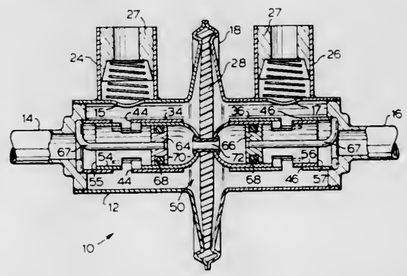
- second handle means arranged on said frame and disposed at a location suitable for supporting the hands of a person when said frame is positioned in a second orientation wherein said second support means are disposed downwardly and in engagement with a walking surface; and
- third handle means disposed on said frame at a location suitable for supporting the hands of a person ascending stairs when said first support means are oriented downwardly and in stair engagement.

4,094,332
EARTHQUAKE-RESPONSIVE FUEL SHUT-OFF DEVICE
Joseph F. Poff, and Jerry W. Poff, both of 89 Bishop Rd., Crockett, Calif. 94525
Filed Oct. 12, 1976, Ser. No. 731,362
Int. Cl.² F16K 17/36
U.S. Cl. 137—46 **6 Claims**



1. An earthquake-responsive fuel shut-off device adapted for insertion in a fuel line connected to a fuel source under pressure comprising:
- a main valve and a fluid-pressure-responsive actuator therefor for maintaining said valve in fluid flow open position in response to a fuel-line-imposed pressure differential and including means biasing said valve to flow shut-off position in the absence of said differential;
- means providing a fluid-line-connected passage to said actuator for placing said line pressure in opposition to and equalizing said pressure differential to effect closing of said valve by said biasing means;
- a second valve in said passage movable between open and closed positions therein;
- a spring urging said valve to open position;
- a member having a position engaged with and supporting said valve in closed position against the urge of said spring; and
- an earth-movement-responsive actuator connected to and displacing said member from its said position in response to a predetermined minimum severity earthquake, thus permitting opening of said valve.

4,094,333
REGULATING VALVE SYSTEM
Sigurdur G. Petursson, 2169 Linby Street, Mississauga, Ontario, Canada (L4Y 1V6)
Filed Apr. 14, 1976, Ser. No. 676,980
Int. Cl.² G05D 11/02
U.S. Cl. 137—100 **7 Claims**

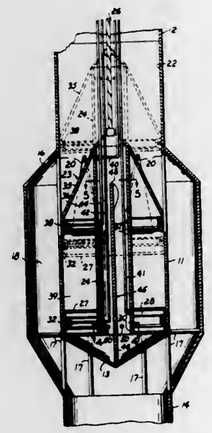


6. A pressure equalising valve having a pair of inlet chambers, each having an inlet to receive in operation a respective pressurized fluid supply in connected relation therewith, a pair of outlet chambers, and valve means interposed in flow regulating relation between each said inlet chamber and the respective outlet chamber for maintaining in predetermined relation the output pressure of two fluids supplied thereto, said valve means having a balancing valve mechanism comprising a slide valve means mounted in each said inlet chamber and supported in axially positioned pressure controlling relation by a diaphragm arranged in chamber dividing relation with said pair of outlet chambers, and substantially immoveable piston means within each said slide valve means blocking a cross section portion of each said slide valve means from exposure to the respective fluid inlet pressure, to provide a predetermined area of said valve means in pressure responsive axially unbalanced relation within the respective said inlet in direct axially facing relation with the respective said inlet chamber to assist in positioning said valve members in flow regulating relation.

4,094,334
OCEAN THERMAL ENERGY CONVERSION VALVE
Julian S. Taylor, 8300 SW. 8, Oklahoma City, Okla. 73108
Filed Jun. 23, 1977, Ser. No. 809,345
Int. Cl.² F16K 31/46
U.S. Cl. 137—219 **6 Claims**

1. A tubular gate valve interposed between upper and lower sections of casing, said upper casing having a depending end, comprising:
- a tube having a closed depending end and having an upper end at least diametrically equal with and coaxially connected with the depending end of said upper casing,

said tube having a plurality of ports in its wall spaced above its closed end;
tubular means connecting said tube with said lower casing for fluid communication therebetween through the tube ports;
sleeve valve means including a sleeve within said tube and upper and lower hollow ring members surrounding and secured to said sleeve in vertically spaced relation for forming upper and lower floatation chambers each having

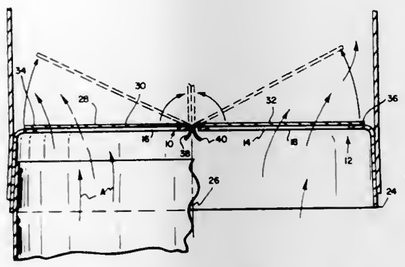


a drain port and being slidably received by the inner wall surface of said tube, the spacing between said ring means being at least slightly greater than the vertical extent of the tube ports, for opening and closing the ports;
sealing means carried by said upper and lower ring members for sealing fluid tight with the inner wall surface of said tube; and,
control means extending through said upper casing for moving said sleeve means.

4,094,335
BEER TAP ROD RETAINER
William C. Haensch, 2163 Arapahoe St., Denver, Colo. 80205
Filed Oct. 18, 1976, Ser. No. 733,161
Int. Cl. F16k *43/00*
U.S. Cl. 137—317 **8 Claims**

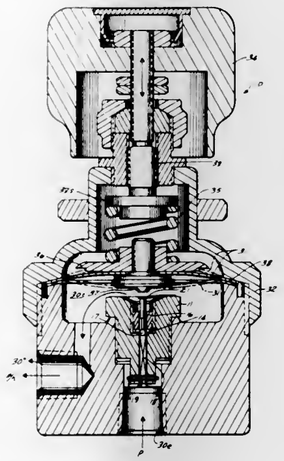
1. A beer tap rod and tap retainer bracket for mounting on a hollow tap rod having a tubular tap affixed to the upper end thereof and wherein said tap rod is insertable through a corked tapping hole therein, said bracket including a lower clamping ring for receiving the tap rod, said ring being clamped to said keg tapping hole, substantially flat and centrally apertured plate means spaced above said clamping ring for receiving said tap rod, and spaced arm means pivoted to and interconnecting said ring and plate means for relative pivotal movement therebetween whereby said tap is arranged therebetween and said tap extends through both said ring and plate means and is secured to the keg and prevented from being dislodged therefrom, and said arms and plate means are pivotal to permit of the installation of said tap through the clamping ring thereof.

4,094,336
BACK DRAFT FOR EXHAUST FANS AND HOODS
John N. Urschel, 3102 N. 46th Pl., Phoenix, Ariz. 85034; Robert P. Urschel, 727 Solano Dr., Tempe, Ariz. 85281, and Fred P. Urschel, 5302 N. Woodmere Fwy., Scottsdale, Ariz. 85253
Filed Apr. 19, 1977, Ser. No. 788,807
Int. Cl.² F16K *15/03*
U.S. Cl. 137—512.1 **12 Claims**



1. A back draft damper for exhaust fans and hoods comprising: a generally stationary valve plate having a pair of openings therein; said plate having a bar portion extending across said plate between said openings; said bar portion having an elongate slot therein; said slot having opposite sides; a pair of flapper valve plates having curved edge portions disposed in said slot; said flapper valve plates having overlapping portions while overlap the extremeties of respective ones of said openings; said flapper valve plates, at said curved edge portions, being freely pivotally moveable in said slot.

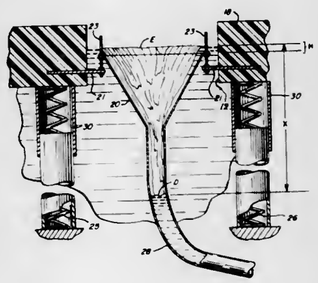
4,094,337
PRESSURE REGULATOR VALVE
Alfred D. Robinson, El Monte, Calif., assignor to Delphi Instruments, Inc., South El Monte, Calif.
Continuation-in-part of Ser. No. 516,024, Oct. 18, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,668
Int. Cl.² F16K *31/12*
U.S. Cl. 137—505.42 **4 Claims**



1. A water pressure regulator comprising
a body having a water inlet passageway, a water outlet chamber communicating with the inlet passageway and a water outlet passageway for conveying the water entering the inlet passageway out of the outlet chamber through the water outlet passageway,

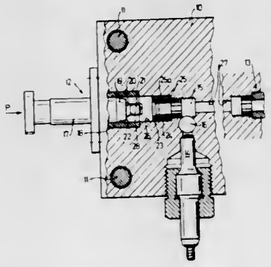
water valve control means secured in the water inlet passageway for controlling the volume of water flow into the outlet chamber,
manually controllable means secured to the body for controlling the water valve control means to thereby control the quantity of water flow into the outlet chamber for controlling the output pressure of the water exiting from the outlet chamber, the manual means being adjusted for normally maintaining a preselected maximum pressure of water flow out the outlet chamber,
said water valve control means including a valve body having a stepped bore extending therethrough,
a sapphire ring mounted in the larger bore of the valve body,
means secured to the stepped bore for securing said ring against the inner wall of the bore, said means having a longitudinal passageway coaxial with the stepped bore for passing water therethrough,
a sapphire ball mounted on the opposite side of the inner wall of the bore and engaging the ring for coaction therewith,
means mounted in the bore for resiliently urging the sapphire ball against the sapphire ring, and
means mounted in the bore and extending through said longitudinal passageway of the securing means for urging the ball away from the ring, said means for urging the ball away from the ring includes an element that engages the ball that is constructed of sapphire,
the water to be sampled flows into the water pressure regulator through the valve body from the ball side of the bore, past the ball and through said longitudinal passageway and the bore into the outlet chamber and out through the outlet passageway,
said manual adjustable means including diaphragm means positioned in the water outlet chamber for responding to the pressure build-up in the outlet chamber and the changes in pressure for automatically responding thereto for varying the initial adjustment thereof for causing said water valve control means to respond to the changes in the adjustment of the diaphragm means to cause the water valve control means to automatically adjust for maintaining the water pressure downstream of the water pressure regulator essentially constant.

4,094,338
CONSTANT RATE FLOAT INTAKE
William J. Bauer, 422 S. Park Rd., LaGrange, Ill. 60525
Filed May 20, 1977, Ser. No. 798,988
Int. Cl.² G01F *11/00*; E03B *11/00*
U.S. Cl. 137—578 **7 Claims**



1. Liquid flow control apparatus for use in a reservoir of liquid of fluctuating level comprising a buoyant float member, an intake weir element carried by said float member, a conduit having one end thereof communicating with said weir element and extending downward therefrom to conduct flow by gravity of liquid from the weir, said conduit being yieldable to accommodate movement of said weir and float member, and counterbalancing springs which counterbalance the change in buoyancy as the buoyant float member and connected conduit rise and fall with the variable elevation of the liquid in which disposed.

4,094,339
HIGH TEMPERATURE COMBUSTION SHOCK DEBURRING SYSTEM
Ernst Leisner, Gerlingen; Wolfgang Ulbricht, Tamm, and Helmut Kaufmann, Bischberg, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Division of Ser. No. 579,118, May 19, 1975, Pat. No. 4,015,815. This application Dec. 6, 1976, Ser. No. 747,490
Claims priority, application Germany, May 17, 1974, 2424148
Int. Cl.² F16K *19/00*
U.S. Cl. 137—604 **6 Claims**



1. High-temperature combustion shock deburring system comprising
two deburring valve units (12, 13) having gas duct inlets and outlets,
means defining a mixing chamber (15) having gas duct inlets;
first gas conducting means (32) conducting oxygen to the gas duct inlet of one of the valve units (12);
second gas conducting means (28, 32) separate from said first means and conducting a combustion gas to the gas duct inlet of the other of the valve units (13);
and separate connecting lines (27) connecting the gas duct outlets of each of said deburring valve units (12, 13) to the gas duct inlets of said mixing chamber (15),
said deburring valve units, during deburring operation being closed and while in closed condition, being subjected to thermal and pressure shock,
at least one of said connecting lines (27)
being characterized in that
said one line (27) has a length of such extent that the line encloses therein a volume of the respective gas when placed under pressure due to an explosion in the chamber (15), so that the gas will compress and extend in the respective connecting line (27) for a distance from the respective valve unit (13) sufficient to thermally isolate the respective valve unit from the chamber and provide a compressible thermally isolating shock cushion for the respective valve unit and thus protect the respective valve unit against thermal damage and shock.

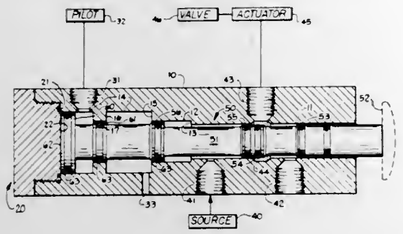
4,094,340
RELAY LOCK-OUT
Ned A. Bergeron, Houma, La., assignor to B.W.B. Controls, Inc., Houma, La.
Filed Dec. 13, 1976, Ser. No. 749,745
Int. Cl.² F16K *17/00*
U.S. Cl. 137—625.66 **3 Claims**

1. A device for controlling a first fluid signal from an actuator fluid supply to an actuator as a function of a further fluid signal received from a further fluid supply, comprising:
an axially bored housing;
said housing including further fluid signal inlet means communicating with said further fluid supply, first fluid signal

outlet means communicating with said actuator, and first fluid signal inlet means;

slide valve member movable within said housing bore from a first position allowing communication between said actuator fluid supply and said actuator, to a second position blocking communication between said actuator fluid supply and said actuator; and

means preventing a fluid signal through said further fluid



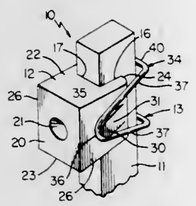
signal inlet means from causing said slide valve member to move from said second position to said first position, said preventing means including a) means for causing said fluid signal through said further fluid signal inlet to bias said slide valve member toward said second position whenever said slide valve member is in said second position, and b) means for causing said fluid signal from said actuator fluid supply to bias said slide valve member toward said second position at all times.

4,094,341

LOOM PICKER CONSTRUCTION

William T. Wagner, Dayton, Ohio, assignor to Dayco Corporation, Dayton, Ohio

Filed Jun. 22, 1977, Ser. No. 809,131
Int. Cl.[2] D03D *49/36*
U.S. Cl. 139—159 **18 Claims**



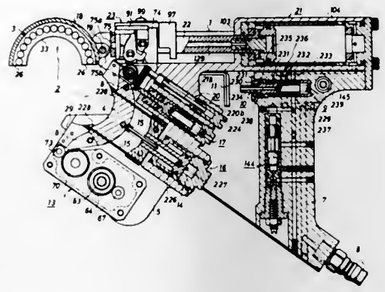
1. In a loom picker construction having a picker stick, a shuttle-engaging block, and means holding said block on said stick; the improvement in said holding means comprising, a pair of projections extending from opposite sides of said block, and a spring clamp engaging said projections and stick and yieldingly urging said block against said stick, said spring clamp comprising a pair of similar roughly V-shaped portions each defined by a bight and a pair of diverging legs and each being disposed with its bight and legs in a common plane, with a pair of planes associated with the V-shaped portions being disposed in spaced approximately parallel relation and with the V-shaped portions symmetrically arranged.

4,094,342

AUTOMATIC BINDER

Mitsuo Nishikawa; Hideo Hosaka, and Jun Maemori, all of Takasaki, Japan, assignors to Max Co., Ltd., Tokyo, Japan

Filed Feb. 22, 1977, Ser. No. 770,898
Claims priority, application Japan, Feb. 23, 1976, 51-17984; Mar. 6, 1976, 51-24438; Mar. 12, 1976, 51-26039; Mar. 12, 1976, 51-28596[U]; Mar. 13, 1976, 51-27266; Mar. 12, 1976, 51-26040; May 20, 1976, 51-58300; May 20, 1976, 51-63382[U]; Jun. 5, 1976, 51-65788; Oct. 28, 1976, 51-144078[U]; Nov. 4, 1976, 51-131637; Dec. 18, 1976, 51-152601; Feb. 21, 1976, 51-18328
Int. Cl.[2] B21F *9/02*
U.S. Cl. 140—93.2 **17 Claims**



1. An automatic binder for binding an object with a continuous flexible lacing material, comprising:

a main body;

guide means within said body for guiding said lacing material around the object to be bound, comprising mating guide elements, defining a central opening therewithin in a closed position of said mating guide elements, and being provided with lacing material lead-in and lead-out holes, said holes being connected with a continuous guide channel having the configuration of a knot;

feed-in primary tightening means for feeding said lacing material into said guide channel and rewinding said lacing material on said object to be bound to form a knot in a primary tightening operation;

lacing material gripping means actuated by a free end of said lacing material for gripping said free end of said lacing material during primary and secondary tightening operations, said means generating a first pilot signal for actuating said feed-in primary tightening means to effect said primary tightening operation and a second pilot signal for actuating a secondary tightening means to effect said secondary tightening operation; said secondary tightening means effecting said secondary tightening operation by moving said lacing material gripping means away from said lacing material lead-out hole;

cutting means for cutting a portion of said lacing material which has been used for binding said object from the excess portion of said lacing material after said secondary tightening operation; and

means for driving and controlling said guide means, said feed-in primary tightening means, lacing material gripping means, secondary tightening means, and cutting means in said closed position of said mating guide elements.

4,094,343

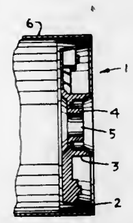
SLIDING COVER FOR DUPLICATING FLUID RECEPTACLES

Peter Koreska, Vienna, Austria, assignor to Kores Holding Zug AG, Zug, Switzerland

Filed Jan. 24, 1977, Ser. No. 761,678
Claims priority, application Austria, Feb. 4, 1976, 765/76
Int. Cl.[2] B65B *3/04*
U.S. Cl. 141—86 **3 Claims**

1. In a sliding cover, for use in connection with a duplicating fluid canister of a duplicating machine and including outlet means for discharging the fluid into a duct for distribution in the duplicating machine;

said outlet means comprising a raised lip forming a discharge opening and being operative to form an interconnection with the duct; and



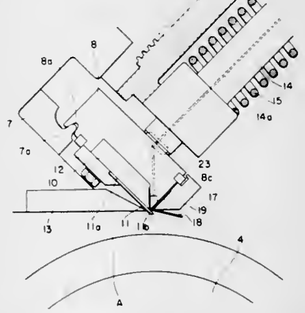
a collar formed by a tapering wall thereby defining an outwardly flaring funnel, said collar circumferentially surrounding and being spaced apart from said raised lip defining with said lip a reservoir for retaining duplicating fluid which may have leaked from the interconnection whereby any duplicating fluid leaked into said reservoir is easily removable therefrom.

4,094,344

APPARATUS FOR MENDING SURFACE IRREGULARITIES OF WOODEN PLATES

Katsuji Hasegawa, Nagoya, Japan, assignor to Meinan Machinery Works, Inc., Ohbu, Japan

Filed Aug. 17, 1976, Ser. No. 715,010
Int. Cl.[2] B65B *3/26*
U.S. Cl. 141—125 **9 Claims**



1. An apparatus for mending surface irregularities of a wooden plate which is fed past the apparatus in a selected direction along a predetermined path, said apparatus comprising:

support means;

head means mounted on said support means in an angled relationship with respect to said path, and cooperating means between said head and support means for permitting slight angular movement of said head means, said head means being located over the path of said wooden plate and having a putty outlet formed in the lower portion thereof, said head means also having passageway means provided therein for communication with said outlet;

supply means connected to said passageway means for supplying pressurized putty to said outlet;

a plurality of elongated needles positioned closely adjacent each other, said needles being disposed in a slanted relationship with respect to the wooden plate and having the upper portions thereof mounted on the lower portion of said head means, the lower portions of said needles being positioned adjacent said outlet and disposed for engagement with said wooden plate as it moves along said path whereby said wooden plate holds said lower portions of the needles in an upper position wherein they close said outlet, means causing said lower portions of the needles to be normally resiliently urged downwardly away from said head means and away from said outlet whereby they will move downwardly into any recesses or other surface irregularities in the wooden plate so as to at least partially open said outlet, the lower portions of said needles extending transversely above the path of said wooden plate;

pressing means acting against said head means for causing pivotal movement of said head means in a direction causing said lower portions of the needles to be moved downwardly toward the path; and

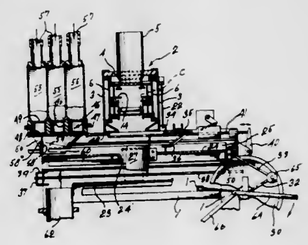
stop means positioned for engagement with the needles for limiting the downward movement of the lower portions of said needles away from said head means.

4,094,345

DISPENSING MACHINE TO PREPARE CUPS WITH A DRY CONTENT

Marcel Deziel, 3365 Petit St., St. Hubert, Canada

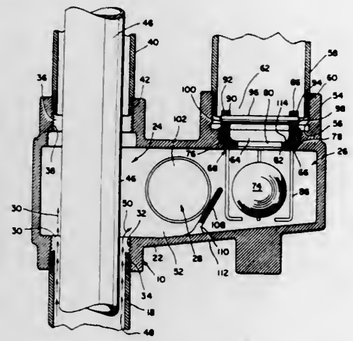
Filed Nov. 16, 1976, Ser. No. 742,257
Int. Cl.[2] B65B *43/42*
U.S. Cl. 141—174 **8 Claims**



1. In a machine to pour a dry granular or powdered ingredient into cups, the combination comprising a frame, an empty cup magazine carried by said frame for supporting a stack of nestled empty cups, a cup-releasing mechansim mounted at the lower end of said empty cup magazine for releasing the bottomost cup of said stack of empty cups, a cup-conveying mechanism mounted on said frame underneath said cup-releasing mechanism for receiving a cup released by said cup-releasing mechanism and conveying said cup along a path to a position at a dry ingredient dispensing station, a dry ingredient dispensing mechanism carried by said frame above and including a funnel having a bottom outlet in register with a cup positioned at said dispensing station, and a tripping elongated trough having a pouring end and pivoted about an axis transverse to the length of said trough and located away from said pouring end, said trough having an elongated projection extending underneath the same and along the same, being connected to said trough away from said pouring end to define a slot between the bottom of said trough and said projection, said projection having a free end disposed short of said pouring end, said trough biased to take a normal position closing said funnel bottom outlet, and having its pouring end disposed just above a cup being conveyed to said ingredient dispensing station and with said projection having its free end in the path of said last-named cup, said last-named cup, during its terminal movement towards said station, abutting against said free end of said projection and causing downward pivoting of said trough to an open discharging position to cause said trough pouring end to engage over and into said cup as said cup reaches said station while uncovering said funnel bottom outlet to allow pouring of the ingredient from said funnel into said

cup, the top portion of the cup wall progressively engaging said slot during downward pivoting of said trough.

4,094,346
TANK MANIFOLD
Joseph V. Milo, Elizabeth, N.J., assignor to Universal Valve Co., Inc., Elizabeth, N.J.
Filed Aug. 12, 1976, Ser. No. 713,641
Int. Cl.² B65B *3/18*; F16K *1/14*
U.S. Cl. 141—286 **2 Claims**



1. In a vapor recovery system for a liquid and vapor containing tank, the combination of

a manifold adapted to be mounted upon the tank, said manifold comprising

a fill section and a vapor recovery section, said fill section having a fill opening in communication with the tank,

said vapor recovery section having a boss defining a first vapor return opening for recovering vapor from the tank,

said vapor recovery section having a smaller bottom opening in registry below the first vapor return opening, said first and second openings being in communication and defining a vapor channel through which the vapor to be recovered passes;

means to admit vapor from the tank into the manifold through the fill opening;

float means mounted in the vapor recovery section at the said second opening to prevent liquid from exiting the manifold through the vapor return opening,

the said float means being of size and configuration to upwardly pass through the first opening to permit remote removal from above;

an inclined baffle affixed interiorly at the manifold intermediate the float means and the fill section; and

wherein the manifold comprises a floor which slopes downwardly from the vapor recovery section towards the fill section, the baffle being secured to the floor and being provided with a drain opening, said opening permitting the passage of liquid along the floor from the vapor recovery section to the fill section and thence back to the tank.

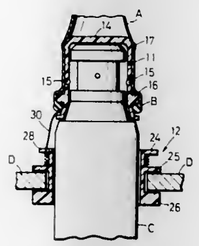
4,094,347
BALLOON NECK FITTING
Kikuji Ikemoto, 100-27, Shin-narita, Hirono-cho, Uji-shi, Kyoto, Japan
Filed Dec. 23, 1976, Ser. No. 753,944
Claims priority, application Japan, Jul. 10, 1976, 51-135307
Int. Cl.² B65B *3/04*
U.S. Cl. 141—313 **6 Claims**

1. A balloon neck fitting, for use in a balloon vending machine having a transporting mechanism to transport the balloons therethrough and a gas supply nozzle to fill the balloon with gas, comprising:

a. a cylindrical check valve section having a configuration adapted to be fitted in the neck of a balloon, and being closed at the one end to be inserted into the neck of the balloon and open at the other end, and having several openings in the lateral wall thereof;

b. guide means for engaging the transporting mechanism of the balloon vending machine, said guide means comprising an open-ended cylindrical guide section;

c. frangible connecting means for connecting said guide section with the open end of said check valve section in such a manner as to readily permit breaking of the connection;

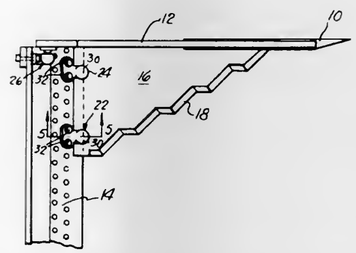


d. a string connected at one end to said check valve section, and connected at the other end to said guide section; and

e. said open ended cylindrical guide section and said check valve section open end being sized to receive therein the gas supply nozzle of the balloon vending machine,

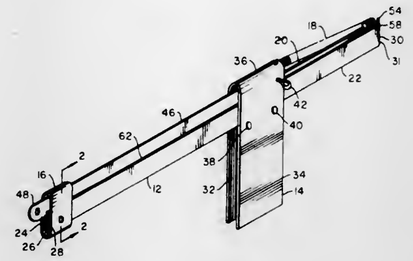
whereby, after the balloon is filled with gas by means of the gas supply nozzle, said frangible connecting means is caused to be broken, leaving said sections connected only by said string.

4,094,348
TREE AND STUMP SPLITTER
Robert H. Wolf, 408 S. Willow St., Flora, Ind. 46929
Filed Nov. 19, 1976, Ser. No. 743,487
Int. Cl.² A01G *23/08*
U.S. Cl. 144—34 F **4 Claims**



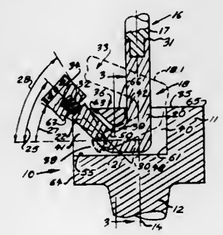
1. A stump splitter attachment for a bulldozer having a bulldozer blade, said attachment comprising a vertical sharp edged stump splitting blade extending forwardly of said attachment, at least one horizontally extending generally triangular cut off blade secured to said splitting blade from a position near the forward end of said splitting blade and having a rear edge lying in a plane normal to said splitting blade, and means to secure said attachment to the bulldozer blade in which said means to secure said attachment to the bulldozer blade consists of at least three ball means disposed in a triangular configuration secured to said attachment, socket means swingably mounted on said balls said socket means being provided with flanges including holes to receive bolts by which said socket means may be secured to the bulldozer blade.

4,094,349
HAND SABRE SAW
William C. Lajack, and Joseph J. Lajack, both of 3446 Berkshire, Warren, Mich. 48091
Filed Mar. 3, 1977, Ser. No. 773,927
Int. Cl.² B27B *21/00*
U.S. Cl. 145—31 B **9 Claims**



1. A saw including an elongated, U-shaped body member constructed of an elongated metal band folded centrally to provide a short connecting portion and two elongated leg portions defining a slot capable of receiving a saw blade therebetween, which leg portions extend longitudinally of the body member with the connecting portion at one end of the body member, a handle constructed of an elongated U-shaped metal band folded centrally to provide a connecting portion and two elongated leg portions positioned over the body member with the leg portions of the handle immediately adjacent and outside of the leg portions of the body member and with the connecting portion above the body member, a collar constructed of a continuous metal band secured to the other end of the body member extending above the body member for guiding a saw blade therethrough, means for securing the collar to the other end of the body member and for supporting a saw blade guided through the collar, means for securing one end of a saw blade to the handle above the body member with the saw blade extending into the slot defined between the leg portions of the body member, and means for guiding the handle in movement longitudinally of the body member.

4,094,350
SCREW DRIVER
Ralph Spencer Jacobson, 27970 Le Dunne Ave., Aldergrove, B.C., Canada
Division of Ser. No. 680,715, Apr. 27, 1976, Pat. No. 4,033,244.
This application May 12, 1977, Ser. No. 796,348
Int. Cl.² B25B *15/02*
U.S. Cl. 145—50 D **10 Claims**



1. A screw engaging means of a screw driver, the screw engaging means being adapted to extend from a shank of the screw driver and being generally V-shaped and including a root portion, a transverse portion and an oblique portion, the portions being characterized by:

(a) the root portion extending from the screw driver shank to join the transverse portion,

(b) the transverse portion interconnecting the root and oblique portions, the transverse portion having a size sufficient to pass through a clearance passage extending under a bridge portion of a screw,

(c) the oblique portion extending obliquely from the transverse portion to an outer end of the oblique portion, the outer end having stop engaging means spaced from the transverse portion sufficiently to accept the screw retained on the transverse portion,

and the screw engaging means further includes:

(d) a separable stop member to engage releasably the stop engaging means at the outer end of the oblique portion to retain the screw on the screw driver.

4,094,351
LAUNDRY BAG
Frank Catenaccio, 222 Cayler St., Brooklyn, N.Y. 11222
Filed Oct. 5, 1976, Ser. No. 729,724
Int. Cl.² A45C *11/00*
U.S. Cl. 150—7 **3 Claims**

1. A laundry bag, comprising in combination, a canvas bag for containing laundry articles, a utility bag for containing a box of washing powder and magazines or related objects, and a shoulder strap secured to said canvas bag and utility bag for resting across a person's shoulder with said canvas bag at said person's back and said utility bag at a front, said canvas bag has a mouth at an upper end closable by a canvas lid hingedly stitched to said canvas bag, said lid having several looped ropes attached thereupon and extending radially with loops at an edge of said lid, said loops being engagable with rope knits around said bag upper end, said looped ropes together with other circular ropes attached on said lid having the nautical shape of a ship wheel.

4,094,352
FASTENERS HAVING TOOTHED BEARING SURFACES
Emil J. Hlinsky, Oak Brook, Ill., assignor to MacLean-Fogg Lock Nut Co., Mundelein, Ill.
Continuation of Ser. No. 589,529, Jun. 23, 1975, abandoned.
This application Oct. 21, 1976, Ser. No. 734,680
Int. Cl.² F16B *39/28*
U.S. Cl. 151—37 **18 Claims**

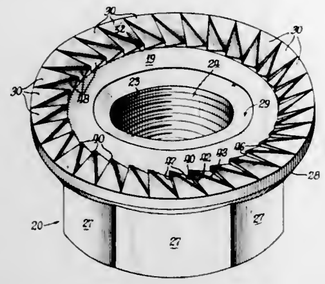
1. In a fastener for a threaded joint, a body having an end portion symmetrical about a central axis with a plurality of teeth in an annular array integrally formed in said end portion;

said teeth having individual top bearing surfaces comprising discontinuous sections of said end surface, said individual top bearing surfaces being flanked in opposite circumferential directions respectively by an abrupt side surface and a gradually sloping side surface;

whereby said top bearing surfaces limit the indentation of said teeth into the coacting surface of a workpiece in accordance with the combined areas of said top bearing surfaces;

said individual top bearing surfaces each having generally

the shape of a triangle with a base and an apex respectively at outer and inner margins of said annular array; and



the height of each abrupt side surface as measured parallel to said central axis progressively increasing from the base to the apex.

4,094,353

TIRES HAVING A SOLID POLYURETHANE CORE

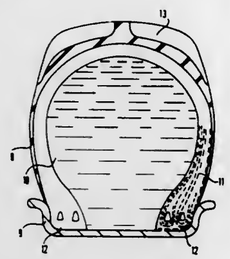
Peter Ford, Birmingham, England, assignor to Dunlop Limited, London, England

Filed Feb. 27, 1976, Ser. No. 662,020

Claims priority, application United Kingdom, Mar. 6, 1975, 9254/75

Int. Cl.² B60C *1/00*; C08G *18/14, 18/48, 18/76*

U.S. Cl. 152—310 **11 Claims**



1. A tire and wheel rim assembly comprising a tire having a reinforced carcass, a wheel rim on which the tire is mounted to define a chamber, the chamber having a filling of resilient solid polyurethane material consisting of the reaction product of a) at least one liquid polyoxpropylene polyether polyol and b) a diphenylmethane diisocyanate chemically modified by known means to liquid form, the amounts of these reactants being such that the ratio of functional isocyanate groups to hydroxyl groups is in the range 0.65 to 0.9.

9. A process for puncture-proofing a pneumatic tire mounted on a wheel rim comprises filling the tire with a liquid reactant mixture of (a) at least one liquid polyoxypropylene polyether polyol and (b) a diphenylmethane diisocyanate chemically modified by known means to liquid form the amounts of these reactants being such that the ratio of functional isocyanate groups to hydroxyl groups in the reactants is in the range 0.65 to 0.9, and cross-linking said mixture to form a resilient solid polyurethane material filling the tire.

4,094,354

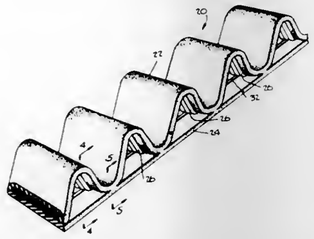
BREAKER REINFORCING TAPE FOR BELTED PNEUMATIC TIRES, AND TIRES MADE THEREFROM

Wesley Ferrell, Southbury, and Daniel Shichman, Trumbull, both of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed Mar. 9, 1977, Ser. No. 775,803

Int. Cl.² B60C *9/22*

U.S. Cl. 152—361 R **55 Claims**



21. An uncured belted pneumatic tire, comprising a carcass composed of at least one body ply, and a belt-forming structure surrounding said body ply in the medial region of said carcass, said belt-forming structure being constituted by a tape of cords wound substantially helically around said medial region of said carcass with a multiplicity of turns having a pitch of substantially zero degrees relative to the median equatorial or mid-circumferential plane of said carcass, and said tape comprising a crimped strip having continuous undulations, a plurality of said cords extending side by side in parallel relation longitudinally along said crimped strip, each of said cords having respective undulations corresponding to and nesting in the undulations of said crimped strip, first means for anchoring each of said cords to said crimped strip, a flat strip having a width substantially corresponding to the width of said crimped strip, second means for anchoring said flat strip to alternate ones of the apexes of the undulations of said crimped strip, and frangible means coextensive with said flat strip for releasably reinforcing and stabilizing said flat strip against inadvertent expansion that would prematurely reduce the amplitude and frequency of the undulations of said crimped strip and of said cords.

4,094,355

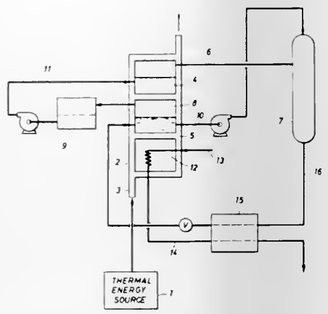
HEAT RECOVERY PROCESS

George C. Blytas, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 23, 1976, Ser. No. 725,759

Int. Cl.² F25B *15/00*

U.S. Cl. 165—1 **20 Claims**



1. A process for transferring thermal energy comprising contacting steam and a water absorbent solution in a first contact zone under conditions to absorb water, dilute the solution, and raise the temperature of the solution, the solution being in indirect heat exchange with an aqueous stream and raising the temperature of the aqueous stream and converting at least the bulk of the aqueous stream to steam,

passing diluted solution from the first contact zone to a second contact zone,

passing the aqueous stream of raised temperature produced in the first contact zone to a second contact zone wherein the stream is contacted with the diluted solution from the first contact zone, under conditions to absorb water and heavily dilute the solution, and raise further the temperature of the solution,

and transferring heat from the heavily diluted solution to a medium to be heated.

4,094,356

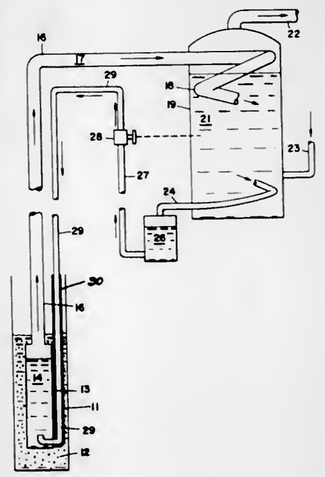
GEOTHERMAL HEAT RECOVERY SYSTEM

Whewell Frank Ash, 1095 Capital Hill, Reno, Nev. 89502, and Frank Robert Ash, 834 Shriver Blvd., Sparks, Nev. 89403

Filed Jan. 6, 1977, Ser. No. 757,379

Int. Cl.² F28D *15/00*

U.S. Cl. 165—39 **5 Claims**



1. A geothermal heat recovery device, comprising a heat absorber containing a variable quantity of working fluid, said heat absorber being disposed within a hot zone of a geothermal well, a gas delivery pipe extending from said heat absorber out of said well, heat exchanger means connected to said gas delivery pipe for condensing the gas from said delivery pipe to liquid and conducting heat therefrom, reserve tank means connected to the output of said heat exchanger means for storing a reserve quantity of said working fluid, a supply pipe extending from said reserve tank means down said well to said heat absorber to supply said working fluid thereto, said supply pipe being substantially full of said working fluid in liquid phase to create a substantial pressure head in said heat absorber, insulation means surrounding said supply pipe for the entire portion thereof within said well for limiting the heating and expansion of and preventing vaporization of said working fluid within said supply pipe, and thermostatic valve means including a sensing element operatively associated with the operating temperature of said heat means interposed between said reserve tank means and said supply pipe for selectively controlling the feed rate of said working fluid to said heat absorber.

4,094,357

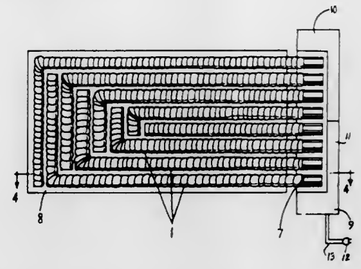
HEAT TRANSFER BLANKET

Ronald Sgroi, Syosset, N.Y., assignor to Kenneth C. McCord, Bethpage, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,301

Int. Cl.² F28D *15/00*; A47C *19/00*; H05B *1/00*

U.S. Cl. 165—105 **5 Claims**



1. A heat transfer blanket comprising a plurality of flexible sheath heat pipes, a pair of juxtaposed fabriclike layers having the marginal edges of one of said pair substantially in intimate contact with the marginal edges of the other of said pair, a portion of the length of each of said heat pipes adjacent one end thereof fixedly secured to and between said fabric-like layers disposed in spaced apart relationship, said spaced apart relationship providing substantially uniform distances between adjacent heat pipes, the other end of said plurality of said heat pipes fixedly secured to a solid metallic rod, said rod in intimate thermal contact with a source of thermal energy.

4,094,358

LIQUID COOLING APPARATUS

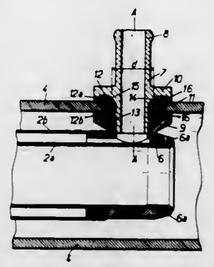
René Neveux, Les Clayes-sous-Bois, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed Mar. 29, 1976, Ser. No. 672,546

Claims priority, application France, Apr. 2, 1975, 75 10251

Int. Cl.² F28D *7/12*

U.S. Cl. 165—154 **7 Claims**



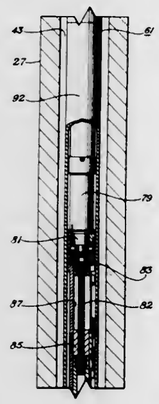
1. Apparatus for cooling liquid, such as oil, including an exchanger disposed within a container having a wall and being filled with a cooling medium, such as water, said wall having passages therethrough, fluid connectors fixed to said exchanger for the inflow and outflow of the liquid to be cooled and extending through the passages in said container wall, each connector comprising two parts, each part extending through said container wall from opposite sides thereof, one part penetrating the other part, said two parts, when assembled together, forming an annular cavity closed on at least one side of said container wall and enclosing the rim of the passage associated therewith and an annular seal arranged in said cavity astride the rim of said passage and substantially filling said cavity, the volume of said cavity gradually diminishing and compressing said seal during assembly of said two parts.

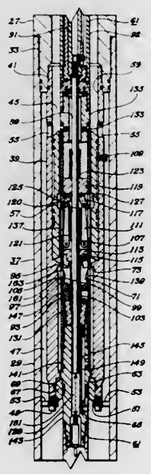
4,094,359

APPARATUS AND METHODS FOR TESTING EARTH FORMATIONS

David W. King, Fort Worth, Tex., assignor to Gearhart-Owen Industries, Inc., Fort Worth, Tex. and Petro-Data C. A., Caracas, Venezuela

Filed May 27, 1977, Ser. No. 800,902
Int. Cl.² E21B *43/00*
U.S. Cl. 166—65 R **3 Claims**





1. Motorized sleeve valve shifter apparatus for use in a wireline tool in earth well bore operations, comprising:

a. a drive shaft extending longitudinally within the body of said wireline tool and powered by an electric motor for controlled reciprocating movement;

b. upwardly facing lower latch dog means pivotally fixed to the body of said wireline tool and adapted, when extended, to engage shoulder means to prevent movement of said wireline tool in the upward direction;

i. first spring means for biasing said latch dog means outwardly;

ii. means on said drive shaft for compressing said first spring means to retract said latch dogs when said drive shaft is in a lowermost position and permitting extension of said latch dogs when said drive shaft has moved upwardly to an intermediate position;

c. upwardly facing latch arm means pivotally fixed at the lower end to a first slidable collar means that is in turn fixed by first shear pin means to said drive shaft, said latch arm means adapted, when extended, to engage shoulder means on said sleeve valve means so that said sleeve valve means may be actuated and controlled by movement of said latch arm means;

i. link means pivotally connected at one end to the upper end of said latch arm means and at the other end to a second slidable collar means that is free to move relative to said drive shaft and said wireline tool body;

ii. stop means for limiting downward movement of said second slidable collar means such that when said drive shaft is in its lowermost position said latch arm means is retracted;

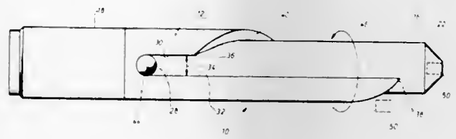
iii. second spring means for biasing said second slidable collar means downwardly so that, when said drive shaft is in said intermediate position, said sleeve valve means is in the open position and said latch arm means is at least partially extended; and, when said drive shaft is moved to its uppermost position, said sleeve valve means is moved by engagement of fully extended said latch arms to its closed position.

4,094,360

SELF-LOCKING MULE SHOE

Sharon Parr Nelson, Houston, Tex., assignor to Wilson Industries, Inc., Houston, Tex.

Filed Jul. 1, 1977, Ser. No. 812,062
Int. Cl.² E21B *41/00*
U.S. Cl. 166—243 **3 Claims**



1. A mule shoe comprising:

a member having an axis therethrough and having a long and short axially extending edge therein, said edges being spaced angularly from each other for a first predetermined angular distance and cooperating to define a key-receiving slot therebetween;

a cam surface disposed between the ends of said long and short edges, said cam surface winding about the axis of the member for a second angular distance such that the sum of said first and said second angular distances is equal to at least 360° such that an axially directed reaction force imposed on said cam surface by abutting engagement with a key imposes a torque on said member in a predetermined direction.

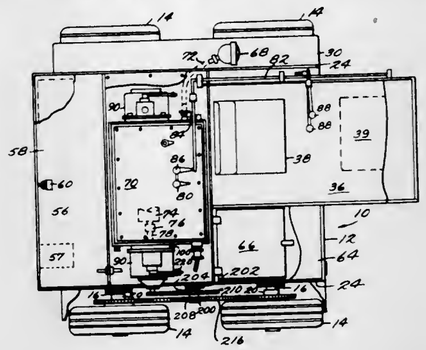
4,094,361

PERMISSIBLE MINE CAR ADAPTER ASSEMBLY

Jeffry R. Yago, Barboursville, W. Va., assignor to Lester Construction Company, Hurricane, W. Va.

Filed Apr. 20, 1976, Ser. No. 678,631
Int. Cl.² H02K *5/10*
U.S. Cl. 169—48 **3 Claims**

1. A fire-safe torque transmission apparatus comprising a walled explosion proof container, a sleeve member defining a throughgoing bore secured to a wall of said explosion proof container, the bore allowing communication of the interior of said container with the atmosphere, an adapter plate assembly removeably mounted to said sleeve member, said adapter plate assembly comprising a support member and a shaft support member connected to said support member, said shaft support member defining a throughgoing bore with first, second and third annular steps at each end, the third step forming a common step for both ends and defining a cylindrical bore adapted to receive a rotatable shaft, the first step serving as a bearing race seat and the second step serving as a flame baffle, ball-bearing race means mounted on each end of said shaft support member in said bearing race seats, a rotatable shaft of smaller diameter than the diameter of the cylindrical bore formed by the common third step mounted on said ball-bearing race means and rotatably positioned within said cylindrical bore, one end of said shaft being connected to a motor mounted



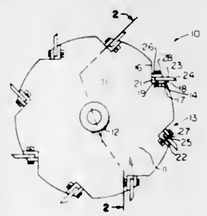
inside said explosion proof container and being adapted to be rotated by said motor with the spacing between the inner wall of the shaft support member defining the cylindrical bore and the outer surface of the rotatable shaft not exceeding 0.014 inches and extending a length of not less than about 1½ inches to prevent a flame from passing therethrough.

4,094,362

APPARATUS FOR FINE GRADING COMPACTED EARTH

Melvin O. Hild, 923 W. 15th, Grand Island, Nebr. 68801

Filed Dec. 6, 1976, Ser. No. 747,662
Int. Cl.² A01B *33/02, 33/10*
U.S. Cl. 172—120 **4 Claims**



1. Apparatus for fine grading compacted earth including a cutting blade, said blade comprising:

(a) a substantially planar circular base member having a hole through the center thereof and a plurality of 90° notches evenly spaced about the circumference of said base member, each notch including first and second legs which, in turn, are each perpendicular to the plane of a radius of said base member;

(b) a collar affixed to one side of said base member, said collar having a hole therethrough substantially the same size as said hole through said base member and aligned therewith, said collar further having fixing means thereon for decreasing at least partially the diameter of said hole through said collar;

(c) a slot in said first leg of each of said 90° notches;

(d) an L-shaped bracket having a threaded hole through the long leg thereof fixed to said first leg of each of said 90° notches such that said threaded hole is aligned with said slot and the short leg of the bracket is in contact with said second leg of said 90° notches;

(e) a rectangular blade having a sharpened edge positioned on each of said L-shaped brackets and projecting past the periphery of said base member, each of said blades having a hole therethrough aligned with said threaded hole in said L-shaped bracket;

(f) a substantially planar rectangular fixing plate positioned on each of said blades, each of said fixing plates having a hole therethrough aligned with said hole in said blade and said threaded hole in said L-shaped bracket; and

(g) a bolt projecting through each of said aligned holes and threadingly engaged with said threaded hole in said L-shaped bracket whereby said blades are fixedly held in position on said base member.

4,094,363

CULTIVATING IMPLEMENTS

John Michael McCoomb, Auckland, New Zealand, assignor to Spintiller International Limited, Auckland, New Zealand

Continuation of Ser. No. 633,949, Nov. 20, 1975, abandoned, which is a continuation of Ser. No. 485,597, Jul. 3, 1974, abandoned, which is a continuation of Ser. No. 340,747, Mar. 13, 1973, abandoned. This application Jul. 28, 1977, Ser. No. 819,994
Claims priority, application New Zealand, Mar. 13, 1972, 166562
Int. Cl.² A01B *21/04*
U.S. Cl. 172—349 **5 Claims**

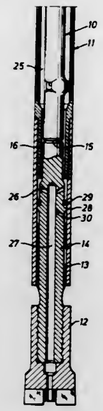
1. A cultivating implement for cultivating the ground by movement thereover, said implement comprising a head member disposed so as to be movable over the ground; a pair of axles extending one on each side of said head member outwardly and at an included angle of substantially 160°, the axles in use lying substantially in a plane parallel to the ground; at least one tined spider means of diameter D freely rotatably mounted on each said axle about a center axis of the spider means, each spider means being unitarily and integrally formed and having a boss of diameter of approximately 0.23D and four or five cantilever mounted tines radiating from said boss each to a free end, each tine having a base of circular cross section adjoining said boss, the tine extending radially from said base to a plane at a distance of approximately 0.2D from the center axis of the spider means and then being arcuately curved along its remaining length curving forwardly in the direction of movement in use of the implement with a radius of approximately 0.3D from a center on a tangent to a circle of radius approximately 0.2D, said tangent being normal to the axis of the base of the tine, adjacent sides of adjacent tines curving smoothly into each other, the tines progressively reducing in cross-section from the boss to their free ends, the base of each tine having a diameter of approximately 0.2D where it adjoins the boss, a diameter of approximately 0.06D at said plane, thereafter the cross section of the tine becoming oval towards the free end of the tine and the tine terminating at said free end in a chisel-shaped cutting edge lying in a plane substantially parallel to the axle upon which the respective spider means is mounted; the progressive reduction in cross section of the tines resulting in any particular cross section of a tine having a perimeter length no greater than the perimeter length of another cross section of the tine which is closer to the boss than said particular cross section.

4,094,364

PERCUSSION DRILL ROD

Hans Per Olof Lundstrom, and Ernst Lennart Johansson, both of Sandviken, Sweden, assignors to Sandvik Aktiebolag, Sandviken, Sweden

Filed Jun. 25, 1974, Ser. No. 483,045
Claims priority, application Switzerland, Jul. 5, 1973, 7309455
Int. Cl.[2] E21B *1/06*
U.S. Cl. 173—80 **1 Claim**



1. Drill rod structure for use with a percussive-type rock drilling machine comprising,

a plurality of rod members (10);

a plurality of tubular members (11) connected to each other, said tubular members being disposed around said rod members leaving a space (25) between them and said rod members;

a drill bit (12) having a shank (14) provided with a force-receiving surface;

said rod members being massive and loosely mounted in end abutment with each other to transmit only longitudinal forces to said drill bit;

said tubular members being rotatably connected to the drilling machine at one end portion and having a slideable interlocking connection (13) with said shank at the opposite end portion to transmit only rotational forces to said bit shank;

said bit shank also having means (28) to prevent said shank and bit from sliding out of said tubular members;

either of said rod and tubular members being provided with protrusions (21) extending in several directions to function as guides and to provide passageway for flushing medium to pass through said space and thereby also to pass between said protrusions, said slideable interlocking connection consisting of splines connecting said bit shank with the foremost tubular member, said bit shank being provided with a centrally extending flushing channel (27) and at least one channel (26) extending laterally at an acute angle from and in communication with said first channel and with the aforesaid space.

4,094,365

ELECTROHYDRAULICALLY OPERATED PORTABLE POWER TOOL

Karl Wanner, Echterdingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Continuation of Ser. No. 574,715, May 5, 1975, Pat. No. 3,995,703. This application Aug. 6, 1976, Ser. No. 712,247
Claims priority, application Germany, May 20, 1974, 2424391
Int. Cl.[2] B25D *11/00, 9/00*
U.S. Cl. 173—117 **2 Claims**

1. A portable power tool, particularly an impact type power tool, comprising a hollow housing;

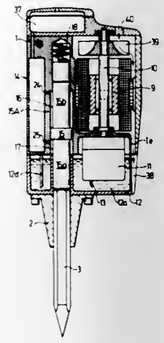
holder means carried by said housing and arranged to receive a tool adapted to reciprocate with respect thereto;

a hydraulic pump mounted in said housing;

a receptacle provided in said housing and arranged to contain a supply of hydraulic fluid for said pump;

hydraulic motor means mounted in said housing, driven by pressurized fluid supplied by said pump and including a double-acting cylinder which has a first and a second chamber and in which said tool is received so as to reciprocate therein;

a valve assembly mounted in said housing, connected with



said pump and operative to alternately admit pressurized fluid into said first and second chambers and to thereby effect reciprocation of said tool;

means for cooling the supply of hydraulic fluid in said receptacle including blower means mounted in said housing; and

an electric motor mounted in said housing and arranged to drive said hydraulic pump and said blower means, said blower means being arranged for sucking air into said housing and then inducing the flow of sucked air from said blower means first along said electric motor and thereupon along the exterior of said receptacle.

4,094,366

PNEUMATIC PERCUSSION MACHINES

Abraham Glen, and Bernard Lionel Glen, both of PO Box 196, Swartruggens, Transvaal, South Africa

Filed Sep. 30, 1976, Ser. No. 728,027
Claims priority, application South Africa, Oct. 2, 1975, 75/6257
Int. Cl.[2] H01B *17/00*
U.S. Cl. 173—138 **5 Claims**

1. A pneumatic percussion machine including:

a hollow casing;

a valve assembly at one end of the casing;

a bit assembly at the other end of the casing;

a piston for reciprocation in the casing between a first position in which it is in contact with the bit assembly and a second position in which it is removed from such first position, the piston being stepped along its length;

a first chamber formed between an end of the piston and the valve assembly;

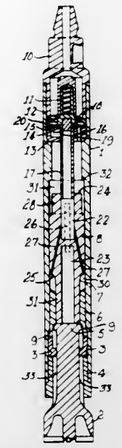
a second chamber formed inwardly from the other end of the piston about such stepped portion of the piston;

a first fluid supply path through the valve assembly to the first chamber;

a second fluid supply path through the valve assembly to the second chamber, such second fluid supply path passing, for at least part of its length through the piston;

a first fluid discharge path from the first chamber passing between the wall of the casing and the piston and then through the piston, such fluid discharge path being open

in particular positions of the piston along the length of the hollow casing;



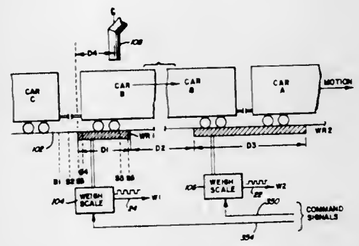
the arrangement being one in which the valve assembly is adapted, on operation of the machine, to open alternately the fluid supply paths.

4,094,367

SYSTEM FOR SINGLE DRAFT WEIGHING OF CARS COUPLED IN MOTION

William F. Jones, Glenview, and Gerald J. Hochberger, Chicago, both of Ill., assignors to Railweight, Inc., Elk Grove Village, Ill.

Filed Feb. 16, 1977, Ser. No. 769,032
Int. Cl.[2] G01G *19/04*
U.S. Cl. 177—1 **27 Claims**



1. A method for weighing railroad cars coupled in motion, each of which railroad cars has a front truck and a rear truck, comprising the steps of:

(a) providing a first scale and a second scale located forwardof said first scale;

(b) moving said railroad cars over said first and second scales;

(c) weighing the rear trucks on said first scale and storing said weight;

(d) while the rear truck of a railroad car under consideration is on said first scale, weighing on said second scale the front truck of the railroad car under consideration and the rear truck of the just preceding railroad car;

(e) totaling the weights on the first and second scales; and

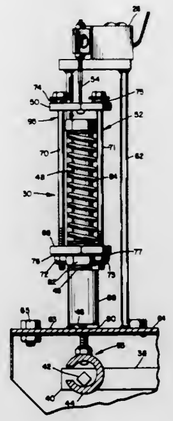
(f) subtracting the stored weight of the rear truck of the just preceding railroad car to obtain the full draft weight of the railroad car under consideration.

4,094,368

LOAD CELL OVERLOAD PROTECTION SYSTEM FOR WEIGHING SCALES

Robert I. Sann, Englewood Cliffs, and Arthur Goldberg, Fort Lee, both of N.J., assignors to Howe Richardson Scale Company, Clifton, N.J.

Filed Feb. 3, 1976, Ser. No. 654,752
Int. Cl.[2] G01G *21/10*
U.S. Cl. 177—128 **25 Claims**



1. In a weighing scale, a load-receiving structure for receiving a load to be weighed, force-transmitting means supporting said load-receiving structure for transmitting a load-induced force resulting from application of a load to said load receiving structure, and a self-contained module comprising a rigid support structure and an assembly supported by said support structure and detachably connected to said force-transmitting means, said assembly comprising a load cell receiving said load-induced force for converting said load-induced force into a weight-indicating signal other than a mechanical force, a preloaded spring in series with said load cell and biased to protect said load cell from overload, and means enabling selective preloading of said spring to set a selected preload force in said spring independently of any scale parts not forming a part of said module and without requiring assembly of said module with any other scale parts, said load cell being stationarily and rigidly mounted on said rigid support structure so that it remains stationary relative to said support structure while preloading said spring.

4,094,369

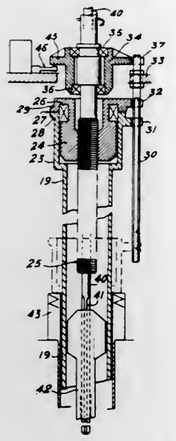
MONITORING DEVICE FOR NUCLEAR REACTOR CONTROL RODS

Raymond Blanc, and Roland Jacquelin, both of Manosque, France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Oct. 7, 1975, Ser. No. 620,416
Claims priority, application France, Oct. 8, 1974, 74 33852
Int. Cl.[2] G01G *19/14, 3/14;* G21C *17/10*
U.S. Cl. 177—147 **9 Claims**

1. A monitoring device for nuclear reactor control rods including an assembly for the continuous weighing of a control rod and at least the moving portion of a rod-position control mechanism, comprising at least one strain gage and a circuit for said strain gage for measuring the electrical resistance of said gage which resistance varies with elongation of said strain gage, said elongation being a function of the weight to be measured, a drive mechanism of the screw-and-nut type for said control rod, said mechanism being carried on a fixed reference plane by a supporting head applied against beams inset at a stationary extremity with respect to said reference plane, said mechanism being subjected to bending stress under

the action of the weight of said control rod and said drive mechanism, at least one strain gage for each of said beams



extending in the longitudinal direction of said beam between the inset extremity thereof and a point of application of said supporting head against the other extremity of said beam.

4,094,370

VESSEL FOR WEIGHING MATERIALS

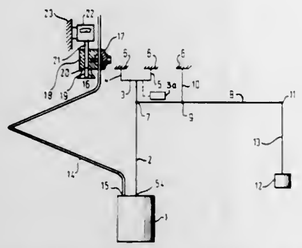
Johannes Petrus Ruiter, Bemmel (Gld), Netherlands, assignor to Stichting Energieonderzoek Centrum Nederland, The Hague, Netherlands

Filed Jul. 21, 1976, Ser. No. 707,257

Claims priority, application Netherlands, Aug. 26, 1975, 7510033

Int. Cl.² G01G *23/14, 3/18*

U.S. Cl. 177—168 **5 Claims**



1. In apparatus for weighing and handling a fluid material of the kind including a weighing vessel, a measuring beam fixed at spaced positions against downward movement and suspending said vessel between said positions so that said measuring beam is deformed by the weight of said vessel, a measuring member associated with said measuring beam for measuring the deformation of the latter and hence for indicating the weight of said vessel, and a material supply line for supplying fluid material to said vessel, the improvement wherein said supply line has at one end a resilient conduit-portion adapted to be elastically deformed, said conduit-portion being in communication with said weighing vessel for the flow of fluid material, and the conduit-portion at its other end being connected to an adjustable suspension point on a fixed base and being subjected to a prestressing force by means for adjusting the suspension point so that the required prestress is obtained such that the change in this prestressing force due to the change with the working temperature of the elasticity modulus of the conduit corresponds to the opposite change in the elastic force of the conduit resulting from its thermal change in length.

4,094,371

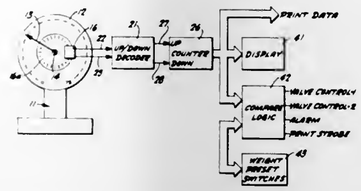
DIGITAL DISPLAY FOR WEIGHING SCALES

Herbert W. Ferrell, 38799 Jonquil Dr., Newark, Calif. 94560

Filed Feb. 4, 1976, Ser. No. 655,014

Int. Cl.² G01G *23/37*

U.S. Cl. 177—210 R **1 Claim**



1. In apparatus for providing a digital signal indicative of the load on a scale having a member operatively connected to the member for providing first and second electrical signals which change from a first level to a second level and return to the first level each time the member moves a predetermined amount, the first signal leading the second signal when the member moves in a first direction and the second signal leading the first signal when the member moves in a second direction, a first pair of cascaded flip-flops to which the first signal is applied, a second pair of cascaded flip-flops, a first exclusive OR gate connected to the outputs of the flip-flops in the first pair, a second exclusive OR gate connected to the outputs of the flip-flops in the second pair, up/down counting means, and multiplexing means responsive to the outputs of the flip-flops for delivering pulses from the OR gates to the counting means to be counted in a direction corresponding to the direction in which the displaced member moves.

4,094,372

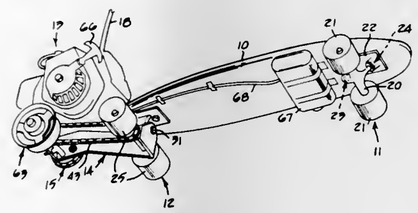
MOTORIZED SKATEBOARD WITH UNI-DIRECTIONAL REAR MOUNTING

Michael A. Notter, 115 Greenwood Ave., San Francisco, Calif. 94112

Filed Feb. 28, 1977, Ser. No. 772,647

Int. Cl.² B62D *51/02*

U.S. Cl. 180—1 G **16 Claims**



1. A skateboard comprising

a horizontally disposed rider's platform,

a pair of laterally spaced front wheels connected beneath a forward end of said platform,

a pair of rear wheels,

mounting means connecting said rear wheels beneath a rearward end of said platform for solely permitting vertical pivotal movements of said rear wheels about a pivot axis disposed in a vertically disposed plane intersecting a longitudinal axis of said skateboard, said mounting means comprising a bracket assembly pivotally mounted beneath the rearward end of said platform and having said rear wheels rotatably mounted thereon and wherein said bracket assembly extends rearwardly from said rear wheels,

motor means, having an output shaft, mounted rearwardly on said bracket assembly and

drive means connecting the output shaft of said motor means with only one of said rear wheels for selectively driving the same comprising a first sprocket secured to the output shaft of said motor means, a countershaft rotatably mounted on said bracket assembly, a second sprocket secured to a first end of said countershaft, an endless first chain entrained about said first and second sprockets, a third sprocket secured to a second end of said countershaft, a fourth sprocket connectible with said one rear wheel and an endless second chain entrained about said third and fourth sprockets.

4,094,373

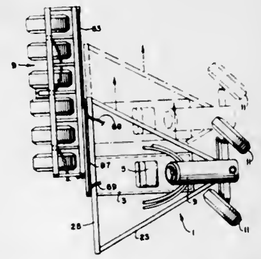
METHOD AND APPARATUS FOR CONVERTING AN AGRICULTURE MACHINE TO A TRACTOR

Arthur F. Crow, Jr., R.F.D. 3, Milford, Ill. 60953

Filed May 4, 1977, Ser. No. 793,751

Int. Cl.² A01B *71/00*

U.S. Cl. 180—1 F **12 Claims**



1. Apparatus for converting an agricultural machine having a substantially wide traction wheel assembly into a tractor having a traction wheel assembly of substantially less width than the traction wheel assembly of the agricultural machine, including in combination a driven part and a traction wheel assembly of substantial width, drive means powering said traction wheel assembly, further means releasably connecting said traction wheel assembly to said driven part said traction wheel assembly formed in two sections releasably connected together for use with the agricultural machine and said sections when released from one another being separable and slideable in said further means, and one of said sections being removed from the driven part, and mechanism connected at one end to said other of said sections and at the other end to said driven part, said mechanism being operable to move said other section and said driven part laterally relative to each other to align them in fore and aft relationship for operation as a tractor.

4,094,374

TWO WHEELED ELECTRICALLY POWERED VEHICLE

Herbert Adams, 1036 San Carlos Rd., Pebble Beach, Calif. 93953

Continuation of Ser. No. 500,389, Aug. 26, 1974, Pat. No. 3,934,669. This application Nov. 13, 1975, Ser. No. 631,843

The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.

Int. Cl.² B62M *7/10*; B62K *15/00*

U.S. Cl. 180—31 **2 Claims**

1. A powered vehicle comprising:

an integrally formed body frame bounded by a top wall, a front wall, a rear wall, and side walls;

a pair of wheels protruding from the bottom of said frame for supporting said frame;

a steering column having a lower portion rotatably carried by said frame, said lower portion of said steering column being coupled to one of said wheels to facilitate the steering of said vehicle when said steering column is rotated with respect to said frame;

an upper portion of said steering column being longitudinally slidably received in said lower portion and movable between a raised position and a lowered position;

lock means for releasably securing said upper portion to said lower portion when in said raised position, such that said upper portion of said steering column is rotatable with said lower portion when said upper portion is in said raised position and releasably secured with said lower portion;

handlebar means carried by said upper portion of said steering column, said handlebar means having opposite projecting ends extending from said upper portion, said handlebar means being movable with said upper portion relative to said steering column lower portion wherein said handlebar means extends transversely with respect to

the longitudinal axes of said frame, said handlebar means being movable with said upper portion relative to said lower portion to said lowered position such that said handlebar means is disposed in a front-to-rear fashion, said handlebar means being sized that one end of said handlebar means is in close proximity to said top wall of said frame while the portion of said handlebar means between said one end and said upper portion of said steering column is located near the mid-section of said frame, said lock means releasably securing said upper portion to said lower portion when same is in said lower position; and the other end of said handlebar means projecting outwardly from said front wall of said vehicle, whereby when said handlebar means is in said front-to-rear lower position, said one end of said handlebar means serving as a means for lifting and carrying said vehicle, said other end of said handlebar means serving to facilitate the manual propelling of said vehicle on at least one of said wheels.

4,094,375

RIGID CONNECTION DEVICE AND ITS APPLICATION TO MOTOR CYCLES

Pierre M. Doncque, Amiens, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Mar. 26, 1976, Ser. No. 670,943

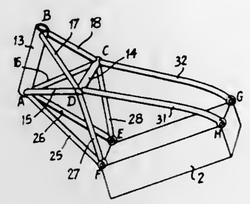
Claims priority, application France, Apr. 3, 1975, 75 10461

Int. Cl.² B62K *11/04*

U.S. Cl. 180—33 A **6 Claims**

1. A motorcycle having an engine block and steering column, in which the engine block is joined to the steering column by an intermediate solid which extends rigidly from two connection points on the steering column, and comprises two other connection points disposed on a cross-member at a distance from the steering column, and wherein the engine block and the intermediate solid are joined to one another by a structure of at least six connecting bars whose junctions are at least three connection points of the intermediate solid and at least three connection points of the engine block not in straight line

alignment with each other, two of said three points of the block each being connected to at least two connection points of the



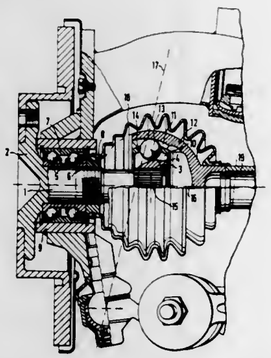
intermediate solid and two of said three points of the block being longitudinally spaced from each other.

4,094,376

BEARING ASSEMBLY FOR A WHEEL HUB

Hans-Heinrich Welschof, Rodenbach, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach am Main, Germany

Filed Oct. 29, 1976, Ser. No. 736,888
Claims priority, application Germany, Oct. 31, 1975, 2548722
Int. Cl.[2] F16C *33/76*
U.S. Cl. 180—43 R **6 Claims**



1. In a bearing assembly for a wheel hub, the combination of a constant velocity universal joint mounted on a wheel support of a vehicle and having rotatable outer and inner joint members, a wheel hub, bearing means journaling said wheel hub within the wheel support and comprising an inner bearing race mounted on said wheel hub and an outer bearing race on the wheel support, said wheel hub having one end non-rotatably but detachably connected to said inner joint member and the other end of said hub having a flange to which a wheel can be attached, and a flexible boot having one end mounted upon said rotatable outer joint member and another end mounted upon one of said wheel support and said wheel hub at said wheel support to enclose said universal joint and extend over the bending range of the outer joint member and the inner joint member such that a seal is defined between rotatable and non-rotatable elements.

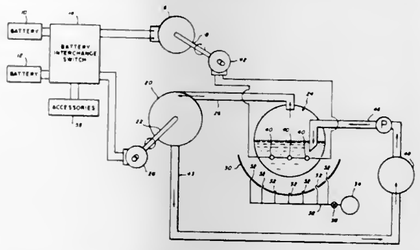
4,094,377

ELECTRICALLY POWERED VEHICLE

Herbert W. Biggs, P.O. Box 1510, Hobe Sound, Fla. 33455

Filed Apr. 15, 1976, Ser. No. 677,366
Int. Cl.[2] B60K *1/00, 3/04*
U.S. Cl. 180—65 C **6 Claims**

1. A battery powered drive system for vehicles comprising
an electric drive motor and drive shaft adapted to propel a vehicle,
a pair of electrical storage batteries,
circuit means for selectively connecting one or the other of said batteries to said motor,
a steam engine having a shaft and a generator mounted on said shaft,
a steam boiler,
a solar heater mounted in operative relation to the boiler for heating liquid in the boiler to generate steam,
a duct connected between the boiler and the engine for conveying steam generated by the boiler to the steam



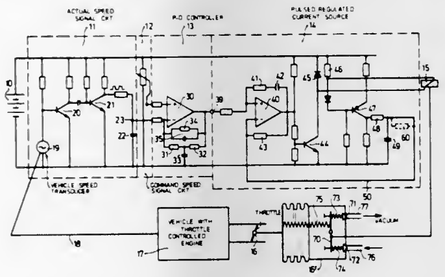
engine and returning the exhaust of the steam engine to the boiler,
switching means connected between the generator and the batteries for selectively connecting the generator to one or the other of said batteries for recharging the batteries,
gas burners disposed immediately adjacent the boiler for heating liquid in the boiler,
a gas container connected to the burners,
and means for selectively operating the burners to heat the liquid in the boiler.

4,094,378

VEHICLE CONSTANT SPEED CONTROL CIRCUIT

Hans Scheyhing, Leonberg; Helmut Fleischer, and Karl-Ludwig Abend, both of Schwieberdingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Jul. 16, 1976, Ser. No. 705,923
Claims priority, application Germany, Aug. 22, 1975, 2537415
Int. Cl.[2] B60K *31/00*
U.S. Cl. 180—105 E **10 Claims**



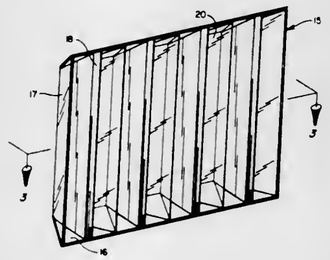
1. Vehicle constant speed control system to control an engine input to maintain the speed of the vehicle at a commanded value, comprising
means (**11**) generating an actual vehicle speed signal;
means (**12**) generating a command speed signal;
means (**16**) coupled to the engine of the vehicle controlling energy input thereto;
a controller (**13**) having proportional-derivative (PD) characteristics comparing said actual speed signal and said command speed signal and generating an error signal;
and positioning means (**14, 15**) responsive to the error signal and controlling said energy input control means (**16**) and hence affecting the speed of the vehicle, said positioning means and said vehicle responding to the error signal, proportionately, with substantial time delay;
and wherein the PD controller (**13**) includes a control amplifier (**30**) having a feedback circuit comprising a T-resistance-capacitance circuit including two serially connected resistors (**31, 32**) and a cross connected capacitor (**33**).

4,094,379

SOUND-ABSORPTION PANEL

David I. Steinberger, Columbus, Ohio, assignor to Body Guard Inc., Columbus, Ohio

Filed Sep. 13, 1976, Ser. No. 722,358
Int. Cl.[2] G10K *11/04;* E04B *1/99*
U.S. Cl. 181—284 **11 Claims**



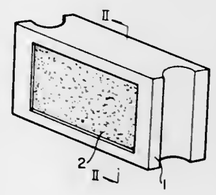
1. A sound-absorbent structure comprising an outer shell of high-density sound-deflecting material forming a cavity with sound-deflecting walls and a mouth adapted to open toward the sound emitter, and a body of low-density sound-absorbent material disposed within the cavity and extending outwardly relative thereto in spaced relationship to the walls of said cavity; said sound-deflecting walls having inner plane surfaces diverging at an angle less than ninety degrees from an inner vertex, said sound-absorbent body being in the form of a strip of material having opposed plane surfaces and inner and outer edges with its inner edge at the vertex between said sound-deflecting walls and with its outer edge exposed at a position substantially outwardly thereof, said sound-absorbent strip bisecting said cavity formed by said diverging sound-deflecting walls to provide pockets at each side of said strip, each of said pockets having a plane sound-deflecting surface formed by one of said sound-deflecting walls and a plane absorbing surface adjacent thereto and on said sound-absorbing strip which are disposed relatively at an angle of less than 45°.

4,094,380

MULTI LAYER SOUND-PROOFING STRUCTURE

Hiroshi Kobayashi, Chofu, and Nobuyoshi Kuwabara, Yokohama, both of Japan, assignors to Chiyoda Chemical Engineering & Construction Co., Ltd., Yokohama, Japan

Filed Jun. 1, 1977, Ser. No. 802,418
Claims priority, application Japan, Jun. 3, 1976, 51-64122
Int. Cl.[2] E04B *1/84*
U.S. Cl. 181—285 **9 Claims**



1. A multi layer sound-proofing structure for absorbing sounds having frequencies of from about 100–4000 Hz, comprising:
a first layer (**2**) comprising a light aggregate and a binder, having a bulk density of from 0.1 to 2.0 g/cm^3 and void fraction as continuous void of from 15 to 60%;
a second layer (**4**) on said first layer (**2**), said first layer having at least a major surface uncovered by said second layer so as to serve as an incident surface for sounds;
a third layer (**3**) on said second layer (**4**) with said second layer (**4**) interposed between said first and third layers, said third layer comprising a light aggregate and a binder, each of which is the same as or different from those of the first layer and having a bulk density of from 0.1 to 2.0 g/cm^3 and void fraction as continuous void of from 15 to 60%;
said second layer (**4**) being of a material having a quality to insulate relatively high frequency sounds and to permit penetration of relatively low frequency sounds; and
a fourth layer (**1**) of a material having a high sound-insulating ability, and covering all free surfaces of the layered structure of said first, second and third layers except for said uncovered major surface of said first layer (**2**) such that said uncovered major surface of said first layer at least substantially defines the direct incident surface for sounds impinging on said sound-proofing structure.

4,094,381

AERIAL EXTENSION LADDER

Darrell F. Wilkerson, 1700 W. Reno, Oklahoma City, Okla. 73106

Filed May 2, 1977, Ser. No. 793,201
Int. Cl.[2] E06C *5/06*
U.S. Cl. 182—67 **4 Claims**

1. An aerial ladder including a base ladder section and a top ladder section in combination with a vehicle having a flat bed and a turret mounted on the flat bed for pivoting movement about a vertical axis, the improvement comprising:
a support frame underlying and secured to said base ladder section,
said support frame having a lower end pivotally connected with
said turret for pivoting movement of its other end in a vertical plane;
a hydraulic lift cylinder extending between the turret and the support frame for tilting the latter about a horizontal axis;
a double acting hydraulic extension cylinder longitudinally secured within said support frame intermediate the ends of the latter,
said extension cylinder having a double end piston rod reciprocating from its respective ends;

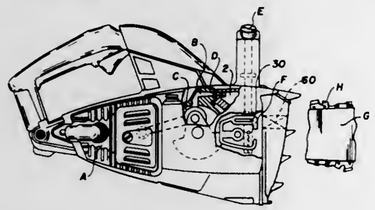
a pair of pulleys connected with the respective end portions of said base ladder section;
a pulley bracket, journalling a plurality of pulleys, secured to each end of said piston rod and to the respective end portion of said support frame forming cooperating pairs of pulley brackets; and,
a base ladder section cable secured at its respective ends to respective ends of said support frame and entrained around said pair of pulleys and between the plurality of pulleys of the respective pair of pulley brackets for movement of an intermediate portion of said base ladder cable longitudinally of said base ladder section, said base ladder cable being connected intermediate its ends with said top ladder section.

4,094,382

LUBRICANT FEED SYSTEM

Arthur Lee, North Vancouver, Canada, assignor to Trail Manufacturing Ltd., Trail, Canada

Filed Jun. 21, 1976, Ser. No. 699,001
Int. Cl.[2] F16N *13/08*
U.S. Cl. 184—15 R **5 Claims**



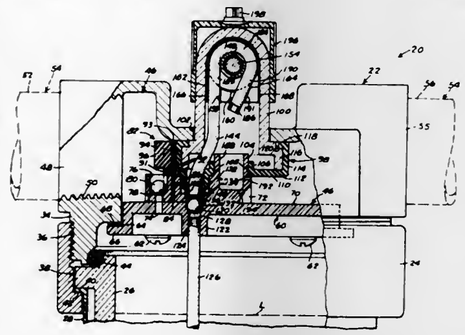
1. A lubricant feed system for use in providing a normal lubrication oil flow and a purging oil flow to cutting attachments of a chain saw having an internal combustion engine with a crankcase, a lubricant tank, means communicating the crankcase and the lubricant tank to put the lubricant tank at crankcase pressure when the engine is running, a bar pad and a guide bar for the chain, the feed system comprising:
a first passageway communicating the interior and the exterior of the lubricant tank;
a check valve in the first passageway permitting lubricant oil to flow out of the lubricant tank and openable by the pressure within the lubricant tank;
a plunger in the first passageway spaced from the check valve and extending to the exterior of the lubricant tank for manual depression;
a chamber defined in the first passageway between the check valve and the plunger;
a second passageway communicating the chamber with the bar pad of the chain saw;
the plunger being manually movable towards the check valve to close the valve and increase the pressure in the chamber and the second passageway to a purging pressure to purge the second passageway;
a metering valve in the second passageway to regulate the normal lubrication oil flow from the chamber to the bar pad under the influence of the pressure in the lubricant tank;
manually operable control means for the metering valve linked to the metering valve by a link and extending to the exterior of the chain saw to permit manual movement of the metering valve to a predetermined position ranging from a closed position to an open position to regulate normal lubrication oil flow;
resilient means urging the metering valve to the predetermined position against the normal lubrication oil flow under the influence of the pressure in the lubricant tank;
the link between the control means and the metering valve co-acting with the resilient means to maintain the metering valve in the predetermined position under normal lubrication oil flow at lubricant tank pressure but permitting (a) the metering valve to move from the predetermined position to a fully open position upon application of purging pressure to the chamber, to the second passageway and to the metering valve by the plunger and (b) the metering valve to return to the predetermined position upon cessation of the purging pressure.

4,094,383

AIR LINE LUBRICATOR

George E. Thrasher, Jr., Sterling Heights, Mich., assignor to Master Pneumatic-Detroit, Inc., Sterling Heights, Mich.

Filed Oct. 6, 1976, Ser. No. 730,142
Int. Cl.[2] F16N *7/32*
U.S. Cl. 184—55 A **32 Claims**



1. In a lubricator which introduces lubricant from a reservoir into an air line at a metered rate under pressure differential induced by air flowing through a passageway in the lubricator connected into the air line, improved structure which comprises,
tubing which has an upstream end positioned to receive lubricant from said reservoir under said pressure differential,
said tubing having a downstream end through which lubricant is delivered,
said tubing having wall portions between said ends which can be squeezed inwardly to reduce the effective area of the tubing interior,
and means operable to squeeze said wall portions sufficiently so that the reduced effective area thereof forms a restriction limiting to said metered rate the flow of lubricant through said tubing.

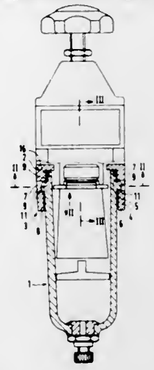
4,094,384

BAYONET CONNECTING SYSTEM FOR COLLECTOR BOWL ATTACHMENT TO CONNECTING HOUSING OF COMPRESSED AIR CONDITIONING DEVICE

Roland Heilmann, Neuenhaus, Germany, assignor to Firma Festo-Maschinenfabrik Gottlieb Stoll, Esslingen, Germany

Filed Oct. 19, 1976, Ser. No. 734,268
Claims priority, application Germany, Oct. 22, 1975, 7533573[U]
Int. Cl.[2] F16N *7/32*
U.S. Cl. 184—55 A **13 Claims**

1. A device such as an oil atomizer, a pressure regulator, or a separator, which can be used in a compressed air conditioning apparatus, which device includes a connecting housing having an open end and a separate collector bowl having an open end, said collector bowl being lockable together with said connecting housing, said collector bowl having near its open end thereof multiple external shoulder means extending peripherally outwardly therefrom to form multiple counter-lugs, said connecting housing having internal means forming inwardly extending open areas to form multiple lugs at its open end thereof with discontinuity areas therebetween, such that the multiple counter-lugs fit through the discontinuity areas when said open end of said collector bowl is fitted within said open end of said connecting housing, and when said collector bowl is turned the multiple counter-lugs will engage behind the multiple lugs to connect said collector bowl to said connecting housing; both said collector bowl and said connecting housing having interengageable means for locking said collector bowl to said connecting housing when said collector bowl is turned so that said multiple counter-lugs fully engage said multiple lugs.

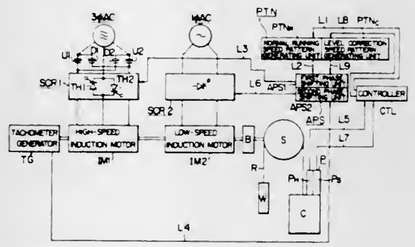


4,094,385

LEVELLING APPARATUS FOR AC ELEVATOR

Yasuyuki Maeda; Nobuo Mitsui, both of Katsuta; Tadao Kameyama, Ibarakimachi, and Katsu Komuro, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 14, 1976, Ser. No. 677,071
Claims priority, application Japan, Apr. 21, 1975, 50-47438
Int. Cl.[2] B66B *1/40*
U.S. Cl. 187—29 R **33 Claims**



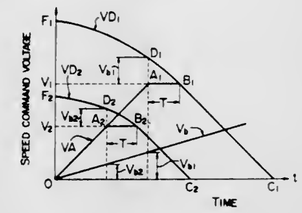
1. A levelling apparatus for an AC elevator system comprising a three-phase induction motor, motoring torque control means for controlling the motoring torque produced by said motor, braking torque control means for controlling the braking torque produced by said motor until a speed of said motor reaches a very low speed in the vicinity of zero, and an elevator car driven for vertical movement by said motor through a rope, wherein the improvement comprises level error detecting means for detecting dislocation of a floor level of said elevator car in either direction from the floor level of a target floor and means for controlling the torque produced by said motor by actuating said motoring torque control means and said braking torque control means in response to an output of said level error detecting means.

4,094,386

SPEED COMMAND GENERATOR FOR ELEVATOR

Kazuo Suzuki, Katsuta, and Hiroyuki Kataoka, Nakamachi, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 30, 1976, Ser. No. 682,043
Claims priority, application Japan, May 7, 1975, 50-54986
Int. Cl.[2] B66B *1/30*
U.S. Cl. 187—29 R **9 Claims**



1. A speed command generator for an elevator comprising means for generating a first speed command signal varying depending on the distance between the existing position of an elevator car and the target floor position, means for generating a second speed command signal varying with the lapse of time in response to the application of the starting instruction to the elevator car, comparing means for comparing said first speed command signal with said second speed command signal thereby delivering an output when said first and second speed command signals satisfy a predetermined relationship, and means for storing the value of said second speed command signal in response to the appearance of the output from said comparing means, thereby to drive the elevator car according to a continuous speed pattern consisting of a sequence of speed patterns provided by said second speed command signal, said stored value and said first speed command signal, wherein the improvement comprises means for generating a reference command signal varying depending on the variation of said second speed command signal, said comparing means being responsive to said reference command signal for delivering an output when the difference between said first speed command signal and said second speed command signal is reduced to a value less than that of said reference command signal.

4,094,387

INERTIA DEPENDENT DEVICE FOR PREVENTING AND PERMITTING RELATIVE ROTATION BETWEEN TWO MEMBERS

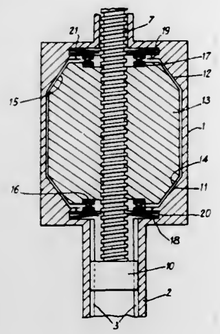
Roger Patrice Pelat, Paris, and Gildas Le Pierres, La Ferte Alais, both of France, assignors to International Vibration Engineering, Boutigny-sur-Essonne, France

Filed Oct. 8, 1976, Ser. No. 730,946
Claims priority, application France, Oct. 8, 1975, 75 30848; Jan. 30, 1976, 76 02561; Jan. 30, 1976, 76 02562
Int. Cl.[2] F16F *7/10*
U.S. Cl. 188—1 B **22 Claims**

1. A device for inhibiting relative movement between two articles, which device comprises:
a support connected to one of said articles,
a sliding member connected to the other article and capable of sliding through said support without rotating with respect to said support,
a rotating member adapted to be rotated by relatively slow movement of the said sliding member to permit said relative movement between said articles, and to resist rotation and thereby inhibit said relative movement in response to more rapid movement of said sliding member,
two braking surfaces connected to said support,
said rotating member having two abutment surfaces positioned to be applied against the said braking surfaces upon relative axial movement between said rotating member and said support in one direction or the other,
said device further comprising two prestressed elastic means

for normally maintaining said rotating member spaced from said braking surfaces, and abutment means for preventing each of said elastic means for moving said rotating member, when said rotating member is not urged against said elastic means,

said rotating member being connected to the sliding membe



so as to be started in rotation by a movement of low acceleration of said sliding member, and to be driven longitudinally toward one of said braking surfaces of said support against the resistance of one of said elastic means when said acceleration is greater and sufficient to drive said rotating member with a force greater than the prestress of said elastic means.

4,094,388

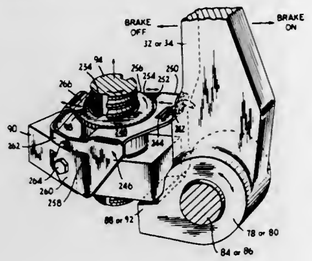
AUTOMATIC BRAKE ADJUSTING MEANS

Edward J. Falk, St. Louis County, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Division of Ser. No. 703,933, Jul. 9, 1976, abandoned. This application Mar. 14, 1977, Ser. No. 776,846

Int. Cl.² F16D *65/56*

U.S. Cl. 188—71.9 **7 Claims**



1. In a vehicular disc brake system having at least one friction member retained in a brake caliper and actuated by applying mechanical motion thereto and wherein brake wear results from braking friction, the improvement of an automatic disc brake adjuster mechanism comprising:

(a) an adjuster nut containing a threaded hole;

(b) a threaded adjusting screw engaged in said threaded hole;

(c) a star wheel on said threaded screw;

(d) means for relatively non-rotating connecting of said star wheel to said threaded adjusting screw;

(e) a spring finger resiliently connected to said adjuster nut in ratchetable contact with said star wheel;

(f) means for connecting the mechanical motion applied to said friction member to said spring finger;

(g) means for compensating for said wear when said star wheel and attached adjusting screw are rotated by said spring finger; and

(h) retainer means attached to said adjuster nut for retaining said star wheel adjacent said adjuster nut.

4,094,389

DISC BRAKES

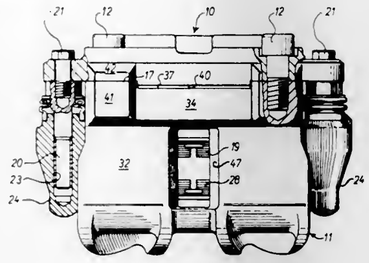
Hermann Josef Brix, Koblenz, and Hans-Jurgen Wienand, Stelmel, both of Germany, assignors to Girling Limited, Birmingham, England

Filed Mar. 28, 1977, Ser. No. 781,989

Claims priority, application United Kingdom, Apr. 1, 1976, 13264/76

Int. Cl.² F16D *55/224*

U.S. Cl. 188—73.3 **6 Claims**



1. A disc brake caliper which comprises a body member, a bridge member and means securing said members together along a parting plane, said body member having two separate co-planar parting faces in said parting plane with respective bolt holes therein and having a cylinder portion which projects forwardly beyond said parting plane, and said bridge member having two complementary parting faces with respective bolt holes therein aligned with said bolt holes in said body member and having a recessed portion between the last-mentioned parting faces and overlying but spaced from said forwardly projecting cylinder portion of said body member, said securing means comprising two bolts passing respectively through said aligned bolt holes.

4,094,390

BIDIRECTIONAL CLEARANCE SENSING BRAKE ADJUSTER

Richard F. Neuman, Farmington, Mich., assignor to Eaton Corporation, Cleveland, Ohio

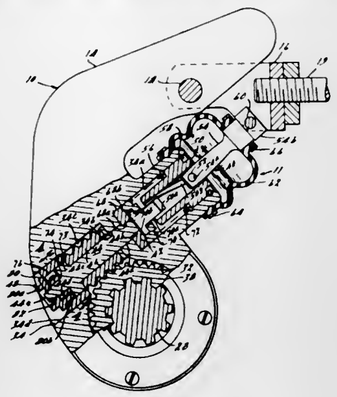
Filed Mar. 31, 1977, Ser. No. 783,258

Int. Cl.² F16D *65/56*

U.S. Cl. 188—196 D **17 Claims**

1. In an automatic adjuster for controlling clearance between a moveable friction member and a rotating member, said adjuster including a lever defining a housing having first and second intermeshed gears disposed therein, adjusting means, and means operative to apply a force for inhibiting rotation of said gears by said adjusting means in at least one direction relative to said lever; said first gear adapted for driving connection with said moveable member; said second gear operative to adjustably lock said first gear to said lever and to transmit forces between said lever and said first gear for moving said friction member into engagement and disengagement with said rotating member; said adjusting means operative to apply a torque to rotate said second gear relative to said lever and effect a clearance adjusting rotation of said gear in response to pivotal movement of said lever; and wherein said improvement comprises:

a two-way torque limiting ratchet clutch having torque transmitting capacity in both drive directions, said clutch operative in one drive direction to resist slipping and to allow a clearance decreasing rotation of said second gear while said forces transmitted are below a first predetermined level, said clutch operative in said one drive direction to slip and prevent said clearance decreasing rotation in response to said forces transmitted exceeding said first predetermined level, said clutch operative in the other drive direction to slip and prevent a clearance increasing



rotation in response to said transmitted forces exceeding a second predetermined level, and said clutch operative in said other drive direction to slip and prevent said clearance increasing rotation in response to said inhibiting force when said transmitted forces fall below said second predetermined level.

4,094,391

SUITCASE WITH WHEELS AND TRANSPORTING HOOK

Debrilla M. Ratchford, 1900 S. Eads St., Arlington, Va. 22202

Filed Apr. 18, 1977, Ser. No. 788,529

Int. Cl.² A45C *13/26*

U.S. Cl. 190—18 A **15 Claims**

1. A suitcase engaging hook having a handle, a support member configured to engage suitcases, a shank connecting the handle and support member, the support member comprising a relatively long portion having first and second ends, the first end connected to the shank at an angle, retaining means connected to the second end for preventing accidental removal of suitcases from the support member, wheel carrier assemblies connected to a suitcase engaged by the suitcase engaging hook, and wheel assemblies rotatably supported by the wheel carrier assemblies.

4,094,392

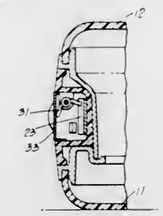
LUGGAGE LATCH MECHANISM

James S. Gregg, Denver, and William J. Reynolds, Arvada, both of Colo., assignors to Samsonite Corporation, Denver, Colo.

Filed Mar. 1, 1977, Ser. No. 773,375

Int. Cl.² A45C *13/10*

U.S. Cl. 190—41 R **4 Claims**



2. In a luggage case having first and second case sections closable upon each other, the first case section including a latch mechanism for releasably joining the case sections together when they are closed, said latch mechanism being released by moveing a drive plate along a first direction, comprising:

a detent mounted to said first case section to rotate under the influence of gravity alone in a plane transversely of the direction of movement of said drive plate from a first position preventing said drive plate movement to a second position out of the path of movement of said drive plate.

4,094,393

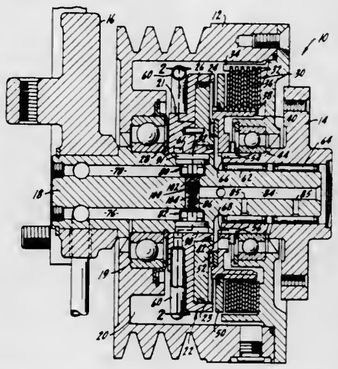
CLUTCH MECHANISM

Romas Balys Spokas, Rockford, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Apr. 27, 1977, Ser. No. 791,370

Int. Cl.² F16D *43/25, 25/08, 13/74*

U.S. Cl. 192—82 T **7 Claims**



1. A temperature responsive drive mechanism comprising a driving member and a driven member, a friction clutch connected between said members adapted to provide a releasable coupling therebetween, an actuator mechanism associated with said members and adapted to engage said clutch in response to fluid pressure, a source of pressure and a sump for said mechanism, a fluid for connecting a said source to said actuator, said fluid circuit including a valve having temperature responsive means exposed to a medium of varying temperature, said valve having two positions, a pair of fluid passages connecting said drive mechanism and said valve, said valve being connected to said source, one of said passages connected to said actuator to supply pressure thereto, said valve being operative to alternatively connect said source to either of said conduits connected to said drive mechanism and to alternatively connect said conduits to a return passage to said sump,

whereby one of said passages will supply pressure to the actuator to engage the clutch when supplied with fluid pressure by the valve when the temperature of said medium exceeds a predetermined maximum, and the other of said passages when supplied with pressure providing lubricant supply to said drive mechanism when said valve is the other position and said medium is below a predetermined temperature; said pair of passages alternatively acting as return fluid passages when the other passage is connected to said source.

4,094,394

CLUTCH THROW-OUT DEVICE

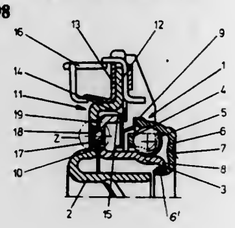
Walter Köder, and Reinhart Hillmann, both of Schweinfurt, Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Germany

Filed Mar. 30, 1977, Ser. No. 783,005

Claims priority, application Germany, Apr. 10, 1976, 7611433[U]

Int. Cl.² F16D *19/00*

U.S. Cl. 192—98 **9 Claims**



1. In a clutch throw-out device having a self-centering thrust bearing with a fixed bearing ring, the fixed bearing having a radially extending flange, a pressure plate, and means coupling said pressure plate to said flange to inhibit relative rotation between said flange and pressure plate, the improvement wherein said coupling means comprises projection means on one of said plate and flange and positioned to extend into a recess in the other of said plate and flange, said recess being sufficiently large to permit substantial radial play between said projection means and recess, and elastic means in said recess between said pressure plate and projection means.

4,094,395

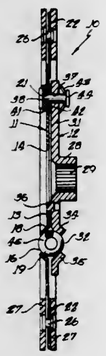
TWO PIECE DRIVEN PLATE ASSEMBLY

William Lee Brown, Chicago, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sep. 2, 1976, Ser. No. 720,040

Int. Cl.² F16D *3/14*

U.S. Cl. 192—106.2 **19 Claims**



1. A one-piece stamped hub element for a two-piece clutch plate assembly having coil springs between such element and its friction clutch plate, comprising a barrel and an integral flange, said barrel extending entirely from one side of said flange, said flange having spring pockets receiving the coil springs with each pocket having an inner and an outer spring retaining lip, and pivoting means on said flange for positioning of said friction clutch plate including a plurality of bosses projecting from the side of said flange opposite but closely adjacent to said barrel, said bosses being extruded from the flange during a stamping operation to form the hub element.

4,094,396

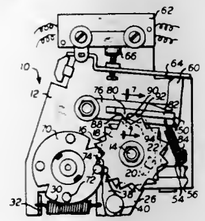
CONTROL DEVICE FOR A COIN OPERATED MECHANISM

Harry Greenwald, Whitestone, N.Y., assignor to Walter Kidde & Company, Inc., Clifton, N.J.

Filed Mar. 7, 1977, Ser. No. 774,963

Int. Cl.² G07F *15/12*

U.S. Cl. 194—1 M **5 Claims**



1. A control device for a coin operated mechanism, said device comprising:

(a) a mounting plate;

(b) a shaft projecting from said mounting plate;

(c) a ratchet wheel and a star wheel rotatably mounted on said shaft in axially spaced relation, each of said wheels having a pin thereon projecting toward the other wheel, and said pins each being located at an equal radial distance from the axis of said shaft;

(d) first stepping means oscillatably mounted on said shaft and operatively connected to the coin operated mechanism, said stepping means comprising a pawl assembly engagable with the teeth of said ratchet wheel to step-wise rotate said wheel in one direction by a distance of one tooth upon movement of said stepping means;

(e) switch means mounted on said plate having a switch movable from a normally closed state to an open state;

(f) a spring biased switch operating arm pivotally mounted on said plate and operatively connected to said switch, said arm having a follower portion engagable with the teeth of said ratchet wheel;

(g) said switch being in its closed state when the follower portion of said switch operating arm is located between the teeth of said ratchet wheel, and said switch being moved to its open state when said follower portion is displaced to the outer end of a tooth of said ratchet wheel;

(h) an electrically operated timer mounted on said plate having an energizing circuit controlled by said switch, said timer comprising second stepping means operable when said switch is in its closed state to engage with the teeth of said star wheel and intermittently rotate said star wheel in the same direction of rotation of said ratchet wheel, such rotation of said star wheel causing the pin thereof to engage with the pin of said ratchet wheel;

(i) the follower portion of said switch operating arm being displaced to the outer end of a tooth of said ratchet wheel upon conjoint rotation of said star wheel and said ratchet wheel in said one direction by the engagement of said pins to open said switch; and

(j) a spring biased lever member pivotally mounted on said plate and engagable with said star wheel, said lever having restraining means located to engage one of the teeth of said star wheel upon said conjoint rotation of said star wheel and said ratchet wheel to prevent counterrotation

of said star wheel in a direction opposite to said one direction when said switch is in its open state, the engagement of said pins preventing counterrotation of said ratchet wheel in said opposite direction wherein said switch follower portion is held in its displaced position on the outer end of said ratchet wheel tooth to prevent the inadvertent movement of said switch to its closed state.

4,094,397

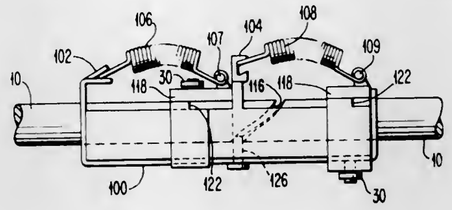
TYPEWRITER SELECTION DRIVE FOLLOWER BLOCK AND SHUTTLE ASSEMBLY

Frank Marion Hughes, Paris, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 3, 1977, Ser. No. 756,307

Int. Cl.² B41J *23/04*

U.S. Cl. 400—161.4 **2 Claims**



1. A shuttle assembly for use in a single element typewriter comprising:

a shuttle body, conformed to move axially over a rotating shaft;

a projection extending from the shuttle body toward the axis of said rotating shaft to engage a cam groove formed in the surface of said shaft;

at least one follower member;

biasing means for biasing said follower member against said shuttle body and in an axial direction, said follower member having a stop engaging surface thereon whereby said follower member upon the engagement of said engaging surface with a stop member will cease to translate and said shuttle body will continue to translate and said biasing means will provide a force through said follower member against said stop member.

4,094,398

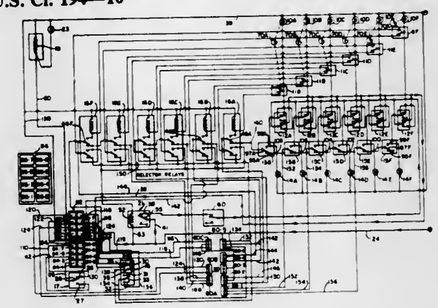
COMPOSITE VENDING CIRCUIT DISPOSABLE IN SINGLE- AND MULTIPLE-PRICED CONFIGURATIONS

Vernon D. Camp, Chattanooga, Tenn., and Raymond D. Bowman, Fort Oglethorpe, Ga., assignors to Cavalier Corporation, Chattanooga, Tenn.

Filed Jun. 27, 1975, Ser. No. 590,855

Int. Cl.² G07F *11/00*

U.S. Cl. 194—10 **13 Claims**



1. A composite vending circuit disposable in either of a first, single-priced circuit configuration adapted to be coupled to a first, single-priced coin-operated vend mechanism for establishing a first energization circuit in response to coin deposit of at least a first value, and of a second, multi-priced circuit configuration adapted to be coupled to a second multi-priced coin-operated vend mechanism for establishing at least a second energization circuit in response to coin deposit of at least a second value and for establishing a third energization circuit in response to coin deposit of at least a third value differing from the second value, said composite vending circuit comprising:

a. a plurality of vend motors each corresponding to one of a plurality of columns of articles adapted to be selectively dispensed from its corresponding column, one-at-a-time, according to the choice of a customer;

b. a plurality of selector switches, one for each vend motor, adapted upon selective actuation by the customer to energize a corresponding vend motor for dispensing an article from a selected column;

c. a plurality of selector relays, one for each corresponding vend motor and selector switch, having an operating winding adapted to be selectively energized upon actuation of its corresponding selector switch; and

d. switch means disposable to a first position for connecting said selector relays in series with each other and for connecting the first energization circuit of the single-priced coin-operated vend mechanism to said series-connected selector relays whereby said circuit is disposed in its single-priced circuit configuration, and to a second position for connecting independently the second and third energizing circuits, respectively, to first and second groups of corresponding selector relays and for connecting independently said first and second groups of selector relays to corresponding first and second groups of selector switches, whereby said composite circuit is disposed in its multi-priced circuit configuration.

4,094,399

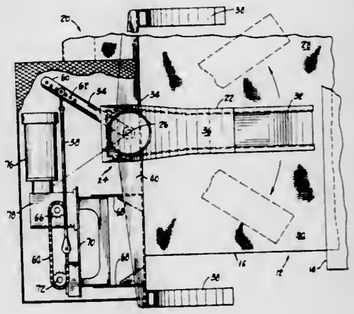
OSCILLATING FEED ASSEMBLY AND DRIVE ESPECIALLY FOR A DRYER CONVEYOR

K. A. George, Levittown, Pa., assignor to Procter & Schwartz, Inc., Philadelphia, Pa.

Filed Jul. 28, 1976, Ser. No. 709,494

Int. Cl.² B65G *47/20*

U.S. Cl. 198—535 **5 Claims**



1. A dryer for particulate material comprising

a dryer housing;

conveyor means having a conveyor carrying run adapted to convey particulate material to said housing;

a distributing feed-chute including a discharge end for uniformly distributing particulate material onto the conveyor means carrying run;

pivot means pivotally supporting said feed-chute so that the discharge end is above the conveyor carrying run;

a drive means adapted to pivot said feed-chute so that it traverses the conveyor carrying run with quick reversal of

the feed-chute discharge end at the end of each traverse, said drive means thereby being subjected to rapid acceleration and deceleration forces, said drive means including a continuous chain drive;

said chain drive comprising a double strand roller chain, a plurality of pins connecting successive links of said chain strands, an adjacent pair of said pins extending laterally from said chain strands, and a bearing pin supported by said pairs of pins;

a pair of spaced-apart sprockets on which said chain drive is mounted, said sprockets being of relatively small diameter adapted to effect said quick reversal of the feed-chute discharge end;

a lever arm to pivot said chute; and

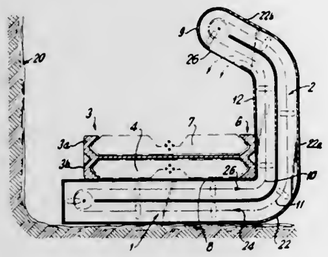
linkage means between said chain drive and lever arm connected to said chain drive bearing pin whereby the feed-chute discharge end reciprocatingly traverses the conveyor means carrying run on movement of the bearing pin between the chain drive sprockets.

4,094,400

CONVEYOR FOR CONVEYING FINE MATERIAL

Ernst Braun, and Gert Braun, both of Essen-Heisingen, Germany, assignors to Halbach & Braun, Germany

Filed Sep. 27, 1976, Ser. No. 727,250
Claims priority, application Germany, Oct. 2, 1975, 2543987
Int. Cl.[2] B65G *19/08, 19/14*
U.S. Cl. 198—607 **6 Claims**



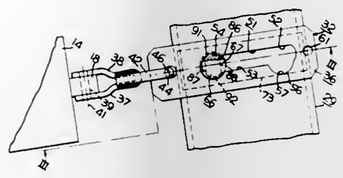
1. A conveyor for conveying fine materials, particularly a fine coal conveyor for underground operations, comprising a first conveyor unit comprising a substantially C-shaped housing with a bottom horizontal leg, a vertical leg connecting one end of said horizontal leg and an upper leg extending backwardly from said vertical leg over said horizontal leg, a horizontal section in said housing horizontally movable in a transport direction and a vertical section in said housing vertical leg connected to the opposite end of the horizontal section from the beginning of the transport direction in a position to direct the fine materials received from the horizontal section vertically upwardly, and an upper section extending backwardly from said vertical section over said horizontal section, a second conveyor unit mounted on the horizontal housing leg and located adjacent said first conveyor unit including upper and lower superposed troughs having respective upper and lower conveyor sections running in respective upper and lower troughs, said horizontal section of said first conveyor unit having a reversal end and being disposed to traverse at least a portion of said lower section of said second conveyor in the vicinity of said reversal end and substantially at right angles to the direction of transport on said horizontal section, said horizontal section receiving the fine materials from the lower section and delivering the fine materials to the vertical section for movement thereon, said vertical section having a discharge directed to said upper section.

4,094,401

QUICK RELEASE FOR CATERNARY ROLLERS

Gerald D. Sanderson, Belleville, Canada, assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 17, 1976, Ser. No. 751,377
Int. Cl.[2] B65G *15/60*
U.S. Cl. 198—827 **7 Claims**



1. A quick release mechanism for a catenary carrier for a conveyor belt comprising:

a support having walls defining a cylindrical opening;

a link adapted at one end for attachment to one end of a catenary carrier for a conveyor belt moving in a predetermined direction and including wall means at its other end defining an elongated slot with opposite closed ends, said wall means including a pair of spaced walls defining a channel portion of said slot of predetermined width and an arcuate wall defining an annular portion at the closed end of said slot nearest said carrier, said annular portion having a diameter of greater dimension than the width of said channel portion of said slot; and

a locking pin having

a cylindrical bearing portion pivotally mounted in said cylindrical opening, and

a neck disposed in said slot presenting a pair of diametrically opposite concentric annular surfaces and a pair of diametrically opposite faces spaced a distance from one another less than the diameter of said annular surfaces and less than the width of said channel portion of said slot;

said pin being pivotable between a locking position wherein said annular surfaces engage diametrically opposite portions of said arcuate wall whereby said annular portion of said slot is supported on said neck of said pin and a release position wherein said faces are aligned with said channel portion of said slot thereby allowing said link to slide on said pin to place said catenary carrier in a lowered position wherein said pin abuts the wall means at the closed end of said slot remote from said carrier.

4,094,402

INLAY FABRIC

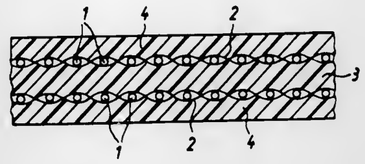
Hugo Heeke, Hamburg, Germany, assignor to Conrad Scholtz AG, Hamburg, Germany

Filed Apr. 27, 1976, Ser. No. 680,693
Claims priority, application Germany, Apr. 30, 1975, 2519448
Int. Cl.[2] B29H *9/02*
U.S. Cl. 198—847 **11 Claims**

1. A conveyor belt which is transverely stiff, has low longitudinal stiffness, and is capable of accommodating tensile forces, comprising, in combination, an elastomer and an inlay fabric embedded within said elastomer, said inlay fabric comprising:

warp threads to be arranged longitudinally of the conveyor belt; and

relatively stiff weft threads extending transversely of the warp threads, said weft threads having a diameter in the range of 0.2 mm. to 1.0 mm., the density of said weft threads ranging from 60 to 120 threads per 100 mm. of



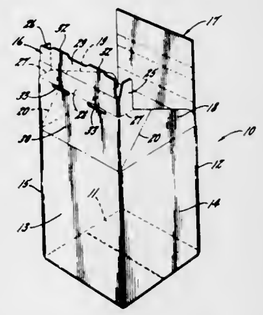
fabric length, and said warp threads having a crimp between 6.5% and 22.5%.

4,094,403

DISPLAY CARTON

Bram A. Takefman, Evanston, and Donald C. Baxter, Winfield, both of Ill.

Filed Jan. 17, 1977, Ser. No. 760,028
Int. Cl.[2] B65D *79/00, 5/02*
U.S. Cl. 206—45.13 **4 Claims**



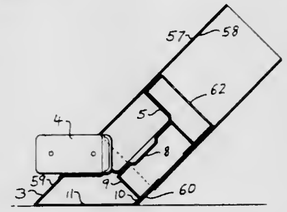
1. A combined shipping and merchandising carton comprising opposite top and bottom panels and two opposing side panels joined to margins of the top and bottom panels to form a carton of generally rectangular cross-section, inner and outer flaps forming an end closure for said carton; said inner flap being hingedly joined to an end margin of said bottom panel to swing outwardly relative to the latter from a closed position in which said inner flap is disposed substantially perpendicular to said bottom panel to an open position in which said inner flap is disposed substantially in the plane of said bottom panel, side flaps hingedly joined to end margins of said side panels and also hingedly joined along their bottom margins to the adjacent margins of said inner flap, a fold line extending across each of said side flaps and permitting each side flap to fold upon itself and swing to a closed position when said inner flap is swung to its closed position and to unfold and swing to an open position when said inner flap is swung to its open position, each of said side flaps, when in its closed position, underlying said inner flap and being disposed substantially perpendicular to its respective side panel and, when in its open position, being disposed substantially in the plane of its respective side panel; a said outer flap being hingedly joined to an end margin of said top panel to swing outwardly relative to the latter from a closed position in which said outer flap is disposed in a plane substantially perpendicular to said top panel and overlies said inner flap, and an open position in which said outer flap is disposed substantially in the plane of said top panel, means for fastening a lower end portion of said outer flap to a lower end portion of said inner flap when said flaps are in said closed positions thereby to hold all of said flaps in said closed positions during shipping, means enabling the freeing of an upper portion of said outer flap from the secured lower portion of said outer flap thereby to permit all of said flaps to be swung open to merchandising positions after shipping; and means for holding said flaps in said merchandising position including tabs projecting from each side flap, each tab being joined to its respective side flap along a hinge line which permits each tab to underly said inner flap when in closed position and to be swung inwardly to a position in which said tab is disposed in an upright plane when said inner flap is in merchandising position, said inner flap being defined by a main body portion extending outwardly from said bottom panel to a location adjacent said tabs when the latter are in said merchandising positions, said inner flap also including a first panel hingedly joined to the outer end of said body portion to swing upwardly to a merchandising position along the outer faces of said tabs when the latter are in their merchandising positions, said inner flap further including a second panel hingedly joined to said first panel to wrap downwardly around the upper ends of said tabs when the latter are in their merchandising positions and to fold to a merchandising position lying along the inner faces of said tabs, an ear on the free edge of said second panel, and a slot in said body portion for receiving said ear to lock said tabs and said first and second panels in their meerchandising positions.

4,094,404

COMBINED DISPLAY AND SHIPPING PACKAGE

Paul D. Miller, New York, and V. Lorenzo Porcelli, Ossining, both of N.Y., assignors to GAF Corporation, New York, N.Y.

Filed Mar. 14, 1977, Ser. No. 777,118
Int. Cl.[2] B65D *5/50, 5/52*
U.S. Cl. 206—45.15 **2 Claims**



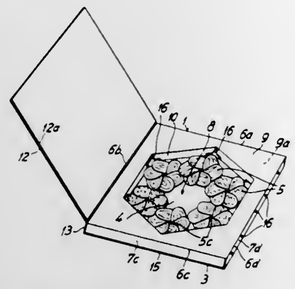
1. An improved shipping and display package comprising an outer sleeve, and an inner shell, said outer sleeve having an outer and inner surface, said inner shell having a front, back, side and end surfaces with at least one end surface inclined to the front surface of said inner shell, a display tray within and secured to said inner shell, an upper surface of said display tray lying in the same plane as the front surface of the inner shell, a well located on the front surface of said inner shell for supporting said display tray within the inner shell, said display tray being constructed to accommodate a display item in one of two alternate positions, a first position in which the display item is totally enclosed within said tray with no portion of said item extending above the top surface of said tray and a second position in which the displayed item protrudes above the top surface of said display tray, when the display item is in said second position said outer sleeve is in a position above said display item, thereby enlarging the surface area of the display package in a telescoping manner, the combined centers of gravity of the displayed item and the display package being located in a position that prevents the display package from tipping when said package is resting on said inclined end surface.

4,094,405

SALES PACKAGING

Walther Ruger, Munich, Germany, assignor to Refeka Werbemittel GmbH, Munich, Germany

Filed May 12, 1976, Ser. No. 685,514
Int. Cl.[2] B65D *85/50*
U.S. Cl. 206—423 **11 Claims**



1. A rigid container having foldable portions, said container designed to protect fragile contents while allowing said contents access to air comprising:

a. a base;

b. compartments mounted essentially on said base defining a folding compartment zone, each compartment foldable about its contents in a manner which allows the contents access to air;

c. a cover wall ring surrounding the folding compartment zone having an opening defining the area of said zone, said cover wall ring having outer edges defining the outer periphery thereof, and inner edges defining the opening thereof;

d. outer side walls extending downwardly from said outer edges, respectively, for supporting and elevating said cover wall ring in spaced relationship to said base; and

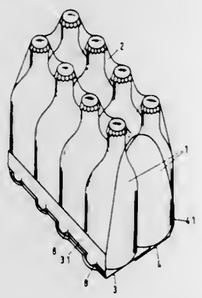
e. a cover hingable on said cover wall ring, said container having air passage means operable when the cover is in the closed position for passage of air between the compartment zone and the area exterior to the container.

4,094,406

PACKAGE FOR A GROUP OF ARTICLES

Jurgen Zietzschmann, Kordel, Germany, assignor to The Mead Corporation, Dayton, Ohio

Filed Mar. 28, 1977, Ser. No. 782,302
Int. Cl.[2] B65D *65/18*
U.S. Cl. 206—432 **14 Claims**



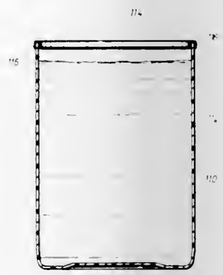
1. A package for a group of articles, particularly bottles, cans, or the like, comprising a wrapper placed around the group of articles and open at opposing ends, said wrapper being formed from a substantially rectangular blank which has two oppositely disposed closure portions adapted to be joined together for securing said wrapper, characterized in that the blank is provided at both of said closure portions with a closure strip (3, 4) made of paperboard and in that the area of said blank intermediate said closure portions having end portions and being partially of a film of plastic material (2) which is joined at its end portions to the closure strips (3, 4), and in that tightening apertures (5) are formed in said closure strips and in that locking tongues (6) are formed in one of said closure strips and apertures (7) are formed in the other of said closure strips said tongues received by said apertures to form said wrapper.

4,094,407

NONPANELLING PLASTIC OIL CONTAINER

Jack Hurst, Houston, Tex., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Feb. 4, 1977, Ser. No. 765,502
Int. Cl.[2] B65D *81/00*
U.S. Cl. 206—524.3 **3 Claims**



1. A filled plastic container of hydrocarbon lubricating oil having a reduced tendency to panel which consists essentially of:

(a) a wide mouth cylindrical container fabricated from an ethylene polymer having a density of at least about 0.950 gms/ml in which at least the inner surface of the container contains about 10 - 1,000 ppm of carbon black and the entire body of the container contains at least about 1.0 wt. % of TiO_2 pigment,

(b) a liquid hydrocarbon lubricant which substantially fills the container, and

(c) a cap affixed to and sealing the container.

4,094,408

CONTAINERS FOR PILLS AND THE LIKE

John B. Ford, 6118 Webber-Cole Rd., Kinsman, Ohio 44428

Filed Feb. 14, 1977, Ser. No. 768,141
Int. Cl.[2] B65D *83/04*
U.S. Cl. 206—534 **3 Claims**

1. A container for carrying medical capsules, pills, and the like on one's person for handy and convenient use, comprising:

a tubular center section and two tubular end sections connected to opposite ends of said center section in axially aligned relation,

said center section being H-shaped in longitudinal section and providing tubular cylindrical portions at its opposite ends and an intermediate transverse wall which blocks communication between the interior of said cylindrical portions,

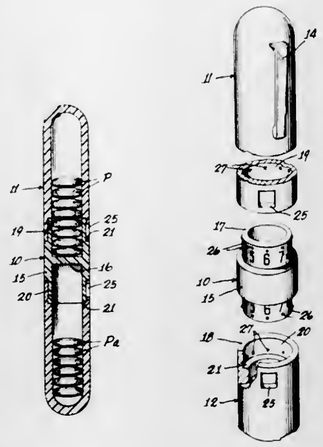
each of said end sections being in the form of an elongated barrel adapted to contain pills and the like, each barrel being closed at an outer end and open at an inner end,

the open inner end of each barrel having a smooth surfaced cylindrical recess of a size closely and rotatably receiving a respective one of said center section cylindrical portions thereby to effect assembly of said end sections with said center section, with the interiors of said end sections isolated from each other by said transverse wall,

said center section cylindrical portions and said end section

cylindrical recesses having like diameters whereby either said end section may be cooperatively associated with either end of said center section,

each said center section cylindrical portion having a circumferential series of uniformly spaced projections and each said cylindrical recess of said end sections having a complementary series of circumferentially uniformly spaced projection-receiving recesses, thereby effecting snap fit



association of said end sections with said center section and further retaining either said end section in a selected rotational position with respect to said center section, and,

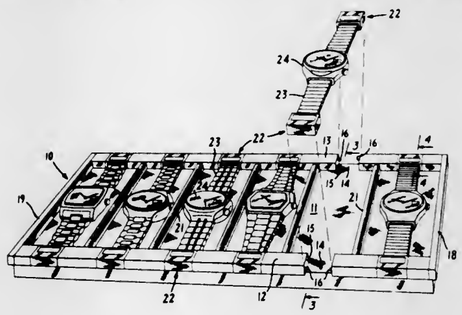
indicia associated respectively with each said end sections and said center section and circumferentially related to said projections and recesses for indicating selected rotational positions of said center and end sections with respect to each other.

4,094,409

SAMPLE DISPLAY TRAY

Douglas M. Spranger, Brooklyn; Malcolm J. Brookes, New York, both of N.Y., and Paul J. Mulhauser, Paramus, N.J., assignors to Seiko Time Corporation, New York, N.Y.

Filed Apr. 8, 1977, Ser. No. 785,924
Int. Cl.[2] B65D *1/36, 85/40*
U.S. Cl. 206—566 **9 Claims**



1. Apparatus for releasably holding articles to be displayed comprising:

a generally planar display surface having a raised edge portion formed with a recess;

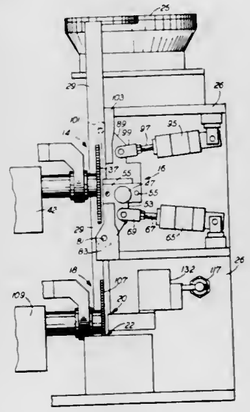
a clasp assembly to be releasably secured over one end of an article and consisting of a slotted enclosure having a pivotally mounted member formed with a generally inwardly depending finger movable upon pivoting of said member alternately to press against and release the article inserted within the slot, a sidewall of said enclosure being resiliently formed with a throated detent opening outwardly to receive a corresponding boss element formed on and projecting away from a corresponding sidewall of said recess in the edge portion of the display surface, the width of the throat of said detent being slightly less than the diameter of said boss.

4,094,410

METHODS OF AND APPARATUS FOR CONVEYING, TESTING AND SORTING ARTICLES AND STRAIGHTENING THEIR LEADS

Charles R. Fegley, Laureldale; Richard H. Morrow, Temple, and Arthur G. Naylor, Wyomissing, all of Pa., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Oct. 12, 1976, Ser. No. 731,279
Int. Cl.[2] B07C *5/08*
U.S. Cl. 209—73 **19 Claims**



1. A method of conveying articles which comprises the steps of:

guiding the articles along a first portion of a path tangential to a rotatable member having notches spaced on the periphery thereof which substantially conform to at least a part of the outer configuration of the articles; and

moving the rotatable member to engage such part of each of the articles with one notch to space the articles from each other in accordance with the spacing of the notches, to support the articles in the notches and to controllably move the articles with the rotatable member along a second portion of the path adjacent to, and in alignment with, the first portion.

4,094,411

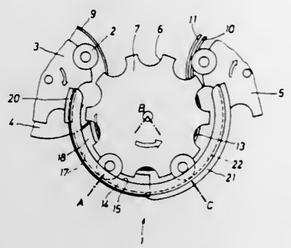
APPARATUS FOR CONVEYING UPRIGHT STANDING CONTAINERS AND REJECTING ABNORMAL CONTAINERS

Hermann Kronseder, Regensburger Strasse, Worth, Donau, Germany; Karl Dullinger, Neutraubling, Germany, and Kurt Matzinger, Regensburg, Germany, assignors to Hermann Kronseder, Worth, Donau, Germany

Filed Dec. 1, 1976, Ser. No. 746,275
Claims priority, application Germany, Dec. 13, 1975, 2556338
Int. Cl.[2] B07C *9/00*
U.S. Cl. 209—97 **15 Claims**

1. In apparatus for conveying upright standing containers on a curved path, said apparatus including a driven star wheel which advances containers in spaced relation along said path, said apparatus having a transfer point at the beginning of the curved path where containers are fed into the star wheel and a second transfer point at the end of the curved path where normal containers are discharged from the star wheel, the

improvement for rejecting abnormal containers laterally from the star wheel intermediate said transfer points and comprising a curved support rail on which the container rests and a curved guide rail spaced above the level of the said curved support rail to form in a spacing between the guide and support rails and intermediate said transfer points an abnormal container reject-



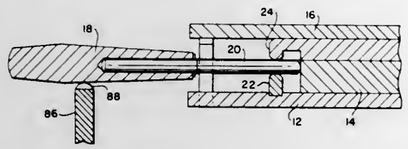
ing gap, said gap being longer than the container diameter and higher than the abnormal container, said rails being substantially concentric to the star wheel, said guide rail being disposed outside the path of that part of the container which bears against it by centrifugal force, whereby abnormal containers of a height less than said spacing will be rejected by centrifugal force through said gap.

4,094,412

ROLLING METHOD OF SORTING PARTICULATE ARTICLES

Kurt H. Hoppmann, Falls Church, Va., and George W. Edmunds, Derwood, Md., assignors to Hoppmann Corporation, Springfield, Va.

Filed Nov. 30, 1976, Ser. No. 746,024
Int. Cl.[2] B07C *5/04*
U.S. Cl. 209—106 **22 Claims**



1. Rolling method of sorting particulate articles comprising:
(A) radially distributing said articles upon a member having an axis;
(B) advancing said articles upon a plurality of peripherally spaced rotating spindles extending radially outwardly of said axis, and
(C) discharging said articles from said spindles.

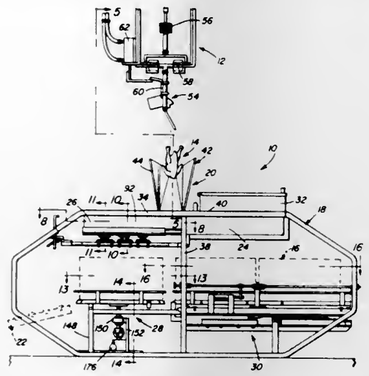
4,094,413

POULTRY WEIGHING AND PACKING METHOD

William F. Altenpohl, 1315 Robin Hood Rd., and Paul J. Altenpohl, 1411 Longcreek Dr., both of High Point, N.C. 27260

Division of Ser. No. 571,005, Apr. 22, 1975, Pat. No. 3,988,874.
This application Jun. 15, 1976, Ser. No. 696,391
Int. Cl.[2] B07B *13/08*
U.S. Cl. 209—121 **9 Claims**

1. In combination with a sorting mechanism having a conveyor from which objects are suspended by a plurality of carriers and means for releasing sorted objects from the carriers at a sorting station, a container filling machine, including inlet means operatively positioned relative to the sorting station for receiving sorted objects released from the carriers, accumulator means connected to the inlet means for storing said objects, ram means for displacing each of the sorted objects received in the inlet means into the accumulator means to compact the same, and guide means connected to the inlet means for positioning each of the objects in a predetermined orientation relative to the ram means prior to said displacement into the accumulator means, said carriers being spaced from each other by a predetermined distance along a path of travel of the conveyor, and means responsive to unloading of the



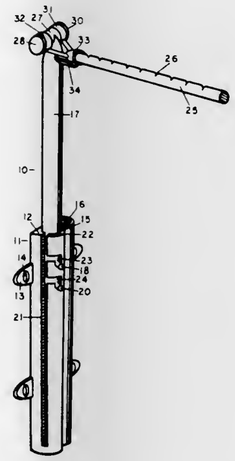
sorted objects from the carriers at said sorting station for delaying operation of the ram means until the unloaded carrier is advanced by the conveyor a predetermined distance from the sorting station to synchronize operation of the machine with movement of the conveyor.

4,094,414

CLOTHES HANGING RACK

Richard E. Thiot, and Phyllis J. Thiot, both of 4981 Cedar Bay St., Orlando, Fla. 32806

Filed Jun. 6, 1977, Ser. No. 803,544
Int. Cl.[2] A47F *7/24*
U.S. Cl. 211—1.3 **9 Claims**



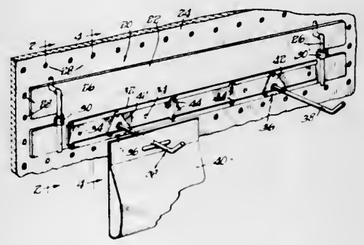
1. A clothes hanging rack comprising in combination:
a container having a pair of adjacent bores therein;
a telescoping rod mounted for telescoping into and out of one of said bores in said container;
a clothes hanging bar pivotally mounted to said telescoping rod for pivotal movement thereon and having a horizontal support positon and a folded storage position with said clothes hanging bar being positioned the other of said bores in said container in said folded storage position;
support bracket means for supporting said clothes hanging bar in a generally horizontal position when said clothes hanging bar is in its working position; and
locking means for locking said telescoping rod in a telescoped position, whereby a foldable clothes hanging rack may be conveniently stored in a laundry room.

4,094,415

DISPLAY RACK DEVICE

Charles O. Larson, Sterling, Ill., assignor to Chas. O. Larson Co., Sterling, Ill.

Continuation of Ser. No. 372,411, Jun. 21, 1973, abandoned.
This application Dec. 3, 1974, Ser. No. 529,154
Int. Cl.[2] A47F *7/00*; A47B *96/06*
U.S. Cl. 211—57.1 **9 Claims**



1. A display rack device for attachment to an apertured vertical panel, said device including a plurality of generally elongate arms each having a free extremity for telescopically accommodating goods for display purposes, mounting means associated with the opposite extremity of said arms and extending laterally thereof, an elongate horizontal support member extending substantially normal to said arms for accommodating a plurality of said mounting means in horizontally spaced relation, a plate to which the elongate support member is secured along the length thereof for attaching said elongate member to an apertured vertical panel and with the ends of the support member terminating short of the ends of the plate leaving plate end portions beyond each end of the support member, said plate having at least two longitudinally spaced apertures, one through each of said plate end portions and offset outwardly of adjacent ends of the support member to be placed in registry with two apertures of said apertured vertial panel, and rod means having a first bent portion for insertion through the aligned apertures of said plate and said apertured vertical panel and moved into position behind said apertured vertical panel, and a forwardly offset second bent portion to be placed over the front face of said plate end portions, and a resilient gripping finger formed as an integral part of each said plate end portion and extending forwardly from the front face thereof and presenting an open throat between the ends of the support member and the plate to receive the second bent portion of said rod means transversely across the plate end portions and spaced from adjacent ends of the support member for resiliently and removably securing it in place in direct surface contact against the front face of the plate end portions, thereby securing said plate and said support member to said apertured vertical panel.

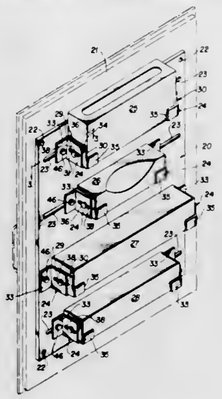
4,094,416

SUPPORT FOR DISPENSING PACKAGES

James A. Smith, 19 Donelon Dr., Harahan, La. 70123

Filed Apr. 29, 1977, Ser. No. 792,105
Int. Cl.[2] A47F *7/17*
U.S. Cl. 211—71 **11 Claims**

1. A support for dispensing packages and the like comprising a panel body adapted for attachment to the interior of a cabinet door or the like, said panel body having at least one elongated adjustment slot formed therethrough across the panel body, and at least a pair of adjustable dispensing package holder units on one side of the panel body adjacent said slot, each holding unit adapted to engage one end portion of the dispensing package and each holding unit comprising first and second bracket parts, fastener means connecting each first bracket part adjustably with the panel body through said slot, slotted fastener means adjustably connecting said first and second bracket parts of each holder unit adjustably along an axis perpendicular to



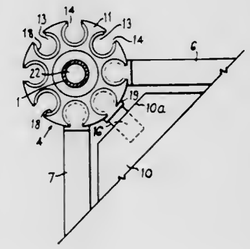
the panel body, each first bracket part having a lower flange adapted to engage beneath opposite end portions of a dispensing package to support the package, and each second bracket part having a flange perpendicular to the last-named flange adapted to overlap a side wall of a dispensing package spaced forwardly of the panel body and in a plane parallel thereto.

4,094,417

SHELVING AND DISPLAY SYSTEMS AND THE LIKE

Denis Alan Cairnes, and Derrick John Maltby, both of London, England, assignors to Cairnes Maltby Associates Limited, London, England

Filed Jan. 24, 1977, Ser. No. 761,955
Claims priority, application United Kingdom, Jan. 29, 1976, 3618/76
Int. Cl.[2] A47F *5/00*
U.S. Cl. 211—183 **9 Claims**



1. A bracket device for shelving systems, display systems and the like, comprising:
a body;
said body having a plurality of recesses disposed in and about the periphery thereof with the axes of said recesses being substantially parallel;
said recesses being opened at both ends of the body;
at least one support member for supporting an element of said systems from said body;
said support member comprising a body - engaging part and a projecting part;
said body-engaging part being slidable into a selected recess via either one of said open ends thereof with said projecting part projecting from the periphery of said body;

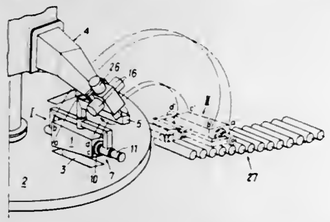
cooperating means on said body-engaging part and said body for retaining said support member in position when said support member is inserted into said recess, said cooperating means including shoulders on said body-engaging part and said body, each recess in the body having one of said shoulders adjacent each open end thereof, whereby when said body-engaging part is inserted into a selected recess via either open end, the shoulder on the body-engaging part abuts one of said shoulders adjacent the ends of said recess to retain said body-engaging part in said recess.

4,094,418

APPARATUS FOR SIMULTANEOUSLY PIVOTING, TILTING AND ROTATING A LINING BRICK

Alois Altendorfer, Linz, and Anton Stahrlinger, Stadl Paura, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed Oct. 13, 1976, Ser. No. 732,144
Claims priority, application Austria, Oct. 20, 1975, 7947/75
Int. Cl.[2] B65G *47/90*
U.S. Cl. 214—1 BC **6 Claims**



1. An apparatus for simultaneously pivoting, tilting and rotating a lining brick, in particular a converter lining brick having a trapezoidal cross-section, into a position adequate for stacking comprising

a stationary supporting stand,

a carrying arm journaled on the stationary supporting stand to be pivotable around a stationary axis,

a bracing means for holding the lining brick journaled on one end of the carrying arm to be rotatable around an axis that is skew relative to the stationary axis of the carrying arm, and

a planet gear capable of being disengaged provided to rotate the bracing means and having a central axis coinciding with the stationary axis of the carrying arm and an orbit axis coinciding with the axis of rotation of the bracing means whereby as the carrying arm and bracing means are each caused to turn about their respective axis by a drive means, the lining brick may be selectively turned end for end in the process of being transferred from one location to another location.

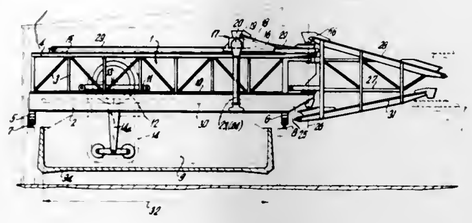
4,094,419

HANDLING PLANT FOR DUMPING AND DISCHARGING BULK MATERIALS

Rolf Krüger, Lubeck, Germany, assignor to O and K Orenstein & Koppel Aktiengesellschaft, Germany

Filed Oct. 12, 1976, Ser. No. 731,669
Claims priority, application Germany, Oct. 18, 1975, 2546757
Int. Cl.[2] B65G *65/28*
U.S. Cl. 214—10 **9 Claims**

1. A handling plant for dumping and discharging bulk material into or from a pile, comprising only one loading bridge adapted to span and be moved over the pile, said bridge having first and second support beam portions extending longitudinally of said bridge, each having a respective first and second trackway thereon, a dumping gear comprising a first trolley movable along said first trackway and having conveyor means for receiving the bulk material and for dumping it downwardly, and a removing gear comprising a second trolley movable along said second trackway, a support depending from said second trolley with a pivoted arm member at its



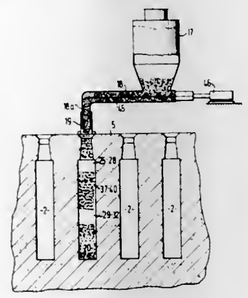
lower end, a roller guide at each end of said arm member and a conveyor entrained about said support and arm member, said removing gear and said dumping gear being capable of independent and combined operation over one area of the pile.

4,094,420

CHARGING OF AN OVEN CHAMBER OF A BATTERY OF COKE OVENS

Johann G. Riecker, Breitscheid, Germany, assignor to Hartung, Kuhn & Co., Dusseldorf, Germany

Division of Ser. No. 563,115, Mar. 28, 1975, abandoned. This application Jun. 10, 1976, Ser. No. 694,522
Claims priority, application Germany, Apr. 3, 1974, 2416151
Int. Cl.[2] C10B *31/02*
U.S. Cl. 214—35 R **5 Claims**



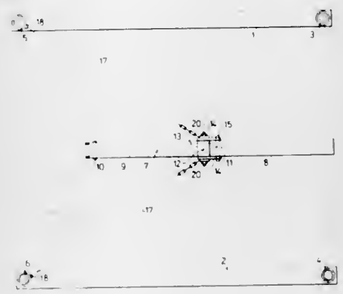
1. An apparatus for charging an oven chamber of a battery of coke ovens with coal through charging openings in an oven roof, comprising a larry car movable over said oven roof and provided with coal feed hoppers each having an outlet hole, said hoppers corresponding in number of said openings in said oven roof; and conveying means adapted for conveying said coal from each of said hoppers into said oven chamber, said conveying means including a plurality of pipes each operative for connecting one of said outlet holes of said hoppers with one of said charging opening in said oven roof, and a plurality of conveyor screws each located in one of said pipes and rotatable about its own longitudinal axis, each of said conveyor screws having a leading end as considered in the direction of coal conveying and is provided at said leading end with an extension configurated as a hollow cylindrical segment, said cylindrical segment being rigid with and in a fixed position relative to the respective conveyor screw for joint rotation therewith about said axis, said hollow cylindrical segment being adapted to close an associated one of said charging openings in said oven roof during a part of each revolution of the respective conveyor screw, so as to intermittently charge the coal from said outlet hole of said hopper into the corresponding opening of the oven roof.

4,094,421

DEVICE FOR UNLOADING OF TIMBER

Bengt Anders Nordin, Tåsjö-Lövvik, Hoting, Sweden

Filed Oct. 29, 1976, Ser. No. 736,933
Claims priority, application Sweden, Nov. 3, 1975, 7512271; Sep. 24, 1976, 7610613; Sep. 24, 1976, 7610614
Int. Cl.[2] B60P *1/00*
U.S. Cl. 214—82 **4 Claims**



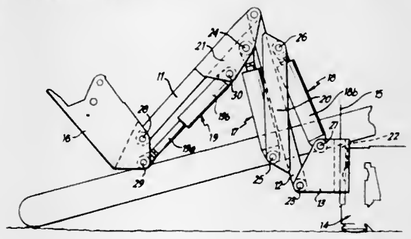
1. An apparatus for unloading timber from a loading platform of a vehicle and the like, said timber being stacked on a support such as, on timber bunks between at least two stationary stakes at one side of said platform and at least two removable stakes at the other side thereof, said apparatus comprising: a linearly reciprocating prime mover defined by a hydraulic jack enclosed in a non-circular tube extending beyond said jack and is provided with two longitudinal slots in two opposing side faces, said slots forming a guide for a slide member, and being secured to said platform beneath said said support, extending perpendicularly relative to said platform sides and centrally between said stationary stakes, and at least two elongated flexible members, each having a first end secured to each one of said stationary stakes at a distance upward from said support, the second end of each of said elongated members being attached to said prime mover through said slide member for lateral displacement of said platform upon reciprocation of said prime mover, whereby said elongated members which normally are loosely disposed along said stationary stakes and pass in under said stacked timber, are caused to be tensioned, as said second ends are laterally displaced, thereby forming a sloping ramp along which said timber moves down from said support.

4,094,422

BUCKET LOADER BOOM

Arthur David Thompson, Chorley, England, assignor to Dobson Park Industries Limited, Nottingham, England

Filed Sep. 20, 1976, Ser. No. 724,639
Claims priority, application United Kingdom, Oct. 7, 1975, 41111/75
Int. Cl.[2] E02F *3/81*
U.S. Cl. 214—145 R **7 Claims**



1. A protective type of boom structure for the actuator means in a bucket loader which is particularly adapted for low headroom mine workings comprising:

a yoke having at least limited pivotal motion about a generally vertical axis,

two articularly connected boom elements pivotally coupled to said yoke, one a remote or forward boom element and one a yoke or rearward boom element, each comprised of channel sections having a web portion forming a top wall and a pair of flange portions depending from said web portion forming a pair of downward inclined side walls thereby providing respective protected interior spaces therein,

a piggy-back channel section mounted forwardly on the top of said rearward boom element, also having a web portion forming a top wall and a pair of flange portions depending therefrom forming a pair of downward inclined side walls meeting the web portion of the boom element providing yet another protective interior space therein,

first ram actuation means extending along and at least partially within the interior space of said rearward boom element and between the rear end portions of said forward and rearward boom elements and being connected thereto so as to be operable to adjust the relative angular position of said boom elements,

second ram actuator means coupled at one end to said yoke and extending into said yet another protective interior of said piggy-back channel section and coupled at its other end to the forward portion thereof and being operable thereby to raise and lower the boom structure, and

third ram actuator means extending along and at least partially within the interior space of said forward boom element being coupled at one end to the bucket loader and its other end to a selected portion of said forward boom element and being operable to adjust the angular position of the bucket loader relative to said rearward boom element,

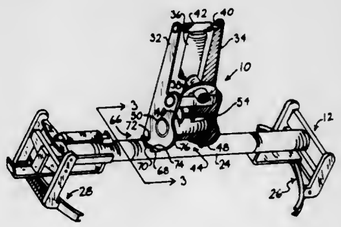
said channel sections thereby not only protecting the respective ram actuator means against mechanical damage but said web portions thereof being additionally able to protect the ram actuator means from overhead spoil in said mine working which may foul the ram actuator means and thus render them inoperable.

4,094,423

TILTING ASSEMBLY FOR PICK-UP HEAD

James Rogers, P.O. Box 2011, Haines City, Fla. 33844

Filed Jan. 31, 1977, Ser. No. 764,430
Int. Cl.[2] B65G *67/46*
U.S. Cl. 214—147 G **8 Claims**



1. An orienting assembly of the type primarily designed for use in positioning a boom supported pick-up head having a rotary shaft, said orienting assembly comprising:

frame means pivotally connected to the pick-up head in supporting relation thereto, said frame means disposed in movably interconnected relation between the head and the boom;

activating means disposed in driving, movable interconnection to the pick-up head;

lever means having at least a portion thereof fixedly attached

to said rotary shaft of said pick-up head and movably connected in driven relation to said activation means;
attachment means including a pivot shaft rotatably connected to said frame means and disposed for supported attachment to the boom, whereby the head is pivotable relative to said frame means upon operation of said activation means;
said frame means comprising at least two mounting plates rotatably mounted on said pivot shaft and each disposed in spaced apart relation to one another and in at least partially surrounding relation to said activation means; and
stabilization means mounted on said rotary shaft in sliding engagement with a peripheral edge portion of at least one of said mounting plates, said stabilization means correspondingly configured to at least a portion of the length of said peripheral edge, said one mounting plate biased into stabilized position upon mating engagement between said correspondingly configured peripheral edge and said stabilization means.

4,094,424

REFUSE CONTAINER DISCHARGE STATION

Samuel E. Harvey, Knoxville; James Stephen Whitehead, Maryville, and Paul L. Goranson, Knoxville, all of Tenn., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,524
Int. Cl.² B65G *69/22*
U.S. Cl. 214—304 **10 Claims**

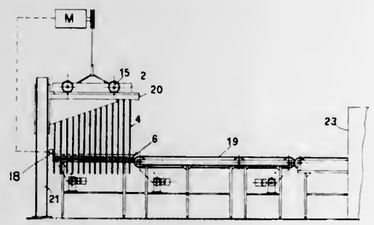
1. A refuse container unloading apparatus for discharging material from a transportable refuse container, comprising:
carriage means for supporting a removable container during unloading thereof, the carriage means being movable longitudinally thereof between a container receiving position and a container refuse unloading position;
positioning means connected to the carriage means for moving the carriage means between said positions, the positioning means including a deceleration means for slowing inertial movement of the carriage means; and
ejection means for discharging refuse from said container when the carriage is in the unloading position.

4,094,425

DEVICE AND A METHOD FOR HANDLING MATERIAL

Franco Gabbrielli, Via Reginaldo Giuliani, 126, 50141-Firenze, Italy

Filed Dec. 10, 1976, Ser. No. 749,265
Claims priority, application Italy, Dec. 24, 1975, 9663 A/75
Int. Cl.² B65G *65/04*
U.S. Cl. 214—310 **11 Claims**



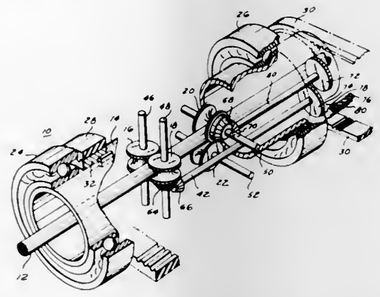
1. A material handling device comprising a roller conveyor component having rollers which are separated by gaps; a cage component which includes rows of uprights, the spacing and the thickness of the uprights in each row being such as to permit their insertion into said gaps and their movement through said gaps; crosspieces interconnecting the uprights of one row only with corresponding uprights of other rows, said crosspieces extending parallel to the axes of said rollers and being insertable in said gaps means for effecting relative movement between said cage and said conveyor perpendicularly to each other such that said uprights and said crosspieces can move through said gaps.

4,094,426

APPARATUS FOR IMPARTING INDEPENDENT ROTATIONAL AND TRANSLATIONAL MOVEMENT

Charles A. Vogel, Effingham, Ill., assignor to Fedders Corporation, Edison, N.J.

Filed Jun. 16, 1977, Ser. No. 807,165
Int. Cl.² B65H *51/10*
U.S. Cl. 214—338 **9 Claims**



1. Apparatus for imparting independent rotational and axial movements to a workpiece and combining such movements, including
(a) first means to impart rotational movement to the workpiece in a first direction and rotational movement to the workpiece in a second direction opposite to said first direction;
(b) second means to impart axial movement to the workpiece in a first axial direction transverse to the direction of rotation of the workpiece and in a second axial direction opposite to said first axial direction;
(c) first timing means for said first means to control the rate of rotation of the workpiece;
(d) second timing means independent of said first timing means to control the rate of axial movement of the workpiece; and,
(e) common means intercoupling said first and said second means and responsive thereto for simultaneously imparting the rotational and the axial movement to the workpiece, said common means being independently controlled by said first and said second means for independent axial and rotational movement of the workpiece.

4,094,427

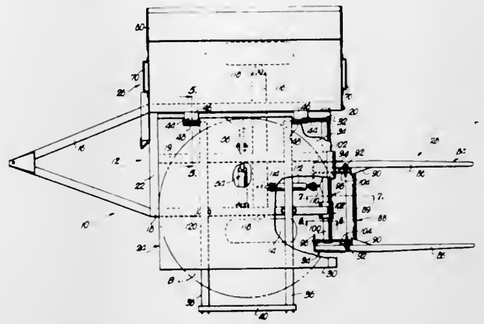
METHOD FOR LOADING AND DISINTEGRATING SINGLE ROUND BALES

Bruce Lynn White, Newton; Mark Winfield Kiner, Hesston, and Arlen Jacob Wiens, North Newton, all of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Aug. 25, 1976, Ser. No. 717,672
Int. Cl.² B60P *1/16*
U.S. Cl. 214—505 **3 Claims**

1. The method of loading and disintegrating a large ground-lying, circumferentially supported, cylindrical bale, including the steps of:
engaging the circumference of said ground-lying bale from one end thereof;

swinging said bale in a first upright plane to an elevated, substantially horizontal support surface;
end-supporting said bale on said surface in a stationary position with the axis of the bale vertically disposed;
subsequently swinging said bale in a second upright plane from said position toward an upstanding zone of disintegration;



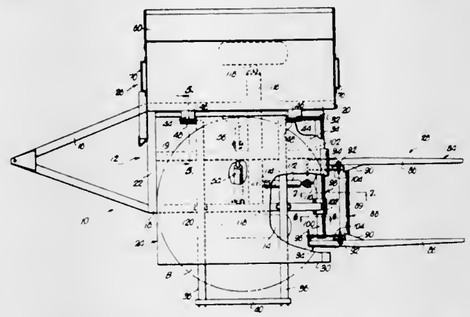
progressively shredding said bale in said zone while continuing to swing the bale in said second plane whereby the bale is disintegrated obliquely thereof; and
retaining said bale against movement away from said zone until completely disintegrated.

4,094,428

METHOD AND APPARATUS FOR LOADING AND DISINTEGRATING SINGLE ROUND BALES

Bruce Lynn White, Newton; Mark Winfield Kiner, Hesston, and Arlen Jacob Wiens, North Newton, all of Kans., assignors to Hesston Corporation, Hesston, Kans.

Division of Ser. No. 717,672, Aug. 25, 1976. This application Feb. 22, 1977, Ser. No. 770,637
Int. Cl.² B60P *1/16*
U.S. Cl. 214—505 **13 Claims**



1. A machine for loading and disintegrating large ground-lying, cylindrical bales of crop material, said machine including:
a frame;
a disintegrator supported on said frame;
a normally horizontal feeding bed on the frame swingable to and from said disintegrator; and
loading structure pivotally mounted on said frame for vertical swinging movement between the ground and said bed,
said structure being adapted to engage said ground-lying, cylindrical bale and stand the latter on end upon said bed whereupon the bales are forcibly fed end-first into said disintegrator by swinging movement of the bed toward the disintegrator,
said bed having a substantially flat support surface and being pivotally secured along one edge to said frame adjacent said disintegrator,
said support surface being disposed below said disintegrator when said bed is in its horizontal position,
said bed including support means opposite said one edge and extending above said support surface for retaining said bales on said bed during swinging movement to said disintegrator.

4,094,429

STOPPER FOR TEST TUBE, AND THE LIKE

Matthew C. Urbin, 4524 La Barca Dr., Tarzana, Calif. 91364

Filed Jul. 26, 1976, Ser. No. 708,402
Int. Cl.² B65D *41/00*
U.S. Cl. 215—305 **4 Claims**

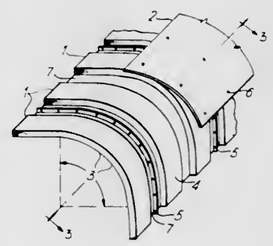
1. A stopper for sealing the mouth of a test tube, and the like, said stopper being formed of a resilient material, and having a hat-shape with a closed outer end and an open inter end, and having a peripheral rim surrounding said open inter end and dimensioned to engage the edge surrounding the mouth of the test tube in which the wall of the stopper tapers from a thicker to a thiner dimension from the closed end of the stopper to said peripheral rim and with the central portion of the stopper being adapted to be pushed inwardly into the mouth of the test tube to assume an inside-out configuration in sealing relationship with the inner wall of the test tube adjacent to the aforesaid edge.

4,094,430

CARGO CONTAINER

John F. Cauley, 847 Montgomery Drive, Ancaster, Ontario, Canada

Continuation-in-part of Ser. No. 570,949, Apr. 22, 1975, abandoned. This application Dec. 9, 1976, Ser. No. 748,918
Claims priority, application Canada, Jul. 15, 1974, 204749
Int. Cl.² B65D *87/00, 7/44;* E04C *1/10*
U.S. Cl. 220—1.5 **2 Claims**



1. In a cargo container having a bottom, end, and side walls, and a top wall or roof, connected to said side and end walls, an

improved connection between said side walls and the top wall comprising

a plurality of continuous grooved metal sheets connected to and extending from each said side wall and curving to extend across the top of the container and defining a smooth, long radius corner, said grooved sheets extending transversely of the longitudinal axis of the container;

each sheet having at least one flat trough part and a parallel, adjacent flat top part joined to said trough part by flat side walls extending ninety degrees to said trough part and top parts, and a raised lip seam longitudinally and continuously formed with the length of the sheet;

each sheet being joined to an adjacent sheet by said lip seam;

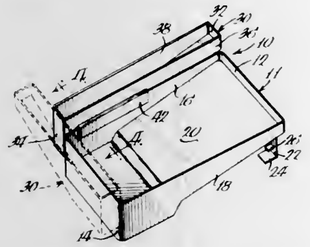
in combination with a curved metal reinforcing edge strip contoured in cooperation with said long radious corner and extending parallel to said longitudinal axis along the upper corner between the side and top walls of the container; said edge strip overlying and being secured to the flat top parts of the grooved sheets defining a box section with the trough parts of the grooved sheets to thereby strengthen the grooved sheets both longitudinally with the length of the container and laterally about said radious corner in a direction transverse to said axis of said container.

4,094,431

PAINT TRAY WITH BRUSH HOLDING ATTACHMENT

William A. Wheeler, 352 Jefferson St., Glencoe, Ill. 60022

Filed Feb. 2, 1976, Ser. No. 654,410
Int. Cl.² B44D *3/12*; B65D *21/02*
U.S. Cl. 220—23.4 **8 Claims**



1. An assembly for simultaneously accommodating a paint roller and a conventional paint brush for painting the walls and ceiling of a dwelling, said brush having a handle with an aggregation of bristles extending longitudinally therefrom at one end thereof, said aggregation of bristles having a lateral width several times greater than its thickness, comprising:

a paint tray having a bottom wall which has an incline for at least a part of its length, a front wall, a back wall and a pair of side walls, together defining a receptacle for receiving a paint roller;

a paint brush receptacle havng a front wall, a back wall, a pair of side walls, and a bottom wall, the distance between said side walls of said paint brush receptacle being less than the width of said paint brush at said bristled end thereof and greater than the thickness of said brush at said bristled end, said side walls and bottom wall of said paint brush receptacle having a length about equal to the length of one of the paint tray walls so that said paint brush receptacle will receive said paint brush with the wider dimension of said aggregation of bristles inserted in a generally verticle plane with the handle of the brush extending outwardly from the paint brush receptacle in a position where it may be conveniently grasped by the user, said paint brush receptacle having a length sufficient to accommodate a second of said conventional paint brushes oriented in the same vertical plane; and

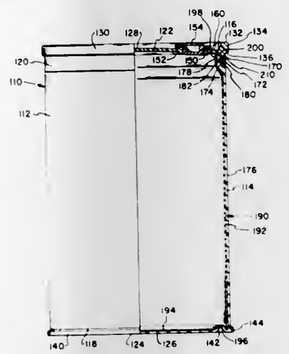
clamp means secured to said paint brush receptacle for removably attaching said paint brush receptacle to a wall of said paint tray, said paint brush receptacle being attachable to either of said side walls of said paint tray and also being attachable to said back wall of said paint tray.

4,094,432

INDUSTRIAL DRUMS

Seymour Zilbert, Demarest, N.J. Assignors to Bergen Barrel & Drum Co., Demarest, New Jersey

Filed Feb. 9, 1977, Ser. No. 767,137
Int. Cl.² B65D *1/12, 25/14*
U.S. Cl. 220—404 **21 Claims**



1. An industrial drum constructed of synthetic resin material and capable of being gripped by a clamp of a drum-handling apparatus to facilitate mechanized handling of the drum, said drum comprising:

a generally tubular body member extending longitudinally between opposite ends and including a cylindrical side wall;

first and second end members, at least one of which is unitary with the tubular body member at one end thereof and closes said one end, the first and second members each including a circular end wall; and

at least one chime molded unitary with a member of the drum, the chime having a configuration including portions extending longitudinally and laterally outwardly for being gripped by the clamp of the drum-handling apparatus, the chime being annular and being located at the intersection of one of the end members and the body member so as to extend circumferentially around substantially the entire perimeter of said one of the end members, the longitudinally extending portion of the chime extending outwardly beyond the end wall of said one of the end members at said intersection and including an outer edge spaced longitudinally from said intersection, and the laterally extending portion of the chime extending laterally beyond the cylindrical side wall;

the tubular body member, and at least the one of the end members unitary therewith, being rotationally molded of a crosslinkable high density polyethylene resin having the ability to crosslink as the drum is molded.

19. For use in an industrial drum having a generally tubular body member extending longitudinally between opposite ends, first and second end members, one of which is unitary with the tubular body member at one end thereof and closes said one end, an external thread integral with the other of the ends of the tubular body member, and an internal thread on the other of the end members, said internal thread being generally complementary to the external thread, the improvement comprising:

a cupped liner of relatively rigid synthetic resin material for reception within the tubular body member, said cupped liner having

a tubular wall complementary to the tubular body member;

a closed end complementary to the unitary end member;

an opposite open end; and

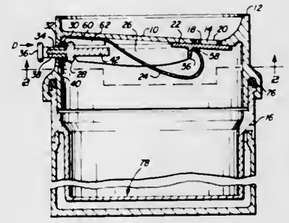
a lip at the open end of the liner, said lip including an annular portion turned longitudinally back toward the closed end and spaced laterally outwardly from the tubular wall of the liner, said annular portion being in the form of a thread complementary to the external thread of the tubular body and the internal thread of the other of the end members for reception interjacent the external thread and the internal thread when the liner is in place within the drum and said other end member is threaded onto the tubular body member.

4,094,433

DRINKING RECEPTACLE VALVE MEANS

Jody L. Numbers, Scottsdale, Ariz., assignor to Thermo-Seal, Inc., Los Angeles, Calif.

Filed Jan. 14, 1977, Ser. No. 759,142
Int. Cl.² A47G *19/22*
U.S. Cl. 220—90.4 **2 Claims**



1. In a drinking vessel of heat-insulating material:

(a) a receptacle;

(b) a cover for said receptacle, said cover including a top wall formed with a dispensing opening and a cylindrical wall depending from said top wall and formed with a pneumatic vent;

(c) a valve for said dispensing opening in the form of a flat plate in sealing engagement with a valve seat on the underside of said cover about said dispensing opening;

(d) a valve actuator integral with said dispensing valve and having a portion extending through said vent;

(e) a retainer flange on said actuator spaced from the inner surface of said cylindrical wall;

(f) an O-ring seal between said retainer flange and said inner surface of the cylindrical wall;

(g) an operating knob having a shank of lesser cross-sectional area than said vent through which it passes and is secured to the portion of said valve actuator which extends through said vent;

(h) a bar portion integral with said valve actuator and adjacent to said O-ring retainer flange;

(i) a pair of spaced-apart rail members each having an end integral with said bar portion and extending therefrom on opposite sides of said valve actuator;

(j) an outwardly extending flange on each of said rail members;

(k) a cross member integral with the other ends of said rail members;

(l) a leaf spring having an end portion secured to the underface of said cover and an intermediate bowed portion depending from the cover with the other end of the spring being secured to said dispensing valve, whereby said spring biases the dispensing valve into sealing position on said valve seat and the O-ring into sealing position relative to said vent; and

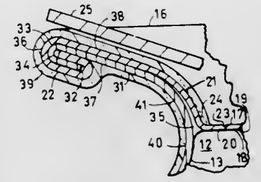
(m) a pair of cams depending from said cover on opposite sides of said valve actuator and passing through recesses in the flanges on said rail members, each of said cams having a cam surface that is normally spaced from that portion of a flange on one of said rail membes which it confronts but which is engaged by said flange on said rail member after the valve actuator has been moved inwardly from the cylindrical wall of said cover a distance sufficient to open said pneumatic vent whereupon the engagement of said rail member flanges with said cam surfaces causes the valve actuator to move the valve for said dispensing opening into a position in which said dispensing opening is open.

4,094,434

DISPOSABLE CONTAINER FOR HEATABLE FOOD PRODUCTS

William A. Coiner, 101 S. Indian Cir., Cocoa, Fla. 32922

Filed Dec. 13, 1976, Ser. No. 749,888
Int. Cl.² A47G *19/22*; B65D *25/28*
U.S. Cl. 220—90.6 **2 Claims**



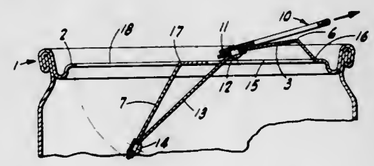
1. A disposable container for a heatable food product comprising a metal body that defines an hermetically sealed chamber for the food product, said body having upper and lower ends and being adapted at its lower end for placement on a stove or other heat source, an annular lip and a removable closure at said upper end, said closure having a perimeter and being surrounded at said perimeter by said lip, said lip being arranged to project above the perimeter of the closure and having oppositely facing surfaces, and insulating means covering said oppositely facing surfaces for protecting the lips of a consumer of the container contents from heat transmitted to said oppositely facing surfaces, said body having a peripheral side wall section with an annular recess portion that surrounds the closure at said upper end, said annular recess portion having an outer surface that merges with one of said oppositely facing surfaces, said recess portion being adapted to receive fingers of a person manipulating said container, and said insulating means additionally covering said outer surface of the annular recess portion for protecting such fingers of the person from heat transmitted to said outer surface.

4,094,435

PULL TAB BEVERAGE CAN OPENER

Clyde Kennedy, 2524 E. Main St., Stockton, Calif. 95205

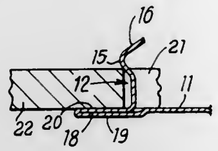
Filed Oct. 21, 1977, Ser. No. 844,277
Int. Cl.² B65D *41/32*
U.S. Cl. 220—269 **10 Claims**



1. A beverage can opener comprising—in combination with the top of a metallic beverage can—a hinged-end tear strip defined on said top by scoring thereof, a hinged-end tear flap defined on said top by scoring thereof, the tear strip and tear flap being spaced but alined on the can top, a finger-engageable pull tab connected to the tear strip exteriorly of the can top, and a tension strap connected between the tear strip and the tear flap internally of the can; pulling motion on the pull tab severing said tear strip, except at one end providing a hinge, from the can top whereby a vent is formed in said can top, and such motion—at the same time and as a transmitted force imposed by the tension strap on the tear flap—severing said

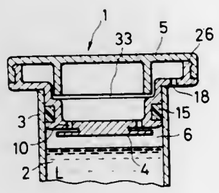
tear flap, except at one end providing a hinge, from the can top and bending such tear flap into the can, thus producing a drinking and pouring opening in the can top.

4,094,436
APERTURE PLUG
Douglas William Birmingham, Ickenham, England, assignor to TRW Inc., Cleveland, Ohio
Continuation of Ser. No. 543,087, Jan. 22, 1975, abandoned. This application Oct. 21, 1976, Ser. No. 734,490
Int. Cl.[2] B65D *45/16, 45/00*
U.S. Cl. 220—315 **7 Claims**



1. A one-piece plug for a panel aperture comprising a plate member having a flat, planar inside face portion, a peripheral edge and a plurality of resilient legs which depend from said plate member from the inside face portion side thereof adjacent said peripheral edge, said plate member having a plurality of spaced recesses embossed on the inside face thereof and adjacent each leg and said peripheral edge, said legs being formed by extensions of the plate member, each leg having: a first portion integrally joined to said peripheral edge which is folded back onto the inside face portion of said plate member and is positioned within said recesses and abutting the bottom of said recesses so as to lie substantially flush with and substantially in coplanar relationship with the said inside face portion of said plate member, each of said recesses having a width substantially equal to said first portions of said legs, a second portion which extends substantially at right angles to said plate member, and a third portion extending from said second portion, said third portion including a retaining part and an inwardly inclined lead-in part, said second and third portions of each of said legs projecting from the plate member at a position radially inwardly of said peripheral edge thereby leaving said peripheral edge of said plate member unbroken.

4,094,437
CAP ASSEMBLY AND METHOD FOR PRODUCING THEREOF
Yoshihiro Hayashida, Chigasaki, Japan, assignor to Tokico Ltd., Kawasaki, Japan
Filed Aug. 25, 1977, Ser. No. 827,812
Claims priority, application Japan, Mar. 19, 1977, 52-30771; Aug. 30, 1976, 51-116029[U]
Int. Cl.[2] B65D *51/16*
U.S. Cl. 220—374 **15 Claims**

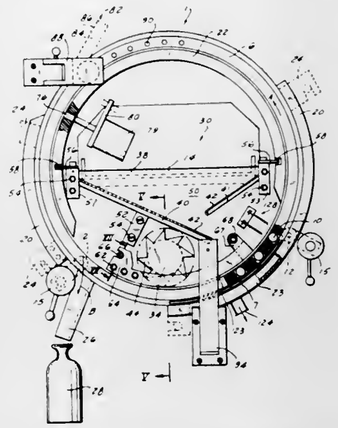


1. A cap assembly for the reservoir of a vehicular brake comprising a cap body and a cap cover, said cap body a bottom being provided with a vent hole communicating between the interior of said reservoir and an air space, including a first cylindrical portion adapted to be received in the opening of said reservoir, a flange integrally formed with and radially and outwardly extending from said first cylindrical portion and having a vent hole communicating between said air space and the exterior of said reservoir radially and outwardly of said opening of the reservoir and a second cylindrical portion extending from the side of said flange opposite from the side of the flange adjacent said first cylindrical portion; and said cap cover including a third cylindrical portion fitted on said second cylindrical portion of the cap body and closed at one end; said second and third cylindrical portions having mating radial concave and convex engaging means and said closed end of the third cylindrical portion covering said second cylindrical portion of the cap body to thereby close said opening of the reservoir.

4,094,438
METHOD OF DISPENSING LABELS
Gilbert A. Neubauer, Centerville, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio
Division of Ser. No. 604,290, Aug. 13, 1975, abandoned. This application Apr. 11, 1977, Ser. No. 786,312
Int. Cl.[2] B32B *3/10*
U.S. Cl. 221—1 **6 Claims**

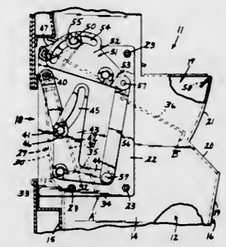
1. Method of dispensing labels, comprising the steps of: providing a plurality of labels releasably secured by pressure sensitive adhesive to a longitudinally extending web of supporting material, the web having cut means disposed at longitudinally spaced apart locations, each cut means including three slits arranged in a generally Y-shaped configuration and spaced apart by a frangible portion, each slit of the cut means being inclined with respect to the transverse direction across the web, one of the slits of each cut means extending generally longitudinally, each spaced apart cut means forming a respective generally V-shaped flap portion extending initially in the plane of the web, causing the web to undergo a sharp change in direction at a delaminating zone where labels are successively delaminated from the web, the web being oriented such that the flap portions extend in the upstream direction as the web travels toward the delaminating zone, bringing a driver having a plurality of teeth into contact with the web downstream of the delaminating zone to cause each tooth to press against portions of the web adjacent the respective slit to fold said adjacent web portions out of the plane of the web, to open a hole in the web, to sever the respective frangible portion and to fold the respective flap portion out of the plane of the web about a respective fold line and to drivingly engage the flap portion, and pulling on the delaminated part of the web by advancing the toothed driver to effect label delamination at the delaminating zone.

4,094,439
ARTICLE APPORTIONING APPARATUS HAVING A ROTATABLE DRUM
Hans List, Laustrasse 51, 7 Stuttgart 70 BRD, Germany
Filed May 10, 1976, Ser. No. 684,631
Claims priority, application Germany, May 9, 1975, 2520685; Nov. 13, 1975, 2550987
Int. Cl.[2] B23Q *7/12*
U.S. Cl. 221—9 **17 Claims**



1. An apparatus for handling a multiplicity of like bodies, said apparatus comprising:
a housing;
a drum rotatable in said housing about a horizontal axis and having a multiplicity of inwardly open pockets arranged in circumferentially extending axially spaced rows and each dimensioned to hold one of said bodies;
a pair of axially spaced end walls in and axially closing said drum and defining therewith a separating space;
connectors extending axially between and axially securing together said end walls;
means for rotating said drum about said axis in a predetermined rotational sense relative to said end walls and to said housing;
input means for feeding a multiplicity of said bodies in random fashion into said space at a given input location therein;
end bolts extending axially between said end walls;
guide plates inclined downwardly at said input location and receiving said bodies from said input means;
a separating comb having a plurality of arcuate elongated separating elements defining a plurality of parallel slits and at least one rod extending transversely to and rigidly secured to said separating elements, said rod being held on and extending axially between said end walls;
means for joint sliding of said end walls, connectors, and comb axially out of said drum and out of said housing;
means including a pair of axially spaced hooks on said comb engageable over said rod for releasably securing said comb to said end walls in a position generally below said axis in said space downstream relative to said rotational sense from said location and with said slits each aligned with a respective one of said rows;
means for removing said bodies from said pockets at a removal location located downstream of said comb relative to said rotational sense; and
shields closely juxtaposed with said drum and fixed to said housing in such positions that said bodies cannot fall out of said pockets between said input location and said retrieval location, said shields having formations constituting said means for joint sliding.

4,094,440
SAFETY DOOR MECHANISM
Joseph A. Lotspeich, Eagan, Minn., assignor to Gross-Given Manufacturing Company, St. Paul, Minn.
Filed Sep. 23, 1976, Ser. No. 725,881
Int. Cl.[2] G07F *11/00*
U.S. Cl. 221—12 **9 Claims**



2. In combination with a dispensing machine including a dispensing chamber having a top supply opening and a front delivery opening, a safety door mechanism comprising:
(a) a delivery door pivoted about a horizontal axis near the top of the delivery opening and normally positioned by gravity to close the delivery opening;
(b) a supply door pivoted about a horizontal axis near the front of the supply opening and normally positioned by gravity to clear the supply opening, said supply door depending behind said delivery door; and
(c) linkage means interconnecting said supply and delivery doors for closing said supply door in response to opening movement of said delivery door at a closing rate which initially exceeds the opening rate of said delivery door, so that said supply opening is substantially closed before said delivery opening is substantially open; said linkage means comprising a pair of linkage mechanisms, one of said mechanisms interconnecting said doors at each side of said dispensing chamber, wherein each of said linkage mechanisms comprises:
(i) a delivery door lever arm pivoting with said delivery door and having a first drive pin adjacent its free end;
(ii) a bell crank having a fixed center pivot, a first lever arm containing an arcuate slit receiving said first drive pin therein, and a second lever arm having a first pivot pin;
(iii) a supply door lever arm pivoting with said supply door and having a second drive pin adjacent its free end;
(iv) a fixed pivot lever having a first lever arm containing an arcuate slit receiving said second drive pin therein, and a second lever arm having a second pivot pin adjacent its free end; and
(v) a link pivotally connecting said first and second pivot pins.

4,094,441
STAMP DISPENSING APPARATUS
Daniel Davis Warren, 7317 Fisher Rd., Dallas, Tex. 75214
Filed Nov. 1, 1976, Ser. No. 737,464
Int. Cl.[2] B65H *7/18*
U.S. Cl. 221—18 **10 Claims**

8. Apparatus for dispensing stamps, having a housing including therein,
(a) a magazine for containing and positioning at least one row of a stack of stamps, said magazine comprising more particularly
(i) means for urging the stamps toward the suction means (b),
(ii) pawl and cog means providing unidirectional movement of stamps in said magazine toward the suction means (b) herein, and

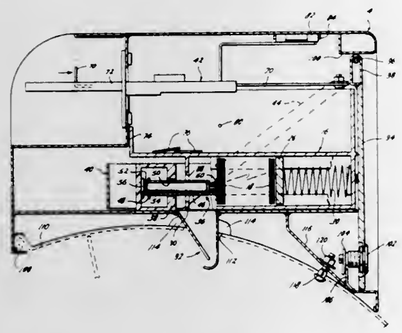
(iii) yieldable retention means for retaining stamps in the magazine but yieldable so as to release a stamp therefrom upon attachment of the suction means (b) herein to said stamp,

(b) suction means for releasably attaching to a stamp and withdrawing said stamp from the magazine (a), said means comprising,

(i) a support slideable within the housing,

(ii) a tube slideably retained within the support (i), and

(iii) means urging the tube (ii) away from the support (i) whereby said tube engages by suction a stamp within the magazine (a),



(c) coin actuated means for sliding the support (i) of the suction means (b) within the housing,

(d) means for preventing actuation of the coin actuated means (c) upon insertion of a coin in the apparatus when the stamps in the magazine (a) are exhausted,

(e) means for releasing a stamp from the suction means (b) comprising a wall within the housing having a portal through which the tube (ii) of the suction means (b) passes such that upon contact with the wall by a stamp in suction engagement with said tube, the stamp is released from the tube, and

(f) a chute for gravitationally receiving a stamp upon release thereof from the suction means (b).

4,094,442

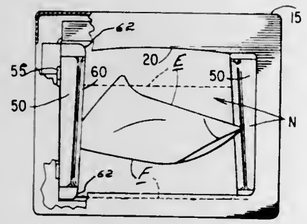
NAPKIN DISPENSER

John R. Radek, Hinsdale, Ill., assignor to Ready Metal Manufacturing Company, Chicago, Ill.

Continuation-in-part of Ser. No. 667,161, Mar. 15, 1976, abandoned. This application Apr. 13, 1977, Ser. No. 787,170

Int. Cl.[2] B65H *1/26*

U.S. Cl. 221—59 **5 Claims**



1. A napkin dispenser for a stack of folded napkins each folded in multiple plies having a final rectangular contour, with the outermost lifting ply terminating in a straight edge extending across the width of the folded napkin along a line parallel to the top and bottom edges thereof, comprising

(a) a parallelepiped container having a rectangular end wall of the approximate dimensions of said folded napkins and four side walls fixed thereto,

(b) an ingress-egress wall secured to the sidewalls opposite said end wall and having a generally rectangular opening therein for leading and dispensing napkins into and out of the container,

(c) a spring loaded follower within the container normally urging napkins within said container toward said opening,

(d) a pair of relatively narrow leaves having a longitudinal edge hingedly mounted on opposite sides of said opening and spring biased normally to assume a horizontal position generally coplanar with said opening and resiliently rotatable into said container when napkins are inserted through the opening against the follower, with the lifting ply straight edge perpendicular to the sides of the opening and the leaves completely covering the side edges of the napkins,

(e) said leaves also having free longitudinal edges opposite their hinged edges gently sloping substantially from end to end of said leaves, so as to present an opening of tapering width for convenient egress of a napkin, whereby a napkin may be withdrawn from said stack of folded napkins within the dispenser by grasping the free edge of the outermost ply extending transversely of said opening and pulling it away from said opening.

4,094,443

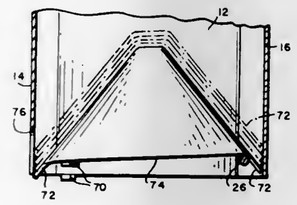
PAINT STRAINER DISPENSER

James P. Whelan, N. Marshfield, Mass., assignor to Ad-Tec Products, Inc., Plymouth, Mass.

Filed Jun. 25, 1976, Ser. No. 699,663

Int. Cl.[2] B65H *1/00*

U.S. Cl. 221—63 **5 Claims**



1. A dispenser for the dispensing of containers from an inverted stack of containers, said containers having diametrically disposed, radially extending ears, comprising a vertically elongate tubular structure open at its bottom, said tubular structure having diametrically disposed openings at the back and front sides extending from top to bottom of a width to receive the diametrically disposed ears of a stack of containers

situated in the structure, a support bar adjacent the lower end of the structure extending across the opening at the back side, two supports at the front side, one at each side of the opening at the front side, said supports at the back and front side being so situated that when the inverted stack is disposed in the structure, the ears at the back side of the stack extend through the opening at the back side over the support bar, the ears at the front side extend through the opening at the front side and the rim of the lowermost container of the stack rests on the supports at the opposite sides of the opening at the front side, said opening at the front side providing access to the stack to enable grasping the ear at the front side of the lowermost container and thrust the rim at the front side off the supports to thus permit the lowermost container to be pulled downwardly.

4,094,444

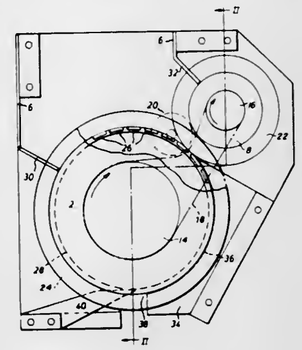
SEED METERING DEVICE HAVING HIGH FRICTION MATERIAL ON ROTATING WHEEL

Robert Anthony Willis, Hythe, England, assignor to Stanhay (Ashford) Limited, England

Filed Mar. 18, 1977, Ser. No. 779,416

Int. Cl.[2] A01C *7/04, 7/20*

U.S. Cl. 221—266 **8 Claims**



1. A seed metering device comprising a seed hopper having a base defining an aperture; two sets of contra-rotated circular rotary members driven about adjacent substantially horizontal axes and sealing said aperture in said base, one set of the said rotary members having the form of Vee-belt pulleys each provided with a plurality of regularly spaced single seed receptors at the base of its Vee-shaped peripheral slot and the other set of said rotary members having Vee-shaped protruding rims of high friction material penetrating upper parts of the said slots with close tolerance to sweep open faces of said seed receptors; and at least one masking plate mounted in said seed hopper and having an arcuate edge closely spaced from the said open faces of said seed receptors, said masking plate being located beneath the location at which the Vee-shaped protruding rims sweep said open faces of said seed receptors to maintain single seeds within the receptors until the seeds reach a position at which said seeds can be released from said receptor.

4,094,445

HIGH SPEED BEER DISPENSING METHOD

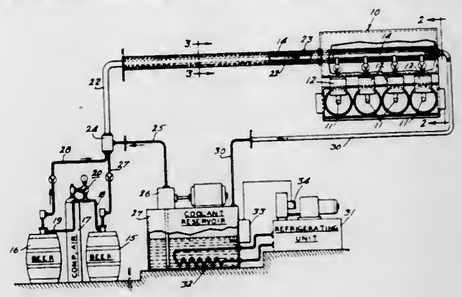
James Bevan, Hatboro, Pa., assignor to Elliott-Lewis Corporation, Philadelphia, Pa.

Filed Mar. 29, 1973, Ser. No. 346,186

Int. Cl.[2] B67D *1/04;* B65D *83/14*

U.S. Cl. 222—1 **2 Claims**

1. A method of dispensing, from a tap having a plurality of pouring spouts, a beer having a foaming tendency which is directly related to its temperature, comprising the steps of flowing the beer through a supply line to the tap, maintaining the temperatue of the beer at the lap less than 34° F and within about 2° F of its freezing temperature, disposing beneath said spouts a like number of open containers at atmospheric pressure, discharging the beer into said containers simultaneously from said spouts to a predetermined height below the top edges of the containers, covering the open end of each container after



pouring, and thereafter subjecting the liquid and containers to an ambient temperature above the pouring temperature for a sufficient period of time to permit foam to form on the liquid in the containers.

4,094,446

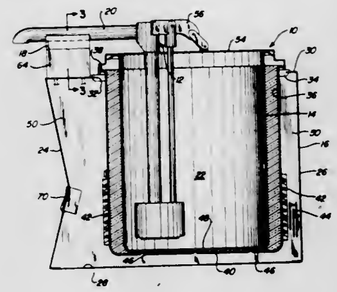
HEATED DISPENSER FOR HOT TOPPINGS AND THE LIKE

James W. Brutsman, Cheyenne, Wyo., assignor to Wyott Corporation, Cheyenne, Wyo.

Filed Mar. 1, 1976, Ser. No. 662,363

Int. Cl.[2] B67D *5/62*

U.S. Cl. 222—146 HE **7 Claims**



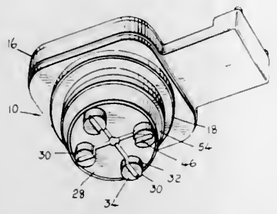
1. A heated dispenser for heat-softenable products susceptible of being pumped which comprises: an outer shell with an opening in the top thereof; an open-topped inner shell disposed within the opening in the outer shell cooperating therewith to define a double-walled insulated housing; an electrically powered heating element located between the walls of the housing in position adjacent the inner shell; an open-topped storage vessel removably mounted inside the inner shell of the housing, said inner shell and heating element coacting upon actuation of the latter to produce a heated jacket effective to warm the contents of said storage vessel; a pump subassembly detachably resting atop the storage vessel for removing the contents thereof, said pump assembly including lid-forming means for covering the open top of said vessel, externally-operable pump means extending down into the interior of said vessel through the lid-forming means, and a spigot positioned to receive the output of the pump means and deliver same over the side of the housing; and, means comprising an electrically-heated saddle carried by said housing in position to cradle the spigot of the pump assembly when the latter is in position atop the storage vessel, said saddle being operative upon energization to maintain any heat-softenable residues left within the spigot in a pumpable condition.

4,094,447

HEATER CAST FOR MULTI-CAVITY HOT RUNNER EDGE GATE

Jobst Ulrich Gellert, 11 Newton Rd., Brampton, Ontario, Canada

Filed Dec. 6, 1976, Ser. No. 747,609
Claims priority, application Canada, Dec. 2, 1976, 266988
Int. Cl.[2] B29F *1/02*
U.S. Cl. 222—146 HE **2 Claims**



2. An improved heater cast for multi-cavity hot runner edge gate injection molding providing for hot melt to flow downward through a central injection passage to a plurality of peripheral gates, the heater cast comprising:

(a) a mid portion having a cylindrical outer wall and a substantially flat lower surface, and

(b) a corresponding number of spaced lower nozzle portions extending downwardly around the periphery of the mid portion to positions each adjacent one of the gates respectively, each of the lower nozzle portions having a cylindrical outer wall and a substantially flat lower face;

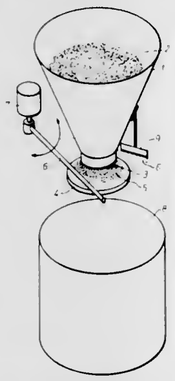
wherein the central injection passage extends downwardly to the lower surface of the mid portion of the heater cast where it communicates with a corresponding number of radial channels each of which extends across the lower surface of the mid portion, down the inside of the wall of a nozzle portion and across the lower face of said nozzle portion, whereby the melt branches from the central injection passage through the channels to the area of each of the respective gates.

4,094,448

DOSING DEVICE FOR PULVERULENT MATERIAL

Helmut Häseler, and Günter von der Kall, both of Leverkusen, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 19, 1976, Ser. No. 659,278
Claims priority, application Germany, Feb. 25, 1975, 2508066
Int. Cl.[2] G01F *11/00*
U.S. Cl. 222—342 **6 Claims**



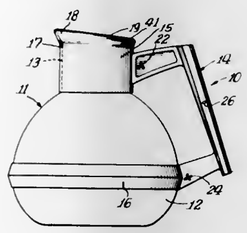
1. A device for dosing a pulverulent material into an open vessel, comprising a funnel-shaped storage container for pulverulent material, the container having an outlet aperture at its lower end, a plate located beneath the said aperture at a distance therefrom so that in use a standing column of material is formed between the plate and the aperture, a dosing rod which is displaceable in a horizontal plane which passes through the column of material, movable means supporting the dosing rod to move from positions disposed completely outside of the column of material and projected borders of the plate to positions passing through the column of material, means for periodically passing the rod from positions completely outside through the column of material thereby to convey at each such passage a predetermined quantity of material into the open vessel which is located beneath the dosing device, and a stripper is arranged above the plane of the dosing rod at such a position that with each passage of the dosing rod through the column the stripper carries any residues of substance left on the rod into the open vessel by wiping contact with the dosing rod above the open vessel.

4,094,449

DECANTER HANDLE STRUCTURE

Norman H. Schlegel, and Harvey R. Karlen, both of Chicago, Ill., assignors to Cory Food Services, Inc., Chicago, Ill.

Continuation of Ser. No. 285,090, Aug. 30, 1972, abandoned.
This application Jan. 21, 1974, Ser. No. 434,810
Int. Cl.[2] B65D *23/10*
U.S. Cl. 222—475 **6 Claims**



1. For use with a glass decanter having a globular bowl portion having a bottom and terminating in an upper tubular portion defining a pouring spout, a handle structure comprising

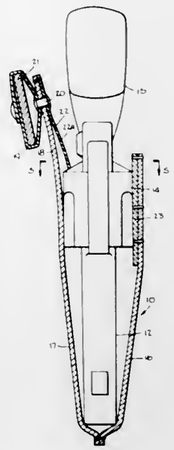
a unitary element defining an annular collar having spaced apposed rear ends and adapted to embrace said spout, a segmentally annular band having spaced apposed rear ends adapted to be separably juxtaposed to cause said band to grip said bowl portion at a position spaced above said bottom thereof, and a longitudinally split handle having a first portion connecting one of said collar ends to one of said band ends, a second portion connecting the other of said collar ends to the other of said band ends, and locking means defined by portions of said handle first and second portions immediately adjacent said rear ends of said band and collar for releasably locking said handle first and second portions together to retain said collar about said spout and said band about said bowl portion spaced above said bottom thereof as a result of the releasable retention of said handle portions together to define a handle for carrying the decanter, each of said collar and band being free of fold portions and defining a continuous arcuate cross section at all times.

4,094,450

OPEN-TOP HOLSTER FOR REVOLVER

Frank Parlante, Brooklyn, and Henry Parlante, Bayside, both of N.Y., assignors to Courtlandt Boot Jack Co., Ltd., New York, N.Y.

Filed Jan. 27, 1977, Ser. No. 763,096
Int. Cl.[2] F41B *13/04*
U.S. Cl. 224—2 B **6 Claims**



1. An open-top revolver holster to be strapped to the side of a wearer and so securing the revolver in the holster that only the wearer can withdraw it with his gun hand, said revolver having a barrel, a trigger assembly, a cylinder and a grip, the holster comprising:

A. a pocket defined by a rear wall adjacent the wearer and a complementary front wall, said rear wall having a tongue extending upwardly from the pocket, said pocket being shaped to socket the barrel as well as the trigger assembly and the cylinder of the revolver, the grip of the revolver being exposed above the pocket; and

B. a catch plate formed of resilient synthetic plastic material whose profile conforms to that of the tongue to which it is marginally secured, the lower straight-edged portion of the plate projecting into the pocket and including a free depressible sector which normally bulges away from the inner surface of the pocket, the sector being so positioned that when the revolver is being inserted the cylinder depresses the sector to admit the revolver into the pocket, and when the revolver is fully inserted the edge of the sector springs out to intercept the upper end of the cylinder to prevent unauthorized withdrawal of the revolver, said sector having a memory whereby for the wearer to draw the gun he must first depress the sector to clear the cylinder, the sector when released always reverting to its normal bulge, said plate being molded of thermoplastic polycarbonate material which has high impact strength and is dimensionally stable and has a persistent memory.

4,094,451

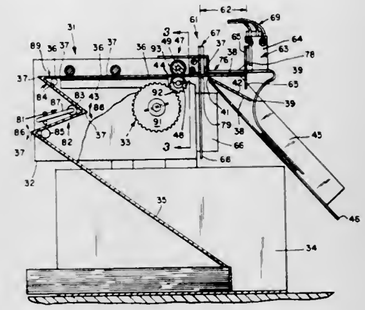
LOTTERY TICKET DISPENSER FOR BREAK-RESISTANT WEB MATERIAL

George F. Wescoat, Manchester, N.H., assignor to Granite State Machine Co., Inc., Manchester, N.H.

Filed Nov. 4, 1976, Ser. No. 738,726
Int. Cl.[2] B26F *3/00*
U.S. Cl. 225—96 **6 Claims**

1. A lottery ticket dispenser of the type having a continuous web of individual lottery tickets, separated by perforated lines, guided along a path from a supply compartment to a breaker bar station proximate a delivery chute, said dispenser having friction feed mechanism advancing said web along said path, ticket bowing means on said path, just in advance of said breaker bar station, for rigidifying each successive endmost ticket to span said breaker bar station, and stop means including a limit switch in the path of the leading edge of each said successive endmost ticket for stopping said feed mechanism when closed by contact with said leading edge, characterized by

breaker bar means including a pivoted breaker bar normally poised out of said path at said breaker bar station; power means for moving said bar in an upward path to separate each endmost ticket engaging said stop means along its perforated line of connection to said web and bed plate means extending over the path of said unsupported web at said station including a pair of bed plates separated by a slot in the path of said upward moving breaker bar, the perforated line of connection of each successive endmost ticket being located in said slot when the leading edge of said ticket is in engagement with said stop to cooperate



with said bar in separating said endmost ticket despite flimsiness of said web and;

pre-breaking means comprising a set of three cylindrical rolls mounted along said path in advance of said breaker bar station for pre-folding each said ticket first in one direction and then in the opposite direction along its perforated line of connection to said web;

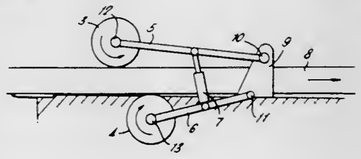
said friction feed mechanism and said ticket bowing means comprises a pair of smooth faced rolls forming a pressure nip at each opposite end thereof, the lower roll having a pair of annular, spaced apart centrally located grooves each of arcuate cross section and the upper roll having a pair of annular, spaced apart centrally located friction rings of yieldable rubber like material, each ring being arranged to distort the adjacent portion of a ticket down into one of said grooves to bow the same in a smooth curved cross section.

4,094,452

ARRANGEMENT FOR ADJUSTING THE COMPRESSION FORCE OF DRIVE ROLLS

Markku Makela, Tampere, Finland, assignor to Rauma-Repola Oy, Finland

Filed Mar. 10, 1977, Ser. No. 776,481
Claims priority, application Finland, Mar. 10, 1976, 760617
Int. Cl.[2] B65H *17/34*
U.S. Cl. 226—34 **7 Claims**



1. A system for adjusting the compression force exerted

upon a lengthy article as it is driven along a feed line comprising:

a plurality of drive rolls disposed about the periphery of said article and in contact with the surface thereof;

an arm means associated with each drive roll for pivotably mounting each drive roll to a support structure;

drive means for said drive rolls for advancing said lengthy article along said feed line;

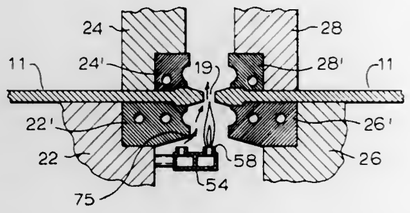
means connected between said arm means and operatively connected to said drive means and adapted to adjust the compression force between said rolls in proportion to the force exerted by said drive means to advance said lengthy article along said feed line.

4,094,453

METHOD FOR PRESSURE WELDING METAL WORKPIECES

Lloyd A. Cook, Parkersburg, W. Va.; Kim A. Reynolds, Shelburne, and Werner J. Mark, Orangeville, both of Canada, assignors to Alforge Metals Corporation, Limited, Orangeville, Canada

Filed Aug. 2, 1976, Ser. No. 711,037
Int. Cl.² B23K *19/00, 5/14*
U.S. Cl. 228—265 **11 Claims**



1. A method of pressure welding together metal workpieces which comprises:

(a) juxtaposing a longitudinal edge of a first workpiece gripped between a pair of dies into substantially parallel spaced alignment with a longitudinal edge of a second workpiece gripped between a second pair of dies,

(b) maintaining the longitudinal edge of the first workpiece between about 1/32 to 1 inch away from the opposed longitudinal edge of the second workpiece so as to form an elongated open rectangular channel therebetween,

(c) introducing a uniform stream of heated gases into the proximity of the opposed longitudinal edges and causing a portion of said stream of heated gases to flow through said elongated open rectangular channel,

(d) maintaining the flow of heated gases through said elongated open rectangular channel for a time sufficient to heat the surfaces of said opposed edges to a temperature within the range of from about 200° to 900° F and to form a core of relatively cooler and harder material within each edge,

(e) stopping the flow of heated gases and eliminating said elongated open rectangular channel by moving the longitudinal edges of said workpieces into abutting relationship with each other to obviate the flow of said heated gases therethrough whereby said edges are heated only when the rectangular channel is formed, and

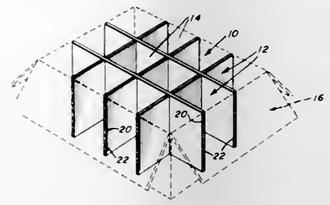
(f) immediately applying pressure to the abutting heated longitudinal edges of said workpieces while they are at a temperature of between about 200° to 900° F to create a solid-phase weld bond between the cores and to upset a portion of heated adjacent surfaces and cause heated metal to be substantially displaced out of the plane of said pressure welded interface.

4,094,454

PARTITIONS WITH RELEASABLE GRIPPING EDGES

Herbert Clarke Snyder, Brockway, Pa., assignor to Sonoco Products Company, Hartsville, S.C.

Filed Jun. 13, 1977, Ser. No. 805,853
Int. Cl.² B65D *5/48*
U.S. Cl. 229—15 **5 Claims**



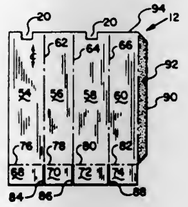
1. A partitioned container comprising a box, a partition removably received within said box, said box having an inner wall surface, said partition having vertical edge portions, top edge portions, and bottom edge portions engageable with the inner wall surfaces of the box, and a movement resisting substance primarily adhered to at least a portion of said partition vertical edge portions and releasably adhered to the inner wall surface for separation from the inner wall surface while retaining the integrity of the inner wall surface and the partition vertical edge portions.

4,094,455

COMBINATION SHIPPING AND STORAGE CONTAINER AND METHOD

Robert A. Bamburg; Farris N. Duncan, both of West Monroe, and Roger M. Floyd, Monroe, all of La., assignors to Olinkraft, Inc., West Monroe, La.

Division of Ser. No. 736,987, Oct. 29, 1976, Pat. No. 4,056,913, which is a division of Ser. No. 557,420, Mar. 11, 1975, Pat. No. 4,040,558. This application Oct. 28, 1977, Ser. No. 846,348
Int. Cl.² B65D *5/35, 5/02*
U.S. Cl. 229—15 **1 Claim**



1. A production blank for forming an inner cell structure for use in a combination shipping and storage container comprising:

(a) a generally four-sided cell structure having a top portion and a bottom portion and having a pair of end panels and a pair of centrally located panels positioned between the end panels on the production blank forming the cell structure;

(b) means, associated with one of the end panels, for fastening to the other of the end panels to form the cell structure;

(c) flap means formed on the bottom portion of the cell for forming a bottom for the cell; and

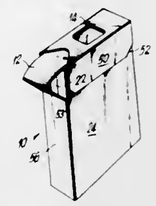
(d) at least two notches, formed in the top portion, said notches adapted to face each other by being positioned and formed in opposite sides of the cell.

4,094,456

RECLOSABLE DISPENSING CARTON

Harry I. Raccaforte, Western Springs, Ill., assignor to Champion International Corporation, Stamford, Conn.

Filed Apr. 25, 1977, Ser. No. 790,573
Int. Cl.² B65D *5/72*
U.S. Cl. 229—17 SC **6 Claims**



1. A reclosable dispensing carton made of a single sheet of carton blank and comprising an elongated tubular enclosure including first and second side panels, and first and second end panels; said enclosure being closed at one end while the other end is closed by, in turn and in overlapping relationship, a first tab extending from said first side panel and including an aperture therein, said aperture disposed intermediate the length of said first tab; a second tab extending from said first end panel and extending for only a portion of the length of said first tab so as to not obstruct said aperture; an elongated closure tab extending from said second end panel and covering the aperture; and a cover tab extending from said second side panel and including a first section overlapping said closure tab and an aperture which is in registration with the aperture of said first tab and a second section that is adhesively bonded to said first side panel; said closure tab being connected to a portion of said second end panel that is pivotally connected to said tubular enclosure whereby said closure tab is slidably received intermediate the first tab and said first section of the cover tab, and may be slidably displaced in a direction opposite to said second tab extending from said first end panel to uncover the registered apertures in the first tab and the cover tab, said first side panel including a depressed glue area receiving wholly therein said second section of said cover tab.

4,094,457

COLLAPSIBLE DRUM-TYPE CONTAINER

George A. Spillson, Monroe, Mich., assignor to Consolidated Packaging Corporation, Monroe, Mich.

Filed Oct. 17, 1977, Ser. No. 842,590
Int. Cl.² B65D *3/02, 5/00*
U.S. Cl. 229—21 **19 Claims**

1. A drum-shaped container composed of a single sheet of foldable material comprising:

(A) eight vertical equal and substantially rectangular side panels forming an octagonal prism with an open top and a closed bottom,

(B) a pair of flaps at diametrically opposite corner edges of said prism, each flap being attached to one side panel and overlapping and attached to the adjacent side panel,

(C) alternate straight angular upwardly and downwardly foldlines between the bottom of each side panel and the bottom of the container, which angles of adjacent foldline are about 10° with respect to each other,

(D) eight triangularly shaped panels separated by creases diagonally from each corner of the octagon forming said bottom,

(E) two opposite triangular double-thickness flaps hinged to the bottom edges of opposite adjacent pairs of said panels and folded under said container against said bottom, and

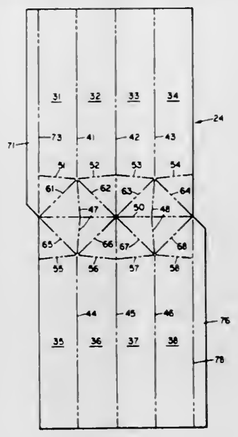


FIG.

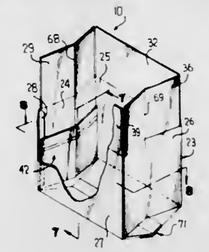
(F) means for fastening said two opposite triangular double-thickness flaps to said bottom.

4,094,458

REUSABLE, COLLAPSIBLE SHIPPING CONTAINER

Bennie Charles Nelson, Jr., Chicago, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Mar. 7, 1977, Ser. No. 775,040
Int. Cl.² B65D *5/10, 5/36*
U.S. Cl. 229—39 R **11 Claims**



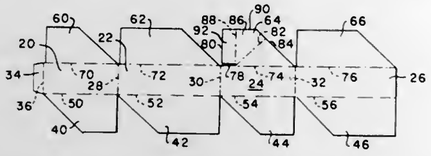
9. A container blank comprising a scored and cut sheet of material, said sheet including first and second end panels transversely hinged to a first side panel, a second side panel being transversely hinged to said second end panel, a tab being transversely hinged to said second side panel, said first and second end and side panels each having a top end and a bottom end, a top flap being longitudinally hinged to said top end of each of said first and second end and side panels, a bottom flap being longitudinally hinged to said bottom end of each of said first and second end and side panels, said bottom flaps each having a longitudinal hinge line dividing each bottom flap into first and second portions, said longitudinal hinge lines of said bottom flaps being positioned in generally longitudinal alignment with each other, and said first and second end panels, and their respective top and bottom flaps having a generally centrally located transverse hinge line whereby upon the setting up of said container blank into a container the latter is collapsible by relative folding movement of said first and second panels about said transverse hinge lines and by relative folding movement of said bottom flaps of at least said first and second side panels about said dividing longitudinal hinge line.

4,094,459

CONTAINER WITH EASY TUCK-UNDER FLAP FOR OVERLAPPING CLOSURE AND METHOD

Everett A. Coons, West Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Filed Dec. 12, 1977, Ser. No. 859,672
Int. Cl.² B65D *5/10, 5/02*
U.S. Cl. 229—41 B **12 Claims**



1. A container blank comprising

a plurality of side panels serially hinged together so that the side panels can be folded to form an enclosed wall for a container,

a joint flap on one end panel of the side panels for being secured to the other end panel of the side panels to form the enclosed wall,

bottom means attached to the bottom edges of the side panels for closing the bottom of the container,

a plurality of trapezoidal closure flaps each having the longer of the two parallel edges thereof hinged to the top edge of the respective side panel,

said closure flaps having dimensions for being sequentially folded together so that one side portion bordered by one of the non-parallel edges of each closure flap is overlapped by another side portion bordered by the other non-parallel edge of an adjacent flap,

one of the closure flaps having a slit extending along a segment of the longer parallel edge thereof from the one non-parallel edge thereof to an inner end of the slit,

said one closure flap also having a first scoreline extending across the one closure flap from the inner end of the slit at an acute angle relative to the longer parallel edge thereof toward the other non-parallel edge thereof to form a fold-down portion between the first scoreline and the one non-parallel edge thereof to permit the one side portion of the one closure flap to be inserted beneath the another side portion of the corresponding adjacent closure flap, and

said one closure flap having a second scoreline extending from the slit across the fold-down portion intermediate the first scoreline and the one non-parallel edge of the one closure flap to define a reverse folding portion between the second scoreline and the one non-parallel edge for being reverse folded relative to the remaining portion of the fold-down portion to substantially reduce the extent of protrusion of the fold-down portion into the container during insertion of the one side portion of the one closure flap beneath the another side portion of the corresponding adjacent closure flap.

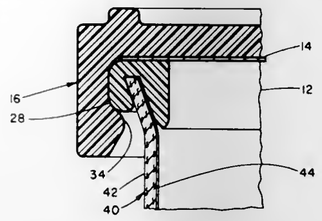
4,094,460

CLOSURE ASSEMBLY AND PACKAGE

Theodore P. Scanga, Lower Burrell, and Robert E. Callender, Frazer Township, Allegheny County, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Apr. 26, 1976, Ser. No. 680,360
Int. Cl.² B65D *53/02*
U.S. Cl. 229—43 **5 Claims**

1. A closure assembly for sealing a container having a closed end and an open end and having a metal foil layer on the inside surface thereof with a heat seal resin on the foil layer, comprising a molded plastic sealing ring having inner and outer walls defining a channel therebetween for receiving and sealing against the foil layer at the open end of such a container, with said inner wall including an outwardly facing frusto-conical surface of increasing outward extent toward the bottom of the channel, said surface being adapted for exerting pressure against the foil layer in order to facilitate induction heat sealing of the ring thereto, a sealing surface defined by the top of the ring, and an outer shoulder below said sealing surface, a metal foil liner having an upper and lower surface and overlying said ring including said sealing surface thereon and disposed against such sealing surface, and having a heat seal coating on at least



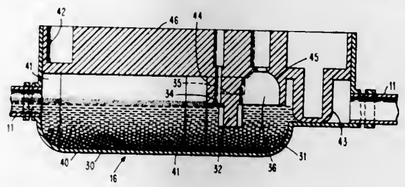
the outer portion of the lower surface thereof in contact with the sealing surface on the ring to be heat sealed to the ring upon induction heating of said liner, and a flexible plastic overcap having a top wall portion overlying said ring and liner and a depending skirt around the overcap with an inwardly projecting lip on said skirt engaged under the shoulder on said sealing ring.

4,094,461

CENTRIFUGE COLLECTING CHAMBER

Robert Melroy Kellogg, Endwell, and Alfred Paul Mulzet, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 27, 1977, Ser. No. 810,243
Int. Cl.² B04B *11/06*
U.S. Cl. 233—40 **12 Claims**



1. Apparatus for continuous collection of an intermediate one of three or more stratified fractions of a liquid mixture at the outlet end of a centrifuge container comprising:

means forming a chamber;

a dam across said chamber for blocking flow only of one of said intermediate fractions;

first withdrawal port means extending interiorly of said chamber into the stratum of said blocked intermediate fraction; and

second withdrawal port means at the downstream side of said dam extending into said chamber substantially the same distance as said first withdrawal port means whereby the location of said intermediate fraction is maintained having removal of the other of said fractions.

4,094,462

METHOD AND MEANS FOR PROVIDING AND TESTING SECURE IDENTIFICATION DATA

John L. Moschner, Centerville, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Aug. 2, 1976, Ser. No. 710,827
Int. Cl.² G06F *7/02;* **G06K** *7/08*
U.S. Cl. 235—419 **21 Claims**

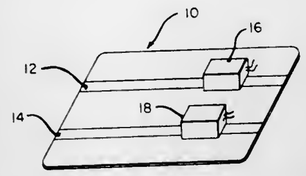
5. Apparatus for testing the legitimacy of an identification element, comprising

sensing means for sensing first, second and third categories of information from said identification element;

first storage means for storing the first category of information sensed from the identification element;

second storage means for storing the second category of information sensed from the identification element;

third storage means for storing the third category of information sensed from the identification element;



information processing means to generate output data from a specified sequence of operations performed upon said first and second categories of information transmitted to said information processing means from said first and second storage means; and

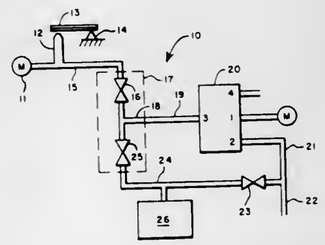
comparison means for comparing said output data with said third category of information transmitted from said third storage means and capable of indicating whether or not said output data and said third category of information are identical.

4,094,463

SYSTEM HAVING RESET ACTION

Sylvester Milewski, Morton Grove, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 23, 1977, Ser. No. 780,636
Int. Cl.² H01M *4/86;* **G05B** *11/50*
U.S. Cl. 236—82 **20 Claims**



1. A system for providing reset action comprising:

pressure dividing means having a first input adapted to receive an input signal, a second input connected to receive a feedback signal and an output providing a pilot signal which is a division of said input signal and said feedback signal;

output means having an input and an output;

connecting means connecting said output of said pressure divider means to said input of said output means and connecting said output of said output means to said second input of said pressure divider means; and,

capacity means connected to said connecting means for delaying a change in said feedback signal upon an occurrence of a change in said input signal,

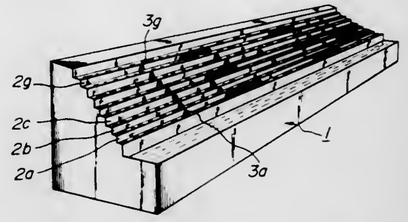
said output means producing an output signal having a predetermined relationship to said pilot signal.

4,094,464

THREE DIMENSIONAL DISPLAY DEVICE USING WATER FOUNTAIN

Koichi Kawamura, and Yoshiko Kawamura, both of No. 66, Jomyoji, Kamakura City, Japan

Filed Nov. 5, 1976, Ser. No. 739,104
Claims priority, application Japan, Nov. 14, 1975, 50-136351
Int. Cl.² B05B *17/08*
U.S. Cl. 239—17 **7 Claims**



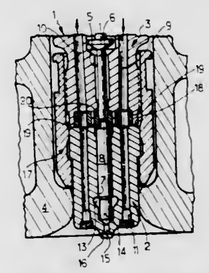
1. A three dimensional water fountain display device comprising a nozzle matrix in which the nozzles thereof are arranged in a series of vertical steps and in aligned relation, said nozzles being thus able upon the discharge of water from selected ones of said nozzles to display desired characters, numerals and other notational representations, an electromagnetic valve operatively connected to each of said nozzles, and a controller circuit associated with each of said valves so as to enable the display of the desired pattern of characters, numerals and other notational representations in three dimension by a combination of selected ones of said nozzles in operation.

4,094,465

METHOD AND DEVICE FOR OBVIATING THE RISK OF INJECTION FUEL LEAKAGE, MORE PARTICULARLY INTO THE COOLING SYSTEM OF DIESEL ENGINE INJECTORS

Dirk Bastenhof, Eaubonne, France, assignor to Societe d'Etudes de Machines Thermiques S.E.M.T., Saint-Denis, France

Filed Jan. 19, 1977, Ser. No. 760,570
Claims priority, application France, Feb. 20, 1976, 7604813
Int. Cl.² B05B *15/00*
U.S. Cl. 239—132.3 **6 Claims**

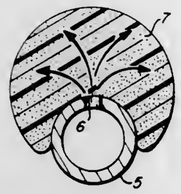


1. A diesel engine fuel injector having an elongated injector nozzle body, a nozzle holder at one end of said body, the body and holder having glazed mating surfaces in a plane transverse to the longitudinal axis of the nozzle body, a bore through the body and holder, an injector push rod and needle in said bore, a fuel leakage recovery passage in the holder, and coolant inlet and return passages extending lengthwise of the body and holder across said transverse plane, the coolant passages being spaced from the fuel leakage recovery passage, wherein the improvement comprises

a counterbored section in each of the coolant inlet and return

passages in one of the injector nozzle body and holder adjacent said transverse plane;
a sleeve fitted tightly in each of said counterbored sections so that one end thereof terminates at said plane;
an annular relief passage being provided adjacent the outer periphery of each sleeve at said one end; and
channels at least one of said mating surfaces communicating between each of said annular grooves and the leakage fuel recovery passage to provide a low pressure fuel leakage return path and prevent fuel contamination of the coolant.

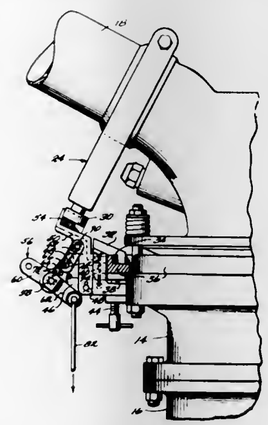
4,094,466
IRRIGATION APPARATUS
Oscar DeRomano, Rue du Stade, Fontvieille, Monaco
Continuation of Ser. No. 649,339, Jan. 15, 1976, abandoned. This application Jan. 24, 1977, Ser. No. 762,138
Int. Cl.[2] B05B *15/00*
U.S. Cl. 239—145 **1 Claim**



1. An irrigation apparatus for use with a cylindrical distribution pipe having apertures at spaced locations along the pipe, said apparatus comprising: a porous structurally rigid, solid body formed by sintering a quantity of plastic particles leaving interstitial spaces therebetween and thereby permitting flow of water therethrough, said body having a generally cylindrical shape with a central longitudinal axis adapted to be parallel with the axis of said distribution pipe, the lower portion of said body having a hollow portion extending therethrough with the longitudinal axis thereof parallel to the central axis of said body, said hollow portion having a cross-section which is at least semi-circular and wherein the greatest extent of said hollow portion into said body is at the central axis of said body, said hollow portion forming with said body two longitudinally extending, transversely depending sections which are adapted to conform to the exterior surface of said distribution pipe so that the apparatus can be engaged and retained in a self-supporting position by clipping the body in place about the distribution pipe over at least one of said apertures to distribute and diffuse a flow of fluid from said aperture into the area surrounding the apparatus at low pressure and low flow rates.

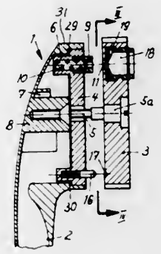
4,094,467
SPRINKLER HEAD SELECTIVELY OPERABLE IN A PART-CIRCLE MODE OR A FULL CIRCLE MODE
Larry P. Meyer, Walla Walla, Wash., assignor to Nelson Irrigation Corporation, Walla Walla, Wash.
Filed Apr. 1, 1977, Ser. No. 783,758
Int. Cl.[2] B05B *3/08*
U.S. Cl. 239—230 **13 Claims**

1. A sprinkler head selectively operable in a part-circle mode or a full circle mode comprising:
a sprinkler body having an inlet and an outlet;
stationary means for mounting said sprinkler body for controlled rotational movement about a generally vertical axis with said inlet in communication with a conduit arranged to communicate a source of water under pressure therewith;
said outlet being disposed to direct water under pressure communicated with said inlet in a stream flowing therefrom in a direction upwardly and outwardly in generally symmetrical relation to a plane passing through the axis of rotation;
cam follower means mounted on said sprinkler body for movement with respect thereto between (1) a first position wherein said cam follower means moves rotationally with said sprinkler body along a first arcuate path and (2) a spaced second position wherein said cam follower means moves rotationally with said sprinkler body along a second arcuate path spaced from said first arcuate path,
means operable by the flow of water communicated with said sprinkler body (1) for effecting a movement of said sprinkler body about its axis in one direction of rotation when said cam follower means is disposed in said first position, (2) for effecting a movement of said sprinkler body about its axis in the other direction of rotation when said cam follower means is disposed in said second position, and (3) for providing a yielding bias on said cam follower means to maintain the same in either one of its positions during the movement of said sprinkler body in the corresponding direction of rotation;
first and second adjustable means mounted on said stationary means for independent movement with respect to each other into any one of a plurality of variably spaced fixed positions of arcuate adjustment with respect to the axis of rotation of said sprinkler body,



first cam means carried by said first adjustable means within the second arcuate path of said cam follower means and outside the first arcuate path of said cam follower means so as to be operable during the movement of said sprinkler body in said other direction of rotation when engaged by said cam follower means to move the latter out of said second position toward said first position for biased maintenance in said first position as aforesaid,
second cam means mounted on said second adjustable means for movement between (1) a part-circle operative position within the first arcuate path of said cam follower means so as to be operable during the movement of said sprinkler body in said one direction of rotation when engaged by said cam follower means to move the latter out of said first position toward said second position for biased maintenance in said second position as aforesaid and (2) a full circle operative position out of said first arcuate path of said cam follower means so as to permit movement of said sprinkler body in said one direction with said cam follower means bias maintained in said first position through a multiplicity of rotations; and
means for selectively moving said second cam means between said part-circle operating position and said full circle operating position to thereby selectively determine the mode of operation of said sprinkler head.

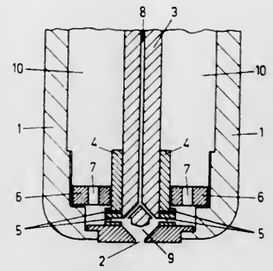
4,094,468
HAND SHOWER
Günter Volle, Bad Liebenzell, Germany, assignor to Schläfer G.m.b.H. & Co., Bad Liebenzell, Germany
Filed Dec. 2, 1976, Ser. No. 746,808
Claims priority, application Germany, Dec. 24, 1975, 2558796
Int. Cl.[2] B05B *1/18*; A47K *3/22*
U.S. Cl. 239—394 **12 Claims**



1. A hand shower, which comprises
a head body defining an internal flow passage, having an inlet end and an outlet end,
a socket carried by said head body in said flow passage and having a screw-receiving opening which is coaxial with said outlet end,
a screw which extends coaxially in said outlet end, and said screw-receiving opening is detachably fixed in said head body,
a U-shaped baffle carried by said head body in said flow passage, and spaced around said socket and open toward said inlet end, and adapted to divide a flow entering said passage through said inlet end,
a stationary cover plate coaxially mounted on said screw disposed in said outlet end, and formed with an axially open and eccentric counterbore, which is disposed on that side of said socket that is opposite to said inlet end,
a nozzle plate which is rotatably mounted on said screw in said outlet end, axially outwardly of said cover plate and in close proximity thereto,
an annular sealing element which is in sealing contact with said counterbore and protrudes from said cover plate to engage said nozzle plate,
a coil spring disposed in said counterbore, axially inwardly of said sealing element, and engaging the latter to urge it against said nozzle plate and adapted to impart turbulance to liquid flowing through said counterbore, and
a plurality of different nozzle passages, which extend through said nozzle plate and are eccentrically disposed therein, peripherally spaced apart and have the same eccentricity as said counterbore, so that each of said nozzle passages is adapted to selectively register with said counterbore.

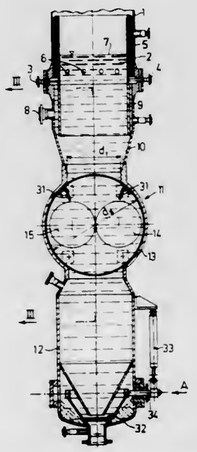
4,094,469
FUEL INJECTION NOZZLE ASSEMBLY
Theo Woringer, Zurich, Switzerland, assignor to BBC Brown, Boveri & Company Limited, Baden, Switzerland
Filed Nov. 24, 1976, Ser. No. 744,781
Claims priority, application Switzerland, Dec. 12, 1975, 16139/75
Int. Cl.[2] B05B *7/10*
U.S. Cl. 239—405 **2 Claims**

1. A fuel injection nozzle assembly particularly for gas turbines comprising a nozzle holder, a nozzle plunger extending generally centrally of said holder, fuel inlet passage means defined between said holder and said plunger, means defining a nozzle exhaust opening, said nozzle plunger having an end terminating adjacent said nozzle exhaust opening, means defining a swirl chamber extending to between said plunger end and said nozzle opening, tangential port means through which fuel flows between said fuel inlet passage means and said swirl chamber, and additive supply means for introducing a fuel additive into said nozzle assembly, said additive supply means comprising an additive inlet duct provided in said nozzle



plunger and being arranged to maintain the flow of additives through said nozzle assembly separate from the fuel flowing therein and to deposit said additives directly in said swirl chamber.

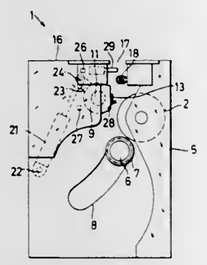
4,094,470
COMMINUTOR FOR USE IN A GASIFYING INSTALLATION
Reinhard Waldhofer, Essen, Germany, assignor to Krupp-Koppers GmbH, Essen, Germany
Filed Jan. 31, 1977, Ser. No. 764,453
Claims priority, application Germany, Feb. 2, 1976, 2606039
Int. Cl.[2] B02C *23/36*
U.S. Cl. 241—46 R **9 Claims**



1. In an arrangement of the type having a gasifying vessel for gasifying solid combustible substances therein with an attendant development of ashes and cinders, a combination comprising means defining a chamber at the bottom of the gasifying vessel; comminuting means situated below said chamber and communicating therewith; and means for maintaining in said chamber and in said comminuting means a body of a liquid which captures the ashes and cinders in the form of clinker which gravitationally descends through said liquid body from said chamber toward said comminuting means to be comminuted by the latter to particles of at most a predetermined size, including means for supplying the liquid into said chamber, means for discharging at least some of the liquid from said chamber including at least one outlet port located upwardly of said comminuting means, and shielding means in said chamber

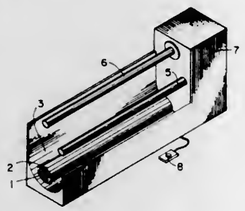
for preventing the clinker from reaching and entering said outlet port.

4,094,471
DEVICE FOR FEEDING THREAD INTO A TRAVERSING DEVICE IN A WINDING MACHINE
Alfred Tschentscher, Cologne, Germany, assignor to FMN Schuster & Co., Hurth-Efferen, Germany
Filed Sep. 22, 1976, Ser. No. 725,581
Claims priority, application Germany, Oct. 4, 1975, 2544538
Int. Cl.² B65H *54/02, 54/34, 54/20*
U.S. Cl. 242—18 PW **14 Claims**



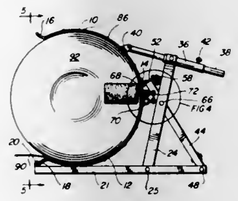
1. A device for feeding thread into a winding and traversing mechanism of a winding machine having an entrainment means and a slot wherein the thread is fed to a spool via a traversing device having a thread guide and a reverse thread roller and the start of the thread is fed to said entrainment means via said slot that is open at one end in the winding machine, the combination comprising:
(a) a traversing device housing rotatably mounted on the winding machine; and
(b) rotational adjustment means for rotating the housing about a longitudinal axis into an operating position wherein the traversing device is guiding the thread during the winding operation of said winding machine and out of said operating position before said guiding of the thread starts;
(c) said rotational adjustment means being effective to rotate the traversing device housing through an angle about said longitudinal axis when the start of said thread is brought into said slot;
(d) said angle being such that the thread guide of the traversing device lies outside a vertical plane tangential to said housing to prevent premature engagement of said thread by the thread guide.

4,094,472
CORE STRIPPING PROCESS FOR DEPLETED ROLLS OF NEWSPRINT PAPER
Robert Charles Berndt, Lutz, and George B. Eady, Tampa, both of Fla., assignors to Dar-Mar, Inc., Lutz, Fla.
Filed Sep. 27, 1976, Ser. No. 726,970
Int. Cl.² B65H *75/00*
U.S. Cl. 242—54 R **1 Claim**



1. A method for separating newsprint paper from the core upon which it is wound, after said core and newsprint paper have been utilized in a newspaper printing process, comprising
a. Starting with
i. A core upon which a depleted amount of newsprint paper is wound,
ii. A cradle,
iii. An open-end, rotatable shaft located in parallel proximity to said cradle,
iv. A friction bar located in parallel proximity to said cradle and shaft offset from any imaginary line drawn between the center of said shaft and the center of a core placed in any location in said cradle,
v. A drive motor, housing and frame to which said shaft, cradle and friction bar are attached, and
vi. A switching means for energizing said motor;
b. Placing said core with newsprint paper in said cradle;
c. Pulling the exposed end of said newsprint paper to slide over said friction bar then to surround said shaft;
d. Causing said shaft to rotate by activating said switching means and motor;
e. Transferring said newsprint paper from said core to said open-end shaft;
f. Causing said shaft to cease rotating by de-activating said switching means and motor; and
g. Removing said newsprint paper while in rolled configuration from the open-end of said shaft.

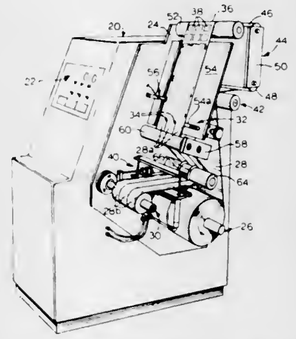
4,094,473
PORTABLE DEVICE FOR SUPPORTING A ROLL OF ALUMINUM SHEETING FOR DISPENSING
Lawrence P. Salvino, 285 Milton Rd., Wauconda, Ill. 60084
Filed May 9, 1977, Ser. No. 795,293
Int. Cl.² B65H *75/02*
U.S. Cl. 242—55 **4 Claims**



4. A device of the class described comprising pairs of spaced base, side and rear frames: (a) said side frames affixed at one end to said base frames adjacent one end thereof extending upwardly and one towards the other end of said base frames at approximately 105°;
(b) the upper portions of each of said side frames being bent inwardly and upwardly;
(c) said rear frames secured at one end to said one end of said base frames and extending upwardly and forwardly towards said side frames;
(d) a fixed lower curved plate spanning said base frames having a forward marginal end bent outwardly and downwardly and fixed to said base frames;
(e) the opposed marginal end of said lower plate being bent upwardly and rearwardly;
(f) an upper movable curved plate, said plate having the forward marginal end bent upwardly and outwardly, and an opposed end, a hinge, means for fixing said hinge to said opposed ends of said upper and lower plates;
(g) a sleeve pivoted to the upper ends of said side frame members, a rod slidable in said sleeve, one end of said rod pivoted to said upper plate for adjusting said plate towards and away from said lower plate, and means for adjustably fixing said rod in said plate;
(h) a pair of elongated sleeves affixed to said lower plate, and lying in a plane normal to the plane of said plate and adjacent the bend on said opposed edge;

(i) a pair of tubes each slidably positioned in one of said elongated sleeves, respectively, with one end of each having a right angled bend, a rotary drum on each of said ends; and
(j) a series of headed plastic rivets on each plate for ease in removing the contents therebetween.

4,094,474
SLITTING APPARATUS
Joseph August Stollenwerk, Oakville, and Reinhard Muhs, Orangeville, both of Canada, assignors to Rotoflex Engraving Limited, Mississauga, Canada
Filed Mar. 3, 1977, Ser. No. 773,882
Int. Cl.² B65H *35/02, 75/24*
U.S. Cl. 242—56.2 **18 Claims**



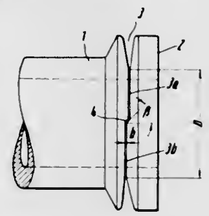
1. Appartus for longitudinally slitting travelling webs of paper and the like to form strips, the apparatus comprising:
means for supporting a rolled web to be slit;
take-up means for winding into rolls, strips of paper and the like formed by slitting the web;
means for guiding the web in a path which extends from said support means to said take-up means; and,
a cutter unit disposed adjacent the path of the web and comprising: at least one cutter head including a knife for forming a slit in the web; and means supporting said cutter head for adjustment in a direction transversely of the path of the web to vary the position of the slit formed by said knife in use; said support means including: an elongate member disposed parallel to the direction of adjustment of the cutter head; a locking element which extends longitudinally of said member over the range of adjustment of said head, the member including a slot receiving said locking element and having an internal cavity communicating with said slot, and the element being movable in the slot between a locking position in which it engages and prevents movement of the cutter head laterally of the web, and a release position permitting adjustment of the cutter head; an inflatable member disposed in said cavity in the elongate member and arranged, when inflated, to move the locking element to its locking position; and means for selectively delivering a fluid pressure medium to said inflatable member to inflate the same and thereby lock the cutter head in an adjusted position.

4,094,475
AUTOMATIC LOCKING SAFETY BELT RETRACTOR
Juichiro Takada, Tokyo, Japan, assignor to Takata Kojyo Co. Ltd., Tokyo, Japan
Filed May 6, 1976, Ser. No. 683,574
Claims priority, application Japan, May 7, 1975, 50-053847
Int. Cl.² A62B *35/02;* **B65H** *75/48*
U.S. Cl. 242—107.4 A **10 Claims**

1. A vehicle acceleration responsive safety belt retractor comprising:
a U-shaped frame (A) including side walls;
a reel (E) mounted between said side walls and having a belt (D) coupled thereto and being rotatable in opposite belt extraction and retraction directions;
means spring biasing said reel in a belt retraction direction;
a pair of ratchet wheels (1,2) located on opposite sides of said reel and rotatable and coaxial therewith, the teeth of one of said reels being peripherally offset relative to the teeth of the other reel by one-half the pitch of said teeth;
a pair of independently operable pawls (7,8) rockable into and out of engagement with respective ratchet wheels (1,2) to respectively lock and release said reel in the belt extraction direction;

a cross piece (9) having its opposite end portions engaging substantially transversely aligned eccentric points on said pawls;
a condition sensing member (13) responsive to a predetermined value of the acceleration of said vehicle; and
an actuating member (10) movable in response to said sensing member, said cross piece being movable by said actuating member to advance said pawls toward ratchet wheel engage positions and being so disposed that the intermediate portion of said cross piece assumes a rest state proximate said actuating member under normal conditions.

4,094,476
THREAD SPOOL
Max Christof Schmidt, Bonnigheim, and Richard Huber, Beilstein-Billenbach, both of Germany, assignors to Amann & Sohne, Bonnigheim, Germany
Filed Sep. 29, 1977, Ser. No. 837,844
Claims priority, application Germany, Oct. 1, 1976, 2644882
Int. Cl.² B65H *75/28*
U.S. Cl. 242—125.2 **4 Claims**



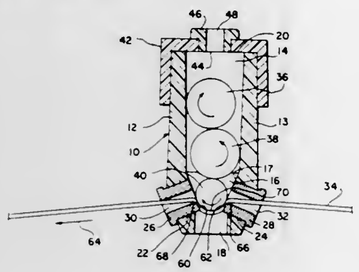
1. Thread spool having a sleeve and two flanges, at least one of the flanges having a notch like peripheral groove for inserting the end piece of a thread, the improvement comprising, the groove having at least two sections which are offset in direction of a spool axis, the sections establishing a single closed groove.

4,094,477

TENSION DEVICE FOR HORIZONTAL YARN

Edward J. McBride, Jr., P.O. Box 311, Moorestown, N.J. 08057

Filed Sep. 7, 1976, Ser. No. 720,904
Int. Cl.[2] B65H *59/22, 59/28*
U.S. Cl. 242—152.1 **18 Claims**



1. A ball tension device comprising a body having a longitudinal axis and defining a channel in which at least one ball can be positioned to vary yarn tension;

a first opening through the body communicating with the channel to define a yarn inlet passageway,

a second opening through the body communicating with the channel to define a yarn outlet passageway;

at least one passageway being angularly inclined from the axis to define an angularly inclined conduit through which the yarn passes,

said angular inclination being greater than ninety degrees,

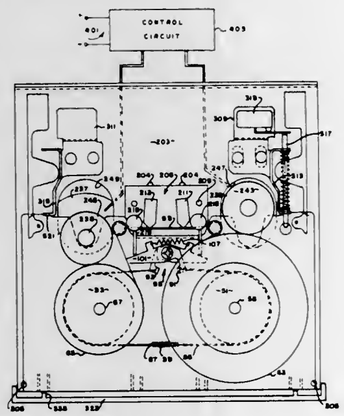
whereby the yarn is tensioned by the ball as it leaves the conduit and enters the channel.

4,094,478

DUAL MOTOR TAPE RECORDER SYSTEM

Bansi K. Shroff, Irvine, and Stephen K. Shu, Fountain Valley, both of Calif., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 28, 1975, Ser. No. 635,940
Int. Cl.[2] G11B *15/32, 15/46, 23/10*
U.S. Cl. 242—192 **3 Claims**



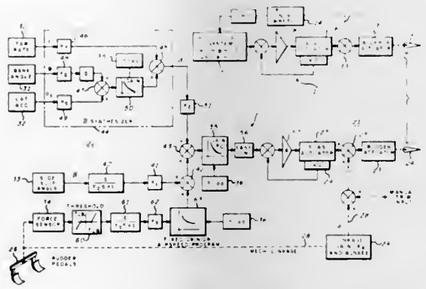
1. A tape transport system comprising a pair of coplanar hubs rotatable about fixed axes and a length of pliable tape carried in rolls on said hubs; a transducer cooperative with a span of tape intermediate said rolls; and drive means for driving said tape across said transducer from one said tape roll to the other said tape roll, said drive means comprising a first capstan movable into engagement with the periphery of a first of said tape rolls, a second capstan movable into engagement with the periphery of the second of said tape rolls, a first variable speed motor drivingly connected to said first capstan and a second variable speed motor drivingly connected to said second capstan, biasing means for biasing said capstans into driving engagement with the peripheries of said tape rolls, and control circuit means connected to both said motors for controlling the speed of each of said motors, said control circuit means further comprising acceleration/deceleration means for controlling the rate of acceleration and deceleration of the system, said acceleration/deceleration means comprising means for generating a first voltage ramp having a pre-selected slope for accelerating said system, means for deriving from said first voltage ramp a first reference signal for controlling the acceleration of said first motor, means for generating a second voltage ramp having a pre-selected slope for decelerating said system, means for deriving from said second voltage ramp a second reference signal for controlling the deceleration of said second motor, and means for deriving a reference signal from said first voltage ramp for controlling the acceleration of said second motor, and means for deriving a reference signal from said second voltage ramp for controlling the deceleration of said second motor, said reference signals being digital, and including a voltage-controlled oscillator means controlled by said voltage ramps for producing a first train of pulses from said first voltage ramp and a second train of pulses from said second voltage ramp, and further including first means for deriving from said trains of pulses first-motor reference signals for controlling the instantaneous speed of said first motor and second means for deriving from said trains of pulses second-motor reference signals for controlling the instantaneous speed of said second motor, said second-motor reference signals having a lower instantaneous frequency than said first-motor reference signals.

4,094,479

SIDE SLIP ANGLE COMMAND SCAS FOR AIRCRAFT

Thomas W. Kennedy, Jr., Phoenix, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Continuation of Ser. No. 653,555, Jan. 29, 1976, abandoned. This application Mar. 25, 1977, Ser. No. 781,226
Int. Cl.[2] G05D *1/10*
U.S. Cl. 244—179 **8 Claims**



1. In a yaw axis stability and command augmentation system for aircraft having a manually actuated rudder controller and a primary and secondary rudder actuator means for positioning the rudder to command a substantially steady state side-slip angle attitude of said aircraft proportional to a substantially steady state force on said manually actuated rudder controller, the combination comprising,

(a) means for supplying a first signal proportional to the side slip angle of the aircraft, including substantially steady state values thereof,

(b) means for supplying a second signal proportional to the force applied to said manually actuated controller including substantial steady state values thereof,

(c) summing means responsive to said first and second signals for supplying a control signal in accordance with the difference therebetween, and,

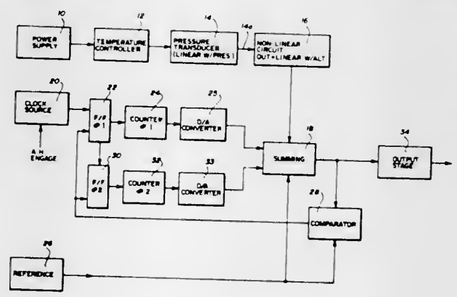
(d) means supplying said control signal to said secondary actuator for positioning said rudder in accordance therewith, thereby commanding said substantially steady state side-slip angle attitude of said aircraft proportional to said substantially steady state force on said manual controller.

4,094,480

AIRCRAFT ALTITUDE HOLD SYSTEM

John M. Nixon, Mineral Wells, Tex., assignor to Edo-Aire Mitchell, Mineral Wells, Tex.

Continuation of Ser. No. 716,442, Aug. 23, 1976, abandoned. This application Apr. 4, 1977, Ser. No. 784,525
Int. Cl.[2] G05D *1/08*
U.S. Cl. 244—180 **23 Claims**



17. A system for maintaining aircraft altitude in combination with aircraft control surfaces, comprising:

means responsive to altitude pressure and generating an output signal varying with altitude,

means for generating a reference altitude signal,

means for supplying a standard reference signal,

means for combining the reference altitude signal with the signal varying with altitude and with the standard reference signal to generate an altitude hold signal, and

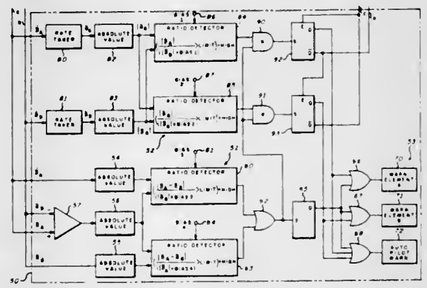
means for comparing the altitude hold control signal with the standard reference signal to generate a control signal to said means for generating a reference altitude signal.

4,094,481

FAIL PASSIVE DUAL SERVO WITH CONTINUOUS MOTOR SPEED AND ACCELERATION AND MONITORING

Michael P. DeWalt, Phoenix, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jun. 30, 1977, Ser. No. 811,653
Int. Cl.[2] G05D *1/00;* **G05B** *9/03*
U.S. Cl. 244—194 **7 Claims**



1. A monitored multiple channel automatic pilot for aircraft having a control surface controlled thereby for controlling the attitude and flight path of the aircraft comprising

first and second substantially identical closed loop control channels responsive to attitude and flight path control signals and including corresponding first and second servomotors normally supplying substantially identical outputs for controlling said control surface,

differential means having first and second inputs responsive respectively to the outputs of said first and second servomotors and an output connected to drive said control surface for controlling the attitude and flight path of said aircraft in response to said control signals, and

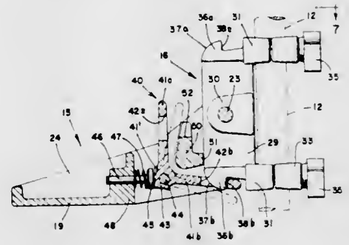
monitor means continuously responsive to the ratio of the absolute values of the accelerations of said first and second servomotors and the ratio of the absolute values of the velocity difference between said first and second servomotor outputs and the velocity of each of said servomotors outputs for clamping that input to said differential means having the highest acceleration when said velocity ratio exceeds a predetermined value.

4,094,482

DECK MOUNT FOR FISHING MOTOR

Lester C. Weaver, Fayetteville, Ark., assignor to Shakespeare of Arkansas Inc., Fayetteville, Ark.

Filed Dec. 17, 1976, Ser. No. 751,469
Int. Cl.[2] B63H *21/26*
U.S. Cl. 248—4 **6 Claims**



1. A deck mount for mounting the motor tube of a fishing motor on a boat deck, comprising a base bracket adapted for attachment to the deck, a yoke for holding the motor tube, means for clamping said motor tube in said yoke, said yoke swiveled on said bracket for swinging said motor tube between vertical operating position and horizontal stowed position, single latch means having two angularly disposed intersecting legs adapted selectively to engage and lock said yoke in operating and stowed positions, said latch means pivoted on said bracket at the intersection of said legs, and spring means bearing against said intersection for biasing said latch means into locking engagement with said yoke in either position.

4,094,483

MOUNTING DEVICE

Richard E. Busch, La Puente, Calif., assignor to Addmaster Corporation, San Gabriel, Calif.

Filed Jun. 6, 1977, Ser. No. 803,665
Int. Cl.[2] F16L *3/08*
U.S. Cl. 248—73 **2 Claims**

1. A device for mounting an article on a support comprising

a one-piece member of plastic material having spaced relatively stiff legs,

said legss having upper, lower, and mid portions,

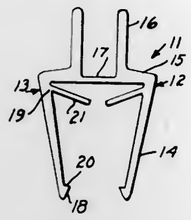
said lower portions adapted to straddle opposite sides of said article,

said lower portions having inwardly extending barbs at the lower ends thereof for latching engagement with said support,

a relatively flexible cross element connected between said mid portions of said legs,

said upper portions being movable toward each other

whereby to rock said arms to release said barbs from latching engagement with said support, and



inward extending yieldable arms integral at their outer ends with said lower portions for engagement with said article.

4,094,484

BALANCED PORTABLE PEDESTALS

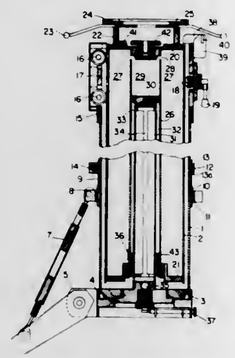
Edward Richard David Galione, Bury St. Edmunds, England, assignor to W. Vinten Limited, Bury St. Edmunds, England

Filed Feb. 28, 1977, Ser. No. 772,422

Claims priority, application United Kingdom, Mar. 13, 1976, 10168/76

Int. Cl.[2] A47F *5/12*

U.S. Cl. 248—162 **8 Claims**



1. A portable pedestal for instruments such as cameras or the like, comprising a base member having an outer column mounted thereon, at least one inner column slidably locatable substantially concentric with said outer column, pressure increasing means operable to pressurise said inner column via valve means during relative movement between said inner and outer columns to produce a pressure of gas within said inner column operable to substantially balance said inner column against an externally applied force on said inner column.

4,094,485

RADIO MOUNTING BRACKET

James S. O'Callaghan, Gilford, N.H., assignor to Tram/-Diamond Corporation, Winnisquam, N.H.

Continuation-in-part of Ser. No. 709,228, Jul. 27, 1976, Pat. No. 4,042,201. This application Jun. 27, 1977, Ser. No. 810,031

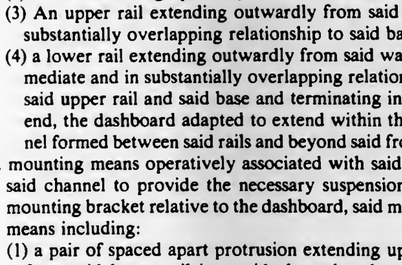
Int. Cl.[2] B60R *11/02*

U.S. Cl. 248—221.3 **8 Claims**

1. A bracket for mounting electronic equipment in a vehicle comprising:

(a) a U-shaped bracket having a first slot and a second slot in each upright of the "U" for receiving mounting studs attached to opposite sides of an equipment unit, each slots having an entrance at one end of an entrance leg and a foot formed substantially perpendicular to the other end of said leg so as to form an "L" shape;

(b) at least one wire spring element bent in a semicircle at a first punched tab in a respective said upright having an upper arm extending to a second bend about a second punched tab and having a lower arm extending through a double bend to block said first slot; and,



(c) a third punched tab providing upward support for said lower arm; all whereby said spring element resists passage of equipment mounting studs into said first slot and then snaps behind it as it moves into the foot of the first slot to secure said equipment unit in place.

4,094,486

CB RADIO MOUNTING BRACKET

Frank Sunderlin, Rte. 1, Box 120A, Pickens, S.C. 29671

Filed Nov. 2, 1976, Ser. No. 738,248

Int. Cl.[2] A47F *5/00*

U.S. Cl. 248—225.4 **9 Claims**

1. A mounting bracket for use in a motor vehicle for securing a CB or the like to the upper and lower sides of a dashboard, said mounting bracket comprising:

a. a housing member including:

(1) a base adapted to be secure to the CB or the like,

(2) a wall extending upwardly from said base,

(3) An upper rail extending outwardly from said wall in substantially overlapping relationship to said base, and

(4) a lower rail extending outwardly from said wall intermediate and in substantially overlapping relationship to said upper rail and said base and terminating in a front end, the dashboard adapted to extend within the channel formed between said rails and beyond said front end,

b. mounting means operatively associated with said rails in said channel to provide the necessary suspension of the mounting bracket relative to the dashboard, said mounting means including:

(1) a pair of spaced apart protrusion extending upwardly from said lower rail into said channel and proximate said wall for engagement with the lower side of the dashboard, and

(2) a pair of spaced apart adjustable prongs extending downwardly from said upper rail into said channel and outwardly of said protrusions, said prongs adapted to engage the upperside of the dashboard so as to engage same, each said prong having a threaded stud extending in threaded engagement through said upper rail and a wing nut thereon to adjust the extension of said prong within said channel,

c. locking means mounted outwardly of said prongs on said lower rail and including a pair of levers pivotally mounted intermediate their ends to said lower rail so that in a locking position a forward end of each lever extends above said lower rail and a rear end of said lever extends below said lower rail, each of said levers being individually manually operable between a locking position in which the forward end thereof engages the lower side of the dashboard to be clamped in locked position between each said prong providing a downward clamping force and each said protrusion and lever providing an upward clamping force, to a release position in which each said lever is disengaged from contacting engagement with the dashboard.

4,094,487

SECURING DEVICE

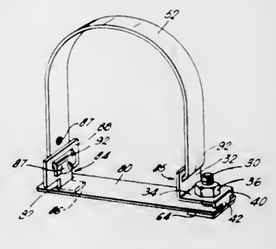
Robert Arthur Henderson Heard, Church Farm, 63 Church Lane, Backwell, Bristol, England

Filed Jun. 14, 1976, Ser. No. 695,411

Claims priority, application United Kingdom, Jun. 16, 1975, 25618/75

Int. Cl.[2] E01F *9/01*

U.S. Cl. 248—231 **5 Claims**



1. A device for securing a first body to a second body, the second body comprising a channel member having a mouth restricted by inturned lips, the device comprising an elongate plate for insertion lengthwise into the channel to extend across its mouth and be retained in the channel by the inturned lips thereof, a pair of attachment members arranged for connection to the elongate member through the mouth of the channel and connected or arranged for connection to a strap to be passed around the first body, one of the attachment members comprising a flat body part slotted to receive said strap and a narrower stem part to extend through the channel mouth and being connected at its end remote from the body part to an end portion of the elongate plate, the other attachment member being of L-shaped configuration comprising a first limb connected or arranged for connection to said strap and a second limb at right angles thereto with an aperture therein, a nut and bolt adjustably connecting said second limb with the adjacent end portion of the elongate plate so that the shank of the bolt extends through the channel mouth, the shank of the bolt passing through an aperture in the elongate plate and the aperture in said second limb, the head of the bolt lying on the side of the elongate plate remote from said second limb and the nut being carried on the shank on the side of said second limb remote from the elongate plate.

4,094,488

HANGER FOR TENNIS RACKETS

Neil Bryant, 2800 Crouchwood, Little Rock, Ark. 72207

Filed Aug. 8, 1977, Ser. No. 822,803

Int. Cl.[2] A47G *29/00*

U.S. Cl. 248—359 **6 Claims**

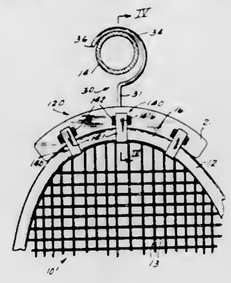
1. An article for hanging a game racket in a clothes closet on a horizontal bar therein, the racket having a curved frame with an open face across which strings are tautly strung at spaced intervals, the article comprising:

a body having upper and lower edges and opposite side walls therebetween,

the lower edge of the body having surfaces conforming to an upper, outer portion of the racket frame;

an open hook affixed to the upper side of the body and extending upwardly therefrom for engaging over said bar of said closet; and

at least one flexible strap member affixed to one of the walls and edges of the body and having means thereon for



removably engaging one of the frame and face of the racket,

the said flexible strap and engagement means thereon comprise one part of a two-part synthetic sheet-form material, the parts of which are removably adhesvie to one another upon pressing, facial contact together; and

a second flexible strap comprising a second part of said two-part tape material is affixed to the body in alignment with the first strap along the face of the racket, for engagement with the racket face and the first strap through the racket face.

4,094,489

SEAT POSITION ADJUSTING MEANS FOR AUTOMOBILE SEAT ASSEMBLIES

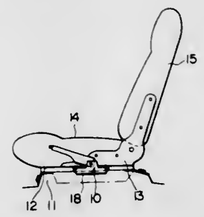
Noboru Yoshimura, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Nov. 29, 1976, Ser. No. 745,976

Claims priority, application Japan, Dec. 9, 1975, 50-146730

Int. Cl.[2] F16M *13/00*

U.S. Cl. 248—429 **6 Claims**



1. Seat position adjusting means for an automobile seat assembly, which comprises rail means provided on a floor of an automobile body and having a plurality of recesses arranged at least in one row, bracket means slidable along said rail means and carrying seat means thereon, locking means provided on said bracket means and including locking elements which are resiliently biased into locking engagement with said recesses in said rail means, adjusting lever means mounted on said bracket means for swinging movement about a first axis, means for interconnecting said adjusting lever means with said locking elements in such a manner that at least one of the locking elements is moved out of engagement from one of the recesses in the rail means when said lever means is swingably actuated

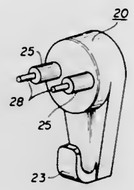
in at least one direction, and outrigger elements mounted on said lever means for swinging movement about a second axis which is offset from said first axis, said outrigger elements being resiliently biased into engagement with another of said recesses in the rail means whereby, when said lever means is actuated to disengage said one of the locking elements from said one of said recesses in the rail means, one of the outrigger elements functions as a fulcrum member for supporting said second axis against displacement so as to cause a predetermined displacement of the first axis with respect to said rail means for producing a corresponding displacement of the bracket means.

4,094,490

HARD WALL FASTENER

Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 555,737, Mar. 6, 1975, Pat. No. 3,974,557. This application Jun. 21, 1976, Ser. No. 698,069
Int. Cl.² A47G *1/16*
U.S. Cl. 248—489 **17 Claims**



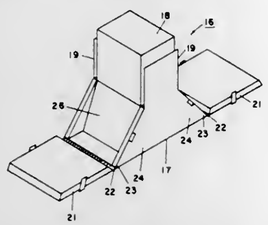
1. In an article of the type having a base member with a first surface adapted to engage a wall, and at least one hardened pin with a sharpened end initially extending into an aperture in the base member from a surface opposite said first surface and a driving end extending from said opposite surface, whereby said pin may be driven into a wall for supporting said article on the wall; the improvement wherein said article further comprises a bushing mounted to support said pin in said aperture, said bushing being releasably coaxially held in said aperture, with one end thereof in said aperture and spaced from said first surface and the other end extending from said opposite surface, said bushing having a central coaxial hole into which said pin extends whereby said bushing guides said pin in said aperture, said bushing having a length less than the length of said pin.

4,094,491

CORE FORM FOR LINING CONTAINERS

Jack E. Towers, Littleton, Colo., assignor to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 656,245, Feb. 9, 1976, abandoned, which is a division of Ser. No. 578,102, May 16, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,073
Int. Cl.² B29C *1/06*
U.S. Cl. 249—83 **1 Claim**



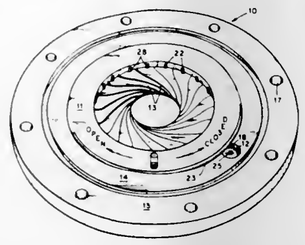
1. A mold for applying a foamable resilient material to the interior surfaces of a container, comprising a base, a center portion centrally mounted on the base, the base having opposed wedge-shaped end sections, each end section defining an inclined portion which inclines from the center portion; two side walls fixedly mounted on the sides of the base and in spaced apart relationship with the center portion; an end flap hingedly affixed to each of the ends of the end sections, pivotable on a hinge and capable of being removably secured to the inclined portion of each of the end sections; each end section further having a recess between the sides thereof, wherein the end flap holds the lid of the container over the recess so that the foamable resilient material substantially fills the recess under the lid to adhere to the interior side of the container lid.

4,094,492

VARIABLE ORIFICE USING AN IRIS SHUTTER

Raymond Beeman, El Cerrito, and Steven J. Brajkovich, Fremont, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 18, 1977, Ser. No. 760,305
Int. Cl.² F16K *31/54, 3/06*
U.S. Cl. 251—212 **4 Claims**



1. A variable orifice forming mechanism for controlling flow of medium therethrough comprising: a mounting ring defining a central orifice and consisting of an inner section, an intermediate section, and an outer section, a plurality of curved members pivotally mounted on said mounting ring, said inner section of said mounting ring having a plurality of spaced holes therein, said curved members each having an extending pivot pin located at one end thereof positioned in one of said holes, said intermediate section of said mounting ring having a thickness greater than said inner section and having a countersink therein, and said outer section of said mounting ring having a thickness greater than said intermediate section and being provided with means by which said mechanism is adapted to be secured to an associated system through which medium to be controlled flows, a drive ring having a plurality of grooves therein, said drive ring being positioned on said inner section of said mounting ring, said curved members having pins extending therefrom and movably secured in said grooves of said drive ring, and drive means mounted in said countersink of said intermediate section of said mounting ring for moving said drive ring with respect to said mounting ring thereby moving said curved members such that said orifice in said mounting ring is effectively changed in diameter.

4,094,493

GANTRY CRANES

Karl L. Polen, Alliance, Ohio, assignor to The Alliance Machine Company, Alliance, Ohio

Division of Ser. No. 637,230, Dec. 3, 1975, Pat. No. 4,027,800. This application Jan. 5, 1977, Ser. No. 757,059
Int. Cl.² B66C *23/60*
U.S. Cl. 254—144 **3 Claims**

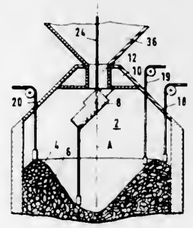
1. A safety reeving system for gantry cranes comprising a pair of drums on each end of said gantry, an upper sheave assembly on the gantry above each drum, each drum having a pair of independent cables reeving from the drum to said upper sheave assembly above it on the gantry, a lower relatively movable sheave assembly below each upper sheave assembly, one cable from each pair of cables passing over one sheave of the upper sheave assembly and downward around the lower sheave assembly and back over the upper sheave assembly and dead ending at the lower sheave assembly, the other cable from each pair of cables passing over a sheave of the upper sheave assembly across the gantry to the opposite upper sheave assembly on the other side of said gantry and downwardly to the lower sheave assembly on said other side and back over the said opposite upper sheave assembly and dead ending at the said opposite lower sheave assembly.

4,094,494

FURNACE CHARGE PROFILE MEASURING PROCESS AND APPARATUS

René N. Mahr, Howald-Hesperange, Luxembourg, assignor to S. A. des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed Jan. 25, 1977, Ser. No. 762,781
Claims priority, application Luxembourg, Feb. 9, 1976, 74321
Int. Cl.² C21B *7/24*
U.S. Cl. 266—44 **1 Claim**



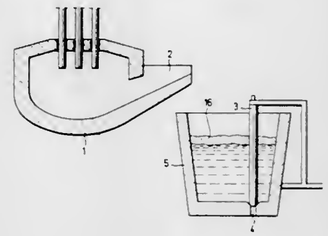
1. A process for monitoring the development of the surface of the charge burden on the hearth of a shaft furnace, the furnace employing a rotatable and angularly adjustable distribution chute which extends downwardly on the axis of the furnace, the angle of the chute with respect to the axis of the furnace being adjustable to deposit furnace charge material in a predetermined pattern, said process including the steps of:
- inclining the distribution chute such that its axis is at a preselected angle with respect to the axis of the furnace;
- lowering a probe initially axially with respect to the furnace until it contacts the charge surface, the probe being deflected from the furnace axis by the distribution chute;
- measuring the distance traveled by the probe until contact with the charge surface has been established;
- correcting the measured distance in accordance with the angular inclination of the distribution chute; and withdrawing the probe from the charge surface.

4,094,495

METHOD AND APPARATUS FOR THE PRODUCTION OF QUALITY STEELS

Horst Kutscher, Dortmund, and Gernot Zahs, Dortmund-Lichtendorf, both of Germany, assignors to Vacmetal Gesellschaft fur Vakuum'-Metallurgie mbH, Dortmund, Germany

Filed Apr. 22, 1976, Ser. No. 679,118
Claims priority, application Germany, May 17, 1975, 2522194
Int. Cl.² C21B *13/14*
U.S. Cl. 266—143 **7 Claims**



1. An installation for producing high quality steels with analyses within a very close range of tolerances from solid raw materials comprising:
- a furnace including heating means by which the raw materials are melted down and at least partially decarburized and dephosphorized and the resulting melt is heated to metal;
- a transfer ladle positioned to receive the melt produced in said furnace, said transfer ladle including means to discharge the metal;
- means to separate the slag component from the said metal component of said melt; a receiving ladle positioned to receive the metal component of said melt, discharged from said transfer ladle;
- means to agitate a melt contained in said receiving ladle;
- a transporting unit by which said receiving ladle and its contents is moved to a plurality of locations at which it is selectively engaged in a vacuum tight relationship with one of the following:
  - (a) a hood under which vacuum treatment and degassing may be effected;
  - (b) a vacuum lifter through which alloying additions can be made while the contents of said receiving ladle remains under a vacuum; and
  - (c) a heating unit under which said receiving ladle and its contents may be heated;
- a vacuum producing unit; and
- means to operatively connect said vacuum producing unit to each of said hood, said vacuum lifter and said heating unit.

4,094,496

ENCLOSURE FOR STEEL CONVERTING APPARATUS

John P. Readal, Allison Park, Pa., assignor to Pennsylvania Engineering Corporation, Pittsburgh, Pa.

Filed Dec. 31, 1975, Ser. No. 645,535
Int. Cl.² C21C *5/46*
U.S. Cl. 266—142 **2 Claims**

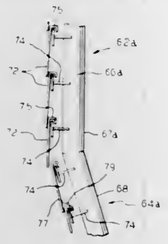
1. A converter vessel having a metal receiving opening formed adjacent an upper end,
- an enclosure having an upper wall portion disposed above said vessel and side wall portions extending downwardly along the sides of said vessel,
- an access opening formed in one of said wall portions, door means mounted adjacent said access opening for movement into open and closed positions relative to said access opening,
- said vessel being mounted for pivotal movement toward and away from the access opening to permit the charging thereof,

said vessel having submerged tuyeres for injecting oxygen and a hydrocarbon shielding fluid beneath the level of molten metal in said vessel and for injecting non-oxidizing gases into said metal when it is tilted toward said door means, said gas injections tending to cause materials to discharge from said metal receiving opening and to coat said door means,

the improvement wherein:

said door means including a plurality of generally horizontally oriented support means disposed in vertically spaced relation,

at least a substantial portion of said door means on the side thereof facing said vessel being defined by a plurality of plates individually mounted on said support means, said plates being arranged in substantially horizontal rows with a plurality of plates in each row, said plates each having hanger means at their upper ends for pivotally and slidably engaging said support means as the sole support thereof, said plates being shorter and narrower than said door and longer than the distance between said support means so that the lower ends of the plates overlap and



loosely engage the upper end of the plate disposed in the row therebelow to cover the hanger means thereon, the surfaces of said plates presented to the vessel being free of projections,

said plates being formed of a ferrous material having a carbon content substantially higher than steel and are individually pivotal and slidable so that each plate may be moved relative to adjacent plates to facilitate the removal of material briding the plates,

said support means each comprising a plurality of members mounted on said door means and extending in parallel spaced apart relation, each of the plates in said rows being mounted on one of said members,

said hanger means comprising first hook means extending over said support means,

the lower portion of said door means extending obliquely outwardly away from said access opening, the lower ones of said rows of plates defining the lower portion of said door means, each of the plates in said lower rows having a second hook means formed thereon and engaging the plate in the row disposed therebelow and to limit movement away from said lower plate.

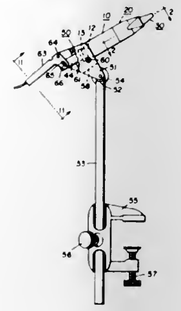
4,094,497

VISE FOR FLY TYING, SMALL PARTS AND THE LIKE

Paul E. Stratton, R.R. #1, Box 220, Fairfax, Iowa 52228

Filed Dec. 27, 1977, Ser. No. 864,276
Int. Cl.² B25B *1/22*
U.S. Cl. 269—71 **10 Claims**

1. In a vise having a pair of jaws, means for actuating the jaws in order to selectively hold and release a workpiece, and means for mounting the vise, the improvement wherein: the jaws comprise a pair of finger-like jaw members having corresponding forward and rearward ends and corresponding opposed interior surfaces and corresponding opposite exterior surfaces symmetrically disposed with respect to a longitudinal axis therebetween, said interior surfaces of the jaw members including two sets of opposing faces, the first set extending parallel to each other rearwardly from the forward ends of the jaw members and consitituting workpiece gripping faces of the jaws, the second set of faces diverging rearwardly from the rear ends of the first set of faces, the first and second sets of faces being symmetrically disposed with respect to a first plane through said axis, said exterior surfaces of the jaw members including a third set of faces symmetrically disposed with respect to said first plane and intermediate the forward and rearward ends of the jaw members, the second and third faces of each jaw member forming parallel intersections with second planes normal to said first plane and parallel to said axis; a hollow nose member having open forward and rearward ends corresponding to said ends of the jaw members, the nose member having interior surfaces enveloping exterior surfaces of the jaw members concentrically with respect to said axis including a fourth set of faces disposed adjacent the forward end of the



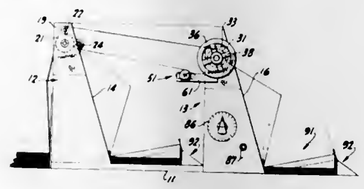
nose member and complementary with the third set of faces; a jaw guide member extending between and fixed in opposite wall portions of the nose member rearward of its forward end, the guide member intersecting said first axis and having exterior surfaces disposed between the second set of faces; exterior surfaces of the jaw members including the third set of faces and interior surfaces of the nose member including the fourth set of faces respectively slidably engaging each other during conjoint movement of the jaw members in forward and rearward directions in response to forces imposed upon the rearward ends thereof in opposite directions along said axis, exterior surfaces of the guide member also slidably engaging the second set of faces throughout said jaw member movement; and means associated with the rearward ends of the jaw member to provide said jaw member movement.

4,094,498

SEPARATOR

Marlin A. Schueler, San Leandro, Calif., assignor to Tion Equipment Company, Oakland, Calif.

Filed Jul. 22, 1977, Ser. No. 818,074
Int. Cl.² B65H *41/00*
U.S. Cl. 270—52.5 **8 Claims**



1. A separator for removing the top layer of printout paper from a plurality of layers thereof comprising:

a first rotatable drive roller having pressure wheels resiliently urged against said roller and a rotatably mounted breaker roller disposed adjacent thereto,

a second rotatable drive roller spaced from said first roller

for defining a first folding station therebetween and having pressure wheels resiliently urged against said second roller,

a rotatably driven fork structure including at least two adjacent parallel tines disposed intermediate and parallel to said first and second rollers above said first folding station, and

at least one folding wedge disposed at a second folding station adjacent and below said second roller on the opposite side thereof from said first roller, said wedge being in the form of a tetrahedron wherein one of the triangular faces of the tetrahedron forms an inclined upper surface for supporting the successive sheets as they are refolded in a stack, said upper surface having a common edge with the base of the tetrahedron substantially parallel to said second drive roller,

whereby successive sheets of a separated layer of printout paper are refolded and deposited on said triangular upper surface with fold lines adjacent said common edge.

4,094,499

DEVICE FOR CONTROLLING THE ACTUATION OF GRIPPING MEANS IN A SHEET ASSEMBLING APPARATUS

Hermann Thomas, Darmstadt, Germany, assignor to Maschinenfabrik Goebel GmbH, Darmstadt, Germany

Filed Nov. 2, 1976, Ser. No. 738,268
Claims priority, application Germany, Nov. 6, 1975, 2549761
Int. Cl.² B65H *39/08*
U.S. Cl. 270—60 **4 Claims**

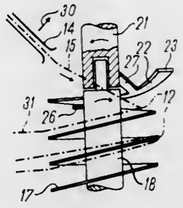
1. In an apparatus for assembling sheets which comprises a cylinder mounted for rotation about its axis and having a sheet gripping means thereon for holding at least one sheet thereon and for releasing the sheet for passage onto a sheet handling means, the gripping means connected to a follower roll in engagement with a stantionary cam plate having a predetermined profile for effecting actuation of the gripping means as the follower roll engages a depressed portion of the cam plate, a device for further controlling the actuation of the gripping means comprising, a rotatable cam plate eccentrically mounted relative to the cylinder axis, the rotatable cam plate having a profile for preventing actuation of the gripping means when the follower roll simultaneously engages at least one portion of the rotatable cam plate which may overlie a depressed portion of said stationary cam plate and thereby preventing said follower roll from following the profile of the stantionary cam plate, said rotatable cam plate being mounted for rotation about the cylinder axis independent of said stationary cam plate and the cylinder, means for rotating said rotatable cam plate to alter the phase of the rotatable cam plate relative to the cylinder during rotation, and to effect movement of the portion of the rotatable cam plate into and out of an overlying position relative to said depressed portion.

4,094,500

APPARATUS FOR THE FOLDING OF PAPER WEBS OR SIMILAR MATERIALS

Otto Kunzmann, Neuffen, Germany, assignor to Bielomatik Leuze & Co., Neuffen, Germany

Filed Oct. 29, 1976, Ser. No. 736,800
Claims priority, application Germany, Nov. 12, 1975, 2550759
Int. Cl.² B65H *45/20*
U.S. Cl. 270—79 **20 Claims**



1. An apparatus for the folding of paper webs or similar materials for the formation of a stack made up of folded layers, comprising:

an arm for laying out the layers to form the stack, the laying arm being adapted for substantially cyclical, oscillatory motion, each of said layers being formed by one half-cycle of said cyclical motion, successive topmost layers being formed during each of said half-cycles as said webs leave said arm, each of said topmost layers having an upper surface directed away from said stack;

at least one folding screw which, in use, is located in the region of a corner of the stack having an axis of rotation extending substantially perpendicularly to the plane of the layers and having a leading edge for first engaging said webs, the leading edge entering the stack from the inside thereof between layers to be folded, the at least one folding screw being adapted to rotate twice for each said oscillatory cycle of the laying arm;

means for rotating the at least one folding screw in one direction; and

a pressing-down element mounted for rotation in the opposite direction to the at least one folding screw about an axis of rotation extending substantially perpendicularly to the plane of the layers and arranged to act upon each of said upper surfaces, so as to vertically position the web below the leading edge of the at least one folding screw, in the region where the leading edge enters in between the layers, the at least one folding screw preventing movement of the folded layers toward the middle of the stack.

4,094,501

ILLUSION APPARATUS

Edward D. Burnett, 3945-A W. Ainslie, Chicago, Ill. 60625

Filed Dec. 13, 1976, Ser. No. 750,282
Int. Cl.² A63J *5/02*
U.S. Cl. 272—8 M **1 Claim**

1. A fish bowl optical illusion apparatus wherein an image is made to appear in a liquid-filled container, wherein the improvement comprises

(a) a compartment having front, back and side walls and a partial top wall providing a partially open top for the compartment,

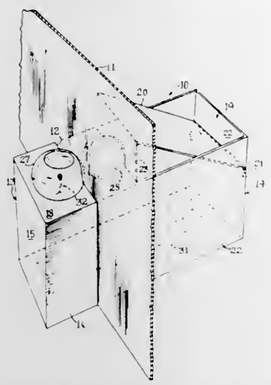
(b) an opaque wall member providing an opening of a size equal to the height and width of the compartment so as to receive a portion of the compartment therethrough,

(c) an opaque stand provided by a part of said partial top wall of said compartment projecting through said opening formed in said opaque wall member,

(d) a reflective surface angularly positioned over said partially open top of said compartment on one side of said wall member and adapted to reflect an image of the con-

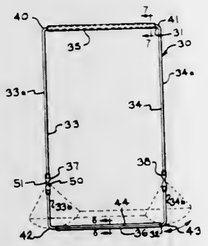
tents within said compartment below said reflective surface in the direction of said wall member,

(e) a pair of circular liquid-filled transparent receptacles supported in horizontal alignment on said stand to either side of said opaque wall member in the path of reflection of said reflective surface, and



(f) a second opening in said wall member in the line of the reflected image from said reflective surface and adapted to substantially receive a portion of one of said liquid-filled receptacle positioned upon said stand on the other side of said wall member and in which appears the reflected image of the contents of said compartment.

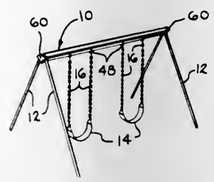
4,094,502
SKIPPING EXERCISE DEVICE
Arthur W. Cook, 822 Roosevelt St., Lima, Ohio 45804
Filed Feb. 7, 1977, Ser. No. 766,189
Int. Cl.[2] A63B *5/22*
U.S. Cl. 272—74 **9 Claims**

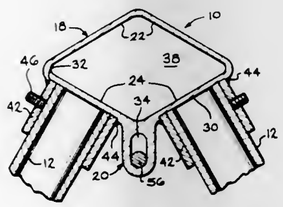


1. A skipping exercise device comprising a rectangular frame having two rigid long sides and two rigid short sides, a first of said short sides having means defining a handle, and hinge means located at a fixed predetermined point in each long side, said predetermined points being equally spaced from the second of said short sides a distance of from one-third to one-ninth the length of said long sides, said hinge means permitting said second short side to swing about said predetermined points in said long sides.

4,094,503
PLAYGROUND SWING WITH EXTRUDED CROSSBAR
Robert S. Wormser, 6900 SW. 19th Ave., Ocala, Fla. 32670
Filed Mar. 30, 1977, Ser. No. 782,892
Int. Cl.[2] A63G *9/00*
U.S. Cl. 272—85 **12 Claims**

1. In a playground swing including a crossbar supported upon leg columns affixed to the crossbar and angularly extending therefrom and swing members suspended from the crossbar having hanger members pivotally connected thereto, the improvement comprising said cross bar constituting an elongated hollow body having ends, an interior cavity, exterior sides to which the leg columns may be attached and a lower portion, said lower portion also having an interior cavity extending longitudinally therealong, an elongated pivot rod within said cavity of said body lower portion, rod restraining means within said body cavity engaging said rod preventing lateral rod displacement within said body lower portion cavity, a plurality of transverse notches defined in said body lower

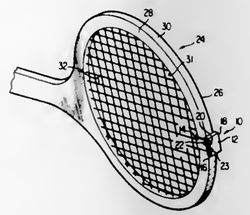




portion intersecting said cavity, said rod extending across said notches, and swing hanger members received within said notches pivotally mounted upon said rod.

9. A crossbar for playground swings comprising a hollow metal extrusion having a primary upper portion and a lower portion of reduced transverse dimension with respect to said upper portion, a longitudinal cavity within said lower portion for receiving a swing hanger supporting rod, and longitudinal spaced notches defined in said lower portion intersecting said cavity adapted to receive a swing hanger.

4,094,504
SIGNALLING DEVICE TO BE USED WITH A SPORT IMPLEMENT FOR DETECTING AND INDICATING THE PROPER OR IMPROPER USE THEREOF
Kenneth S. Barasch, 380 Lenox Ave., South Orange, N.J. 07079
Filed Mar. 3, 1976, Ser. No. 663,623
Int. Cl.[2] A63B *69/38*
U.S. Cl. 273—29 A **2 Claims**



1. A signalling device in combination with a tennis racquet for detecting and indicating the proper or improper use thereof, comprising:

air-actuable means comprising a plurality of reed members, each said reed member having a longitudinal axis, for emitting an audible signal when air passes through said means in a predetermined manner;

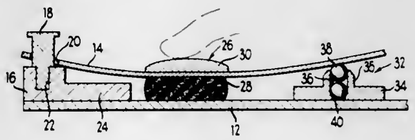
some of said reed members being mounted on said tennis racquet in a first direction so as to indicate a proper forehand stroke of said tennis racquet and other ones of said reed members being mounted on said tennis racquet in a direction opposite said first direction so as to indicate a proper backhand stroke of said tennis racquet; said proper stroke being indicated by said reed members when said longitudinal axis is moved parallel to the direction of said forehand and backhand stroke of said tennis racquet; and

means mounting said reed members to said tennis racquet.

4,094,505
TENNIS RACKET
Thomas E. Beall, Jr., 5350 Edgemoor La., Bethesda, Md. 20014
Filed Jan. 4, 1977, Ser. No. 756,798
Int. Cl.[2] A63B *49/02*
U.S. Cl. 273—73 C **9 Claims**

1. A racket, having orientations of an inner end toward the player and an outer end away from the player comprising: a rigid handle having a gripping surface to be held by the player; a bow having opposed sides and opposed inner and outer ends; main strings strung from end to end of said bow and cross-strings strung side to side on said bow; first shaft means extending cantilevered from said handle to a direct mechanical connection with only the inner end of said bow; second shaft means cantilevered from said handle outwardly to a mechanical direct connection with only the outer end of said bow; said first and second shaft means extending from said handle independently of each other to flex as cantilevered beams separately according to forces exerted only at their outer ends through their respective mechanical connection to the inner and outer ends of said bow; and each of said first and second shaft means being unconnected to and freely movable with respect to said opposed bow sides.

4,094,506
COMPETITIVE GAME
Howard J. Morrison, Deerfield, and Alan A. Hicks, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed May 23, 1977, Ser. No. 799,706
Int. Cl.[2] A63F *7/06, 7/10, 9/00*
U.S. Cl. 273—85 R **19 Claims**



1. A game apparatus comprising:

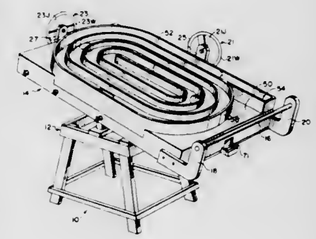
means for defining a relatively flat playing surface;

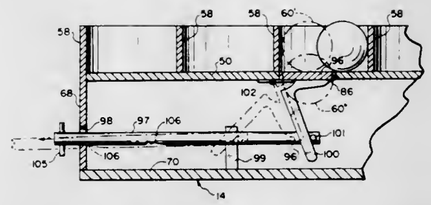
flexible cover means spaced above said playing surface and deflectable downwardly;

resilient support means for normally supporting said cover means at a preselected spacing above said playing surface and compressible to provide reduced spacing between said cover means and said playing surface on downward deflection of said cover means; and

a playing piece mounted for movement over said playing surface between said playing surface and said flexible cover means, said piece including means engageable by said cover means when deflected downwardly for propelling said piece across said playing surface in a direction determined by the deflection of said cover means.

4,094,507
CHANNELED PIVOTING BALL GAME WITH SELECTIVE HOLE CLOSURE
Russell E. Kauffmann, 1604 Executive La., Glenview, Ill. 60025
Filed Feb. 9, 1977, Ser. No. 766,860
Int. Cl.[2] A63F *7/04*; A63B *71/04*
U.S. Cl. 273—110 **2 Claims**





1. A rolling ball game apparatus comprising in combination,

a table top height unit having an upper surface of approximately rectangular overall shape and on which is defined spaced apart walls which form a continuous spiralling track from a start position to a finish position, said track being sized such that it is generally wider than the ball so that the ball may roll over different paths while proceeding along the track;

means for mounting the table top height unit at that height such that the unit may be tipped about a central area in any direction and its strike plane changed, and manual grip means for allowing one or more players to control the dip and strike of the table unit;

said table top unit surface also defining a plurality of hazard holes spaced about the track and so sized as to allow a ball to fall through them and positioned such as to allow a ball to travel past the hole without falling in it;

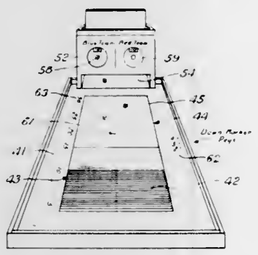
means provided in the unit for selectively closing alternatively one or more different ones of the plurality of holes such that a ball will roll over the closed holes without material interuption, said means being selectively manually operable from the edge of the unit to alternatively latch in the closed or open position the selected hole or holes

whereby one or more players may attempt to control the dip and strike of the table top height unit to maneuver a ball past hazard holes and along the spiralling track from start to finish, and the game's difficulty may be increased by alternatively manually latching in the closed or open position the selected hole or holes.

4,094,508
COMBINATION PIPE AND GAME DEVICE
Daniel D. Kirsch, 4734 N. 79th Ave., Phoenix, Ariz. 85033
Filed May 21, 1976, Ser. No. 688,581
Int. Cl.[2] A63F *7/00;* **A24F** *3/00, 1/16;* **A63H** *33/28*
U.S. Cl. 273—118 R **5 Claims**

1. A combination game and smoking device comprising:
(a) a base;
(b) a hollow tube connected to said base and having an end;
(c) a mouthpiece associated with said end for reception in a smoker's mouth;
(d) a pipe bowl in free communication with the interior of said tube; and
(e) a game piece within said tube adapted to move therein and solely in response to smoke and/or air movement in either longitudinal direction of said tube and being selected to permit passage of smoke through the tube in all positions thereof.

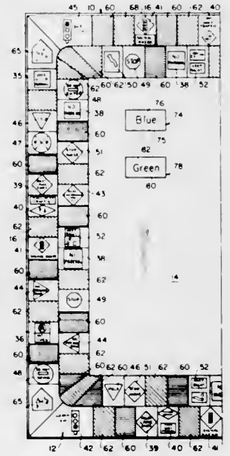
4,094,509
FOOTBALL GAME
William F. Barron, Ticonderoga, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed Feb. 9, 1977, Ser. No. 766,866
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—247 **1 Claim**

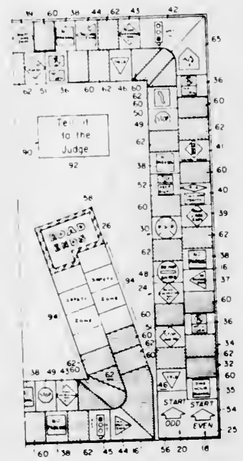


1. A football game, comprising
a gameboard providing a miniature football field having a plurality of spaced parallel yard lines and side lines and a plurality of peg holes down the center of the field and along one of the side lines, holes being provided at each yard line;
a football shaped peg of a first color adapted to removably fit in the peg holes;
a football shaped peg of a second different color adapted to removably fit in the peg holes;
a plurality of pegs of a third different color adapted to removably fit in the peg holes;
a dice box extending substantially perpendicularly from one end of the gameboard and having a chute formed therein and opening at the surface of the gameboard, said dice box having a side facing the field and extending substantially parallel to the yard lines, said dice box having a dimension substantially parallel to said yard lines which is greater than the width of the field and smaller than the width of the gameboard, the opening of the chute being greater than the width of the field;
a plurality of dice of the first color and a plurality of dice of the second color;
a plurality of play cards indicating various offensive plays and all types of playing variations which occur in a football game whereby a player rolls a predetermined number of the dice of one of the colors into the chute of the dice box via the opening thereof to determine a yardage gain or loss after referring to a play card to determine his play, the player placing the football peg on the correct yard line in the center of the field and the side line peg on the same yard line as the football peg to mark the line of scrimmage before the next play is called; and
a pair of scoring wheels on the side of the dice box facing the field, each of the scoring wheels being of a corresponding one of the first and second colors.

4,094,510
TELL IT TO THE JUDGE GAME
Walter Drohomirecky, 164 Fifth St., Rankin, Pa. 15104
Filed Nov. 5, 1976, Ser. No. 739,114
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—251 **4 Claims**

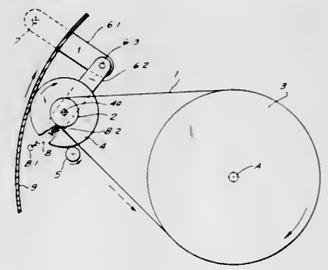
1. A game adapted to increase appreciation of the meaning of actual traffic road signs and that there are penalties for disobeying the signs, said game comprising in combination:
A. a plurality of pieces at least one for each player of the game,
B. a game board having a playing surface upon which said playing pieces are supportable,
C. said game board having its periphery divided into a roadway having a continuous right lane and a continuous left lane, said lanes being adjacent to each other and extending about said board so as to provide two paths of travel for the movement of said playing pieces in the same direction from the beginning to the end of each of said lanes, each said lane affording a path of progression for the purpose of continuity of play and including a series of distinguishable zones on each of said lanes,
D. said game board is generally square in configuration with said lanes of progression arranged about the periphery of said board to form a generally square closed figure of four sides with a particular location in one of said corners of the square from which said game is started,
E. said lanes extending in substantially parallel spaced relationship to each other and terminating in an inwardly directed section prior to closing of said square, such that said periphery of said game board is traveled by said pieces along said lanes prior to reaching said inwardly directed section,
F. a pair of starting zones in said corner of the square from which said game is started, one of said starting zones positioned adjacent to said right lane and the other of said starting zones adjacent to said left lane,
G. said inwardly directed section having one end thereof with a terminal zone for receiving thereon said pieces at the conclusion of movement thereof along said lanes,
H. said inwardly directed section including a plurality of said zones and extending in a plane adjacent to said roadway at substantially the one of said corners of the square from which said game is started,
I. traffic designations bearing different indicia thereon representative of road signs having varying identification indicia thereon along each of said lanes in a plurality of said zones, certain of said traffic designations providing for the crossing of said pieces between said lanes,
J. first identifiable means distinguishable by the color thereof, being interspersed among said signs along each of said lanes in a plurality of said zones,
K. second identifiable means distinguishable by the color thereof, being interspersed among said signs and said first identifiable means in a plurality of said zones,
L. a chance device operable by players of said game apparatus for determining the possible odd or even number of zones a particular playing piece shall move along the playing surface of said lanes,
M. odd indicium in one of said starting zones and even





indicium in the other of said starting zones, so as to commence play of the game with each one of said pieces on one of said lanes depending if an even or odd number is obtained by said chance device,
N. a first set of cards corresponding to said first identifiable means,
O. a second set of cards corresponding to said second identifiable means,
P. a set of chance cards, each said chance card having indicia thereon representative of an advantage one player must exercise over another player or a hazard that a player must suffer relative to the movement of said pieces along said lanes,
Q. said chance cards selected by a player when a preselected number of said first set of cards are accumulated by a player by landings on said zones of said first identifiable means and which are equivalent to traffic violations, or a preselected number of said second set of cards are accumulated by a player by landings on said zones of said second identifiable means and which are equivalent to traffic violations,
R. first positioning means on said game board for placing said first set of cards corresponding to said first identifiable means,
S. second positioning means on said game board for placing said second set of cards corresponding to said second identifiable means, and
T. chance positioning means on said game board for placing said set of said chance cards thereon.

4,094,511
BELT-DRIVEN RECORD PLAYER
Erhard Richter, and Dietrich Borsum, both of Kiel, Germany, assignors to Electroacustic GmbH, Kiel, Germany
Filed Feb. 25, 1976, Ser. No. 661,336
Claims priority, application Germany, Mar. 21, 1975, 2512403
Int. Cl.[2] G11B *3/60;* **F16H** *7/10*
U.S. Cl. 274—39 A **6 Claims**

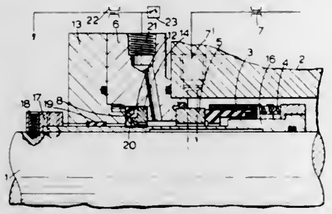


1. A belt-driven record player, comprising a turntable having a circumferential rim and being rotatable about an axis, said turntable being in normal operation subjected to a first load but being intermittently subjected to a higher second load; means for driving said turntable, including a motor shaft, a pulley shaft parallel to said motor shaft and mounting a drive pulley, a friction wheel on said pulley shaft rotatable therewith, and a drive belt trained about said pulley and transmitting torque to said turntable; and means responsive to changes in the load acting upon said turntable and mounting said pulley shaft for displacement in parallelism with said axis between a first position which it assumes when said first load acts upon said turntable and in which said friction wheel functionally engages said motor shaft but is spaced from said rim so that torque is transmitted to said turntable only via said drive belt, and a second position which said pulley shaft assumes when said second load acts upon said turntable and in which said friction wheel frictionally engages both said motor shaft and said rim so that torque is transmitted to said turntable via said drive belt as well as directly via said friction wheel to said rim.

4,094,512
SHAFT SEALS
Anthony Charles Back, Slough, England, assignor to Crane Packing Limited, Slough, England
Filed Jul. 14, 1976, Ser. No. 705,154
Int. Cl.[2] F16J *15/32*
U.S. Cl. 277—27 **11 Claims**

1. A seal assembly between first and second relatively rotatable elements, said assembly comprising an external cylindrical surface on said first element, a ring of flexible material which is free to float axially on said cylindrical surface, said ring having inner and outer annular lips both directed in the same axial direction, an internal cylindrical surface in said second

element disposed around said ring, said lips being capable of engaging and sealing respectively against the external cylindrical surface on said first element and against the internal cylindrical surface in said second element, the dimensions being such that in its free condition, said ring is normally out



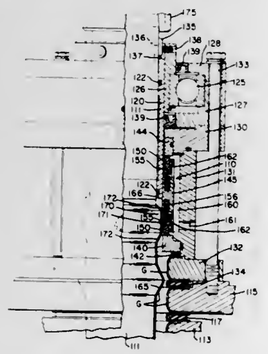
of contact with at least one of said surfaces but comes into contact with both, to form a seal, when fluid pressure acts against that axial face of the ring which faces in the direction towards which said lips are directed.

4,094,513

FULLY CARTRIDGE AGITATOR SEAL FOR USE WITH GLASS LINED MIXER TANKS

Donald L. Kime, Vandalia, and Ronald G. Stogdill, Trotwood, both of Ohio, assignors to Chemineer, Inc., Dayton, Ohio

Filed Sep. 13, 1976, Ser. No. 722,809
Int. Cl.² F16J *15/34*
U.S. Cl. 277—41 **6 Claims**



1. A fully cartridge, corrosion-resistant seal and agitator shaft assembly for use on mixer tanks particularly adapted for effecting sealing between an agitator shaft and the wall defining the opening through which the shaft extends into the mixer tank, said seal and shaft being free of any metal surface exposed to the contents of the tank, comprising:

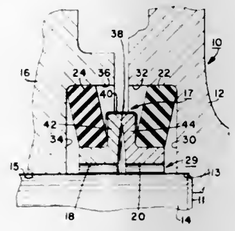
a. a stationary, vertically elongated annular seal housing mounted on the tank defining an opening which opens into the tank,
b. an agitator shaft extending through said housing into said tank,
c. bearing means supporting said shaft for rotation within said housing,
d. a sleeve within said housing mounted at a predetermined axial position on the agitator shaft and fixed thereto for direct rotation therewith,
e. upper and lower annular seal rings secured in stationary relation in said housing,
f. a seal retainer secured to said sleeve for direct rotation therewith and enclosed within said housing between said stationary seal rings
g. upper and lower rotary seal assemblies carried by said retainer for direct rotation therewith and each including a rotary annular seal member having a non-metallic surface positioned for running sealing engagement with the adjacent said stationary seal ring,
h. said sleeve proportioned to terminate at the lower end thereof at a position axially intermediate said seal assemblies within said housing,
i. the upper said seal member having an inside surface adapted to form a fluid seal with the outer surface of said sleeve,
j. said shaft having a corrosion resistant coating thereon extending from a position axially above said lower seal assembly into said tank, and
k. said non-metallic surface of said annular seal member of said lower seal assembly being proportioned to form a fluid seal directly against said shaft on the coated surface thereof to prevent access of the contents of the tank to said sleeve.

4,094,514

METAL ALLOY COMPOSITION WITH IMPROVED WEAR RESISTANCE

Donald L. Johnson, Rolling Meadows, Ill., assignor to Chicago Rawhide Manufacturing Company, Elgin, Ill.

Filed Nov. 28, 1977, Ser. No. 855,216
Int. Cl.² C22C *38/18*; F16J *15/28, 15/32*
U.S. Cl. 277—92 **9 Claims**



1. A tough, wear resistant metal alloy composition comprising, in weight percent, from about 3.10% to about 3.35% carbon, not more than 1.00% manganese, from about 0.75% to about 1.40% silicon, from about 16.5% to about 19.0% chromium, from about 0.75% to about 2.00% vanadium, from about 2.5% to about 4.0% molybdenum, from about 0.25% to about 1.25% cobalt, from about 1.75% to about 3.00% tungsten, not more than 0.040% phosphorous, not more than 0.040% sulfur, and the remainder iron.

4,094,515

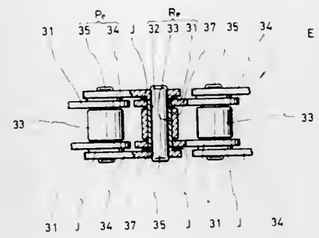
SEAL DEVICE IN A ROLLER CHAIN

Kumakichi Araya, No. 2, Daishoji Seki-machi, Kaga-shi, Ishikawa-ken, and Junichi Motoya, I-13, Diashoji Honmachi, Kaga-shi, Ishikawa-ken, both of Japan

Filed Feb. 8, 1977, Ser. No. 766,678
Claims priority, application Japan, Feb. 20, 1976, 51-18280; Feb. 20, 1976, 51-18281
Int. Cl.² F16J *15/34*; B62D *55/00*
U.S. Cl. 277—92 **3 Claims**

1. A seal device in a roller chain comprising an annular body rich in rubber-like elasticity having square lips in an outer peripheral edge portion of a base portion thereof and having one surface formed into a substantially X-letter cross section between said lips by a triangular concave portion and curved side walls, a pin link plate for holding and securing said annular body in opposed relation with a roller link plate, and a pin received into said pin link plate, said pin having ends caulked, characterized in that said lips are inwardly and outwardly pressed against said pin into slight contact with said roller link plate and said pin link plate, and as the chain travels, said lips

are further brought into intimate contact with said roller link plate and said pin link plate by means of deformation of the side



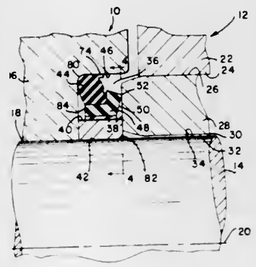
walls to prevent leakage of lubricating oil in the peripheral edge of the pin or to prevent entry of dirt.

4,094,516

TRACK PIN ASSEMBLIES AND SEAL THEREFOR

James P. Morley, Arlington Heights, and William J. Woods, Bensenville, both of Ill., assignors to Chicago Rawhide Manufacturing Company, Elgin, Ill.

Continuation-in-part of Ser. No. 694,265, Jun. 9, 1976, abandoned. This application May 10, 1977, Ser. No. 795,569
Int. Cl.² F16J *15/38, 15/54*
U.S. Cl. 277—92 **13 Claims**



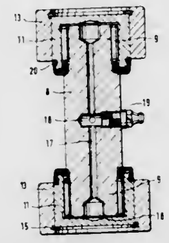
1. An end face seal unit for use in severe service environments, said assembly comprising, in combination, a primary annular sealing ring having a generally axially extending flange portion and a generally radially extending flange portion, said axial flange having respective inner and outer diameter surfaces and said axial flange having generally radially extending front and rear surface portions, said front surface portion of said radial flange having a portion thereof adapted to engage a mating surface in snug end face sealing engagement therewith when urged axially toward said mating surface, and a secondary sealing member of generally annular form, said secondary member including generally axially extending inner and outer diameter surfaces and front and rear surface portions, said front and rear surfaces being inclined forwardly and inwardly such that said secondary member, in the unstressed condition thereof, has a generally parallelogram shaped cross section, said inner diameter of said secondary member being received in use over said outer diameter of said axial flange portion of said primary seal ring, with at least a portion of said front surface of said secondary seal member engaging at least a portion of said rear surface of said primary seal member, said primary member being made from a relatively stiff but resilient first elastomeric material, and said secondary member being made from a second resilient elastomeric material which is substantially less stiff than said first material, said axial flange portion of said primary member being adapted to be supported in use on the inner diameter thereof by a portion of an element being sealed thereby.

4,094,517

SEAL FOR A UNIVERSAL JOINT

Erich Aucktor, Offenbach am Main, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach am Main, Germany

Filed Dec. 16, 1976, Ser. No. 751,166
Claims priority, application Germany, Dec. 17, 1975, 2556769
Int. Cl.² F16J *15/34*
U.S. Cl. 277—94 **4 Claims**



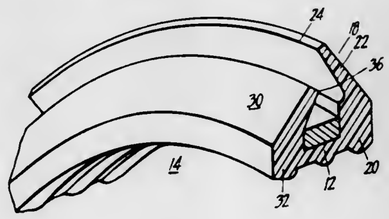
1. In a sealing device for a universal joint, the combination of a trunnion pin having roller bearings adjacent thereto, a bearing element surrounding said trunnion pin and having an inner wall spaced from said pin, a resilient sealing ring rigidly mounted on said trunnion pin and having a first portion extending axially to project between said bearing element and said trunnion pin toward said roller bearings, said sealing ring having a second portion extending radially from said first portion and having an axially directed surface thereon engaging an end face portion of said bearing member, a sealing lip on said first portion extending substantially radially therefrom and having an outer edge movably engaging the inner wall of said bearing element, said first and second portions together with said bearing element defining a chamber, said lip defining an angle with said bearing element inner wall of less than 90° with respect to the interior of the bearing element such that the lubricant can flow outwardly from the interior of the bearing element.

4,094,518

SHAFT SEAL

Jack Jebson Cox, Cheltenham, Australia, assignor to Flavell Proprietary Limited, Australia

Filed Aug. 23, 1976, Ser. No. 717,008
Claims priority, application Australia, Aug. 27, 1975, 2956/75; May 4, 1976, 5800/76
Int. Cl.² F16J *15/34*
U.S. Cl. 277—95 **7 Claims**



1. A fluid seal for installation as a unit between first and second, relatively rotatable machine elements, said seal unit including a relatively rigid, annular seal case element having a mounting portion for engaging one of said machine elements and a radially extending flange portion having an axially directed first sealing surface facing toward the region to be sealed and an axially directed second sealing surface facing axially away from the region to be sealed, and an annular elastomeric seal element molded into a single piece, said elasto-

meric element having a seal body including a radially inwardly directed portion adapted to engage the other of said machine elements to form a secondary seal therewith, and first and second, axially inner and outer sealing lip portions extending radially outwardly from the axial ends of said body, said lip portions being spaced apart from each other at the radially inner ends thereof by a radially outwardly facing, circumferentially extending seal body surface, said lips each including a sealing edge adjacent the radially outer portions thereof and having said radially outer portions thereof extending axially towards each other in use, with said sealing edges of said axially inner and outer lips lying in use respectively axially inwardly and outwardly of the central plane of said radial flange of said case element, said edges being also spaced radially apart from each other, said sealing edges being disposed, as said elastomeric element is formed, in axially overlapping relation such that said radially outer edge of said axially inner lip lies axially outwardly of said central plane of said radial flange and said radially outer edge of said axially outer lip lies axially inwardly of said central plane of said radial flange, said case element being positioned in use such that said radial flange thereof extends between said lips, such that said lip edges engage said first and second flange surfaces, respectively, in snug engagement, said lips being thereby biased towards each other and toward said first and second flange surfaces by the inherent resiliency of said lips, thereby furnishing an axially directed sealing force for application to said first and second sealing surfaces respectively.

4,094,519

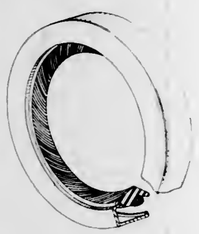
SHAFT SEAL WITH HELICAL PUMPING ELEMENT

William O. Heyn, and Glenn W. Peisker, both of Barrington, Ill., assignors to Chicago Rawhide Manufacturing Company, Elgin, Ill.

Continuation of Ser. No. 225,862, Feb. 14, 1972, abandoned. This application Aug. 20, 1974, Ser. No. 499,070

Int. Cl.² B61F *15/22*

U.S. Cl. 277—134 **4 Claims**



1. An oil seal including a relatively stiff mounting portion and an elastomeric sealing lip portion, said sealing lip portion including a pair of convergent frusto-conical surface portions, one of said surface portions facing the interior or a region to be sealed and the other of said surface portions facing a region exterior thereto, said exteriorly facing surface being only a single surface with a fixed angle of inclination relative to the axis of the seal, said surface portons meeting each other to form an annular seal band of intended contact with an associated shaft and a plurality of pumping elements lying on said exteriorly facing surface, each of said elements being partially defined by a pair of side faces meeting to define a working edge portion which is straight throughout its entire extent, each of said elements being of continuously varying height throughout its entire extent and having substantially no height near said seal band, said working edge extending between two points which are radially and axially offset with respect to each other, said points being also spaced apart from each other by an angle measured paralled to the plane of said seal band, and with one of said points lying substantially on said seal band, whereby said working edge blends gradually into said frusto-conical surface portion.

4,094,520

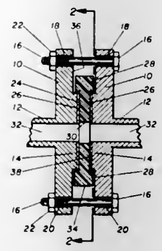
SELF CENTERING FLANGE GASKET ASSEMBLY

Wahling H. Ng, Rockaway, and Andrew Zaycer, Dover, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 793,023, May 2, 1977. This application Oct. 11, 1977, Ser. No. 841,092

Int. Cl.² F16J *15/10*

U.S. Cl. 277—166 **3 Claims**



1. A self centering flange gasket assembly for use in making connections to pipelines of unequal size carrying molten explosive materials therein which comprises:

a first circularly shaped pipe flange having a first axially aligned bore therethrough, a raised annular circularly shaped first flange boss thereon and an annular shoulder section on an interior side, said first flange boss having concentrically ringed circularly serrated grooves in the face thereof, said first pipe flange having an integral tubularly shaped transmission line connection section axially protruding from an exterior side thereof, and a first plurality of diametrically disposed flange bolt holes therethrough;

a second circularly shaped pipe flange having a second axially aligned bore therethrough, said second axially aligned bore being larger than said first axial bore of said first pipe flange, a second raised annular circularly shaped flange boss thereon and an annular second shoulder section on an interior side, said second flange boss having concentrically ringed circularly serrated grooves in a face thereof, said second pipe flange having a second integral tubularly shaped transmission line connection section axially protruding from an exterior side thereof, and a second plurality of diametrically disposed flange bolt holes therethrough said second flange bolt holes being in axial alignment with said first flange bolt holes;

a circular rim shaped venturi gasket having an axially aligned tubular protrusion section extending perpendicularly from a first face thereof, said protrusion section having an internally curved venturi section on one end which communicates with an axial cylindrical bore on the other end, an annular counterbore surface disposed on the other face of said gasket adjacent said serrated grooves of said flange boss of said first pipe flange, a second gasket annular counterbore sealing surface disposed on said first face of said venturi gasket, said second gasket sealing surface being disposed adjacent to and in sealing contact with said serrated grooves of said second flange boss, said tubular protrusion section slidably tightly fitting within said second axially aligned bore of said second pipe flange, and a gasket locating rim operatively disposed intermediate said shoulder sections of said first and second pipe flanges; and

threaded bolt means operatively disposed in said pair of first and second flange bolt holes, for holding said rim shaped venturi gasket intermediate said first and second pipe flanges, the rim of said gasket nesting intermediate said first and second flange shoulder sections, said annular grooves of said gasket being located in sealing contact with said serrated grooves of said first and second flange bosses.

4,094,521

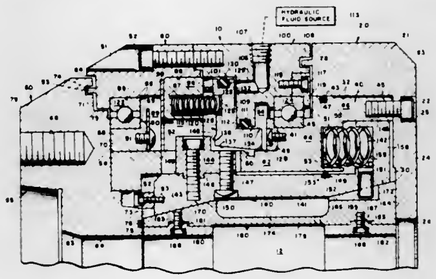
COLLET CHUCK

Charles Piotrowski, Suttons Bay, Mich., assignor to Sheffer Collet Company, Traverse City, Mich.

Filed Jan. 21, 1977, Ser. No. 761,127

Int. Cl.² B23B *31/20*

U.S. Cl. 279—4 **23 Claims**



1. A collet chuck comprising:

a chuck body having a spindle adapter mounted to one end and a collet retainer mounted to an opposite end; each of said body, spindle adapter and retainer including an axially extending aperture aligned with each other for the passage of a workpiece therethrough;

a slip ring assembly rotatably mounted to said body between said adapter and retainer;

an axially movable piston mounted to said slip ring assembly;

a workpiece clamping collet positioned within said body; and

actuator means slidably mounted to said body and engaging said collet and biasing it into clamping position; said piston when actuated engaging said actuator means and shifting it axially to release said collet.

4,094,522

CHUCK HAVING RADIALLY RECIPROCATING JAWS

Karl Hiestand, Pfullendorf, Germany, assignor to Firma SMW-Spanneinrichtungen Schneider & Weisshaupt, Germany

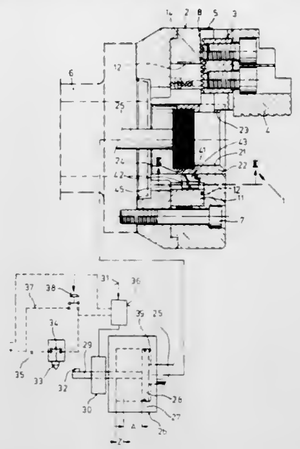
Filed Dec. 13, 1976, Ser. No. 749,694

Claims priority, application Germany, Dec. 13, 1975, 2556227

Int. Cl.² B23B *31/16*

U.S. Cl. 279—4 **28 Claims**

1. In a chuck, for turning machines, of the type including a chuck body, and radially displaceable jaws each movable by a key bar, guided in the chuck body tangential to the axis of turning, with each key bar having a splined strip meshing with teeth on the associated jaw and being displaceable to an extent such that, for removing the associated jaw, the splined strip attains a position in which it is disengaged from the teeth of the associated jaw, an improved key bar actuating mechanism comprising, in combination, a control member concentrically guided in said chuck body and axially displaceable in the latter through a key bar operating range and into end positions beyond said operating range; and mechanical means interconnecting said control member and said key bars, operable, responsive solely to axial displacement of said control member in said chuck body, to displace said key bars tangentially of the



axis of turning to displace said jaws radially of said chuck body, and restraining rotation of said control member.

4,094,523

DRILL CHUCKS

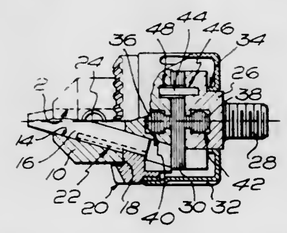
George Cecil Derbyshire, Sheffield, England, assignor to The Jacobs Manufacturing Company, Limited, Sheffield, England

Filed Nov. 18, 1976, Ser. No. 742,867

Claims priority, application United Kingdom, Nov. 24, 1975, 48247/75

Int. Cl.² B23B *31/04*

U.S. Cl. 279—62 **9 Claims**



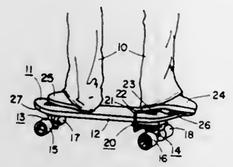
1. A drill chuck comprising a main body part; jaws slidably mounted for converging movement in respective guides in said main body part; a nut member rotatably mounted on said main body part but axially located in a circumferential groove encircling said body part, said nut member having screwthreaded engagement with said jaw members; said nut member including a bevel gear element with which an extraneous chuck key may be engaged for adjusting the jaws; a further body part which provides a mounting means for connecting the chuck to a power tool driving spindle; a cylindrical sleeve which is connected at one end to said nut member and at its other end surrounds a portion of said further body part; and means located between the main body part and the further body part for retaining them in position with an initial degree of co-axial alignment whilst allowing a self-centering action when drilling.

4,094,524

SKATE BOARD BRAKING AND STEERING SYSTEM

Mathew Ralph Carroll, 3516 Downing, Glendale, Calif. 91208

Filed Oct. 18, 1976, Ser. No. 733,389
Int. Cl.[2] A63C *17/14*
U.S. Cl. 280—11.2 14 Claims



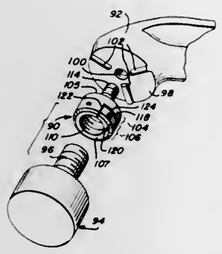
1. A skate board assembly comprising:
a board having a longitudinal generally horizontal axis;
a front truck secured to said board;
a rear truck secured to said board having a pair of wheels;
a brake assembly secured to said skate board assembly including a pair of brake shoes;
actuator means for pivoting said brake shoes about a first axis substantially transverse to said longitudinal axis of said board and selective into engagement with said wheels by the application of force to said actuator means;
means mounting said actuator means for rotational movement about a second axis at an inclined angle with respect to the said longitudinal axis of the board whereby said actuator means may pivot said brake shoes into simultaneous engagement with both wheels of said rear truck by pivoting about said transverse axis or into engagement with one of said wheels by rotation of said actuator means about said second axis of rotation.

4,094,525

ROLLER SKATE TOE STOP CONVERTER

Cecil E. Davis, Tulsa, Okla., assignor to Unarco Industries, Inc., Chicago, Ill.

Filed May 2, 1977, Ser. No. 792,698
Int. Cl.[2] A63C *17/14*
U.S. Cl. 280—11.2 5 Claims



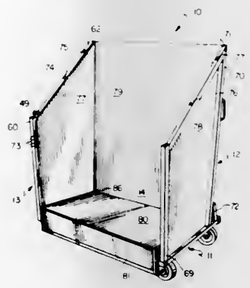
1. An adjustable toe stop converter for converting a roller skate from use with a first toe stop having a threaded mounting stud of a given diameter and thread to use with a second toe stop having a threaded mounting stud of a diameter larger than the mounting stud of said first toe stop, said skate having on its forward end a toe stop mounting shoulder presenting a generally downwardly and forwardly facing toe stop bearing surface and defining a first threaded bore of a diameter and thread equal to that of the threaded mounting stud of said first toe stop, said toe stop converter comprising:
(a) a counterbored member having at one end wall an upper end surface adapted to matingly abut said roller skate toe stop bearing surface and having at the opposite end wall a lower end surface, said one end wall defining a second bore having a second diameter at least equal to the diameter of said first bore in said roller skate toe stop mounting shoulder and less than the diameter of the mounting stud of said second toe stop, said opposite end wall defining a third threaded bore having a diameter and thread equal to that of the mounting stud of said second toe stop, said third bore being coaxial and communicating with said second bore to define an annular shoulder between said second and third bores;
(b) a bolt having a head of a diameter greater than that of said second bore and having a shank with a diameter less than that of said second bore, said shank having threading means adapted to threadingly engage said first bore in said roller skate toe stop mounting shoulder; and
(c) means for securing the threaded mounting stud of said second toe stop against rotation within said third bore when said stud of the second toe stop is threadingly engaged therewith, whereby
said bolt can be inserted into said counterbored member with the bearing surface of the bolt head bearing against said annular shoulder in the counterbored member and with the shank projecting from said second bore to threadingly engage said first bore in said roller skate toe stop mounting shoulder for matingly abutting said upper end surface of the counterbored member against said roller skate toe stop bearing surface,
said stud of the second toe stop can be threadingly engaged with said third bore to adjustably position said second toe stop relative to said roller skate at a distance from said counterbored member lower end surface that is variable with the amount of thread engagement, and
said stud of the second toe stop can be secured in the desired position by said securing means.

4,094,526

PORTABLE DISPLAY VEHICLE

Richard Allen Clarke, Greenwich; William James Chvala, and Raymond Edward DeWitte, both of Danbury, all of Conn., assignors to PepsiCo, Inc., Purchase, N.Y.

Continuation of Ser. No. 491,070, Jul. 23, 1974, abandoned. This application Jun. 11, 1976, Ser. No. 694,987
Int. Cl.[2] B62B *3/02*
U.S. Cl. 280—47.35 12 Claims



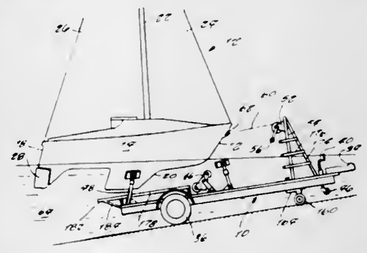
1. A portable display vehicle for transporting, storing and displaying food, beverage and other displayable products comprising:
a base member having a rear edge, said base member including a plurality of casters attached to the underside of said base member for supporting the vehicle in an upright and stable condition,
sidewalls attached in a vertical position to the sides of said base member,
an L-shaped product support member comprising a back wall attached to a bottom shalf wherein said support member is attached to said base member between said sidewalls so that said bottom shelf slopes downwardly toward the rear edge of said base member and wherein said sidewalls and said product support member form an open volume for containing the displayed products, said sidewalls each being bounded by rigid frame members with a continuous skin member rigidly supported between said frame members and each having an upper frame slanting downward from the top of said back wall and away from said rear edge,
a substantially vertically oriented front panel extending downwardly from the front edge of said bottom shelf to a position below said base member so as to shield at least a portion of said casters from view, and
a lower extension shelf for extending the surface formed by said bottom shelf,
said lower extension shelf comprising a horizontal shelf member extending from the front edge of said bottom shelf, a vertically oriented sign display panel for displaying written material extending downwardly from the forward edge of said horizontal shelf member, a hinge member for attaching said horizontal shelf member and said sign display panel, and a plurality of supporting legs extending downwardly from said sign display panel.

4,094,527

BOAT TRAILER

Richard L. Miller, 3612 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007

Filed Dec. 20, 1976, Ser. No. 752,675
Int. Cl.[2] B60P *3/10*
U.S. Cl. 280—414 R 23 Claims



1. A trailer for storing thereon a boat having a hull and keel, and facilitating launching and landing of the boat, and comprising:
a flatbed having a longitudinal center axis;
wheels connected to the flatbed for moving the trailer into and out of cooperative relationship with the boat;
support means connected to the flatbed and positioned to engage the hull of the boat on opposite sides thereof, to thereby retain the boat in position on the trailer, and
pivoted rolling means positioned on the flatbed intermediate said support means for rotatingly engaging the hull to accommodate entry and exit of the boat from the trailer, and for supporting the keel during retention of the boat on the trailer, and positioning means for angularly positioning said pivoted rolling means with respect to said flatbed and facing rearward of said flatbed.

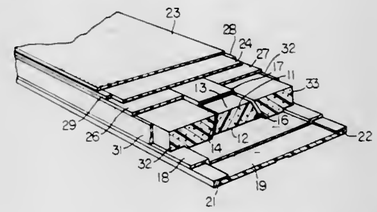
4,094,528

SKI STRUCTURE

John Michael Cluzel, 753 Hickory Hill Rd., Wyckoff, N.J. 07481

Filed Oct. 21, 1976, Ser. No. 734,607
Int. Cl.[2] A63C *5/00*
U.S. Cl. 280—610 6 Claims

1. A ski structure comprising:
a central member of solid foamed material free of mechanical directivity and extending longitudinally along the structure and having a trapezoidal cross-section defined by a base, a top narrower than the base and substantially parallel to the base, and two sides joining the edges of the base to the corresponding edges of the top;
a trapezoidal torsion box of fiber-reinforced plastic fitting snugly around the central member and comprising a base and a top corresponding in width to the base and top, respectively, of the central member;
a solid, resilient bottom member wider than the base of the trapezoidal torsion box, the box being firmly adherently joined to the upper surface of the bottom member to remain in fixed position relative the the bottom member in spite of forces having lateral components acting on the trapezoidal torsion box and the bottom member, the bottom member being much wider than it is thick;



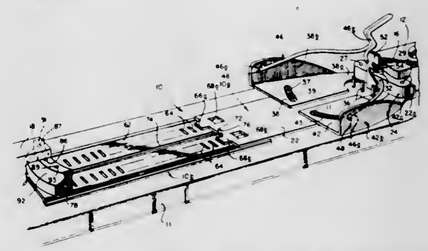
a solid, resilient top member wider than it is thick over at least most of its length, and rigidly, adherently joined to the top of the trapezoidal torsion box to remain in fixed position relative to the top member in spite of said forces acting to move the top member relative to the trapezoidal torsion box, the top member being wider than the top of the trapezoidal torsion box;
a pair of solid, resilient side members joining edge sections of the top member to corresponding edge sections of the bottom member to form an outer boxlike structure; and
solid, foamed material free of mechanical directivity at least substantially filling the spaces on each side of the trapezoidal torsion box and within the outer boxlike structure.

4,094,529

SKI BINDING ADAPTER

Harold H. Nasson, 8 Hidden Ledge Rd., Manchester, Mass. 01944

Filed Apr. 7, 1977, Ser. No. 785,519
Int. Cl.[2] A63C *9/086*
U.S. Cl. 280—614 12 Claims



1. An adapter for use in conjunction with a standard downhill ski having a standard downhill ski binding including toe and heel clamps secured thereto, said adapter being removably retainable in the standard downhill ski binding and being adapted to clamp a cross-country ski boot so as to enable the standard downhill ski to be used for cross-country skiing, said adapter comprising
A. first and second elongated relatively thin adapter plate sections adapted to be supported on the downhill ski between the toe and heel clamps of the standard downhill binding, said plate sections being adjustable lengthwise relative to one another,

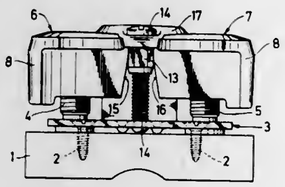
B. means for securing said plate sections in different selected positions of lengthwise adjustment,
C. means projecting upwardly from the forward end of said first plate section adapted to be clamped to the downhill ski by the toe clamp of the standard downhill binding,
D. means projecting upwardly from the rear end of said second plate section adapted to be clamped to the downhill ski by the heel clamp of the standard downhill binding,
E. clamp means mounted on said first adapter plate section, said clamp means being movable from an open position wherein it permits the cross-country ski boot to be positioned on said first adapter plate section to a closed position wherein it clamps the toe of the cross-country ski boot to said first adapter plate section, and
F. means mounted on said first adapter plate section for locking said clamp means in its closed position.

4,094,530

FRONT JAW FOR SAFETY SKI BINDINGS

Gerhard Sedlmair, Farchant, Germany, assignor to Hannes Marker, Germisch-Partenkirchen, Germany

Filed Mar. 21, 1977, Ser. No. 779,773
Claims priority, application Germany, Mar. 22, 1976, 2612069
Int. Cl. A63c *9/08*
U.S. Cl. 280—625 **7 Claims**



1. A front jaw for a safety ski binding, comprising a jaw portion adapted to be fixed with respect to a ski and having two vertical shafts, a central abutment attached to the jaw portion, two levers pivotable about the vertical shafts, first ends of the levers serving as retainers for a sole of a ski boot to restrain outward and upward movement thereof, a vertical screw which is rotatably mounted in the jaw portion for engaging the tapped hole, the screw being prevented from axial displacement, the spacer member being vertically displaceable upon rotation of the screw, spring means for urging second ends of said levers into engagement with said spacer member, one of said spacer members and said second ends having an engagement surface formed as an oblique surface so that vertical movement of said spacer member varies the spacing between the first ends of said levers.

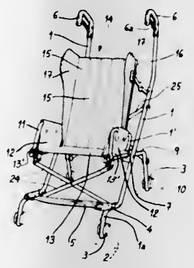
4,094,531

FOLDABLE STROLLER FOR CHILDREN

Ramon Jane Cabagnero, Barcelona, Spain, assignor to Jane, S.A., Barcelona, Spain

Filed Jan. 5, 1977, Ser. No. 756,974
Claims priority, application Spain, Jan. 14, 1976, 218.173
Int. Cl.² *B62B 7/02*
U.S. Cl. 280—649 **7 Claims**

1. A foldable stroller comprising:
a seat and seat back, said seat back being formed by a flexible laminar assembly reinforced lengthwise by juxtaposed strips which provide rigidity and which permit transverse folding in zigzag form; a frame for said back, said back being mounted in said frame, said frame having side-pieces; articulated front and rear scissor-type wheel carrying elements, said frame side-pieces being articulated in a lower portion thereof to the articulation between the scissor-type wheel carrying elements; a harness formed by a pair of branches which are an extension of said front wheel carrying elements, said frame side-pieces being connected with the respective branches of the harness by respective articulated divider-type elements, said divider-type element arranged for opening and closing for determining respective different positions of inclinations of the back, said rear wheel-carrying element being situated between the side-piece of the frame and the front wheel-carrying element which is in external location; a first set of two articulatedly crossed rods for connecting said front



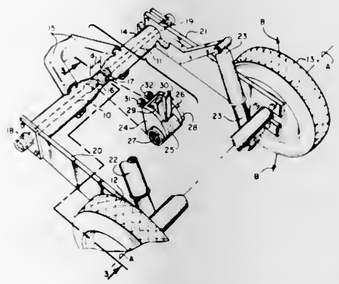
wheel-carrying elements in a front lower portion thereof with a front upper portion of the rear wheel-carrying element, a second set of two articulatedly crossed rods for connecting said front and rear wheel-carrying elements in a rear portion; and two cross-pieces split into two articulated sections which connect with the side-pieces of the frame and to which are attached a common control means, the cross pieces maintaining the unfolded state of the carriage; and when raised the common control means effect the folding of the stroller.

4,094,532

TORSION BAR ADJUSTING DEVICE

William A. Johnson, Sylmar; Philip W. Pausmer, Newbury Park, and Russel J. Harmon, Thousand Oaks, all of Calif., assignors to Sway-A-Way Corporation, Van Nuys, Calif.

Filed May 16, 1977, Ser. No. 796,966
Int. Cl. B60g *11/20*
U.S. Cl. 280—695 **3 Claims**



1. A torsion bar adjusting device for insertion in the rear torsion bar suspension system of a car wherein said system includes two axially aligned independent torsion bars extending in directions generally parallel to the rear wheel axes ahead of the rear wheels within a torsion bar housing tube fixed to the frame of the car with the inner ends of the torsion bar secured to the housing tube and their oppositely extending outer ends secured to rear wheel supporting spring plates respectively, so that up and down movement of each rear wheel is opposed by a twisting reaction torque from its associated torsion bar, said device comprising, in combination:
(a) a frame structure including a collar having an elongated slot parallel to its axis in its side wall;

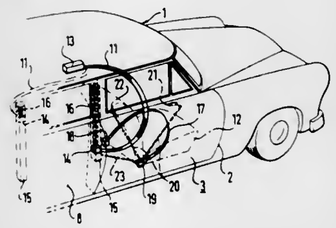
(b) first and second axially aligned torsion bar end receiving sockets rotatable within said collar and having integral radially outwardly extending arms passing through said slot; and
(c) First and second arm engaging means on said frame each being individually adjustable to move an associated arm relative to said frame and thereby impart a rotation to the integral socket portion from which the arm extends within said collar through a number of degrees within the width of said slot
whereby a short center section of said housing tube in the suspension system of said car can be cut out and the collar of said device secured to the housing tube in place of said section with the inner ends of said torsion bars being received in opposite ends of said collar and respectively secured in said first and second torsion bar end receiving sockets, operation of said arm engaging means imparting a twisting force into the torsion bars to thereby enable adjustment of the spring force provided by said torsion bar suspension system to each of the rear wheels of the car respectively.

4,094,533

SEATBELT SYSTEM FOR MOTOR CARS

Alfred Grossbach, Lindenstrasse 42, Tamm, Wttbg, Germany

Division of Ser. No. 596,293, Jul. 16, 1975, Pat. No. 4,047,737.
This application Feb. 4, 1977, Ser. No. 765,759
Claims priority, application Germany, Jul. 19, 1974, 2434748; Jul. 4, 1975, 2529811
Int. Cl.² *B60R 21/02*
U.S. Cl. 280—745 **6 Claims**



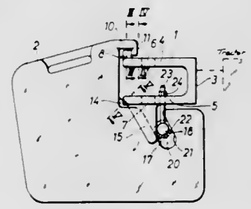
1. A seat belt system particularly for motor vehicles having doors which open and close by movement thereof forwardly and rearwardly of said vehicle, said vehicle including a vehicle body having a side wall, said vehicle body having a front, a back and a center spaced between said front and back, at least one sliding door mounted on said side wall of said vehicle body and movable from a closed position flush with the side wall of said vehicle body to an intermediate position parallel with and spaced from the closed position and then to an open position spaced in the longitudinal direction of the vehicle from the intermediate position, and means for mounting said door to said vehicle including a first pivotal arm pivotally mounting said door to said vehicle body, each of said at least one sliding doors having an inner side with the inner side having a front end and a rear end, said seat belt system comprising at least one safety belt having a first end and a second end, means mounting said first end to said center of said vehicle, means mounting said second end with said at least one safety belt extending freely in an unrestrained condition continuously from said first end to said second end, said means mounting said second end of said at least one safety belt including a second pivotal arm having said second end of said safety belt attached thereto and operatively associated with said first pivotal arm, said second pivotal arm operating to effect pivotal movement in response to pivotal movement of said first pivotal arm to move said second end of said at least one belt relative to said door to a first belt position to dispose said safety belt in an orientation permitting ingress and egress of a passenger into and out of said vehicle when said door is in said open position, and to a second belt position to dispose said belt to actively restrain a passenger in said vehicle when said door is moved to said closed position.

4,094,534

DETACHABLE BALLAST VEHICLE STABILIZER

Helmut Welke, and Karl Tullius, both of Cologne, Germany, assignors to Klöckner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Dec. 6, 1976, Ser. No. 747,437
Claims priority, application Germany, Dec. 4, 1975, 2554581
Int. Cl.² **B60B** *39/00;* **B60R** *19/04, 27/00;* **B61C** *15/04*
U.S. Cl. 280—760 **8 Claims**



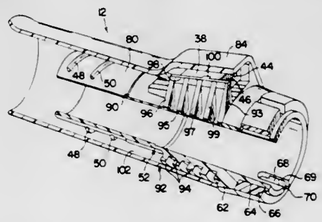
1. In combination, a ballast weight means and agricultural motor vehicle: a holding device having said ballast weight means detachably suspended thereon and releasably connected to said motor vehicle, locking shaft means extending transverse to and through said ballast weight means and being adjustable selectively in the direction toward and away from said holding device, and means operatively connected to said locking shaft means as well as operable in response to said locking shaft means being adjusted toward said holding device thereby to fix and lock said ballast weight means and said holding device to releasable secure the same to each other to avoid undesired vibration and noise during operative use of said ballast weight means with the vehicle, said means operatively connected to said locking shaft means including clamping elements respectively connecting the ends of said locking shaft means to said holding device, said holding device for each ballast weight means comprising at least two supporting bearings spaced from each other for respective engagement with said ballast weight means, and said clamping elements through the intervention of said locking shaft acting upon said clamping elements to exert a moment upon all of said supporting bearings.

4,094,535

CONDUCTIVE HOSE AND ENDS

Keith G. Minton, North Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio

Filed Jan. 10, 1977, Ser. No. 758,044
Int. Cl.² **A47L** *9/24*
U.S. Cl. 285—7 **4 Claims**



1. An electrically conductive hose including at least one plastic coupling assembly, the combination including;
(a) an inner plastic coupling member having a means for attachment of a hose. '(b) a hose in telescopic relationship with said inner, plastic coupling member,
(c) an outer plastic coupling member received over said

inner coupling member and including an internal periphery,

(d) means forming annular ridges on said inner coupling member, said ridges being spaced from each other by reliefs disposed between said ridges, said ridges having at least portions with substantially equal radial extent,

(e) terminations on said portions of said ridges being in generally tight abutting contact with portions of said internal periphery of said outer member, said portions having a generally constant annular extent,

(f) adhesive means disposed between said terminations,

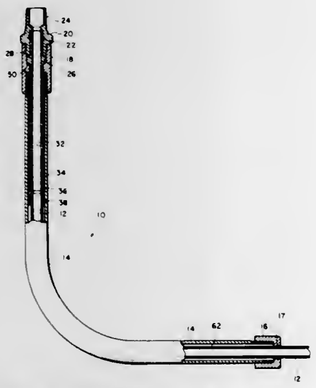
(g) said means forming annular ridges formed on an enlarged portion on said inner coupling member of sufficient size to mount a strain relief.

4,094,536

METER RISER

Judson C. Cole, Tulsa, and Eldon W. Morain, Broken Arrow, both of Okla., assignors to Continental Industries, Inc., Tulsa, Okla.

Filed Dec. 20, 1976, Ser. No. 752,438
Int. Cl.² F16L *13/02*
U.S. Cl. 285—21 **6 Claims**



1. A meter rising comprising:

(a) a length of small diameter polyethylene pipe adapted for attachment at one end to a line pipe carrying a fluid under pressure;

(b) a selected length of high ambient heat tolerant tube of substantially the same diameter as said polyethylene pipe having a first end adjacent the second end of said polyethylene pipe.

(c) cup-like polyethylene bushing with a central opening placed over and attached and sealed at the second end of said polyethylene pipe;

(d) a short length polyethylene sealing tube received on said high ambient heat tolerant tube at its first end, and including sealing means between and sealingly engaging the inside surface of said sealing tube and the outer surface of said high ambient heat tolerant tube, said bushing being heat sealed to said sealing tube in coaxial relationship; and

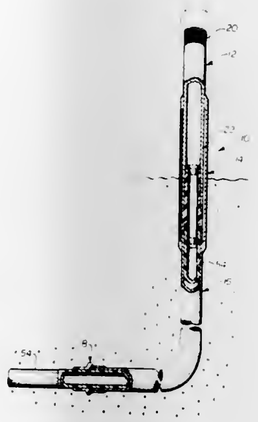
(e) a meter riser body surrounding said high ambient heat tolerant tube and a portion of said polyethylene pipe comprising a selected length of metal pipe surrounding said joined pipe and tube and including means to seal said riser body to said high ambient heat tolerant tube and means to attach said riser body to a meter or the like.

4,094,537

GROUND LEVEL METER RISER

Robert W. Lyall, 9770 El Greco Cir., Fountain Valley, Calif. 92708

Filed Sep. 1, 1976, Ser. No. 719,613
Int. Cl.² F16L *11/12, 33/00*
U.S. Cl. 285—47 **8 Claims**



1. A ground level riser for gas meters and the like for connecting the same to a plastic service line, comprising:

(a) a section of metal mounting pipe adapted to receive a valve and meter or the like a predetermined distance above ground level,

(b) a plastic transition fitting connected and joined to the inside surface of said mounting pipe, and having an inner first bore, said plastic fitting having on its end away from said mounting pipe a shorter second bore radially outwardly offset from said first bore,

(c) a predetermined length of a plastic product carrying tube received in and joined to said second bore so that said first bore is generally co-dimensional in diameter with the inside diameter of said tube,

(d) a relatively thin wall lower steel protective casing externally of said tube having an upper end and a lower end and abutting said plastic fitting at its upper end and extending over a predetermined length of said length of tube, said first protective casing being bent if desired to give a specified amount of horizontal and vertical run in said riser, said lower protective casing being generally coaxial with said mounting pipe and plastic transition fitting and further being generally of the same external diameter as said mounting pipe and as at least a portion of said plastic transition fitting,

(e) a seal means at the lower end of said lower protective casing for sealing the space inside of said lower casing and outside said tube from water and other containment fluids and materials,

(f) an upper protective steel casing secured to and extending from below ground level and below the upper end of said lower protective casing to said mounting pipe above said transition fitting, said upper casing being generally of larger diameter than either said lower casing or said mounting pipe and secured as by welding to both, and

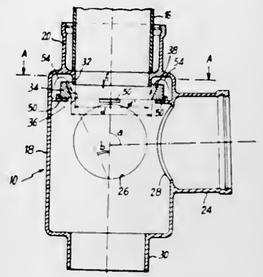
(g) a protective coating of plastic extending over said riser from said seal means to above that end of said upper casing which is secured to said mounting pipe.

4,094,538

CONNECTION FOR EVACUATION PIPES

Georges Pichon, 14, Allee de Port Royal, Residence de l'Abbaye, 91 Gif Yvette, France

Filed Jul. 16, 1976, Ser. No. 705,880
Claims priority, application France, Jun. 25, 1976, 76 19356
Int. Cl.² F16L *41/00*
U.S. Cl. 285—150 **4 Claims**



1. A hollow bodied joint for connection of at least one secondary pipe to a principal pipe comprising:

a first union for fluidly connecting the outlet of the principal pipe to said joint

at least one other union for fluidly connecting at least one secondary pipe to said joint

an annular member having a downwardly inwardly tapering internal surface spacedly positioned below and coaxial to said first union

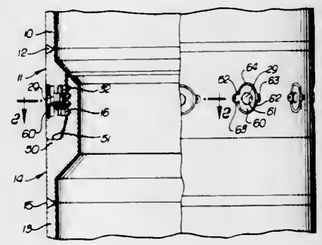
annular support means for said annular member, said support means and said annular member forming an air channel for downwardly directing air through the space formed by said annular member and said pipe union to propel the liquid therein toward the center of the pipe and an outlet for fluid flow.

4,094,539

RIGID CONNECTOR AND PILING

Larry E. Reimert, Camarillo, Calif., assignor to Vetco, Inc., Ventura, Calif.

Continuation of Ser. No. 712,491, Aug. 9, 1976, abandoned. This application Nov. 23, 1977, Ser. No. 854,356
Int. Cl.² F16L *21/00*
U.S. Cl. 285—309 **3 Claims**



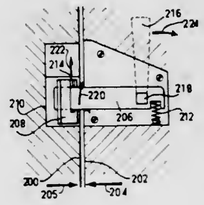
1. A rigid pipe connector comprising a metallic tubular pin having an external transverse shoulder and a plurality of axially spaced outer peripheral grooves, sides of said groove providing a plurality of axially spaced tapered surfaces, a metallic tubular box telescopically disposed over said pin and having a transverse end engaging said shoulder, circumferentially spaced lock members slidable radially in said box into said grooves, said lock members having tapered surfaces axially spaced from each other and simultaneously engaging said axially spaced tapered groove surfaces, means for shifting said lock members radially inwardly of said grooves to force the tapered surfaces of said lock members against said pin tapered surfaces and shift said pin axially of said box to force said shoulder against said box end and apply compressive preload to said box end and pin shoulder, the other sides of said groove axially spaced from said lock members to enable said compressive preload to be effected, the periphery of said pin within said box and the inner surface of said box confronting said periphery being shaped in such manner as to be free from axial force transmitting relation to each other so that the full preloading force produced by coengagement between said lock member tapered surfaces and pin tapered surfaces is transmitted to said pin shoulder and transverse box end contacting such shoulder.

4,094,540

CLOSURE DEVICE FOR LOCKING A MOVABLE ELEMENT WITH RESPECT TO ANOTHER ELEMENT

Joseph Antoine Roig, Yerres, France, assignor to Agence Nationale de Valorisation de la Recherche, Michelis, France

Filed Apr. 24, 1975, Ser. No. 571,322
Claims priority, application France, Apr. 24, 1974, 74 14138; Feb. 11, 1975, 75 04195
Int. Cl.² E05C *3/10*
U.S. Cl. 292—214 **26 Claims**



1. A closure comprising:

(a) two elements relatively movable toward and away from each other, and means for separably locking said elements together, said locking means comprising:

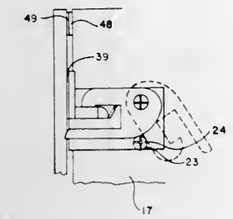
(b) a male member in the form of a flat plate mounted on and protruding from one of said elements, the plane containing said plate being in the direction of relative movement between said elements,

(c) a casing carried by the other of said elements, said casing having an opening through which said plate can move freely into and out of said casing when the two elements are brought together and separated, said opening extending continuously along two adjacent sides of said casing,

(d) a female member within said casing, said female member being a flat plate movable about an axis perpendicular to the direction of relative movement between said elements between a position substantially perpendicular to the direction of relative movement between the elements and a position oblique to that direction, said plate having an elongated slot perpendicular to the direction of relative movement between said elements, said slot being aligned with said casing opening and slightly wider than the thickness of said male member plate, and said slot extending to one edge of said plate, and

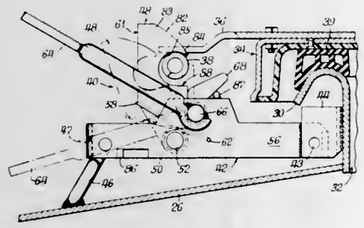
(e) resilient means urging said female member plate toward its oblique position, said male member plate moving said female member plate toward its perpendicular position against the force of said resilient means when said elements are moved together to insert said male member plate through said casing opening and said slot in said female member plate, said male member plate becoming wedged within said slot upon attempted separation of said elements.

4,094,541
CONCEALED SAFETY LATCH ASSEMBLY
Larry Lee Simms, P.O. Box 1083, San Pedro, Calif. 94433
Filed Mar. 9, 1977, Ser. No. 775,740
Int. Cl.[2] E05C *3/04*
U.S. Cl. 292—231 **8 Claims**



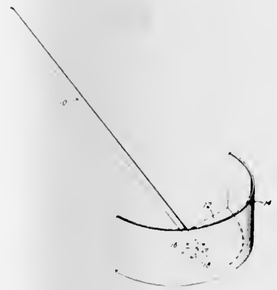
1. A concealed safety latch assembly for a cabinet having a hinged door comprising:
a mounting plate for attachment to the wall of a cabinet,
a latch member having a nose portion with a cam surface, said latch member also having an unlatching finger with a notch formed between them,
a locking member for attachment to the door of a cabinet, said locking member having means for engaging said latch member, and
means pivotally attaching said latch means to said mounting plate comprising a shaft extending outwardly from the mounting plate and said latch member has a bore into which said shaft is received, said bore being eccentrically located on said latch member thereby allowing the latch member to be pivoted to a position where it will not be engaged by the locking member when the cabinet door is closed.

4,094,542
DETENTABLE AUTOMATIC HATCH LATCH APPARATUS
Allen D. Siblik, Mundelein, Ill., assignor to MacLean-Fogg Lock Nut Co., Mundelein, Ill.
Filed Oct. 6, 1975, Ser. No. 619,857
Int. Cl.[2] E05C *3/30*; B63B *19/14*
U.S. Cl. 292—256.5 **5 Claims**



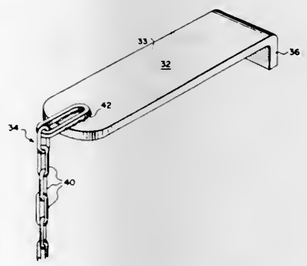
1. A latch apparatus for automatically releasably latching a hinged hatch cover of the type having a striker bar which is operable with closing movement of the hatch cover to forcibly engage the latching apparatus, comprising, in combination: a housing means, a latch lever means pivotally mounted on said housing means and characterized by a gripping surface for engaging a striker bar, first spring means resiliently urging said latch lever means into a normal operating position whereat said latch lever means is operable to releasably lock said striker bar, pedal lever means rotatably mounted on said housing means and operably movable to and between latching and detent positions, first cam means on said pedal means, second cam means on said housing means, second spring means operable to resiliently bias said first cam means against said second cam means whereby the same cooperate to secure said pedal lever means selectively in one of said latching and detent positions as selected, and repositioning means carried by and actuated with said pedal lever means for engaging said latch lever means, said repositioning means being operable in response to movement of said pedal lever means to said detent position to hold said latch lever means out of engagement with said striker bar, said repositioning means further being operable when forcibly struck by said striker bar to move said pedal lever means from said detent position into said latching position, whereby said latch lever means is operably repositioned to releasably lock said striker bar.

4,094,543
SNOW SHOVEL
Sabatino A. Fratini, 232 Crawford Ave., Lansdowne, Pa. 19050
Filed Jan. 10, 1977, Ser. No. 758,030
Int. Cl.[2] E01H *5/02*
U.S. Cl. 294—54 **2 Claims**



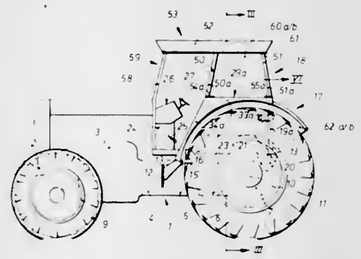
1. An apparatus for snow displacement which comprises:
a semi-circular flat base plate;
a curved panel having a lower edge and straight diametric edge, said panel being substantially at a right angle with respect to said base, rigidly connected to the curved portion of said base plate such that the plane of the base is at a small angle with respect to the ground, and said lower edge and said straight diametric edge being in contact with the ground when said apparatus is in use; and
a handle pivotally connected to said base plate which permits an operator to push said apparatus, thereby causing the convex outer surface of said vertical curved panel to contact the snow and impact it so that the snow will flow around and be displaced by said apparatus.

4,094,544
PALLET PULLING DEVICE
David L. Spaine, Rte. #4, Dixon, Ill. 61021
Filed Nov. 1, 1976, Ser. No. 737,652
Int. Cl.[2] B66C *1/00*
U.S. Cl. 294—82 R **3 Claims**



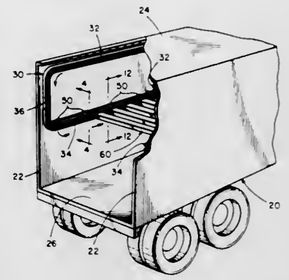
1. The combination with a load-bearing pallet embodying a pair of longitudinally extending side ribs and a load-bearing panel consisting of longitudinally spaced transverse planks extending between said side ribs, of a pallet pulling device in the form of a hook member embodying an elongated horizontal body portion having its forward end turned laterally at a right angle to provide a short linearly straight hook portion, said body portion being disposed with its forward end portion abutting squarely against one of said horizontal planks and with the hook portion projecting vertically between said one plank and the next adjacent forward plank and resting squarely against the forward edge of the latter plank, the effective height of said hook portion being slightly less than the thickness of the planks, and a relatively short pull chain consisting of a series of interlocked chain links, the forward link of said pull chain being fixedly welded to the rear end of said body portion in overhanging relationship, the individual links of said pull chain being designed for cooperation with a hook which is carried by one end of a pull line, the rear edge of said body portion being rounded to provide an arc on the order of 180°, thus affording a taper designed for camming engagement with an object which may be in the pull path of the device.

4,094,545
VEHICLE CAB STRUCTURE, ESPECIALLY FOR THE TRACTORS OF THE AGRICULTURAL OR CONSTRUCTION TYPE
Peter Kramer, Spich, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany
Filed Aug. 17, 1976, Ser. No. 715,938
Claims priority, application Germany, Aug. 19, 1975, 2536820
Int. Cl.[2] B60J *1/00*
U.S. Cl. 296—28 C **19 Claims**



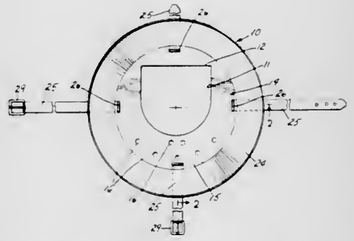
1. A vehicle cab structure, especially for mounting on the frame of an agricultural or a construction tractor, and having a roof section and a lower section respectively forming a side wall also forming a fender which takes up supporting forces effective parallel to the wall and posts extending in the up and down direction between said sections, said cab structure comprising in combination: a pair of laterally spaced members forming a portion of said lower section and each comprising a generally vertical metal panel, a horizontal panel connected to and extending outwardly from the upper edge of each vertical panel, and an inclined, transversely extending front panel having the inner edge connected to the forward edge of said vertical panel and the top edge connected to the forward edge of said horizontal panel and reinforcing the forward end of said horizontal panel against deflection, a transverse beam interconnecting the lower ends of said front panels, means connecting said beam to the tractor frame, upstanding bend resistant brace elements connected to the rear edges of said vertical panels and near the rear axle of the tractor when the cab structure is mounted thereon, and means connected to said brace elements and to the rearward ends of said horizontal panels to brace at least the rearward ends of the latter against deflection, the posts extending between the roof section and the lower section engaging said horizontal panel near the forward and rearward ends respectively of said horizontal panels.

4,094,546
ROLL AWAY DECKING SYSTEM
John J. Glassmeyer, Glenwood, Ill., and Joseph T. Kelley, Hamilton, Ohio, assignors to Pullman Incorporated, Chicago, Ill.
Filed Oct. 26, 1976, Ser. No. 735,290
Int. Cl.[2] B62D *25/20*
U.S. Cl. 296—28 M **23 Claims**



1. A rollaway decking system for transport vehicle provided with spaced vertical sidewalls, comprising;
a track mounted on each sidewall comprising a storage track section and an operative track section; and
a flexible movable deck extending between said tracks and means on each sidewall for operatively interconnecting the track sections of the track mounted thereon to permit said deck to be moved between storage and operative positions, and means for selectively positioning said track sections at different operative elevations with respect to each other.

4,094,547
COMBINATION BUMPER TRAY APPLIANCE
Arthur T. Zampino, and Dolores V. Zampino, both of 120 Beach 19 St., Far Rockaway, N.Y. 11691
Filed Feb. 7, 1977, Ser. No. 765,922
Int. Cl.[2] A47D *15/00*
U.S. Cl. 297—182 **8 Claims**



1. An appliance adapted to be used with a chair as a combination bumper tray and toy holder which comprises a semi-rigid, unitary circular or oval tray provided with an off-center solid U-shaped opening of sufficient size to accommodate the body of a child with the straight edge of the U-shaped opening fitting over the backrest of a chair, said tray comprising a horizontal radial surface of lesser depth in the rear portion than the front portion thereof, integral with an upwardly and outwardly inclined circumferentially continuous surface of equal depth in its entirety, the front portion of said horizontal surface being provided with round sized apertures for removably receiving toys and feeding plates mounted on round or oval equally sized ball ends adapted to frictionally fit into said sized apertures.

4,094,548

APPARATUS FOR CONVEYING AND SEPARATING LOOSE MATERIAL

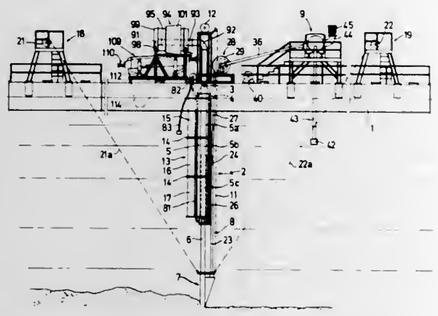
Ludwig Lorenz Schnell, Aufhausen, Germany, assignor to Schuttgutfordertechnik AG, Zug, Switzerland

Continuation of Ser. No. 521,461, Nov. 6, 1974, abandoned. This application Jul. 19, 1976, Ser. No. 706,653

Claims priority, application Germany, Nov. 8, 1973, 2355831

Int. Cl.[2] E02F *3/88, 7/00*

U.S. Cl. 299—9 **25 Claims**



1. In an apparatus for conveying loose material, a combination comprising a substantially vertically extending conveyor line including at least an upper outer pipe which is immovable in the axial direction thereof, and a lower inner pipe surrounded by said upper outer pipe and being extendable and retractable relative thereto, said pipes having respective telescoped-together portions which bound an annular interspace with one another; sealing means for sealingly closing longitudinally spaced end regions of said interspace, including an upper sealing sleeve disposed at the upper end of said lower inner pipe and having an elastically deflectable sealing lip which is pressed against the inner surface of said upper outer pipe with a predetermined force; and means for maintaining a fluid seal in said interspace, including a sealing medium feedline communicating with said interspace in the region of the lower end of said upper outer pipe, and a sealing medium pump communicating with said sealing medium feed line and feeding said sealing medium into said interspace at an elevated pressure sufficient to overcome said predetermined force with which said sealing lip is pressed against said inner surface of said outer pipe, so that said sealing medium deflects said sealing lip and flows past the same out of said interspace to thereby prevent contaminants from entering said interspace past said sealing means even during said relative extension and retraction of said lower inner pipe resulting in decreasing and increasing of said interspace.

4,094,549

PROCESS FOR HYDRAULICALLY MINING COAL EMPLOYING A CUTTING MONITOR AND A BREAKING MONITOR

Kouichi Shoji, Nihonbashi-Muromachi, Japan, and Arthur W. T. Grimley, Fernie, Canada, assignors to Kaiser Resources Ltd., Vancouver, Canada, by said Arthur Grimley and Mitsui Mining Co., Ltd., Tokyo, Japan, by said Kouichi Shoji

Continuation of Ser. No. 519,643, Oct. 31, 1974, abandoned, which is a division of Ser. No. 350,509, Apr. 12, 1973, abandoned. This application Nov. 12, 1976, Ser. No. 741,489

Claims priority, application Canada, Apr. 13, 1972, 139608

Int. Cl.[2] E21C *41/00*

U.S. Cl. 299—17 **15 Claims**

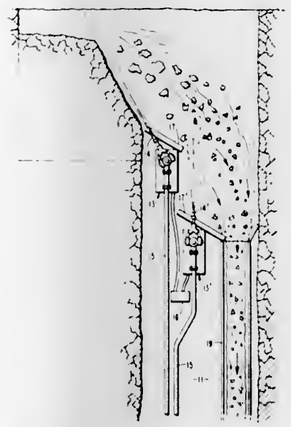
1. The method of hydraulically mining coal from a panel of coal of preselected average thickness comprising:

(1) driving at least one entry upward through the panel to a predetermined terminus thereof at an average slope of at least about 5 degrees;

(2) installing a fluming system in said entry that slopes in the same direction as the entry;

(3) positioning a monitor within said entry, said monitor comprising a nozzle adapted for pivotal motion vertically and horizontally, and being connected to means for receivinng water under pressure;

(4) ejecting a jet of high pressure water from said nozzle



against the panel of coal to cut the coal from the face area of the panel and break the coal into pieces of varying size;

(5) further breaking the cut and broken coal with a jet of high pressure water from a second monitor positioned in the same entry and located near said face area prior to transporting the coal from the face area;

(6) feeding the broken coal to said fluming system; and

(7) transporting the mined coal with the aid of gravity through said sloping fluming system with water from the nozzle as a coal-water slurry.

4,094,550

VEHICLE WHEEL TRIM RING ASSEMBLY

Desmond J. Toal, Valdosta; John Matthew McKenzie, Lake Park, both of Ga., and Franklin Delano Hemby, Warren, Mich., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 20, 1975, Ser. No. 551,095

Int. Cl.[2] B60B *7/00*

U.S. Cl. 301—37 R **5 Claims**

1. A wheel cover assembly comprising a retaining ring member having a circle of radially resilient teeth at one end thereof and an initially radially directed and axially facing margin at the other end thereof and terminating in a sharp terminal edge, and a trim ring member having an outer annular and axially facing margin;

wherein said margin of said retaining ring is provided with a reinforced portion formed from the initial plane of said margin of said retaining ring member and of a single thickness of the material of said margin of said retaining ring member, wherein the sharp terminal edge of said margin is spaced and extends radially outwardly from said reinforced portion; and

wherein said annular margin of said trim ring member includes a portion which is folded over the axially inwardly and outwardly facing sides of said terminal edge and clinched about said reinforced portion of said retaining ring member, and wherein said folded over portion is provided with a series of circumferentially spaced indentations on the axially inwardly facing side of said folded over portion which indentations project axially outwardly to grippingly engage the axially inwardly facing side of said reinforced portion of said retaining ring member.

4,094,551

MATERIAL CONVEYING SYSTEMS

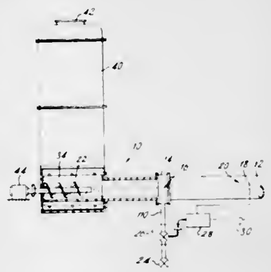
Robert James Flain, Stevenage, and Roy Farley, Hitchin, both of England, assignors to National Research Development Corporation, London, England

Filed Jun. 2, 1976, Ser. No. 692,050

Claims priority, application United Kingdom, Jun. 4, 1975, 24124/75

Int. Cl.[2] B65G *53/04*

U.S. Cl. 302—26 **7 Claims**



1. A conveyor system for materials, the conveyor system comprising a duct along which the material is to be conveyed, a separating means operative for a given period of time for displacing material in the duct downstream of the separating means further downstream away from material in the duct upstream of the separating means, a detector device positioned at a specific duct location downstream of the separating means for detecting presence of material in the duct at said location to control the operation of the separating means and control means for causing further operation of said separating means for a further period when said detector device indicates the continued presence of material at the end of said given period of time.

4,094,552

ARRANGEMENT FOR PNEUMATIC TRANSPORTING OF MATERIALS

Joachim Mellor, Bienrode, Germany, assignor to Buhler-Miag GmbH, Braunschweig, Germany

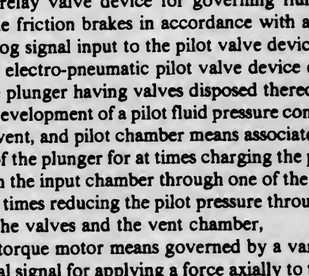
Filed Dec. 22, 1976, Ser. No. 753,485

Claims priority, application Germany, Jan. 8, 1976, 2600546

Int. Cl.[2] B65G *53/04, 53/54*

U.S. Cl. 302—29 **15 Claims**

1. In an arrangement for pneumatic transporting of materials, particularly those having a tendency to form deposits, a combination comprising a conduit adapted for transporting of the materials and having a resiliently deformable wall; a substantially rigid supporting element arranged outwardly of said wall so as to define a gap with the same; and a hollow intermediate member located in said gap and adapted to intermittently bulge to a size exceeding the size of said gap between said wall



and said supporting element and to thereby bear upon said supporting element and said wall so as to intermittently inwardly resiliently deform said wall whereby deposits of said materials which tend to form on an inner surface of said wall are dislodged.

4,094,553

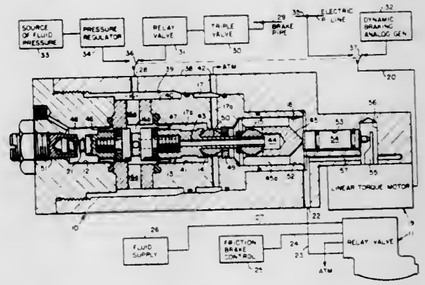
BRAKE CONTROL SYSTEM HAVING AN ELECTRO-PNEUMATIC PILOT VALVE

Glen O. Bohusch, and Walter E. Rojecki, both of Watertown, N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Jul. 28, 1977, Ser. No. 819,907

Int. Cl.[2] B60T *7/12*

U.S. Cl. 303—3 **8 Claims**



1. A brake control system for governing fluid pressure control of friction brakes of a vehicle, the brake control system having an electro-pneumatic pilot valve device operably connected to a relay valve device for governing fluid pressure control of the friction brakes in accordance with at least one variable analog signal input to the pilot valve device, wherein an improved electro-pneumatic pilot valve device comprises;

(a) a valve plunger having valves disposed thereon for governing development of a pilot fluid pressure control signal,

(b) input, vent, and pilot chamber means associated with the valves of the plunger for at times charging the pilot chamber from the input chamber through one of the valves and at other times reducing the pilot pressure through another one of the valves and the vent chamber,

(c) linear torque motor means governed by a variable input electrical signal for applying a force axially to the plunger in a direction to open said another valve for reducing pressure in the pilot chamber in accordance with an increase in magnitude of the electrical signal input to the torque motor,

(d) self-lapping means for governing axial movement of the plunger to lap said another valve in accordance with a

combination of the axial force on the plunger developed by the torque motor and an axial force on the plunger generated by pressure in the pilot chamber substantially balancing an opposing axial force on the plunger generated by pressure in the input chamber, and

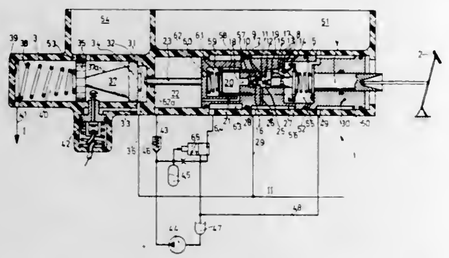
(e) whereby the improved electro-pneumatic pilot valve device is operable without requiring modification, either as a blending valve device in response to a variable fluid input to the input chamber indicative of a desired degree of braking and an input to the torque motor of an electrical signal variable in accordance with a degree of dynamic braking, or as a control valve device in response to a constant pressure input to the input chamber and a variable electrical input to the torque motor inversely indicative of a desired degree of braking.

4,094,554

HYDRAULIC BRAKE BOOSTER FOR A VEHICULAR BRAKE SYSTEM

Heinz Leiber, Leimen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 7, 1977, Ser. No. 775,220
Claims priority, application Germany, Mar. 10, 1976, 2609905
Int. Cl.² B60T *13/16*
U.S. Cl. 303—52 **4 Claims**



1. In a master brake cylinder for two-circuit braking systems including a housing, a control piston sliding within an booster piston, a brake control valve, actuated by said control piston, for establishing fluid communication between said master cylinder and the first and second of said two brake cylinders, said control piston having means for engaging and carrying along said booster piston after a predetermined amount of axial travel, and including a second main cylinder and piston for said second braking circuit, the improvement comprising:

said booster piston having oppositely disposed surfaces, one of which is subjected to pressure from a resilient means and the other of said surfaces being subjected to pressure flow from a pump and

means associated with said booster piston serving to cooperate with a stop means and further arranged to sense loss of pressure flow.

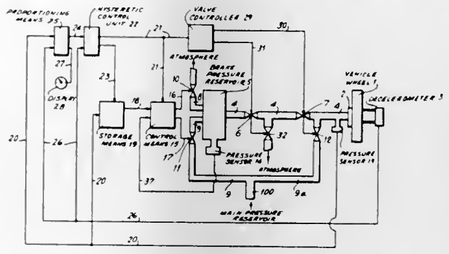
4,094,555

ANTI-SKID CONTROL METHOD AND APPARATUS FOR A BRAKE-EQUIPPED VEHICLE WHEEL

Peter Cyril Byrne, and Desmond F. Moore, both of Dublin, Ireland, assignors to PCB Controls Ltd., Dublin, Ireland

Filed Apr. 25, 1977, Ser. No. 790,693
Claims priority, application Ireland, Nov. 26, 1976, 2597/76
Int. Cl.² B60T *8/08*
U.S. Cl. 303—100 **35 Claims**

1. An anti-skid control method for a vehicle wheel comprising the steps of detecting deceleration of the vehicle wheel and comparing the same with a reference value of minimum deceleration and also with a reference value of maximum deceleration, controlling brake force based on the comparing step so that, independently of the position of the brake operating means controlled by the driver during braking, said brake force is released from said wheel if the actual deceleration of said wheel exceeds said reference value of maximum deceleration, whereas the brake force is reapplied to the wheel if the actual deceleration of said wheel decreases below said reference value of minimum deceleration, and varying said reference value of maximum deceleration during braking in dependence of a value characteristic of the maximum frictional forces transferable between the wheel and the road surface, said



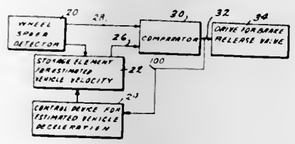
method further comprising applying the brake force by pressure from a brake pressure reservoir, and varying said pressure during a braking operation by adjusting the reservoir brake pressure to the pressure level which was actually operating on the brake at the time when the reference value for maximum deceleration value was reached, said adjusting of the reservoir brake pressure being effected after the reservoir brake pressure has been released from the brake.

4,094,556

ANTI-SKID SYSTEM FOR A VEHICLE

Atutoshi Okamoto, Toyohashi; Koichi Taniguchi, Kariya; Yoshiaki Nakano, Gifu, and Koichi Toyama, Toyohashi, all of Japan, assignors to Nippondenso Kabushiki Kaisha, Kariya, Japan

Continuation-in-part of Ser. No. 816,203, Apr. 15, 1969, abandoned, and a continuation-in-part of Ser. No. 816,928, Apr. 17, 1969, abandoned, and a continuation-in-part of Ser. No. 832,192, Jun. 11, 1969, abandoned. This application Mar. 11, 1971, Ser. No. 123,228
Claims priority, application Japan, Apr. 24, 1968, 43-27844; Jun. 26, 1968, 43-44348; Jun. 28, 1968, 43-45381; Jul. 13, 1968, 43-49499
Int. Cl.² B60T *8/10*
U.S. Cl. 303—109 **8 Claims**



3. An improved anti-skid system for vehicle which effectively utilizes an approximated slip ratio between vehicle velocity and wheel velocity to generate a brake release signal for a brake release valve without actually utilizing a vehicle velocity detector, said improved system comprising:

a wheel speed detector means for generating a wheel speed signal corresponding to the instantaneous wheel speed of at least one wheel of said vehicle;

a vehicle velocity estimation means connected to said wheel speed detector means for generating a vehicle velocity signal proportional to the successive maximum magnitudes of instantaneous wheel speed but reduced from such maximum values at a controlled rate;

control circuit means connected with said wheel speed detector means and with said vehicle velocity estimation means and producing a brake release signal whenever the difference between the wheel speed signal and the vehicle velocity signal reaches a predetermined level;

feedback means connected to control at least one of said wheel speed detector means and said vehicle velocity estimation means in response to the occurrences of said brake release signal;

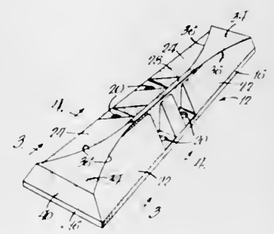
said feedback means being connected to the vehicle velocity estimation means so as to increase the controlled rate at which the vehicle velocity signal is reduced in response to the occurrence of a brake release signal thereby advancing the phase of brake reapplication in anticipation for and compensation of inherent time lags in the hydraulic brake system of the vehicle.

4,094,557

COMBINATION LOW GROUND PRESSURE, LOW TURNING RESISTANCE AND SELF-CLEANING TRACK SHOE

Larry E. Miller, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Oct. 18, 1976, Ser. No. 733,521
Int. Cl.² B62D *55/28*
U.S. Cl. 305—54 **9 Claims**



1. A combination low ground pressure, low turning resistance, and self-cleaning shoe for an articulated endless track used on track-type vehicles comprising:

a body having a sloping forward surface and a sloping rearward surface, each said forward and rearward surface substantially converging toward the other;

a traction lug projecting from said body between said forward and rearward surfaces and terminating at opposite ends at locations spaced from opposite ends of said body; and

a high-flotation bearing surface on each end of said body between said forward and rearward surfaces, each said bearing surface having a portion adjacent to, and of the same width as said lug and each said bearing surface increasing in width with increasing distance from said lug toward an adjacent end of said body, each of said bearing surfaces sloping away from said lug toward the adjacent end of said body.

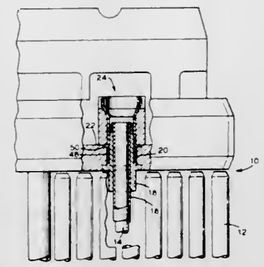
4,094,558

LOCKING NUT ASSEMBLY WITH DEFORMABLE LOCKING SLEEVE

David Wayne Christiansen, Kennewick, Wash., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Aug. 24, 1976, Ser. No. 717,312
Int. Cl.² F16C *33/00*
U.S. Cl. 308—3 R **4 Claims**

1. A locking nut assembly for attachment of a threaded element with at least one channel to a support member comprising: a nut for engagement with the threaded element, the nut being provided with at least one opening, a locking sleeve for insertion within the nut, the sleeve being formed with at least one prong in parallel alignment with the channel of the threaded element, the prong being formed with a foot adapted to interact with the support member to inhibit relative motion



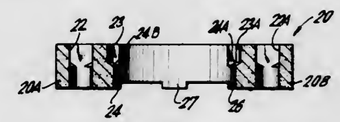
therebetween, and at least one portion of the inserted locking sleeve being deformed to fill the opening of the nut to restrain relative movement of the nut with respect to the threaded element.

4,094,559

FLANGED BEARING CARTRIDGE

Ronald S. Slusarski, Berlin, Conn., assignor to Textron Inc., Providence, R.I.

Filed Dec. 30, 1976, Ser. No. 755,655
Int. Cl.² F16C *23/08, 35/06*
U.S. Cl. 308—194 **8 Claims**



1. A sintered compacted powdered steel bearing flange housing, said housing comprising,

bearing mounting means in the form of a circular bore having a continuous inner wall of predetermined axial thickness located centrally of said sintered housing and passing axially through the plane of said housing,

said continuous inner wall having a spherically shaped groove machined along its periphery for receiving an annular antifriction bearing assembly having inner and outer rings with a complement of bearing balls held therebetween, said outer ring being shaped for spherically mating with said spherical groove,

end flange means extending radially from said circular bore of said flange housing,

said end flange means being substantially flat and each having bolt-receiving holes therein, each located centrally along a line passing diametrically across said circular bore,

and a pair of diametrically oppositely disposed axial-access slots located on said inner wall and extending partially axially into said circular bore and merging with the spherically-shaped groove of said inner wall,

each of said slots having a bevelled bottom shoulder formed by compaction,

the width of said slots being sufficient to enable the axial insertion of said annular antifriction bearing assembly across its diameter therein into said bore, such that when said bearing is inserted into said slots and rotated about its diameter, said annular bearing assembly is caused to fit snugly into the spherical groove of said bore, said sintered powdered housing being formed of a steel composition and having a sintered density ranging

from about 80 to 92% of the theoretical density of said steel composition,

said steel composition consisting essentially by weight of up to about 6% Ni, up to about 3% Cu, up to about 2% Mn and/or silicon, about 0.2 to 1.2% C and the balance at least about 90% iron and any residuals normally present in steel,

said sintered housing when employed in a flanged bearing cartridge being characterized by a metallographic structure of pearlite, by improved resistance to wear at the machined spherically shaped groove, and by improved strength properties and ductility as compared to a cast iron bearing housing.

5. A flanged bearing cartridge capable of self-alignment which comprises,

a sintered compacted powdered steel bearing flange housing having a bearing mounting means in the form of a circular bore having a continuous inner wall of predetermined axial thickness located centrally of said housing and passing axially through the plane of said housing,

said continuous inner wall having a spherically shaped groove machined along its periphery and a pair of diametrically disposed axial-access slots located on said inner wall and extending partially axially into said circular bore and merging with the spherically shaped groove of said inner wall, the width of said slots being sufficient to enable the axial insertion and mounting of an annular antifriction bearing assembly into said bore in spherical mating relationship with said spherically shaped groove,

each of said slots having a bevelled bottom shoulder formed by compaction,

and an annular antifriction bearing mounted in said flange bore,

said bearing comprising inner and outer bearing rings with a complement of bearing elements supported therebetween, the outer ring having a spherically shaped surface in spherical mating relationship with the spherical groove of said bore in said flange,

said sintered powdered flange being formed of a steel composition and having a sintered density ranging from about 80 to 92% of the theoretical density of said steel composition,

said steel composition consisting essentially by weight of up to about 6% Ni, up to about 3% Cu, up to about 2% Mn and/or Si, about 0.2 to 1.2% C and the balance at least about 90% iron and any residuals normally present in steel,

said sintered housing in said bearing cartridge being characterized by a metallographic structure of pearlite, by improved resistance to wear at the machined spherically shaped groove, and by improved strength properties and ductility as compared to a cast iron bearing housing.

4,094,560

V-GROOVE ROLLING CONTACT ROLLER BEARING

Earl W. Traut, 8040 Palm Lake Dr., Orlando, Fla. 32811

Division of Ser. No. 511,237, Oct. 2, 1974, Pat. No. 3,989,324.
This application Jul. 16, 1976, Ser. No. 705,953
Int. Cl.[2] F16C *33/51*
U.S. Cl. 308—206 **1 Claim**

1. A rolling contact roller bearing comprising:

an inner bearing race,

only one retainer race,

said inner bearing race and said retainer race being circular and coaxial,

said retainer race being located radially outwards of said inner race and affixed thereto,

an outer bearing race,

said outer bearing race being circular, coaxial with said inner race and said retainer race, and free to rotate relative thereto,

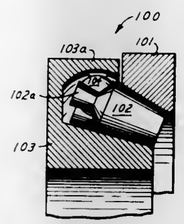
first rotating means,

said first rotating means comprising rollers,

said rollers each including a V-grooved portion at one end, second rotating means,

said second rotating means comprising balls,

said balls being alternately interposed between said V-



grooves and in rolling contact therewith and with said retainer race, so as to prevent said rollers from contacting each other,

said balls each making only one contact with said retainer race,

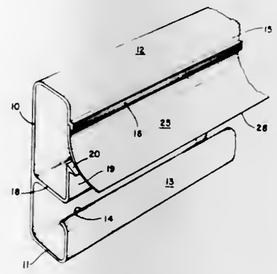
said rollers being in rolling contact with said inner race and with said outer race, so as to transfer loads therebetween.

4,094,561

WIRING ENCLOSURE FOR DESKS

Douglas F. Wolff; Harold N. Minick, and Jay J. Reinhart, all of Marshall, Mich., assignors to Harter Corporation, Sturgis, Mich.

Filed Jun. 20, 1977, Ser. No. 808,188
Int. Cl.[2] A47B *77/08*; H01R *13/60*
U.S. Cl. 312—223 **5 Claims**



1. An elongated tubular integral wiring enclosure adapted for mounting at and extending above the rear of a desk top comprising walls forming an upper longitudinal compartment having a front wall, a longitudinal access slot formed in said front wall with an angular attaching flange along its lower edge for attachment to the desk top, walls forming a lower compartment under the upper compartment and a coextensive flexible wiper strip secured to the upper edge of said access slot and extending downwardly and forwardly over said attaching flange to conceal the same and to contact the desk top surface.

4,094,562

TRUCK BODY DOOR ASSEMBLY

Irven R. Wilhelmsen, 6359 Dominica St., Cypress, Calif. 90630

Filed Sep. 29, 1975, Ser. No. 617,314
Int. Cl.[2] F02N *11/06*
U.S. Cl. 312—290 **2 Claims**

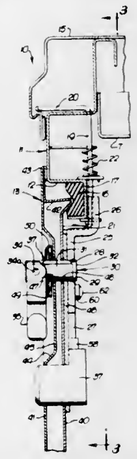
1. In combination:

a door assembly including a wall frame having a rectangular opening and a door supported on said frame to swing downward about the lower edge of said opening;

a tool tray extending horizontally inwardly from the upper edge of said wall frame;

a cover for said tray;

key-lockable manually operable latch means mounted in said door for holding said door in opening covering position, said door, when unlocked, being swingable downwardly



and outwardly from closing relation with said opening; and

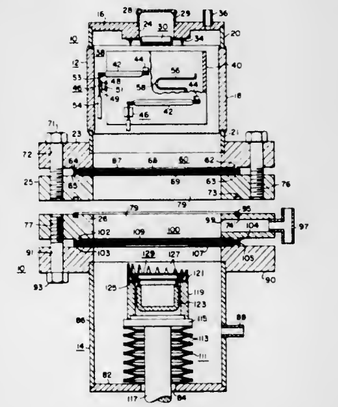
means automatically responsive to the closing of said door to lock said cover in closing relation with said tool tray, and automatically responsive to the opening of said door to release said cover permitting access simultaneously to said tray and to said door opening.

4,094,563

METHOD OF FABRICATING AN ELECTRON TUBE

Robert A. Simms, Horseheads, and Gene R. Feaster, Elmira, both of N.Y., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 9, 1967, Ser. No. 660,875
Int. Cl.[2] H01J *9/18*
U.S. Cl. 316—19 **6 Claims**



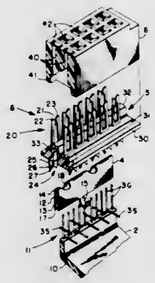
1. A method of fabricating an electron discharge device including the steps of providing a first chamber portion having a first penetrable portion disposed between the interior and exterior thereof, forming an electrode within said first chamber portion, providing a second chamber portion having a second penetrable portion disposed between the interior and exterior thereof, forming a portion of said electron discharge device to be associated with said electrode, connecting said first and second chamber portions to form a third chamber portion therebetween, penetrating said first and second penetrable members and moving said electrode and said portion of said electron discharge device together so that said portion of said electron discharge device and said electrode may be assembled to form an evacuated electron discharge device with said first and second penetrable portion exterior of said electron discharge device.

4,094,564

MULTIPLE CONDUCTOR ELECTRICAL CONNECTOR WITH GROUND BUS

Santo J. Cacolici, Mentor, Ohio, assignor to A P Products Incorporated, Painesville, Ohio

Filed Mar. 17, 1977, Ser. No. 778,580
Int. Cl.[2] H01R *3/06*
U.S. Cl. 339—14 L **22 Claims**



1. A cable termination assembly comprising a multiconductor cable, a plurality of contacts connected electrically to respective conductors of said cable, bus means for electrically connecting respective conductors of said cable, and dielectric body means for holding together said contacts, said bus means, and said cable, said body means including carrier means molded directly about and to said contacts for holding the same in a fixed pattern, said carrier means also including further means for holding said bus means thereto in electrical isolation from at least one of said contacts.

4,094,565

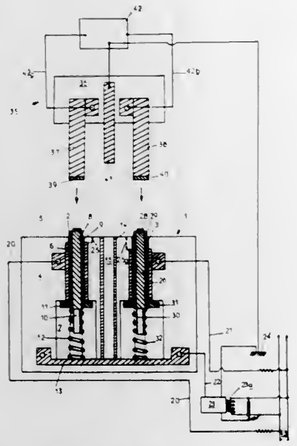
SAFETY ELECTRIC CONNECTOR

André Parrier; Jean Parrier, and Henri Parrier, all of rue de la Sabliere, St. Genis les Ollieres (Rhone), France

Filed Dec. 13, 1976, Ser. No. 749,791
Claims priority, application France, Dec. 12, 1975, 75 39398
Int. Cl.[2] H01R *3/06*
U.S. Cl. 339—14 P **10 Claims**

1. A safety electric connector comprising a socket wherein each terminal comprises at least one conductive tubular part connectable to an electric supply; a conductive pin slidably mounted inside each tubular part, said conductive pin being connected to an earth terminal, each conductive pin further

being disposed inside an insulating sheath while the wires of the socket are connected to a fault detecting apparatus; and an



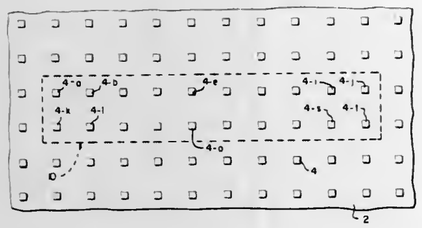
insulating moulding encapsulating said at least one tubular part.

4,094,566

CONNECTOR HAVING WIRE LOCATING MEANS

Frank Peter Dola, Port Richey, and Frederick William Rossler, Jr., New Port Richey, both of Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 18, 1977, Ser. No. 770,127
Int. Cl.² H01R *3/06*
U.S. Cl. 339—14 R **34 Claims**



1. A mutli-contact electrical connector which is intended for use with a multi-conductor cable of the type comprising a plurality of signal conductors and a plurality of ground conductors, said connector comprising:

a connector housing, said housing having a mating end, a rearward end, and a laterally facing side which extends between said mating end and said rearward end,

a plurality of contact terminals in said housing, each of said terminals having a contact portion and a wire-receiving portion which receives a wire upon movement of said wire laterally of its axis towards said side and into said wire-receiving portion, said terminals being arranged in side-by-side relationship on said side of said housing in a row with said contact portions adjacent to said mating end and with said wire-receiving portions between said ends,

a commoning conductor means on said laterally facing side extending across said side of said housing proximate to said rearward end, a plurality of ground conductor receiving members on said commoning conductor means, said ground conductor receiving members each having a functional position and a non-functional position, said ground conductor receiving members being effective to receive, and establish electrical contact with, a ground conductor when in said functional position and being spaced from a conductor extending across said surface when in said non-functional position,

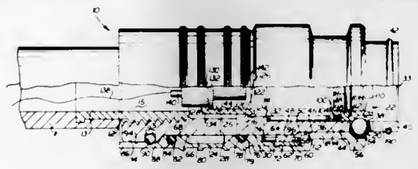
selected ground conductor receiving members being in alignment with said conductor-receiving portions of said contact terminals, and at least one ground conductor receiving member being located between each two adjacent contact terminals whereby, signal conductors in said cable can be connected to said contact terminals by placing said selected ground conductor-receiving members in said non-functional positions and moving said signal conductors laterally of their axis and into said conductor-receiving portions of said terminals, and said ground conductors can be commonly connected to said commoning conductor means by moving said ground conductors into said ground conductor receiving members, and said commoning conductor means can be electrically connected to one of said terminals by moving one of said ground conductors into one of said selected ground conductor receiving members and into the conductor receiving portion of the one terminal which is in alignment with said one selected ground conductor receiving member.

4,094,567

COMBINATION QUICK CONNECT-DISCONNECT PNEUMATIC/ELECTRICAL COUPLING

Thomas D. Karcher, Rocky River, and Harry H. Hammond, North Royalton, both of Ohio, assignors to The Hansen Manufacturing Company, Cleveland, Ohio

Filed Jan. 5, 1977, Ser. No. 756,759
Int. Cl.² H01R *3/04*
U.S. Cl. 339—15 **13 Claims**



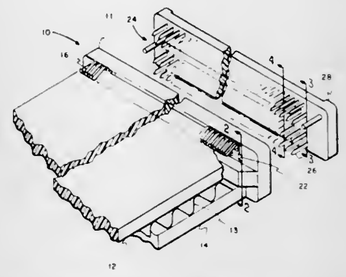
1. A quick connect-disconnect coupling for simultaneously connecting and disconnecting fluid conduits and the ends of an electrical conductor comprising a combination, a socket attached to one of said fluid conduits, a wall across said socket; a first electrical connector element supported by said wall; a fluid plug attached to the other of said fluid conduits, said plug having a second electrical connector element disposed within and circumvallated by the leading end portion thereof, said leading end portion being dimensioned to fit within said socket and for telescoping movement with respect to said first electrical connector element to establish electric connection, means for holding said plug in said socket and means for directing a flow of fluid around said wall and through said plug to connect said conduits in fluid communication with each other including a manually operable valve member selectively movable between an open condition and a closed condition when said plug and socket are in the connected condition, said valve member being effective to prevent fluid flow around said wall when said valve member is in the closed condition and block fluid flow between said conduits, said valve member being effective to allow fluid to flow around said wall when said valve is in the open condition and enable fluid flow between said conduits.

4,094,568

ELECTRICAL CROSSOVER AND TEST CONNECTORS

Laurence Saul Lee, New Hartford, and Joseph Philip Roback, Utica, both of N.Y., assignors to General Electric Company, Utica, N.Y.

Continuation of Ser. No. 699,728, Jun. 24, 1976, abandoned.
This application Sep. 26, 1977, Ser. No. 836,190
Int. Cl.² H05K *1/07*
U.S. Cl. 339—17 LM **2 Claims**



1. A circuit board connection assembly, comprising:

a first circuit board **12** having a first margin along which are fixed a first plurality of spaced apart contacts;

a second circuit board **14** having a second margin along which are fixed a second plurality of spaced apart contacts;

means **13** fixing said first and second boards together in a spaced apart, parallel relationship with said first and second margins adjacent each other;

a receptacle body having

a first portion interlocked with said first and second boards;

a second portion having

a first and a second face, said first face being adjacent said boards and said second face being remote from said boards,

a first plurality of transverse bores, each extending between said faces and having a progressive enlargement onto said second face, disposed alternately in an upper and a lower row, parallel to each other, and adjacent said first margin of said first board,

a second plurality of transverse bores, each extending between said faces and having a progressive enlargement onto said first face, disposed alternately in an upper and a lower row, parallel to each other, and adjacent said second margin of said second board,

said upper rows being spaced apart by a given distance,

said lower rows being spaced apart by said given distance,

a first plurality of contact elements **20**, each disposed in a respective one of said upper and lower rows of said first plurality of bores, each contact element having a female portion disposed in said respective bore but not in said progressive enlargement thereof, and having a lead portion **16** extending from said respective bore through said first face to a respective one of said first contacts of said first board,

a second plurality of contact elements, each disposed in a respective one of said upper and lower rows of said second plurality of bores, each contact element having a female portion disposed in said respective bore but not in said progressive enlargement thereof, and having a lead portion extending from said respective bore through said first face to a respective one of said second contacts of said second board,

a cross-over connector body **24** having

a first face and a second face, said first face disposed adjacent said second face of said connector body and said second face remote therefrom,

a first plurality of transverse bores extending inwardly and having a progressive decrement from said second face of said connector body, disposed alternately in an upper and a lower row, parallel to each other,

a second plurality of transverse bores extending inwardly and having a progressive decrement from said second face of said connector body, disposed alternately in an upper and a lower row, parallel to each other,

a third plurality of contact elements each communicating with a respective one of said upper and lower rows of said first plurality of bores of said connector body and passing through said first face of said connector body and through said second face of said receptacle body into the female portion of a respective one of said first plurality of contact elements of said receptacle body,

a fourth plurality of contact elements, each communicating with a respective one of said upper and lower rows of said second plurality of bores of said connector body and passing through said first face of said connector body and through said second face of said receptacle body into the female portion of a respective one of said second plurality of contact elements of said receptacle body,

said third and fourth pluralities of contact elements thereby forming an array of rows and columns wherein each column contains two contact elements,

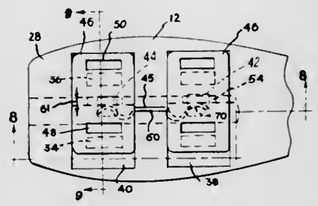
a plurality of conductive elements **27** disposed within said connector body in predetermined ones, but not all, of said columns, electrically connecting the respective third contact element of said one column with the respective fourth contact element of said one column.

4,094,569

SAFETY CAP SLIDE

Ernest W. Dietz, Torrance, Calif., assignor to Pacific Electricord Company, Gardena, Calif.

Filed May 9, 1977, Ser. No. 794,845
Int. Cl.² H01R *13/44*
U.S. Cl. 339—40 **7 Claims**



1. An electrical connector for receiving a prong type connector plug comprising:

a body bearing, on at least one of its faces, juxtapositioned, prong-receptacle means to receive a plurality of said connector plugs;

contactor strips carried internally of said body for electrical contact with prongs placed in said prong receptacles;

a plurality of protective plates, each overlying a respective face area inclusive of a respective receptacle means and bearing prong-receiving aperture means;

attachment means comprising dependent brackets projecting from the undersurface of said protective plates inwardly into face-central apertures in said body in sliding relationship therein between aligned and misaligned positions with respective prong receptacles;

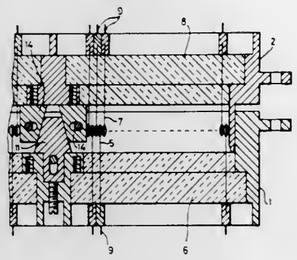
slot means in said body open to said face and extending beneath and between adjacent face areas; and

resilient means for each adjacent pair of face areas comprising a spring having a central section received in said slot means and distal S-bowed sections, each resiliently biasing against the center of a respective bracket to urge a respective plate into its misaligned position.

4,094,570
ELECTRICAL CONNECTOR

Ruy F. M. de Barros, Woluwe-St-Lambert, Belgium, assignor to Societe Anonyme belge d'exploitation de la navigation aerienne (SABENA), Belgium

Filed Mar. 11, 1977, Ser. No. 776,781
Claims priority, application Belgium, Nov. 19, 1976, 172530
Int. Cl.² H01R *13/62*
U.S. Cl. 339—75 M 11 Claims



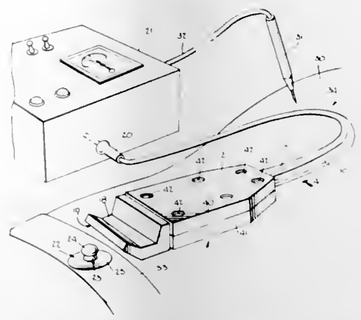
1. An electric connector comprising first and second support means having an elongated shape, first and second sets of contact means arranged in at least one layer extending in a plane parallel to the lengthwise direction of a respective support means, each contact means of each set being fixed at one end of a flexible strip having its other end fixed to the respective support means, each strip extending transversely to the lengthwise direction of the support means, each strip being arranged to allow it to bend in the plane of the respective layer of contact means, the said contact means of both sets being arranged to be in an alternating relationship and insulated one from the other when the two sets are engaged one into the other, said contact means having an insulating element such that each contact means of one set electrically cooperates with one contact means of the other set; at least one pressure means on the first support means extending transversely to the lengthwise direction of the support means, said pressure means having at least one face oblique to the lengthwise direction of the support means; and at least one blocking means on the second support means and being mounted for longitudinal movement relative to said second support means, said blocking means having at least one surface arranged to cooperate with the said face of the pressure means thereby to apply force to the contiguous alternate contact means when the two sets of contact means engage one into the other so that transverse mating engagement of one support means with the other produces a pressure in the lengthwise direction of the support means and against said contact means to cause said contact means on the ends of said flexible strips to be directly physically engaged together in vibration-free relation.

4,094,571
GROUNDING CABLE CLIP

Thomas A. Benjamin, Glen Gardner, N.J., assignor to IPCO Hospital Supply Corporation, White Plains, N.Y.

Filed Apr. 15, 1977, Ser. No. 787,835
Int. Cl.² H01R *13/54*
U.S. Cl. 339—91 R 26 Claims

1. A grounding cable clip comprising a power plate and a monitor retaining shoe, said plate and shoe being spaced from each other, said shoe having an upstanding tab portion, said plate having a resilient tongue overlying the tab portion, said shoe having means for receiving a grounding pad connector,

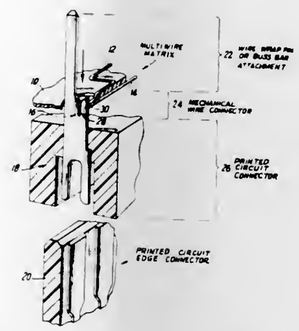


said resilient tongue being in position to contact a grounding pad connector when received in the shoe.

4,094,572
MULTI-WIRE ELECTRICAL INTERCONNECTING MEMBER HAVING A MULTI-WIRE MATRIX OF INSULATED WIRES MECHANICALLY TERMINATED THEREON

Robert Page Burr, Huntington; Ronald Morino, Sea Cliff, and Raymond J. Keogh, Huntington, all of N.Y., assignors to Kollmorgen Technologies, Inc.

Division of Ser. No. 604,204, Aug. 13, 1975, Pat. No. 4,065,850.
This application Jan. 24, 1977, Ser. No. 762,118
Int. Cl.² H01R *13/38*
U.S. Cl. 339—97 P 2 Claims



1. A multi-wire electrical interconnection circuit member, comprising:

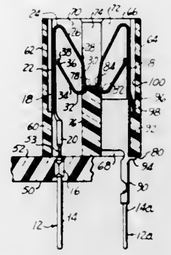
a multi-wire matrix including insulated wires; and

wire-retaining members having a body portion affixed to said circuit member, said body portion having a pin portion extending outwardly from said circuit member, a tapered entrant portion adjacent to said pin and said circuit member and a slotted portion extending downwardly in said body from said tapered entrant portion and away from said pin, said slotted portion including side wall edges for applying an insulation penetration force to the insulated wires therein for forming and maintaining a gas-tight electrical connection therewith.

4,094,573
CIRCUIT BOARD EDGE CONNECTOR

Arvin L. Langham, Canoga Park, Calif., assignor to Elfab Corporation, Dallas, Tex.

Filed Aug. 1, 1973, Ser. No. 384,776
Int. Cl.² H05K *1/07*
U.S. Cl. 339—176 MP 12 Claims

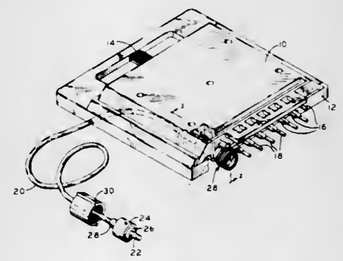


1. An edge connector for a circuit board comprising: a plurality of contact terminals each having a contact head, each of said contact heads including a loop portion; an insulative housing comprising a shell having oppositely disposed outer longitudinal walls and a bottom surface, a member between each of said walls forming cavity means between said member and each respective outer wall, the bottom of each of said cavity means being open, said member having an upper surface portion facing upwardly into each of said cavity means, said shell having an opening above said member to receive a circuit board for insertion along a predetermined axis so that said contact heads establish electrical contact to respective portions on such circuit board, said upper surface portion being substantially normal to said predetermined axis; and mounting means fixedly positioning each respective contact terminal with respect to the bottom surface of said shell; each of said loop portions continuously engaging an edge of the upper surface portion of said member for all operational conditions of the connector to bias said housing against said mounting means.

4,094,574
COAXIAL CABLE CONNECTOR DEVICE AND METHOD OF MANUFACTURE THEREOF

Thomas L. Gunn, P.O. Box 246, Bonaparte, Iowa 52620

Filed Dec. 27, 1976, Ser. No. 754,407
Int. Cl.² H01R *17/06*
U.S. Cl. 339—177 E 6 Claims

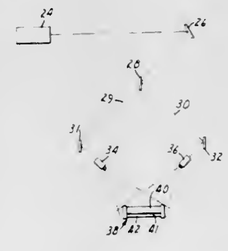


1. In a coaxial cable having a center conductor, an insulating sleeve surrounding the center conductor, and a tubular conductor surrounding the sleeve; connector means on at least one end of the cable comprising different conductive elements electrically engaging the center conductor and the tubular conductor and moldable plastic electrical insulating material in the form of body means molded in situ on the end of said cable and in engagement with said conductive elements thereon for fixing said conductive elements in place and in engagement with said center and tubular conductors, said insulating material holding said conductive elements in spaced electrically insulated relation on the end of the cable; said conductive elements include a socket-like first element electrically engaging the center conductor, a second element having an aperture to receive the insulating sleeve, and when mounted on the sleeve electrically engaging the tubular conductor, said body means of plastic material closely surrounding the cable on both sides of said second element and engaging both of said first and second elements to fix said elements on the cable and to support the elements in spaced electrically insulated relation, said second element having reduced diameter portions extending therefrom from both ends, each said portion being imbedded in and interlocked with said body means of plastic insulating material.

4,094,575
HOLOGRAPHIC ARTICLE AND PROCESS FOR MAKING SAME

Truman F. Kellie, North St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 30, 1976, Ser. No. 682,090
Int. Cl.² G02B *27/00, 5/18*
U.S. Cl. 350—3.67 33 Claims



1. A hologram comprising a sheet material having a permanent, optically detectable pattern which includes at least one linear grating, which grating has a preselected spatial frequency and results from the interference fringe field produced by two intersecting coherent light beams of a predetermined wavelength passing through an optical transparency in substantial contact with a photosensitive medium to impart a holographic image of said transparency in said medium, which medium is then further processed to provide said sheet material with said permanent pattern containing said holographic image, characterized by the feature that the grating is formed by two intersecting coherent light beams which are directed along non-colinear paths to pass through spatial filters and thence directly impinge onto said optical transparency at equal angles of incidence with respect to the plane of the transparency at the point of incidence, such that the formed gratings are free of artifacts such as are produced by lens aberrations or dust.

4,094,576
STRAIGHT-LINE OPTICAL SCANNER USING ROTATING HOLOGRAMS

Gerald Michael Heiling, Pine Island, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 673,183, Apr. 2, 1976, abandoned. This application Apr. 25, 1977, Ser. No. 790,720
Int. Cl.² G02B *5/32, 27/17*; G03H *1/04*
U.S. Cl. 350—3.71 16 Claims

1. A method for producing straight-line optical scan-patterns, comprising the steps of:

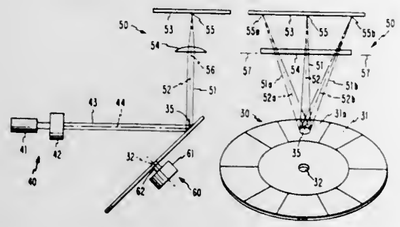
(a) projecting a collimated coherent optical reference beam onto an area of a sensitized medium;

(b) projecting a spherical object beam onto said area through a first cylindrical lens having a first focal line extending in

a first direction in an object plane, so as to produce an optical interference pattern in said area;

(c) developing said medium, so as to fix said interference pattern in said area;

(d) projecting a collimated coherent reconstruction beam onto said medium, so as to generate a reconstructed beam converging toward a line image in said object plane;



(e) transmitting said reconstructed beam through a second cylindrical lens having a second focal line extending in a second direction in said object plane; and

(f) imparting rotary relative motion between said medium and said reconstruction beam.

4,094,577

HIGH-RESOLUTION, WIDE-FIELD HOLOGRAPHIC LENS

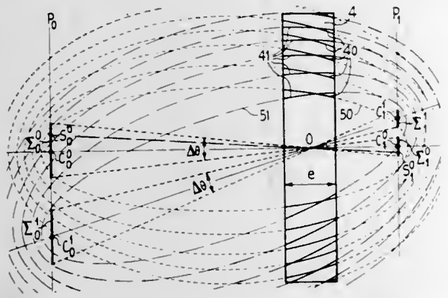
Erich Spitz, and Guy Bismuth, both of Paris, France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 443,502, Feb. 15, 1974, abandoned, which is a continuation of Ser. No. 240,140, Mar. 31, 1972, abandoned. This application Jun. 28, 1976, Ser. No. 700,182

Claims priority, application France, Apr. 13, 1971, 71.12966

Int. Cl.[2] G02B *5/32*; G03H *1/04*

U.S. Cl. 350—3.72 **5 Claims**



1. Holographic lens for optically conjugating a plurality of first elementary surfaces and an equal number of second elementary surfaces with aberrations less than a predetermined limiting value using the angular selection properties caused by Bragg effect of 3-dimensional network;

said lens being constituted by a thick plate of photosensitive material having parallel faces;

said plate comprising as many superimposed 3-dimensional networks made of recorded interference fringes mixed within the volume of said material as there are said first elementary surfaces;

each said network constituting a 3-dimensional holographic elementary lens, each said elementary lens field of view bieng restricted by said angular selection properties;

each said holographic elementary lens respectively conjugating a single said first elementary surface and a single said second elementary surface;

the respective centers of said first elementary surface, said second elementary surface and said holographic lens being substantially aligned along a straight line; and

said plate thickness restricting each said elementary lens field of view to the value for which said aberrations are at most equal to said limiting value.

4,094,578

OPTICAL EQUALIZER FOR SIGNAL-TRANSMISSION SYSTEM USING MULTIMODE LIGHT GUIDES

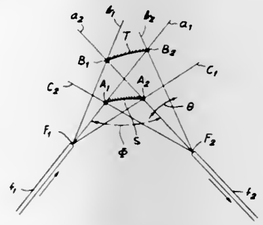
Pietro DiVita, Turin, and Riccardo Vannucci, Rome, both of Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni S.P.A., Turin, Italy

Filed Feb. 18, 1977, Ser. No. 770,232

Claims priority, application Italy, Feb. 19, 1976, 67380 A/76

Int. Cl.[2] G02B *5/14*

U.S. Cl. 350—96.15 **5 Claims**



1. A system for the optical transmission of signals, comprising:

a first and a second light guide with internally reflecting boundaries respectively connected to a transmitter and a receiver of luminous signals, said light guides having proximal ends respectively emitting and collecting bundles of light rays with axes angularly intersecting in a common plane, each bundle being bounded by a pair of limiting rays on opposite sides of the respective axis; and

a mirror confronting said proximal ends for reflecting light rays from said first light guide to said second light guide, said mirror having a cross-section in said common plane in the shape of a segment of an ellipse whose foci are the center points of said proximal ends within said common plane, said segment extending between the intersection of the axis of said first light guide with the position of a limiting ray of said second light guide and the intersection of the axis of said second light guide with the position of a limiting ray of said first light guide.

4,094,579

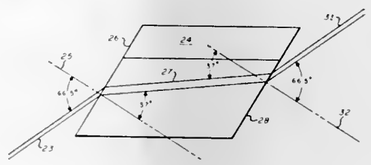
MULTIMODE OPTICAL WAVEGUIDE DEVICE WITH NON-NORMAL BUTT COUPLING OF FIBER TO ELECTRO-OPTIC PLANAR WAVEGUIDE

Donald H. McMahon, Carlisle, and Arthur R. Nelson, Stow, both of Mass., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sep. 13, 1976, Ser. No. 722,898

Int. Cl.[2] G02B *5/14*

U.S. Cl. 350—96.17 **9 Claims**



1. An optical waveguide device comprising:

a planar optic waveguide having an index of refraction n_1 and an end region whereat light energy is coupled for guidance therein;

a fiber optic waveguide with core diameter W_2 and an index of refraction n_2 butt coupled to said end region of said planar optic waveguide in a manner so that its axis forms an angle θ_2, other than zero, with a perpendicular to said end region such that light energy propagating in said fiber optic waveguide is coupled to said planar optic waveguide within a region W_1 thereby accomplishing a magnification M_W for the width of the light energy that is given by

$$M_W = W_1/W_2 = \cos\theta_1/\cos\theta_2$$

and a divergence magnification M_D that is given by

$$M_D = (n_2/n_1)\,(1/M_W)$$

where θ_1 is the angle made by the propagation path, in said planar optic waveguide with said perpendicular to said end region and is determined from

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

4,094,580

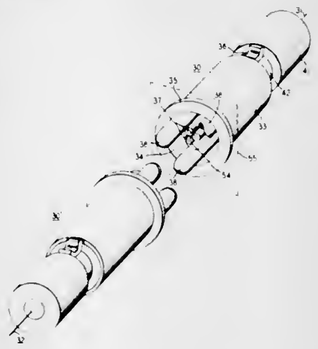
HERMAPHRODITE OPTICAL FIBER CONNECTOR

John Stone Cook, Rumson, and Carl Ragnar Sandahl, Morristown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 27, 1976, Ser. No. 754,602

Int. Cl.[2] G02B *5/14*

U.S. Cl. 350—96.21 **2 Claims**



1. A hermaphrodite optical fiber connector comprising:

a first housing having a cylindrical opening extending axially therethrough,

a connector body disposed within said first housing and having an end portion with three equally circumferentially spaced radially extending slots therein,

a second portion of said connector body adjacent to said end portion having an aperture running axially therethrough and being of substantially triangular cross section,

a third portion of said connector body adjacent said second portion having an axially aligned aperture with a truncated conical cross section,

three substantially identical cylindrical inner rods partly disposed within the triangular cross sectioned aperture, said inner rods being thereby held in tangential contact with each other so that they form a holding channel,

an optical fiber disposed within the holding channel formed by the inner rods, the end of the fiber and ends of said inner rods terminating in a planar surface substantially perpendicular to the longitudinal axis of the fiber,

three substantially identical cylindrical outer rods interference fitted in said connector body slots with the ends of said outer rods extending beyond said planar surface to protect the end of the fiber, the diameter of said outer rods being substantially greater than the diameter of said inner rods, the ends of said outer rods being hemispherically shaped;

a duplicate housing having a cylindrical opening extending axially therethrough;

a duplicate connector body disposed within said duplicate housing and having an end portion with three equally circumferentially spaced radially extending slots therein,

a second portion of said duplicate connector body adjacent to the end portion thereof having an aperture running axially therethrough and being of substantially triangular cross section,

a third portion of said duplicate connector body adjacent the second portion thereof having an axially aligned aperture with a truncated conical cross section,

three substantially identical cylindrical inner rods partly disposed within the triangular cross sectioned aperture in said duplicate connector body, said inner rods being thereby held in tangential contact with each other so that they form a holding channel,

an optical fiber disposed within the holding channel formed by the latter inner rods, the end of the fiber and ends of the latter inner rods terminating in a planar surface substantially perpendicular to the longitudinal axis of the fiber,

three substantially identical cylindrical outer rods interference fitted in said duplicate connector body slots with the ends of said outer rods extending beyond said planar surface to protect the end of the fiber, the diameter of the latter outer rods being substantially greater than the diameter of the latter inner rods, the ends of the latter outer rods being hemispherically shaped,

all of said outer rods being of the same diameter D_2 and all of said inner rods being of the same diameter D_1,

said first and duplicate housings being mated by slidably engaging each of said plurality of outer rods so that the interdigitated tangentially contacting outer rods form a six-sided nest containing each of the plurality of inner rods.

4,094,581

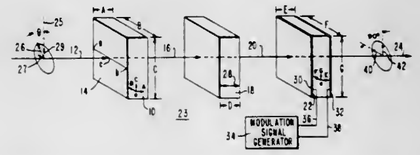
ELECTRO-OPTIC MODULATOR WITH COMPENSATION OF THERMALLY INDUCED BIREFRINGENCE

Gary D. Baldwin, Columbia, and Stephen J. Bepko, Cockeysville, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 31, 1977, Ser. No. 763,764

Int. Cl.[2] G02F *1/03*

U.S. Cl. 350—150 **14 Claims**



1. A method for modulating radiation which includes compensation for thermally induced birefringence comprising the steps of:

passing monochromatic radiation through a first electro-optic crystal having a predetermined crystalline structure and chemical composition,

passing radiation exiting from said first electro-optic crystal through an optical compensating element having rotatory power,

passing radiation exiting from said optical compensating element through a second electro-optic crystal having a prdetermined crystalline structure and chemical composition,

generating a modulation signal, and

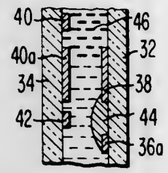
generating an electric field across said second crystal in response to said modulation signal.

4,094,582

LIQUID CRYSTAL MATRIX DISPLAY DEVICE WITH TRANSISTORS

Lawrence Alan Goodman, East Windsor, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,168
Int. Cl.² G02F *1/16*; G08B *23/00*; H03K *17/60*; H01L *29/78*
U.S. Cl. 350—333 **7 Claims**



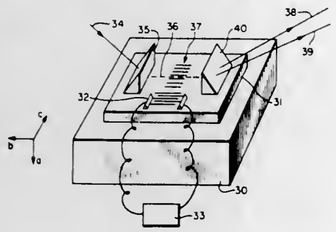
1. A liquid crystal display device comprising
a first set of a plurality of elongated, spaced, parallel electrodes,
a second set of a plurality of spaced electrodes coplanar with said first set of electrodes,
a third set of a plurality of elongated, spaced parallel electrodes in a plane spaced from that of the first and second electrodes, the third set of electrodes extending substantially perpendicular to said first set of electrodes, with each of said third electrodes being opposite to at least one of the second electrodes,
a liquid crystal material between the second set of electrodes and the third set of electrodes, and
semiconducting material extending between and contacting each of the second electrodes and a first electrode and wherein the liquid crystal material extends across and contacts the semiconductor material forming a transistor.

4,094,583

ACOUSTOOPTIC DEVICE

Yojiro Kondo, and Yoshinori Ohta, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Jun. 30, 1976, Ser. No. 701,024
Claims priority, application Japan, Dec. 11, 1975, 50-147982; Jul. 4, 1975, 50-82480
Int. Cl.² G02F *1/28*
U.S. Cl. 350—358 **12 Claims**



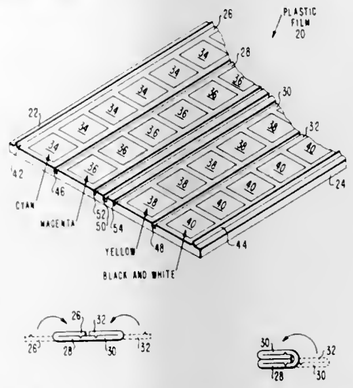
1. In an acoustooptic device, an acoustooptic medium consisting essentially of a single crystal of $PbO \cdot xNb_2O_5$ in which the mol composition of Nb_2O_5 in said crystal is $1.5 \leqq x \leqq 3.1$.

4,094,584

FORMAT FOR COLOR DIFFRACTIVE SUBTRACTIVE FILTERS

William James Hannan, Concord, Mass., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 14, 1977, Ser. No. 787,702
Claims priority, application United Kingdom, Sep. 28, 1976, 40134/76
Int. Cl.² G02B *5/18*; G03C *1/76*
U.S. Cl. 350—162 SF **5 Claims**



1. In a color-picture transparency comprised of three superimposed diffractive subtractive filters each corresponding to a different one of three primary subtractive colors, the picture information manifested by said respective superimposed filters being disposed in substantially registered relationship with each other, the improvement wherein said color picture transparency comprises:
a plastic film divided into four side-by-side regions situated between a first outer edge and a second outer edge of said film with first and second adjacent ones of said four regions located between said first outer edge and a midline halfway between said first and second outer edges and with third and fourth adjacent ones of said four regions located between said second outer edge and said midline;
each one of said three filters being embossed as a relief pattern on the same given side of said film within a different one of three of said four regions;
said film being first folded at the junction of said first and second regions to provide that said first outer edge substantially coincides with said midline and said given side of said first region is in face-to-face relationship with said given side of said second region;
said film being second folded at the junction of said third and fourth regions to provide that said second outer edge substantially coincides with said midline and said given side of said third region is in face-to-face relationship with said given side of said fourth region, and
said film being third folded at said midline to provide that said outer edges are within the interior thereof and that all three of said filters are superimposed and are substantially in registration with each other.

4,094,585

LOUPE

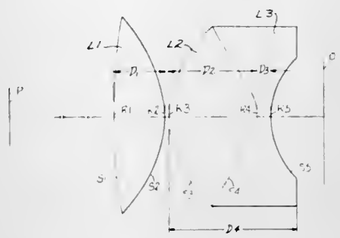
Ellis I. Betensky, Toronto, Canada, assignor to Opcon Associates of Canada, Ltd., Toronto, Canada

Filed Sep. 17, 1976, Ser. No. 724,323
Int. Cl.² G02B *9/10, 25/00*
U.S. Cl. 350—175 E **16 Claims**

1. A magnifier comprising from the viewing end, a first positive lens group comprising a singlet element, a second lens group comprising a bi-convex element and a bi-concave element forming a doublet having the overall shape of a meniscus,

said elements having surfaces S1–S5 with curvatures C1–C5 numbered successively from the viewing end where the curvature is the equivalent focal length of the lens, divided by the surface radius at the optical axis, and

$0.2 < C1 < 0.75$



$1.0 < C2 < 1.7$

$1.2 < C3 < 1.9$

$1.0 < C4 < 5.0$

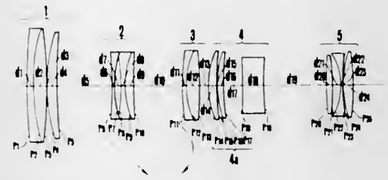
$1.5 < C5 < 3.5$.

4,094,586

COMPACT ZOOM LENS

Yasuhisa Sato, Kawasaki; Sadahiko Tsuji, Yokohama, and Katsumi Tanaka, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 1, 1976, Ser. No. 736,941
Claims priority, application Japan, Nov. 5, 1975, 50-133320
Int. Cl.² G02B *15/18*
U.S. Cl. 350—184 **10 Claims**



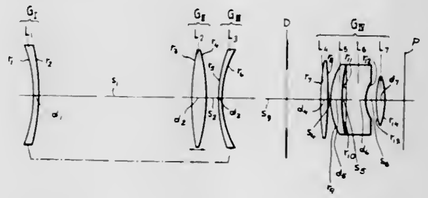
1. A compact zoom lens comprising:
a first lens group which has a positive refractive power and consists of a positive lens formed by joining a negative lens and a positive lens together and a positive meniscus lens, the first lens group being movable for focusing;
a second lens group which has a negative refractive power and is disposed in the rear of the first lens group on the axis thereof, the second lens group consisting of a negative lens and another negative lens formed by joining a negative lens and a positive lens together, the second lens group being movable for variation;
a third lens group which has a positive refractive power and is disposed in the rear of the second group on the axis thereof, the third group consisting of a positive lens formed by joining a negative lens and a positive lens together, the third lens group being movable for compensation concurrently with the second lens group, the locus of the movement of the third group being in a concave shape as viewed from the side of an photographing object; and
an image forming lens group which has a positive refractive power and is disposed in the rear of the third lens group on the axis thereof, the image forming lens group consisting of a front sub-group and a rear sub-group, the front sub-group having a positive refractive power and being composed of two positive lenses each having a convex face on the object side and a negative lens being disposed apart from these two lenses on their axis, the rear sub-group being composed of a positive lens, a negative lens having a concave face on the object side; and a positive lens having a convex face on the object side.

4,094,587

AFOCAL FRONT ATTACHMENT FOR ZOOM OBJECTIVE

Walter Besenmatter, and Trude Muszumanski, both of Vienna, Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed Aug. 10, 1976, Ser. No. 713,222
Claims priority, application Austria, Aug. 11, 1975, 6231/75
Int. Cl.² G02B *15/10*
U.S. Cl. 350—184 **7 Claims**



1. A substantially afocal front attachment of variable magnification ratio for an optical objective, consisting of a first, a second and a third lens member axially spaced from one another, said first and third lens members being negatively refracting and rigidly interconnected, said second lens member being positively refracting and axially movable with reference to said first and third lens members;
said first lens member L_1, said second lens member L_2 and said third lens member L_3 having radii of curvature $r_1 - r_6$, thicknesses $d_1 - d_3$, axial separations $s_1 - s_2$, refractive indices n_d and Abbe numbers ν_d substantially as given in the following table:

			n_d	ν_d
L_1	$r_1 = -2.6$ $r_2 = -10.3$	$d_1 = 0.1$ $s_1 = 2.9 - 0.2$	1.53	48
L_2	$r_3 = +5.2$ $r_4 = -5.2$	$d_2 = 0.3$ $s_2 = 0.2 - 2.9$	1.64	60
L_3	$r_5 = +3.3$ $r_6 = +1.9$	$d_3 = 0.1$	1.62	58

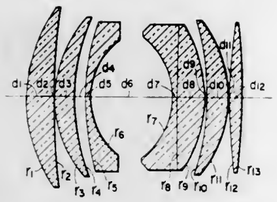
4,094,588

LARGE-APERTURE PHOTOGRAPHIC LENS SYSTEM

Jihei Nakagawa, Higashimurayama, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Jun. 10, 1976, Ser. No. 694,644
Claims priority, application Japan, Jun. 14, 1975, 50-72257
Int. Cl.² G02B *9/62*
U.S. Cl. 350—215 **2 Claims**

1. A large-aperture photographic lens system comprising a first positive meniscus lens component, a second positive meniscus lens component, a third negative meniscus lens component, a fourth negative cemented meniscus doublet lens component, a fifth positive meniscus lens component and a sixth positive lens component, in which said large-aperture photographic lens system has the following numerical data:



$r_1 = 0.6147$			
$d_1 = 0.1158$	$n_1 = 1.6204$	$\nu_1 = 60.3$	
$r_2 = 2.9052$			
$d_2 = 0.0019$			
$r_3 = 0.4738$			
$d_3 = 0.0777$	$n_2 = 1.6935$	$\nu_2 = 50.8$	
$r_4 = 0.8002$			
$d_4 = 0.0468$			
$r_5 = 1.0617$			
$d_5 = 0.0203$	$n_3 = 1.5814$	$\nu_3 = 40.8$	
$r_6 = 0.2764$			
$d_6 = 0.3357$			
$r_7 = -0.2984$			
$d_7 = 0.0193$	$n_4 = 1.7552$	$\nu_4 = 27.5$	
$r_8 = 15.8469$			
$d_8 = 0.1160$	$n_5 = 1.6935$	$\nu_5 = 53.3$	
$r_9 = -0.5113$			
$d_9 = 0.0019$			
$r_{10} = -1.0617$			
$d_{10} = 0.0890$	$n_6 = 1.8061$	$\nu_6 = 40.9$	
$r_{11} = -0.4676$			
$d_{11} = 0.0023$			
$r_{12} = 1.8784$			
$d_{12} = 0.0570$	$n_7 = 1.6935$	$\nu_7 = 50.8$	
$r_{13} = -2.2973$			
$f = 1.0$	$f_B = 0.7430$		

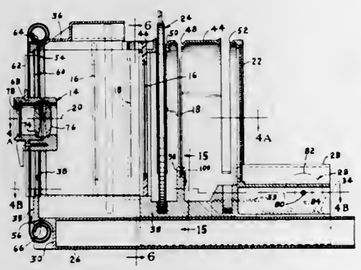
wherein reference symbols $r_1, r_2 \ldots r_{13}$ respectively represent radii of curvature of respective surfaces of respective lenses, reference symbols $d_1, d_2 \ldots d_{12}$ respectively represent thicknesses of respective lenses and airspaces between respective lenses, reference symbols $n_1, n_2 \ldots n_7$ respectively represent refractive indices of respective lenses, reference symbols $\nu_1, \nu_2, \ldots \nu_7$ respectively represent Abbe's numbers of respective lenses, reference symbol f represents the focal length of the lens system as a whole, reference symbol f_B represents the back focal length of the lens system.

4,094,589

DATA VIEWER

George J. Brown, 22 Grandview Ave., Waterbury, Conn. 06708

Filed Mar. 29, 1976, Ser. No. 671,109
Int. Cl.² G09F *11/24*; G02B *27/02*; G03B *21/00*
U.S. Cl. 350—241 **26 Claims**



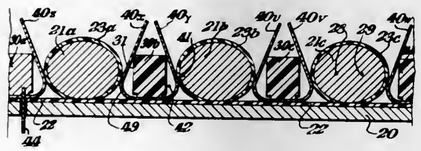
1. The combination comprising a viewer and at least two translucent information sources for positioning in said viewer, each of said information sources having data imprinted thereon and related to data imprinted on the other of said information sources, at least one of said information sources comprising a transparency, one of said information sources having data imprinted thereon in one translucent color and another of said information sources having information imprinted thereon in another translucent color, said one color and said other color being additive colors, said viewer having a housing, lens means supported on said housing, means for selective focusing said lens means on each of at least two focal planes located serially along the optical axis of said lens means and within said housing, one of said focal planes being located between said lens means and the other of said focal planes, said one focal plane being outside of the field of focus of said lens means when said lens means is focused on said other focal plane, means for supporting said one information source in said one focal plane, means for supporting said other information source in said other focal plane, and means for illuminating said information sources whereby data thereon may be viewed through said lens means.

4,094,590

ELECTROSTATIC DEVICE FOR GATING ELECTROMAGNETIC RADIATION

Charles G. Kalt, Williamstown, Mass., assignor to Dielectric Systems International, Inc., Williamstown, Mass.

Filed Aug. 4, 1976, Ser. No. 711,610
Int. Cl.² G02F *1/16*
U.S. Cl. 350—269 **10 Claims**



1. In an electrostatic device for the control of electromagnetic radiation in response to an electrical signal of the class having a fixed and a resilient variable electrode, and an insulative film interposed therebetween, the improvement comprising said variable electrode being fixedly mounted in a portion thereof and extending therefrom to a line of tangency between said fixed and variable electrodes, said variable electrode further extending from said line of tangency away from said fixed electrode, said variable electrode having a bend in the region between said mounting and said line of tangency, said bend being convex toward said fixed electrode.

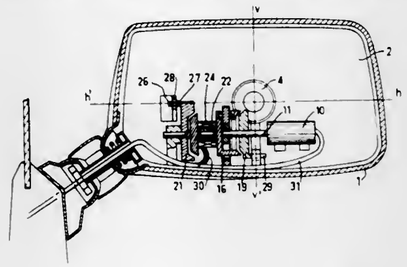
4,094,591

ELECTRIC DEVICE CONTROLLING THE MOVEMENT OF THE MIRROR IN AN EXTERNAL REARVIEW MIRROR UNIT

Raymond Lafont, Paris, France, assignor to B.S.G. International Limited, Birmingham, England

Filed Jun. 25, 1976, Ser. No. 699,851
Claims priority, application France, Jun. 27, 1975, 75 20407
Int. Cl.² G02B *5/08*
U.S. Cl. 350—289 **10 Claims**

1. A rear-view mirror assembly comprising a housing, a reflective surface mounted in said housing for movement on first and second axes of rotation, said first axis of rotation being different to said second axis of rotation, an electrical motor, rotary drive means including a reduction gear coupled to said electrical motor, first and second driven means for rotating said reflective surface on said first and second axes of rotation respectively and selector means for selectively coupling said reduction gear to said first and second driven means, said first and second driven means each comprising a clutch having first and second engageable members, each of said first engageable members being constantly connected to said reduction gear and selectively connected to a respective one of said second engageable members by said selector means.

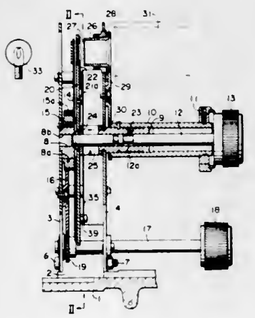


4,094,592

OPHTHALMIC EXAMINATION CHART PROJECTOR

Mitsugu Aoki, Tokyo, and Taketoshi Ishihara, Soka, both of Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1977, Ser. No. 762,338
Claims priority, application Japan, Feb. 3, 1976, 51-11220[U]
Int. Cl.² A61B *3/02*
U.S. Cl. 351—30 **6 Claims**



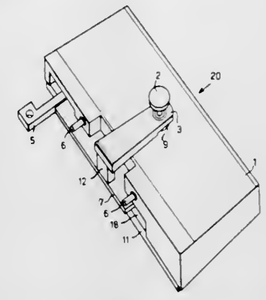
1. Ophthalmic examination chart projector comprising a circular chart carrying disc having a plurality of ophthalmic examination charts disposed along a peripheral portion of the disc, a circular mask plate having a plurality of openings which are peripherally spaced apart from each other, means for supporting said chart carrying disc and the mask plate co-axially and rotatably about a horizontal axis, illumination light source means provided at one side of the chart carrying disc and the mask plate, projection lens means provided at the other side of the chart carrying disc and the mask plate so as to define together with the light source means a projecting optical path which pass through the peripheral portion of the disc, one of said chart carrying disc and said mask plate being in engagement with a first operating member extending co-axially from said one of the chart carrying disc and the mask plate so that it is rotated by the first operating member, the other of the chart carrying disc and the mask plate being in engagement with a second operating member which is located outside the periphery of said other of the disc and the plate and extending in parallel with and in the same direction as the first operating member, whereby one of the charts on the disc and one of the openings in the mask plate can be positioned in the optical path through actuation of the first and the second operating members, said projector further including astigmatic index means comprising a rotatable member positioned in said optical path and having an index, and a third operating member extending in the same direction as the first and second operating members and in engagement with said rotatable member for rotating it to circumferentially move said index.

4,094,593

INSTRUMENT BASE FOR OPHTHALMOLOGICAL INSTRUMENTS

Andreas Kutscherauer, Oberkochen, and Ortwin Müller, Konigsbronn, both of Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Germany

Filed Sep. 1, 1976, Ser. No. 719,811
Claims priority, application Germany, Sep. 16, 1975, 7529211
Int. Cl.² A61B *3/00*
U.S. Cl. 351—38 **5 Claims**



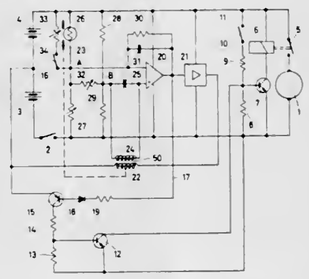
1. An instrument base for ophthalmological instruments comprising a hollow housing having an upper surface which serves as a table, said housing having means defining an opening in one side thereof, a guide plate within said housing and therefore beneath said table, at least a portion of said guide plate extending to the outside through the opening, means located within said housing for supporting said guide plate for movement along coordinate axes x-y, and a control arm connected to said guide plate and extending across a relatively small area of the upper surface of said table.

4,094,594

MOVIE-CAMERA WITH AUTOMATIC FADE-OUT SHUTOFF

Hermann Mayer, Esslingen, and Hans-Friedrich Kiefer, Stuttgart, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Apr. 12, 1976, Ser. No. 675,808
Claims priority, application Germany, Apr. 25, 1975, 2518369
Int. Cl.² G03B *21/36*
U.S. Cl. 352—91 C **10 Claims**



1. A movie camera comprising: a film-advance motor; a source of electricity; switch means between said source and said motor closable for connecting same together to operate said motor and openable for disconnecting same to stop said motor; a diaphragm having an aperture of variable size; fade means connected to said diaphragm for slowly closing same for

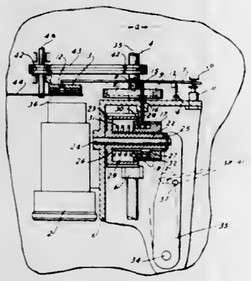
fade out and for slowly opening same for fade in; and circuit means connected between said fade means and said switch means for detecting the aperture size and opening said switch means when said aperture being closed after fade out, wherein said fade means includes a driving coil connected to said diaphragm for opening and closing same, said circuit means including a damping coil adjacent said drive coil and capable of generating a voltage.

4,094,595

CONTROL MECHANISM FOR THE PULL-DOWN PAWL OF A FILM PROJECTOR

Hans Lieckfeldt, Stuttgart, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Jan. 11, 1977, Ser. No. 758,544
Claims priority, application Germany, Jan. 16, 1976, 2601503
Int. Cl.² G03B *21/48*
U.S. Cl. 352—180 **12 Claims**



1. In a control mechanism for the pull-down pawl means of a projector for the projection of films with different film frequencies, a combination comprising support means; a drive wheel mounted on said support means for rotation about its axis; a control drum coaxial with said drive wheel and arranged for controlling the movement of one end of the pull-down pawl means into and out of perforations in a film to be projected; a plurality of different cam curves extending axially displaced from each other about the periphery of said control drum; and means connecting said control drum with said drive wheel for rotation with the latter and movable in axial direction relative thereto, said drive wheel being formed with a recess extending in the direction of said axis and dimensioned so that said control drum may be moved in axial direction into and out of said recess.

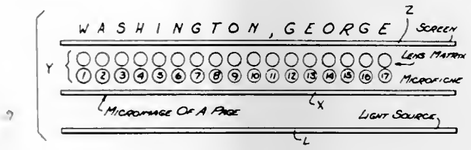
4,094,596

ANIMATED IMAGE PRESENTATION APPARATUS

Adnan Waly, Stamford, Conn., assignor to Izon Corporation, Stamford, Conn.

Continuation of Ser. No. 291,589, Sep. 25, 1972, Pat. No. 4,033,686, which is a continuation of Ser. No. 135,996, Apr. 21, 1971, Pat. No. 3,704,068. This application Sep. 8, 1976, Ser. No. 721,451
The portion of the term of this patent subsequent to Nov. 28, 1989, has been disclaimed.
Int. Cl.² G03B *23/08*
U.S. Cl. 353—27 R **3 Claims**

1. An animated image presentation apparatus comprising:
A. a multiple microrecord on which a plurality of interrelated images are recorded on a reduced scale in a manner in which each image thereof is dissected into a multiplicity of bits which are dispersed to form an image pattern that is distinct from and interlaced with the image patterns defined by the recordings of the other images;
B. means to support said microrecord in a plane;
C. a lens matrix disposed in parallel relation to said microrecord to project an image pattern in registration therewith, said matrix being constituted by an array of lensettes that are dispersed on the matrix to assume positions that are optically aligned with the bits in the image pattern;
D. means to illuminate the registered image pattern;
E. a screen disposed in parallel relation to said matrix to present the recorded images projected by the matrix; and



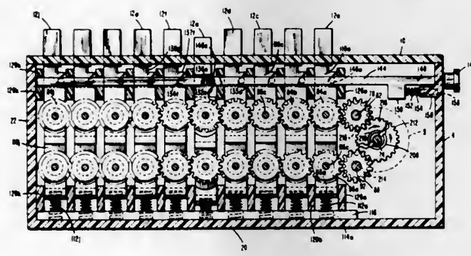
F. means to index the microrecord relative to the matrix to successively register in a predetermined sequence the image patterns recorded on the microrecord with the array of lensettes for presentation on said screen and at a rate providing an animated display.

4,094,597

METHOD AND APPARATUS FOR PRODUCING COMPOSITE FILM IMAGES FOR IDENTIFICATION

Don L. Cloud, Springfield, Mo., assignor to I.I.C., Inc., Springfield, Mo.

Filed Sep. 15, 1976, Ser. No. 723,664
Int. Cl.² G03B *21/26*
U.S. Cl. 353—35 **24 Claims**



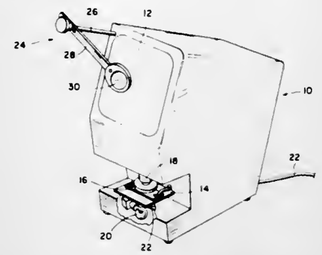
1. A viewing device for illuminating and positioning a plurality of superimposed film images comprising
a housing having at one end a viewing lens,
a light source within said housing spaced from said viewing lens,
a plurality of spaced roller pairs positioned about said light source, comprising a series of first rollers and a corresponding series of oppositely spaced second rollers,
a plurality of indicia-bearing roll films each film being secured at one end to a roller of said roller pairs,
guide means to direct each film from one of said first rollers past said light source and onto a corresponding second roller of said roller pair,
means to maintain said plurality of films between said viewing lens and said light source is approximately the same focal plane, and
film positioning control means for winding each of said films independently back and forth between its respective pair of spaced rollers without binding the film comprising
only one rotatably external control knob,
an associated internal drive means driven by said external control knob, and
only one external engaging element for each roller pair to engage both rollers of the roller pair with said drive means.

4,094,598

MICRO DISPLAY WITH MAGNIFIER

Dewey W. Hodges, 1502 S. Boulder, Tulsa, Okla. 74119

Filed Jan. 21, 1977, Ser. No. 761,237
Int. Cl.² G03B *21/14;* G02B *27/02*
U.S. Cl. 353—76 **2 Claims**



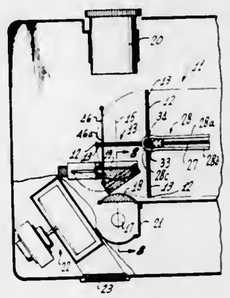
1. An improved apparatus for displaying a magnified image comprising:
a console having a rear lighted projection screen, a light source, a specimen holder, and a lens system for displaying a magnified image of the specimen on the rear surface of the projection screen, the screen being mounted for easy view of the user;
a support rod slidably and rotatably extending from said console perpendicular to said screen and adjacent one edge of said screen, the length of the support rod extending from said console being slidably variable, the outer end of the support rod having threaded means;
an arm having a slot at its inner end and being affixed to the outer end of said support rod by said threaded means being received in the slot, the arm extending parallel to and spaced from said screen, the length of said arm from said support rod being varible by reason of the threaded means being slidabe in the slot; and
a magnifying glass pivotally supported at one edge to the outer end of said arm by a pin extending perpendicular the plane of said screen, the magnifying glass being supported parallel said console screen and movable over at least a substantial portion of said screen and variably spaced from said screen by the sliding action of said support rod to permit focusing on said screen.

4,094,599

FLEXIBLE MAGAZINE SLIDE PROJECTOR WITH MOVABLE LENS

Gerald J. Frey, 1486 Cantera Ave., Santa Barbara, Calif. 93110

Filed Aug. 22, 1977, Ser. No. 826,550
Int. Cl.² G03B *1/48, 21/20, 23/08*
U.S. Cl. 353—96 **18 Claims**



1. In a slide projector having:
an optical system including an optical axis, a slide-projection station along said axis in a plane substantially perpendicular to the axis, and a condensing lens along said axis closely adjacent to one side thereof, for directing light from a light source through a slide positioned in said station,
means supporting a series of slides in said projector for movement along an endless, closed-loop path including two substantially straight side sections and two arcuate connecting sections at the opposite ends of said side sections, one of said end sections being located alongside said slide-projection station for swinging of slides along an arcuate path into and out of the slide-projection station, through arcs of approximately ninety degrees and generally about an axis defined by said one arcuate section, said lens having an inner side adjacent said one arcuate section, an outer side remote from said one arcuate section, and upper and lower sides,
and actuating means for feeding slides along said path and into and out of the slide-projection station,
the improvement comprising:
means movably supporting said condensing lens on said projector including:
first and second tracks associated, respectively, with the outer and inner sides of said lens, said first track extending outwardly from said outer side substantially parallel to said plane, and said second track extending outwardly from said inner side substantially radially of said arcuate path and being inclined relative to said first track,
and follower means on said frame for riding on said tracks and guiding the lens for movement thereon to swing the lens about said outer side as the lens moves along said tracks;
lens-moving means for shifting the lens back and forth along said tracks in timed relation with the feeding of slides along said track by said actuating means, between the normal position in which said lens is closely adjacent the slide-projection station and a retracted position spaced outwardly from said normal position away from said one arcuate section and out of the slide path, including:
a rotary crank mechanism having a lateral throw of preselected length during each revolution,
a connecting rod connected at one end to said crank mechanism and at the other end to said lens, adjacent said outer side, to shift said outer side back and forth along said first track between said positions during each revolution,
a spring-loaded lost-motion connection between said crank mechanism and said lens,
and means for stopping outward movement of said lens at said retracted position before the lateral throw of the crank mechanism is complete, thereby to hold the lens stationary in the retracted position during a portion of each revolution,
and means driving said crank mechanism with said actuating means to produce one revolution of the crank mechanism during each slide change.

4,094,600

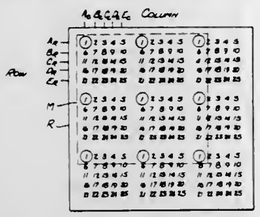
MICRO-IMAGE RECORDS

Adnan Waly, Stamford, Conn., assignor to Izon Corporation, Stamford, Conn.

Continuation of Ser. No. 291,589, Sep. 25, 1972, Pat. No. 4,033,686, which is a division of Ser. No. 135,996, Apr. 21, 1971, Pat. No. 3,704,068. This application Sep. 23, 1976, Ser. No. 725,797
The portion of the term of this patent subsequent to Nov. 28, 1989, has been disclaimed.
Int. Cl.² G03B *21/00*
U.S. Cl. 353—120 **2 Claims**

1. In combination with a lens matrix provided with a multiplicity of like lensettes in a planar array having parallel optical axes normal to the plane of said matrix, each lensette having a narrow angle of field, a microrecord in which a plurality of pages are recorded in a reduced scale, said microrecord comprising a planar record medium in parallel relation to said matrix and in close proximity thereto and a plurality of data

sets formed on said medium, each of which is separately readable, each data set formed on said medium representing a reduced scale image of a distinct page having alphanumeric or other intelligence printed thereon and being dissected into a multiplicity of data sub-sets equal in number to the number of lensettes in said array, all of which sub-sets are generated along corresponding optical axes which are parallel to each other and are normal to the medium, each sub-set constituting a minute portion of the intelligence printed on said page, the



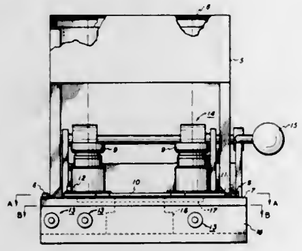
sub-sets which together form a data set being dispersed on said medium according to a predetermined pattern, the dispersed sub-sets forming the plurality of data sets being interlaced with each other whereby the multiplicity of data sub-sets constituting each data set occupies a distinct position on said medium and is projected for reading when the parallel axes of the data set selected for reading are coincident with the parallel axes of the array of lensettes and each of the sub-sets in the selected data set lies within the field of a respective lensette in the array.

4,094,601

REPRODUCTION OF PAGED MATERIAL FROM MICROFORM CARDS

Robert George Holliday, Ann Arbor, Mich., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 8, 1977, Ser. No. 814,250
Int. Cl.[2] G03B *27/32, 27/52, 27/42*
U.S. Cl. 355—26 **2 Claims**



1. A process for reproducing paged material from microform cards, comprising:

(a) photographing a first sequence of paged material to produce a first microform card containing at least some of the pages in said first sequence;

(b) photographing a second sequence of paged material, corresponding to the respective reverse sides of said first sequence of pages, to produce a second microform card containing at least some of the pages in said second sequence;

(c) aligning each microform card thus produced with a spatially-defined test pattern;

(d) while the card is thus aligned, perforating the card;

(e) placing the perforated card in a microfiche holder of an office-type microprint copier, the holder having at least one raised pin per card perforation for securing the card;

(f) using said copier, reproducing enlarged copies of said first sequence of pages from the microform;

(g) repeating step (f) for said second sequence of pages using the reverse sides of said first sequence enlarged copies as the copy members for the second sequence of copies, such that the front and back portions of each resulting duplexed copy are sequentially-numbered pages of the paged material;

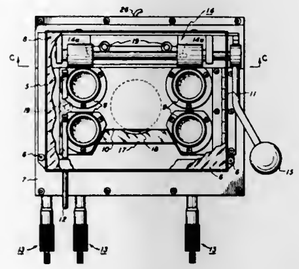
wherein the front and back portions of the copies have image areas which substantially coincide with each other.

4,094,602

MICROFORM CARD ALIGNMENT DEVICE

Robert George Holliday, Ann Arbor, Mich., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 3, 1977, Ser. No. 814,251
Int. Cl.[2] G03B *27/32, 27/42*
U.S. Cl. 355—40 **1 Claim**



1. An apparatus for aligning a series of microform cards with a spatially-defined test pattern, comprising:

(a) a platen having at least one substantially transparent area bearing a spatially-defined test pattern;

(b) means for retaining a microform card upon said platen and said test pattern;

(c) optical means proximate said platen for projecting said test pattern and that portion of said microfiche card overlapping thereon onto a viewing surface;

(d) adjustable means in contact with said retaining means for moving said retaining means and thus said microform card relative to said platen and said test pattern; and

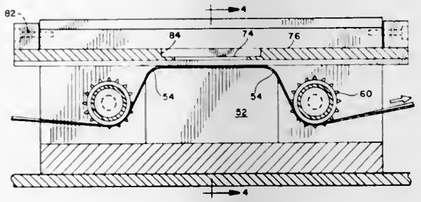
(e) means for perforating said microform card when said card is in contact with said retaining means.

4,094,603

FLAT FIELD, ROLL FILM TRANSPORT

Ben Fowler Evers, 10315 Madrid Way, Spring Valley, Calif. 92077

Filed Nov. 22, 1976, Ser. No. 743,782
Int. Cl.[2] G03B *27/32, 27/52*
U.S. Cl. 355—64 **9 Claims**



1. A roll film transport for use with a paper printer or the like, comprising:

(a) a supporting base plate;

(b) a supply spool and a take-up spool operatively mounted on said base plate;

(c) an exposure station structure between said spools and having a film track defined by a pair of narrow, co-planar, spaced rails to receive the longitudinal edge portions only of a film being processed, and having a mask operatively positioned slightly above said rails and having a window opening between the rails and dimensioned to expose a single frame of film being processed;

(d) means to bend a film sharply downwardly at at least one end of said film track in said exposure station structure immediately outside the exposure area thereof whereby the film is flattened temporarily in a portion thereof including that portion at said window opening; and

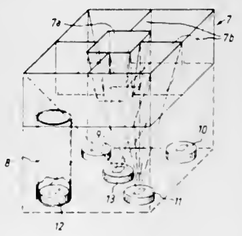
(e) means to slip drive said take-up spool and means to advance the film intermittently to expose successive frame portions of the film in said window opening.

4,094,604

APPARATUS FOR DETERMINING THE LIGHT TRANSMISSIVITY OF FILM FRAMES OR THE LIKE

Bernd Payrhammer, and Helmut Treiber, both of Munich, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Sep. 1, 1977, Ser. No. 829,786
Claims priority, application Germany, Sep. 9, 1976, 2640681
Int. Cl.[2] G03B *27/78*
U.S. Cl. 355—68 **10 Claims**



1. Apparatus for determining the light transmissivity of film frames or other originals of the type wherein a central field is surrounded by a plurality of peripheral fields, comprising means for locating an original in a predetermined plane; means for directing light against one side of the original in said plane; a plurality of signal-generating photosensitive elements at the other side of said plane, one for each of said fields; and a diaphragm interposed between said plane and said elements, said diaphragm including means for confining light passing through the central field of the original in said plane to impinge solely upon the associated element and for confining light passing through the peripheral fields of the original in said plane to impinge solely upon the elements which are associated with the respective peripheral fields as well as upon the element which is associated with said central field.

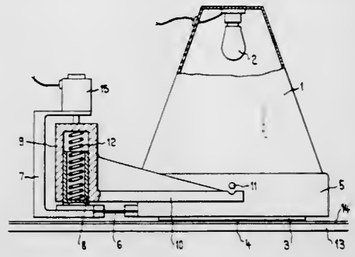
4,094,605

APPARATUS FOR PRODUCING IDENTICAL SHEETS OF MATERIAL HAVING A NUMBER OF REPRESENTATIONS THEREON

Bruno Zumbach, Orpund, Switzerland, assignor to Zumbach Electronic AG, Orpund, Switzerland

Continuation of Ser. No. 535,857, Dec. 23, 1974, abandoned, which is a division of Ser. No. 176,767, Aug. 27, 1971, Pat. No. 3,868,756. This application May 9, 1977, Ser. No. 795,169
Claims priority, application Germany, Aug. 31, 1970, 2043121
Int. Cl.[2] G03B *27/04*
U.S. Cl. 355—95 **9 Claims**

1. A photocopying apparatus for producing sheets of material each having a number of representations thereon, comprising rigid support means for fixing a sheet, a reproduction device and means for the adjustment of the reproduction device in steps for applying representations on said sheet in different places, said reproduction device having a fluoroscopy bell and lifting means for lifting it transversely off said sheet, and on the underside of which an original drawing or transparency of a representation can be fitted, said fluoroscopy bell including a source of illumination for illuminating said drawing or transparency, and the fluoroscopy bell being connected to a carriage by suspension means substantially rigid in a direction parallel to said sheet but elastic in a direction transversely to said sheet, a loose connection between a portion of said lifting means and said fluoroscopy bell allowing free alignment of the



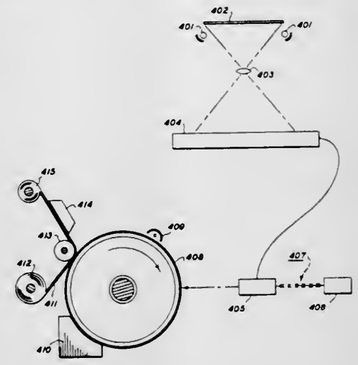
fluoroscopy bell to said sheet and support means respectively if the fluoroscopy bell rests on said sheet and support means respectively, such that the bottom portion of the fluoroscopy bell may closely be applied against said sheet disposed below it but the location of said fluoroscopy bell on said sheet being substantially rigidly determined by said suspension means.

4,094,606

XEROGRAPHIC SYSTEM EMPLOYING WAVEGUIDE ADDRESSING AND MODULATING APPARATUS

Don L. Camphausen, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 26, 1976, Ser. No. 745,276
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—3 R **4 Claims**



1. An imaging system for producing an image responsive to optical input from an original image, the system comprising:

(a) a light sensitive imaging surface;

(b) a plurality of individual optical waveguides having light propagating therethrough and impinging said surface, the waveguides being formed from a material which modulates the propagating light responsive to an electric field,

(c) a means to modulate the propagating light in the individual waveguides which comprises a common electrode adjacent to the waveguides, a charge-coupled device positioned to intersect the individual waveguides, the charge-coupled device including an individual electrode adjacent each waveguide opposite the common electrode, and a control means to optically scan an original and to cause the charge-coupled device to place a charge at selected ones of the individual electrodes responsive to non-image areas of the original so as to establish an elec-

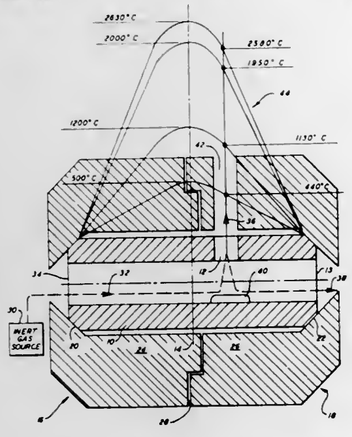
tric field between each of the selected ones of the individual electrodes and the common electrode.

4,094,607

APPARATUS FOR FLAMELESS ATOMIZATION OF A SAMPLE FOR ATOMIC ABSORPTION ANALYSIS

Rolf Gunther Arnold Tamm, Salem, Germany, assignor to Bodenseewerk Perkin-Elmer & Co., GmbH, Uberlingen, Germany

Filed Mar. 21, 1977, Ser. No. 779,559
Claims priority, application Germany, Mar. 27, 1976, 2613196
Int. Cl.² G01J *3/30*; G01N *21/16*
U.S. Cl. 356—85 **6 Claims**



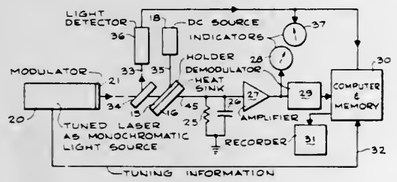
1. Apparatus for flamesless atomization of a sample for atomic absorption analysis comprising:
a sample tube of electrically conductive material, said sample tube having a transverse bore offset axially towards one end of the tube with respect to the transverse central plane;
electrode means including portions in electrical contact with said sample tube at spaced locations for passing an electrical current through the tube to cause heating thereof; and
means for generating an inert gas flow inwardly from the end opposite said one end of the sample tube and outwardly through said transverse bore.

4,094,608

SPECTROMETER OF THE ELECTRO-OPTO-ACOUSTIC TYPE WITH CAPACITOR-TYPE DETECTION

Robert A. Young, Chatsworth, Calif., assignor to Xonics, Inc., Van Nuys, Calif.

Filed Oct. 14, 1976, Ser. No. 732,309
Int. Cl.² G01J *3/42*; G01N *21/06*; G01R *27/26*
U.S. Cl. 356—97 **35 Claims**



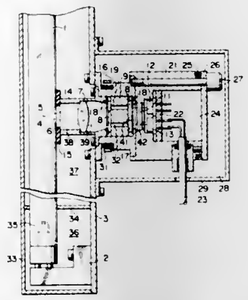
23. A method of analyzing a sample including the steps of:
collecting the sample in a sample carrier;
providing a conducting backing sheet for one surface of the sample carrier;
after collection of the sample providing an electrical potential on a conducting layer at the opposite surface of the sample carrier;
directing a beam of radiation onto the sample to cyclically heat the sample and vary the spacing between the electrical potential and the backing sheet; and
producing an ac signal varying with the variation in spacing.

4,094,609

HIGH SENSITIVITY ABSORPTIOMETER

Yoshio Fujii; Mitsuo Shimada, both of Katsuta, and Sadabumi Ohnuma, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 11, 1977, Ser. No. 767,888
Claims priority, application Japan, Feb. 19, 1976, 51-17423
Int. Cl.² G01N *21/22*
U.S. Cl. 356—201 **18 Claims**



1. A high sensitivity absorptiometer comprising a light source lamp with an inevitable heat generation, sample containing means through which light from said light source lamp transmits, detecting means for detecting the light transmitted through said sample accommodating means, and a chamber formed by at least a surface portion of said light source lamp and an enclosing wall member fitted tightly to said surface so that said chamber is inhibited from fluid communication with the exterior, wherein said light emitted from said light source lamp and directed to said sample containing means is caused to pass through said chamber

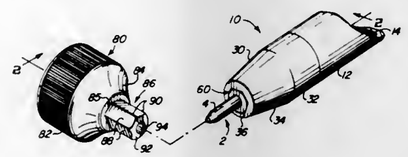
---

4,094,610

PEN LOCK APPARATUS

Wesley H. Larson, P.O. Box 224, Scottsdale, Ariz. 85252

Filed Feb. 3, 1977, Ser. No. 765,378
Int. Cl.² B43K *29/00*
U.S. Cl. 401—195 **5 Claims**



1. Pen lock apparatus, comprising in combination:
a barrel for receiving a spring biased pen cartridge, including
a first bore in the barrel in which the cartridge is disposed,
a first shoulder at one end of the barrel, and
an internally threaded portion in the first bore adjacent the shoulder;
a tip secured to the barrel, including
first bore means,
a second shoulder in the first bore means,
an externally threaded portion for matingly engaging the internally threaded portion of the first bore of the barrel, and

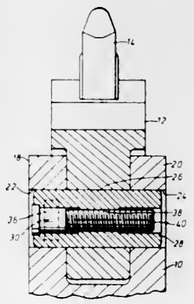
a third shoulder adjacent the externally threaded portion and disposed against the first shoulder of the barrel when the tip is secured to the barrel;
insert means movably disposed in the first bore means of the tip, including
a fourth shoulder disposed against the second shoulder of the first bore means of the tip,
second bore means for receiving the spring biased cartridge, including a fifth shoulder in the second bore means against which a portion of the spring biased cartridge is disposed; and
a wrench for locking and unlocking the tip from the barrel, including
a cylindrical portion for grasping by a user,
key means secured to the cylindrical portion and insertable into the first bore means of the tip to engage and disengage the threaded portions of barrel and tip, and
third bore means for receiving a portion of the pen cartridge.

4,094,611

SECURING MEANS FOR MACHINE PARTS

John A. Harper, High Wycombe, and Terence V. Williams, Marlow, both of England, assignors to Austin Hoy and Company, Ltd.

Filed Mar. 25, 1977, Ser. No. 781,353
Claims priority, application United Kingdom, Jan. 28, 1977, 3694/77
Int. Cl.² F16B *21/00*
U.S. Cl. 403—14 **6 Claims**



1. Means for securing together a first, U-shaped member and a second member received within the first member, comprising registering bores in the legs of the first member, a bore in the second member positionable in registration with and of equal cross section to the bores in the first member, at least one recess formed in one of said members to extend transversely from the bore therein, a cross pin having a cross section corresponding with said bores and being of a length equal to or less than the overall length of said bores in registration, the cross pin being hollow and provided on part of its internal surface with a screw thread, the cross pin also having a transverse bore extending from its internal to its external surface and adapted for positioning opposite said recess, and a locking pin in frictional force fit engagement with said transverse bore and seated below the external periphery of said cross pin and drivable along the transverse bore to extend into the recess.

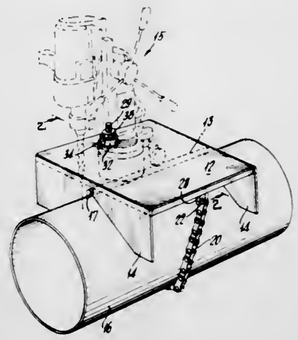
4,094,612

TOOL MOUNTING APPARATUS

Adrian H. Krieg, Yorktown Heights, N.Y., assignor to Widder Corporation, Mamaroneck, N.Y.

Filed Jul. 29, 1976, Ser. No. 709,890
Int. Cl.² B23B *39/00, 47/00, 49/00*
U.S. Cl. 408—92 **7 Claims**

1. Apparatus for supporting a tool relative to a work piece having a curved or irregular circumferential surface, comprising a flat mounting plate having a pair of side legs respectively depending from first and second opposite sides of said plate, each of said side legs having a substantially identical V-shaped notch adapted to receive said work piece, the apex of each notch being adjacent to and positioned substantially at the center of the mounting plate, and means attaching said plate to said work piece comprising a flexible fastener, first means



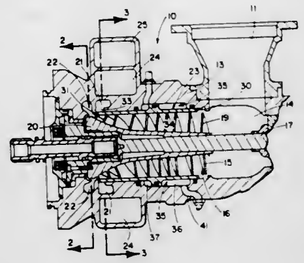
attaching one end of said fastener to a third side of said plate and second means depending from a fourth side of said plate and adapted to engage the other end of said fastener, said second means including an adjustable device for pulling the said other end of said fastener toward the bottom of said plate to engage the edges of the notches into tight gripping relationship with the surface of said work piece.

4,094,613

VARIABLE OUTPUT CENTRIFUGAL PUMP

Robert L. Bracken, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

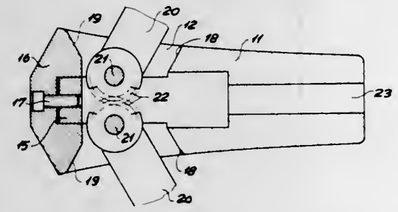
Filed May 7, 1976, Ser. No. 684,335
Int. Cl.² F01B *25/04*; F01D *17/08*; F04D *29/44*
U.S. Cl. 415—17 **5 Claims**



1. A centrifugal pump for receiving fluid at one flow rate and pressure head and discharging the fluid at an increased pressure head including, a housing, a shaft journaled for rotation within housing, an impeller within said housing and mounted on said shaft for rotation therewith, an inlet chamber within said housing for receiving fluid into said housing and directing said fluid to one end of said impeller, a first diffuser continuously communicating with the other end portion of said impeller to receive fluid discharged from said impeller, a second diffuser axially spaced from said first diffuser for selective separate communication with said other end portion of said impeller, said diffusers each being fixed to handle fluid at a specific flow rate for producing a specific pressure head, an outlet passageway between said impeller and said second diffuser, a moveable member telescoped into said housing for movement between an extended position closing off said pas-

sageway and a retracted position permitting fluid to flow from said impeller into said second diffuser, and means for biasing said member toward one of its positions including a pressure chamber communicating with said member, means for selectively pressurizing said chamber for moving said member toward said one position, said means for selectively pressurizing including a passage communicating with one of said inlet chamber and said fluid discharged from said chamber.

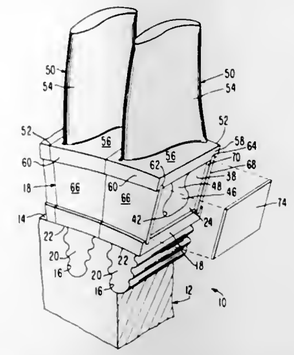
4,094,614
PROPELLER
Torben Munk, Virum, and Nils Oluf Ehrenskjold, Kolding, both of Denmark, assignors to Gori-Vaerk A/S, Kolding, Denmark
Filed Nov. 19, 1975, Ser. No. 633,417
Claims priority, application Denmark, Nov. 20, 1974, 6023/74
Int. Cl.² B63H *1/20*
U.S. Cl. 416—140 **2 Claims**



1. A propeller such as a ship's propeller or screw and comprising at least one propeller blade, a propeller drive shaft, means for mounting said propeller blade on the propeller drive shaft comprising a hub having a free end secured on the propeller drive shaft, said hub being provided with a central bore in the free end thereof, means defining a pivot axis mounted within said hub and perpendicular to the axis of the drive shaft comprising a pivot shaft, means pivotally mounting said blade about the inner end of the blade freely about the pivot shaft, said pivot shaft intersecting the longitudinal direction of the blade, abutment means for the blade for limiting the free pivotal movement of the blade between two extreme positions at either side of the position in which the propeller blade extends substantially perpendicular to the axis of the shaft, said abutment means comprising a pair of abutment members, said abutment members being secured in said bore to serve as abutments for the blades, and means for adjusting one of said abutment members comprising a clasp nut mounted within said central bore, securing means for removably securing one of said abutment members to said clasp nut, said abutment member secured to said clasp nut having an abutment face for limiting the free pivotal movement of the blade.

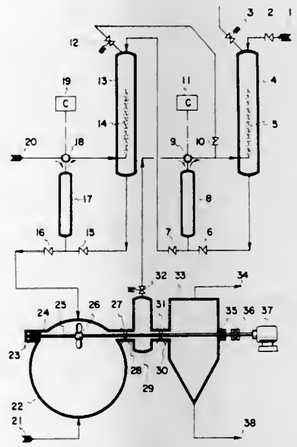
4,094,615
BLADE ATTACHMENT STRUCTURE FOR GAS TURBINE ROTOR
Robert G. Glenn, Huntington Valley, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.
Filed Dec. 27, 1976, Ser. No. 754,725
Int. Cl.² F01D *5/30*
U.S. Cl. 416—215 **10 Claims**

1. In a turbine rotor: a rotor disk having an outer periphery provided with a number of spaced, axially extending grooves; a plurality of ceramic turbine blades spaced outwardly from said outer periphery; and an attachment piece for each blade, respectively, each attachment piece having a root received within a respective groove of the rotor disk, each attachment piece extending outwardly from said outer periphery for coupling the blades thereto, and having an outer peripheral groove extending transversely to the corresponding groove of the rotor disk, each blade having a root received within the outer peripheral groove of the corresponding attachment piece, each pair of adjacent attachment pieces being in substantial abut-



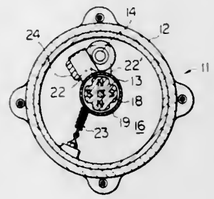
ment with each other to prevent gases in the vicinity of said blades from contacting the rotor disk.

4,094,616
STEAM-HEATER-PUMP
Hyok Sang Lew, 7890 Oak St., Arvada, Colo. 80005
Filed Jan. 27, 1977, Ser. No. 763,029
Int. Cl.² F04F *1/10, 1/12, 1/14, 1/18*
U.S. Cl. 417—121 **5 Claims**



1. A device which heats and pumps a liquid or slurry, said device comprising:
a. an uprightly disposed pumping cylinder,
b. a heating tower disposed at a higher elevation than said pumping cylinder, said heating tower including, a cylindrical container and conduits for injecting and distributing pressurized steam into a liquid or slurry contained in said cylindrical container,
c. a first pipe originating from the bottom of said heating tower and terminating at the bottom of said pumping cylinder, said first pipe having a check valve; whereby, a liquid or slurry in said heating tower may flow into said pumping cylinder, but not in reverse direction,
d. a second pipe with a check valve originating from the bottom of said pumping cylinder, whereby, a liquid or slurry in said pumping cylinder may be pushed out through said second pipe, but prohibited to flow back into said pumping cylinder,
e. a three port valve with first port connected to a pressurized steam supply line, second port connected to the top of said pumping cylinder and third port connected to said conduits for injecting and distributing steam into said cylindrical container of said heating tower, and
f. a valve controller operating said three port valve in such a way that said third port becomes shut when said first port is open to said second port, and said first port becomes shut when said second port is open to said third port; whereby, firstly the pressurized steam directed into said pumping cylinder pumps out a liquid or slurry in pumping cylinder through said second pipe and secondly, when the steam directed into said pumping cylinder is bled into said heating tower, a liquid or slurry in said heating tower heated by condensing steam flows into said pumping cylinder by the gravity force, said heating tower becomes refilled with a fresh liquid or slurry when the steam pressure in said heating tower vanishes as the result of condensation during the period of pumping of the liquid or slurry out of said pumping cylinder by said steam injection.

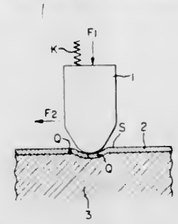
4,094,617
AUTOMOTIVE AIR CONDITIONER COMPRESSOR
Tsunenori Shibuya, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan
Filed Nov. 3, 1976, Ser. No. 738,203
Claims priority, application Japan, Nov. 10, 1975, 50/152645
Int. Cl.² F04R *49/00*; F25B *27/00*
U.S. Cl. 417—295 **9 Claims**



1. A compressor comprising:
a housing provided with an inlet and an outlet;
a rotor operatively rotatably supported within the housing to displace fluid from the inlet to the outlet upon rotation thereof; and
variable occluder means connected to the rotor and operative to occlude the inlet to an extent corresponding to a rotational speed of the rotor, said occluder means comprising a drive member fixed to the rotor, a driven member yieldably connected to the drive member, biasing means urging the driven member in a direction opposite to a direction of rotation of the rotor and an occluder member fixed to the driven member and movable thereby into variable occluding relation with the inlet.

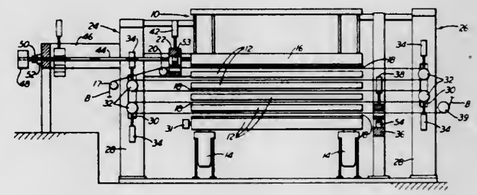
4,094,618
ROTARY PISTON ENGINES
Kuniaki Kakui, Hiroshima; Toshihiko Shigeta, and Koso Koike, both of Kure, all of Japan, assignors to Toyo Kogyo Co., Ltd., Japan
Filed Mar. 30, 1977, Ser. No. 782,905
Claims priority, application Japan, Mar. 31, 1976, 51-36385
Int. Cl.² F01C *21/00*
U.S. Cl. 418—178 **6 Claims**

1. Rotary piston engine comprising a casing which includes a rotor housing having a trochoidal inner wall and a pair of side housings secured to the opposite sides of the rotor housing to define a cavity therein, and a substantially polygonal rotor disposed in said cavity for rotation with apex portions in sliding engagement with the inner wall of the rotor housing, said rotor being provided at each apex portion with an apex seal of iron-based material which includes 50 to 75% in volume of carbide at least in a sliding surface which is adapted to be brought into sliding engagement with the inner wall of the rotor housing, said apex seal having a hardness of 700 to 900 in Vickers' scale at the sliding surface, said rotor housing including a base which is made of an iron-based material having a hardness of not less than 105 in Vickers' scale and provided at its inner wall with a chromium-plated layer having a hardness not less than 850 in Vickers' scale, the hardness of the rotor housing base and that of the chromium-plated layer being in a region defined in a chart having an ordinate representing the



hardness of the rotor housing base and an abscissa representing the hardness of the chromium-plated layer by a line connecting a first point which corresponds to the base hardness of 180 and the plated layer hardness of 850 and a second point which corresponds to the base hardness of 125 and the plated layer hardness of 950, and also by a further line connecting said second point and a third point which corresponds to the base hardness of 105 and the chromium plated layer hardness of 1200, all in Vickers' scale, said region being at a side of the lines wherein the values of the hardness are greater than those on the lines.

4,094,619
APPARATUS FOR STRETCHING AND STRIPPING BELTING IN A MULTIPLATEN PRESS
David Weinschenk George, New Castle, Pa., assignor to Wean United, Inc., Pittsburgh, Pa.
Filed Aug. 20, 1976, Ser. No. 716,329
Int. Cl.² B29H *7/22*
U.S. Cl. 425—135 **7 Claims**



1. In combination with a three or more movable platen press for processing belting, fed in a continuous manner through openings formed by the platens of the press and having alternate belting portions arranged between said openings, entry and delivery tensioning devices for the belting comprising:
entry clamping means arranged adjacent the entry side of said press,
delivery clamping means arranged adjacent the delivery side of said press,
means for moving said entry clamping means to effect a clamping of a portion of the belting fed into said entry clamping means and for moving said entry clamping means,
said entry and delivery tensioning devices arranged on the entry and delivery sides of the press and including belting supporting means for receiving different portions of the belting from different openings of the press during said

feeding and for supporting the belting during said tensioning,

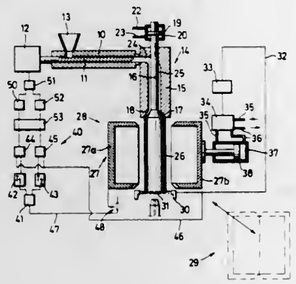
means for mounting said belting supporting means relative to said press so as to only be movable in a direction parallel to the movement of said press platens, and

means for selectively moving said belting supporting means in said direction parallel to said movement of said press platens, in concert with said press platens and independently of said press platens.

4,094,620
APPARATUS FOR THE MANUFACTURE OF HOLLOW BODIES OF A THERMOPLASTIC BY BLOW-MOULDING

Werner Daubenbüschel, Bensberg-Refrath; Alfred Thomas, Dambroich; Dieter Hess, Swistal-Morenhoven, and Hans-Rüdiger Augst, Windeck, all of Germany, assignors to Kautex Maschinenbau GmbH, Bonn-Holzlar, Germany

Filed Oct. 1, 1976, Ser. No. 728,642
Claims priority, application Germany, Oct. 3, 1975, 2544171
Int. Cl.² B29D *23/04*
U.S. Cl. 425—140 **5 Claims**



1. Blow-moulding apparatus for the manufacture of hollow bodies from a thermoplastic material, said apparatus comprising, in combination:

(a) a screw-extruder for forming a parison;

(b) a receiving station into which said parison is extruded;

(c) a mould release station spaced from said receiving station;

(d) a blow-mould consisting of at least two openable parts, said blow-mould being movable to and fro between said receiving station and said mould release station, the open blow-mould encompassing the parison in the receiving station;

(e) means for detecting when the length of the parison extruded reaches a given length corresponding to the length of the blow-mould;

(f) control means operable only by said detecting means when the mould is at said receiving station, effective to close the mould parts on the parison;

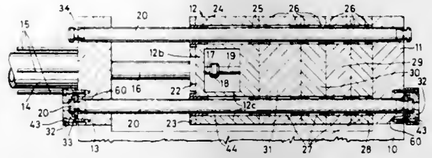
(g) time-dependent open-loop control means effective to control the movement of the blow-mould, whereby it is in the open position in said receiving station before the length of said parison reaches said given length; and

(h) means for controlling the speed of the screw of the screw-extruder with a change of speed proportional to a change of time outside a predetermined range of times at which the parison reaches said given length, whereby the time for each mould cycle remains within said range.

4,094,621
DIE CLOSING UNIT WITH OVERSIZE INJECTION MOLDING DIE

Karl Hehl, Arthur-Hehl-Str. 32, 7298 Lossburg, Germany

Division of Ser. No. 640,531, Dec. 15, 1975, Pat. No. 4,025,264, which is a continuation-in-part of Ser. No. 569,886, Apr. 21, 1975, abandoned. This application May 23, 1977, Ser. No. 799,577
Claims priority, application Germany, Dec. 13, 1974, 2459025
Int. Cl.² B29F *1/00*; B29C *3/02*
U.S. Cl. 425—190 **6 Claims**



1. In a die closing unit of an injection molding machine, defining a movement axis and having a stationary die carrier member and a movable die carrier member with opposing axially oriented mounting faces to which the component parts of a multi-plate injection molding die are removably attachable, which die is thereby closable and openable, as a result of an axial reciprocating movement of the movable die carrier member towards and away from the stationary die carrier member; in such a die closing unit, the combination comprising:

at least two parallel cylindrical tie rods extending between said stationary and movable die carrier members, the rods being transversely spaced apart;

an equal number of tie rod bores in each of the two die carrier members, the bores in one die carrier member forming a guiding engagement with the tie rods, while the bores in the other die carrier member form a seating engagement with end portions of the tie rods, the latter and said other die carrier member defining means for releasably connecting the tie rods to said die carrier member;

a multi-plate injection molding die having at least one stationary die plate attached to the stationary die carrier member, and at least one movable die plate attached to the movable die carrier member, the die plates having such an extent in the transverse or radial sense that they enclose the tie rods, having tie rod bores engaging the latter, so as to be guided and centered on the tie rods; and

means for forcibly retracting the tie rods from the connected die carrier member, after release of said connecting means, for the removal and insertion of die plates.

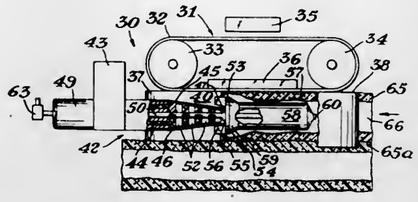
4,094,622
FOAM DEPOSITION APPARATUS

Hubert Stacy Smith, Jr., Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 634,997, Nov. 24, 1975, Pat. No. 4,034,027, which is a continuation of Ser. No. 487,073, Jul. 10, 1974, abandoned, which is a continuation of Ser. No. 302,840, Nov. 1, 1972, abandoned. This application Oct. 15, 1976, Ser. No. 732,626
Int. Cl.² B29D *27/04*
U.S. Cl. 425—224 **6 Claims**

1. In an apparatus for the deposition of hardenable foamable resin in the form of a hollow strip, the apparatus comprising in cooperative combination a foam depositing head, the depositing head comprising a frame, the frame having at least first and second foam restraining means, a drive means operatively associated with said depositing head to advance the depositing head at a desired rate, a means operatively associated with said first and second restraining means to dispense foamable hardenable synthetic resinous material within the first and second restraining means, the dispensing means having a deflecting means to generally radially outwardly direct the hardenable foamable material by centrifugal force, the improvement which comprises

a rotatable mandrel affixed generally adjacent the dispensing means,

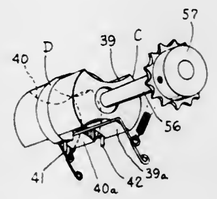


means connected to said mandrel to rotate said mandrel relative to the restraining means, the mandrel being disposed between the first and second restraining means and to contact the hardenable foamable resin during at least the initial portion of its foaming and hardening to thereby form a hollow foamed strip having a passageway therein of generally uniform cross section.

4,094,623
DOUGH DISPENSING AND SUPPORT APPARATUS

Jacob T. Nelson, 105 W. Lee Rd., Taylors, S.C. 29682

Filed Dec. 27, 1976, Ser. No. 754,335
Int. Cl.² A21C *5/00*
U.S. Cl. 425—227 **14 Claims**



1. Dough dispensing apparatus comprising:

a dough containing chamber having a dough dispensing outlet;

rotatable cylindrical molding means carried across said outlet having spaced dough receiving cavities formed therein for receiving a mass of said dough flowing from said chamber and dispensing said dough through said outlet as said dough cavity is rotated;

a stationary disk carried between said space cavities:

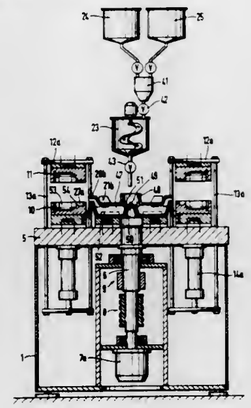
an annular peripheral portion of said disk extending substantially coextensively with a peripheral portion of said cylindrical molding means providing a separator wall between said cavities for separating said dough mass between said dough cavities;

abutment means carried by said disk extending therefrom into engagement with said chamber adjacent said outlet maintaining said disk stationary in relation to said chamber as said cylindrical molding means is rotated.

4,094,624
CENTRIFUGAL CASTING APPARATUS

Richard Halm, Silcherstrasse 54, D 7061 Baltmannsweiler, Germany

Filed Dec. 23, 1976, Ser. No. 753,885
Claims priority, application Germany, Dec. 27, 1975, 2558893
Int. Cl.² B29C *5/04*
U.S. Cl. 425—434 **9 Claims**



1. A centrifugal casting apparatus for producing cast articles from casting resin comprising the combination of

a turntable having an axis of rotation;

means for supporting and rotating said turntable about said axis;

a supply tank on said turntable and rotatable therewith, said supply tank having

a supply chamber adapted to receive and hold a quantity of casting resin before said turntable is rotated,

casting nozzle means for conducting casting resin by centrifugal force out of said supply chamber when said turntable is rotated and for preventing flow of resin out of said chamber when said turntable is at rest,

filler means for receiving casting resin and for conducting said resin into said supply chamber, and

means in said filler means for indicating the degree to which said supply chamber has been filled with resin before the resin is conducted out of said supply chamber;

means for supplying casting resin to said filler means; and

a casting mold on said turntable, said casting mold having means on said casting mold defining an inlet opening directed toward said casting nozzle on said supply chamber; said supply chamber being located on said turntable between said axis of rotation and said casting mold,

said supply chamber having a resin capacity substantially equal to the internal volume of said casting mold.

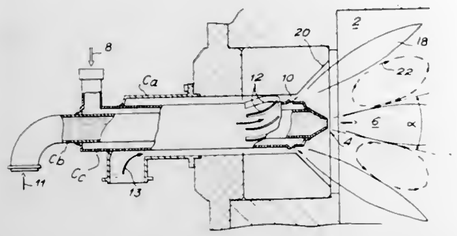
4,094,625
METHOD AND DEVICE FOR EVAPORATION AND THERMAL OXIDATION OF LIQUID EFFLUENTS

Robert Wang, Wissous, and Didier Brun, Saint-Cloud, both of France, assignors to Heurtey Efflutherm, Paris, France

Filed Feb. 13, 1976, Ser. No. 657,898
Claims priority, application France, Feb. 28, 1975, 75 06303; Jul. 2, 1975, 75 20818
Int. Cl.² F23M *3/00*; F23Q *9/00*
U.S. Cl. 431—9 **15 Claims**

1. A method of evaporation and thermal oxidation of liquid effluents in which said effluents are continuously vaporized by a flame, comprising rotating a jet of gaseous oxidizer, introducing a fluid fuel into the jet of oxidizer, igniting and introducing the oxidizer-fuel mixture into a chamber in a rotating out-

wardly diversing annular jet and introducing a jet of atomized liquid effluent into said chamber with said jet of atomized liquid effluent being concentric to and geometrically distinct in



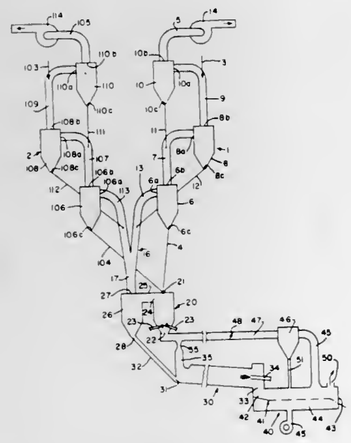
the vicinity of the chamber inlet from the rotating jet of oxidizer-fuel mixture whereby the combustible substances of said liquid effluents are evaporated and burned by the jet of ignited mixture within the chamber.

4,094,626

APPARATUS FOR PRODUCING CEMENT CLINKER

Donald S. Boyhont, Nazareth, and Jay Warshawsky, Allentown, both of Pa., assignors to Fuller Company, Catasauqua, Pa.

Filed Nov. 23, 1976, Ser. No. 744,364
Int. Cl.² F27B *15/00*
U.S. Cl. 432—58 **11 Claims**



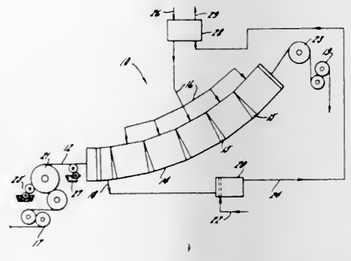
1. Apparatus for burning cement raw meal to produce cement clinker comprising:
- a pair of parallel suspension preheaters, each including means for supplying hot gases to the bottom thereof for passage upwardly through the suspension preheater and means for supplying cement raw meal to the top thereof for passage downwardly through the suspension preheater generally countercurrent to the flow of hot gas whereby the cement raw meal is heated by the hot gas;
- a single calcining furnace having an inlet for combustion gas, an inlet for heated cement raw meal, means for producing combustion within the calcining furnace for at least partially calcining the cement raw meal and an outlet for spent calcining furnace combustion gas and the at least partially calcined cement raw meal;
- a single separator flow connected to the outlet of the calcining furnace for separating the at least partially calcined cement raw meal from the spent calcining furnace combustion gas;
- means for supplying the separated spent calcining furnace combustion gas from said single separator to both of said parallel suspension preheaters to thereby provide the means for supplying hot gases to the bottom of each suspension preheater;
- a cement clinkering furnace having an inlet for at least partially calcined raw material, an outlet for cement clinker, means for supplying combustion gas thereto, means for producing combustion within the cement clinkering furnace and an outlet for spent clinkering furnace combustion gas;
- means for supplying at least partially calcined cement raw meal from said single separator to the inlet for at least partially calcined cement raw meal of said clinkering furnace; and
- means for supplying the spent clinkering furnace combustion gas from said clinkering furnace to said calcining furnace.

4,094,627

OVEN SYSTEM

Clare L. Milton, Jr., 9325 Snowden River Pkwy., Columbia, Md. 21046

Continuation of Ser. No. 521,525, Nov. 6, 1974, abandoned, and a continuation-in-part of Ser. No. 464,185, Apr. 25, 1974, abandoned. This application Sep. 15, 1975, Ser. No. 613,641
Int. Cl.² F27B *9/28*; F23J *15/00*
U.S. Cl. 432—59 **28 Claims**



21. In an elongated oven having openings at both ends for the introduction and removal of substantially flat sheet material conveyed therethrough, a hot air supply system for introducing hot air into said oven and an exhaust system for exhausting hot air therefrom, a sealing system for maintaining the amount of room air drawn by the exhaust system into said oven at a predetermined level, comprising, in combination, a seal chamber located adjacent an end of the oven, an air supply system for forcing air into said seal chamber through curtain air jets located within said chamber and disposed on opposite sides of the sheet material and extending laterally thereacross, said air jets containing inclined discharge openings to provide, both above and below said sheet, substantially identical curtain-like air streams directed toward said sheet in the direction opposite to the travel thereof, an exhaust means opening through the top and bottom of said chamber for exhausting from said chamber air forced therein through said jet means, and means for regulating the amount of air forced through said jets to provide control of leakage into the oven.

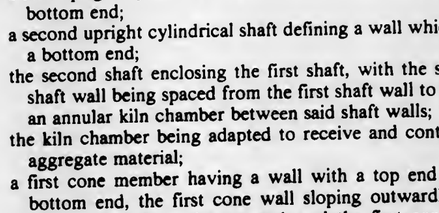
4,094,628

ROTARY DRUM

Poul Rasmussen, and Helge Carl Christian Kartman, both of Copenhagen, Denmark, assignors to F. L. Smith & Co., Cresskill, N.J.

Filed Jan. 21, 1976, Ser. No. 650,920
Claims priority, application United Kingdom, Jan. 22, 1975, 2842/75
Int. Cl.² F27D *15/02*; F27B *7/14*
U.S. Cl. 432—80 **33 Claims**

1. A rotary drum for treating materials comprising:
- a drum shell having a generally tubular configuration wall;
- one or more material treating members, each comprising a unitary member having a circumferential portion which forms a portion of said wall and a generally radial portin integral therewith and projecting radially inwardly or outwardly from said wall; and



means secured to said radial portion for supporting a cooler tube or for facilitating the direct advancement of said materials.

4,094,629

VERTICAL KILN APPARATUS

Eddie Lee Greenawalt, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 22, 1977, Ser. No. 770,861
Int. Cl.² F27B *9/14*; F27D *3/00*
U.S. Cl. 432—98 **8 Claims**

1. A vertical kiln apparatus for firing an aggregate material which comprises:
- a first upright cylindrical shaft defining a wall which has a bottom end;
- a second upright cylindrical shaft defining a wall which has a bottom end;
- the second shaft enclosing the first shaft, with the second shaft wall being spaced from the first shaft wall to define an annular kiln chamber between said shaft walls;
- the kiln chamber being adapted to receive and contain an aggregate material;
- a first cone member having a wall with a top end and a bottom end, the first cone wall sloping outwardly and downwardly from the top end, and the first cone wall being joined at its top end to the bottom end of the first shaft wall;
- a second cone member having a wall with a top end and a bottom end, the second cone wall sloping inwardly and downwardly from the top end, and the second cone wall being joined at its top end to the bottom end of the second shaft wall;
- the bottom end of the second cone wall being spaced from the first cone wall to define an outlet for the annular kiln chamber;
- a plate member fastened along its upper surface to the bottom end of the wall of the first cone member, the upper surface of said plate extending beyond the outer edge of the bottom end of said first cone wall, the extended surface defining a shelf member below the kiln chamber outlet, the shelf member being adapted to support the aggregate material during a downward movement of the aggregate material from the kiln chamber, through said outlet, and onto the shelf member;
- a support member fastened to the wall of the second cone member, and positioned above the shelf member;
- a driven gear supported by said support member, and positioned above the shelf member;
- a driver gear which engages the driven gear;
- a drive means operatively connected to the driver gear;
- a means fastened to the driven gear, positioned above the shelf member, and adapted to travel above the shelf member in the same direction as the driven gear to continuously remove the downwardly moving aggregate material from the shelf member; and
- a collection means positioned below the shelf member, said collection means being adapted to collect the aggregate material removed from the shelf member.

4,094,630

WELDING FLUX CURING APPARATUS

James Franklin Turner, Signal Mountain, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Sep. 8, 1976, Ser. No. 721,633
Int. Cl.² F27B *9/14*
U.S. Cl. 432—134 **6 Claims**

1. An apparatus for curing bonded welding flux comprising:
- a. an upper inclined plane;
- b. at least one intermediate inclined plane;
- c. a lower inclined plane, each of said planes inclined at an angle less than the angle of repose of material being cured;
- d. a support supporting said inclined planes with the lower end of said upper plane over an upper portion of the intermediate plane and the lower end of said intermediate plane over the upperportion of said lower plane;
- e. means for vibrating said inclined planes;
- f. means for feeding uncured flux to the upper portion of said upper inclined plane, whereby the flux traverses said inclined planes;
- g. heating means for radiantly heating the flux as it traverses throughout a substantial portion of each of said inclined planes, said heating means being above and parallel to each of said inclined planes; and
- h. side plates joining each of said inclined planes with its respective heating means, whereby a flow passage is

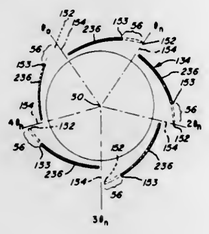
formed therebetween, the flow passage being substantially unrestricted throughout its length.

4,094,631

MULTIPLE OUTLET BLOWER SCROLL FOR AN INDUSTRIAL OVEN

Douglas V. Grieve, 212 Hazelwood Dr., Lindenhurst, Ill. 60046

Continuation of Ser. No. 649,406, Jan. 15, 1976, abandoned. This application Mar. 28, 1977, Ser. No. 781,680
Int. Cl.[2] F27B *3/22*
U.S. Cl. 432—176 **2 Claims**



1. An improved industrial oven of the type including a housing defining a work chamber, a duct system including a plurality of passages within said chamber, a plurality of heating elements mounted within said passages, a blower wheel mounted within said chamber and communicating with said duct system for forcing air through said passages so as to circulate hot air through said chamber, wherein the improvement comprises:

a blower scroll mounted around said blower wheel;

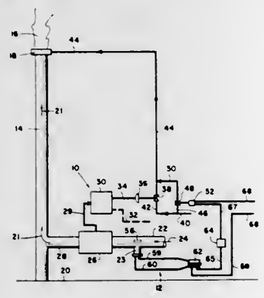
said scroll having a plurality of radial outlets, each said outlet being aligned with a single passage, to allow air to pass therethrough into said passages, said scroll defined by a plurality of short, curved circumferentially extending individual plates equal in number to the number of said outlets, said plates surrounding said wheel and of a size such that the circumferential face area of said wheel surrounded by each of said plates is the same, said plates being of a short length such that circumferential portions of said wheel are uncovered.

4,094,632

ACCELERATED RESPONSE FOR DELIVERY OF SMOKE SUPPRESSANT TO FLARES

Robert D. Reed, and Vern A. Street, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Filed Feb. 7, 1977, Ser. No. 766,133
Int. Cl.[2] F23D *13/20*
U.S. Cl. 431—202 **8 Claims**



1. In a flare system for the smokeless burning in the atmosphere, of suddenly released flows of waste gases, said system including;

(a) conventional first flow sensing means in the conduit supplying said waste gases to said stack;

(b) pneumatic fluid control means responsive to said flow sensing means;

(c) pneumatically controlled first valve means in a steam line for controlling the flow of steam as a smoke suppressant to the flame at the top of the flare stack; said pneumatically controlled first valve means responsive to said pneumatic fluid control means;

the improvement comprising;

(d) rapid-acting second flow sensing means in said conduit supplying said waste gases;

(e) first and second pressure lines from said second flow sensing means connected to a fast-acting electrical pressure switch;

(f) said pressure switch controlling a solenoid operated second valve connected into said steam line in parallel with said first valve to supply steam to said flare stack, and

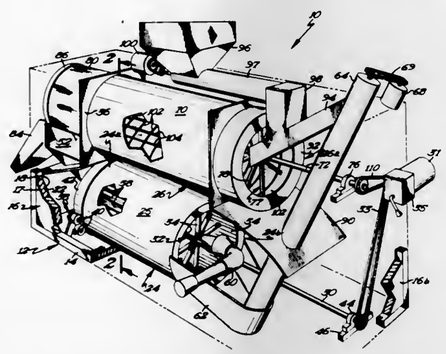
(g) time delay means for opening the electrical circuit to said solenoid operated valve after it has been operated for a selected time interval.

4,094,633

GRANULAR BED ROASTER CONSTRUCTION

Don G. Peterson, Frisco, and Judson M. Harper, Fort Collins, both of Colo., assignors to Food Processes, Inc., Saginaw, Mich.

Filed Jun. 14, 1976, Ser. No. 695,826
Int. Cl.[2] F27B *7/14, 15/00*
U.S. Cl. 432—118 **7 Claims**



1. A granular bed roasting apparatus usable with heat transferring granular material for heating a product, said apparatus comprising:

a rotatable granular material heating bin adapted to contain only heat transferring granular material, said heating bin comprising an internally defined granular material heating chamber and a plurality of granular material lifting flights disposed within said heating chamber and extending inwardly therefrom from said bin a predetermined distance for continuously picking up and dropping granular material through said granular material heating chamber in response to rotation of said bin;

heating means associated with said heating bin for directly heating the interior of said heating chamber and applied directly to granular heat transfer material dropped by said lifting flights and falling within said chamber;

a rotatable product roaster bin separate from said heater bin for heating a product;

means for inputting heated granular material outputted from said heating bin into said roaster bin;

means for inputting a raw product to be heated by said apparatus into said roaster bin thereby commingling said product with said granular heat transfer material;

separation means adapted to receive material outputted from said product roaster bin for separating granular heat transfer material from product;

recycling means for returning and inputting granular materials separated from product to said rotatable heating bin; and

means for controllably rotating said heating bin and said roaster bin.

4,094,634

ANIONIC AND NONIONIC EMULSIFIED OPTICAL BRIGHTENER SUSPENSION WITH A HYDROTROPIC AGENT

Carl Becker, Basel; Jacques Wegmann, Bettingen, and Andres Schaub, Biel-Benken, all of Switzerland, assignors to Ciba Geigy AG, Basel, Switzerland

Division of Ser. No. 574,042, May 2, 1975, Pat. No. 4,042,320, which is a continuation-in-part of Ser. No. 506,775, Sep. 17, 1974, Pat. No. 3,997,828. This application May 11, 1977, Ser. No. 797,374

Claims priority, application Switzerland, May 9, 1974, 6374/74; Sep. 2, 1974, 11896/74; Dec. 18, 1974, 16894/74

Int. Cl.[2] D06L *3/12*; D06P *1/44*

U.S. Cl. 8—1 W **12 Claims**

1. An aqueous stable, highly concentrated finely dispersed flowable optical brightener composition comprising at least 10% by weight of water, at least 30% by weight of at least one finely dispersed optical brightener insoluble to difficultly soluble in water having a particle size smaller than 10μ and a mixture consisting of at most 10% by weight of an anion-active dispersing agent, at most 5% by weight of a nonionic dispersing agent and at most 35% by weight of a hydrotropic agent capable of converting the optical brightener into a stable deflocculated form.

4,094,635

META-AMINOPHENOL SULFONAMIDES AS COUPLERS IN HAIR DYE COMPOSITIONS

Andrée Bugaut, Boulogne, and Chantal S. Fourcadier, Paris, both of France, assignors to L'Oreal, Paris, France

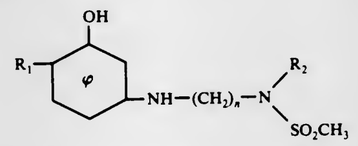
Filed Sep. 13, 1976, Ser. No. 722,610

Claims priority, application France, Sep. 9, 1976, 76 27125

Int. Cl.[2] A61K *7/12*; C07C *143/72*

U.S. Cl. 8—11 **11 Claims**

1. A dyeing composition for keratinic fibers or for human hair, containing an aqueous solution of at least one oxidation base which contains as a coupler, at least one compound of the formula



(I)

in which R_1 represents an alkyl having 1 to 4 carbon atoms, R_2 represents hydrogen or an alkyl having 1 to 4 carbon atoms, and n is a number having a value of 2 or 3.

4,094,636

PROCESS FOR DYEING CELLULOSE FIBERS WITH WATER-INSOLUBLE AZO DYESTUFFS PRODUCED ON THE FIBER

Hans-Ulrich von der Eltz, Frankfurt am Main, Germany, assignor to Hoechst Aktiengeselischaft, Frankfurt (Main), Germany

Filed Jan. 28, 1977, Ser. No. 763,557

Claims priority, application Germany, Jan. 30, 1976, 2603444

Int. Cl.[2] C09B *27/00*; D06P *3/12*

U.S. Cl. 8—46 **2 Claims**

1. In a process for dyeing or printing cellulose fibers with azo dyestuffs produced on the fiber by treating with an aqueous liquor or printing paste containing an azoic coupling component, a solution or dispersion of a diazotizable primary aromatic amine, an alkaline agent and sodium nitrite with subsequent acid treatment, the improvement comprising using a diazotizable primary aromatic amine which contains a carboxylic acid ester or amide group, and which does not contain any group rendering soluble in water the azo dyestuff formed.

4,094,637

PROCESS FOR THE PRINTING WITH DEVELOPING DYES

Erich Feess, Hofheim, Taunus; Willy Gronen, Kelkheim, Taunus, and Hasso Hertel, Muhlheim (Main), all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 17, 1975, Ser. No. 623,338

Claims priority, application Germany, Oct. 19, 1974, 2449782; Mar. 17, 1975, 2511537

Int. Cl.[2] C09B *27/00*; D06P *1/02*

U.S. Cl. 8—71 **10 Claims**

1. A process for printing cellulosic textile material with a printing paste containing

a. the alkaline solution of a coupling component capable of forming developing dyes,

b. the dispersion of a diazotble amine capable of forming developing dyes, said amine having an average particle size of 0.002 mm or less,

c. sodium nitrite and

d. a thickener,

which process comprises printing said textile material with said printing paste, drying said printed material, developing the dyestuff on the fiber either by acidic steaming or by adding a dilute aqueous solution of an organic acid of which at least 30 g are soluble in 100 g water, having at 20° C a pK value of 4 to 2.5 and at normal pressure a boiling point above 175° C, and steaming said material with neutral steam or immediately drying it.

4,094,638

APPARATUS FOR THE CONTINUOUS THERMAL STERILIZATION OF PACKING

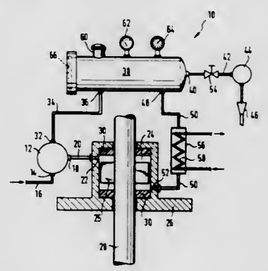
Erich Todtenhaupt; Wolfgang Müller, both of Schopfheim; Hans Schupper, Zell, and Walter Geng, Schopfheim, all of Germany, assignors to Ekato-Werk, Schopfheim, Germany

Filed Nov. 8, 1976, Ser. No. 740,017

Claims priority, application Germany, Dec. 15, 1975, 2556467

Int. Cl.[2] A61L *1/00*; F16J *15/00*; F16K *49/00*

U.S. Cl. 21—61 **7 Claims**



1. An apparatus for the continuous thermal sterilization of packings on rotating and/or reciprocating shafts, comprising:

a steam ejector means for supplying steam as a source of heat for said thermal sterilization of said packings, said steam ejector means in communication with a mixing tank means,

a mixing tank means for mixing water with said steam to form hot water for said thermal sterilization of said packings,

means for supplying water to said mixing tank means in communication with said mixing tank means,

an outlet means in communication with said mixing tank means at a level effective to maintain at least a portion of said water in said mixing tank means,

a temperature sensing valve means in communication with said outlet means for measuring the temperature of said water in said mixing tank means and for releasing water from said apparatus when the water temperature in said

mixing tank means falls below a pre-determined value, thereby permitting additional steam to enter the apparatus and increase the water temperature,

a chamber means in communication with said mixing tank means and also in communication with said steam ejector means containing packings for sealing a rotating and/or reciprocating shaft, thereby permitting said hot water to effect thermal sterilization of said packings, and

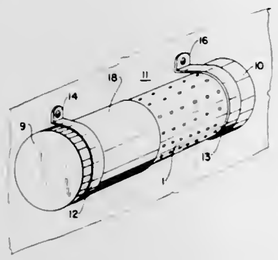
a pump means in communication with said chamber means for circulating said hot water in a closed circuit through said steam ejector means, said mixing tank means, said chamber means and again through said steam ejector means.

4,094,639

DEODORIZER

Ronald J. McMillan, Fort Lauderdale, Fla., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 15, 1977, Ser. No. 787,775
Int. Cl.[2] A61L *3/00, 9/01, 9/04*
U.S. Cl. 21—74 R **1 Claim**



1. A deodorizer, comprising

an elongated perforated cylindrical housing sleeve having spaced opposite first and second ends with a partition at the center thereof equidistant from the ends dividing the housing sleeve into a pair of separate equally dimensioned chambers;

a pair of deodorizing units mounted in the housing sleeve, each in a corresponding one of the chambers thereof;

a pair of cover caps each threadedly coupled to the housing sleeve at a corresponding end thereof for facilitating replacement of deodorizing units in the chambers;

mounting means for mounting the housing sleeve on a supporting surface; and

a cylindrical cover sleeve having a length equal to substantially half the length of the housing sleeve and slidably mounted on said housing sleeve in a manner whereby said cover sleeve covers one of the chambers of the housing sleeve while freeing the other so that the deodorizing unit in the one of the chambers is preserved while the deodorizing unit in the other of the chambers deodorizes the surrounding area, said cover sleeve being freely slidable on said housing sleeve for selectively varying the strength of deodorant transmitted from said housing sleeve.

4,094,640

METHOD FOR PROCESSING BIOMATERIALS

Georg Iwantscheff, Nuremberg, and Egmont Scheubeck, Erlangen, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

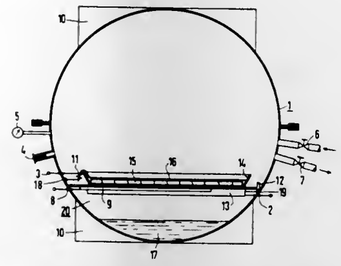
Filed Jan. 31, 1977, Ser. No. 764,541
Claims priority, application Germany, Feb. 12, 1976, 2605560
Int. Cl.[2] G01N *31/12*
U.S. Cl. 23—230 PC **12 Claims**

1. A processing method for breaking down biomaterial comprising:

a. disposing 20–30g of a moist sample of the biomaterial in a closed pressure vessel;

b. predrying said sample down to a residual moisture of 5–10%;

c. cooling the wall of the pressure vessel to about 10° C. during the predrying; and



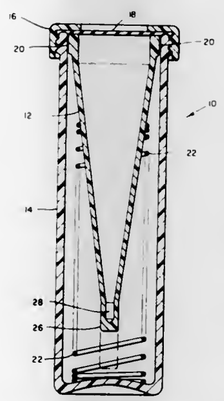
d. subsequently burning in oxygen, within the closed pressure vessel, the predried biomaterial in the presence of the water vapor generated during pre-drying and which has been condensed on the wall of the pressure vessel.

4,094,641

LOW LOSS SAMPLE BOTTLE ASSEMBLY

David R. Friswell, Holliston, Mass., assignor to Waters Associates, Inc., Milford, Mass.

Filed Feb. 25, 1977, Ser. No. 772,146
Int. Cl.[2] B01L *3/00*
U.S. Cl. 23—230 R **9 Claims**



1. A container assembly adapted to facilitate the removal of liquid contained therein into a needle having an upper hollow portion, said portion terminating at its lower end in a port, and a lower solid portion below said port, said assembly comprising:

(a) a sample bottle having a lower internal portion with a recess of smaller circumference than the circumference of the bottle internal upper portion,

(b) a member surrounding and supporting said sample bottle substantially erect for vertical movement with respect to said member,

(c) a resilient means positioned in said member below said sample bottle resiliently to resist downward and sideward movement of said bottle,

(d) said lower portion of said sample bottle having an internal shape complementary to the external shape of a solid lower portion of a hollow needle having a port adjacent and above the solid portion,

said sample bottle lower portion being capable of closely mating with a said solid lower portion of a hollow needle to displace excess liquid in said sample bottle lower portion upward,

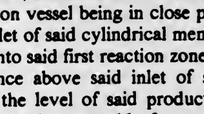
whereby the displaced liquid may be sucked into said port and said resilient means allows alignment and close mating of said needle and bottle.

4,094,642

INDICATOR FOR ETHYLENE OXIDE GAS

Mitsuhiro Sumimoto, Chiba, and Haruo Kohama, Tokyo, both of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 15, 1977, Ser. No. 768,850
Int. Cl.[2] G01N *21/12*
U.S. Cl. 23—254 R **19 Claims**



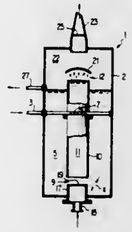
11. An indicator structure for ethylene oxide gas which comprises a substrate and a layer of indicator composition disposed on the substrate and comprising 4-(4-nitrobenzyl)-pyridine, nitrocellulose, a basic substance, and a blue coloring agent.

4,094,643

AMMONIUM NITRATE NEUTRALIZER

Toby M. Cook; Gerald L. Tucker, and Marion L. Brown, all of Yazoo City, Mich., assignors to Mississippi Chemical Corporation, Yazoo City, Mich.

Filed Sep. 16, 1976, Ser. No. 723,929
Int. Cl.[2] C01C *1/18;* B01F *5/10*
U.S. Cl. 23—285 **6 Claims**



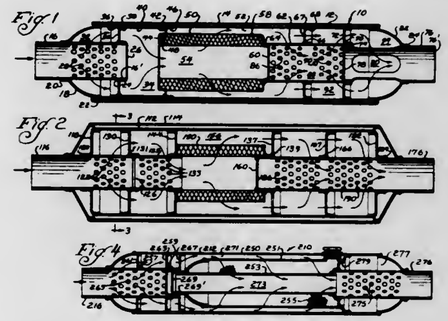
1. A thermal syphon-pressure pump neutralizer being adapted for neutralizing nitric acid with ammonia, comprises a reaction vessel suitable for containing an aqueous reaction medium and having a gas outlet in its upper end and a product outlet spaced below said gas outlet, at least one elongated fluid impervious cylindrical member positioned substantially vertically within said vessel so as to define a second reaction zone within said member and a first reaction zone outside said member between said member and said vessel, the lower end of said cylindrical member being an inlet being situated in said vessel such that said inlet of said cylindrical member is spaced above the bottom of the vessel, ammonia inlet means leading into the bottom of said reaction vessel being in close proximity to but spaced below said inlet of said cylindrical member, nitric acid inlet means leading into said first reaction zone being spaced a predetermined distance above said inlet of said cylindrical member and below the level of said product outlet of said vessel, said apparatus being operable for neutralizing nitric acid with ammonia by filling said vessel with an aqueous medium at least to the level of said product outlet and introducing nitric acid into said first reaction zone through said nitric acid inlet means and ammonia into the reaction vessel through said ammonia inlet means, and diluting the concentration of the nitric acid before entering said second reaction zone, so that the major portion of nitric acid being introduced through said nitric acid inlet means will be neutralized with the ammonia being introduced through said ammonia inlet means in said dilute concentration within said second reaction zone, and whereby circulation mixing and turbulence of the aqueous medium, nitric acid and ammonia between said first reaction zone and said second reaction zone is facilitated by a thermal syphon and pressure effect caused by the heat of neutralization and the density differential between the product solution and the reacted solution such that water vaporized by said heat of neutralization will be discharged through said gas outlet of said reaction vessel and ammonium nitrate product will be recovered through said product outlet of said reaction vessel, wherein the improvement comprises: said reaction vessel further containing a free gas zone between said reaction zones and said gas outlet being situated such that gases disengaging from said first reaction zone will enter said free gas zone, and then into said gas outlet, deflector means situated above said second reaction zone and depending thereabout to at least the level of said product outlet such that solution and gases evolved from the outlet of said second reaction zone are substantially completely reintroduced into the liquid in said first reaction zone before entering said free gas zone above said first reaction zone with sufficient force so as to create a scrubbing turbulence within said first reaction zone, whereby turbulent contact between said liquid within said first reaction zone and said gases will scrub the gases and cause dissolution of soluble components of said gases into said liquid, such that gases emanating from said first reaction zone into said free gas zone are substantially completely scrubbed of soluble components.

4,094,644

CATALYTIC EXHAUST MUFFLER FOR MOTORCYCLES

Melvin H. Wagner, Bartlett, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 8, 1975, Ser. No. 638,778
Int. Cl.[2] B01J *8/00;* F01N *3/15*
U.S. Cl. 23—288 F **7 Claims**



1. An exhaust muffler comprising a metal exhaust inlet tube and a coaxial metal exhaust outlet tube, said tubes being longitudinally spaced from each other and welded adjacent their far ends to an elongated metal housing member, said metal housing member having a larger diameter than said tubes and being joined to said tubes by inlet and outlet transition portions; an elongated, hollow, annular, radial flow catalytic converter member comprising a monolithic ceramic substrate positioned intermediate the inner ends of said tubes and axially aligned therewith, said catalytic converter member having its radially outer surface spaced inwardly from the inner wall of said metal housing, a plurality of bulkhead members fixedly mounted relative to portions of said tubes inwardly of the far ends thereof for axial movement with said tubes as said tubes move inside and relative to said housing due to temperature differences between said tubes and said housing, at least one of said bulkhead members being inwardly axially spaced from both

said inlet and outlet tubes, said plurality of bulkhead members including axially extending flange portions which contact the inner wall of said housing around their periphery so as to prevent radial movement of said tubes and bulkhead members while permitting axial sliding movement of said bulkhead members; said catalytic converter member being mounted intermediate said inlet and outlet tubes and intermediate a pair of said plurality of bulkhead members, said catalytic converter member being mounted at its upstream end to said one of said slidably movable bulkhead members which is inwardly axially spaced from said inlet and outlet tubes and at its downstream end to said outlet tube, blocking means for blocking gas flow through the downstream end of said inlet tube and through the downstream end of said hollow catalytic converter member; said tubes, and at least some of said plurality of bulkhead members being perforated to force the exhaust gas flow within said muffler to move radially outwardly and radially inwardly between the inner walls of said tubes and catalytic converter member and the inner walls of said metal housing in at least two cycles.

4. An exhaust muffler comprising a metal exhaust inlet tube and a coaxial metal exhaust outlet tube, said tubes being longitudinally spaced from each other and welded adjacent their far ends to an elongated metal housing member, said metal housing member having a larger diameter than said tubes and being joined to said tubes by inlet and outlet transition portions; an elongated, hollow, annular, radial flow catalytic converter member comprising a monolithic ceramic substrate positioned intermediate the inner ends of said tubes and axially aligned therewith, said catalytic converter member having its radially outer surface spaced inwardly from the inner wall of said metal housing, a plurality of bulkhead members fixedly mounted relative to portions of said tubes inwardly of the far ends thereof for axial movement with said tubes as said tubes move inside and relative to said housing due to temperature differences between said tubes and said housing, a tubular axial extension means mounted to the downstream end of said inlet tube and having a bulkhead member fixedly mounted thereto for axial movement therewith, said plurality of bulkhead members including axially extending flange portions which contact the inner wall of said housing around their periphery so as to prevent radial movement of said tubes and bulkhead members while permitting axial sliding movement of said bulkhead members; said catalytic converter member being mounted intermediate said inlet and outlet tubes and intermediate a pair of said plurality of bulkhead members, said catalytic converter member being mounted at its upstream end to said slidably movable bulkhead member which is affixed to said axial extension means and at its downstream end to said outlet tube, blocking means for blocking gas flow between the downstream end of said inlet tube and said axial extension means and through the downstream end of said hollow catalytic converter member; said tubes, said axial extension means, and at least some of said plurality of bulkhead members being perforated to force the exhaust gas flow within said muffler to move radially outwardly and radially inwardly between the inner walls of said tubes and catalytic converter member and the inner walls of said metal housing in at least two cycles.

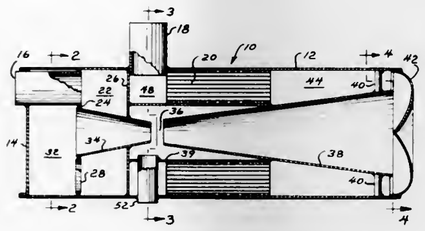
7. An exhaust muffler comprising a metal exhaust inlet tube and a coaxial metal exhaust outlet tube, said tubes being longitudinally spaced from each other and welded adjacent their far ends to an elongated metal housing member, said metal housing member having a larger diameter than said tubes and being joined to said tubes by inlet and outlet transition portions; an elongated, hollow, annular, radial flow catalytic converter member comprising a pair of perforated inner and outer housing portions which define a catalyst bed containing a plurality of catalyst coated pellets, said converter member being positioned intermediate the inner ends of said tubes and axially aligned therewith, said catalytic converter member having its radially outer housing portion spaced inwardly from the inner wall of said metal housing, a plurality of bulkhead members fixedly mounted relative to portions of one of said tubes for axial movement with said one tube as said tube moves inside and relative to said housing due to temperature differences between said tube and said housing, said plurality of bulkhead members including axially extending flange portions which contact the inner wall of said housing around their periphery so as to prevent radial movement of said tube and bulkhead members while permitting axial sliding movement of said bulkhead members; said catalytic converter member being mounted intermediate said inlet and outlet tubes and being slidably supported for axial movement at one end by one of said plurality of bulkhead members, and on the other end by a flexible bulkhead member affixed to said metal housing and the other of said tubes, said catalytic converter member having its inner and outer housing portions joined at one end by said flexible bulkhead member and at its other end by a transition member, blocking means for blocking gas flow through the downstream end of said inlet tube and through the upstream end of said hollow catalytic converter member; said tubes, and at least some of said plurality of bulkhead members being perforated to force the exhaust gas flow within said muffler to move radially outwardly and radially inwardly between the inner walls of said tubes and catalytic converter member and the inner walls of said metal housing.

4,094,645

COMBINATION MUFFLER AND CATALYTIC CONVERTER HAVING LOW BACKPRESSURE

Charles H. Bailey, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 24, 1977, Ser. No. 762,228
Int. Cl.² B01J *8/02, 35/04;* F01N *3/15*
U.S. Cl. 23—288 FC **7 Claims**



1. In a combination muffler and catalytic converter having a housing with inlet and outlet openings for exhaust gases, a monolithic, axial flow catalytic converter element, secondary air inlet means and a venturi for introducing secondary air into the exhaust gas stream before it reaches the catalytic converter element and for controlling the flow of exhaust gases to said catalytic converter element, the improvement comprising at least two serially arranged expansion chamber means located within said housing between said inlet and said venturi, said at least two serially arranged expansion chamber means comprising a first expansion chamber positioned axially inwardly of the inlet end of said housing and spaced therefrom by a second expansion chamber, said first chamber having the inlet cone portion of said venturi located therein and inlet means for communicating the second expansion chamber with said first expansion chamber, said second expansion chamber having a tube therein connecting and communicating the inlet opening of said housing with said first expansion chamber, whereby exhaust gases entering said inlet tube must undergo at least a 360° change in direction in passing from said inlet tube to said inlet cone portion, and gas restriction means extending over the entire gas flow path between the throat of said venturi and the inlet end of said catalytic converter element for controlling the expansion rate of the exhaust gases relatively uniformly over said entire gas flow path to minimize the turbulation of the gas stream, said gas expansion restriction means limiting the expansion rate of the exhaust gases to a rate no greater than the rate present in the expansion cone portion of the venturi immediately downstream of the venturi throat which has an included angle with its axis no greater than about 7½°.

4,094,646

RAPID METHOD OF ASSAYING COLLAGEN IN MEAT AND MEAT PRODUCTS

David L. Stern, Baltimore, and Daniel B. Samchuck, Towson, both of Md., assignors to The Baltimore Spice Company, Baltimore, Md.

Filed Jun. 2, 1977, Ser. No. 802,600
Int. Cl.² G01N *21/24, 33/16*
U.S. Cl. 23—230 R **3 Claims**

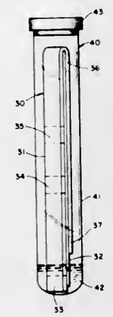
1. A rapid method for assaying collagen in a simple of meat or meat products comprising hydrolyzing the amino acids in said sample under conditions such that all of the tryptophan therein is destroyed and only a portion of the hydroxyproline therein is hydrolyzed and then determining the percent collagen by colorimetrically reading the present hydroxyproline which has been hydrolyzed and extracted.

4,094,647

TEST DEVICE

Marshall E. Deutsch, Sudbury, and Louis W. Mead, Lexington, both of Mass., assignors to Thyroid Diagnostics, Inc., Bedford, Mass.

Filed Jul. 2, 1976, Ser. No. 701,762
Int. Cl.² G01N *33/16*
U.S. Cl. 23—253 TP **14 Claims**



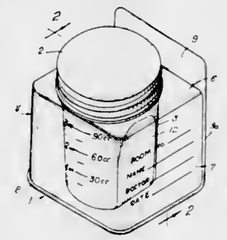
1. A test strip for the detection of an ingredient of a sample which comprises:
a length of strip characterized by
a length of capillarity having a first and second end therealong,
a first zone located in said length of capillarity and spaced from said first end of the capillarity to permit contact of said first end but not said first zone with a developing liquid and impregnated with a first reagent,
said reagent being chosen to be mixable with said ingredient to provide a label therefor, and
a second zone located in said length of capillarity in the direction of said second end from said first zone and including a second reagent adapted to slow capillary movement of a portion of said first reagent carried by said developing liquid,
said length of capillarity being chosen to stop capillary transport therethrough while said portion of said first reagent is in said second zone, whereby a sample may be received in said length of capillarity and spaced from said first end of said capillarity to permit contact of said first end but not the place of sample reception with the developing liquid, said place of sample reception being in said length of capillarity between said first end and said second zone.

4,094,648

URINE SPECIMEN CONTAINER

Leonard Seeley, Palatine, Ill., assignor to Plastofilm Industries, Inc., Wheaton, Ill.

Filed Jan. 28, 1977, Ser. No. 763,250
Int. Cl.² A61B *10/00;* B65D *23/00;* G01N *1/10, 33/16*
U.S. Cl. 23—259 **10 Claims**



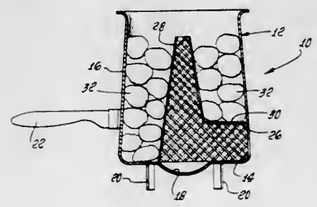
1. In a urine specimen container including a cup-shaped receptacle and a cap therefor, the improvement which comprises a shroud having a top portion extending outwardly from the top of the receptacle and a skirt portion depending from the periphery of said top portion across the front and along the two sides of the receptacle leaving the rear of the receptacle exposed, said skirt portion being spaced from the sides of the receptacle whereby fingers of a hand approaching the receptacle from the rear may pass under said shroud into the spaces on the respective sides of the receptacle to grasp and support the same while shielded by said shroud against the hazard of urine spillage.

4,094,649

BRIQUETTE IGNITING DEVICE WITH FORAMINOUS METAL CONE

Gordon A. Osterried, Box 65, Kelowna, British Columbia, Canada

Filed Feb. 28, 1977, Ser. No. 772,498
Int. Cl.² C10L *11/08, 11/00;* A47J *37/00*
U.S. Cl. 44—35 **2 Claims**



1. In a briquette igniting device, the combination of:
(a) an open-top container having a bottom wall and an upstanding peripheral wall;
(b) a handle connected to said container;
(c) said peripheral wall having air inlet openings therein adjacent said bottom wall;
(d) said peripheral wall having an enlarged access opening therein adjacent said bottom wall;
(e) a central, frusto-conical, foraminous member seated on said bottom wall and extending upwardly therefrom and spaced inwardly from said peripheral wall; and
(f) said foraminous member having at the lower end thereof a tubular portion extending laterally to and communicating with said access opening.

2. A briquette igniting device as defined in claim 1 wherein said bottom wall is provided with a central depression to receive a liquid fuel.

4,094,650

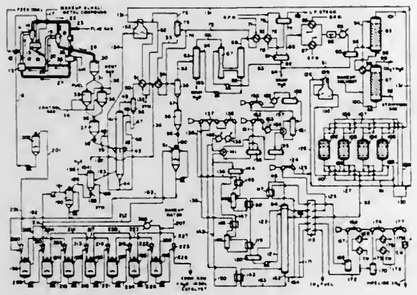
INTEGRATED CATALYTIC GASIFICATION PROCESS

Kwang K. Koh, West Bloomfield, Mich.; Nicholas C. Nahas, Morris Plains, N.J.; Robert E. Pennington, and Lonnie W. Vernon, both of Baytown, Tex., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 514,852, Oct. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 287,319, Sep. 8, 1972, abandoned. This application Nov. 11, 1976, Ser. No. 740,987

Int. Cl.[2] C10J *3/54*; C10G *13/30*

U.S. Cl. 48—197 R **19 Claims**



1. A process for the production of methane from a heavy oil or solid carbonaceous feed material and steam which comprises reacting said steam with said feed material to form essentially methane and carbon dioxide while suppressing the net formation of carbon monoxide and hydrogen in a reaction zone at a reaction temperature between about 1000° F. and about 1500° F. and at a reaction pressure in excess of about 100 psia, in the presence of a carbon-alkali metal catalyst comprising a carbon-alkali metal reaction product prepared by heating an intimate mixture of carbonaceous solids and an alkali metal constituent to an elevated temperature, said catalyst being present in a sufficient quantity to substantially equilibrate the gas phase reactions occuring during the reaction of said steam with said feed material, and in the presence of sufficient added equilibrium amounts, at said reaction temperature and pressure, of molecular hydrogen and carbon monoxide to provide substantially equilibrium quantities of hydrogen and carbon monoxide in said reaction zone at said reaction temperature and said reaction pressure, and withdrawing from said reaction zone a substantially equilibrium mixture, at said reaction temperature and pressure, of steam, molecular hydrogen, carbon monoxide, carbon dioxide, and methane, and recovering methane from the withdrawn mixture.

4,094,651

PROCESS FOR PSEUDOHYDROSTATIC FEEDING OF SOLIDS INTO A REACTOR

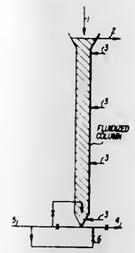
Ernest E. Donath, P.O. Box 1068, Christiansted, St. Croix, V.I. 00820

Continuation of Ser. No. 683,810, May 6, 1976, abandoned. This application May 26, 1977, Ser. No. 800,847

Int. Cl.[2] C10J *3/46*

U.S. Cl. 48—210 **8 Claims**

1. In a method for the continuous reaction of pulverized coal with gases or vapors at a pressure of at least 80 psi, and including shutdown of the operation as required the improvement comprising continuously feeding said pulverized coal into a reaction zone utilizing the pseudohydrostatic pressure of a fluidized column which is of a height of at least 200 feet and includes additions of fluidizing gas at selected points of the column, by passing said pulverized coal downwardly through said column at a descent velocity of the pulverized coal in the column which is greater than the ascent velocity of the fluidizing gas relative to the pulverized coal, the average velocity of the fluidizing gas in the column being between 0.01 and 0.1 feet per second relative to the fluidized coal and the descent velocity of said coal being at least 1 foot per second, said method further including removing excess gas below the top of said



column during said shutdown and further comprising controlling the feed rate at the bottom of said column by throttling the flow of coal, a pressure reduction of up to 5 percent of absolute being effected by said throttling.

4,094,652

ELECTRODESORPTION SYSTEM FOR REGENERATING A DIELECTRIC ADSORBENT BED

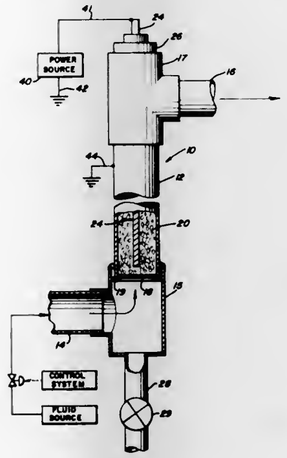
Frank Eugene Lowther, Buffalo, N.Y., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 625,237, Oct. 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 527,832, Nov. 27, 1974, abandoned. This application Feb. 15, 1977, Ser. No. 768,763

The portion of the term of this patent subsequent to Jul. 26, 1994, has been disclaimed.

Int. Cl.[2] B01D *53/04*

U.S. Cl. 55—33 **29 Claims**



1. A drying system comprising

a molecular sieve porous bed of synthetic crystalline metal alumino silicate material having an average particle size of about 1 μ to 100 μ, said alumino silicate material consisting essentially of at least one zeolite selected from the group consisting of Type A, Type L, Type X, Type Y and mixtures of said zeolite with one another;

means for contacting the bed in a drying chamber with a fluid to be dried;

means for regenerating the bed including means for applying a 0–10^3 Hz frequency electrical field of at least 0.2 Kv/cm across the bed directly through the zeolite particles to maintain a current density during regeneration of about 0.01 to 100 microamps/cm^2; and

means for removing water from the bed during regeneration.

4,094,653

PARTICLE CHARGING DEVICE AND AN ELECTRIC DUST COLLECTING APPARATUS MAKING USE OF SAID DEVICE

Senichi Masuda, 40-10-605, 1-chome, Nishigahara Kita-ku, Tokyo, Japan

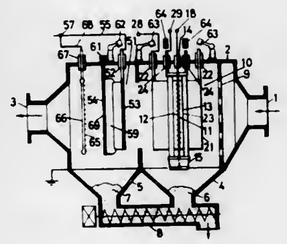
Division of Ser. No. 496,537, Aug. 12, 1974, Pat. No. 3,980,455. This application May 21, 1976, Ser. No. 688,636

Claims priority, application Japan, Sep. 7, 1973, 48-100904; Aug. 14, 1973, 48-91188

The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.

Int. Cl.[2] B03C *3/00*

U.S. Cl. 55—138 **5 Claims**



4. A two-stage electric dust collecting apparatus comprising:

a duct having an inlet port for receiving a dust containing gas and a gas outlet port for exhausting cleaned gas;

a particle collecting section in said duct comprising positive and negative electrode groups disposed insulatively from each other in said duct and opposed to each other so as to intercept the gas flow in said duct and a D.C. high voltage source coupled to said electrode groups for applying a D.C. high voltage between said positive and negative electrode groups, and

a particle charging section positioned in said duct and disposed upstream of said particle collecting section and comprising a plurality of discharge electrodes having a relatively small radius of curvature, a plurality of opposite electrodes opposed to and insulatively spaced from said discharge electrode and positioned in said duct in the flow of gases through said duct, third electrodes having a relatively large radius of curvature compared to said discharge electrodes and disposed in the proximity of said discharge electrodes on opposite sides of said discharge electrodes on the upstream and downstream sides of each of said discharge electrodes, each of said discharge, opposite and third electrodes being insulatively mounted in said apparatus to said duct so as to be exposed in a gas flow in said duct, a first high voltage source coupled to said discharge electrodes for applying a periodically varying high voltage of single polarity between said discharge electrode and said third electrode for developing negative ions intermittently, a D.C. voltage bias source coupled to said third electrodes of the same polarity as said single polarity for applying a D.C. bias voltage between said discharge electrodes and said third electrodes and a first D.C. high voltage source coupled to said opposite electrodes of a polarity opposite said single polarity for applying a D.C. high voltage between said opposite electrodes and said third electrodes to continuously provide a steady electrical field between said opposite and said third electrodes.

4,094,654

CABIN FOR AN ELECTROSTATIC POWDER COATING INSTALLATION

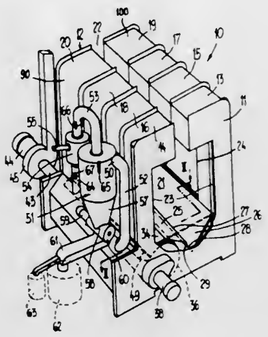
Robert Prinzing, St. Gallen, Switzerland, assignor to Gema AG Apparatebau, St. Gallen, Switzerland

Filed Sep. 10, 1976, Ser. No. 722,134

Claims priority, application Switzerland, Sep. 29, 1975, 12578/75

Int. Cl.[2] B01D *46/04*

U.S. Cl. 55—290 **9 Claims**



1. A cabin for an electrostatic powder coating installation, comprising in combination, means defining an internal compartment, means defining a chamber, a rotatable hollow filter drum arranged within said chamber, said rotatable filter drum having an axis, an inner side and outer side, guide means defining a slot-shaped opening connecting said internal compartment with said chamber for directing air and oversprayed powder transversely to said filter drum axis, said axis being disposed substantially parallel to said slot-shaped opening, means for rotating the rotatable filter drum about its axis, suction means for subjecting said inner side of the filter drum to the action of a negative pressure and for causing air and overspayed powder to flow from said internal compartment through said slot-shaped opening into said chamber and to impinge on said outer side of the filter drum, a stationary suction nozzle spanning the outer side of the filter drum along a surface line thereof for removing oversprayed powder therefrom, a suction blower and a separator for connecting the stationary suction nozzle with the suction blower.

4,094,655

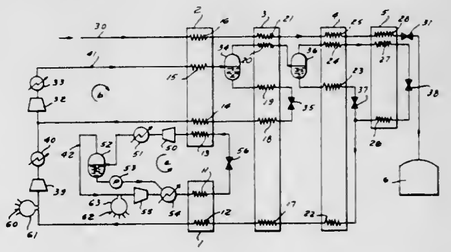
ARRANGEMENT FOR COOLING FLUIDS

Heinrich Krieger, Leitlestrasse 16, 81 Garmisch-Partenkirchen, Germany

Division of Ser. No. 392,812, Aug. 29, 1973, abandoned. This application Apr. 2, 1975, Ser. No. 564,441

Int. Cl.[2] F25J *1/02*

U.S. Cl. 62—40 **1 Claim**



1. An apparatus for cooling fluids, particularly for liquefying gaseous substances, comprising

I. first conduit means (41) defining a first flow path (b) for the circulatin of a cooling fluid, said first flow path (b) including a first section (15) and including a second section (12) downstream of said first section (15), said second section (12) extending through a first heat-exchanger (1) and second first section (15) extending through a second heat-exchanger (2) that constitutes a first cooling stage, said first and said second heat-exchanger being substantially thermally separated from each other; and

II. second conduit means (42) defining a second flow path (a) for the circulation of a precooling fluid, said second flow path (a) including a first path (11) extending through said first heat-exchanger (1) and wherein said precooling fluid flows substantially countercurrent to said cooling fluid in said second section (12), said second section (12) and said first part (11) being arranged in heat-exchange relationship in the first heat exchanger (1) so that said cooling fluid in said second section (12) is effective for cooling said precooling fluid in said first part (11), and said second flow path (1) also including a second part (13) downstream of said first part extending through said second heat-exchanger (2) and wherein said precooling fluid flows substantially countercurrent to said cooling fluid in said first section (15), said first section (15) and said second part (13) being arranged in heat-exchange relationship in the second heat exchanger (2) so that said precooling fluid in said second part (13) is effective for cooling said cooling fluid in said first section (15),

III. and said apparatus further comprising at least one phase-separator means (34, 36) having a vapor discharge side and a liquid discharge side; and at least one further heat-exchanger (3,4) downstream of said vapor discharge side constituting at least one further cooling stage, said phase-separator means being adapted for separating the liquid and vapor components of said cooling fluid subsequent to its passage through a cooling stage;

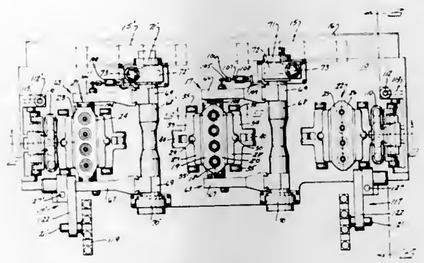
IV. and said apparatus further comprising first compressor means (39, 32) in said first flow path (b) upstream of said first section (15) for compressing said cooling fluid, said first compressor means (39, 32) having an inlet side communicating with said second section (12) and an outlet side communicating with said first section (15); first cooling means (40, 33) intermediate said first compressor means (39, 32) and said first section (15) for cooling the compressed cooling fluid with a surrounding cooling medium; first expansion valve means (37) downstream of said phase-separator means having an inlet side communicating with said liquid discharge side of the latter and an outlet side communicating with said second section (12) via a third section (17) of said first flow path (b) extending through at least one of said further heat-exchangers (3, 4); second compressor means (50, 55) in said second flow path (a) upstream of said first part (11) for compressing said precooling fluid, said second compressor means (50, 55) having an inlet side communicating with said second part (13) and an outlet side communicating with said first part (11); second cooling means (57, 54) intermediate said second compressor means (50, 55) and said first part (11) for cooling the compressed precooling fluid with a surrounding cooling medium; and second expansion valve means (56) intermediate said first part (11) and second part (13) having an inlet side communicating with said first part (11) and an outlet side communicating with said second part (13).

4,094,656

METHOD FOR FORMING GLASS CONTAINERS

Robert D. Colchagoff; Paul W. Fortner, both of Toledo; Richard T. Kirkman, Maumee; Thomas J. Naughton, Toledo, and George Zimmerman, Sylvania, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 7, 1977, Ser. No. 775,131
Int. Cl.² C03B 9/26
U.S. Cl. 65—81 **13 Claims**



1. The method of forming glass containers by the "blow and blow" process wherein a gob of glass is delivered to a parison and neck mold cavity and the gob is settled in the neck mold by vacuum and immediately after being settled is counterblown in the parison mold to thereby form a parison with the glass forming the parison having been continuously worked from the time of gob delivery until the parison is completely formed and, with the parison mold being removed from the parison, the parison then being inverted and transferred from the parison forming position to a blow or final mold where the parison is expanded into final form, the improvement comprising:

maintaining a condition of above atmospheric pressure within the interior of the formed parison at a sufficient level to prevent collapse of the parison during the transfer and inversion thereof to the blow or final mold; and

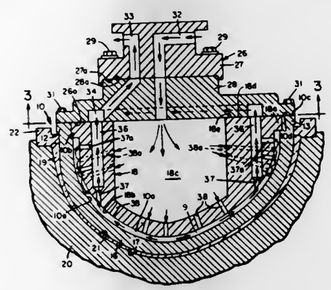
releasing the pressure from the interior of the parison after transfer to the blow mold is completed, whereby a glass container of a given capacity may be formed with less glass, be of more uniform wall thickness and have improved strength.

4,094,657

GLASS PRESSING PLUNGER COOLING

Arieh Carmi, Big Flats; Zung S. Chang, Painted Post, and Thomas J. Rayeski, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 729,409, Oct. 4, 1976, Pat. No. 4,059,429. This application Jun. 3, 1977, Ser. No. 803,153
Int. Cl.² C03B 9/00
U.S. Cl. 65—83 **2 Claims**



1. A method of differentially cooling a plunger for press forming glass articles in a cooperative forming mold, such plunger having regions of sharp curvatures requiring high heat removal rates joining with regions of lesser curvatures requiring lower heat removal rates than said regions of shape curvatures, such method comprising:

(A) providing in said plunger a cooling fluid plenum chamber,

(B) supplying cooling fluid to said chamber,

(C) dividing said cooling fluid in said chamber and flowing the major portion of such fluid therefrom over said regions of sharp curvatures of said plunger and simultaneously directly flowing the minor portion of the fluid therefrom over said regions of lesser curvatures of the plunger, and

(D) exhausting the spent cooling fluid from said plunger.

4,094,658

FORMING A FALLING CURTAIN OF MOLTEN GLASS

Frank J. Lazet, Media, Pa., assignor to PQ Corporation, Valley Forge, Pa.

Filed Aug. 29, 1977, Ser. No. 828,140
Int. Cl.² C03B 37/06, 17/00
U.S. Cl. 65—90 **10 Claims**

1. A method for forming a falling curtain of molten material, characterized by becoming viscous as it cools, said falling curtain being of controlled and uniform thickness and of uniform temperature, comprising the steps of:

(a) forming a bed of said molten material;

(b) drawing said material from the bed into a forehearth which has a compound rate of fall;

(c) allowing said molten material to flow through the forehearth, thereby cooling it;

(d) applying heat to the material near the side walls of the forehearth thereby preventing non-uniform cooling of the material; and

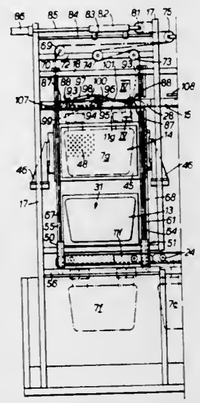
(e) allowing the molten material to flow over the lip of the forehearth, thereby forming the desired falling curtain.

4,094,659

PROCESSING OF GLASS SHEETS

Phillip Sydney Nixon, Skelmersdale, and Harold Woods, Prescot, both of England, assignors to Triplex Safety Glass Company Limited, Birmingham, England

Filed Mar. 15, 1977, Ser. No. 777,837
Claims priority, application United Kingdom, Mar. 17, 1976, 10682/76
Int. Cl.² C03B 35/00
U.S. Cl. 65—104 **14 Claims**



1. Apparatus for the processing of glass sheets comprising a furnace for heating the glass sheets, a plurality of transport members from each of which transport members a glass sheet is suspended vertically in the furnace, a series of treatment stations for the heated glass sheets positioned vertically one above the other over the furnace, a lifting device associated with said treatment stations and including means for engaging below one of said transport members and lifting that transport member and the heated glass sheet suspended therefrom vertically from the furnace at least into the lowermost one of said treatment stations, and means above said lowermost one of the treatment stations for subsequently supporting the transport member and the suspended glass sheet independently of the lifting device, so that the lifting device can then be lowered to engage below the transport member of a further glass sheet suspended in the furnace for the commencement of the lifting of such further glass sheet from the furnace to said lowermost one of the treatment stations while subsequent processing of said glass sheet is carried out.

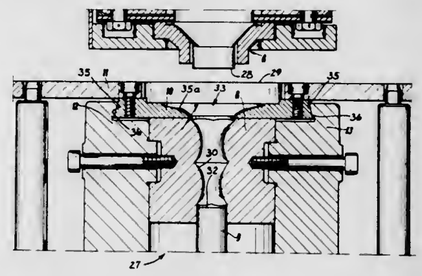
11. A method for the processing of a glass sheet comprising the steps of suspending a glass sheet from a transport member in a furnace, heating the glass sheet in the furnace to a temperature suitable for further processing, lifting the transport member with the suspended glass sheet from below vertically from the furnace into a lowermost one of a series of treatment stations which are positioned vertically one above the other, subsequently independently supporting the transport member and the suspended glass sheet at said lowermost one of said treatment stations, lifting the transport member and the suspended glass sheet from said lowermost one of said treatment stations to a higher one of the treatment stations, lifting a further glass sheet from the furnace to said lowermost one of the treatment stations by lifting a transport member from which said further glass sheet is suspended, and commencing processing of said further glass sheet at said lowermost one of the said treatment stations while subsequent processing of the glass sheet is carried out at said higher one of the treatment stations.

4,094,660

APPARATUS FOR THE PRODUCTION OF STEMMED GLASSWARE

Emil Ilk, 8372 Zwiesel, Ahornweg 4, Germany

Division of Ser. No. 565,573, Apr. 7, 1975, Pat. No. 3,955,954, and a continuation-in-part of Ser. No. 415,640, Nov. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 224,595, Feb. 8, 1972, abandoned. This application May 7, 1976, Ser. No. 684,313
Int. Cl.² C03B 11/02
U.S. Cl. 65—325 **4 Claims**



1. An apparatus for the production of stemmed glassware having a cup and a stem in which a stem is formed with a transverse cross-sectional dimension intermediate the ends of stem smaller than the cross-sectional dimensions at the ends of the stem, the apparatus comprising:

a glass feeder for feeding a drop of glass having a temperature deviation of 2° C to 3° C within the temperature range of 1100° C to 1200° C and having a weight within plus or minus one gram of a predetermined weight,

a rotatable platen, at least one stem mold carried by said platen and being divided longitudinally and rotatable by said platen into position beneath said glass feeder,

said glass feeder being spaced from said split stem mold through a distance in the range of about 20 mm to 40 mm from the feeder, the glass drop forming a skin and being centered within said divided stem mold,

said platen being rotatable to a pressing station to bring said divided stem mold with the drop therein to said pressing station, a pressing die at said pressing station for pressing the glass drop with a pressure of at about 200 kgs to form the stem in said divided stem mold,

said stem mold being heated to a temperature in the range of about 400° C to 500° C during molding of the stem,

a second rotatable platen positioned above said first platen, a cup forming mold on said second platen having an upper opening and a bottom opening,

transfer means for pushing the stem upwardly from said stem mold and for inverting said stem into bottom opening in said cup forming mold for joining to a cup mold molded in said cup mold.

4,094,661

PLANT GROWTH REGULATORS

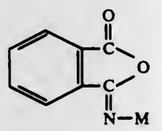
Gerhard H. Alt, Creve Coeur, and John E. Franz, Crestwood, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 536,675, Dec. 26, 1974, Pat. No. 3,985,773. This application Jul. 14, 1976, Ser. No. 705,316

Int. Cl.² A01N *9/28*

U.S. Cl. 71—88 **14 Claims**

1. A method of regulating the natural growth or development of plants which comprises applying to the plants or soil a non-lethal amount of compound selected from those having the formula



wherein M is selected from the group of radicals consisting of naphthyl, tolyl, o- and m-monochloro and monobromo and dichloro- and dibromophenyl, o, m-dimethoxyphenyl, and o-chloro- or bromo-m-trifluoromethylphenyl.

4,094,662

MORPHOLINOBENZIMIDAZOLE N-OXIDES

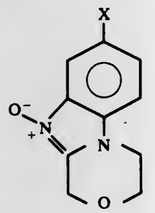
Kelvin Kei-Wei Shen, Fountain Valley, Calif., and Wayne Stuart Belles, Moscow, Id., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 671,452, Mar. 29, 1976, Pat. No. 4,049,422. This application Mar. 10, 1977, Ser. No. 776,395

Int. Cl.² A01N *9/22*; C07D *498/04*

U.S. Cl. 71—92 **12 Claims**

1. A compound of the formula



wherein X is a branched-chain alkyl group of 3 to about 6 carbon atoms or trifluoromethyl.

8. The method of controlling undesirable plant growth which comprises applying a phytotoxic amount of a compound according to claim 1 to the locus of said plants.

4,094,663

QUADRICYCLIC MORPHOLINOBENZIMIDAZOLE COMPOUNDS

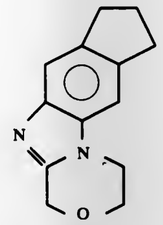
Kelvin Kei-Wei Shen, Fountain Valley, Calif., assignor to United States Borax & Chemical Corporation, Los Angeles, Calif.

Filed Sep. 12, 1977, Ser. No. 832,137

Int. Cl.² C07D *498/04*; A01N *9/22*

U.S. Cl. 71—92 **10 Claims**

1. A compound of the formula



and the N-oxide derivative thereof.

6. The method for controlling weed growth which comprises applying to the locus of said weeds a phytotoxic amount of a compound according to claim 1.

4,094,664

PLANT GROWTH REGULATING AGENTS

Gareth John Thomas, Hitchin, England, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 4, 1976, Ser. No. 655,301

Int. Cl.² A01N *9/24*

U.S. Cl. 71—115 **4 Claims**

1. A method for regulating the growth of plants which comprises applying to the plants, as the active ingredient, an amount of 6-amino-o-toluic acid or an agriculturally acceptable salt thereof which is effective in regulating plant growth.

4,094,665

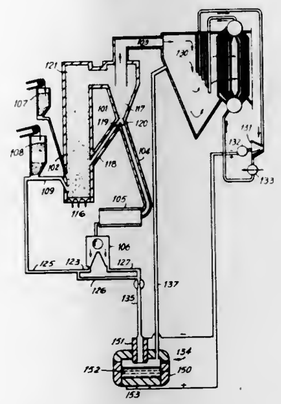
METHOD FOR SIMULTANEOUS COMBINED PRODUCTION OF ELECTRICAL ENERGY AND CRUDE IRON

Per Harald Collin, Falun, and Bjorn Widell, Vasteras, both of Sweden, assignors to Stora Kopparbergs Bergslags AB, Falun, Sweden

Filed May 13, 1977, Ser. No. 796,658

Int. Cl.² C21C *5/52*

U.S. Cl. 75—11 **3 Claims**



1. In a method for production of crude iron from iron oxide and carbonaceous materials wherein electricity is generated as part of the crude iron production and said generated electricity is reutilized in said production of crude iron, the improvement comprising:

maintaining a fast fluidized bed of solid fine-grained carbonaceous material and iron oxide, continuously adding iron oxide and carbonaceous material to said fluidized bed, continuously adding an oxygen-containing gas to said fluidized bed, maintaining in said fluidized bed a temperature high enough to react the oxygen of said oxygen-containing gas with the carbonaceous material to produce a reducing gas, withdrawing reducing gas and solid particles of partially reduced iron oxide and carbonaceous material from the top of the fluidized bed, separating said reducing gas from said solid particles, conveying at least part of said separated solid particles to the fluidized bed at a level between its top and bottom, burning said separated reducing gas in a combustion zone to produce heat, converting said heat into direct current electricity, withdrawing from the fluidized bed carbonaceous material and iron oxide having been partially reduced to a metallization degree of 30–80 percent, maintaining a pool of molten crude iron by maintaining a temperature sufficient to keep molten crude iron in said pool by having a direct current electric arc between a tubular electrode and the surface of the pool, feeding said electric arc with said direct current electricity, conveying the iron oxide, having a metallization degree of 30–80 percent, and at least part of the accompanying carbonaceous material to said pool through said tubular electrode and said direct current electric arc, and burning the gas produced in said pool in said combustion zone to add to the production of electricity.

4,094,666

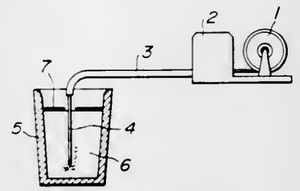
METHOD FOR REFINING MOLTEN IRON AND STEELS

Tohei Ototani, Tokyo, Japan, assignor to Metal Research Corporation, Tokyo, Japan

Filed May 24, 1977, Ser. No. 800,140

Int. Cl.² C21C *7/02*

U.S. Cl. 75—58 **5 Claims**



1. A method for refining molten iron and steel bath comprising,

feeding a compressed and deformed composite clad material of a solidified core encassed in a sheath in wire and rod form having a sufficient rigidity obtained by

cladding a core consisting essentially of at least one element of metallic calcium, metallic magnesium, calcium base alloys and magnesium base alloys,

with a sheath of iron and mechanically compressing and deforming the resulting clad,

into the molten iron and steel bath at a feeding rate of 20–500 m/min, a rate of feeding fast enough to avoid forming a fume or a flame of calcium or magnesium, whereby substantially 100% of the added calcium or magnesium is effectively reacted with said molten iron and steel bath, while deoxidizing, desulfurizing, spherodizing of graphite and inoculating said molten iron and steel bath are effectvely carried out.

4,094,667

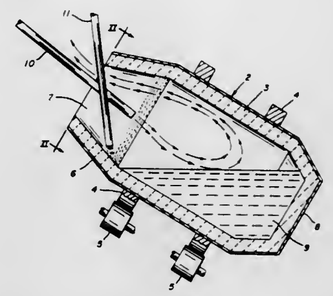
MELTING OF FINE PARTICULATE MATERIAL IN A HIGH-SPEED ROTARY FURNACE

Louis H. Jaquay, Pittsburgh, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Filed Jan. 31, 1977, Ser. No. 764,083

Int. Cl.² C22B *5/02*

U.S. Cl. 75—92 **5 Claims**



1. The method of melting finely divided particulate material in a rotary furnace with a refractory lining and with opposed ends, one of which is open, said furnace and lining being arranged to collect and retain a pool of molten metal during operation of the furnace of maximum depth near one end and diminishing depth extending toward said open end but terminating within the furnace between the place of maximum depth and before reaching said open end whereby there is an area of the refractory lining between the pool and the open end beyond which the said pool of molten metal extends and which is continuously exposed to the atmosphere within the furnace, the steps comprising:

(a) continuously depositing the particulate material from a feed pipe which enters the open end of the furnace onto the refractory lining at the furnace at the low point of revolution of the refractory lining which it is revolving and between the pool of molten metal and said open end;

(b) projecting burning gases within the furnace from burner means at the open end of the furnace at a level above the place of discharge of the particulate material onto the refractory wall and said place of discharge being out of the direct path of the outflow of said gases through the open end of said furnace wall; and

(c) retaining the particulate material on the refractory lining of the furnace by centrifugal force until the material is melted, and collecting the melted material in said pool.

4,094,668

TREATMENT OF COPPER REFINERY SLIMES

John C. Yannopoulos, Danbury, Conn., and Borham M. Borham, Great Falls, Mont., assignors to Newmont Exploration Limited, Danbury, Conn.

Filed May 19, 1977, Ser. No. 798,564

Int. Cl.² C22B *11/00*

U.S. Cl. 75—99 **4 Claims**

1. Process for the recovery of gold, silver and selenium from copper refinery slimes containing these metals which comprises:

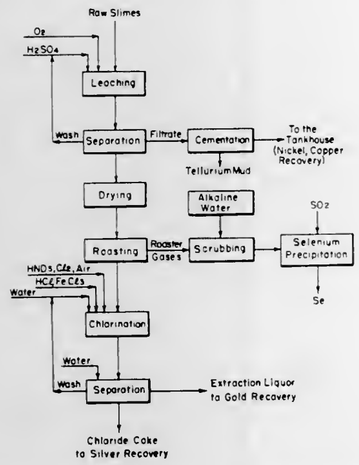
treating the raw slimes with a dilute solution of sulfuric acid at a temperature of between about 40° and 100° C. and at a partial pressure of oxygen of between about 5 to 50 lbs. per square inch gauge to obtain a leach solution containing at least about 98% by weight of the copper content of the raw slimes and to obtain a decopperized leach residue containing the gold, silver and selenium content of the raw slimes,

roasting the leach residue in an oxidizing atmosphere at a temperature of about 400° to 800° C. for at least about 4 hours to obtain effluent roaster gases containing the sele-

nium content of the raw slimes in the form of selenium dioxide and to obtain a deselenized roaster residue containing the gold and silver content of the raw slimes,

treating the effluent roaster gases to recover the selenium dioxide content thereof,

adding dilute hydrochloric acid or nitric acid and ferric chloride to the roaster residue to obtain a slurry containing about 20% by weight solids, and continuously bubbling chlorine and air through the slurry at a temperature



of between about 25° to 90° C. for a period of at least about 5 hours to obtain an extraction liquor containing the gold and residual selenium content of the raw slimes and a solid chlorination residue containing the silver content of the raw slimes,

separating the chlorination extraction liquor from the solid chlorination residue, treating said extraction liquor to recover the gold content thereof and treating said chlorination residue to recover the silver content thereof.

4,094,669

POLYTETRAFLUOROETHYLENE MEMBRANE FILTERS FOR MERCURY RECOVERY

Edward Nicholas Balko, Trenton, and Shyam Dattatreya Argade, Woodhaven, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Jan. 2, 1976, Ser. No. 645,969
Int. Cl.² B01D *13/00*; C22B *43/00*
U.S. Cl. 75—108 **11 Claims**

6. The process of claim 1 wherein the reducing agent is sodium borohydride.

4,094,670

WEATHERING STEEL WITH HIGH TOUGHNESS

Roberto Bruno, and Valerio Faccenda, both of Rome, Italy, assignors to Italsider S.p.A., Italy

Continuation of Ser. No. 514,780, Oct. 15, 1974, abandoned. This application Jul. 1, 1977, Ser. No. 812,391
Claims priority, application Italy, Oct. 15, 1973, 53141 A/73
Int. Cl.² C22C *38/06, 38/16, 38/20*
U.S. Cl. 75—124 **2 Claims**

1. A weathering steel consisting essentially of the following percent composition by weight:

C 0.05 - 0.15
Mn 0.5 - 1.5
Cu 0.2 - 0.5
Al 0.2 - 0.5
Si 0.0 - 0.8
Cr 0.1 - 1.5
S up to 0.02
P up to 0.04
Nb up to 0.020
N up to 0.010
Mo up to 0.15
Ti up to 0.1

balance essentially iron, the manganese, copper, chromium, aluminum and niobium having the following weight relationship: 2.6(Mn%) + 3.2(Cu%) + 41.6(Nb%) + 1.3(Cr%/Al%) = 7.4 to 10.1 the weight ratio of chromium to aluminum being from 2 to 5.

4,094,671

GOLD COLOR COPPER ALLOY FOR RESTORATIVE DENTISTRY

Osamu Hayashi, No. 26-6, Okusawa 2-chome, Setagaya-ku, Tokyo-to, Japan

Filed Jul. 12, 1976, Ser. No. 704,553
Claims priority, application Japan, May 7, 1976, 51-51851
Int. Cl.² A61C *13/00*; C22C *9/04*
U.S. Cl. 75—157.5 **7 Claims**

1. A gold color dental restoration formed of a copper alloy consisting essentially by weight of 48–52% of copper, 47–51% of zinc and 0.1–1.0% of zirconium, said dental restoration being chemically stable against discoloration and dissolution in the mouth in which it is applied.

4,094,672

METHOD AND CONTAINER FOR HOT ISOSTATIC COMPACTING

James N. Fleck, Pittsburgh, Pa.; Richard C. Palmer, East Liverpool, Ohio, and Charles L. Ruffner, Pittsburgh, Pa., assignors to Crucible Inc., Pittsburgh, Pa.

Filed Dec. 22, 1975, Ser. No. 642,976
Int. Cl.² B22F *3/00*
U.S. Cl. 75—226 **2 Claims**

1. A method for isostatically compacting powder metallurgy charges by the application of fluid pressure by:

(a) providing a cylindrical, metal container having a cylindrical body portion closed at each end by a generally disc-shaped end plate,

(b) applying to the interior of said cylindrical body portion a separating medium layer for preventing bonding between said coated portion of said container and a powder metallurgy compact produced therein during subsequent application of said fluid pressure,

(c) providing said container with a powder metallurgy charge,

(d) sealing said container,

(e) outgassing said container,

(f) heating said container and charge to an elevated temperature,

(g) applying fluid pressure to the exterior of said heated container to isostatically compact with charge therein to produce a powder metallurgy compact, and

(h) releasing said pressure and cooling said container and compact,

the improvement comprising:

(i) removing at least one end plate from said container, including all end plates not coated with said separating-medium layer,

(j) introducing to the interior of said container a fluid under pressure sufficient to cause said container to move away from said compact, and

(k) removing said compact from said container by withdrawing said compact through an end from which any said end plate has been removed,

whereby the cylindrical body portion of said container is preserved for reuse.

2. A method for isostatically compacting powder metallurgy charges by the application of fluid pressure to produce a tubular compact by:

(a) providing a cylindrical, metal container having a cylindrical body portion closed at each end by a generally disc-shaped end plate,

(b) applying to the interior of said cylindrical body portion a separating medium layer for preventing bonding between said coated portion of said container and a powder metallurgy compact produced therein during subsequent application of said fluid pressure,

(c) providing said container with a powder metallurgy charge,

(d) sealing said container,

(e) outgassing said container,

(f) heating said container and charge to an elevated temperature,

(g) applying fluid pressure to the exterior of said heated container to isostatically compact said charge therein to produce a powder metallurgy compact, and

(h) releasing said pressure and cooling said container and compact,

the improvement comprising:

(i) axially positioning within said container a metal sleeve substantially coextensive with said container and having an outside diameter less than the inside diameter of said container to define an annular passage between said sleeve and said container,

(j) said powder metallurgy charge being provided within said annular passage,

(k) applying to the exterior of said sleeve a separating medium layer for preventing bonding between said sleeve and a powder metallurgy compact produced within said container during subsequent application of said fluid pressure,

(l) providing an opening in said end plates communicating with the interior of said sleeve,

(m) removing at least one end plate from said container, including all end plates not coated with said separating-medium layer,

(n) introducing to the interior of said container a fluid under pressure sufficient to cause said container and said sleeve to move away from said compact, and

(o) removing said compact from said container by withdrawing said compact through an end from which said end plate has been removed,

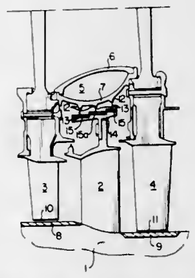
whereby the cylindrical body portion of said container and said sleeve are preserved for further use.

4,094,673

ABRADABLE SEAL MATERIAL AND COMPOSITION THEREOF

Arnold Roderick Erickson, Orange City, Fla., and Carlino Panzera, Belle Mead, N.J., assignors to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 440,794, Feb. 28, 1974, abandoned. This application Nov. 2, 1976, Ser. No. 737,505
Int. Cl.² B22F *5/00*
U.S. Cl. 75—246 **6 Claims**



1. A porous metal mat or compact resistant to oxidation at high temperatures comprising:

(a) a sintered mass of fine metal particles composed of a homogenous alloy consisting essentially of the composition I, Cr, Al and Si, wherein I is at least one member of the group consisting of Fe, Co, Ni, and mixtures of Co and Ni;

(b) the components of the alloy having essentially the following weight percents: 10–27% Cr, not more than 20% Al, 0.1–2.0% Si, and, I = the remainder;

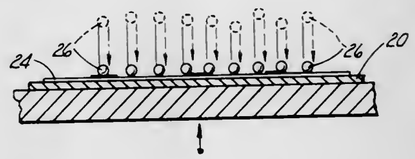
(c) the exposed surface of the particles being capable of developing a protective coating of Al_2O_3 at least 0.5 micron in thickness over an underlying substrate of at least 4% Al content.

4,094,674

METHOD OF FIXING A TONER POWDER IMAGE ON A SHEET OF MATERIAL

James P. Valancius, Elmhurst, Ill., assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio

Filed Jul. 22, 1976, Ser. No. 707,773
Int. Cl.² G03G *13/20*
U.S. Cl. 96—1 SD **6 Claims**



1. A method of fixing to a sheet of paper a toner powder image applied to a first side thereof comprising the steps of:

providing an impact member having a hard smooth impact surface;

placing the side of the sheet of paper which is opposite to the first side into contact with said impact surface;

providing a plurality of compact, hard surfaced pellets each of which has an impacting area which is substantially smaller than that area of said sheet of paper carrying the toner powder image;

imparting kinetic energy to the pellets; and

impacting the first side of said sheet of paper with the thus energized pellets to pressure fix the toner powder image thereto.

4,094,675

VAPOR DEPOSITION OF PHOTOCONDUCTIVE SELENIUM ONTO A METALLIC SUBSTRATE HAVING A MOLTEN METAL COATING AS BONDING LAYER

Hans-Hermann Beschoner, Bad Westernkotten; Gottfried Guder, Belecke; Hartmut Dulken, Belecke, and Karl-Heinz Kassel, Belecke, all of Germany, assignors to LICENTIA Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Jul. 17, 1974, Ser. No. 489,440
Claims priority, application Germany, Jul. 23, 1973, 2337386; Jul. 23, 1973, 7326993
Int. Cl.² G03G *5/04*; C25D *5/00*; C23C *13/02*
U.S. Cl. 96—1.5 **9 Claims**

1. A method of making an electrophotographic image carrier, comprising the following steps:

(a) applying an intermediate layer on a electrically conductive substrate; the material of said intermediate layer being selected from the group consisting of indium, gallium, bismuth, lead, tin, cadmium, the alloys thereof and sul-

phur; said alloys consisting essentially of the elements constituting members of said group;

(b) subsequent to step (a), vapor-depositing an amorphous inorganic photoconductive layer made of selenium, a selenium alloy or a selenium compound, on said intermediate layer; and

(c) at least at the beginning of step (b), maintaining the temperature of the substrate at a value which is above the melting point of the material of the intermediate layer and below the damaging temperature of the material of the photoconductive layer.

4,094,676

NON-SILVER SALT TYPE PHOTOSENSITIVE COMPOSITION

Hiroshi Takano, Gotenba; Masatsugu Yoshino, Numazu; Hiroshi Naka, Yokohama; Yoshinobu Ito, and Tadao Matsushika, both of Fuji, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 14, 1977, Ser. No. 768,507

Claims priority, application Japan, Feb. 16, 1976, 51-5114938

Int. Cl.² G03C *1/52*

U.S. Cl. 96—90 R **7 Claims**

COMPOSITION	DOT OBSERVED BY OPTICAL MICROSCOPE	DENSITY DISTRIBUTION MEASURED BY MICRODENSITOMETER
A		
B		
C		
D		

1. A non-silver salt type photosensitive composition which comprises (A) N,N'-diphenyl-p-phenylenediamine and tetramethylthiuram disulfide as a color developing agent, (B) an organic halide compound as a photoactivator liberating therefrom a free radical upon light irradiation, (C) as a storage stabilizer for an unexposed photosensitive material a salicylic acid selected from the group consisting of 5,5'-methylenedisalicylic acid, 5-chlorosalicylic acid and 3-phenylsalicylic acid, (D) thiourea as an agent capable of functioning as both an anti-foggant at and after image formation and a contrasting agent, and (E) at least one member selected from the group consisting of (i) 2-methylindole, (ii) 2-mercaptothiazoline and (iii) p-diethylaminobenzaldehyde as a color tone adjusting agent, the weight amount ratio of the N,N'-diphenyl-p-phenylenediamine to the tetramethylthiuram disulfide ranging from 1:10 to 10:1, the weight amount ratio of said color developing agent to said organic halide compound being 1:20 – 2:1, the weight amount ratio of said color developing agent to said salicylic acid being 2:1 to 1000:1, the weight amount ratio of said color developing agent to the thiourea being 2:1 to 1000:1 and the weight amount ratio of said color developing agent to said color tone adjusting agent being 1:1 to 200:1.

4,094,677

CHEMICAL FABRICATION OF OVERHANGING LEDGES AND REFLECTION GRATINGS FOR SURFACE WAVE DEVICES

Donald F. Weirauch, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 28, 1973, Ser. No. 429,475

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36 **2 Claims**

1. A method of etching a surface of a substrate to be employed in an acoustic surface wave device, wherein the pattern to be etched into the substrate surface produces an overhanging ledge structure and the substrate is made of a piezoelectric material of ST cut α quartz, said method comprising:

chemically polishing the surface of the substrate by applying a chemical mixture to the substrate surface effective to remove amorphous material from the substrate surface for providing a polished crystalline finish to the substrate surface,

applying a layer of chromium over the polished substrate surface,

applying a layer of gold over the chromium layer,

applying a layer of photoresist material over the gold layer,

photographically exposing the layer of photoresist material to a pattern of a desired image wherein the pattern is oriented so that its major axis is perpendicular to a line which falls within boundaries estabished by a first line making an angle of 30° with the −X axis of the crystal lattice of said ST cut α quartz material and another line making an angle of 40° with the +X axis of the said crystal lattice,

developing the photoresist layer to produce the pattern therein,

etching the pattern into the gold layer from the patterned photoresist layer,

etching the pattern into the chromium layer,

etching the pattern into said substrate surface by immersing the substrate surface with the patterned layers of chromium and gold thereon in a solution of hydrofluoric acid maintained at a temperature of approximately 25° C,

removing the etched substrate surface with the patterned layers of chromium and gold thereon from the solution of hydrofluoric acid, and

stripping off the patterned layers of gold and chromium from the etched substrate surface.

4,094,678

METHOD OF MAKING CURVED COLOR CATHODE RAY TUBE SHADOW MASKS HAVING INTERREGISTRABLE ELECTRON BEAM-PASSING APERTURE PATTERNS

Kazimir Palac, Carpentersville, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Dec. 7, 1976, Ser. No. 748,802

Int. Cl.² G03C *5/00*; B44C *1/22*; C23F *1/00*

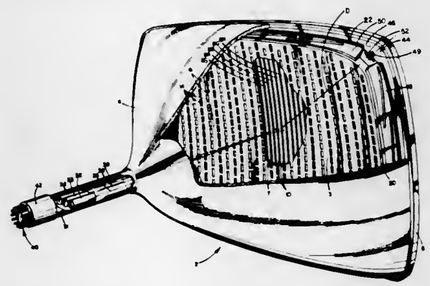
U.S. Cl. 96—36.1 **10 Claims**

1. An improved method of making a curved color cathode ray tube shadow mask comprising:

providing flat mask master means and curved mask master means, said flat and curved mask master means having correlative master stencil patterns;

using said flat mask master means, photochemically forming in at least one side of a flat shadow mask blank a pattern of blind mask apertures whose individual blind aperture location is related to the end-product mask aperture location and whose individual blind aperture size, at least in a direction corresponding to the direction of electron beam scan across the mask is greater than the desired end product mask aperture size by a predetermined misregister tolerance value;

precision-shaping said flat mask blank into a predetermined three-dimensional configuration with the said pattern of blind apertures referenced to indexing means defined by the mask blank; and



photochemically etching in the blank a pattern of through apertures coincident with said pattern of blind apertures but having individual through aperture size smaller by said predetermined tolerance value, at least in said scan direction, than said blind apertures, including using said curved mask master means as a photographic stencil while referencing it to said indexing means defined by the mask blank.

4,094,679

PROCESS FOR REDUCING HALFTONE DOT IMAGES

Yasuo Washizawa, and Tomoaki Ikeda, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Feb. 7, 1977, Ser. No. 766,282

Claims priority, application Japan, Feb. 16, 1976, 51-16305

Int. Cl.² G03F *7/10*

U.S. Cl. 96—36.3 **15 Claims**

1. A process for reducing the size of the dots of a halftone dot image comprising:

(1) imagewise exposing, using active radiation, a metal image-forming material comprising (a) a support, (b) a thin metallic layer comprised mainly of aluminum on said support, which thin metallic layer is dissolved in the alkaline developer solution of step (2), and (c) a photosensitive resin layer on said thin metallic layer, which photosensitive resin layer is dissolved or swollen and selectively removed at exposed or unexposed areas by contact with the alkaline developer solution of step (2);

(2) developing said image-wise exposed metal image-forming material with an alkaline developer solution to cause the dissolving of the thin metallic layer and the dissolving or swelling and selective removal of the photosensitive resin layer, a half-tone dot image resulting upon development of the photosensitive resin layer;

(3) applying a solution which is effective only to swell the photosensitive resin layer but which at most has only a slight capability to etch the halftone dot image at those parts of said metal image-forming material in which the size of the halftone dots is to be reduced, thereby swelling the photosensitive resin; and then

(4) applying to said metal image-forming material a reducing solution which reduces the size of said dots comprising the half-tone image, the reducing solution permeating between the support and the photosensitive resin layer to contact the thin metallic layer at sites where the thin metallic layer does not contact the photosensitive resin layer or the support and etching the thin metallic layer.

2. The process of claim 1, wherein the solution effective only to swell the photosensitive resin layer is an alkaline aqueous solution having a pH of at least about 9 but below about 11, an organic solvent selected from the group consisting of alcohols and hydroxyethers, or an alkaline aqueous solution with a pH of less than about 11 containing an organic solvent selected from the group consisting of alcohols and hydroxyethers.

4,094,680

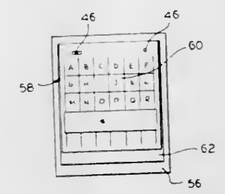
METHOD AND APPARATUS OF CHANGING CHARACTERS ON A FONT AND PREPARING A FONT DUPLICATE

Clifford John Frazier, Wilmette, Ill., assignor to Castcraft Industries, Inc., Chicago, Ill.

Filed Jan. 19, 1977, Ser. No. 760,563

Int. Cl.² G03C *5/04*

U.S. Cl. 96—41 **5 Claims**



1. A method for altering an image including one or more characters located anywhere on a first negative film matrix, under controlled conditions, comprising the steps of:

a. exposing the first negative film matrix on film to produce a first positive film matrix which is an exact duplicate;

b. exposing the first positive film matrix on film to produce a second negative film matrix;

c. overlaying a grid on the first positive film matrix;

d. overlaying a light transparent sheet over said grid;

e. positioning and mounting a replacing image on the light transparent sheet within the desired cell of said grid over the image to be replaced;

f. exposing the mounted replacing image on film to produce a third negative film matrix;

g. covering the image to be replaced on the second negative film matrix with a photographically opaque substance;

h. double exposing both the second and third negative film matrices on the same film to produce a second positive film matrix;

i. exposing the second positive film matrix to produce a fourth negative film matrix which has the replacing image in the position of the replaced image.

3. A method for reproducing and altering a first film matrix having images including one or more characters located anywhere thereon, comprising the steps of:

a. mounting said first film matrix on a jig;

b. mounting a positioning guide having cells of the approximate size of a single character on said jig over said first film matrix;

c. mounting a light transparent sheet on said jig over said positioning;

d. aligning a replacing image within one or more cells of said positioning guide in the desired location over said first film matrix and fixing said replacing image to said light transparent sheet; and

e. double exposing said replacing image and said first film matrix on film to produce a film matrix which includes said replacing image inserted precisely in the desired location with respect to the other images on said first film matrix.

4,094,681

IMAGE AMPLIFICATION OF NEGATIVE-WORKING DIAZO MATERIALS

David P. Habib, East Greenwich, and Gilbert Zweig, Barrington, both of R.I., assignors to Trans World Technology Laboratories, Inc., Fiskeville, R.I.

Filed Oct. 23, 1975, Ser. No. 625,042
Int. Cl.[2] G03C 5/34, 5/18, 5/20
U.S. Cl. 96—49 17 Claims

1. A method for the amplification of dye images formed in a negative-working diazo material having a support and a negative-working acid stabilized diazo layer thereon wherein, on continued exposure to actinic radiation, the diazo compound goes through a photolytic transition starting with an unreactable or non-coupling state, to a reactable state, and finally to an unreactable state, the steps of image formation and amplification which comprise: (1) initially image-wise exposing the negative-working diazo layer to actinic radiation sufficient to convert a portion of the diazo compound contained therein to an active coupling constituent in the light-struck areas to form a first latent image, (2) developing the exposed diazo layer by means of an alkaline agent and/or heat to effect coupling so as to form colored incipient dye images in the light-struck areas, (3) exposing the entire diazo layer from the same side as the initial image-wise exposure to actinic radiation of a greater amount than that used in the initial exposure, said amount of actinic radiation being sufficient to substantially completely photolyze the non-image areas while simultaneously creating second latent images beneath the already-developed dye image areas, and (4) developing the exposed diazo layer again by means of an alkaline agent and/or heat to effect coupling in said second latent image areas to form color therein and to amplify the initial colored incipient dye images.

4,094,682

METHOD FOR PROCESSING LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIAL

Mitsuto Fujiwhara; Syunji Matsuo; Toyoaki Masukawa; Mikio Kawasaki, and Yutaka Kaneko, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Hino, Japan

Filed Oct. 20, 1976, Ser. No. 734,271
Claims priority, application Japan, Oct. 24, 1975, 50-127936
Int. Cl.[2] G03C 7/00, 7/16, 5/32
U.S. Cl. 96—55 3 Claims

1. An improved method for processing an imagewise exposed light-sensitive silver halide photographic material containing a coupler, wherein the silver halide photographic material is processed with a developing bath and thereafter processed, in the presence of imagewise developed silver and a color developing agent, with a solution containing hydrogen peroxide, the improvement comprising processing, after the development, the developed light-sensitive silver halide photographic material with a solution containing a deactivating agent capable of being adsorbed on silver halide or reacting with silver to form sparingly soluble silver salts and selected from the group consisting of 2-mercaptobenzimidazole, 2-mercaptobenzothiazole, 2-mercapto-5-nitrobenzothiazole, 4-methyl-2-mercaptothiazole, 4,5-dimethyl-2-mercaptothiazole, 1-phenyl-5-mercaptotetrazole, 1,2-dimethyl-5-mercapto-1,3,4-triazole, 2-mercapto-5-phenyl-1,3,4- oxadiazole, mercaptoacetic acid, β-mercaptopropionic acid, thiosalicylic acid, benzotriazole, 5-nitrobenzimidazole, 5-methylbenzotriazole, 4-chlorobenzotriazole, 5,5-diphenylhydantoin, 2-methyl-3-(γ-sulfoxypropyl) benzoselenazole, 3-methylbenzothiazole toluenesulfonate, N-isopropyl-α-picolinium bromide, N-ethyl-2-methylbenzothiazolium chloride, phenosafranine, pinakryptol yellow 1,1',3,3,3',3'-hexamethyl-5,5-dinitroimidocarbocyanine-p-toluenesulfonate, 1,3-diallyl-2-[(3,5-dimethyl-1-phenyl-4-pyrazolyl)-vinyl]-imidazo-[4,5-b]-quinoxalium iodide, benzyladenine, 8-hydroxyquinoline, o-phenanthroline and thiosugar, and thereafter subjecting the thus processed light-sensitive silver halide photographic material to spraying with and/or intermittent dipping in said solution containing hydrogen peroxide.

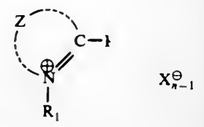
4,094,683

DIRECT POSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIALS

Nobuyuki Tsujino; Akira Ogawa; Tadao Shishido, and Keiichi Adachi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jun. 28, 1976, Ser. No. 700,365
Claims priority, application Japan, Jun. 27, 1975, 50-79893
Int. Cl.[2] G03C 5/24, 1/06, 1/28
U.S. Cl. 96—95 11 Claims

1. A direct positive silver halide light-sensitive material capable of forming direct positive images comprising a support having coated thereon at least one internal image silver halide emulsion layer, wherein said light-sensitive material contains at least one hydrophilic colloid layer containing heterocyclic quaternary salt compound represented by formula (I) in an amount of about 5mg to about 1000mg per 1 mol of silver halide sufficient so that said compound acts as a fogging agent in the silver halide photographic emulsion



(I)

wherein Z is an atomic group necessary for completing a 5- or 6-membered heterocyclic nucleus selected from the group consisting of a thiazole nucleus, a benzothiazole nucleus, a naphthothiazole nucleus, a selenazole nucleus, a benzoselenazole nucleus, a naphthoselenozole nucleus, an oxazole nucleus, a benzoxazole nucleus, a naphthoxazole nucleus, a benzimidazole nucleus, a pyridine nucleus, a quinoline nucleus and an indolenine nucleus, R_1 is an aliphatic group, having 1 to 8 carbon atoms, which aliphatic group is selected from the group consisting of an unsubstituted alkyl group, a sulfo substituted alkyl group, a sulfoalkoxyalkyl group, a hydroxysulfoalkyl group, a carboxyalkyl group, a hydroxyalkyl group, an alkoxyalkyl group, an acyloxyalkyl group, a dialkylaminoalkyl group, a sulfatoalkyl group, an aralkyl group, and a vinylmethyl group, R_2 is a hydrazonoalkyl group having 1 to 8 carbon atoms in the alkyl moiety thereof, $X\ominus$ is an anion, and n is 1 or 2, when n is 1 the compound forms an intermolecular salt.

4,094,684

PHOTOGRAPHIC EMULSIONS AND ELEMENTS CONTAINING AGEL CRYSTALS FORMING EPITAXIAL JUNCTIONS WITH AGI CRYSTALS

Joe E. Maskasky, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 18, 1977, Ser. No. 770,241
Int. Cl.[2] G03C 1/02, 1/28
U.S. Cl. 96—108 20 Claims

1. A photographic emulsion comprised of a photographic vehicle as a continuous phase and, as a discrete phase, radiation-sensitive composite silver halide crystals comprised of

multi-faceted, radiation-receptive silver iodide crystals having a minimum mean diameter of at least 0.1 micron,

silver chloride crystals forming epitaxial junctions with the silver iodide crystals,

at least half of the facets of the silver iodide crystals being substantially free of epitaxial silver chloride, and

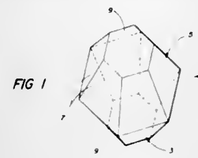


FIG 1

FIG 2

FIG 4

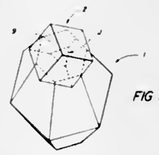


FIG 3

silver chloride being limited to less than 75 mole percent, based on the total silver halide forming said composite crystals.

4,094,685

EXPANDABLE POLYMERIC COATING COMPOSITIONS

David Lester, Arlington, and Robert R. Alexander, Waltham, both of Mass., assignors to Polymerics, Inc., Waltham, Mass.

Filed Jul. 23, 1976, Ser. No. 708,167
Int. Cl.[2] C08J 9/14
U.S. Cl. 260—2.5 B 26 Claims

1. An expandable polymeric coating composition for admixture with paints, dyes and inks to form an expandable chemical coating upon the application of heat comprising:

a first forming binder polymer latex normally in the form of a polymeric dispersion in water to serve as a binder for said composition;

a dispersing agent to serve as a dispersant for expandable volatile substances encapsulated in a monomeric film forming polymer;

a plurality of spheres each of which encapsulates at least one expandable volatile substance in a monomeric film forming polymer dispersed within said first film forming binder polymer latex;

a defoaming agent to prevent excessive foaming when heat is applied to said spheres;

a bridge solvent to provide compatability with the substance into which said polymeric compositions will be mixed and to provide a wetting of said spheres to provide a homogeneous mixture;

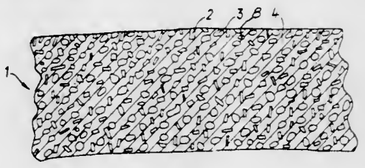
a thickener to increase the viscosity of the composition to the desired level, to give stability to mixtures and to give suspending action to said spheres.

4,094,686

ROAD-SURFACE ADDITIVE FOR PREVENTING ICE AND MELTING SNOW

Robert Dubois, La Croix, Lutry, Switzerland, assignor to Plastiroute S.A., Switzerland

Continuation-in-part of Ser. No. 477,338, Jun. 7, 1974, Pat. No. 4,012,537. This application Nov. 24, 1976, Ser. No. 744,758
Claims priority, application Switzerland, Nov. 25, 1975, 15242/75
Int. Cl.[2] C09K 3/18
U.S. Cl. 106—13 8 Claims



1. A road surface additive for incorporation in an asphalt or bituminous based road surface layer, comprising a mixture of discrete particles of a halide selected from the group consisting of calcium, magnesium and sodium chlorides and mixtures thereof and an alkali metal hydroxide selected from the group of sodium and potassium hydroxides in the ratio of 90 to 97 parts by weight of halide for 3 to 10 parts of hydroxide, said particles having substantially water-tight coatings which are inert to the halide and hydroxide and heat resistant at temperatures to which the admixed additive may be subjected for formation of a road surface layer and which coatings can be mechanically destroyed to expose said particles at the surface of a road incorporating the additive to prevent ice formation and melt snow on said surface.

4,094,687

HEAT-SENSITIVE RECORDING COMPOSITION

William R. Lawton, 6651 Jewett-Holmwood Rd., Orchard Park, N.Y. 14127

Continuation-in-part of Ser. No. 772,084, Feb. 25, 1977, and Ser. No. 774,210, Mar. 3, 1977, and Ser. No. 774,385, Mar. 4, 1977. This application Mar. 4, 1977, Ser. No. 774,330
Int. Cl.[2] C09D 11/00; G03C 1/52
U.S. Cl. 106—21 5 Claims

1. A heat-sensitive, non-volatile, non-hygroscopic, and odor-free recording composition adapted to acquire a color contrasting visibly with a background color of the composition upon heating a selected region thereof to an elevated temperature, comprising

an N-substituted condensation product of a heterocyclic diimino compound and an aromatic aldehyde, said heterocyclic diimino compound being selected from the group consisting of piperazine, homopiperazine, 2-methylpiperazine, and 2,5-dimethyl piperazine and

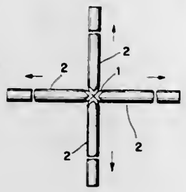
a cyclic polyketo compound reactive with amines and amides at elevated temperatures to form a color, said cyclic polyketo compound being selected from the group consisting of ninhydrin, isatin, 5-bromoisatin, 5,7-dichloroisatin, 5-nitroisatin, alloxan, alloxazine, and hydrindantin.

4,094,688

METHOD AND MOLDING CORE FOR MAKING A FLEXIBLE HOLLOW MOLDED BODY WHICH IS OPEN ON A NUMBER OF SIDES

Franz-Josef Wolf, Sprudelallee 19, -6483 Bad Soden-Salmunster, Germany

Filed Apr. 30, 1976, Ser. No. 682,089
Claims priority, application Japan, Aug. 21, 1975, 2537251; Germany, Feb. 18, 1976, 2606528
Int. Cl.² B28B *7/36;* B29C *1/12*
U.S. Cl. 106—38.2 10 Claims



1. A method for making a flexible pipe manifold having a free passage therethrough comprising: injection molding a plastic material around a brittle one-piece molding core containing at least one predetermined breaking point; after the removal of the manifold from the mold bending the hollow molded body in such a way that the molding core breaks into parts at the predetermined breaking point; and finally withdrawing the parts of the molding core completely from the manifold providing a free passage therethrough.

6. A molding core for making a flexible pipe manifold characterized by the fact that the molding core is in one piece, comprises a brittle material, and has at least one predetermined breaking point which is so disposed that after breaking, the molding core may be withdrawn completely at this point from the manifold providing a free passage therethrough.

4,094,689

GLASS COMPOSITIONS

Henricus Matheus Jacobus Marie van Ass, and Robert Georg Gossink, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 16, 1977, Ser. No. 778,014
Claims priority, application Netherlands, Apr. 12, 1976, 7603832
Int. Cl.² C03C *13/00*
U.S. Cl. 106—50 3 Claims

1. A glass composition suitable for processing into optical fibers with a radial gradient in the refractive index, consisting essentially of GeO_2, at least one oxide chosen from B_2O_3 and SiO_2, an alkali oxide selected from the group consisting of Li_2O, Na_2O, K_2O, wherein

$GeO_2 \geqq 25$ mole %
$SiO_2 + B_2O_3 \geqq 25$ mole %

and a totality of alkali oxide $\geqq 15$ mole %. according

2. Optical fibers with a radial gradient in the refractive index wherein a core having the highest refractive index wherein a core having the highest refractive index and a cladding having the lowest refractive index have a continuous transition zone, obtained froma pair of glass compositions according to claim 1 in which the alkali metal oxide of the core is Li_2O and/or Na_2O and the alkali metal oxide of the cladding is Na_2O and/or K_2O, the alkali metal in the cladding being other than the alkali metal in the core.

4,094,690

LIQUID COMPOSITION

Michael John Morton, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 382,198, Jul. 24, 1973, Pat. No. 3,994,740.
This application Aug. 30, 1976, Ser. No. 718,463
Claims priority, application United Kingdom, Aug. 7, 1972, 36693/72
Int. Cl.² C04B *35/10*
U.S. Cl. 106—73.4 32 Claims

1. A process for the preparation of a fiber comprising a metal oxide and silica comprising the steps of

(a) providing a liquid composition having a viscosity of greater than 0.1 poise comprising an aqueous solution of a water-soluble metal compound and a water-soluble organic silicon compound which is stable to hydrolysis in the liquid composition and in which silicon atoms are attached to carbon atoms directly or through an oxygen atom and wherein the concentration of the metal compound expressed as equivalent metal oxide exceeds the concentration of the silicon compound expressed as silicon dioxide;

(b) fiberizing the said liquid composition to form fibers; and

(c) heating the said fibers to decompose the metal compound and the silicon compound to oxides.

4,094,691

MORTAR FOR ANTICONDENSATE, ANTIMOISTURE, HEAT-INSULATING, AND BIOCIDAL PLASTER

Dinu Stefan Moraru; Ion Pitis, both of Bucharest, and Constantin Bogos, Iasi, all of Romania, assignors to Institutul de Cercetari in Constructii si Economia Constructiilor, Bucharest, Romania

Filed Mar. 10, 1977, Ser. No. 776,268
Int. Cl.² C04B *7/355*
U.S. Cl. 106—95 4 Claims

1. A mortar for interior plastering having anticondensate, antimoisture diffusive, heat insulating and biocidal properties, consisting essentially of a mixture in volume parts of:

about 20 parts of 1 mm pearlite grains;
an effective amount up to 0.1 parts of a copper naphthenate solution in white spirit in proportions by volume of 1:1;
0.1 to -0.2 parts of calcium stearate powder;
an effective amount up to 1 part of white spirit;
about 5 parts of lime paste;
2 to 2.5 parts of Portland cement; and
about 5 parts of water.

4,094,692

PROCESS FOR STABILIZING CEMENT STONE FORMED WITH ALUMINOUS BINDERS

Eberhard Rauschenfels, Wiesbaden-Sonnenberg, Germany, assignor to Dyckerhoff Zementwerke Aktiengesellschaft, Wiesbaden-Amoneburg, Germany

Filed Jan. 6, 1977, Ser. No. 757,423
Claims priority, application Germany, Jan. 10, 1976, 2600769
Int. Cl.² C04B *7/32*
U.S. Cl. 106—104 8 Claims

8. An aluminous binder suitable for forming cement stone containing calcium sulfite waste obtained from purification of furnace flue gases in an amount of at least 0.2 weight % up to about 10 weight % calculated as $CaSO_3$.

4,094,693

D,L TARTARIC ACID AS RETARDANT FOR GYPSUM PLASTER

Helmut Knorre, Seligenstadt; Manfred Langer, Hanau, and Peter Leidl, Cologne, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Sep. 14, 1976, Ser. No. 723,173
Claims priority, application Germany, Sep. 24, 1975, 2542535
Int. Cl.² C04B *11/14*
U.S. Cl. 106—111 8 Claims

1. Gypsum plaster having sufficient D,L-tartaric acid therein to delay the setting time of the plaster and having sufficient calcium hydroxide that a 5% by weight aqueous paste of the plaster has a pH of at least 11.5, the content of D,L-tartaric acid being between 0.01 and 0.5 weight %.

4,094,694

WATER-RESISTANT GYPSUM COMPOSITION AND PRODUCTS, AND PROCESS OF MAKING SAME

William J. Long, Chicago, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Continuation of Ser. No. 669,945, Mar. 24, 1976, abandoned.
This application May 16, 1977, Ser. No. 796,926
Int. Cl.² C04B *11/14*
U.S. Cl. 106—111 44 Claims

1. A water-resistant cementitious composition consisting essentially of a set mass of hydrated gypsum crystals, and a waterproofing composition, said waterproofing composition comprising asphalt and wax originally added as an emulsion, a borate-containing compound and polyvinyl alcohol, the dry weight percent of the total of said asphalt and said wax based on the dry weight of said cementitious composition being at least about 1.6%, said polyvinyl alcohol being present in an amount of at least 0.015 weight percent based on the dry weight of said cementitious composition, and said borate-containing compound being present in an amount effective to cooperate with said polyvinyl alcohol and said asphalt and wax to enhance the water-resistance of said cementitious composition.

4,094,695

PLASTICIZED CELLULOSE ESTER COMPOSITIONS

Robert R. Sanders, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 5, 1976, Ser. No. 711,923
Int. Cl.² C08L *1/10*
U.S. Cl. 106—179 11 Claims

1. A composition comprising an ester of cellulose and one or more carboxylic acids of two to four carbon atoms and a plasticizing amount of (1) poly(tetramethylene glycol) having a molecular weight of about 800 to 1200, (2) a poly(alkylene glycol) copolymer in which 10 weight percent or less is made up of units derived from ethylene oxide and the remainder is made up of units derived from propylene oxide, the copolymer having a molecular weight of about 800 to 1200, (3) poly(propylene glycol) having a molecular weight of about 800 to 1200, or (4) a carboxylic acid ester of (1), (2), or (3) in which the carboxylic acid moiety contains about 2 to 8 carbon atoms.

8. A thermoplastic coating composition in the form of a powder having an average particle size of between about 10 and 300 microns in which the film-forming ingredient consists essentially of a cellulose acetate butyrate wherein the plasticizer is (1) poly(tetramethylene glycol) having a molecular weight of about 800 to 1200, (2) a poly(alkylene glycol) copolymer in which 10 weight percent or less is made up of units derived from ethylene oxide and the remainder is made up of units derived from propylene oxide, the copolymer having a molecular weight of about 800 to 1200, (3) poly(propylene glycol) having a molecular weight of about 800 to 1200, or (4) a carboxylic acid ester of (1), (2) or (3) in which the carboxylic acid moiety contains about 2 to 8 carbon atoms.

4,094,696

ASPHALT EMULSION PAVING COMPOSITION

Michael V. Burris, 723 S. Third St., Las Vegas, Nev. 89101

Filed May 17, 1976, Ser. No. 686,733
Int. Cl.² C08L *95/00*
U.S. Cl. 106—277 9 Claims

1. An asphalt emulsion composition consisting essentially of: an oil phase having between about 5 and about 15 parts by weight gilsonite, between about 5 and about 15 parts by weight naphtha and between about 70 and about 90 parts by weight asphalt and having a residue from distillation penetration less than 40 dmm at 77° F, between about 0.1 and about 2% of a cationic emulsifying agent, and water, the ratio of oil;water being between about 1;1 and 2;1 by weight, respectively.

4,094,697

ASPHALT CEMENT AND CONCRETE COMPOSITIONS AND FILLER COMPOSITIONS THEREFOR

Fritz S. Rostler, Bakersfield, Calif., assignor to Cabot Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 696,926, Jun. 17, 1976, which is a continuation of Ser. No. 495,603, Aug. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 406,865, Oct. 16, 1973, abandoned. This application May 16, 1977, Ser. No. 796,983
Int. Cl.² C08L *95/00;* C09D *3/24*
U.S. Cl. 106—280 26 Claims

1. A filler composition for asphalt which comprises a pelleted mixture of carbon black having a BET-N_2 surface area of at least about 40 m^2/g and a dibutyl phthalate absorption value of at least about 60 c.c./100 g and an essentially nonvolatile asphalt-solvating oil, the weight ratio of said carbon black to said oil being between 90 to 10 and 60 to 40; said pelleted mixture having a 325-mesh residue value, as determined by the Residue Value Test procedure described herein, of not more than about 4 weight percent thereof, and which pelleted mixture, when dispersed into 100 parts by weight of +30−20 sieve analysis Ottawa sand and 2 parts by weight of asphalt cement by hand stirring of the combined ingredients for from three to six minutes at a temperature of about 325° F, results in an improved asphalt composition having reduced pellet abrasion properties as determined by the Pellet Abrasion Test procedure described herein.

4,094,698

DYE OR COLOR DEVELOPING INORGANIC PIGMENTS

Thomas D. Thompson, Flemington, N.J., assignor to Yara Engineering Corporation, Elizabeth, N.J.

Filed Sep. 16, 1974, Ser. No. 506,103
Int. Cl.² C04B *31/00*
U.S. Cl. 106—288 B 10 Claims

1. An oxidizing clay for pressure sensitive record materials comprising an acid leached clay from the group consisting of bentonite and montmorillonite carrying ion exchanged cupric ions.

4,094,699

PROCESS FOR CONVERTING PREMILLED QUINACRIDONE TO PIGMENTARY FORM

Patrick Henry Fitzgerald, Edison, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 1, 1976, Ser. No. 746,299
Int. Cl.² C09B *48/00*
U.S. Cl. 106—288 Q 3 Claims

1. A process for converting premilled quinacridone to pigmentary form by contacting the premilled quinacridone with an aqueous alkaline medium consisting essentially of water having a pH of at least 10 in an amount sufficient to intimately contact the premilled quinacridone at a temperature of at least 85° C. in the presence of at least one surfactant selected form

cationic and nonionic surfactants, wherein the cationic surfactant is in an amount from 2 to 9% by weight, based on the weight of the premilled quinacridone and the nonionic surfactant is in an amount from 2 to 8% by weight, based on the weight of the premilled quinacridone.

4,094,700

APPARATUS AND PROCESS FOR THE PRODUCTION OF GLUTEN AND STARCH FROM WHEAT, RYE, OR BARLEY

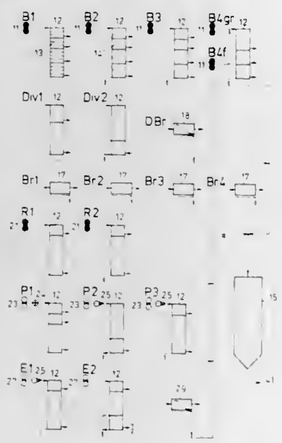
Harri Rennes, Raisio, Finland, and Christian Lippuner, Niederuzwil, Switzerland, assignors to Gebrueder Buehler AG, Uzwil, Switzerland and Oy Vehna AB, Raisio, Finland, part interest to each

Filed Sep. 20, 1976, Ser. No. 724,839

Claims priority, application Switzerland, Sep. 23, 1975, 12347/75

Int. Cl.² C13L *1/02*

U.S. Cl. 127—24 **22 Claims**



1. In the method of producing starch and gluten from a grain such as wheat, rye or barley, comprising the steps of dispersing endosperm fractions derived through the grain milling process in water, separating the dispersion into a starch-rich fraction and a gluten-rich fraction by centifugation, maintaining the gluten-rich fraction at an elevated temperature level for a predetermined period of time to allow the gluten to form filiform agglomerates, adding water to the agglomerate-containing fluid to expand the size of the agglomerate, and separating the gluten accumulation from the resultant mixture, the improvement comprising the additional step of initially grinding the grain to obtain the endosperm fractions by the method comprising the steps of:

(a) breaking and sifting the grain to obtain finished endosperm fractions, a fine product, a coarse product, and a bran waste product;

(b) sizing the coarse product by cutting and sifting to produce finished endosperm fractions and a sized product;

(c) pressing, impacting, and softing the sized product and the fine product to produce finished endosperm fractions and tailings; and

(d) finally reducing the tailings to produce finished endosperm fractions and a fine bran waste product.

4,094,701

METHOD FOR CLEANING TIN SURFACES

Douglas D. Fekete, Warren, Mich., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Filed Mar. 18, 1976, Ser. No. 668,011

Int. Cl.² B08B *3/08*

U.S. Cl. 134—2 **5 Claims**

1. A process for cleaning a tin surface without substantial etching thereof comprising contacting the surface with an aqueous alkaline solution having a pH value of at least 9.0 and containing an organic tannin in an amount sufficient to inhibit etching of the surface.

4,094,702

METHOD AND APPARATUS FOR CONTROLLING BY-PASS LIQUID FLOW IN DISH-WASHING MACHINES

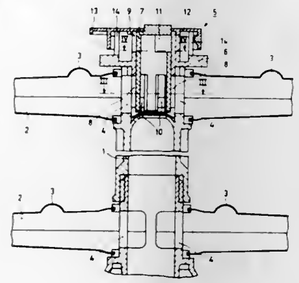
Sergio Rabuffetti, Castronno, Italy, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 596,970, Jul. 17, 1975, abandoned. This application Jan. 13, 1977, Ser. No. 759,058

Claims priority, application Italy, Jul. 11, 1974, 25019 A/74

Int. Cl.² B08B *3/02, 11/02*

U.S. Cl. 134—10 **3 Claims**



1. A method of washing dishes in a dish-washing machine having a plurality of baskets for containing dishes, at least one washing liquid spray device associated with each basket and having spray nozzles, and providing at least one selectable operative cycle, and a single means for circulating washing liquid to said spray devices, comprising setting a reduced flow rate to each spray device independently of the flow rate of other spray devices and the operative cycles selected, by the step of by-passing a portion of circulated liquid from flowing through any of the spray nozzles and returning said portion for recirculation by the single means.

4,094,703

SOLAR ENERGY CONVERTER

Gregory J. Williams, Ithaca, N.Y., assignor to Cornell Research Foundation, Ithaca, N.Y.

Filed Dec. 30, 1976, Ser. No. 755,775

Int. Cl.² H01L *31/04*

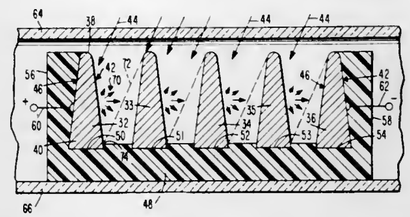
U.S. Cl. 136—89 TF **11 Claims**

1. An improved converter for converting light energy to electrical energy comprising:

a plurality of electrically conductive electrode elements each having a first, photoemissive surface and a second, anode surface;

means mounting said electrode elements in spaced, insulated relationship, said first surface of each electrode element facing said second surface of the next adjacent electrode element, each pair of facing surfaces and the intervening space therebetween defining a voltage cell and said plurality of elements defining a plurality of voltage cells in series, said mounting means securing said electrodes in geometrically arrayed, generally parallel relationship so

that incident light will produce photoemission from only the first surface of each voltage cell, the second surface of



each voltage cell being so positioned as to intercept the electrons from its corresponding first surface.

4,094,704

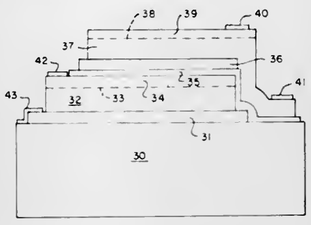
DUAL ELECTRICALLY INSULATED SOLAR CELLS

Arthur G. Milnes, 1417 Inverness Ave., Pittsburgh, Pa. 15217

Filed May 11, 1977, Ser. No. 795,811

Int. Cl.² H01L *31/06*

U.S. Cl. 136—89 TF **13 Claims**



1. A solar cell, adapted for superposition upon an underlying solar cell, comprising a substrate transparent to a first range of sunlight, an intermediate solid rheotaxy layer of a semi-conductor compound transparent to a second range of sunlight overlying said substrate, the first range being at least as great as the second range, the intermediate layer being selected from the group consisting of: Se, As_2Se_3, As_2S_3, Sb_2S_3, Sb_2Se_3, GeS, GeSTe, GeSe, $SnSe_2$ and In_2S and intercompounds of those constituents, and a solar cell layer overlying said rheotaxy layer and comprising a polycrystalline semiconductor compound having a larger crystal grain size than the substrate.

8. The solar cell of claim 1 in combination with an underlying solar cell electrically insulated therefrom, the bandgap of the overlying solar cell being greater than the bandgap of the underlying solar cell.

4,094,705

ALUMINUM ALLOYS POSSESSING IMPROVED RESISTANCE WELDABILITY

Philip R. Sperry, Chesterfield, Mo., and Frank N. Mandigo, Northford, Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Mar. 28, 1977, Ser. No. 781,718

Int. Cl.² C22F *1/04*; C22C *21/06*

U.S. Cl. 148—2 **23 Claims**

1. An aluminum base alloy having improved resistance weldability plus excellent strength and formability, consisting essentially of 1.0 to 5.0% magnesium, 0.3–1.0% lithium, up to 1% manganese, up to 0.3% titanium, up to 0.20% vanadium, and balance aluminum, wherein said lithium is substantially retained in solid solution, said alloy being capable of withstanding elevated temperature without undue loss of strength and formability properties.

17. A method for the preparation of wrought products exhibiting improved resistance weldability plus excellent strength and formability, wherein said alloy is capable of withstanding elevated temperature without undue loss of strength and formability properties which comprises:

A. providing an aluminum base alloy consisting essentially of 1.0 to 5.0% magnesium, 0.3 to 1.0% lithium, up to 1% manganese, up to 0.3% titanium, up to 0.20% vanadium, and balance aluminum;

B. casting said alloy;

C. heating said alloy to a homogenizing temperature and thereafter homogenizing said alloy;

D. hot and cold working said alloy; and

E. annealing said alloy whereby said wrought products are capable of plastic deformation to form automotive body parts.

4,094,706

PREPARATION OF ZIRCONIUM ALLOYS

Erland Maxwell Schulson, Deep River, and Donald James Cameron, Pinawa, both of Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 465,654, Apr. 30, 1974, abandoned. This application Aug. 4, 1976, Ser. No. 711,744

Claims priority, application Canada, May 11, 1973, 171070

Int. Cl.² C21D *1/02*; C22D *16/00*

U.S. Cl. 148—11.5 F **19 Claims**

1. A method of producing a high tensile strength, creep and corrosion resistant zirconium alloy, consisting essentially of 7.0–10.0 wt.% Al, 0-3 wt.% in total of one or more elements selected from the group consisting of magnesium, tin, chromium, iron, carbon, silicon, yttrium, niobium, molybdenum and beryllium, balance zirconium and incidental impurities, comprising annealing said alloy, in a state substantially devoid of untransformable Zr_2Al particles, at a temperature below about 992° C for a period of time sufficient to produce a substantially continuous matrix of the intermetallic compound Zr_3Al in said alloy

---

4,094,707

MAKING WITHDRAWAL ROLLERS FOR INGOTS

Hans Schrewe, Duisburg, and Klaus Frenken, Krefeld, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Aug. 8, 1977, Ser. No. 822,918

Claims priority, application Germany, Aug. 9, 1976, 2636199

Int. Cl.² B21H *1/14*

U.S. Cl. 148—12 R **7 Claims**

1. A method of making rollers for withdrawal of hot ingots, comprising the steps of:

making a roller body of high tensile material but requiring thermal treatment for enhancing toughness;

providing a relatively thick protective coating onto the roller, and sintering the coating;

mechanically surface finishing the coating; and thermally treating the roller body carrying the coating to enhance toughness and tensile strength of the roller.

4,094,708

TITANIUM-BASE ALLOYS

Roger Thomas John Hubbard, Sutton Coldfield; Richard Ernest Goosey, Solihull, and Donald Francis Neal, Lichfield, all of England, assignors to Imperial Metal Industries (KYNOCH) Limited, Birmingham, England

Continuation of Ser. No. 305,329, Nov. 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 797,674, Feb. 7, 1969, abandoned.

Filed Feb. 17, 1977, Ser. No. 769,786

Claims priority, application United Kingdom, Feb. 16, 1968, 7776/68

Int. Cl.[2] C22C *14/00*

U.S. Cl. 148—32.5 2 Claims

1. A high strength creep resistant titanium-base alloy consisting of 6% aluminium, 5% zirconium, 0.5% molybdenum, 0.25% silicon, balance titanium, apart from impurities, said alloy having a creep strain less than 0.1% in 100 hours at 520° C at a stress of 20 tonf/in^2 and in the as welded condition a room temperature ductility of at least 15% reduction in area and 10% elongation when measured on a gauge length of $4\sqrt{S_o}$ where S_o is the cross-sectional area, the alloy being beta solution treated at 1050° C, cooled and aged for not less than 24 hours at a temperature not less than 500° C, and air cooled, whereby the alloy has an alpha plate-like structure with precipitate at the alpha plate boundaries, said precipitate being a titanium/molybdenum silicide, and having a principally body centred cubic structure.

4,094,709

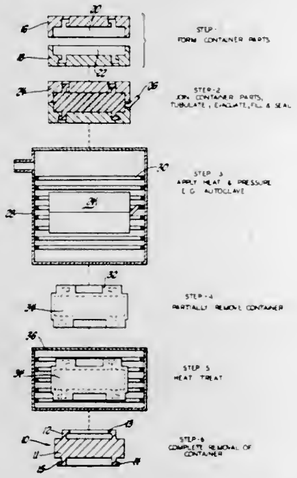
METHOD OF FORMING AND SUBSEQUENTLY HEAT TREATING ARTICLES OF NEAR NET SHAPED FROM POWDER METAL

Walter J. Rozmus, Birmingham, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.

Filed Feb. 10, 1977, Ser. No. 767,522

Int. Cl.[2] B22F *1/00*

U.S. Cl. 148—126 6 Claims



1. A method of forming and subsequently heat treating articles of near net shape from powder metal including the steps of producing a thickwalled container by forming a cavity of predetermined shape in a mass of suitable container material such that the walls of the container are of sufficient thickness so that the exterior surface thereof does not closely follow the contour of the cavity, filling the cavity of the container with powder metal, and applying heat and pressure to the container such that the container material acts like a fluid to apply hydrostatic pressure to the heated powder metal contained in the cavity thereby consolidating the powder metal to produce a densified compact; the improvement comprising the steps of preparing the densified compact for heat treating by selectively removing portions of the container to form a jacket of container material around the densified compact, heat treating the densified compact and completing removal of the container material.

5. A method of forming and subsequently heat treating near net shapes from superalloy powder metal including the steps of producing a thickwalled container from a mass of fully dense and incompressible ferrous-base material by forming a complex cavity of predetermined shape in the mass such that the walls of the container are of sufficient thickness so that the exterior surface thereof does not closely follow the contour of the cavity, filling the cavity of the container with a powder metal selected from a group consisting of nickel, cobalt, and ferrous-based superalloy powder and consolidating the powder metal by heating the container and powder metal to a temperature at which the powder metal will consolidate and by applying pressure to the heated container sufficient to cause plastic flow of the ferrous-base container material whereby the container material acts like a fluid to apply hydrostatic pressure to the heated powder metal contained in the cavity thereby consolidating the powder metal to produce a densified compact; the improvement comprising the steps of preparing the densified compact for heat treating by selectively removing portions of the container to form a jacket of container material around the densified compact, heat treating the densified compact and completing removal of the container material.

4,094,710

EXPLOSIVE COMPOSITION CONTAINING GUANIDINIUM PICRATE

Carl Boyars, and Mortimer J. Kamlet, both of Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 16, 1973, Ser. No. 390,443

Int. Cl.[2] C06B *45/18*

U.S. Cl. 149—3 8 Claims

1. An explosive composition comprising a layer of guanidinium picrate completely surrounding an explosive material which is selected from the group consisting of (a) explosive materials having greater impact sensitivity than guanidinium picrate has, (b) explosive materials having lower thermal stability than guanidinium picrate has, and (c) mixtures thereof.

4,094,711

TRACER AND COMPOSITION

Jawaharlal Ramnarace, Dana Point, Calif., assignor to Ford Aerospace & Communications Corporation, Dearborn, Mich.

Filed Sep. 1, 1977, Ser. No. 829,995

Int. Cl.[2] C06B *45/36*

U.S. Cl. 149—4 7 Claims

1. An improved tracer round comprising a projectile with a cavity containing tracer compositions wherein the tracer composition comprises a consolidated rubbery particulate tracer mixture which comprises:

(A) about 30–60 parts by weight magnesium;

(B) about 10–40 parts by weight polytetrafluoroethylene; and

(C) about 10–25 parts by weight copolymer of hexafluoropropylene and vinylidenefluoride,

wherein a coating on (A) and (B) comprises the copolymer of (C).

4,094,712

CONSOLIDATED CHARGES INCORPORATING INTEGRAL IGNITION COMPOUNDS

Terrence P. Goddard, Aptos; Donald N. Thatcher, Hollister, and Charles G. Garrison, San Jose, all of Calif., assignors to Teledyne McCormick Selph, an operating division of Teledyne Industries, Inc., Hollister, Calif.

Filed May 10, 1977, Ser. No. 795,473

Int. Cl.[2] C06B *45/28*

U.S. Cl. 149—10 19 Claims

1. In a process for consolidating a charge of nitrocellulose-based propellant grains, the improvement of incorporating an ignition compound matrix comprised of certain decahydrodecaborate compounds, through the steps of:

(A) wetting loose propellant grains on their exterior surfaces with a consolidating fluid having a solvating effect on said grains, the consolidating fluid being in the range of approximately 0.010 to 0.100 milliliters of fluid per gram of propellant, and,

(B) introducing a layer of decahydrodecaborate compound onto the exterior surfaces of said grains as the result of the wetting effect of said consolidating fluid, wherein said compound is in the range of approximately 0.1% to 4.0% of the total propellant weight, wherein said compound further includes a salt selected from the class of salts having the common anion $B_{10}H_{10}^{-2}$, and a cation selected from the group consisting of:

(i) ammonium, wherein the salt has the formula $(NH_4)_2B_{10}H_{10}$;

(ii) hydrazinium, wherein the salt has the general formula $(NH_2NH_3)B_{10}H_{10}$;

(iii) metal ions derived from the elements in Groups 1, 2, 8, 3*b*, 4*b*, 5*b*, 6*b*, 7*b*, and the elements of Groups 3*a*, 4*a*, 5*a*, and 6*a* which have atomic numbers respectively greater than 5, 14, 33 and 52; and

(C) consolidating the thusly wetted propellant grains into a consolidated charge by a compaction step, wherein the decahydrodecaborate compound layer on each grain becomes a matrix between the grain-to-grain boundaries of the consolidated charge.

4,094,713

SENSITIZING LIQUID EXPLOSIVES WITH HIGH GAMMA GAS

B. Arthur Breslow, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 21, 1977, Ser. No. 761,189

Int. Cl.[2] C06B *47/08*

U.S. Cl. 149—36 16 Claims

1. A method for sensitizing a liquid explosive that has a desensitizing agent added, said method comprising the steps of:

A. providing a high gamma gas, bubbles of which are capable of overcoming the effect of said desensitizing agent and

B. bubbling said high gamma gas into said explosive.

4,094,714

STABILIZED NITRATO-ALKANOL EXPLOSIVE COMPOSITION

George Henry Barnett, Kew, Australia, assignor to ICI Australia Limited, Melbourne, Australia

Division of Ser. No. 634,179, Nov. 21, 1975. This application Jul. 19, 1977, Ser. No. 816,931

Claims priority, application Australia, Dec. 9, 1974, PB9949

Int. Cl.[2] C06B *25/00*

U.S. Cl. 149—88 16 Claims

1. An explosive composition of the aqueous slurry type, comprising:

an aqueous slurry of one or more inorganic oxygen releasing salts,

water, and

a sensitizer component comprising at least one nitrato-alkanol and a stabilizingly effective amount of one or more derivatives of carbamic acid, the said sensitizer component being present in sensitizing amount and being soluble and dissolved in the aqueous phase of the said explosive composition.

4,094,715

METHOD AND APPARATUS FOR APPLYING FOAM INSULATION TO PIPE

Stewart Henderson, and Ralph Hielema, both of Calgary, Canada, assignors to Henderwood Industries, Ltd., Calgary, Canada

Filed Aug. 27, 1976, Ser. No. 718,394

Int. Cl.[2] B32B *5/18*

U.S. Cl. 156—78 19 Claims

1. A method of applying a foamable liquid to a cylindrical object, comprising:

moving the object along its longitudinal axis;

simultaneously rotating the object about its longitudinal axis;

first spraying the foamable liquid onto the object;

allowing the foamable liquid to rise substantially on the object; and

wrapping the foamable liquid with a flexible sheet material while the risen foam is still deformable,

said wrapping step including applying sufficient pressure to the risen foam through the sheet material to increase the density of the foam only in the vicinity of the foamed surface.

4,094,716

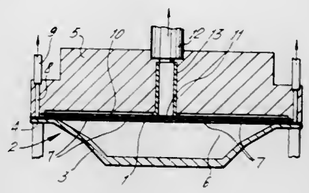
METHOD OF AND APPARATUS FOR DECORATING ARTICLES WITH DECALCOMANIAS

Eduardo Valdez Lopez, Colloto (Oviedo), Spain, assignor to Iberica de Calcomanias, S.A., Spain

Continuation of Ser. No. 512,913, Oct. 7, 1974, abandoned. This application Nov. 8, 1976, Ser. No. 740,071

Int. Cl.[2] B44C *1/16*

U.S. Cl. 156—87 1 Claim



1. A method of decorating an article with a decalcomania, comprising;

perforating a decorative transfer;

wetting the perforated decalcomania transfer to remove it from a substrate thereof;

backing the wetted transfer by a flexible backing sheet stronger than the transfer to hold the transfer, backed by the backing sheet, over a surface portion of an article such as a ceramic plate, which surface portion is to be decorated with the transfer, while holding a marginal portion of the backing sheet to a marginal portion of the article surrounding the surface portion, to define an enclosed space by and between the article and the backing sheet, the backing sheet having an aperture in the enclosed space,

and to hold the wetted perforated transfer in the enclosed space between the backing sheet and the article;

exhausting air from the enclosed space through the perforated transfer and the aperture of the backing sheet for drawing the transfer, backed by the flexible backing sheet, firmly onto the surface portion of the article, to bond the transfer to the article;

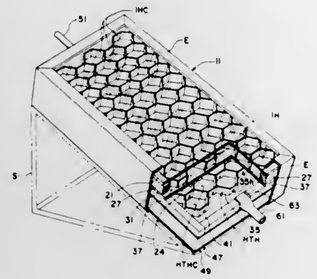
subjecting the article with the wetted perforated bonded transfer to heat, and permitting any resulting steam to escape through the perforated transfer to prevent cracking of the transfer.

4,094,717

METHOD OF ASSEMBLY OF AN INSULATING PANEL ARRANGEMENT

Irwin R. Barr, Baltimore County, Md., assignor to AAI Corporation, Cockeysville, Md.

Continuation of Ser. No. 583,248, Jun. 3, 1975, abandoned, which is a division of Ser. No. 465,845, May 1, 1974, abandoned.
This application Jan. 31, 1977, Ser. No. 764,146
Int. Cl.² B31D *3/02*
U.S. Cl. 156—197 **6 Claims**



1. The method of assembly of an insulating honeycomb sandwich array; comprising

forming an insulating bead along the edges of the cell walls of a honeycomb section,

and securing a sheet to said honeycomb section by bonding said sheet to said insulating bead, and in spaced relation from said cell wall edges and with said bead forming a separating insulating layer between said honeycomb section and said sheet,

securing a second heat conductive sheet to said honeycomb section in substantially direct heat transfer engagement with the edges of said cell walls opposite to said insulated bead edges.

4,094,718

PROCESS OF PREPARING CORRUGATED PAPER BOARD WITH A PARTICULAR POLYVINYL ALCOHOL MODIFIED STARCH-BASED CORRUGATING ADHESIVE

Edward Peter Czerwin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 17, 1975, Ser. No. 632,725
Int. Cl.² B31F *1/20*; C08L *3/02*
U.S. Cl. 156—210 **6 Claims**

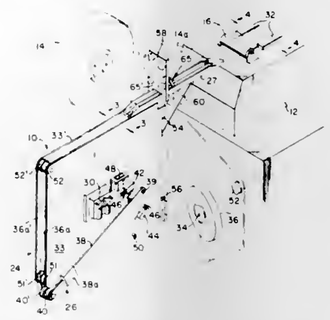
1. An improved continuous process of preparing corrugated board consisting of at least one liner and at least one fluted medium, which process includes the steps of (1) continuously applying to the tips of the corrugations of the fluted medium a composition comprising at least 15%, based upon the weight of the total solids on a dry basis, of a potentially adhesive ungelatinized starch and up to 85%, based upon the weight of the total solids on a dry basis, of a viscous gelatinized starch carrier therefor, (2) bringing a liner in contact with the adhesive coated tips of the corrugated medium; and (3) applying heat and pressure to bond said liner and fluted medium, the improvement consisting of employing in said composition from about 2 to about 20 percent, by weight of the total starch present, of polyvinyl alcohol having a degree of hydrolysis of from about 99 to about 100 percent, a 4 percent aqueous solution viscosity at 20° C. of from about 5 to about 60 centipoises, less than about 3 percent by weight cold water solubles at 30° C., at least about 80 percent by weight hot water solubles at 70° C., at least about 95 percent of said polyvinyl alcohol having a particle size less than about 45 microns and substantially all of said polyvinyl alcohol having a particle size less than about 75 microns.

4,094,719

METHOD FOR DISPENSING ADHESIVE TRANSFER TAPE FOR ENGAGEMENT WITH A MOVING STRIP OF PHOTOGRAPHIC FILM PRINTS

Herman L. Jones, 7302 84th St. N.E., Marysville, Wash. 98270, and John H. Haugen, 9925 Davies Rd., Lake Stevens, Wash. 98258

Division of Ser. No. 505,253, Sep. 12, 1974, Pat. No. 4,001,073.
This application Oct. 21, 1976, Ser. No. 734,467
Int. Cl.² B32B *31/00*; B65C *9/25*
U.S. Cl. 156—250 **22 Claims**



1. A method for dispensing adhesive transfer tape, comprising the steps of: dispensing a strip of pressure sensitive adhesive transfer tape composed of a transferable pressure sensitive adhesive layer and a releasable backing strip; directing the dispensed tape strip into a course of travel aligned with the direction of travel of a moving strip of photographic film prints; and guiding the tape strip by confining and guiding it along an elongated path in the course of travel during said directly step, such that its adhesive layer and the back face of the print strip may be engaged progressively in superimposed face-to-face relation.

4,094,720

STRIP CORE SHEET LENGTH CONTROL

David F. Talbert, Millboro Springs, Va., assignor to Westvaco Corporation, New York, N.Y.

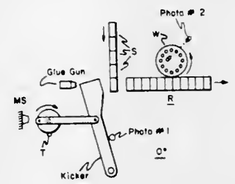
Filed Feb. 8, 1977, Ser. No. 766,698
Int. Cl.² G05G *7/00*
U.S. Cl. 156—304 **10 Claims**

1. A method of controlling the discharge of adhesive from a remotely actuated, pressurized gun onto one face of elongated material strips delivered in continuous, edge-to-edge, individual succession to a collimating breech for face-to-face laminated assembly production by cyclically reciprocating kicker means comprising the steps of:

A. Generating a first signal when said kicker means passes a first position in a 360° kicker cycle to operate said gun for adhesive discharge onto one of said strips;

B. Generating a second signal when said kicker means passes a second position in said cycle later than said first position to disable said gun from operation by said first signal; and,

C. Generating a third signal when said kicker means passes a third position in said cycle later than said second position and in response to a positive, face-to-face addition of



a strip to a preceding assembly, said third signal being effective to inactivate the disabling result of said second signal and enable said gun to be operated by said first signal.

4,094,721

PARTIALLY CRYSTALLINE COPOLYESTERS USEFUL AS ADHESIVES

Karl Günter Sturm, St. Augustin, and Klaus Brüning, Bergisch-Gladbach, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Jul. 15, 1975, Ser. No. 596,048
Claims priority, application Germany, Jul. 25, 1974, 2435863
Int. Cl.² C09J *5/00*
U.S. Cl. 156—309 **24 Claims**

1. A linear saturated crystalline polyester of an acid moiety and a moiety of a dihydric alcohol, at least 40 mol percent of the acid moiety being a terephthalic acid moiety, said polyester containing as moieties of the dihydric alcohol moieties of 1,4-butanediol and 1,6-hexanediol, the ratio of the 1,4-butanediol moieties to 1,6-hexanediol moieties being 10:90:-90:10, said polyester being further characterized by:

A. a glass transition temperature of −10° C to +30° C;

B. a melting point of 40°-130° C;

C. a difference between the glass transition temperature and the melting being equal to or less than 100° C;

D. a maximum logarithmic damping decrement from 0.6 to >1.3; and

E. a reduced viscosity, measured on a 1 wt.-% solution in a 60–40 mixture of phenol and 1,1,2,2-tetrachloroethane, of 0.5 to 1.5.

17. In a process for securing one substrate to another by disposing between said substrates a heat-fusible material and maintaining the substrates in sufficient juxtaposition until said material has fused and bond one of said substrates to the other, the improvement which comprises employing a heat-fusible material of the polyester of claim 1.

4,094,722

ETCHING APPARATUS USING A PLASMA

Shinichi Yamamoto; Yasusuke Sumitomo, both of Yokohama; Yasuhiro Horiike, Tokyo, and Masahiro Shibagaki, Hiratsuka, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Jan. 26, 1977, Ser. No. 762,386
Claims priority, application Japan, Jan. 29, 1976, 51-7957
Int. Cl.² C23F *1/02*
U.S. Cl. 156—345 **10 Claims**

1. An apparatus for etching an object comprising:

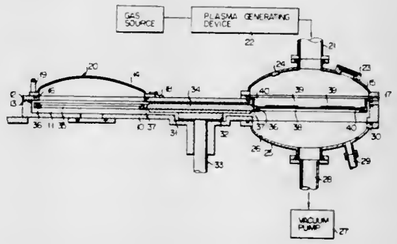
(a) a source of gas activatable for providing an etching action;

(b) plasma generator means for receiving and activating said gas;

(c) an apparatus body including an airtight hollow substantially flat chamber forming an object-feeding chamber and an object-etching chamber wherein an object for etching is presented to a flow of said activated etching gas, said object-etching chamber being spaced from said object-feeding chamber in a substantially horizontal plane and remote from said plasma generator means;

(d) a support plate positioned in said hollow substantially flat chamber for rotation in said substantially horizontal plane;

(e) at least one object holder provided on said support plate for positioning in said object-feeding chamber when said support plate is rotated through a first angle to receive an object to be fed and for positioning in said object-etching chamber when said support plate is rotated through a second angle to present an object for etching to the flow of said activated etching gas;



(f) gas flow-guiding means for removing said activated etching gas from said plasma generator means, transferring said activated etching gas to said object-etching chamber, introducing the flow of said activated etching gas into said object-etching chamber substantially vertically above the object held by said object holder and withdrawing the flow of said gas from said object-etching chamber substantially vertically below the held object; and

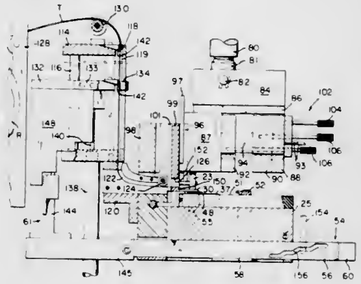
(g) gas flow-baffling means for ensuring said substantially-vertically downward flow of said activated etching gas past the held object in said object-etching chamber and for preventing said gas from flowing from said object-etching chamber to said object-feeding chamber.

4,094,723

VARIABLE WIDTH FILM SPLICER

Herman L. Jones, Marysville, Wash., assignor to J & H Manufacturing, Inc., Everett, Wash.

Filed Apr. 12, 1976, Ser. No. 676,061
Int. Cl.² G03D *15/04*
U.S. Cl. 156—353 **11 Claims**



1. A splicer, comprising: guide means for guiding strips along a run in end-to-end relation, said guide means including spaced apart edge guide elements adjustable to accept strips of different widths along said run; splicing means mounted adjacent said run for effecting a splice between adjacent strip ends, said splicing means including applicator means adjustable to apply different lengths of splicing tape between adjacent strip ends; and control means for controlling said guide means and said splicing means by adjusting said edge guide elements to accept strips of different widths, and adjusting said applicator

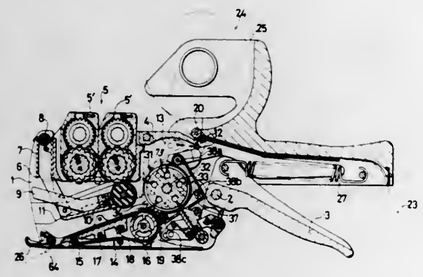
means to apply different lengths of splicing tape in relation to the strip widths acceptable by said edge guide elements.

4,094,724

LABEL CUTTING DEVICE FOR LABEL APPLYING MACHINE

Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed Oct. 6, 1976, Ser. No. 730,121
Claims priority, application Japan, Oct. 18, 1975, 50-124892
Int. Cl.[2] B41M *1/00*
U.S. Cl. 156—384 **26 Claims**



1. A label cutting device for a label applying machine, comprising:
- an operating lever movable between a first and a second position;
- a roller connected to said lever for being rotated thereby as said lever is moved to one of its said positions; said roller having a periphery; a blade receiving means defined in said roller periphery; said roller being rotatable to bring said blade receiving means to a cutting position;
- a cutting blade held nonrotatively stationary with respect to rotation of said roller and positioned at said cutting position; said cutting blade being movable toward and into engagement with said blade receiving means when said roller has rotated to position said blade receiving means at said cutting position; said cutting blade being connected to said lever so as to be reciprocatingly moved toward and away from engagement with said blade receiving means as said lever is moved;
- means for moving a label strip which is to be cut against said roller at said cutting position.

4,094,725

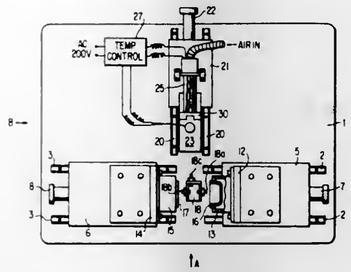
APPARATUS FOR HOT GAS WELDING OF A PAIR OF THERMOPLASTIC MATERIALS

Shinji Takeda, Toyota; Noriyoshi Mitsui, Okazaki, and Nobuharu Kato, Nagoya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Jan. 24, 1977, Ser. No. 761,906
Claims priority, application Japan, Jan. 23, 1976, 51/6981
Int. Cl.[2] B32B *31/00*
U.S. Cl. 156—497 **7 Claims**

1. An apparatus for welding a pair of thermoplastic workpieces by means of hot gas blasting, which comprises:
- nozzle means including;
- a housing having a central bore and side walls; and,
- a pair of partition walls parallely arranged within said central bore in the longitudinal direction of said housing whereby a pair of chambers are formed between said partition walls and said housing side walls and wherein said partition walls include a plurality of bores which communicate said pair of chambers with said central bore and wherein said housing side walls include a plurality of nozzles from which said hot gas blast is ejectable.

2. The apparatus of claim 1, which further comprises:
- a first movable means supporting thereon a workpiece to be welded;
- a second movable means supporting thereon the other workpiece to be welded, said first and second movable means being arranged in alignment for opposing said workpieces to each other; and,
- a third movable means supporting thereon said nozzle means from which said hot gas blast is ejectable, said third mov-



able means being movable at right angles with respect to said first and second movable means,

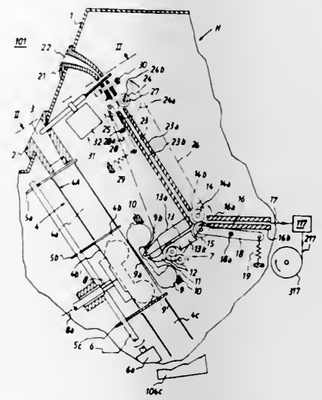
whereby said workpieces are heated by hot gas blast ejected from said third movable means upon said thid movable means being moved to a position between said first and second movable means and whereby said workpieces are pressurized to be welded into one piece upon relative movement of said first and second movable means.

4,094,726

APPARATUS FOR PROCESSING EXPOSED PHOTOGRAPHIC FILMS AND CASSETTES FOR SUCH FILMS

Friedrich Hujer, Grunwald, and Helmut Zangenfeind, Puchheim, both of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 5, 1976, Ser. No. 729,700
Claims priority, application Germany, Oct. 9, 1975, 2545214
Int. Cl.[2] G03D *15/04*
U.S. Cl. 156—502 **20 Claims**



1. In an apparatus for processing photographic films and containers for such films, a combination comprising a substantially lightproof housing having wall means provided with first and second inlets for admission of successive loaded containers and discrete films, respectively; film removing means in said housing; means for conveying containers from said first inlet into the range of said removing means; film splicing means in said housing; means for transporting films from said removing means said splicing means, including a first guide channel

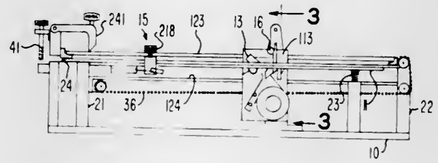
which receives successive films from said removing means and a second guide channel which receives successive films from said first channel and directs such films toward said splicing means; and means for transporting films from said second inlet to said splicing means, including a third channel wherein films advance from said second inlet into said second channel.

4,094,727

SHEET SPLICER

Joseph Martin Collins, Ontario, N.Y., assignor to Burroughs Corporation, Detroit, Mich.

Filed Dec. 17, 1976, Ser. No. 751,657
Int. Cl.[2] B65H *21/00*; B31F *5/06*
U.S. Cl. 156—505 **6 Claims**



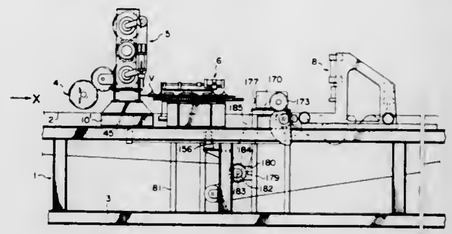
1. A sheet splicer comprising:
- a frame,
- a table mounted on said frame,
- clamping means pivotably mounted about a clamp axis on said frame to secure overlapping plies of the sheets to be joined against movement on said table,
- said table being pivotably mounted on a first side thereof said frame about an axis which is parallel to and spaced from the axis about which said clamping means is pivoted such that said sheets to be spliced may be laid on said table between a portion of the clamping means and said table,
- said table being spring biased at the second free end side thereof remote from the pivoted axis for said table and adjacent the axis about which said clamping means pivots,
- said clamping means having free end which is attached to be clamped to said frame adjacent the first side of the table adjacent the axis about which the table pivots, .
- such that there is an equidistant interference clamping fit along the width of the table along the splice line of sheets to be joined by a butt splice in said splicer,
- a cutter mounted on guide rail means running parallel to said splice line and mounted above said clamping means
- having a blade mounted therein attached to be drawn through overlapping plies of sheets to be spliced along the splice line to sever the sheet plies and to define a butt edge end of the upper and lower plies of said sheets which are to be spliced,
- the opposite side of the defined cut of each ply being considered a selvage edge,
- splicing tape applicator means being mounted on guide rails beneath said tape, which guide rails are parallel to said splice line and mounted on said frame, said table applicator means being adapted to carry a splicing tape for joining the butt ends of the sheet together,
- having selvage edge removal means and spring means for pressing splicing tape drawn along said splice line to the butt edges of the sheets to be joined,
- the cutter and the applicator means being interconnected by a flexible position synchronization interlock extending from the cutter means around the pivot clamp axis of said clamping means down under said table about a second point and across under the table and around a third point and back across under the table to interconnect to said applicator means such that the clamping means may be unclamped and lifted from the table while pivoting about said clamp axis without disconnection of the flexible interlock.

4,094,728

TIRE TUBE MAKING APPARATUS

Yohachiro Nakagawa, Kodaira, and Akio Tanihata, Akigawa, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Nov. 11, 1976, Ser. No. 741,030
Claims priority, application Japan, Nov. 14, 1975, 50-136871
Int. Cl.[2] B29H *15/00*
U.S. Cl. 156—514 **2 Claims**



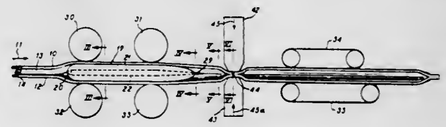
1. A tire tube making apparatus comprising:
- a conveyor mechanism including a stationary frame and an endless belt travelled on said stationary frame by a drive source for conveying a tube material;
- a perforating mechanism for perforating air introducing bores longitudinally equally spaced in an upper half portion of said tube material;
- a valve feeding mechanism for intermittently feeding a tube valve one by one to a predetermined position above the line passing through said air introducing bores perforated in said tube material which is continuously conveyed by said conveyor mechanism;
- a valve transferring mechanism for suckingly holding said tube valve fed by said valve feeding mechanism to transfer said tube valve one by one on said air introducing bore in synchronism with the transfer of said air introducing bore of said tube material; and
- a valve urging mechanism for detecting said tube valve transferred by said valve transferring mechanism and including a movable frame movable on said stationary frame, a gripping device mounted on said movable frame to grip said endless belt for moving said movable frame jointly with said endless belt, and a valve urging device mounted on said movable frame for urging said tube valve against said tube material.

4,094,729

APPARATUS FOR MAKING OPEN PROFILE BAGS

Salvatore Boccia, Blauvelt, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Division of Ser. No. 577,883, May 15, 1975, Pat. No. 4,024,010.
This application Apr. 12, 1977, Ser. No. 786,858
Int. Cl.[2] A41H *37/06*; B31B *19/14*
U.S. Cl. 156—515 **6 Claims**



1. A mechanism for preparing bags of thin plastic film having continuous reclosable fastener profiles on the surface thereof comprising in combination:
- means for continuously advancing facing layers of thin plastic bag film having facing interlocking rib and groove profiles on the inner surface extending along one edge of the layers with the profiles being interlocked;

a separating finger positioned between the rib and groove profiles along the path traveled by the layers having a leading separating edge so that the profiles are forcibly separated as they are advanced by the rib element being pulled out of the groove element;

aligning means positioned immediately after said separating edge holding said rib and groove elements in exact opposing alignment immediately after they are separated and while traveling over the separating finger;

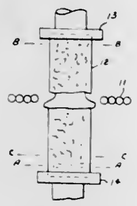
and a heat sealing means positioned immediately after the separating finger intermittently pressing the layers together transversely joining the rib and groove profile elements and heat sealing said layers and profiles by applying heat thereto, said heat sealing means moved intermittently against the bag film at spaced locations to form a cross seal at spaced locations on the film with the rib and groove elements remaining separated between said spaced locations.

4,094,730

METHOD FOR FABRICATION OF HIGH MINORITY CARRIER LIFETIME, LOW TO MODERATE RESISTIVITY, SINGLE CRYSTAL SILICON

W. Patrick Rahilly, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 11, 1977, Ser. No. 776,803
Int. Cl.² B01J *17/40*
U.S. Cl. 156—606 **2 Claims**



1. The method of fabricating a doped silicon single crystal of semiconductor material from a polycrystalline ingot rod of silicon, comprising the steps of:

a. refining the said polycrystalline ingot by a plurality of zone melt passes moving impurities to an upper end and a lower end of the ingot;

b. removing the said lower end of the said crystal providing a new clean end;

c. implanting near the new clean end a dopant on the said polycrystalline rod by ion beam implantation;

d. fusing a single crystal seed crystal to the said clean end;

e. converting the said polycrystalline rod ingot to single crystal structure by a single crystal zone melt pass through the said seed crystal and the said polycrystalline ingot, stopping the said zone melt pass before reaching the said upper end of the ingot; and

f. removing the upper end of the ingot providing a clean doped single crystal for semiconductor element fabrication.

4,094,731

METHOD OF PURIFYING SILICON

Naaman H. Keyser, Hinsdale, Ill., and James C. Cline, Beverly, Ohio, assignors to Interlake, Inc., Chicago, Ill.

Filed Jun. 21, 1976, Ser. No. 697,865
Int. Cl. C01b *33/02;* **B01j** *17/08*
U.S. Cl. 156—616 R **11 Claims**

1. A batch method of producing crystalline silicon having an iron concentration less than about one-twentieth of the iron concentration of the mother liquor, said method comprising introducing a molten mother liquor of silicon contaminated with iron at a temperature higher than the melting point of pure silicon into a ladle-shaped mold having a bottom and side walls, maintaining the mold at a temperature sufficient to cause silicon crystals to grow thereon, providing relative movement between the mold wall with the growing silicon crystals and the molten mother liquor to continuously wash the exposed growing surfaces of the silicon crystals with the mother liquor during the further growth of the silicon crystals and maintaining the top surface thereof substantially liquid by providing relative movement between the mold with the silicon crystals thereon and the molten mother liquor, decanting the mother liquor from the mold before the liquor temperature reaches 2206° F. to leave a hollow ladle-shaped silicon ingot of less than about 60% by weight of the original mother liquor having an outer zone adjacent to the mold and an inner zone centrally of said silicon ladle-shaped ingot, both the outer and inner zones having more than one-twentieth of the iron concentration of the mother liquor, and discarding the outer and inner zones to leave an annular crystalline portion of the silicon ingot with an iron concentration less than about one-twentieth of the iron concentration in the original mother liquor.

4,094,732

SILICON ETCHING PROCESS

Alan R. Reinberg, Dallas, and Rao K. Rao, Houston, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 628,184, Nov. 3, 1975. This application May 26, 1977, Ser. No. 800,826
Int. Cl.² H01L *21/306*
U.S. Cl. 156—643 **5 Claims**

1. A process for etching silicon comprising the step of:

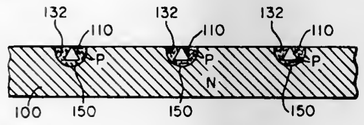
contacting said silicon with a plasma derived from a gas comprising CCl_4 and an inert gas.

4,094,733

METHOD OF NEUTRALIZING LOCAL DEFECTS IN CHARGE COUPLE DEVICE STRUCTURES

Robert C. Gallagher, Ellicott City, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 16, 1976, Ser. No. 742,315
Int. Cl.² H01L *21/306*
U.S. Cl. 156—648 **6 Claims**



1. A method of preventing charge leakages in potential wells of a charge coupled device which are caused by defects located in a semiconductor substrate in which the potential wells are formed and which defects may intersect the potential wells, the method comprising:

diffusing a dopant of a second conductivity into a semiconductor substrate having a continuous surface to provide a first diffused region of approximately uniform depth and second deeper diffused regions surrounding any defect in said substrate; and

removing only said first diffused region from said substrate, said substrate having said second diffused regions surrounding any defects in order to neutralize the effect of any of said defects in the substrate in which the potential wells are to be formed.

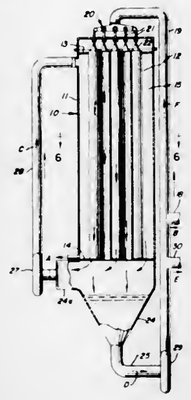
4. A method in accordance with claim 1 wherein said step of removing said first diffused region is achieved by chemical etching.

4,094,734

EVAPORATOR AND TREATMENT OF VISCOUS BRINES

George L. Henderson, Seattle, Wash., assignor to Henderson Industrial Corporation, Seattle, Wash.

Filed Oct. 15, 1973, Ser. No. 406,635
Int. Cl.² B01D *1/22*
U.S. Cl. 159—13 A **10 Claims**



1. An evaporator for concentrating a liquid comprising: a vertically disposed shell, a bundle of parallel open-ended tubes vertically disposed within said shell, said tubes being sealed to a tube sheet at their upper and lower ends to define a steam chamber for heating said tubes, said tubes carrying trap means on the exterior thereof for receiving condensate and for removing the same from said steam chamber, a lower casing positioned beneath said tubes to receive steam and liquid concentrate from said tubes, means in said lower casing for separating said liquid concentrate from said steam, means to withdraw said steam from said lower casing, means to supply heated steam to the upper end of said steam chamber, means to withdraw said liquid concentrate from said lower casing and to pump the same at high velocity through a pipeline toward said tubes at the upper end thereof, header means including distributor arms to distribute the said liquid concentrate to a plurality of feed tubes, one for each of said open-ended tubes, said distributor arms having a graduated internal cross section and said feed tubes having a total internal cross-sectional area substantially equal to the internal cross section of the line through which said liquid concentrate is pumped to maintain the velocity substantially constant throughout said header means.

4,094,735

METHOD OF PULPING WITH SULFITE LIQUOR CONTAINING FORMIC ACID ESTERS

Sigbjorn P. H. E. Holgersson, Gavle, Sweden, assignor to Kopparfors AB, Ockelbo, Sweden

Continuation of Ser. No. 610,075, Sep. 3, 1975, abandoned. This application Jan. 17, 1977, Ser. No. 759,744
Claims priority, application Sweden, Sep. 6, 1974, 7411268
Int. Cl.² D21C *3/04, 3/06, 3/20*
U.S. Cl. 162—76 **3 Claims**

1. In the method of producing wood pulp by cooking wood in a sulfite cooking liquid, the improvement comprising adding to said sulfite cooking liquid, prior to bringing it into contact with the wood, at least one formic acid ester having the formula

$$R-O-\overset{O}{\overset{\|}{C}}-H$$

where R is a hexyl group or an unsubstituted or methyl-substituted norbornyl group, in an amount of from 0.02 to 71 moles of ester per ton of absolutely dry wood and from 0 to 25% by weight of formic acid based on the weight of the added ester and cooking the wood with said cooking liquid to produce a pulp of increased yield and strength.

4,094,736

PREPARATION OF CELLULOSIC MATERIALS

Peter James Malden, Lostwithiel, England, assignor to English Clays Lovering Pochin & Company Limited, St. Austell, England

Filed Jun. 21, 1977, Ser. No. 808,529
Claims priority, application United Kingdom, Jun. 23, 1976, 26007/76
Int. Cl.² D21H *3/28, 3/66*
U.S. Cl. 162—175 **24 Claims**

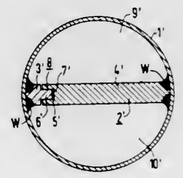
1. A process for preparing paper or cardboard which contains a filler composition, which process comprises the steps of (a) suspending raw starch in sufficient cold water to form a suspension containing about 3 to 10% by weight of starch solids; (b) heating the suspension thus obtained, with stirring, to a temperature in the range 75°–95° C; (c) adding a starch phosphate to sufficient water so as to form a suspension or solution containing about 1–10% by weight of the starch phosphate; (d) adding the starch phosphate solution or suspension to the suspension of raw starch and raising the temperature of the mixture thus obtained to within the range of 75°–95° C. and holding its temperature at that level for about 5 to 10 minutes; (e) agitating the solution of mixed starches thus obtained in a high shear mixer for from about 1 to 5 minutes and thereafter allowing the mixed starch solution to cool; (f) adding the cooled mixed starch solution to a dry powdered mineral filler material so that the resultant mixed suspension contains about 5–25% dry weight of the starch mixture and about 95–75% by weight of dry mineral; (g) adding the mixed suspension thus obtained to a suspension of cellulosic fibres, coagulating the mixed starches by adding a solution of a salt having a multivalent cation and thereafter raising the pH of the suspension to above 5.5; and (h) forming the suspension of cellulosic fibres containing the mixture of mineral and coagulated mixed starches into sheet material.

4,094,737

PRESSURIZED-WATER REACTOR INSTALLATION

Christoph Greischel, Erlangen; Elmar Harand, Hochstadt; Franz Maritsch, and Eberhard Michel, both of Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Apr. 14, 1977, Ser. No. 787,443
Claims priority, application Germany, Apr. 30, 1976, 2619353
Int. Cl.² G21C *19/28*
U.S. Cl. 176—65 **10 Claims**



1. A pressurized-water reactor installation comprising a vertical reactor pressure vessel with an upper portion having at least one coolant connection with a horizontal dividing wall, said vessel internally having means for conducting coolant from below said wall downwardly into the vessel and then upwardly for discharge above the wall, a coolant pipe connected to and extending from the vessel's said connection and containing a horizontal partition wall extending throughout its length and connected with said dividing wall of the vessel's

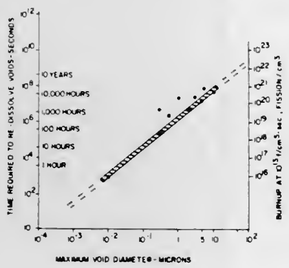
connection, a vertical steam generator positioned adjacent to said vessel, said generator having a lower portion having a coolant connection with which said pipe is connected and internally having a horizontal tube sheet above the generator's said connection and a horizontal partition below the tube sheet and horizontally aligned with and connected with the pipe's said horizontal partition wall and having a vertical partition wall extending upwardly to said tube sheet transversely with respect to the generator's said connection and forming horizontally separated spaces below the tube sheet and above the generator's horizontal partition, one of said spaces being adjacent to and connected to said pipe above its said horizontal partition wall, the generator's said horizontal partition forming a lower space therebelow, a vertical coolant pump vertically positioned in said lower space and discharging thereinto and having a suction inlet connected to the other of said spaces, said lower space being connected with said pipe below its said partition wall, and a vertical motor for driving said pump and positioned below and outside of the generator's said lower portion, a vertical shaft extending through said lower portion and interconnecting said motor and pump; wherein the improvement comprises said horizontal partition wall at least adjacent to said coolant connection being formed by at least two sections extending radially from the inside of said coolant pipe towards each other and having outer edges rigidly fixed to said inside and inner edges spaced from each other and interconnected by an expansion joint.

4,094,738

NUCLEAR FUEL PELLET DESIGN TO MINIMIZE DIMENSIONAL CHANGES

Walston Chubb, Franklin Township, Westmoreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 19, 1976, Ser. No. 687,838
Int. Cl.[2] G21C *3/06*
U.S. Cl. 176—67 **7 Claims**



1. A nuclear fuel pellet for use in a nuclear reactor, said fuel pellet consisting essentially of uranium dioxide and plutonium dioxide and having pores therein randomly distributed to provide a balance between pellet swelling and pore removal at a plurality of temperatures less than 1000° C, said pores being less than 1 percent of the total pellet volume for pore sizes less than 2 microns, and up to 6 percent of total pellet volumes for pore sizes between 0 microns and about 20 microns.

4,094,739

METHOD FOR PURIFYING MICROBIAL POLYSACCHARIDES

Calvin William Schroeck, Eastlake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Dec. 27, 1976, Ser. No. 754,866
Int. Cl.[2] C12D *13/04*
U.S. Cl. 195—7 **9 Claims**

1. A method for removing bacterial cells from an aqueous mixture comprising a polysaccharide produced by bacterial fermentation which comprises the steps of killing said bacterial cells and causing said mixture to undergo a second fermentation with a Trichoderma sp. mold, said second fermentation being continued for a period of time adequate to effect solubilization of said killed cells.

4,094,740

PREPARATION OF LIQUID FUEL AND NUTRIENTS FROM SOLID MUNICIPAL WASTE

John L. Lang, P.O. Box 1242, Midland, Mich. 48640

Filed Sep. 27, 1974, Ser. No. 509,812
Int. Cl.[2] C12C *1/00*
U.S. Cl. 195—27 **8 Claims**

1. The process for preparation of useful materials, including liquid fuels, from solidous municipal waste which comprises the steps of :

(a) Separation of the metal materials present in said waste;
(b) Separation of the non-friable plastic, hydrocarbon impregnated paper and leather present in said waste;
(c) Separation of friable materials, as plastics, glass, bone from said waste;
(d) Steeping to swell water-hydrolyzable material;
(e) Flotation separation of hydrolyzable from nonhydrolyzable material;
(f) Fine grinding of the hydrolyzable material;
(g) acidcatalyzed hydrolysis and saccharification of at least part of the hydrolyzable material to form fermentable sugars;
(h) Filtration of solublized material of step (g), with recycle of the non-solubles to the hydrolysis step and transfer of the solublized material to the fermentation step;
(i) pH adjustment to about 3.4 and fermentation;
(j) Filtration of the fermented mixture, recycling of solid material to the hydrolysis step;
(k) Distillation to produce (I) Liquid Fuel and (II) Residue suitable for use as plant- and animal-nutrients.

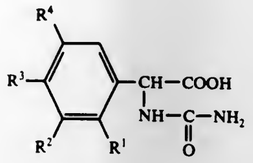
4,094,741

PROCESS FOR PREPARING D-(−)-N-CARBAMOYL-2-(PHENYL OR SUBSTITUTED PHENYL)GLYCINES

Hideaki Yamada, Kyoto; Satomi Takahashi, Takatsuki, and Koji Yoneda, Amagasaki, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

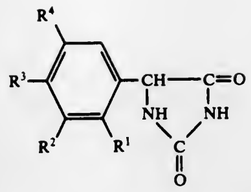
Filed Feb. 1, 1977, Ser. No. 764,635
Claims priority, application Japan, Feb. 4, 1976, 51-11575; Dec. 3, 1976, 51-145748
Int. Cl.[2] C12D *13/06*
U.S. Cl. 195—29 **13 Claims**

1. A process for preparing D-(−)-N-carbamoyl-2-(phenyl or substituted phenyl)glycines having the following general formula:



wherein R^1, R^2, R^3 and R^4 are independently hydrogen atom, a halogen atom, hydroxyl group, a lower alkoxyl group or methyl group,

which comprises subjecting 5-(phenyl or substituted phenyl)hydantoins having the following general formula:



wherein R^1, R^2, R^3 and R^4 are as defined above to the action of an enzyme which is in the form of a cultured broth containing microorganisms or the separated cells of said microorganisms in an aqueous medium, said enzyme being capable of hydrolyzing 5-(phenyl or substituted phenyl)hydantoins so as to substantially produce only D-(−)forms of N-carbamoyl-2-(phenyl or substituted phenyl)-glycines, and recovering said D-carbamoyl glycines from the medium.

4,094,742

PRODUCTION OF ETHANOL FROM CELLULOSE USING A THERMOPHILIC MIXED CULTURE

Winthrop D. Bellamy, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 4, 1977, Ser. No. 774,380
Int. Cl.[2] C12C *11/38*
U.S. Cl. 195—33 **10 Claims**

1. A process for fermenting cellulose to produce ethanol by the combined growth of a mixed culture of thermophilic cellulolytic gram-negative sporocytophaga and thermophilic ethanol-producing gram-positive bacillus said thermophilic cellulolytic gram-negative sporocytophaga always being associated with a gram-positive thermophilic bacillus, which comprises providing a particulate or fibrous cellulosic material wherein at least a major amount of the cellulose component is exposed, admixing an aqueous nutrient mineral broth with said particulate cellulosic material to form a suspension having a pH ranging from about 7 to 8, said aqueous nutrient mineral broth being a source of nutrients for said mixed culture, admixing said mixed culture with said suspension, and fermenting the resulting mixture at a temperature ranging from about 50° C to about 65° C and at a pH of about 7 to 8 to produce at least a significant amount of ethanol and recovering said ethanol.

4,094,743

ENZYMES IMMOBILIZED ON CHITOSAN

Jean-Louis Leuba, Crissier, Switzerland, assignor to Societe d'Assistance Technique pour Produits Nestle S.A., La Tour-de-Peilz, Switzerland

Filed Apr. 1, 1976, Ser. No. 672,790
Claims priority, application Switzerland, Apr. 10, 1975, 4546/75
Int. Cl.[2] C07G *7/02*
U.S. Cl. 195—63 **18 Claims**

1. A process for the preparation of an enzymatically active product insoluble in aqueous medium, comprising treating chitosan as an insoluble inert support with a dialdehyde to provide an activated chitosan support and thereafter fixing an enzyme containing free amino groups to said activated chitosan support.

4,094,744

WATER-DISPERSIBLE PROTEIN/POLYURETHANE REACTION PRODUCT

Frank Joseph Hartdegen, Columbia, and Wayne Elliott Swann, Pasadena, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 743,035, Nov. 18, 1976, which is a continuation-in-part of Ser. No. 660,982, Feb. 24, 1976, abandoned, which is a continuation-in-part of Ser. No. 585,674, Jun. 10, 1975, abandoned. This application Dec. 10, 1976, Ser. No. 749,430
Int. Cl.[2] C07G *7/02*
U.S. Cl. 195—63 **19 Claims**

8. An aqueous solution of a water-dispersible, biologically-active protein bound to a polyurethane characterized as having an essentially linear polyester backbone, said protein bound to said polyurethane through a ureido linkage, said polyurethane-bound protein being water-soluble.

10. A method for preparing an aqueous solution of protein bound to a urethane polymer comprising:

a. admixing a water-dispersible, biologically-active protein and an isocyanate-capped liquid polyurethane prepolymer having a linear polyester backbone under essentially anhydrous conditions to form a solution, said protein and prepolymer reacting to form a water-soluble reaction product wherein the protein and prepolymer are bound together; and
b. dispersing the solution in water with agitation to form an aqueous solution of urethane-polymer bound protein.

4,094,745

METHOD OF STAINING MICROSCOPIC ORGANISMS

John Scholefield, Glenesk, Moor Road, Milngavie, Glasgow, Scotland

Continuation-in-part of Ser. No. 479,583, Jun. 14, 1974, abandoned. This application Jun. 30, 1976, Ser. No. 701,083
Claims priority, application United Kingdom, Jun. 22, 1973, 29674/73
Int. Cl.[2] C12K *1/04*
U.S. Cl. 195—103.5 M **10 Claims**

1. A method of staining viable microorganisms or a mixture of viable and of non-viable microorganisms comprising reacting said microorganisms, suspended in a liquid medium, with phosphate ions, whereby phosphate ions react at active sites on the microorganisms to produce phosphate derivatives of the microorganisms having, at said sites, polydentate phosphate groups, reacting the phosphate derivatives with a phosphate-reactive fluorochrome dye, which thereby combines chemically with the microorganisms via the intermediate phosphate groups, and examining the thus-fluorochrome-dyed microorganisms with fluorescence-activating ultraviolet light for the presence, relative amounts or numbers of viable and non-viable microorganisms suspended in the liquid medium.

4,094,746

COAL-CONVERSION PROCESS

Philip X. Masciantonio, Penn Township, Westmoreland County, and Kenneth A. Schowalter, Monroeville Borough, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

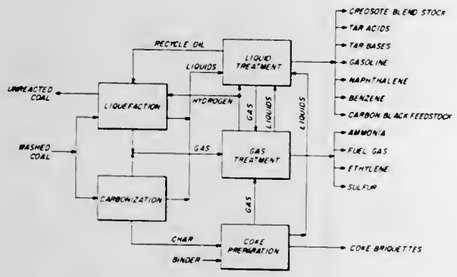
Continuation of Ser. No. 205,248, Dec. 6, 1971, abandoned. This application Nov. 25, 1974, Ser. No. 526,481
Int. Cl.[2] C10B *49/16, 55/02*
U.S. Cl. 201—5 **7 Claims**

1. A method for the economical conversion of high sulfur coal to conversion products for the production of metallurgical grade coke and low sulfur gaseous and liquid fuels, wherein coal carbonization and liquefaction processes are integrated to treat particulate, high sulfur coal containing from about 1 to 5% sulfur, said method comprising,

(a) in a fluidized bed reaction zone maintained at a carbonizing temperature not greater than 1600° F, contacting a

first quantity of said particulate coal with (i) an amount of char at least sufficient to maintain the free flow of the bed of coal particles and (ii) a gas containing at least an amount of H_2 sufficient to yield a resultant low sulfur char containing less than 0.7% sulfur, said gas having no more than about 2% by volume H_2S and being substantially free of O_2; the resultant carbonization reaction producing, in addition to said low sulfur char, gaseous effluents, and liquid effluents including tar acids and hydrocarbon oils,

(b) in a liquefaction reaction zone maintained at a temperature of about 800° to 960° F and a pressure of 2000 to 10,000 psi, combining a second quantity of said particulate coal with carrier oil, a substantial portion of which is hydrocarbon middle oil derived from step (e), and reacting the combination in the presence of H_2 to render said second coal quantity into gaseous effluents, and liquid effluents including light-, middle-, and heavy-hydrocarbon oils,



(c) recovering low sulfur char product and the gaseous and liquid effluents from steps (a) and (b),

(d) recovering H_2 from said gaseous effluents and passing at least a portion of the recovered H_2 to said liquefaction reaction zone to satisfy the H_2 demands thereof,

(e) recovering said hydrocarbon middle oil and passing at least a portion thereof to said liquefaction reaction zone to satisfy the carrier oil demands thereof, said hydrocarbon middle oil containing tar acids from said carbonization reaction for the promotion of said liquefaction reaction,

(f) proportioning the ratios of coal fed to steps (a) and (b) so that said first quantity is between 30 and 65% of the sum of said first and second quantities; whereby heavy-hydrocarbon oil is produced in a quantity at least sufficient to serve as binder, for the low sulfur char recovered as product, in the formation of a green coke material, which, upon calcination at temperatures of 1500° to 2400° F will produce a metallurgical grade coke containing less than 0.7% S.

4,094,747

THERMAL POWER STATION COMBINED WITH A PLANT FOR SEAWATER DESALINATION

Hans Pfenninger, Baden, Switzerland, assignor to BBC Brown, Boveri & Company Limited, Baden, Switzerland

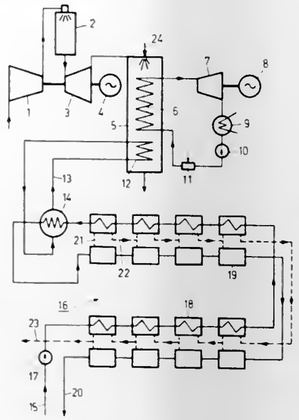
Filed Apr. 12, 1977, Ser. No. 786,870

Claims priority, application Switzerland, May 14, 1976, 6052/76

Int. Cl.[2] B01D *3/02*

U.S. Cl. 202—173 **5 Claims**

1. A combined thermal power station and a desalination plant for seawater wherein said thermal power station comprises a gas turbine set which includes a compressor and gas turbine with a combustor therebetween, a steam turbine, and a waste heat boiler connected to and which receives hot exhaust gas from said gas turbine, said waste heat boiler comprising on the water side first and second sections connected in cascade relative to the flow path of the hot exhaust gas through said boiler, the first section in the exhaust gas flow path constituting



a steam generator for said steam turbine and the second section constituting a source of heat utilized in the desalination plant.

4,094,748

METHOD OF AND DEVICE FOR DISTILLING OFF SECONDARY SUBSTANCES FROM OILY LIQUIDS

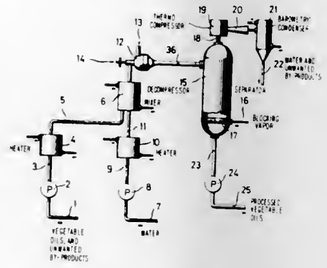
Heinz Schumacher, Hoperfeld 26, D-2050, Hamburg 80, Germany

Filed Jun. 11, 1976, Ser. No. 695,502

Claims priority, application Germany, Jun. 16, 1975, 2526944

Int. Cl.[2] B01D *3/06, 3/38;* **C11B** *3/14*

U.S. Cl. 203—88 **9 Claims**



1. A method of distilling off unwanted by-products from an oily liquid by means of steam, the vaporization points of the by-products and of the steam lying below that of the oily liquid, comprising:

heating and pressurizing said oily liquid and said steam;

mixing said oily liquid and said steam in a contactor;

spontaneously decompressing said mixture in a decompressor to a pressure considerably below the pressure in said contactor, causing said mixture to decompose into a purified liquid phase of said oil and a vapor phase of said steam and said by-products, said steam and said by-products having absorbed their heats of vaporization from the heat of the oily liquid; and separating said vapor from said purified liquid in a separator under a separation pressure which lies considerably below the pressure obtaining in the contactor.

4,094,749

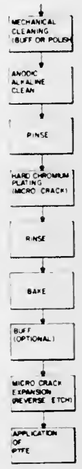
SURFACE TREATMENT WITH DURABLE LOW-FRICTION MATERIAL

Ronald R. Stange, Denver; Samuel B. McGuire, Arvada, and Thomas W. Woodring, Westminster, all of Colo., assignors to Tools for Bending, Inc., Denver, Colo.

Filed Jul. 6, 1976, Ser. No. 702,333

Int. Cl.[2] C25D *5/00, 5/48*

U.S. Cl. 204—25 **11 Claims**



1. The method of plating a metal surface comprising the steps of:

(a) cleaning the metal surface;

(b) electroplating the surface with chromium in a chromic acid bath to form a microcracked chromium plated surface portion;

(c) heating the plated surface to oxidize the external surface thereof;

(d) etching the plated surface to expand the cracks formed in the plating step; and

(e) followed by applying a perfluorocarbon composition under pressure to fill the microcracks.

11. The method of forming a lubricant surface on a tube bending mandrel assembly which is comprised of a plurality of interconnected metal balls and a shank portion at one end comprising the steps of:

(a) cleaning the external surfaces of the metal balls and shank;

(b) electroplating the external surfaces in a chromic acid bath for a time period and at a temperature level sufficient to form a hard chromium plated surface containing microcracks therein;

(c) heating the metal balls and shank at a temperature and for a time period sufficient to oxidize the plated surface thereof;

(d) reverse etching the metal balls and shank to expand the cracks formed in the plating surface; and

(e) applying a polytetrafluoroethylene to the external plated surfaces of the metal balls and shank at an elevated temperature sufficient to cause the polytetrafluoroethylene to fuse into and to fill the microcracks formed in the plated surface portions.

4,094,750

CATHODIC DEPOSITION OF OXIDE COATINGS

Jack D. Mackey, El Segundo, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 5, 1977, Ser. No. 839,581

Int. Cl.[2] C25D *9/12*

U.S. Cl. 204—56 R **6 Claims**

1. A process for depositing a tenaceous, adhesion-promoting oxide coating on the surface of a metal part, comprising: cleaning the surfaces of said part, suspending said part as the cathode in a solution containing isoproponol and a metal salt selected from the group consisting essentially of aluminum nitrate, cupric nitrate, cobalt nitrate, and nickelous nitrate, electrolyzing said part at a current density ranging from 0.02 to 0.5 amp./in.[2] for times ranging from 5–60 seconds.

4,094,751

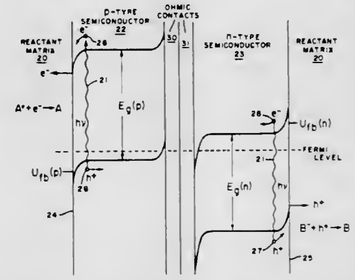
PHOTOCHEMICAL DIODES

Arthur J. Nozik, Summit, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Sep. 30, 1976, Ser. No. 728,474

Int. Cl.[2] C25B *1/00, 1/04*

U.S. Cl. 204—80 **40 Claims**



1. A photochemical diode comprising two portions, a first portion comprising at least one appropriately doped *p*-type semiconductor material provided with an ohmic contact over a portion thereof and a second portion comprising at least one appropriately doped *n*-type semiconductor material provided with an ohmic contact over a portion thereof and joined to said first portion through both said ohmic contacts.

5. A process for converting optical energy into chemical energy to drive a chemical reaction in a matrix of chemical reactants which comprises suspending an assembly of discrete photochemical diodes in the reactant matrix and illuminating the diodes with optical energy, the diodes each comprising two portions, a first portion comprising at least one appropriately doped semiconductor material of a given conductivity type and provided with an ohmic contact over a portion thereof, and a second portion comprising either metal which is joined to said first portion through said ohmic contact or at least one appropriately doped semiconductor material of a given conductivity type opposite to that of said first portion, provided with an ohmic contact over a portion thereof and joined to said first portion through both said ohmic contacts.

9. The process of claim 5 in which the chemical reaction comprises photolytic decomposition of water into hydrogen plus at least one of oxygen and hydrogen peroxide.

10. The process of claim 5 in which the chemical reaction comprises photolytic decomposition of hydrogen sulfide into hydrogen plus zero-valence sulfur.

25. A process for generating hydrogen from a portion of a body of water using solar radiation comprising

suspending an assembly of discrete photochemical diodes in the water, the photochemical diodes comprising two portions, a first portion comprising at least one appropriately doped semiconductor material of a given conductivity type and provided with an ohmic contact over a portion thereof and a second portion comprising either metal which is joined to said first portion through said ohmic contact or at least one appropriately doped semiconductor material of a conductivity type opposite to that of said first portion, provided with an ohmic contact over a portion thereof and joined to said first portion through both said ohmic contacts,

confining the diodes to a fixed volume element by membranes permeable to the water and impermeable to the diodes, and

collecting evolved hydrogen in a space above the water formed by a transparent polymer film.

4,094,752

METHOD OF MANUFACTURING OPTO-ELECTRONIC DEVICES

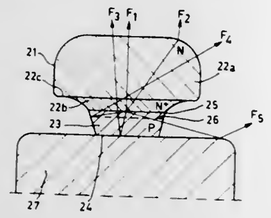
Jacques Vahe, Aunay, Odon, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,901

Claims priority, application France, Dec. 9, 1974, 74 40216

Int. Cl.² H01L *21/306*

U.S. Cl. 204—129.95 **16 Claims**



1. A method of manufacturing opto-electronic devices starting from a semiconductor plate mainly constituted by stratified layers of gallium aluminum arsenide of the general formula $AsAl_xGa_{1-x}$ in which the molar proportion x of aluminum is lower than 0.3, wherein an etching treatment is carried out on said plate in a bath containing hydrofluoric acid, nitric acid and acetic acid for a time sufficient to obtain a desired configuration.

4,094,753

RECOVERY OF GALLIUM FROM GALLIUM COMPOUNDS

Thomas L. Charlton, Rossland, and Robert F. Redden, Fruitvale, Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed Jun. 1, 1977, Ser. No. 802,405

Int. Cl.² C25C *1/00*; C01F *1/00*

U.S. Cl. 204—105 R **25 Claims**

1. A process for the recovery of gallium from gallium compounds containing at least one element selected from the group consisting of antimony, arsenic and phosphorus which comprises the steps of:

(i) leaching said gallium compounds with an oxidizing agent selected from nitric acid and a combination of nitric acid and hydrogen peroxide, said oxidizing agent being added in an amount at least sufficient to dissolve said gallium from said gallium compounds to form a gallium-containing solution;

(ii) forming a gallate solution from said gallium-containing solution; and

(iii) recovering gallium from said gallate solution.

4,094,754

LEACHING OF NI-CU-FE-S MATTE

Raymond D. Symens, Arvada; Paul B. Queneau, Golden; Eddie C. J. Chou, Arvada, and Franklin F. Clark, Golden, all of Colo., assignors to Amax Inc., Greenwich, Conn.

Filed Mar. 7, 1977, Ser. No. 775,169

Int. Cl.² C25C *1/12*

U.S. Cl. 204—108 **14 Claims**

3. A method of controlling the atmospheric leaching kinetics of comminuted nickeliferous sulfide matte containing about 20% to 75% nickel, about 5% to 50% copper, non-stoichiometric sulfur in the range of about 13% to 16% and over 0.5% to about 8% iron, the sum of the nickel, copper and sulfur contents being at least about 80%, and thereby selectively effect the rapid dissolution of substantial amounts of nickel from said matte and leave a residue impoverished in said nickel, which comprises,

providing said matte in particulate leachable form,

subjecting said particulate matte to atmospheric leaching under oxidizing conditions in a confined column of sulfuric acid-copper sulfate solution containing about 10 gpl to 200 gpl H_2SO_4 and 5 gpl to 100 gpl copper, with the mole ratio of H_2SO_4 to copper in said leach solution ranging from about 0.5:1 to 2.5:1 and the temperature from about 50° C to 100° C, the amount of solution being such as to provide about 0.4 to 0.8 mole of said H_2SO_4 plus copper in said solution for each mole of nickel in said matte while injecting a flow of air into the bottom of said solution column at a rate and a partial pressure of oxygen sufficient to sustain said rapid dissolution of nickel,

selectively controlling the kinetics of said leaching to effect rapid dissolution of substantial amounts of nickel from said matte while controlling the residual amounts of copper and iron in the final pregnant solution to below predetermined amounts:

(1) such that to obtain a final nickel solution containing less than about 20 ppm copper and less than about 100 ppm iron, the acid-to-copper mole ratio is controlled to at least about 1.5:1 at a temperature of over about 75° C. and

(2) such that to obtain a final nickel solution containing less than 20 ppm copper and less than about 20 ppm iron, the acid-to-copper mole ratio is controlled at less than about 1.5:1 at a temperature of less than about 70° C.

4. The method of claim 3, wherein following the completion of said atmospheric leach, the residue thereof is subjected to sulfuric acid leaching using air as an oxidant at elevated temperature and pressure to dissolve the metal values nickel and copper therein, and the solution then subjected to copper electrowinning to produce electrolytic copper and a spent sulfuric acid-copper sulfate electrolyte, the spent electrolyte providing solution for use in the atmospheric leaching of said matte.

5. A method of controlling the atmospheric leaching kinetics of comminuted nickeliferous sulfide matte containing about 20% to 75% nickel, about 5% to 50% copper, non-stoichiometric sulfur in the range of about 17% to 23% and over 0.5% to about 8% iron, the sum of the nickel, copper and sulfur contents being at least about 80% and thereby selectively effect the rapid dissolution of substantial amounts of nickel from said matte and leave a residue impoverished in nickel, which comprises,

providing said matte in particulate leachable form,

subjecting said particulate matte to atmospheric leaching under oxidizing conditions in a confined column of sulfuric acid-copper sulfate solution containing about 10 gpl to 200 gpl H_2SO_4 and 5 gpl to 100 gpl copper, with the mole ratio of H_2SO_4-to-copper ranging from about 0.5:1 to 2.5:1 and the temperature from about 50° C to 100° C while injecting a flow of air into the bottom of said solution column at a rate and a partial pressure of oxygen sufficient to sustain said rapid dissolution of nickel,

selectively controlling the conditions of leaching to effect rapid dissolution of substantial amounts of nickel from said matte by:

adjusting the ratio of leach solution to matte so as to provide about 0.4 to 0.8 mole of said H_2SO_4 plus copper in said solution for each mole of nickel in said matte,

adjusting the mole ratio of H_2SO_4-to-copper in said solution to at least about 1.8 at a temperature of over about 75° C,

and continuing the leaching of said matte under said controlled conditions to decrease the copper and/or iron in said solution to below 20 ppm.

4,094,755

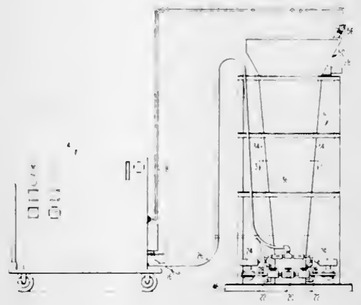
WATER PURIFICATION METHOD

Karl Moeglich, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Gateway Center, Pa.

Continuation-in-part of Ser. No. 613,289, Sep. 15, 1975, abandoned, which is a continuation of Ser. No. 487,730, Jul. 11, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 663,790

Int. Cl.² C25B *1/30*; C02C *5/12*

U.S. Cl. 204—149 **39 Claims**



1. A continuous method for agglomerating solids of colloidal size or larger suspended in aqueous media comprising:

providing at least a pair of metal electrodes having facing surface areas substantially closely spaced with respect to one another;

causing said media and suspended solids to continuously flow between and past the facing surfaces of said spaced electrodes;

causing said suspended solids to agglomerate by applying an alternating (AC) voltage at a frequency between about 0.2 Hz and 800 Hz across said electrodes while

controlling said AC voltage in relation to the spacing between said electrode surface areas and the conductivity of said media so as to provide an alternating electric current flowing between said electrode surfaces with the value of said alternating current being between about 0.08 to 6.0 amperes per square inch of electrode surface to produce hydrogen peroxide at said surfaces as said aqueous media passes; and

providing fluid-induced agitation of said media so as to create turbulence of a Reynolds number of at least about 10,000 in said media as the same flows between and past the spaced facing surfaces of said electrodes whereby the suspending forces of said solids will be broken so that said solids will agglomerate for removal from said media.

4,094,756

PHOTOCHEMICAL MODIFICATION OF POLYMERS

Lynn J. Taylor, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

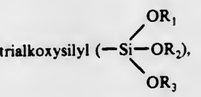
Continuation-in-part of Ser. No. 183,276, Sep. 23, 1971, abandoned. This application Dec. 29, 1975, Ser. No. 645,103

The portion of the term of this patent subsequent to Mar. 16, 1993, has been disclaimed.

Int. Cl.² C08F *8/18, 8/34*

U.S. Cl. 204—159.18 **18 Claims**

1. A process for preparing chemically modified polyolefins or olefin copolymers which comprises exposing to ultraviolet or visible radiation an intimately dispersed mixture containing a polyolefin or olefin copolymer, an organic sensitizer, and an organic co-reactant having a structure containing both a saturated aliphatic hydrocarbon residue and at least one highly polar functional group, said co-reactant being a non-polymeric organic compound having the generalized structure R—X, where R is a saturated linear, branched, or cyclic aliphatic hydrocarbon residue containing at least six carbon atoms, and X is at least one polar functional group selected from the group consisting of hydroxyl (—OH); carboxyl (—COOH); amide (—$CONH_2$); mono- and disubstituted amide (—$CONHR_1$ and —$CONR_1R_2$), where R_1 and R_2 are the same or different lower alkyls containing one to four carbons; amino (—NH_2); mono- and disubstituted amino (—NHR_1 and NR_1R_2), where R_1 and R_2 are the same or different lower alkyls containing one to four carbons;



where R_1, R_2 and R_3 are lower alkyls containing one to four carbons; sulfonic acid (—SO_3H); hydrogen sulfate (—OSO_3H); dihydrogen phosphate (—OPO_3H_2); carboxylate (—$COO^{\ominus}$); sulfonate (—$SO_3^{\ominus}$): singly charged sulfate (—$OSO_3^{\ominus}$); singly and doubly charged phosphate (—$OPO_3H^{\ominus}$ and $OPO_3^{\ominus}$); ammonium (—$N^{\oplus}R_1R_2R_3$), where R_1, R_2 and R_3 are hydrogens or lower alkyls containing one to six carbons; sulfonium (—$S^{\oplus}R_1R_2$), where R_1 and R_2 are the same or different lower alkyls containing one to six carbons; and phosphonium (—$P^{\oplus}R_1R_2R_3$), where R_1, R_2 and R_3 are the same or different lower alkyls containing one to six carbons.

4,094,757

POLYTHIOL ACCELERATED RADIATION CROSSLINKING OF OLEFINICALLY UNSATURATED ALLYLICALLY HALOGENATED POLYMERS

Robert L. Zapp, Short Hills, and Alexis A. Oswald, Mountainside, both of N.J.

Continuation of Ser. No. 531,628, Dec. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 232,275, Mar. 6, 1972, Pat. No. 3,864,229. This application Feb. 22, 1977, Ser. No. 770,457

Int. Cl.² B01J *1/10, 1/12*

U.S. Cl. 204—159.18 **14 Claims**

1. In a process for the curing of a polymer having a number average molecular weight of at least 50,000, using ionizing radiation, wherein said polymer has at least 0.5 mole % chlorine or bromine in an allylic position, the improvement which comprises incorporating into the polymer about 0.5 to 6 parts per hundred parts by weight of polymer of a cure enhancer comprising a hydrocarbon polythiol having a number average molecular weight of about 150 to about 3,000 and having at least three thiol groups.

4,094,758

PROCESS FOR PREPARING HIGHER OXIDES OF THE ALKALI AND ALKALINE EARTH METALS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Pasupati Sadhukhan, La Verne, and Alexis T. Bell, Oakland, both of Calif.

Filed Jan. 19, 1977, Ser. No. 760,810

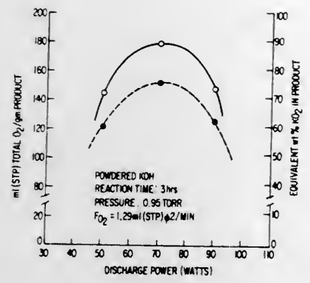
Int. Cl.² B01K *1/00*; C01D *1/02*

U.S. Cl. 204—164 **6 Claims**

1. A process for preparing the inorganic higher oxides of the alkali metals comprising:

(a) positioning the hydroxide of an alkali metal into a radio frequency discharge reactor in such a manner that about half of said hydroxide is within the glow discharge region of said reactor and the rest is outside of said region;

(b) introducing a flow of oxygen into said radio frequency discharge reactor;



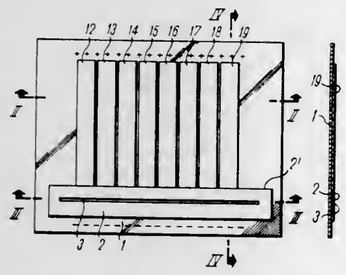
(c) establishing a glow discharge by applying between about 50 to 90 watts of power to the reactor until the higher oxide formation is completed.

4,094,759

METHOD FOR SIMULTANEOUS QUANTITATIVE ANALYSIS OF SEVERAL CONSTITUENTS IN A SAMPLE

Gerhard Ruhenstroth-Bauer, Grafelfing, and Reiner Scherer, Munich, both of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.v., Gottingen, Germany

Division of Ser. No. 646,391, Jan. 2, 1976, Pat. No. 4,018,662. This application Jan. 12, 1977, Ser. No. 758,735
Claims priority, application Germany, Jan. 3, 1975, 2500218
Int. Cl.² G01N *27/26*
U.S. Cl. 204—180 G **10 Claims**



1. A method for the simultaneous qualitative and quantitative analysis of a plurality of immunoreactive substances, especially of antigen-effective substances contained in a sample, comprising the steps of:

A. placing the sample to be tested in a first carrier material which is free from antibodies;

B. providing a second carrier material, adjacent to said first carrier material, said second carrier material containing ingredients capable of undergoing immunoreactions with said substances in said sample, thereby forming precipitates;

C. causing the migration of said sample from said first carrier material into said second carrier material;

D. applying an electric field to the area of said first and second carriers for enhancing the migration of said sample from said first carrier material into said second carrier material substantially in the direction of said electric field; the improvement comprising the steps of:

E. providing a plurality of second carrier materials, simultaneously adjacent to said first carrier material, and

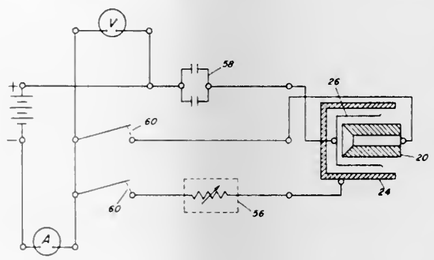
F. providing in each of said plurality of second carrier materials a different ingredient, each different ingredient being capable of undergoing a precipitate-forming immunoreaction with one of the substances to be analyzed in said sample.

4,094,760

METHOD AND APPARATUS FOR DIFFERENTIALLY AND SIMULTANEOUSLY ELECTROCOATING THE INTERIOR AND EXTERIOR OF A METAL CONTAINER

David A. Smith, Murrysville, and John J. Davidson, New Kensington, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jul. 25, 1977, Ser. No. 818,846
Int. Cl.² C25D *13/12*
U.S. Cl. 204—181 R **18 Claims**



1. A method of simultaneously electrocoating the interior and exterior of a metal container, which comprises:

inserting a hollow electrically conductive probe into a container;

enclosing the container within an outer electrically conductive housing generally conforming to the container exterior shape;

sealing said outer housing with said probe to form a continuous passageway from said hollow probe to the interior of the container to the exterior of the container between the container and said outer housing;

flowing electrocoating material through said probe, said outer housing and said continuous passageway therebetween to flood the container in a transient bath of electrocoating material;

impressing an electrical potential between the container and said probe to electrocoat the interior of the container and simultaneously therewith impressing an electrical potential between the container and said outer housing to electrocoat the exterior of the container, said probe and said outer housing having the same electrical polarity.

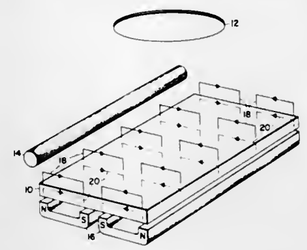
4,094,761

MAGNETION SPUTTERING OF FERROMAGNETIC MATERIAL

Richard W. Wilson, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 25, 1977, Ser. No. 818,681
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 M **1 Claim**

1. An improved method for producing a magnetron sputtered film having the properties of a ferromagnetic material wherein the improvement comprises using a cathode target formed of said ferromagnetic material alloyed with a nonferromagnetic material to lower the Curie temperature of the alloy



to less than the temperature maintained by said cathode target during the magnetron sputtering.

4,094,762

METHOD FOR THE STORAGE OF MATERIAL

David Watson Clelland, Appleton, England, assignor to United Kingdom Atomic Energy Authority, London, England

Continuation of Ser. No. 524,995, Nov. 18, 1974, abandoned. This application Nov. 4, 1975, Ser. No. 628,783
Claims priority, application United Kingdom, Nov. 5, 1974, 47792/74
Int. Cl.² C23C *15/00*; G21F *9/02*
U.S. Cl. 204—192 EC **6 Claims**

1. A method for storage of a material comprising:

providing an electrical glow discharge device comprising a container for enclosing a gas atmosphere, said container including a wall forming a storage glow discharge electrode, and a sacrificial glow discharge electrode located within said container;

introducing into said container a gas atmosphere containing the material to be stored;

maintaining the pressure within said container at a value suitable for electrical glow discharge;

electrically energizing the storage and sacrificial glow discharge electrodes to effect glow discharge between the electrodes to ionize said material in said atmosphere;

controlling the electrical supply such that ions of said material bombard and are implanted into said wall forming said storage electrode and such that ions of said material also bombard said sacrificial electrode, the ion bombardment of said sacrificial electrode being sufficient to cause sputtering thereof such that the sputtered material is deposited on said wall forming said storage electrode;

whereby the thickness of said wall is increased and whereby ions of said material to be stored are implanted in the container wall of increased thickness such that said material is entrapped and stored therein.

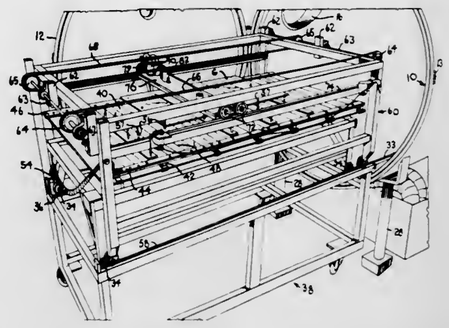
2. A method according to claim 1 wherein said controlling of the electrical supply comprises adjusting at least one parameter of value, polarity and time of potential applied to a particular electrode.

4,094,763

SPUTTER COATING OF GLASS WITH AN OXIDE OF A METAL HAVING AN ATOMIC NUMBER BETWEEN 48 AND 51 AND MIXTURES THEREOF

Frank H. Gillery, Allison Park; Jean P. Pressau, Evans City, and Robert E. Kubichan, Tarentum, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 241,858, Apr. 6, 1972, which is a continuation of Ser. No. 60,002, Jul. 31, 1970, abandoned. This application Jan. 23, 1974, Ser. No. 435,788
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 P **11 Claims**



1. A method of applying a uniform, transparent electroconductive coating having an electrical resistance of less than about 10 ohms/square and a visible light transmittance of at least about 70 percent consisting essentially of the oxide of a metal taken from the class of metals having an atomic number between 48 and 51 and mixtures of said oxides on a ceramic substrate comprising,

supporting said ceramic substrate in a low pressure atmosphere not exceeding 10^{-1} torr and containing a mixture of oxygen and inert gas having an oxygen concentration of at least 1 percent while performing the steps of:

heating said substrate by applying heat throughout the area of said substrate from a radiant heat source spaced from and facing said substrate to heat said substrate to a temperature within the range of from 400° F. to a temperature at which the substrate becomes distorted,

cathode sputtering said oxide of metal onto said substrate when its temperature reaches at least 400° F.,

continuing to apply heat to said substrate to maintain its temperature at a preselected temperature within said temperature range while continuing said cathode sputtering until a film of desired thickness is formed, and

discontinuing said cathode sputtering when said film develops a desired electroconductivity.

4,094,764

DEVICE FOR CATHODIC SPUTTERING AT A HIGH DEPOSITION RATE

Bernard Boucher, Massy; Daniel Luzet, La Frette, and Claude Sella, Meudon-la-Foret, all of France, assignors to Commissariat a l'Energie Atomique, Paris and Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, both of, France

Filed Sep. 13, 1976, Ser. No. 722,472
Claims priority, application France, Sep. 19, 1975, 75 28778
Int. Cl.² C23C *15/00*
U.S. Cl. 204—298 **1 Claim**

1. A device for cathodic sputtering at a high deposition rate on a substrate comprising :

a pumped enclosure adapted to be at a low pressure *p* less than atmospheric pressure ;

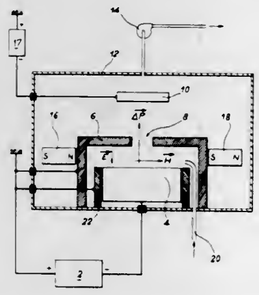
a cup-shaped anode within said enclosure, said anode having a circular bottom portion including a centered orifice;

a target within said enclosure, said target being positioned within said cup-shaped anode and having a single, flat sputtering surface defined by a perimetric edge, said surface being parallel to, opposed to, and spaced from said bottom portion;

means for providing a plasma creating electrical discharge between said target and said anode, said target being at a negative potential relative to said anode;

conduit means for admitting a gas at a high pressure P higher than said low pressure *p* into the space between said sputtering surface of said target and said bottom portion of said anode;

means within said enclosure for holding said substrate outside of said cup-shaped anode, said substrate being opposed to and spaced from said orifice, communication between said sputtering surface and said substrate being



established solely via said orifice, a high gas-pressure gradient P-*p* being established between said sputtering surface and said substrate;

means located externally of said anode for producing a magnetic field H of at least a kilogauss parallel to said sputtering surface of said target, said parallel magnetic field being substantially confined to the space between said sputtering surface and said bottom portion of said cup-shaped anode;

a suppressor screen place around said perimetric edge of said sputtering surface and spaced equidistantly therefrom, said suppressor screen around said perimetric edge being within said cup-shaped anode; and

means for bringing said substrate to a negative potential with respect to said anode wherein plasma is created by an arc imposed by static electrical potentials applied between said substrate and said anode.

4,094,765

COAL LIQUEFACTION PROCESS

Roby Bearden, Jr., and Clyde L. Aldridge, both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Dec. 17, 1976, Ser. No. 751,385
Int. Cl.² C10G *1/06*
U.S. Cl. 208—8 **18 Claims**

1. A process for the liquefaction of coal, which comprises the steps of:

(a) treating a slurry comprising coal and a diluent with a hydrogen sulfide-containing gas at a temperature ranging from 100° to about 482° C. and a pressure ranging from atmospheric to about 5000 psig, and

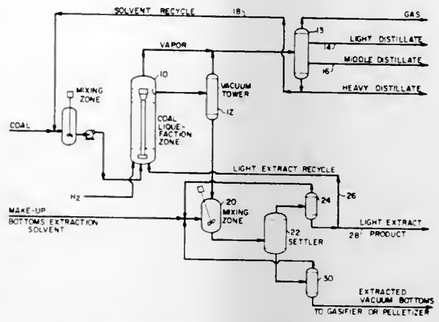
(b) subjecting at least a portion of the resulting product effluent to coal liquefaction conditions in a coal liquefaction zone, substantially all of said hydrogen sulfide being removed from the treated product effluent prior to step (b).

4,094,766

COAL LIQUEFACTION PRODUCT DEASHING PROCESS

Everett Gorin, San Rafael, Calif., assignor to Continental Oil Company, Stamford, Conn.

Filed Feb. 1, 1977, Ser. No. 764,617
Int. Cl.² C10G *1/08*
U.S. Cl. 208—10 **2 Claims**



1. In a coal liquefaction process which uses a distillable liquefaction solvent in the presence of hydrogen in a coal liquefaction zone, the improvement which comprises:

(a) establishing and maintaining conditions in said coal liquefaction zone effective to dissolve above 80 percent by weight of the m.a.f. coal and produce a major portion of the resulting coal liquefaction product as a distillable product,

(b) withdrawing an effluent slurry product from said liquefaction zone which contains distillable and non-distillable fractions, undissolved solids, and liquefaction solvent,

(c) subjecting said effluent slurry product to vacuum distillation to separately recover a distillable fraction composed of liquefaction solvent and distillable coal liquefaction products and a flowable bottoms fraction composed of non-distillable residuum, undissolved solids and residual liquefaction solvent,

(d) mixing said bottoms fraction with a fractionating solvent comprising a saturated hydrocarbon boiling above 150° C which preferentially dissolves the lower molecular weight part of the non-distillable residuum in a mixing zone which is maintained at a temperature above the liquefaction point of said bottoms fraction,

(e) conducting the resulting mixture from step (d) to a settler which is maintained at an elevated temperature to ensure fluidity of the mixture and the formation of two liquid phases, the upper layer being composed of the lower molecular weight oil dissolved in the fractionating solvent and the lower layer being the remainder of said mixture,

(f) separating the upper liquid phase from the lower liquid phase, and

(g) recovering said lower molecular weight oil from said upper liquid phase.

4,094,767

FLUIDIZED BED RETORTING OF TAR SANDS

Phillip H. Gifford, II, Carbondale, Colo., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 10, 1976, Ser. No. 740,525
Int. Cl.² C10G *1/02*
U.S. Cl. 208—11 R **10 Claims**

1. A process for producing a raw oil from a tar sand containing bitumen, which comprises the steps of:

(a) preheating a tar sand containing bitumen by indirect heat exchange with hot off-gas stream as hereinafter recited in step (f).

(b) feeding said preheated tar sand from said step (a) containing bitumen into a fluidized bed of tar sands wherein said fluidized bed of tar sands comprises a contiguous upper cracking zone, an intermediate decoking zone, and a lower heat recovery zone,

(c) converting said tar sand containing bitumen in said upper cracking zone of said fluidized bed at effective temperatures, pressures, and velocities of said fluidized bed in a substantially reducing atmosphere into a coked sand and a vaporous off-gas, wherein said substantial reducing atmosphere comprises steam, combustion gases, and recycle gases, and said vaporous off-gas comprises said reducing atmosphere, hydrocarbonaceous material, and hydrogen,

(d) decoking said coked sand in said intermediate decoking zone of said fluidized bed with steam and oxygen in the presence of recycle gases, at effective temperatures, pressures and velocities, producing a hot spent sand, and said reducing atmosphere,

(e) disengaging said vaporous hot off-gas stream from said coked sand,

(f) preheating said tar sand containing bitumen in said step (a) by indirect heat exchange with said hot off-gas stream, and thereby at least partially cooling said off-gas stream,

(g) separating said at least partially cooled off-gas stream into streams comprising a raw oil stream and a recycle gas stream,

(b) passing at least a portion of said recycle gas stream into said heat recovery zone to contact said hot spent sand at effective velocities, thereby producing a cooled spent sand, and a heated recycle gas stream, and

(i) passing said heated recycle gas stream upwardly through said decoking zone and thence into said cracking zone as a portion of said reducing atmosphere therein.

4,094,768

SEPARATION OF BITUMEN FROM TAR SANDS USING SULFUR AND WATER

Everett J. Fuller, Gillette, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Jan. 4, 1977, Ser. No. 756,643
Int. Cl.² C10G *1/04*
U.S. Cl. 208—11 LE **13 Claims**

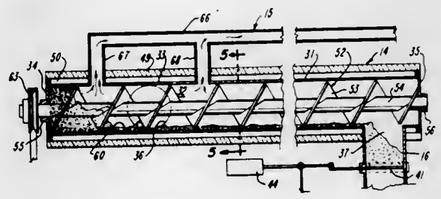
1. A relativey low temperature process for separating bitumen from natural tar sand comprising mixing granular sulfur particles and water with said tar sand to form a sulfur-bitumen agglomerate phase, a sand phase and a water phase, separating said agglomerate from said sand and water and recovering bitumen from said agglomerate and wherein said sulfur-bitumen agglomerate is formed and separated from the water and sand at a temperature below about 170° F.

4,094,769

METHOD AND APPARATUS FOR RETORTING OIL SHALE

Harold Brown, Denver, Colo., assignor to Mineral Concentrates & Chemical Company, Inc., Winnemucca, Nev.

Filed Jun. 13, 1977, Ser. No. 805,983
Int. Cl.² C10G *1/02*
U.S. Cl. 208—11 R **27 Claims**



1. In apparatus for recovering oil products from oil shale and the like, the combination comprising:

means including a generally cylindrically shaped retort with a heat-conductive wall having a heated inner surface defining a retort chamber, said chamber having an inlet and an outlet and sloped downwardly for gravity flow from said inlet to said outlet and having a rotating member in said retort having a conveyor portion extending out from a rotary shaft arranged to force oil shale passed into said inlet in a direction countercurrent to gravity flow and having a peripheral surface area defining an annular flow passage between said heated inner surface and said peripheral surface area for crushing oil shale and confining the crushed oil shale to a layer to which heat is applied from said heated inner surface as the layer is moved from the inlet through an outlet to produce oil product vapors;

means for removing and condensing the oil product vapors into oil product liquids; and

means for selectively removing spent oil shale through said outlet.

4,094,770

PROCESS FOR REMOVING UNFILTERABLE SOLIDS FROM AN OIL

Phillip R. Bose, Pleasant Hill, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jun. 22, 1977, Ser. No. 809,135
Int. Cl.² C10G *21/16*
U.S. Cl. 208—251 R **8 Claims**

1. A process for separating unfilterable, particulate solids from an oil, comprising:

(1) agglomerating said solids by admixing said oil with an agglomerating agent wherein the resulting mixtue contains for each volume of said oil an amount of said agent in the range of from about 0.05 to 3 volumes, said agent comprising a mixture of acetone and 2-butanone and containing, for each 100 volumes of acetone plus 2-butanone, at least 2 volumes of acetone and at least 2 volumes of 2-butanone, said admixing being at a temperature in the range of from about 20° to 160° C and at a pressure at least sufficient to maintain said agent in the resulting liquid-solid mixture;

(2) forming a solids-reduced oil containing said agent by separating said agglomerated solid from said resulting mixture;

(3) separating said agent from said solids-reduced oil by vaporizing said agent; and

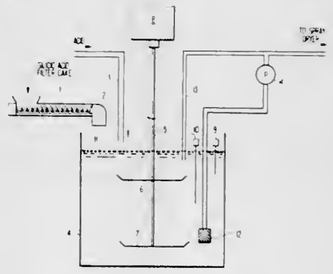
(4) using as at least a portion of said agent in step (1) at least a portion of said separated agent.

4,094,771

PROCESS FOR PREPARATION OF A SPRAYABLE PRECIPITATED SILICIC ACID SUSPENSION

Bernd Brandt, Wesseling-Berzdorf; Peter Nauroth, Wesseling; Albert Peters, Erftstadt-Liblar, and Helmut Reinhardt, Rodenkirchen, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed Jan. 13, 1976, Ser. No. 648,848
Int. Cl.² B03B *1/00*
U.S. Cl. 209—4 **18 Claims**



1. Process for the production of a sprayable, highly concen-

trated, aqueous suspension of a precipitated silicic acid, said suspension having little grit and at least about 18 percent by weight solids, said process comprising:

(a) continuously feeding a silicic acid filter cake and a suspension agent into a dissolver container provided with stirring means;

(b) stirring said filter cake and suspension agent while maintaining a maximum pH value of about 4 in the suspension, said stirring means having a peripheral speed of about 20–30 m/sec; and

(c) continuously removing a portion of the resulting suspension from a zone of highest turbulence of the suspension in said container;

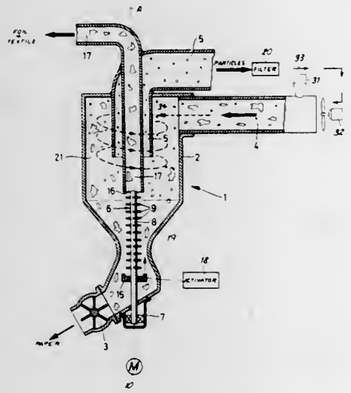
wherein said container and said stirring means each have a diameter and the ratio of container diameter to the diameter of the stirring means is about 3:1 and the ratio of container diameter to level of filling of said container is maintained at a maximum of about 1:2; and further wherein the silicic acid suspension in said container is maintained in an amount of at least 1.5 to about 2 kg. for each 1 kg of silicic acid filter cake which is added to the container.

4,094,772

METHOD OF AND APPARATUS FOR SORTING LIGHT REFUSE FRACTIONS

Klaus Hillekamp, Munich, and Hubert Kindler, Gröbenzell, both of Germany, assignors to Krauss-Maffei Aktiengesellschaft, Munich, Germany

Filed May 19, 1977, Ser. No. 798,487
Claims priority, application Germany, May 22, 1976, 2623067
Int. Cl.² B07B 9/02; B07C 5/34
U.S. Cl. 209—12 **25 Claims**



1. A method of sorting material including flat pieces of different rip resistance, said method comprising the steps of:

suspending said material in a gas stream;

passing said stream with said material suspended therein over an entrapment element;

orienting said entrapement element relative to said stream so that pieces of said material catch thereon; and

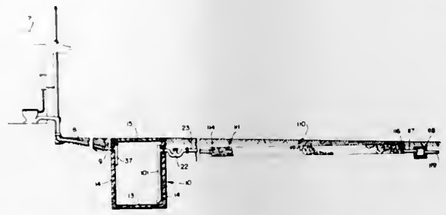
setting the speed of said stream of gas relative to said element so that the less rip-resistant pieces tear free from said element and the more rip-resistant pieces remain caught on said element.

4,094,773

PROCESS FOR SEWAGE TREATMENT WITH COUNTERCURRENT HEAT TRANSFER MEANS

Stanley Beaumont, 118 Macorna St., Watsonia, Australia

Division of Ser. No. 667,171, Mar. 15, 1976, which is a continuation-in-part of Ser. No. 603,623, Aug. 11, 1975, abandoned, which is a continuation of Ser. No. 435,647, Jan. 23, 1974, abandoned. This application Jan. 24, 1977, Ser. No. 761,859
Int. Cl.² C02C 1/06
U.S. Cl. 210—5 **8 Claims**



1. A process for treating sewage, comprising

A. as a psychrophilic stage, flowing raw untreated sewage by gravity within a narrow and deep psychropilic compartment while:

(1.) heating the sewage along the bottom of said psychrophilic compartment to create upward convection currents and form thermally stratified bottom, supernatant, and top zones,

(2.) receiving transversely moving mesophilic sludge along said bottom from an adjoining narrow and deep mesophilic compartment, and

(3.) digesting said sewage at a temperature of about 20°–45° C. to form a psychrophilic sludge and a psychrophilic supernatant;

B. as a mesophilic stage, transferring said psychrophilic supernatant by displacement to said mesophilic compartment and flowing said psychrophilic supernatant therein while:

(1.) heating said supernatant along the bottom of the mesophilic compartment to create upward convection currents and form thermally stratified bottom, supernatant, and top zones, and

(2.) receiving transversely moving bacterial slime along the bottom of said mesophilic compartment from an adjoining narrow and deep entrapment portion of a thermophilic compartment; and

(3.) digesting said psychrophilic supernatant at a temperature of about 35°–55° C. to form a mesophilic supernatant and the mesophilic sludge;

C. as a thermophilic stage, transferring said mesophilic supernatant by displacement to said entrapment portion and flowing said supernatant therein while:

(1.) heating said supernatant along the bottom of said entrapment portion, to create upward convection currents and form thermally stratified bottom, supernatant, and top zones, and

(2.) exposing said mesophilic supernatant to a filter which:

(a) has 50–100 micron apertures, and

(b) provides sufficient surface area for entrapping any suspended solids greater than 50 microns in size, and

(3.) digesting said entrapped solids caught on said filter at a temperature of 45°–70° C until said entrapped solids are hydrolyzed and reacted by thermophilic bacteria to form said bacterial slime and a treated fluid and passing said treated fluid through said filter into an adjoining narrow and deep thermophilic treated portion along which said treated fluid flows while being heated along the bottom thereof;

D. as a sterilizing stage, transferring said treated fluid to the bottom zone of a sterilizing compartment having a bottom heat-transfer surface and a heating means;

E. heating said treated fluid from said bottom surface and with said heating means in said sterilizing compartment to a temperature above 75° C to form a sterilized treated fluid at the top of said sterilizing compartment; and

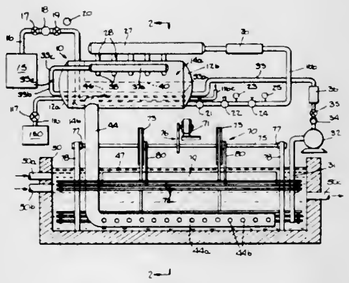
F. as a heat-exchange stage, transferring said sterilized treated fluid to an underlying storage compartment, having a top area and a sloping side area, from which heat is transferred at successively decreasing temperatures from the top area to said bottom surface of said sterilizing compartment and, from said sloping side area, to said bottoms of said treated and entrapment portions of said thermophilic compartment, said mesophilic compartment, and said psychrophilic compartment.

4,094,774

METHOD AND APPARATUS FOR OXYGENATING AEROBICALLY DECOMPOSABLE LIQUORS

Eugene J. Smith, Storms Rd., Valley Cottage, N.Y. 10989

Continuation-in-part of Ser. No. 476,856, Jun. 6, 1974, abandoned, and a continuation-in-part of Ser. No. 530,037, Dec. 5, 1974, abandoned. This application Mar. 10, 1975, Ser. No. 556,918
Int. Cl.² C02B 1/34; C02C 1/02
U.S. Cl. 210—12 **31 Claims**



1. A raw and treated sewage and wastewater effluent oxygenating apparatus comprising, in combination:

(1) means defining a source of liquefied high purity oxygen constituting a cryogen;

(2) a closed receiver tank defining an oxygenating chamber having a gas head section to which is communicated conduit means extending from said source for supplying gaseous phase oxygen to said head section, with said means including a flow conduit section of heat conducting material acting with the oxygen flowing through the latter as a heat sink;

(3) supply means defining a substantially constant volume source of such sewage and wastewater effluent in raw or mixed liquor condition;

(4) means to transfer such liquor under pressure from said supply means to said gas head section for oxygenating contact therein with the gaseous phase oxygen, to pool the oxygenated liquor in said receiver tank below said head section and to deliver from said receiver the oxygenated liquor; and

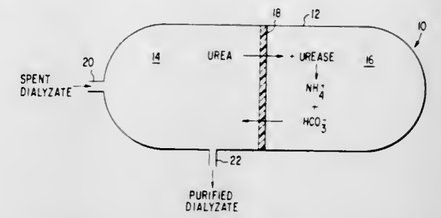
(5) means defining a flow passage section of said transfer means through which such liquor is to flow with this flow passage section being associated in indirect heat exchange relation to said oxygen supply conduit section and liquor oxygen flowing in the latter for conversion to gaseous phase oxygen and for delivery of the latter to said receiver gas head section at elevated pressure and delivery of the liquor in cooled condition to said gas head section.

4,094,775

DIALYSIS SYSTEM

William A. Mueller, Glendale, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Feb. 28, 1977, Ser. No. 772,434
Int. Cl.² B01D 13/00
U.S. Cl. 210—22 **19 Claims**



1. A system for selectively removing urea from an aqueous liquid containing urea and positive metal cations comprising in combination:

a container divided into a first chamber and a second chamber by means of a continuous sheet of cationically charged polymeric membrane selectively permeable to urea and having low permeability to cations;

said first chamber including means for receiving said liquid; and

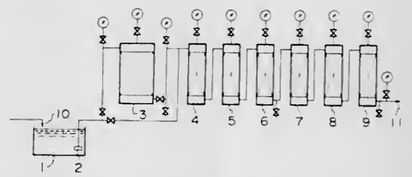
said second chamber receiving a solution containing a urea decomposition agent whereby said cations are repelled by said membrane and retained in said liquid and urea permeates through the membrane into the solution and is decomposed into bicarbonate and ammonium, the ammonium being retained in the solution in the second chamber.

4,094,776

METHOD FOR TREATMENT OF OIL-CONTAINING WASTE WATER BY USING AN OIL ADSORBENT

Kosaku Noguchi, Tokyo; Kiyoharu Yoshimura, Izumi; Honami Tanaka, Izumi, and Masao Hayashi, Izumi, all of Japan, assignors to Koa Oil Co., Ltd., Tokyo, Japan

Filed Jul. 26, 1976, Ser. No. 708,716
Claims priority, application Japan, Oct. 6, 1975, 50-119824; Nov. 27, 1975, 50-141180
Int. Cl.² C02B 9/02
U.S. Cl. 210—27 **6 Claims**



3. A waste water treatment method comprising passing an oil-contaminated waste water through at least one oil-adsorbing vessel wherein there is packed a powdery or granular oil-adsorbent consisting essentially of a solid, particulate pitch formed by heat-treating a heavy petroleum hydrocarbon oil at a temperature of at least 400° C., said solid, particulate pitch having a softening point of at least 200° C. and a volatile matter content of about 30% by weight to about 50% by weight.

6. A waste water treatment method according to claim 3 wherein the oil-contaminated waste water to be treated is subjected to sand filtration before it is passed through the oil adsorbing vessel, and the treated water coming from the oil adsorbing vessel is further treated with active carbon by passing it through at least one active carbon-packed column.

4,094,777

PROCESS FOR REMOVING MERCURY FROM A GAS OR A LIQUID BY ABSORPTION ON A COPPER SULFIDE CONTAINING SOLID MASS

André Sugier, Rueil Malmaison, and Florentino la Villa, Nanterre, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Dec. 16, 1976, Ser. No. 751,452
Claims priority, application France, Dec. 18, 1975, 75 39215; Jan. 23, 1976, 76 02079
Int. Cl.² B01D *15/06*
U.S. Cl. 210—32 21 Claims

1. In a process for the elimination of mercury present in a gas or liquid comprising contacting the liquid or gas with an absorption mass in a fixed bed, the improvement wherein the absorption mass consists essentially of:

(a) a solid dispersant or support selected from the group formed by silica, alumina, silica-alumina, silicates, aluminates and silico-aluminates,

(b) copper whereof at least 30% is in the sulphide state and wherein the copper sulphide proportion in the absorption mass, calculated as copper, represents 2 to 65% of the weight of the mass, and

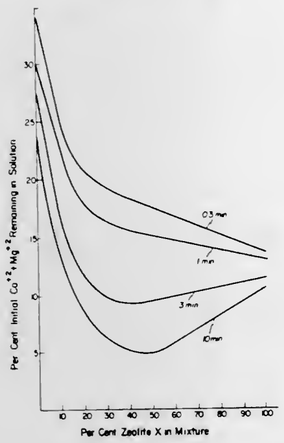
(c) 0–5% of silver in the sulfide state.

4,094,778

SEQUESTERING OF Ca^{++} AND MG^{++} IN AQUEOUS MEDIA USING ZEOLITE MIXTURES

Arthur Francis Denny, Katonah, N.Y.; Anthony Joseph Gioffre, Ridgefield, Conn., and John Delano Sherman, Chappaqua, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jun. 27, 1977, Ser. No. 810,481
Int. Cl.² C02B *1/44, 5/02*
U.S. Cl. 210—38 A 3 Claims



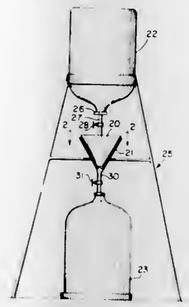
1. Process for sequestering calcium and magnesium cations from aqueous solutions thereof which comprises contacting at a temperature of from 40° to 200° F. said aqueous solution having a pH of from 7 to 10 and containing from 0.0005 to 0.005 gram ions of calcium per liter and from 0.000125 to 0.005 gram ions of magnesium per liter with a mixture of sodium zeolite A and sodium zeolite X, said mixture containing from 40 to 70 weight percent of one of the said zeolite species and a complementary amount of the other.

4,094,779

WATER PURIFICATION MEANS AND METHOD

Abraham S. Behrman, 240 E. Delaware Pl., Chicago, Ill. 60611

Filed Dec. 27, 1976, Ser. No. 754,636
Int. Cl.² C02B *1/14;* B01D *23/14*
U.S. Cl. 210—40 3 Claims



1. A process for removing objectionable tastes and odors from a relatively small volume of water at an automatically controlled rate of flow which comprises allowing the water to flow by gravity from an inverted upper container closed except for an outlet opening and superimposed above and discharging into and below the top of a filter which in turn is superimposed above a filtrate-receiving container, said filter holding a disposable activated carboncontaining filter medium, the rate of flow of the water from the upper container to the filter being controlled automatically by the level of water in the filter with air entering said container exclusively through said outlet opening to replace water emptying through said outlet opening.

4,094,780

PROCESS FOR THE LIQUID PHASE OXIDATION OF ORGANIC SUBSTANCE-CONTAINING EFFLUENTS

Yasuto Iwai, Takaishi; Masayoshi Okabe, Tokyo; Naotoshi Seki; Atsuhiko Hiai, both of Takaishi, and Seiya Iguchi, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals Inc., Tokyo, Japan

Filed Aug. 12, 1976, Ser. No. 713,845
Claims priority, application Japan, Aug. 14, 1975, 50-98077; Aug. 14, 1975, 50-98078; Aug. 14, 1975, 50-98079; Aug. 14, 1975, 50-98080
Int. Cl.² C02B *1/34, 1/42*
U.S. Cl. 210—38 B 4 Claims

1. A process for the liquid phase oxidation of an organic substance-containing effluent comprising oxidizing said effluent at a pH range of 6.0 to 10.0 and at a temperature of 150° to 300° C and under a pressure of 10 to 100 kg/cm² in the presence of an oxidation catalyst system composed of a copper catalyst having a copper ion concentration of 50 to 5000 ppm and an ammonium ion concentration of at least five times that of the copper ion and then recovering said copper catalyst from the treated effluent by double-decomposing the ammonium salt contained in said treated effluent with strong alkali, separating

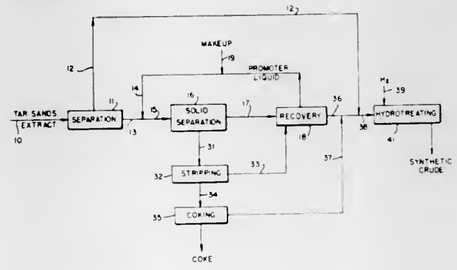
more than 70 weight percent of the dissolved gases from the decomposition solution by ejection with air or steam, adjusting the pH of the ejected decomposition solution to a level of 4.0 to 9.0 whereby dissolved copper catalyst therein is precipitated, and separating the thus precipitated copper catalyst from the solution.

4,094,781

SEPARATION OF SOLIDS FROM TAR SANDS EXTRACT

George J. Snell, Fords, and Raymond H. Long, Morristown, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Nov. 10, 1976, Ser. No. 740,616
Int. Cl.² C10G *1/04;* B01D *21/00*
U.S. Cl. 210—54 11 Claims



1. A process for separating finely divided sand from a tar sands extract, comprising:

separating said finely divided sand from said tar sands extract by gravity difference separation in the presence of a promoter liquid, said promoter liquid having a characterization factor of at least 9.75, a 5 volume percent distillation temperature of at least 250° F and a 95 volume percent distillation temperature of at least 350° F and no greater than 750° F and being present in an amount sufficient to promote and enhance separation of a tar sands liquid essentially free of sand; and

recovering tar sands liquid essentially free of sand.

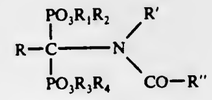
4,094,782

N-ACYL-1-AMINO ALKANE-1,1-DIPHOSPHONIC ACID COMPOUNDS AND COMPOSITIONS FOR AND METHOD OF USING SAME

Friedrich Krüeger, Edingen, and Walter Michel, Ilvesheim, both of Germany, assignors to Joh. A. Benckiser, Ludwigshafen am Rhein, Germany

Division of Ser. No. 677,286, Apr. 15, 1976, Pat. No. 4,029,697. This application Jan. 18, 1977, Ser. No. 760,368
Claims priority, application Germany, Apr. 30, 1975, 2519264; Jul. 5, 1975, 2530139
Int. Cl.² C02B *5/06*
U.S. Cl. 210—58 6 Claims

1. In a process of preventing scale and deposit formation in aqueous systems, the step which comprises adding to the aqueous system, as scale and deposit formation suppressing agent, an N-acyl-1-amino alkane-1,1-diphosphonic acid of the formula

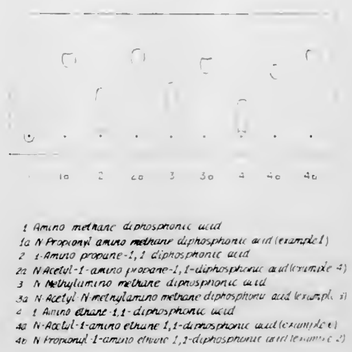


in which

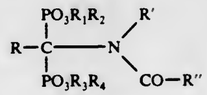
R, R′, and R″ are hydrogen or lower alkyl and

R_1, R_2, R_3, and R_4 are hydrogen or an alkali metal,

in substoichiometrical amounts calculated for the amount of hardness-causing compounds present in the aqueous system.



4. A composition for suppressing scale and deposit formation in aqueous systems, said composition containing, as scale and deposit formation suppressing agent, an N-acyl-1-amino alkane-1,1-diphosphonic acid of the formula



in which

R, R′, R″ are hydrogen or lower alkyl and

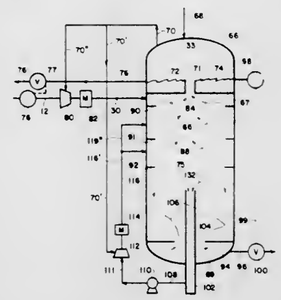
R_1, R_2, R_3, and R_4 are hydrogen or an alkali metal.

4,094,783

CENTRIFUGAL FLOTATION SEPARATOR

George F. Jackson, 5745 E. 47 Pl., Tulsa, Okla. 74135

Filed Sep. 29, 1977, Ser. No. 837,833
Int. Cl.² C02B *1/34*
U.S. Cl. 210—63 R 10 Claims



10. In a multi-stage recycling centrifugal flotation separator system comprising a circular cylindrical closed vessel with vertical axis having a horizontal tray positioned inside the vessel near the top thereof, said tray having an axial tubular opening, the method of operating said separator comprising the steps of;

(a) introducing air under pressure into said vessel at the top thereof;

(b) introducing contaminated liquid into said vessel through a tangential inlet pipe near the top of said vessel but under said tray;

(c) drawing off contaminated froth from an outlet positioned above said tray;

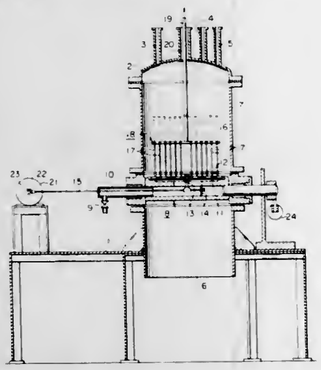
(d) drawing off air to be recycled from the space above said tray, through a pipe near the top of said vessel;

(e) drawing off clean liquid from the bottom of said vessel;
(f) introducing said air to be recycled into an eductor into the inlet contaminated liquid, and mixing the recycled air and liquid before entry into the vessel;
(g) recycling liquid from the bottom of said tank into the tank through tangential pipe means at a point below the entry of the contaminated liquid; and
(h) introducing recycled air into the recycled liquid and mixing said recycled air and recycled liquid before entry into the vessel.

4,094,784
APPARATUS AND METHOD FOR FILTERING DEHYDRATING AND DRYING MATERIAL

Itsuro Hirano, Tokyo, Japan, assignor to B F Kogyo Kaisha, Ltd. (Bl Efy Kogyo Kabushiki Kaisha), Tokyo, Japan

Filed Jul. 27, 1976, Ser. No. 709,018
Claims priority, application Japan, Dec. 30, 1975, 50-158696
Int. Cl.² B01D *37/00, 35/20*
U.S. Cl. 210—68 **29 Claims**



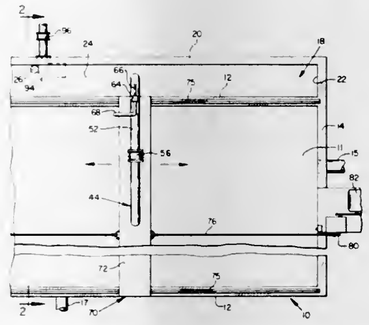
1. A method for filtering, dehydrating and drying material comprising steps of
supplying said material to be treated into a filter cylinder of a filter apparatus through a supply pipe provided at the upper portion of said filter cylinder;
filtering said material with a filter means provided in said filter cylinder to collect filter material on said filter means and to remove a filtrate through a rotatable hollow valve stem communicating with said filter means and extending laterally from said filter cylinder;
drying said filter material on said filter means to prepare dried filter material; and
vibrating said dried filter material on said filter means with a vibration means connected thereto and dropping said dried filter material from said filter means through an opening provided at the lower portion of said filter cylinder by rotating said filter means;
wherein said filter cylinder has a hollow valve plate mounted rotatably at the center portion thereof by means of said hollow valve stem connected thereto so that material to be treated is deposited on said valve plate when it is in the horizontal position and treated material is dumped from said valve plate when it is rotated from the horizontal position to the vertical position, and
said filter means is provided on said hollow valve plate and communicates with said hollow valve stem through said valve plate.

11. An apparatus for filtering, dehydrating and drying a material, comprising:
a vertically extending filter cylinder formed with a top cover formed with input means for supplying a material to be filtered, said cylinder having a full opening on the lower side thereof;
a base for mounting said cylinder;
a hollow valve plate positioned in said cylinder;
filter means for filtering the material to be filtered supported on said hollow valve plate;
auxiliary filter means positioned in said cylinder above said filter means, said auxiliary filter means comprising a mounting plate adapted to permit the passage of material to be filtered therepast and formed with a plurality of rods suspended from the lower surface thereof and an actuator extending upwardly from the upper surface thereof through an opening provided in the top cover of said cylinder, whereby said auxiliary filter means may be moved upwardly and downwardly by moving said actuator to permit the lower end of said rods to engage with said filter means; and
means for rotating said hollow valve plate and filter means between a first position which is substantially horizontal with respect to the acis of said cylinder for receiving the material to be filtered, and a second position which is substantially vertical with respect to the axis of said cylinder for dumping the filtered material from said valve plate, said rotating means including hollow valve stem means defining the axis of rotation of said hollow valve plate and for communicating between said filter means and an outlet for discharging the liquid from the filtered material.

4,094,785
SUCTION CLARIFIER METHOD

William Michael Booty, Corvallis, Oreg., assignor to Neptume Microfloc, Inc., Corvallis, Oreg.

Filed Oct. 26, 1976, Ser. No. 735,381
Int. Cl.² B01D *21/24*
U.S. Cl. 210—70 **1 Claim**



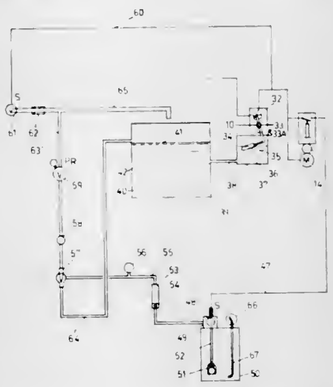
1. A method for unclogging inlets of a siphon conduit used for discharging sludge from the bottom of a liquid clarification settling tank into an adjoining chamber and for maintaining a substantially constant flow of liquid through a siphon conduit having inlets subject to clogging comprising:
causing a stream of liquid waste to flow into and a stream of clarified liquid to flow out of a settling tank at rates set to maintain the surface of liquid in said settling tank substantially at a predetermined level;
producing a flow of sludge by siphon action from the bottom of said tank into an adjoining chamber through a conduit having a plurality of inlets subject to clogging;
removing sludge from said adjoining chamber at a fixed rate greater than the maximum rate of which sludge can flow through said conduit when one or more of said inlets are clogged and less than the maximum rate at which sludge can flow through said conduit when all of said inlets are unclogged so that when one or more of said inlets are clogged, the level of liquid in said adjoining chamber at least momentarily drops to a level below the level at which liquid is maintained when all inlets are unclogged

and the vertical distance between the levels of the liquids in the two chambers increases to an amount greater than the amount maintained when all said inlets are unclogged thereby creating a greater amount of suction inside said conduit then is present when all said inlets are unclogged thus to urge the clogging material through the clogged inlet and into said conduit; and
maintaining said fixed rate of sludge removal from said adjoining chamber indefinitely until such time as all liquid is removed therefrom.

4,094,786
TREATMENT CONTROL APPARATUS FOR WATER SYSTEMS

John R. Bury, 620 Hidden Valley, Kitchener, Canada

Filed Oct. 11, 1977, Ser. No. 840,981
Int. Cl.² C02B *1/18*
U.S. Cl. 210—101 **4 Claims**



1. A system for introducing an accurate quantity of treating solution into a water reservoir to which make up water is added responsive to a predetermined drop in head, said water being added through a control orifice at a predetermined pressure at a constant rate of flow, and comprising in combination: a tank in liquid communication with said reservoir the liquid level in said tank corresponding to the liquid level in said reservoir; a normally open liquid level responsive first electrical switch closable upon a drop in liquid level in said tank corresponding to a predetermined drop in head in said reservoir; means for pumping make-up water at a predetermined rate of flow to said reservoir responsive to closure of said switch; a totalizer device including a clock type motor electrically actuated responsive to closure of said switch; totalizer mechanism associated with said motor and driven thereby, said mechanism defining totalizing cycles responsive to a predetermined time base determined by said motor and responsive to the volume of make-up water delivered to said reservoir through said control orifice; a second normally open electrical switch associated with said totalizing mechanism actuably closable thereby over a predetermined portion only of a cycle thereof; a treating solution container and a second electrically actuated pump of constant pressure characteristic for delivering treating solution from said container to said reservoir; a second control orifice for said treating solution between said second pump and said reservoir; means for actuating said second pump responsive to closure of said second switch; and means for maintaining such float switch closed until the water level in said reservoir rises to a predetermined level.

4,094,787
FILTER FOR PAINT OR OTHER LIQUIDS

Costanzo Giordano, 12820 S. Laflin, Chicago, Ill. 60643

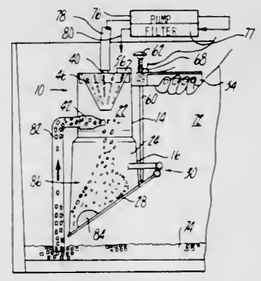
Filed Dec. 6, 1976, Ser. No. 747,787
Int. Cl.² B01D *33/38*
U.S. Cl. 210—103 **14 Claims**

1. A filter device for paint or other liquid,
said filter device comprising a filter housing having a downwardly tapering bottom wall and a closed top wall,
said bottom wall being in the shape of an inverted cone,
a downwardly tapering filter medium mounted in said housing and partitioning said housing into upper and lower compartments,
said filter medium being in the shape of an inverted cone,
said upper compartment being disposed between said top wall and said filter medium,
said lower compartment being disposed between said filter medium and said bottom wall,
said housing having a lower opening communicating with said lower compartment at the lower end of said bottom wall and having appurtenant liquid inlet and drain means for connection to said lower opening,
an outlet pipe extending from said upper compartment and through said top wall,
a control valve connected to said lower opening and to said liquid inlet means and said drain means and selectively operable between first and second positions for switching said lower opening between said liquid inlet means and said drain means, respectively,
selectively operable liquid supply means for supplying the liquid under pressure to said liquid inlet means to cause the liquid to pass through said control valve and said filter medium into said upper compartment and out of said upper compartment through said outlet pipe to filter the liquid,
spray means in said upper compartment and directed toward said filter medium,
and selectively operable solvent supply means connected to said spray means for causing the solvent to be sprayed upon said filter medium and to pass through said filter medium into said lower compartment and through said control valve to said drain means to backwash said filter medium.

4,094,788
AQUARIUM GRAVEL CLEANER

Denzel J. Dockery, 3317 E. Bristol Rd., Flint, Mich. 48507

Filed Jul. 1, 1976, Ser. No. 701,883
Int. Cl.² E04H *3/20*
U.S. Cl. 210—169 **19 Claims**



1. For use with an aquarium carrying aggregate along its bottom, a device comprising,
a housing having an interior chamber,
means for drawing said aggregate into said housing chamber, and drawing means further comprising a pump having an intake line, fluid passage means open at one end to said housing chamber and adapted to engage the aggregate at its other end, said intake line being coupled to said

housing chamber to thereby draw a water and aggregate mixture through said fluid passage means and into said housing chamber,

means for washing said aggregate in said housing chamber, said washing means further comprising a tubular and conically shaped sieve mounted in said housing chamber, said seive having its interior open to the intake line and its exterior open to the fluid passage to the intake line and its exterior open to the fluid passage means,

means for returning the washed aggregate to said aquarium, and

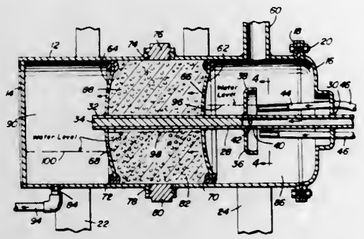
wherein said fluid passage means projects the water and aggregate mixture tangentially into said housing chamber whereby said fluid stream circulates in a vortex around said sieve.

4,094,789

SULFUR GAS REMOVING AND SOLID PARTICLE FILTER FOR WELL WATER

Ronald J. Kemper, R.R. #7, Defiance, Ohio 43512

Filed Mar. 17, 1977, Ser. No. 778,783
Int. Cl.² B01D *19/00, 27/00*
U.S. Cl. 210—188 **7 Claims**



1. A combined sulfur gas removing and solid particle filtering assembly for well water, said assembly including a hollow housing having interior baffle plates dividing the interior of said housing into first, second and third compartments, means operative to discharge water from said third compartment, each of said baffle plates defining spaced water flow openings therethrough for the flow of water from the first compartment through the second compartment and into the third compartment, water filtering material disposed in said second compartment for filtering water flowing therethrough, and water and air inlet means for said first compartment operative to admit jets of water and jets of air under pressure into the first compartment in a manner to thoroughly commingle said jets of water and air, said first compartment also including air vent means operatively associated therewith for venting air from an upper portion of said first compartment, said housing being elongated and said compartments are spaced longitudinally therealong, said housing including one removable end wall, said baffle plates and water and air inlet means being supported from said removable end wall for removal from said housing with said end wall, said water inlet means including a water supply pipe having its discharge end extending and secured through said end wall, the terminal end portion of said pipe being plugged and having said baffles mounted thereon for support therefrom, said pipe having a cup-shaped splash plate mounted thereon between said end wall and the adjacent baffle and opening toward said end wall, water outlet ports formed in said pipe and opening outwardly thereof into said cup-shaped splash plate, said air inlet means including a plurality of compressed air pipe discharge end portions spaced about said water pipe and opening toward and into said splash plate from the side of said water outlet ports remote from the closed end of said splash plate.

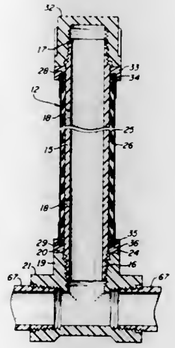
5. A combined sulfur gas removing and solid particle filtering assembly for well water, said assembly including a hollow housing having interior baffle plates dividing the interior of said housing into first, second and third compartments, means operative to discharge water from said third compartment, each of said baffle plates defining spaced water flow openings therethrough for the flow of water from the first compartment through the second compartment and into the third compartment, water filtering material disposed in said second compartment for filtering water flowing therethrough, and water and air inlet means for said first compartment operative to admit jets of water and jets of air under pressure into the first compartment in a manner to thoroughly commingle said jets of water and air, said first compartment also including air vent means operatively associated therewith for venting air from an upper portion of said first compartment, said water inlet means including a water supply pipe having a discharge end portion opening through said housing and into said first compartment, the terminal end of said discharge end portion being plugged, said discharge end portion having a cup-shaped splash plate mounted thereon between said terminal end and the portion of said housing through which said discharge end portion opens, said splash plate opening toward said housing portion, said pipe having water outlet ports formed therein and opening outwardly thereof into said cup-shaped splash plate, said air inlet means including a plurality of compressed air pipe discharge end portions spaced about said water pipe and opening toward and into the open side of said cup-shaped splash plate.

4,094,790

DISTRIBUTOR COLLECTOR ASSEMBLY

Henry Schmidt, Jr., Hinsdale, Ill., assignor to Industrial Filter & Pump Mfg. Co., Cicero, Ill.

Filed Nov. 11, 1976, Ser. No. 740,815
Int. Cl.² B01D *23/20*
U.S. Cl. 210—289 **9 Claims**



1. In combination

a rigid conduit provided with a plurality of apertures in the wall thereof and having an end portion,

an axially rigid tubular grid fitted over said conduit, said end portion of said conduit extending beyond one end of said grid,

an annular, resilient sealing gasket positioned over said tube and said conduit adjacent to and beyond said one end of said grid, one end portion of said tube being folded back on the external side of itself over said gasket, and

internally screw threaded closure means secured to said end of said conduit for sealing said end of said conduit,

said closure means having an annular skirt portion extending over said gasket and overlying portions of said tube for compressing said gasket and overlying portions of said tube into sealing relationship with said conduit.

5. In combination,

a plurality of lengths of plastic tubing,

a plurality of plastic connectors sealably connected between respective lengths of said tubing, and

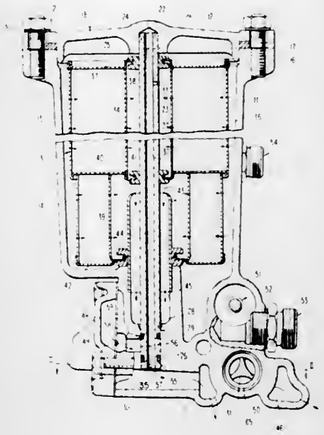
a plurality of the combinations of claim 1 wherein each said conduit is sealably connected to one of said connectors.

4,094,791

LUBRICATING OIL FILTER WITH AN UPRIGHT FILTER POT

Ulrich Conrad, Ludwigsburg, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Nov. 23, 1976, Ser. No. 744,309
Claims priority, application Germany, Nov. 27, 1975, 2553293
Int. Cl.² B01D *27/08*
U.S. Cl. 210—316 **13 Claims**



1. A lubricating-oil filter comprising:

a. a filter base having a bore therein;

b. a filter pot arranged generally upright at the filter base, said filter pot having a large inner space;

c. a bolt retained at its lower end in the bore in the filter base and arranged centrally in the inner space of the filter pot;

d. a first upper clean oil filter chamber centered around the bolt in the inner space of the filter pot;

e. a second lower clean oil filter chamber centered around the bolt in the inner space of the filter pot;

f. a first base channel means in the filter base for receiving oil emptied by way of the bore from the inner space of the filter pot from the first clean oil filter chamber, and from the second clean oil filter chamber;

g. an intermediate channel means in the bolt for connecting the first clean oil filter chamber with the first base channel means;

h. a first oil discharge channel means in the filter base for connecting the second clean oil filter chamber by way of the bore in the filter base with the first base channel means;

i. a second base channel means for receiving oil emptied from the second clean oil filter chamber by way of the first oil discharge channel;

j. a second oil discharge channel means in the filter base for connecting the inner space of the filter pot by way of the bore in the filter base with the first base channel means;

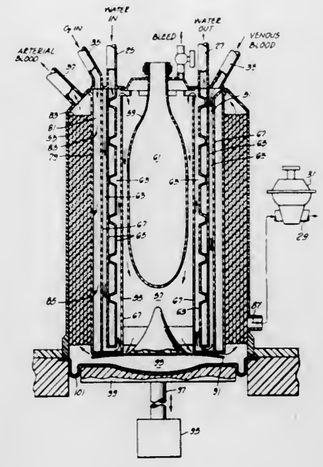
whereby, upon removal of the lower end of the bolt from the bore in the filter base, oil is emptied from the inner space of the filter pot through the first and second oil discharge channels by way of the bore in the filter base into the first base channel means.

4,094,792

MEMBRANE FLUID TRANSFER METHOD AND APPARATUS

Donald J. Bentley, Newport Beach, Calif., assignor to Bentley Laboratories, Inc., Irvine, Calif.

Filed Sep. 8, 1976, Ser. No. 721,458
Int. Cl.² B01D *13/00*
U.S. Cl. 210—321 B **21 Claims**



1. A membrane fluid transfer device comprising:

a housing having a process fluid inlet and outlet;

an atrium chamber means for providing a reservoir for incoming fluid formed within said housing and in communication with said housing process fluid inlet;

a spirally wound, flattened, tubular permeable membrane having a transfer fluid inlet at one end of said tubular membrane and a transfer fluid outlet at the opposite end of said membrane, said membrane forming passageways between adjacent windings of said membrane, one end of said passageways being in communication with said ventricle and the opposite end of said passageways being in communication with said housing process fluid outlet;

control means for maintaining a substantially constant transfer fluid flow in communication with said transfer fluid inlet;

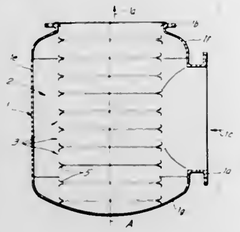
control means for maintaining a substantially constant transfer fluid pressure in communication with said transfer fluid outlet; and a ventricle means for pumping fluid to be treated through said passageways between said adjacent windings of said membrane, said ventricle means being connected to said atrium by a fluid passageway having a valving means positioned within said fluid passageway, said membrane windings and a portion of said ventricle being formed by a member adapted to be actuated by a driving means, whereby the pressure of the fluid to be treated is pumped alternately from a pressure lower than the controlled and constant transfer fluid pressure to a pressure higher than the controlled transfer fluid pressure and thus allowing for alternately opening and closing of said passageways between said adjacent windings of said membrane.

4,094,793

FILTER APPARATUS, ESPECIALLY FOR A LIQUID TO BE FED TO A POWER-PLANT CONDENSER

Dieter Patzig, Ratingen-Tiefenbroich, Germany, assignor to Ludwig Taprogge Reinigungsanlagen fur Rohren-Warmeaustauscher, Dusseldorf, Germany

Filed Mar. 7, 1977, Ser. No. 775,400
Claims priority, application Germany, Mar. 6, 1976, 2609332
Int. Cl.² B01D *25/02, 29/24*
U.S. Cl. 210—323 R **9 Claims**



1. A filter for removing solids from a liquid comprising a substantially cylindrical housing having an inlet and and outlet for said liquid, and a substantially cylindrical filter basket disposed in said housing and traversed by said liquid, passing from said inlet to said outlet, said filter basket comprising a stack of filter rings, each of said filter rings having an outwardly concave perforated periphery and a pair of inwardly extending annular flanges lying generally in planes perpendicular to the axis of said basket, and means for connecting the flanges of adjoining rings together, said perforated periphery being constituted as a stamped sheet metal body of rotation centered on the axis of the respective ring and having in axial section a rounded convex configuration reaching inwardly, said flanges being connected to said body of each ring on opposite sides thereof whereby each of said filter rings is fully self-supporting.

4,094,794

HYDROCYCLONE

Albrecht Kahmann, Weingarten, Germany, assignor to Escher Wyss GmbH, Ravensberg, Germany

Continuation of Ser. No. 567,823, Apr. 14, 1975, abandoned. This application Mar. 8, 1977, Ser. No. 775,624
Claims priority, application Switzerland, Apr. 16, 1974, 5224/74
Int. Cl.² B01D *21/26;* B04C *3/06*
U.S. Cl. 210—512 R **3 Claims**

1. A hydrocyclone for separating impurities from a fiber suspension comprising

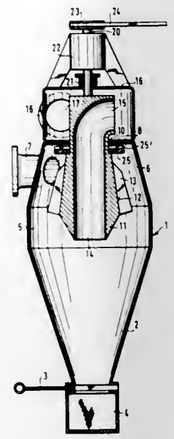
a housing defining a separation chamber and having an aperture at an upper end,

an inlet duct connected tangentially to an upper part of said housing below said aperture for introducing a fiber suspension directly into said separation chamber,

a hollow rotor rotatably mounted in said housing, said rotor defining an outlet duct extending from below said inlet duct along a longitudinal axis from said separation chamber through said aperture with a clearance to an upper portion outside said separation chamber, said upper portion extending in an outward direction angularly of said longitudinal axis and terminating at an orifice,

a casing surrounding said orifice of said rotor and having a tangential outlet aperture therein for exhausting of a purified suspension, and

a centrifugal disc mounted on said rotor within said housing above said inlet, said disc being disposed below and in facing relation to said casing and said aperture of said housing upper part for preventing passage of heavy particles from said housing through said aperture into said



casing, said disc including a plurality of fins thereon extending towards said casing.

4,094,795

POLYGALACTOMANNAN ETHER COMPOSITIONS

Ronald N. DeMartino, Wayne, and Anthony B. Conciatori, Chatham, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Jan. 28, 1977, Ser. No. 763,372
Int. Cl.² E21B *43/25*
U.S. Cl. 252—8.55 R **6 Claims**

1. A hydraulic well-treating fluid composition which comprises an aqueous solution containing N,N-dialkylacrylamide ether adduct of polygalactomannan gum as a gelling agent in an amount in the range between about 0.05 and 5 weight percent based on the weight of the water component, wherein each alkyl group contains between one and about four carbon atoms; and a breaker additive for reduction of solution viscosity.

4,094,796

PROCESS FOR PREPARING NOVEL COMPOUNDS FOR USE AS FABRIC SOFTENERS IN WATER SOLUTIONS THEREOF

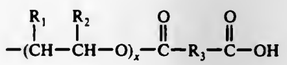
Eckhard C. A. Schwarz, 115 N. Park Ave., Neenah, Wis. 54956, assignor to Blax-Fiberfilm Corporation, Neenah, Wis.

Filed Jun. 7, 1977, Ser. No. 804,232
Int. Cl.² D06M *13/34*
U.S. Cl. 252—8.8 **11 Claims**

1. A composition of matter having the following structural formula:

(a)

wherein X, Y, and Z each being selected from the group consisting of



(1)

wherein one of R_1 and R_2 is hydrogen and the other is an alkyl group having from 1 to 6 carbon atoms with the alkyl to hydrogen mole ratio being less than 0.4 and X being an integer of

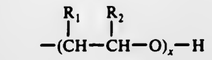
at least 1 and R_3 is a diradical selected for the group consisting of

R_3 is a diradical of either:

(a) 1 to 6 methylene groups

(b) a diradical of: —CH=CH—

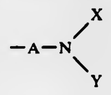
(c) a diradical of:



(2)

where R_1, R_2 and X are as defined above

alkyl radicals having from 1 to 6 carbon atoms (3)

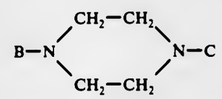


(4)

wherein

A is an alkylene radical having from 1 to 6 carbon atoms and X and Y are as defined above

wherein at least one of X, Y and Z has structural formula (1) and



(b)

wherein B & C are each selected for the group consisting of radicals having above structural formula (1), above structural formula (2) and alkyl group having from 1 to 6 carbon atoms with at least one of B & C having structural formula (1).

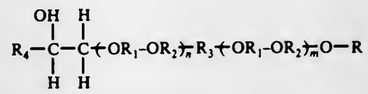
4,094,797

OXIDATION STABLE FIBER LUBRICANT

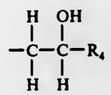
David Dudley Newkirk; Robert Bernard Login, both of Woodhaven, and Basil Thir, Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Aug. 1, 1977, Ser. No. 820,405
Int. Cl. D06m *13/10*
U.S. Cl. 252—8.9 **22 Claims**

1. A lubricant for thermoplastic fibers comprising a block or heteric copolymer polyoxyalkylene composition having the formula:



wherein $n + m$ has a value to produce a molecular weight of about 300 to about 3000; R is selected from the group consisting of hydrogen, the residue of an aliphatic monocarboxylic acid, having 1 to about 24 carbon atoms



and mixtures thereof; R_1 and R_2 are the same or different and derived from lower alkylene oxides selected from the group consisting of ethylene oxide, 1,2-propylene oxide and butylene oxide; R_3 is a divalent radical derived from a difunctional aromatic compound containing at least two active hydrogens and R_4 is an alkyl radical having about 1 to about 22 carbon atoms.

4,094,798

OIL RECOVERY PROCESS USABLE IN HIGH TEMPERATURE FORMATIONS CONTAINING HIGH SALINITY WATER WHICH MAY INCLUDE HIGH CONCENTRATIONS OF POLYVALENT IONS

Jack F. Tate, and Jim Maddox, Jr., both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

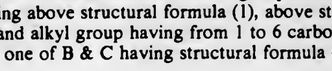
Continuation-in-part of Ser. No. 554,891, Mar. 3, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,788
Int. Cl.² E21B *43/22*
U.S. Cl. 252—8.55 D **12 Claims**

1. A method for recovering petroleum from a subterranean, petroleum-containing, permeable formation penetrated by at least one injection well and at least one production well, both wells being in fluid communication with the formation, said formation containing water whose salinity is from about 50,000 to about 225,000 parts per million total dissolved solids, the formation temperature being greater than 175° F, comprising:

a. introducing into the formation via the injection well an aqueous surfactant-containing fluid to displace petroleum toward the production well, said fluid comprising

(1) from .05 to 5.0 percent by weight of an anionic organic sulfonate surfactant having an average equivalent weight not to exceed 360 selected from the group consisting of water-soluble sodium, potassium or ammonium salts of petroleum sulfonates, alkyl sulfonates having from 5 to 20 carbon atoms, alkylaryl sulfonates having from 5 to 14 carbon atoms in the alkyl chain and mixtures thereof;

(2) from .05 to about 5.0 percent by weight of a phosphate ester surfactant with an average molecular weight not to exceed about 1,000 having the following formula:



wherein R is an alkyl or alkylaryl radical having from 12 to 24 carbon atoms, m is a number from 1 to 20, x and y are 1 or 2 and the sum of x and y is 3, and R′ is hydrogen, sodium, potassium, lithium or ammonium;

(3) said surfactant fluid salinity being at least 50,000 parts per million total dissolved solids; and

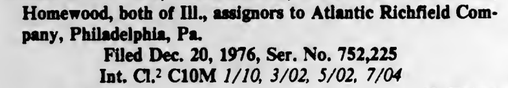
b. recovering petroleum displaced by the surfactant fluid from the formation via the production well.

9. A method for recovering petroleum from a subterranean, petroleum-containing, permeable formation penetrated by at least one injection well and at least one production well, both wells being in fluid communication with the formation, said formation containing water whose salinity is from about 150,000 to 225,000 parts per million total dissolved solids, the formation temperature being greater than 115° F, comprising:

a. introducing into the formation via the injection well an aqueous surfactant-containing fluid to displace petroleum toward the production well, said fluid comprising:

(1) from about .05 to about 5.0 percent by weight an anionic organic sulfonate surfactant having an average equivalent weight not to exceed 360 selected from the group consisting of water-soluble sodium, potassium or ammonium salts of petroleum sulfonates, alkyl sulfonates having from 5 to 20 carbon atoms, alkylaryl sulfonates having from 5 to 14 carbon atoms in the alkyl chain and mixtures thereof; and

(2) from about .05 to about 5.0 percent by weight of a phosphate ester surfactant with an average molecular weight not to exceed about 1,000 having the following formula:



wherein R is an alkyl or alkylaryl radical having from 12 to 24 carbon atoms, *m* is a number from 1 to 20, *x* and *y* are 1 or 2 and the sum of *x* and *y* is 3, and R' is hydrogen, sodium, potassium, lithium or ammonium;

(3) said surfactant fluid salinity being at least 150,000 parts per million total dissolved solids; and

b. recovering petroleum displaced by the surfactant fluid from the formation via the production well.

4,094,799

SOLID PARTICLES-CONTAINING LUBRICATING OIL COMPOSITION AND METHOD FOR USING SAME

Donald L. De Vries, South Holland, and James M. DeJovine, Homewood, both of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Filed Dec. 20, 1976, Ser. No. 752,225
Int. Cl.[2] C10M *1/10, 3/02, 5/02, 7/04*
U.S. Cl. 252—29 **18 Claims**

1. A composition of matter comprising a major amount by weight of oil of lubricating viscosity; a minor amount by weight of solid particles effective to improve the lubricating properties of said composition, said solid particles being selected from the group consisting of graphite, molybdenum disulfide, zinc oxide and mixtures thereof; and a minor amount by weight, at least equal to the amount by weight of said solid particles, of at least one co-polymer of (1) an N-vinyl pyrrolidone, and (2) an oil soluble acrylic ester, said co-polymer being present in an amount effective to reduce the deposit forming tendencies of said composition.

4,094,800

ANTI-WEAR LUBRICATING OIL COMPOSITIONS

Thomas M. Warne, Wheaton, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 705,128, Jul. 14, 1976, abandoned. This application May 9, 1977, Ser. No. 794,983
Int. Cl.[2] C10M *1/48, 3/42, 5/24, 7/46*
U.S. Cl. 252—32.7 E **13 Claims**

1. A lubricating oil composition having improved anti-wear properties comprising a major portion of lubricating oil and an effective amount of an oil soluble additive composition comprising a basic zinc alkyl dithiophosphate having alkyl groups made from primary alcohols containing from about 6 to about 20 carbon atoms and a nonacidic lubricant anti-rust compound comprising the reaction product of a succinic anhydride substituted with an alkenyl group which has 8 to 20 carbon atoms and an alcohol, an amine or mixtures thereof, wherein the ratio of zinc alkyl dithiophosphate to anti-rust is about 1–50:1.

4,094,801

MAGNESIUM-CONTAINING COMPLEXES, METHOD FOR THEIR PREPARATION, AND COMPOSITIONS CONTAINING THE SAME

John Wesley Forsberg, Mentor-on-the-Lake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation-in-part of Ser. No. 681,627, Apr. 29, 1976, abandoned. This application Jan. 18, 1977, Ser. No. 760,315
Int. Cl.[2] C10M *1/44, 1/48, 1/40, 1/24*
U.S. Cl. 252—33 **53 Claims**

1. A method for preparing a non-carbonated magnesium-containing complex which comprises heating, at a temperature above about 30° C., a mixture comprising:

(A) At least one of magnesium hydroxide, magnesium oxide, hydrated magnesium oxide, or a magnesium alkoxide;

(B) At least one oleophilic organic reagent comprising a carboxylic acid, a sulfonic acid, a pentavalent phosphorus acid, or an ester or alkali metal or alkaline earth metal salt of any of these;

(C) Water; and

(D) At least one organic solubilizing agent for component B;

the ratio of equivalents of magnesium to component B, calculated as the free carboxylic or sulfonic acid or as the phosphoric acid ester, being at least about 5:1, and the amount of water present being at least sufficient to hydrate a substantial proportion of component A calculated as magnesium oxide.

26. A complex prepared by the method of claim 1.

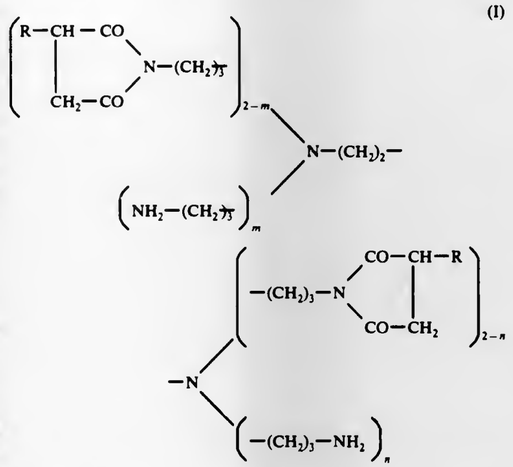
4,094,802

NOVEL LUBRICANT ADDITIVES

Gerard Soula, Meyzieu, and Philippe Duteurtre, Le Havre, both of France, assignors to Societe Orogil, Paris, France

Filed Mar. 30, 1977, Ser. No. 782,881
Claims priority, application France, Apr. 1, 1976, 76 09513
Int. Cl.[2] C10M *1/32, 3/26, 5/20, 7/30*
U.S. Cl. 252—51.5 A **16 Claims**

1. A novel additive composition based on alkenylsuccinimides, comprising an alkenylsuccinimide of the formula (I):



(I)

in which formula R represents an alkenyl group containing from about 20 to 200 carbon atoms, *m* represents an integer selected from the group consisting of zero, 1 and 2, and *n* represents an integer selected from the group of zero and 1.

11. A lubricating composition having desirable dispersion, anti-rust and anti-foam properties, comprising an oil containing between about 1 and 10% by weight of a novel additive according to claim 1.

4,094,803

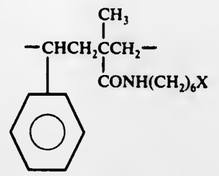
DEVELOPER COMPOSITION COMPRISING AMINOLYZED COATED CARRIER

Harry W. Gibson, Penfield, and Wolfgang H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 500,774, Aug. 26, 1974. This application Oct. 29, 1976, Ser. No. 736,781
Int. Cl.[2] G03G *9/14, 9/10*
U.S. Cl. 252—62.1 P **9 Claims**

1. An electrostatographic developer composition comprising finely-divided toner particles electrostatically clinging to the surface of carrier particles having an average particle diameter of between 50 microns and about 1,000 microns, each of said carrier particles comprising a core surrounded by an outer coating of a polymer selected from the group consisting of styrene-alkylmethacrylate and styrene-alkylacrylate, said

polymer having been functionalized by ester group aminolysis to produce an aminolyzed polymer having the general structure



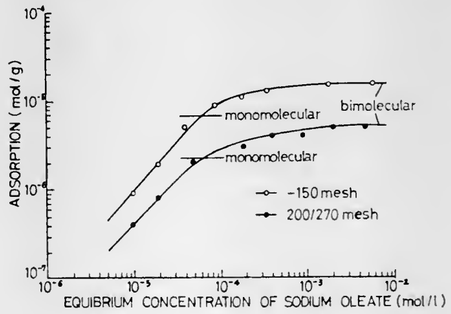
where X may be NH_2, OH, and H said carrier particles being characterized as having controlled triboelectric charging properties.

4,094,804

METHOD FOR PREPARING A WATER BASE MAGNETIC FLUID AND PRODUCT

Junzo Shimoiizaka, 1-1-14, Komegafukuro Sendai-shi, Miyagi-ken, Japan

Continuation-in-part of Ser. No. 605,306, Aug. 18, 1975, abandoned. This application Jan. 5, 1977, Ser. No. 757,037
Claims priority, application Japan, Aug. 19, 1974, 49-94266; Dec. 18, 1974, 49-144546; Mar. 27, 1975, 50-37120
Int. Cl.[2] H01F *1/25, 1/00;* C10M *3/00;* C09D *11/00*
U.S. Cl. 252—62.52 **22 Claims**



19. A stable aqueous magnetic fluid having a pH of above about 4 comprising water having stable dispersed therein ferromagnetic oxide particles of a particle size below about 300 A, each of said magnetic particles having a two layer surfactant coating comprising an inner layer and an outer layer, the inner layer being a monomolecular layer of an 18 carbon atoms unsaturated fatty acid or salt thereof which completely coats said magnetic particle, and the outer layer being an outer coating free of cationic surfactants and consisting essentially of (i) an anionic surfactant having 8 to 30 carbon atoms in its hydrophobic radical other than said first surfactant, or (ii) a non-ionic surfactant having 8 to 20 carbon atoms in it hydrophobic radical and having a hydrophile balance of at least 12 which completely covers said inner layer, said aqueous fluid containing between about 0.005 and 0.7 g/ml of said coated ferromagnetic oxide particles.

4,094,805

PROTECTING PAVEMENT OR CONCRETE MATERIALS AGAINST THE EFFECTS OF THE DESTRUCTIVE ACTION OF FREEZING AND THAWING OF WATER AND OR BRINE SOLUTIONS

Charles Nyberg Hansen, 1448 S. 17th East, Salt Lake City, Utah 84108

Filed Sep. 23, 1976, Ser. No. 711,575
Int. Cl.[2] C09K *3/18*
U.S. Cl. 252—70 **31 Claims**

1. An aqueous or dry composition to be applied to the surface of concrete to reduce the damage resulting from the freezing of solutions formed by the action of de-icing compositions, on water, snow or ice in contact with the concrete, comprising a homopolymer of ethylene oxide with a molecular weight of 100,000 or more and one or more de-icing reagents from the group of sodium chloride, calcium chloride and urea; wherein the polyethylene oxide is present in amounts which reduce the damage caused to concrete resulting from the action of said de-icing reagents with the proviso that when sodium chloride is the sole de-icing reagent said aqueous composition so applied must contain at least 2.5 percent sodium chloride.

31. A method of reducing the destructive action which the freezing of water of of solutions produced by de-icing compositions have on concrete which comprises applying to the concrete surface a de-icing water solution or suspension comprising 0.01 to 50 percent homopolymer of ethylene oxide with a molecular weight of 100,000 or more and 0.00 to the saturation concentration of a de-icing reagent selected from the group consisting of sodium chloride, calcium chloride, urea or any combination of these de-icing reagents and which method of application is performed in such a manner and at such a time that the contained polyethylene oxide is present and active during the freezing process.

4,094,806

PHOTOACTIVATED BLEACH-COMPOSITIONS

Brandon Helmholz Wiers, Forest Park, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 564,587, Apr. 3, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,891
Int. Cl.[2] C11D *7/54, 7/50*
U.S. Cl. 252—102 **14 Claims**

1. An unbuilt liquid detergent composition consisting essentially of:

(a) from 10 to 80% by weight of the composition of a water-soluble organic surfactant chosen from the group consisting of water-soluble anionic and nonionic surfactants and mixtures thereof;

(b) 0.04 to 0.80% by weight of the composition of sulfonated zinc phthalocyanine species characterized by RDV's for its individual species as follows:
Unsulfonated:0
Monosulfonated:0
Disulfonated: 0
Tetrasulfonated:84–94
Trisulfonated:(100)-(RDV for tetrasulfonated);

(c) 0 to 5% by weight of the composition of an electrolyte salt which is not an alkaline detergency builder salt;

(d) 1 to 90% by weight of the composition of a solvent which is chosen from the group consisting of water and alcohol in which the alcohol is a lower hydrocarbon monohydric alcohol containing from 1 to 5 carbon atoms; and

(e) 0 to 50% by weight of the composition of free alkanolamine selected from the group consisting of mono-, di-, and triethanolamine and mixtures thereof.

4,094,807

PREPARATION OF DETERGENT BARS CONTAINING ZINC OXIDE

Peter Franklin Humphreys, Great Sutton, and Edwin Willis, Bromborough, both of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 648,224, Jan. 12, 1976, abandoned, which is a continuation of Ser. No. 554,879, Mar. 3, 1975, abandoned. This application Jun. 6, 1977, Ser. No. 803,715
Claims priority, application United Kingdom, Mar. 7, 1974, 10304/74; Aug. 23, 1974, 37136/74
Int. Cl.[2] C11D *3/12, 9/20, 17/00*
U.S. Cl. 252—131 15 Claims

1. A method of preparing detergent bars containing from about 0.1% to about 2% by weight of zinc oxide wherein

i. zinc oxide is formed into a slurry containing from about 10 % to about 80% by weight of said oxide with a liquid medium,

ii. the slurry is added to and mixed with a detergent material at the mixing stage, and

iii. the detergent material is milled, plodded and stamped to form bars.

4,094,808

SOLUBILITY STABLE ENCAPSULATED DIPERISOPHTHALIC ACID COMPOSITIONS

Dorothy A. Stewart, Pittsburgh, Pa.; Bobby D. Ricketts, and Charles H. Hoelscher, both of Corpus Christi, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 632,923, Nov. 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 360,858, May 16, 1973, abandoned. This application Apr. 19, 1977, Ser. No. 788,877
Int. Cl.[2] C11D *3/395, 7/54*
U.S. Cl. 252—186 4 Claims

1. A bleaching formulation in the form of an encapsulated core wherein the core comprises particles consisting essentially of tabular habit diperisophthalic acid in admixture with from 1.0 to 90 weight percent of an ionic dispersing agent selected from the group consisting of hydratable inorganic salts, non-hydratable inorganic salts and organic acids said agent having a water solubility of 4 to 200 grams per 100 grams of water at 15° C. and whose water solutions have a pH below 9, said core having its diperisophthalic acid content present as tabular habit diperisophthalic acid at the time the bleaching formulation is formed and being essentially completely encapsulated with a water dispersible encapsulating material capable, in the absence of free water, of preventing contact of the diperisophthalic acid with substances capable of causing its decomposition.

4,094,809

PROCESS FOR SOLIDIFYING HIGH-LEVEL NUCLEAR WASTE

Wayne A. Ross, Richland, Wash., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 23, 1977, Ser. No. 771,130
Int. Cl.[2] G21F *9/16*
U.S. Cl. 252—301.1 W 6 Claims

1. In the process of solidifying high-level radioactive waste solutions containing molybdenum (VI) for long-term storage by heating the waste solutions to calcining temperatures whereby the solutions are dried to form a radioactive calcine, mixing the calcine with a glass frit containing alkali metals to form a mixture, heating the mixture to melting temperature to form a molten glass and cooling the molten glass to form a solid containing high-level radioactive waste, the improvement comprising adding to the calcine-frit mixture before melting, an effective amount of reducing agent having a free energy of formation higher than molybdenum to reduce the molybdenum (VI) compounds to a lower valence state whereby the molybdenum (VI) compounds are reduced to a lower valence state which dissolves or disperses in the molten glass whereby the molten glass when cooled forms a leach-resistant solid containing high-level radioactive waste suitable for long-term storage.

4,094,810

AQUEOUS SLURRY OF ASH CONCENTRATE COMPOSITION AND PROCESS FOR PRODUCING SAME

David C. Thomas, Oklahoma City, Okla., assignor to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Jun. 1, 1976, Ser. No. 691,577
Int. Cl.[2] B01J *13/00*
U.S. Cl. 252—313 R 12 Claims

1. A process for producing an aqueous slurry of an ash concentrate composition comprising insoluble coal products, said process comprising the steps of:

mixing a predetermined amount of surfactant with water to form a mixture in which the surfactant comprises at least about 0.1 percent by weight of the mixture of surfactant and water;

adding up to about 60 percent said ash concentrate composition to the mixture of surfactant and water; and

mixing said ash concentrate composition, the water and the surfactant while adding said ash concentrate composition to produce said aqueous slurry of the ash concentrate composition.

8. An aqueous slurry comprising:

water;

a predetermined amount of surfactant mixed with the water to form a mixture in which the surfactant comprises at least about 0.1 percent by weight of the mixture of surfactant and water; and

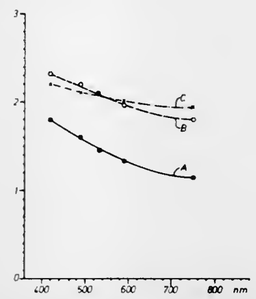
an ash concentrate composition comprising insoluble coal product mixed with the water and the surfactant to form an aqueous slurry containing up to about 60 percent of said ash concentrate composition.

4,094,811

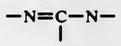
PROCESS FOR THE PREPARATION OF SILVER DISPERSIONS FOR FILTER LAYERS AND ANTIHALATION LAYERS

Artur Botta; Anita von König, both of Krefeld; Franz Moll, Leverkusen; Christian Rasp, Cologne, and Johannes Hartl, Bechen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Filed Dec. 21, 1976, Ser. No. 753,093
Claims priority, application Germany, Dec. 30, 1975, 2559191
Int. Cl.[2] B01J *13/00;* G03C *1/84*
U.S. Cl. 252—313 R 10 Claims



1. A process of preparing a neutral grey dispersion of silver in a protective colloid which comprises the step of reducing with a silver salt reducing agent, silver nitrate in an aqueous solution in a mixture with an aqueous solution of a protective colloid without using cadmium salt and in the presence of an agent for providing the reduced silver in a neutral grey dispersion having a uniform absorption over the spectrum of visible light, wherein the agent for providing the uniform dispersion consists essentially from about 5 mg to about 500 mg per mol of silver salt of a heterocyclic 5-membered or 6-membered compound containing an



group in its 1,2,3-position and having in its 2-position an amino alkyl or hydroxy alkyl group or an alkylene chain attached too to the N atom in 1-position thus forming an anellated ring.

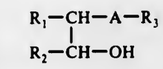
4,094,812

ANTIFOAM COMPOSITION AND PROCESS WITH α-HYDROXYAMINE DERIVATIVES

Rudi Heyden, Erkrath; Adolf Asbeck, Dusseldorf; Michael Eckelt, Dusseldorf; Manfred Petzold, Dusseldorf, and Günter Uphues, Dusseldorf, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Germany

Filed Dec. 20, 1976, Ser. No. 752,244
Claims priority, application Germany, Dec. 22, 1975, 2557898
Int. Cl.[2] B01D *19/04*
U.S. Cl. 252—321 13 Claims

1. A process for the control of foam in a foamable liquid comprising adding to said foamable liquid an antifoam effective amount of an α-hydroxyamine derivative of the formula



wherein A is —NHCONH—, R_1 and R_2 are members selected from the group consisting of hydrogen and alkyl having from 1 to 22 carbon atoms, at least one of R_1 and R_2 being alkyl and the sum of the carbon atoms in R_1 and R_2 is from 8 to 22, and R_3 is a member having 8 to 22 carbon atoms selected from the group consisting of alkyl and hydroxyalkyl.

4,094,813

PROCESS AND APPARATUS FOR THE MANUFACTURE AND COOLING OF GASES CONTAINING HYDROGEN AND CARBON MONOXIDE

Nicolaas Van Lookeren Campagne, Rotterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Jul. 18, 1973, Ser. No. 380,437
Claims priority, application United Kingdom, Aug. 2, 1972, 36028/72
Int. Cl.[2] C07C *1/02;* B01J *7/00*
U.S. Cl. 252—373 7 Claims

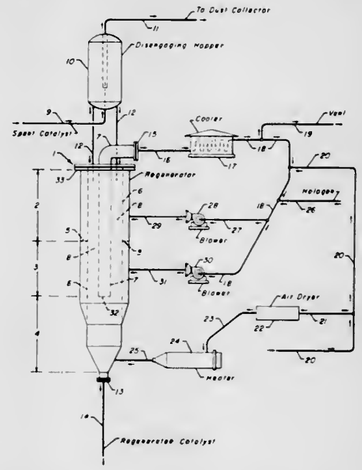
1. In a process for the manufacture of a hydrogen and carbon monoxide-containing gas mixture by the partial combustion of a carbonaceous fuel with an oxygen-containing gas at a pressure of between 1 to 300 atmospheres and a temperature between about 1300° and about 1500° C whereby a hot, carbon monoxide and hydrogen-containing gas mixture is obtained which is cooled in a waste heat boiler containing a helical tube in external contact with water through which the hot gas mixture is flowed, the improvement which comprises cooling the hot gas mixture to a temperature not exceeding 1200° C by passing it over a cooling tube which is externally insulated with a refractory material of between 10 millimeters and 100 millimeters thickness in a primary cooling zone prior to introduction of the gas mixture into said waste heat boiler.

4,094,814

REGENERATION METHOD FOR GRAVITY-FLOWING DEACTIVATED CATALYST PARTICLES

Earl S. Lemberger, Buffalo Grove; Robert K. Olson, Elgin, and Lester F. Smith, Itasca, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Jun. 15, 1977, Ser. No. 806,885
Int. Cl.[2] B01J *23/96, 21/20;* C10G *35/08*
U.S. Cl. 252—415 8 Claims



1. A method for continuously regenerating hydrocarbon conversion catalyst particles comprising a Group VIII metal and a halogen component in combination with a refractory inorganic oxide carrier material, and which have become deactivated (1) by deposition of carbonaceous matter thereon and, (2) through loss of halogen therefrom, in a regeneration zone comprising a first carbon-burning/halogenation section interconnected with and surmounted with respect to a second carbon-burning/halogenation section, said second being interconnected with and surmounted with respect to a lower drying

section, wherein said catalyst particles are downwardly and countercurrently movable through a descending column via gravity-flow with respect to the upward flow of vapors within said regeneration zone, said regeneration method comprising the inter-related sequential steps of:

(a) introducing (i) said deactivated catalyst particles, (ii) a first air stream from an external source and, (iii) a first mixture of steam and a halogen, or halogen-containing compound from an external source, into said first carbon-burning/halogenation section;

(b) maintaining said catalyst particles within said first section for a time sufficient to (i) remove the greater portion of said carbonaceous matter therefrom and, (ii) increase the halogen content thereof;

(c) introducing (i) said catalyst particles from said first section, via gravity-flow and (ii) a second air stream from an external source and, (iii) a second mixture of steam and a halogen, or a halogen-containing compound from an external source, into said second section;

(d) maintaining said catalyst particles within said second section for a time sufficient to (i) remove substantially all of the remaining carbonaceous material therefrom and, (ii) further increase the halogen content thereof;

(e) introducing (i) said catalyst particles from said second section, via gravity-flow and countercurrent with, (ii) a substantially dry third air stream from an external source into said lower drying section, and maintaining said catalyst particles therein for a time sufficient to remove substantially all the water therefrom; and,

(f) withdrawing substantially water-free, regenerated catalyst particles from said regeneration zone.

4. The method of claim **1** further characterized in that said first air stream is introduced into said first carbon-burning-/halogenation section through the same locus through which said first steam/halogen mixture is introduced.

5. The method of claim **1** further characterized in that said second air stream is introduced into said second carbon-burning/halogenation section through the same locus through which said second steam/halogen mixture is introduced.

7. The method of claim **1** further characterized in that excess air and the combustion products resulting from the burning of carbon, are withdrawn from said first carbon-burning section, cooled and at least in part recycled to said first and second carbon-burning sections.

8. The method of claim **7** further characterized in that said excess air and combustion products are recycled to said carbon-burning/halogenation sections without intermediate treatment.

4,094,815

REGENERATION OF ACTIVATED CARBON HAVING MATERIALS ADSORBED THEREON

Vito Cedro, III, Pittsburgh; Donald L. Kinosz, Tarentum, both of Pa., and Thomas G. Lamberti, II, Palestine, Tex., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jun. 2, 1977, Ser. No. 802,633

Int. Cl.[2] B01J *21/20*

U.S. Cl. 252—415 **6 Claims**

1. A process for regeneration of an activated carbon bed having materials adsorbed thereon which comprises passing a mixture of reactive gases and/or vapors therethrough capable of reacting exothermically in the presence of activated carbon in situ, without reacting with either the carbon bed or the materials adsorbed thereon, wherein the exothermic heat of reaction is used to heat the carbon bed to assist in stripping the bed of materials adsorbed thereon.

2. The process of claim **1** wherein the space time of the gases and/or vapors is at least .05 minutes to insure substantially complete reaction in the bed.

3. The process of claim **2** wherein the flow of reactive gases and/or vapors into the bed is terminated when the temperature in the reaction zone reaches 623–673° K and an inert gas is then passed through the bed to complete the stripping of adsorbed materials from the carbon bed.

6. The process of claim **2** wherein the reactive gases and/or vapors consist essentially of Cl_2 and a second reactant selected from the class consisting of H_2 and CO.

4,094,816

METHOD FOR STABILIZING A PHOSPHORUS-VANADIUM-OXYGEN COMPLEX CATALYST

Walter Partenheimer, Naperville, Ill., assignor to Standard Oil Company, Chicago, Ill.

Continuation-in-part of Ser. No. 616,370, Sep. 24, 1975, Pat. No. 4,020,174. This application Dec. 22, 1976, Ser. No. 753,551

The portion of the term of this patent subsequent to Apr. 26, 1994, has been disclaimed.

Int. Cl.[2] B01J *23/92, 27/28*

U.S. Cl. 252—415 **27 Claims**

1. A method for stabilizing a phosphorus-vanadium-oxide catalyst having an atomic ratio of phosphorus to vanadium in the range of about 0.5 to 5, which comprises:

(A) Contacting said catalyst at deactivation conditions including a temperature in the range of from about 350° to 600° C. with a gaseous mixture containing molecular oxygen for a period of greater than about 1 hour;

(B) Contacting said catalyst with an effective amount of a material selected from the group consisting of:

(1) Molecular chlorine or fluorine or mixtures thereof;

(2) Halides of fluorine, chlorine, bromine or iodine being in the vapor state above about 250° C. at atmospheric pressure represented by the following formula:

$$C(X)_n$$

where each X is a selected halide and *n* is an integer from 1 to 4, any remaining radicals being hydrogen or mixtures thereof;

(3) Organic halides of fluorine, chlorine, bromine or iodine being in the vapor state above about 250° C. at atmospheric pressure represented by the formula:

$$R(X_1)_m$$

where R is alkane, alkene or alkyne of straight or branched structure having at least two carbon atoms and X_1 is independently a primary, secondary, or tertiary halide and m is an integer of from 1 to about **20** consistent with the number of carbon atoms of said structure or mixtures;

(4) hydrogen halides;

or mixtures thereof at reactivation conditions including a temperature in the range of from about 300° to about 500° C.; and

(c) repeating the sequence of steps (A) and (B) at least once.

9. A method for stabilizing a phosphorus-vanadium-oxide catalyst having an atomic ratio of phosphorus to vanadium in the range of about 0.5 to 5, which comprises:

(A) Contacting said catalyst at deactivating conditions including a temperature in the range of from about 350° to 600° C. with a gaseous mixture containing molecular oxygen and a hydrocarbon having less than about ten carbon atoms per molecule for a period of greater than about 1 hour.

(B) Contacting said catalyst with an effective amount of a material selected from the group consisting of:

(1) Molecular chlorine or fluorine or mixtures thereof;

(2) Halides of fluorine, chlorine, bromine or iodine being in the vapor state above about 250° C. at atmospheric pressure represented by the following formula:

$$C(X)_n$$

where each X is a selected halide and n is an integer from 1 to 4, any remaining radicals being hydrogen or mixtures thereof;

(3) Organic halides of fluorine, chlorine, bromine or iodine being in the vapor state above about 250° C. at atmospheric pressure represented by the formula:

$$R(X_1)_m$$

where R is alkane, alkene or alkyne of straight or branched structure having at least two carbon atoms and X_1 is independently a primary, secondary, or tertiary halide and m is an integer of from 1 to about 20 consistent with the number of carbon atoms of said structure or mixtures;

(4) Hydrochloric acid;

or mixtures thereof at reactivation conditions including a temperature in the range of from about 300° to about 500° C.; and

(c) repeating the sequence of steps (A) and (B) at least once.

4,094,817

REGENERATION METHOD FOR GRAVITY-FLOWING DEACTIVATED CATALYST PARTICLES

Robert K. Olson, Elgin, and Lester F. Smith, Itasca, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Jun. 15, 1977, Ser. No. 806,886

Int. Cl.[2] B01J *23/96, 21/20;* **C10G** *35/08*

U.S. Cl. 252—415 **7 Claims**

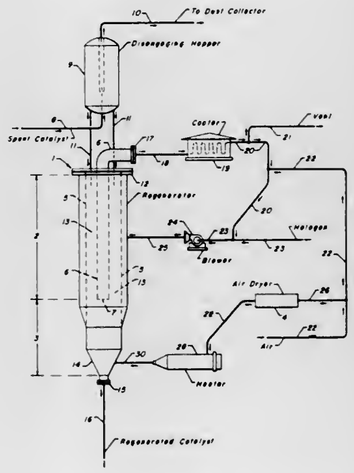
1. A method for continuously regenerating hydrocarbon conversion catalyst particles comprising a Group VIII metal and a halogen component in combination with a refractory inorganic oxide carrier material, and which have become deactivated through use in said hydrocarbon conversion reaction by (1) deposition of carbonaceous matter thereon and through (2) loss of halogen therefrom, said continuous regeneration being effected in a regeneration zone wherein said particles are downwardly movable through a descending column via gravity-flow in countercurrent relationship with the upward flow of vapors within said zone and wherein said regeneration zone comprises a carbon-burning/halogenation first section interconnected with and surmounted with respect to a lower drying second section, which regeneration method comprises the interrelated sequential steps of:

(a) introducing (i) deactivated catalyst particles, (ii) a first air stream from an external source and, (iii) a halogen or a halogen-containing compound from an external source into said upper carbon-burning/halogenation first section;

(b) maintaining said catalyst particles within said first section for a time sufficient to (i) remove substantially all of said carbonaceous matter therefrom and, (ii) increase the halogen content thereof;

(c) introducing (i) said catalyst particles from said carbon-burning/halogenation first section, via of said gravity-flow, and, (ii) a second air stream from an external source into said lower drying section, and maintaining said catalyst particles within said lower drying section for a time sufficient to remove substantially all the water therefrom; and

(d) withdrawing substantially water-free, regenerated particles from said regeneration zone.



6. The method of claim **1** further characterized in that excess air and the combustion products resulting from the burning of carbon, are withdrawn from said carbon-burning section, cooled and at least in part recycled to said carbon-burning and drying sections.

7. The method of claim **6** further characterized in that said excess air and combustion products are recycled to said carbon-burning and drying sections without intermediate treatment.

4,094,818

ZIEGLER TYPE CATALYST SYSTEM

Arthur W. Langer, Jr., Watchung, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 11, 1977, Ser. No. 767,766

Int. Cl.[2] B01J *31/02, 31/12*

U.S. Cl. 252—429 C **8 Claims**

1. An improved catalyst composition adaptable for use in an alpha-olefin polymerization which comprises a mixture of:

(a) at least one Group IVB to VIII transition metal halide;

(b) an alkyl metal cocatalyst, said cocatalyst being selected from the group consisting essentially of a trialkyl metal or a dialkyl metal halide compound and mixtures thereof, said trialkyl metal compound having the structure of

$$R'_3Y$$

said dialkyl metal halide compound having the structure of

$$R'_2YX$$

wherein R′ is selected from the group consisting of C_1 to C_{20} alkyl, branched alkyl, naphthenic or aralkyl groups, Y being selected from the group consisting of aluminum, gallium or indium and X being a halide group; and

(c) a nitrogen-containing metal alkyl compound, a structure

of said nitrogen-containing metal alkyl compound being selected from the group consisting of

R'_2YNR_2 or $R'XYNR_2$

wherein Y being selected from the group consisting of Al, Ga or In, X being halide, R' being a C_1 to C_{20} alkyl, branched alkyl, naphthenic or aralkyl group and R being selected from the group consisting of C_3 to C_{10} bulky alkyl groups and cycloalkyl groups, with the proviso that the two R groups can be taken with N to form a pyrrolidyl or piperidyl and the alkyl substituted derivatives of pyrrolidyl and piperidyl, said compound being in a mole ratio of 0.05 to 5 moles of said compound to said transition metal halide.

4,094,819

CATALYST AND PROCESS FOR OXIDATIVE DEHYDROGENATION

Brent J. Bertus, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 458,721, Apr. 8, 1974, Pat. No. 3,972,954, which is a continuation of Ser. No. 226,299, Feb. 14, 1972, abandoned. This application Mar. 5, 1976, Ser. No. 664,216

Int. Cl.[2] B01J *27/14*

U.S. Cl. 252—435 **7 Claims**

1. An activated catalyst composition prepared by admixing oxides, or compounds convertible to the oxide on calcination, of (I) cobalt or nickel, (II) molybdenum, and (III) phosphorus, and calcining in the presence of a molecular oxygen-containing atmosphere, such that the resulting activated catalyst composition represents a cobalt or nickel content of 15 to 65 weight percent, molybdenum 10 to 40 weight percent, and phosphorus 1 to 25 weight percent.

4,094,820

MANUFACTURE OF COBALT AND/OR NICKEL-MOLYBDENUM-ALUMINA CATALYSTS

Grant A. Mickelson, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Mar. 11, 1977, Ser. No. 776,762

Int. Cl.[2] B01J *21/04, 23/88*

U.S. Cl. 252—465 **10 Claims**

1. A single-calcination, ammonia-free method for the manufacture of a finished cobalt- and/or nickel- molybdenum- alumina catalyst, which comprises:

(1) reacting in an aqueous slurry at least one carbonate or hydroxide of cobalt or nickel with at least a stoichiometric proportion of MoO_3 and/or molybdic acid to form finely divided undissolved crystalline cobalt- and/or nickel molybdate in aqueous suspension;

(2) mixing said aqueous suspension with sufficient alumina hydrate consisting essentially of gelatinous boehmite to provide about 50–90 wt.% Al_2O_3 in the finished catalyst;

(3) digesting and/or mulling the resulting mixture for at least about 0.5 hour with at least sufficient water to provide an extrudable plastic mixture;

(4) recovering from step (3) and extrudable plastic mixture;

(5) extruding the plastic mixture to provide extrudates of desired size and shape; and

(6) drying and calcining the extrudates at a maximum temperature between about 800° F and 1500° C.

4,094,821

CATALYSTS AND METHOD OF THEIR PREPARATION

Gary B. McVicker, Westfield, and Robert L. Garten, Summit, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 579,789, May 22, 1975, abandoned. This application Oct. 4, 1976, Ser. No. 729,834

Int. Cl.[2] B01J *21/04, 21/12, 23/58*

U.S. Cl. 252—466 PT **61 Claims**

1. A hydrocarbon conversion catalyst resistant to metal agglomeration upon regeneration under oxidizing conditions due to the formation of a complex oxide under said oxidizing conditions between a component metal of Group VIII and a Group IIA metal oxide selected from the group consisting of calcium oxide, barium oxide, strontium oxide and mixtures thereof, comprising a Group VIII metal or mixture thereof supported on a Group IIA metal oxide selected from the group consisting of calcium oxide, barium oxide, strontium oxide and mixtures thereof which Group IIA metal oxide is supported on an acidic refractory oxide wherein the Group IIA metal oxide is present in sufficient quantity to neutralize the acid sites of the acidic refractory oxide support and to supply an excess at a level of from about 0.5 to 50 moles Group IIA metal oxide per mole of said Group VIII metal or mixtures thereof, the Group VIII metal or mixtures thereof on Group IIA metal oxide or mixtures thereof on neutralized acidic refractory oxide combination being supported on an acidic refractory oxide.

4,094,822

BIO-EVENT ELECTRODE MATERIAL

John A. R. Kater, 583 Traverse Dr., Costa Mesa, Calif. 92626

Continuation-in-part of Ser. No. 566,335, Dec. 26, 1974, Pat. No. 3,993,049. This application Oct. 21, 1976, Ser. No. 734,405

Int. Cl.[2] H01B *1/02*

U.S. Cl. 252—512 **4 Claims**

1. An electrolyte material for use in producing electrodes comprising a mixture of adhesive, a metal salt, powdered metal of the same kind as the metal of the salt and a solvent in which both said adhesive and said salt are soluble.

4,094,823

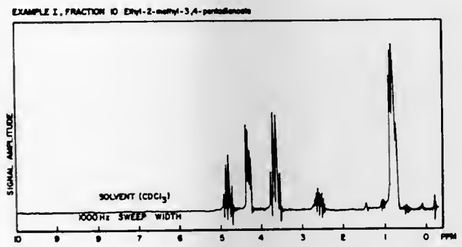
ETHYL-2-METHYL-3,4-PENTADIENOATE PERFUME COMPOSITIONS

John B. Hall, Rumson; Denis E. Hruza, Brick Town; Manfred Hugo Vock, Locust; Joaquin Vinals, Red Bank, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

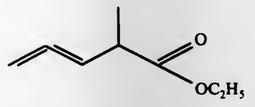
Division of Ser. No. 566,118, Apr. 8, 1975, Pat. No. 3,978,239. This application May 5, 1976, Ser. No. 683,330

Int. Cl.[2] C11B *9/00*

U.S. Cl. 252—522 **3 Claims**



1. A perfume composition comprising from 0.05% up to 5% by weight of the fragrance components of ethyl-2-methyl-3,4-pentadienoate having the structure:



and the remainder of said composition being at least one adjuvant selected from the group consisting of natural perfume oils, synthetic perfume oils other than said ethyl-2-methyl-3,4-pentadienoate, alcohols, aldehydes, ketones, esters other than said ethyl-2-methyl-3,4-pentadienoate, lactones and nitriles.

4,094,824

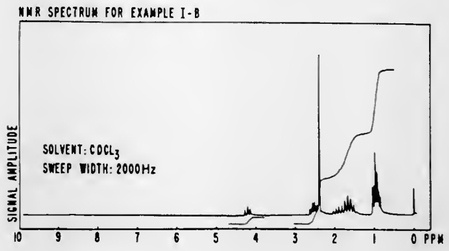
α-OXY(OXO) SULFIDES IN PERFUME

William J. Evers, Red Bank; Howard H. Heinsohn, Jr., Hazlet, both of N.J.; Edward J. Shuster, Brooklyn, N.Y., and Frederick Louis Schmitt, Holmdel, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

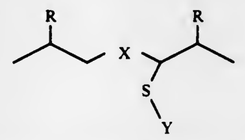
Division of Ser. No. 723,534, Sep. 15, 1976, Pat. No. 4,065,408. This application Jul. 28, 1977, Ser. No. 819,961

Int. Cl.[2] C11B *9/00*

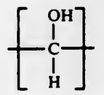
U.S. Cl. 252—522 **4 Claims**



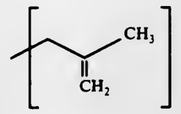
1. A perfume comprising a carrier and a compound having the structure:



wherein R is one of hydrogen or methyl, X is



and Y is selected from the group consisting of methyl, methallyl having the structure:



1-propyl, 2-methyl-1-propyl and acetyl.

4,094,825

PROCESS FOR THE PRODUCTION OF PHENOL SILICOFORMATE COMPOUNDS AND THEIR CONDENSATION PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 672,559, Mar. 31, 1976, Pat. No. 4,032,511, which is a continuation-in-part of Ser. No. 555,078, Mar. 3, 1975, abandoned. This application Dec. 6, 1976, Ser. No. 747,873

The portion of the term of this patent subsequent to Jun. 28, 1994, has been disclaimed.

Int. Cl.[2] C08G *2/00*

U.S. Cl. 260—2 S **15 Claims**

1. The process for the production of phenol silicoformate compounds by the following steps:

(a) mixing silicoformic acid and a phenol compound,

(b) adding an alkali catalyst equal to 1 to 10% by weight of silicoformic acid and phenol compound,

(c) heating said mixture to just below the boiling point of the phenol compound for 20 to 80 minutes while agitating at ambient pressure, thereby

(d) producing a granular phenol silicate compound.

5. The method of claim 1, including the further steps, following step (d), of:

(a) adding an aldehyde in the ratio of 1 to 3 mols to each mol of the phenol compound,

(b) heating said mixture at 50° to 120° C for 20 to 90 minutes while agitating, thereby

(c) producing a resinous product.

4,094,826

FLUORINATED GRAFT CATION EXCHANGE COPOLYMERS

Masayoshi Tatemoto, Ibaraki, and Sinji Tamaru, Suita, both of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Aug. 23, 1977, Ser. No. 827,018

Claims priority, application Japan, Aug. 25, 1976, 51-102113

Int. Cl.[2] C08F *259/08*

U.S. Cl. 260—2.2 R **10 Claims**

1. An ion exchanger which comprises a water-insoluble copolymer prepared by post-polymerizing at least one fluoroolefin monomer selected from the group consisting of tetrafluoroethylene, trifluoroethylene, trifluorochloroethylene, hexafluoropropylene, vinylidene fluoride and vinyl fluoride to a perfluorovinylacetic acid-vinylidene fluoride copolymer containing not less than 25% by mole of the perfluorovinylacetic acid unit in an aqueous solution of said perfluorovinylacetic acid-vinylidene fluoride copolymer in the presence of an organic or inorganic peroxide polymerization initiator wherein the proportion of the post-polymerized fluoroolefin monomer is from 5 to 60% by weight based on the weight of said perfluorovinylacetic acid-vinylidine fluoride copolymer.

4,094,827

SUBSTITUTED UREAS AS POLYURETHANE CATALYSTS

Edward E. McEntire, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,547

Int. Cl.[2] C08G *18/16, 18/18*

U.S. Cl. 260—2.5 AC **11 Claims**

1. A method for producing a polyurethane which comprises reacting an organic polyisocyanate with an organic polyester polyol or polyether polyol in the presence of a catalytic amount of a compound having the following structural formula:

where R is lower alkyl and X is hydrogen or $CONR_1R_2$ where R_1 and R_2 are independently selected from the group consisting of hydrogen, alkyl and aryl with the proviso that both R_1 and R_2 may not be aryl.

4,094,828

RIGID POLYURETHANE FOAMS

Howard P. Klein, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed Sep. 30, 1976, Ser. No. 728,486

Int. Cl.[2] C08G *18/62*

U.S. Cl. 260—2.5 AM **15 Claims**

1. A rigid polyurethane foam obtained by reacting in the presence of a blowing agent and a catalyst of polyurethane formation, an organic polyisocyanate and a polyol combination comprising 5–85 percent by weight of a copolymer of allyl alcohol and styrene and 15–95 percent by weight of a poly-

ether polyol having a hydroxyl number ranging from about 200 to about 800, said weight percentages being based on the total weight of said polyol combination.

4,094,829

QUICK SETTING COMPOSITIONS

Herbert Jackson Shearing, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 2, 1976, Ser. No. 710,884

Claims priority, application United Kingdom, Aug. 29, 1975, 35707/75; Dec. 8, 1975, 50235/75

Int. Cl.² C08G *18/38, 18/14*

U.S. Cl. 260—2.5 AK **13 Claims**

1. A composition obtained by first preparing a reaction mixture by mixing together an aqueous solution or suspension of an ammonium or alkali metal borate and an organic polyisocyanate in amount such that the borate/polyisocyanate ratio is from 1:0.5 to 1:50 by weight, the amount of water supplied by said aqueous solution or suspension being sufficient to render the total reaction mixture a spreadable paste or fluid mix, and allowing said reaction mixture to set.

5. A composition obtained by mixing an aqueous solution of an alkali metal or ammonium borate and an alkali metal or ammonium silicate, with (a) at least one non-silicate compound of a polyvalent metal having a solubility in water at 20° C of at least 0.01 gm per liter and/or (b) a hydraulic cement, in amount from 5% to 100 times that theoretically necessary to react completely with the alkali metal or ammonium borate, or borate and silicate together, to form an insoluble metal borate and/or silicate in the presence of (1) an organic polyisocyanate or (2) an organic polyisocyanate and a mono and/or a polyfunctional organic isocyanate-reactive compound present in an amount up to that which is theoretically necessary to react completely with all the isocyanate groups in the organic polyisocyanate, and allowing the mixture to set.

13. A composition as claimed in claim 5 wherein the composition is obtained in foamed form by incorporating into the mixture of ingredients a blowing agent.

4,094,830

GRAFTING OF VINYLAROMATIC COMPOUNDS BY CATIONIC POLYMERIZATION ON NON-HALOGENATED DOUBLE-BONDED CHAINS

Cecile Baudin, Kremlin-Bicetre; Mihajlo Miskovic; Alain Polton, both of Paris, and Pierre Sigwalt, St Michel-sur-Orge, all of France, assignors to Societe Chimique des Charbonnages, Paris, France

Filed Nov. 14, 1975, Ser. No. 631,943

Claims priority, application Luxembourg, Nov. 18, 1974, 71297

Int. Cl.² C08E *19/28;* **C08F** *253/00, 279/02, 279/00*

U.S. Cl. 260—4 R **4 Claims**

1. A process for preparing copolymers wherein a macromolecular hydrocarbon elastomer having a non-halogenated alkyl or branched alkyl double-bonded chain and a vinylaromatic monomer selected from the group consisting of indene, styrene and styrene having at least one alkyl substituent are reacted at a temperature from −80° C to +40° C in the presence of 5.10^{-4} to 5.10^{-2} mole/l of a Lewis acid initiator and optionally in the presence of a co-initiator.

4,094,831

GREEN STRENGTH OF ELASTOMERS

Paul H. Sandstrom, Tallmadge, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 22, 1976, Ser. No. 734,773

Int. Cl.² C08F *8/00, 224/00;* **C08L** *7/00, 63/00*

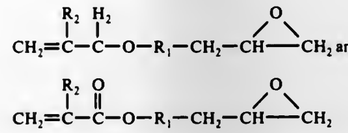
U.S. Cl. 260—5 **29 Claims**

1. A process, comprising:

forming a synthetic elastomer interpolymer having improved green strength by reacting at least one type of a synthetic elastomer forming monomer with an epoxy containing monomer,

said synthetic elastomer forming monomer selected from the class consisting of at least one type of a conjugated diene monomer having from 4 to 10 carbon atoms, and at least one type of an olefin monomer having from 2 to 14 carbon atoms in combination with at least one type of a conjugated diene monomer having from 4 to 10 carbon atoms,

said epoxy containing monomer selected from the class of compounds having the formula



where R_2 contains from 1 to 4 carbon atoms and R_1 contains from 0 to 8 carbon atoms,

the amount of said epoxy compound in said interpolymer ranging from about 0.5 percent to about 75 percent by weight based upon the total weight of said interpolymer,

partially cross-linking said interpolymer to improve the green strength of said interpolymer by adding and reacting from 0.1 to 2.0 parts by weight based upon 100 parts of said interpolymer of an epoxy cross-linking agent, said epoxy cross-linking agent selected from the class consisting of monoamines, polyamines, monoanhydrides, monocarboxylic acids and polycarboxylic acids,

said monoamines and said polyamines selected from the class consisting of an aliphatic containing from 1 to 16 carbon atoms, a cycloaliphatic containing from 4 to 6 carbon atoms, an aromatic containing from 6 to 16 carbon atoms, and combinations thereof,

said monoanhydrides selected from the class consisting of an aliphatic containing from 1 to 30 carbon atoms, a cycloaliphatic containing from 4 to 30 carbon atoms, an aromatic containing from 6 to 30 carbon atoms, and combinations thereof, and

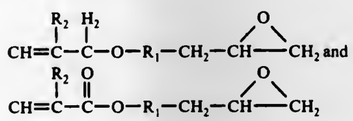
said monocarboxylic acids and said polycarboxylic acids selected from the class consisting of an aliphatic containing from 1 to 30 carbon atoms, an aromatic containing from 6 to 30 carbon atoms, and combinations thereof.

10. A process comprising:

forming a synthetic elastomer interpolymer having improved green strength from at least one type of a synthetic elastomer forming monomer and from an epoxy containing monomer,

said synthetic elastomer forming monomer selected from the class consisting of at least one type of a conjugated diene monomer having from 4 to 10 carbon atoms, and at least one type of an olefin monomer having from 2 to 14 carbon atoms in combination with at least one type of a conjugated diene monomer having from 4 to 10 carbon atons,

said epoxy containing monomer selected from the class of compounds having the formula:



where R_2 contains from 1 to 4 carbon atoms and R_1 contains from 0 to 8 carbon atoms,

the amount of said epoxy compound in said interpolymer ranging from about 0.5 percent to about 75 percent by weight based upon the total weight of said interpolymer,

improving the green strength of an elastomer selected from the class consisting of synthetic elastomers and natural rubber by adding said interpolymer to form a blend,

the amount of said epoxy containing interpolymer in said blend ranging from about 2 percent to about 98 percent by weight based upon the total weight of said blend,

said synthetic elastomers selected from the class consisting of nitrile rubber, butyl rubber, chlorinated butyl rubber brominated butyl rubber, polyalkenylenes, ethylene-propylene-diene rubber, polymers made from at least one type of a conjugated diene monomer having from 4 to 10 carbon atoms, and polymers made from at least one type of an olefin monomer having from 2 to 14 carbon atoms in combination with at least one type of a conjugated diene monomer having from 4 to 10 carbon atoms.

4,094,832

VINYLIC GROUP CONTAINING DEXTRAN DERIVATIVE GEL FOR USE IN ELECTROPHORETIC SEPARATION PROCESSES

John Lennart Söderberg, Upsala, Sweden, assignor to Pharmacia Fine Chemicals AB, Upsala, Sweden

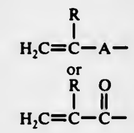
Filed Nov. 29, 1976, Ser. No. 745,903

Claims priority, application Sweden, Dec. 12, 1975, 7514093

Int. Cl.² C08L *5/02*

U.S. Cl. 260—17.4 GC **2 Claims**

1. A dextran derivative gel for use in electrophoretic separation processes, which gel comprises a polymerisate obtained by the free-radical homopolymerization of a dextran derivative containing vinylic groups of the formula



(I)

or

(II)

in which A is $-CH_2$ or —O— and R is a hydrogen atom, a methyl group, a trifluoromethyl group, a fluorine, chlorine or bromine atom or a cyano group, or free-radical copolymerization of such a vinylic derivative of dextran with a low-molecular weight monovinyl compound, the degree of substitution of the vinylic groups in the starting dextran derivative being 0.3 - 1.5 mmol/g of dextran derivative in the case of substituents of the formula (I) and 0.05 - 1 mmol/g of dextran derivative in the case of substituents of the formula (II) and the amount of dextran derivative containing vinylic groups being 20 - 100% by weight, calculated on the total weight of the reactants.

4,094,833

VINYLIC GROUP CONTAINING DEXTRAN DERIVATIVE GEL IN PARTICLE FORM FOR SEPARATION PURPOSES

Haldor Ingemar Johansson; Dag Torsten Lindström, and John Lennart Söderberg, all of Upsala, Sweden, assignors to Pharmacia Fine Chemicals AB, Uppsala, Sweden

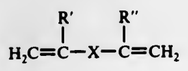
Filed Nov. 29, 1976, Ser. No. 745,904

Claims priority, application Sweden, Dec. 12, 1975, 7514092

Int. Cl.² C08L *5/02*

U.S. Cl. 260—17.4 GC **2 Claims**

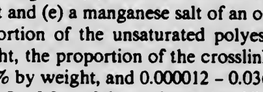
1. A dextran derivative gel in particle form for use in the separation of substances according to at least one property selected from the group consisting of molecular size and electrical charge by means of at least one technique selected from the group consisting of gel chromatographic and ion exchange techniques, which gel comprises a copolymerisate obtained by the free-radical copolymerization of a mixture of 20 - 80% by weight of a dextran derivative containing groups selected from the class consisting of vinyl and substituted vinyl groups, 20 - 80% by weight of a divinyl compound of the formula:



(I)

in which R' and R'' are equal or different and each represent hydrogen or methyl, X is

—SO_2— or the group



wherein *n* is an integer from 1 to 6, and 0 - 40% by weight of a low-molecular weight monovinyl compound, calculated on the total weight of the reactants, the degree of substitution of groups selected from the class consisting of vinyl and substituted vinyl groups in the starting dextran derivative being 0.05 - 2 mmol/g of dextran derivative.

4,094,834

ABS-FORMALDEHYDE NOVOLAK

Lewis H. Bowers, Scotia; Raymond E. Jankowski, Schenectady, and John L. Sullivan, Ballston Lake, all of N.Y., assignors to Schenectady Chemicals, Inc., Schenectady, N.Y.

Division of Ser. No. 492,967, Jul. 26, 1974, Pat. No. 3,944,510.

This application Nov. 25, 1975, Ser. No. 635,074

Int. Cl.² C08K *5/09;* **C08L** *9/02, 55/02, 61/10*

U.S. Cl. 260—19 UA **9 Claims**

1. A composition suitable for use as a shell process foundry flake resin comprising a blend of a phenol-formaldehyde novolak containing 0.70 to 0.83 moles of formaldehyde per mole of phenol and 1 to 20% of an acrylonitrile-butadiene-styrene terpolymer resin based on the phenol in the novolak.

4,094,835

UNSATURATED POLYESTER RESINOUS COMPOSITION

Eiji Omori; Yuuji Aimono; Yoshiyuki Mukoyama, and Hatuo Sugitani, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Japan

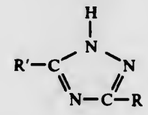
Filed Jan. 25, 1977, Ser. No. 762,266

Claims priority, application Japan, Jan. 28, 1976, 51-8811; Jul. 30, 1976, 51-91947

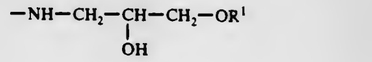
Int. Cl.² C09D *3/66, 5/25*

U.S. Cl. 260—22 CB **5 Claims**

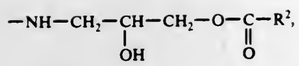
1. An unsaturated polyester resinous composition comprising (a) unsaturated polyester, (b) at least one crosslinkable monomer, (c) at least one compound selected from the group consisting of 1,2,4-triazole and its derivatives, (d) a curing agent and (e) a manganese salt of an organic acid, wherein the proportion of the unsaturated polyester (a) is 80 - 30% by weight, the proportion of the crosslinkable monomer (b) is 20 - 70% by weight, and 0.000012 - 0.036 mole of the compound (c), 0.5 - 3.0 g of the curing agent (d) and 0.001 - 1.5 g of the manganese salt (e) are present based on 100 g of the total of the components (a) and (b), and wherein 1,2,4-triazole and its derivatives in the compound (c) have the formula:



wherein R and R' are independently hydrogen, amino or a group of the formula,



or



wherein R^1 is alkyl having 4 to 8 carbon atoms, phenyl, halogen substituted phenyl, cresyl, or halogen substituted cresyl; and R^2 is alkyl having 8 to 10 carbon atoms.

4,094,836

AQUEOUS ALKYD RESINS

Seimei Yasui, Ibaraki; Minoru Hino, and Kazuya Hayashi, both of Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 670,957, Mar. 26, 1976, abandoned. This application Apr. 7, 1977, Ser. No. 785,699
Claims priority, application Japan, Mar. 26, 1975, 50-37260
Int. Cl.² C09D *3/52, 3/66, 5/02*
U.S. Cl. 260—22 CB **14 Claims**

1. An aqueous alkyd resin obtained by the neutralization of a polycondensation resin with a base, the polycondensation resin being prepared by reacting a reaction mixture obtained by the transesterification or esterification of (a) a natural fat and oil or a fatty acid with a polyhydric alcohol with an adduct of (b) a liquid polybutadiene having a number average molecular weight of 150 to 900, a viscosity of 2 to 80 cps;. at 30° C and at least 50% of the cis-1,4 structure with an α,β-unsaturated dicarboxylic acid or the anhydride thereof, and/or the half-ester of said adduct, and (c) an aromatic polycarboxylic acid or the anhydride thereof, the proportion of the component (b) to the component (a) being in the range of 0.1 to 0.7 by weight, as calculated by (b)/(a) + (b), the polycondensation resin having free carboxyl groups in the amount corresponding to an acid value of 30 to 70 and containing 5 to 50% by weight of the component (b), wherein the total amount of the components (a) and (b) is in the range of 30 to 85% by weight on the basis of the whole resin.

4,094,837

CORROSION INHIBITING PRIMER PAINT FOR HAND CLEANED FERROUS METALS

William C. Johnson, Kintnersville, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed May 10, 1977, Ser. No. 795,583
Int. Cl.² C09D *3/64, 5/08*
U.S. Cl. 260—22 A **10 Claims**

1. A red lead primer paint for coating the surface of ferrous metals comprising between 0.25 to 2.2 pounds of an 85% to 98% grade of red lead pigment per gallon (29.95 to 263.46 grams per liter) of paint solids well dispersed in a binder comprised of raw linseed oil and a long oil alkyd resin in a ratio of between 1:1 to 2:1, said primer paint having a pigment volume concentration of between about 25% to 30% and being characterized by having improved wetting and penetrating properties and improved corrosion inhibiting properties, and producing a coating having improved adherence to the surface to which it is applied.

4,094,838

TRIGLYCERIDE OIL-DERIVED WATER-DISPERSIBLE URETHANE RESIN COATINGS

Wilma J. Schneider, and Lyle E. Gast, both of Peoria, Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 3, 1977, Ser. No. 803,192
Int. Cl.² C08G *18/28*
U.S. Cl. 260—22 TN **13 Claims**

1. A method of preparing water-dispersible urethane resin coating compositions comprising the following steps:

a. amidating a drying or semidrying triglyceride oil with a diolamine in an oil:amine ratio of about 1:2 to yield a mixture of 2-monoglycerides and N,N-bis hydroxyalkyl fatty amides in a 2-monoglyceride:N,N-bis fatty amide ratio of approximately 1:2;

b. reacting the mixture of 2-monoglycerides and N,N-bis hydroxyalkyl fatty amides from step (a) with a sufficient amount of an anhydride under sufficient conditions to convert a portion of said 2-monoglycerides and said N,N-bis hydroxyalkyl fatty amides to the corresponding 2-monoglyceride and N,N-bis hydroxyalkyl fatty amide half esters and to provide an acid value in the range of about 30–70 in said urethane resin coating compositions;

c. neutralizing unesterified anhydride carboxyl groups on said 2-monoglyceride and N,N-bis hydroxyalkyl fatty amide half esters from step (b):

d. reacting the resultant 2-monoglyceride, 2-monoglyceride half ester, N,N-bis hydroxyalkyl fatty amide, and N,N-bis hydroxyalkyl fatty amide half ester mixture from step (c) with a diisocyanate in a molar ratio of diisocyanate:2-monoglyceride +N,N-bis-hydroxyalkyl fatty amide of from about 0.85:1 to about 0.58:1, thereby polymerizing the components of said mixture into a urethane resin; and

e. recovering said urethane resin prepared in step (d).

4,094,839

PREPARATIONS FOR COLORING MOLTEN THERMOPLASTIC POLYMERS

Albert Riegler, Basel; Werner Saar, Riehen, and Volkhard Wiese, Pratteln, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,308
Claims priority, application Sweden, Oct. 22, 1974, 7414104
Int. Cl.² C08L *91/00*
U.S. Cl. 260—23 R **9 Claims**

1. A preparation which contains 10 to 70% by weight of a pigment or a polymer-soluble colourant and 90 to 30% by weight of a carrier mixture which is composed of 51 to 95% by weight of a metal salt of an aliphatic carboxylic acid containing at least 12 carbon atoms, said metal selected from the group consisting of calcium, barium, zinc, aluminum, and magnesium, and 49 to 5% by weight of an elastomeric or thermoplastic polymer selected from the group consisting of a copolymer of ethylene and vinyl esters of aliphatic carboxylic acids of 2 to 6 carbon atoms, homo- or copolymers of ethylene, propylene, butylene, styrene, acrylonitrile, butadiene and polyamide.

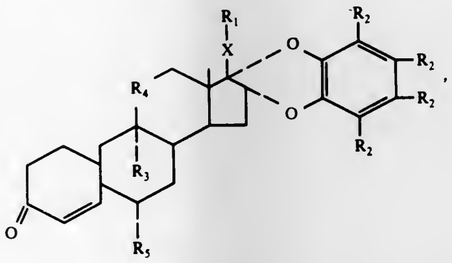
4,094,840

17-ALKYLTHIO (AND ARYLTHIO) ANDROSTENO[16α,17α-b]BENZODIOXIN-3-ONES

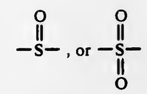
Ravi K. Varma, Belle Mead, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 12, 1977, Ser. No. 796,293
Int. Cl.² C07J *73/00*
U.S. Cl. 260—239.55 R **22 Claims**

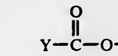
1. A steroid having the formula



or the 1,2-dehydro derivative thereof, wherein X is —S—,



R_1 is alkyl, aryl or acyloxyalkyl; R_2 is fluoro, chloro, bromo, or iodo; R_3 is hydrogen, fluoro, chloro, bromo or iodo; R_4 is carbonyl, β-hydroxymethylene or β-acyloxymethylene; and R_5 is hydrogen or fluoro; wherein the term "aryl" is phenyl or phenyl substituted with 1 or 2 alkyl, alkoxy, fluoro, chloro, bromo or iodo groups; the terms "alkyl" and "alkoxy" refer to groups having 1 to 10 carbon atoms; and the term "acyloxy" refers to groups of the formula



wherein Y is alkyl or aryl.

4,094,841

HIGHLY MONODISPERSE LATEXES OF NON-FILM FORMING POLYMERS

Inder Mani, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jun. 17, 1974, Ser. No. 479,957
Int. Cl.² C08F *220/56*
U.S. Cl. 260—29.6 H **10 Claims**

1. A highly monodisperse latex of a water-insoluble copolymer of an emulsion polymerizable α,β-ethylenically unsaturated hard monomer and at least about one weight percent of an emulsion polymerizable α,β-ethylenically unsaturated amide selected from the group consisting of acrylamide, methacrylamide, fumaric amide, maleic amide, itaconic amide, and citraconic amide; said copolymer being in the form of non-film forming discrete particles having an average particle diameter in the colloidal range with a standard particle size deviation less than 2 percent.

4,094,842

DISPERSING SOLID POLYURETHANE PREPOLYMERS INTO WATER

Wolfgang Wenzel, and Dieter Dieterich, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sep. 27, 1976, Ser. No. 727,088
Claims priority, application Germany, Sep. 26, 1975, 2543091
Int. Cl.² C08J *3/04;* **C08G** *18/12;* **C08J** *3/24;* **C08G** *18/82*
U.S. Cl. 260—29.2 TN **9 Claims**

1. A process for the production of polyurethane films and coatings from oligomeric polyurethane prepolymers which are free from isocyanate groups and cross-linking agents comprising:

(a) contacting solid oligomeric polyurethane prepolymers which are free from isocyanate groups in the form of lumps or coarse powders with water at a temperature below the softening point of the prepolymer to form a dispersion, said oligomeric polyurethane prepolymers characterized in that

(1) they have an average molecular weight of less than about 20,000,

(2) they contain at least about 4 to 120 milliequivalents of ionic groups per 100 grams of prepolymer, said milliequivalents of ionic groups derived from groups selected from the group consisting of ionic groups and groups capable of conversion into ionic groups before, during or after said prepolymers are brought into contact with water, or at least about 2 to 20% by weight of hydrophilic units of the formula $—CH_2—CH_2—O—$, and

(3) they are solid at room temperature,

(b) applying the dispersion to a substrate,

(c) cross-linking the oligomeric polyurethane prepolymer by the addition of a cross-linking agent to the dispersion, said addition being before, during or after the application of the dispersion to said substrate and,

(d) drying said dispersion.

4,094,843

AQUEOUS COATING COMPOSITION AND PROCESS FROM A MERCAPTAN CONTAINING POLYMER AND A BIS-MALEIMIDE

Vincent Daniel McGinniss, Valley City, Ohio, assignor to SCM Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 708,106, Jul. 23, 1976, Pat. No. 4,035,272, which is a continuation-in-part of Ser. No. 595,448, Jul. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 519,409, Oct. 31, 1974, Pat. No. 3,925,181. This application Mar. 28, 1977, Ser. No. 781,549
Int. Cl.² C08J *3/00*
U.S. Cl. 260—29.2 N **12 Claims**

1. A coating composition in aqueous dispersion for forming a curable film thereof, comprising:

a water-dispersed polymer having at least about 5% by weight pendant mercaptan groups; and

at least about 5% by weight of said polymer of bis-maleimide cross-linking agent;

said bis-maleimide having alpha-, beta-ethylenic unsaturation for cross-linking said polymer through said mercaptan groups by addition polymerization upon subsequent curing of said curable film.

4,094,844

WATER-BORNE EPOXY RESIN COATING COMPOSITIONS

Roy A. Allen, and Leroy W. Scott, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 28, 1977, Ser. No. 782,208
Int. Cl.² C08L *61/06, 63/00*
U.S. Cl. 260—29.3 **9 Claims**

1. A hydrolytically-stable, heat-curable composition comprising:

(1) a water-soluble composition prepared by (a) condensing a chemical excess of a lower molecular weight epoxy resin with an amino-substituted benzoic acid, (b) reacting the terminal epoxide groups of the resulting condensate with a secondary amine and then (c) solubilizing the product of (b) by neutralizing the carboxyl groups with a tertiary amine or ammonia, and

(2) a curing amount of a water-miscible aminoplast or phenolplast resin.

4,094,845

METHOD OF REDUCING LOSS OF WATER BY TRANSPIRATION AND COMPOSITION THEREFOR

Charles F. De Long, Washington, D.C., assignor to United States Trading International, Inc., Washington, D.C.

Filed Sep. 19, 1975, Ser. No. 614,925
Int. Cl.² C08L *61/28, 63/00, 33/08*
U.S. Cl. 260—29.4 UA **12 Claims**

1. Composition for decreasing the loss of water from leaves and stems of plants by transpiration and for protecting plants from damage by wind and cold consisting essentially of an aqueous solution or dispersion of a carboxylated hydrophilic acrylic polymer, a cross-linking agent for the carboxylated hydrophilic acrylic polymer and an effective amount of an ultraviolet-absorbing agent, wherein the carboxylated hydrophilic acrylic polymer and the cross-linking agent together comprise from about 3% to about 30% by weight of the aqueous solution or dispersion, said carboxylated hydrophilic acrylic polymer is a copolymer containing monomer units from at least one C_1-C_4 alkyl acrylate or methacrylate and from about 5% to about 20% by weight of at least one carboxylic monomer, and the amount of cross-linking agent is about 1% to

about 20% by weight of solids of said carboxylated hydrophilic acrylic polymer.

4,094,846

LOW PRESSURE MELAMINE RESINS CONTAINING ELASTOMERS

Darwin Fiske DeLapp, New Canaan, Conn., assignor to Formica Corporation, Cincinnati, Ohio

Filed Feb. 11, 1977, Ser. No. 767,720
Int. Cl.[2] C08L *61/28*
U.S. Cl. 260—29.4 R **10 Claims**

1. A composition of matter comprising a mixture of
(1) an aqueous melamine/formaldehyde resin solution wherein the melamine to formaldehyde ratio thereof ranges from about 1:1.6 to about 1:2.5,
(2) from about 2.5% to about 30.0%, by weight, based on the weight of the resin solids of (1), of an elastomer comprising
(a) an ethylene vinyl chloride copolymer containing from about 20% to about 30% ethylene, from about 65% to about 80% vinyl chloride and from about 0.5% to about 7.0%, by weight, said percentages being based on the total weight of (a), of amide groups,
(b) a polyurethane resin containing from about 3.0% to about 10.0%, by weight, based on the total weight of (b), of carboxyl groups, or
(c) a butadiene/acrylonitrile polymer containing from about 50% to about 95% butadiene, from about 5% to about 50% acrylonitrile and from about 1% to about 10%, by weight, said percentages being based on the total weight of (c), of carboxyl groups, said elastomer having a particle size of up to about 20,000 Angstroms, and
(3) from about 0.25 to about 1.25%, by weight, based on the total weight of solids in said composition, of an alkylene polyamine having the formula

$$H_2N[CH_2CH_2NH]_nCH_2CH_2NH_2$$

wherein n is a whole, positive integer of 0–3, inclusive.

4,094,847

ELASTOMER MODIFIED MELAMINE RESINS

Kenneth Robert Huffman, Stamford; Donald James Casey, Ridgefield, and Walter Moreland Thomas, Darien, all of Conn., assignors to Formica Corporation, Cincinnati, Ohio

Filed Feb. 11, 1977, Ser. No. 767,721
Int. Cl.[2] C08L *61/28*
U.S. Cl. 260—29.4 R **11 Claims**

1. A composition of matter comprising a mixture of
1. an aqueous melamine/formaldehyde resin solution and,
2. from about 2.5% to about 30.0%, by weight, based on the weight of the resin solids of (1), of an elastomer comprising
a. an ethylene/vinyl chloride copolymer containing from about 0.5% to about 7.0%, by weight, based on the total weight of (a), of amide groups or
b. a polyurethane resin containing from about 3.0% to about 10.0%, by weight, based on the total weight of (b), of carboxyl groups,

said elastomer having a particle size of up to about 20,000 Angstroms.

4,094,848

PROCESS FOR PRODUCING FINELY DIVIDED POROUS POLYMER PARTICLES

Kenji Naito, Odawara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 20, 1976, Ser. No. 688,191
Claims priority, application Japan, May 20, 1975, 50-59925
Int. Cl.[2] C08L *33/04*
U.S. Cl. 260—29.6 E **12 Claims**

1. A process for producing finely divided porous polymer particles comprising:
(1) forming a solution by dissolving a copolymer in a solvent mixture
(a) said copolymer comprising as one comonomer component of said copolymer, from about 10 to about 70 mol % of a vinyl compound which contains a carboxyl group,
(b) said solvent mixture comprising
(i) from about 20 to about 90% by weight of a solvent selected from the group consisting of sec-butanol, tert-butanol or mixtures thereof, and
(ii) from about 10 to about 80% by weight of a hydrophobic organic solvent,
(2) forming a water drop containing polymer emulsion by dispersing said solution in an aqueous medium in the presence of at least one emulsion stabilizer or surface active agent, and
(3) recovering said finely divided porous polymer particles from said emulsion.

4,094,849

PROCESS FOR PRODUCING AQUEOUS DISPERSION OF ETHYLENE-VINYL ACETATE COPOLYMER CONTAINING NO FORMALIN

Takeo Oyamada; Kazuhisa Satoh; Shinobu Tsuru, all of Ichihara; Masahiro Domoto, Toyonaka, and Shizuo Narisawa, Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Oct. 27, 1976, Ser. No. 736,100
Claims priority, application Japan, Nov. 4, 1975, 50-132694
Int. Cl.[2] C08L *31/00*
U.S. Cl. 260—29.6 MQ **7 Claims**

1. A process for producing an aqueous dispersion of an ethylene-vinyl acetate copolymer containing no formalin by emulsion-polymerization ethylene and vinyl acetate and optionally other copolymerizable vinyl monomers in the presence of a redox catalyst consisting of an oxidizing agent and a reducing agent, which is characterized in that a reaction product of a glyoxal compound and an alkali metal, ammonium or zinc salt of a reductive sulfur oxide is used as the reducing agent for the redox catalyst.

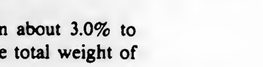
4,094,850

FLAME RETARDANT COMPOSITION

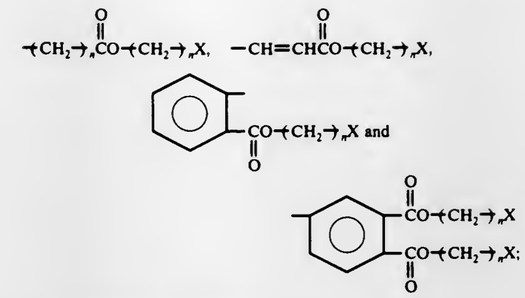
Albert W. Morgan, Collinsville, Ill.; David S. Moorman, Houston, Tex., and William Vanderlinde, St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 619,722, Oct. 6, 1975, abandoned, which is a continuation of Ser. No. 232,189, Mar. 6, 1972, abandoned. This application Jul. 6, 1976, Ser. No. 702,802
Int. Cl.[2] C08K *5/11, 5/12*
U.S. Cl. 260—31.8 PQ **36 Claims**

1. A composition consisting essentially of a polyolefin, said polyolefin having incorporated the resin a plasticizing amount of a compound of the formula



wherein
R represents alkyl,



X represents halogen; and
n represents the integer 4 or 5.

4,094,851

METHOD OF PREPARATION OF CLEAR CONCENTRATE COMPOSITIONS

Richard T. Haynes, Kirkwood, and Harry L. Young, Rock Hill, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 407,372, Oct. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 274,156, Jul. 24, 1972, abandoned, which is a continuation of Ser. No. 770,088, Oct. 23, 1978, abandoned. This application Jun. 3, 1975, Ser. No. 583,327
Int. Cl.[2] C08K *5/01;* D06P *1/00*
U.S. Cl. 260—33.6 UA **11 Claims**

1. In a method for preparing a clear concentrate composition useful in forming a clear vehicle for cutting color concentrates wherein a bonding agent, a wetting agent, an organic solvent in 5 percent to 50 percent by weight of said composition, and a thickening agent are admixed to form said clear concentrate composition, said thickening agent comprising a C_2–C_4 olefin-maleic anhydride interpolymer cross-linked with a cross-linking agent selected from the group consisting of a vinyl ester of an olefinically unsaturated carboxylic acid having from 3 to 24 carbon atoms and about 0.35 to about 0.55 mol percent of triallyl isocyanurated based upon the maleic anhydride monomer, the improvement which comprises neutralizing said clear concentrate composition, prior to further dilution, to a pH greater than 7, as measured by a 1% aqueous dispersion of said clear concentrate composition, with an organic amine selected from the group consisting of acyclic primary monoamines and heterocyclic monoamines, said organic amines having a boiling point less than 100° C.

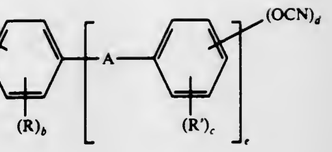
4,094,852

PROCESS FOR THE PRODUCTION OF POLYTRIAZINES IN THE PRESENCE OF HIGH-BOILING ESTERS

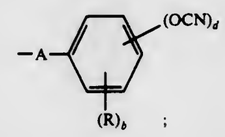
Rudolf Sundermann, New Martinsville, W. Va.; Günther Rottloff, Cologne, Germany; Ernst Grigat, Odenthal-Gloebusch, Germany, and Rolf Putter, Dusseldorf, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Jul. 22, 1976, Ser. No. 707,546
Claims priority, application Germany, Jul. 24, 1975, 2533124
Int. Cl.[2] C08G *73/06*
U.S. Cl. 260—37 N **7 Claims**

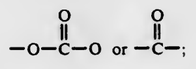
1. A polytrimerizable mixture of 30 to 99.9% by weight of at least one aromatic cyanic acid ester of the formula



wherein
R is hydrogen, halogen, alkyl having 1 to 9 carbon atoms, phenyl, alkoxy having 1 to 4 carbon atoms or alkoxy carbonyl having 1 to 4 carbon atoms in the alkyl moiety, or two R substituents together on adjacent carbon atoms of the phenyl moiety to which they are attached together form a hydrocarbon ring containing from 5 to 6 carbon atoms or together form with O, S or N a 5 or 6-membered heterocyclic ring; R′ has the same meaning as R or is the group



A is a bond, alkylene having 1 to 9 carbon atoms or said alkylene substituted by phenyl or alkyl having 1 to 4 carbon atoms, a divalent cycloaliphatic or aromatic 5 or 6-membered ring or said divalent ring including oxygen as a hetero atom, oxygen, $-SO_2-$,



a is 0 to 5 when e is 1 and 2,5 when e is 1;
b is 5 – a when e is 1 and 6 – a – d when e is 0;
c is 5 – d;
d is 0 to 5; and
e is 0 to 3
with the proviso that the sum of $a + d$ is always from 2 to 5.

or a partially cross-linked prepolymer of said cyanic ester of said formula which is soluble in organic solvents and 0.1 to 70% by weight of at least one high boiling ester plasticizer having a boiling point above 250° C at 760 Torr.

4,094,853

ALKOXY TITANATE SALTS USEFUL AS COUPLING AGENTS

Salvatore J. Monte, Staten Island, N.Y., and Gerald Sugerman, Allendale, N.J., assignors to Kenrich Petrochemicals, Inc., Hudson, N.J.

Filed May 15, 1975, Ser. No. 577,922
Int. Cl.[2] C08K *9/04*
U.S. Cl. 260—40 R **8 Claims**

1. A filled polymeric composition which comprises a peroxide-cured polymer containing therein a filler treated with a compound having the formula $(RO)Ti(OCOR')_3$ wherein R is a monovalent alkyl, alkenyl, alkynyl, or aralkyl group having from 1 to 30 carbon atoms or a substituted derivative thereof and R′ is a monovalent organic group, the total number of carbon atoms in the three R′ groups in a molecule being not more than 14.

4,094,854

POLYOLEFIN COMPOSITION

Taro Harada, Suita; Taisuke Okita, Ibaraki; Takahisa Hara, Toyonaka, and Yuji Ikezawa, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Mar. 24, 1977, Ser. No. 780,705
Claims priority, application Japan, Mar. 31, 1976, 51-36539
Int. Cl.² C08K *3/34*
U.S. Cl. 260—42.46 **6 Claims**

1. A polyolefin composition comprising (I) a crystalline polyolefin and (II) 5 to 45% by weight of a mixture of inorganic fillers based on the total weight of said polyolefin and said inorganic filler mixture, said mixture comprising (1) 40 to 95% of a powder mixture consisting essentially of calcium metasilicate and 0.2 to 20% by weight of calcium carbonate, said powder being in the long and narrow shape and more than 98% by weight thereof being passable through a 200-mesh Tyler's standard sieve and (2) 60 to 5% by weight of hydrated magnesium silicate powder which is passable through a 325-mesh Tyler's standard sieve.

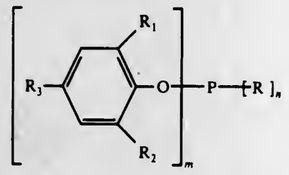
4,094,855

HINDERED PHENYL PHOSPHITES

John D. Spivack, Spring Valley, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 30, 1976, Ser. No. 710,063
Int. Cl.² C07F *9/145, 9/146, 9/206*
U.S. Cl. 260—45.8 NT **20 Claims**

1. A compound of the formula



wherein R_1 and R_2 are independently lower alkyl or hydrogen, provided that only one of R_1 and R_2 is hydrogen,

R_3 is $-(A)_q-COOR_4$

where

A is alkylene of 1 to 6 carbon atoms,

R_4 is alkyl of 1 to 24 carbon atoms, phenyl or alkyl substituted phenyl,

q is 0 or 1,

m and n are each 1 or 2, the values of m and n being such that the trivalent state of P is satisfied,

R is

(a) halogen,

(b) hydroxyl, provided that m is 2 and n is 1 when R is hydroxyl, or

(c) $-XR_5$ wherein X is S or O and R_5 is alkyl of 1 to 24 carbon atoms, phenyl, alkyl susbstituted phenyl.

15. A composition of matter comprising an organic polymeric synthetic material normally subject to thermal, oxidative and ultraviolet degradation stabilized with

(a) 0.005% to 5% of a stabilizing compound according to claim 1,

(b) 0 to 5% of a phenolic antioxidant,

(c) 0 to 5% of a thio co-stabilizer,

(d) 0 to 5% of a UV absorber, and

(e) 0 to 5% of a light stabilizer.

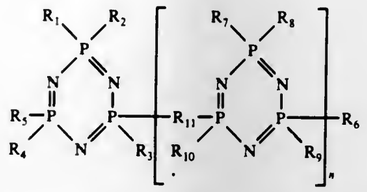
4,094,856

FLAME RETARDANT POLYMERIC COMPOSITIONS

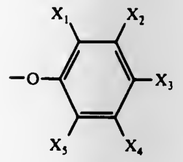
Randolph Joseph Guschl, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 15, 1976, Ser. No. 696,278
Int. Cl.² C08K *5/16*
U.S. Cl. 260—45.9 NP **15 Claims**

1. A flame retardant polymeric composition comprising a polymer selected from the group consisting of polyester, polyamides, polycaprolactam, acrylic resins, modacrylic resins, acrylonitrile-butadiene-styrene terpolymers, polyolefins, polycarbonates, epoxy resins, polyurethanes and polyphenylene oxides and a flame-retardant effective amount of a compound of the formula



wherein each of R_1 to R_{10} is a substituent of the formula



where

X_1 to X_5 is hydrogen, bromine and chlorine,

R_{11} is a linking group derived from bisphenol A, resorcinol, hydroquinone, bisphenol S and p,p'-dihydroxybiphenyl, and

n is a number from 1 to 10.

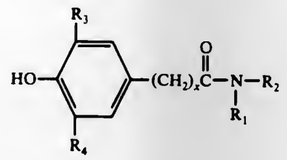
4,094,857

COPOLYMERIZABLE PHENOLIC ANTIOXIDANT

James Richard Wolfe, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

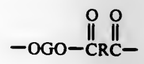
Filed Sep. 1, 1977, Ser. No. 829,822
Int. Cl.² C08K *5/20*; C07D *307/89, 307/93*; C07C *101/42*
U.S. Cl. 260—45.9 QB **29 Claims**

1. An antioxidant having the structural formula:

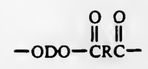


where R_1 is hydrogen or a lower alkyl radical; R_2 is a monovalent radical containing carbon, hydrogen, and oxygen, free of ethylenic or acetylenic unsaturation, and having a molecular weight between about 99–300 and, further, containing two carboxyl groups or their ester-forming equivalents; R_3 and R_4 are tertiary alkyl radicals each containing not more than 8 carbon atoms; and x is an integer of from 0–4.

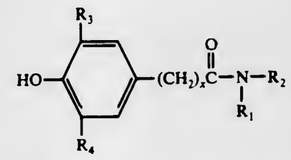
10. In a stabilized copolyetherester composition consisting essentially of a multiplicity of recurring long chain ester units and short chain ester units joined head-to-tail through ester linkages, said long chain ester units being represented by the formula



and said short chain ester units being represented by the formula



where G is a divalent radical remaining after the removal of terminal hydroxyl groups from a poly(alkylene oxide) glycol having a number average molecular weight of about 400–6000 and a carbon to oxygen atomic ratio of about 2.0–4.3; R is a divalent radical remaining after removal of carboxyl groups from a dicarboxylic acid having a molecular weight less than about 300, and D is a divalent radical remaining after removal of hydroxyl groups from a diol having a molecular weight less than about 250; provided said short chain ester units amount to about 15–95 percent by weight of said copolyetherester and characterized in that said copolyetherester is stabilized against oxidative degradation due to the presence in the backbone of the copolyetherester of an effective concentration of antioxidant units derived from:



where R_1 is hydrogen or a lower alkyl radical; R_2 is a monovalent radical containing carbon, hydrogen, and oxygen, free of ethylenic or acetylenic unsaturation, and having a molecular weight between about 99–300 and, further, containing two carboxyl groups or their ester-forming equivalents; R_3 and R_4 are tertiary alkyl radicals each containing not more than 8 carbon atoms; and x is an integer of from 0–4, said antioxidant units being connected to ester units in the copolyetherester through ester linkages.

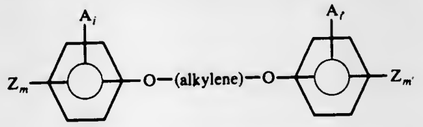
4,094,858

FLAME RETARDANT PLASTIC COMPOSITIONS

Arnold L. Anderson, Antioch, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 330,806, Feb. 8, 1973, Pat. No. 4,049,624. This application Jul. 25, 1977, Ser. No. 818,373
Int. Cl.² C08K *5/06*
U.S. Cl. 260—45.75 B **16 Claims**

1. A plastic composition containg polystyrene having incorporated therein (1) an effective amount of a flame retardant which is a bis-phenoxy compound having the formula:



wherein Z is bromine; m is an integer having a value of 1–5 and m' is an integer having a value of 0–4; i is an integer having a value of 0–2 and i' is an integer having a value of 1–5; alkylene is a straight or branched chain alkylene group having from 1 to 6 carbon atoms; and A is chlorine; and (2) an enhancing agent which is antimony, arsenic, bismuth, tin or zinc-containing compound.

4,094,859

PROCESS FOR THE PREPARATION OF COPOLYMERS OF THIODIETHANOL USING A PHOSPHOROUS ACID-METAL SULFATE CATALYST

Eugene Yue Chieh Chang, Bridgewater, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 18, 1977, Ser. No. 779,114
Int. Cl.² C08G *75/12*
U.S. Cl. 260—47 R **7 Claims**

1. A process for the preparation of a linear, high molecular weight elastomeric polymer of thiodiethanol which comprises condensing a monomer charge comprising thiodiethanol or a major proportion of thiodiethanol with (A) one or more saturated or unsaturated aliphatic diols, or (B) one or more dihydric phenolic compounds, or (C) mixtures of (A) and (B), at a temperature in the range of about 150° to 200° C, under conditions whereby water formed in the reaction is removed and in the presence of a catalyst comprising from about 0.01 to 3 percent by weight of phosphorous acid and from about 0.01 to 3 percent by weight of manganese, iron, cobalt, nickel, copper or zinc sulfate.

4,094,860

CONDENSATION PRODUCTS OF AROMATIC POLYHYDROXY COMPOUNDS AND POLYAMINO ALIPHATIC COMPOUNDS

Joseph Kestutis Valaitis, University Heights, and Harold James Harwood, Stow, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 371,636, Jun. 20, 1973, abandoned. This application Mar. 13, 1975, Ser. No. 558,038
Int. Cl.² C08G *73/00, 73/02*
U.S. Cl. 260—47 R **9 Claims**

1. The method of producing a polymer of (1) an aromatic polyhydroxy compound in which the ring portion of the compound is unsubstituted or alkyl-substituted and (2) an aliphatic polyamine of the class consisting of (a) aliphatic polyamines in which the hydrocarbon contains 2 to 60 carbon atoms and (b) polyamines of the formula H_2N-alkylene-X-alkylene-NH_2 in which X is oxygen, sulfur or an arylene or amino group, and the alkyl groups contain 2 to 20 carbon atoms, which comprises heating substantially equimolar amounts of the reactants in the presence of a condensation catalyst and thereby obtaining a polymer by condensation of amine groups with hydroxy groups.

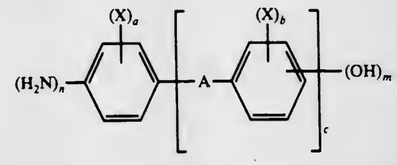
4,094,861

PROCESS FOR THE PRODUCTION OF NON-INFLAMMABLE POLYTRIAZINES

Rudolf Sundermann, New Martinsville, W. Va.; Günther Rottloff, Cologne, Germany; Ernst Grigat, Odenthal-Gloebusch, Germany, and Rolf Pütter, Dusseldorf, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Jul. 22, 1976, Ser. No. 707,545
Claims priority, application Germany, Jul. 24, 1975, 2533122
Int. Cl.² C08G *73/06*
U.S. Cl. 260—47 P **10 Claims**

1. A process for producing a polytriazine which comprises reacting more than 0.5 mol and less than 3 mols of a compound of the formula



wherein:

each X is hydrogen, halogen, alkyl having 1 to 9 carbon atoms or phenyl;

A is —O—, —SO_2—,—CO—,

alkylene having 1 to 9 carbon atoms or said alkylene substituted by phenyl or alkyl having 1 to 4 carbon atoms, or a direct bond;
n is 1, 2 or 3;
m is 1, 2 or 3;
c is 0 or 1;
a is 5-*n* where *c* is 1 and 6-*m*-*n* where *c* is 0; and
b is 5-*m*

is condensed with 1 mol of a phosphorus compound selected from the group consisting of phosphorus trihalide and phosphorus oxytrihalide in the presence of a base selected from the group consisting of alkali metal hydroxides, alkali metal carbonates, alkaline earth metal carbonates and tertiary amines in an amount of up to 3.2 mols of base per mol of said phosphorus compound and at a temperature of from −40° to 250° C, thereafter reacting the resulting compound with 1 to 1.1 mol of cyanogen halide in the presence of 1 mol of an inorganic base or a tertiary amine for every primary amino or every phenolic hydroxyl group and at a temperature of −40° to 65° C, and polytrimerizing the latter reaction product at a temperature of from 50° to 350° C to form polytriazine product.

4,094,862

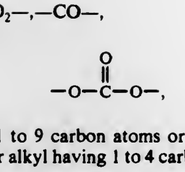
PROCESS FOR PREPARING THERMOPLASTIC AROMATIC POLYIMIDES

Vernon L. Bell, Seaford, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 448,321, Mar. 5, 1974, abandoned. This application Mar. 28, 1975, Ser. No. 562,992
Int. Cl.² C08G *73/10*
U.S. Cl. 260—65 **6 Claims**

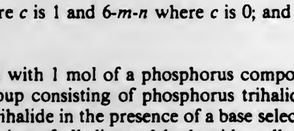
1. A method for preparing insoluble thermoplastic aromatic polyimide film having uniquely low softening temperatures by reacting, in a suitable inert solvent,

(a) an aromatic dianhydride with the structural formula

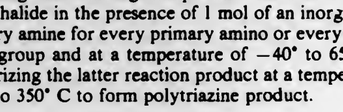


where R is an aromatic tetravalent radical, with

(b) a diamine of the structural formula



where one or both of the amine groups is located in a meta position on the phenylene ring to the function Z, Z connects the two phenylene rings and is selected from the group consisting of



R_2 being selected from the alkyl and aryl group, wherein the diamine-dianhydride reaction produces a viscous polymer solution and including the further step of making a film from this viscous solution, drying the film at ambient room temperatures for 4–16 hours, further drying the film in an air circulating oven for 1 hour at 100° C., and heating and maintaining the film to the temperature and range of 200° - 225° C. for at least 2 hours to effect imidization of the polymer film.

4,094,863

CROSS-LINKING HYDROCARBON UNSATURATED POLYMER WITH MONO-SULPHONYLOXYCARBAMATE COMPOUNDS

John Langshaw Brooks, and Richard Budziarek, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Feb. 22, 1977, Ser. No. 770,569
Claims priority, application United Kingdom, Feb. 27, 1976, 7809/76
Int. Cl.² C08F *18/24;* C08G *18/00;* C08C *19/20*
U.S. Cl. 260—77.5 B **4 Claims**

1. A process for the cross-linking of hydrocarbon polymers which contain ethylenically unsaturated groups which comprises forming an intimate mixture of the polymer with a mono-sulphonyloxycarbamate of the formula:

$$A - O - CO - NH - O - SO_2R \quad (1)$$

wherein A is an alkyl group, a cycloalkyl group, an alkenyl group, a substituted alkyl group, a substituted aryl group or a heterocyclic group, and R is an optionally substituted alkyl or aryl group and heating the mixture at a temperature within the range 50° to 250° C.

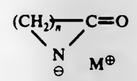
4,094,864

PREPARATION OF POLYAMIDEIMIDE FROM DIISOCYANATE WITH ALKALI METAL LACTAMATE CATALYST

Besir K. Onder, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 521,745, Nov. 7, 1974, Pat. No. 4,021,412. This application Feb. 17, 1977, Ser. No. 769,312
Int. Cl.² C08G *18/20, 18/22, 73/14*
U.S. Cl. 260—78 TF **6 Claims**

1. In a process for preparing an essentially linear, solvent soluble solid polyamideimide by the condensation of an organic diisocyanate with a compound containing one carboxylic acid group and one intramolecular anhydride group or the free carboxylic acids thereof in said solvent, the improvement which comprises adding to the solution of polyamideimide forming reactants a catalytic amount of a compound



wherein *n* is an integer from 2 to 5 inclusive, and M is an alkali metal at a temperature of from about 40° C to about 140° C.

4,094,865

POLYESTER OF A CYCLIC DIACID ANHYDRIDE WITH AN EPOXIDE

James C. Hill, Chesterfield, and Walter R. Knox, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jan. 2, 1976, Ser. No. 646,215
Int. Cl.² C08G *63/00*
U.S. Cl. 260—78.41 **6 Claims**

1. A polymeric material comprising a polyester produced by a process which comprises:

a. forming a mixture of a cyclic diacid anhydride, a poly-terminal epoxide and a mono-terminal epoxide, the ratio of total epoxy groups to cyclic diacid anhydride groups being from 1:1 to 2:1 and the epoxy-equivalent mole ratio of polyepoxide to monoepoxide being from 0.01 to 1.0, and adding to said mixture a catalytically effective quaternary salt in an amount that is from 0.0001 to 0.2 mole per mole of anhydride,

b. initiating a non-self-sustaining exothermic reaction between the epoxide and anhydride components of the mixture,

c. raising the temperature of the mixture to a point at which the exothermic reaction becomes self-sustaining and

d. controlling the reaction conditionsduring the self-sustaining exothermic reaction such that the temperature of the reaction mixture is not substantially reduced until after the rate of evolution of heat by the reaction has begun to decrease; the time spent in stages *b* and *c* combined being less than 600 seconds.

4,094,866

PREPARATION OF POLYAMIDE FROM DIISOCYANATE WITH ALKALI METAL LACTAMATE CATALYST

Besir K. Onder, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 521,745, Nov. 7, 1974, Pat. No. 4,021,412. This application Feb. 17, 1977, Ser. No. 769,313
Int. Cl.² C08G *18/20, 18/22, 69/26*
U.S. Cl. 260—78 R **8 Claims**

1. In a process for preparing an essentially linear, solvent soluble solid polyamide by the condensation of an organic diisocyanate with a compound containing two carboxylic acid groups in said solvent, the improvement which comprises preparing said polyamide in the presence of a catalytic amount of a compound

wherein *n* is an integer from 2 to 5 inclusive, and M is an alkali metal at a temperature of from about 40° C to about 140° C.

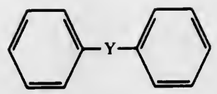
4,094,867

MANUFACTURE OF POLYSULPHONES

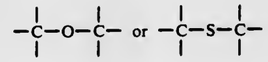
Michael Edward Benet Jones, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 320,508, Oct. 31, 1963, Pat. No. 4,008,203, and Ser. No. 215,140, Jan. 3, 1972, which is a continuation of Ser. No. 805,025, Mar. 6, 1966, abandoned, which is a continuation-in-part of Ser. No. 320,508, and Ser. No. 474,933, Jul. 26, 1965, abandoned, which is a continuation-in-part of Ser. No. 320,508,. This application May 17, 1976, Ser. No. 687,324
Claims priority, application United Kingdom, Nov. 6, 1962, 41976/62; Mar. 18, 1963, 10592/63; Oct. 3, 1963, 38973/63; Aug. 6, 1964, 32016/64
Int. Cl.² C08G *75/20, 75/23*
U.S. Cl. 260—79.3 M **6 Claims**

1. A process for substantially reducing or eliminating entirely an increase in the viscosity of a molten film or fibre-forming polyaryl sulphone made from a reagent of the formula H-Ar-SO_2.X and/or an equimolar mixture of reagents of the formulae X.SO_2-Ar-SO_2.X and H-Ar-H, in which some of the SO_2 groups may be replaced by -CO- groups where X is a halogen atom and Ar is a divalent aromatic radical obtained by removal of two aromatically bound hydrogen atoms from benzene, a polynuclear hydrocarbon containing no more than 2 aromatic rings, diphenyl, a compound having the structure



where Y is —O—,—S—, —SO—, a divalent hydrocarbon radical a substituted divalent hydrocarbon radical or a residue of a diol containing only carbon atoms or groups of the structure



in the chain between the hydroxyl groups, or substituted derivatives of any such aromatic radicals in which at least one of the aromatically bound hydrogen atoms is substituted by a halogen atom, an alkyl group containing from 1 to 4 carbon atoms or an alkoxy group containing from 1 to 4 carbon atoms and Ar may vary from unit to unit in the polymer chain, which comprises contacting the polymer below the temperature at which such viscosity increase would occur and in the presence of an inert solvent with an organic compound which will inactivate sulphonyl and carbonyl halide groups at temperatures at which the polymer is molten.

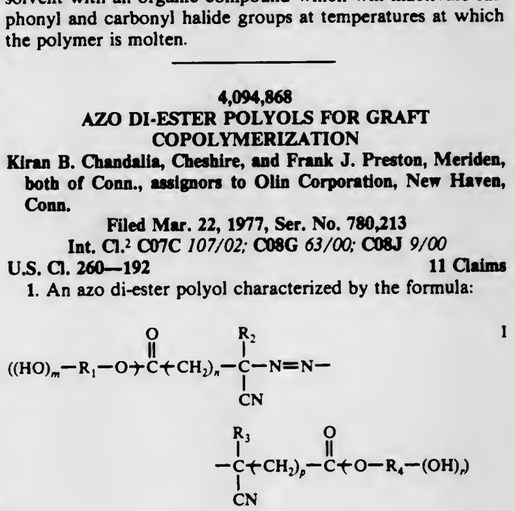
4,094,868

AZO DI-ESTER POLYOLS FOR GRAFT COPOLYMERIZATION

Kiran B. Chandalia, Cheshire, and Frank J. Preston, Meriden, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Mar. 22, 1977, Ser. No. 780,213
Int. Cl.² C07C *107/02;* C08G *63/00;* C08J *9/00*
U.S. Cl. 260—192 **11 Claims**

1. An azo di-ester polyol characterized by the formula:



I

wherein:

m and *r* independently represent integers from 2 to 5;

n and *p* independently represent integers from 0 to 5;

R_2 and R_3 independently represent alkyl of 1 to 4 carbons; and

$((HO)_m—R_1—O—$ and $—O—R_4—(OH)_r)$ independently represent residues of polyether or polyester polyols, $R_1(OH)_{m+1}$ and $R_4(OH)_{r+1}$, wherein R_1 and R_4 independently represent polyether or polyester chains, having an average equivalent weight of from about 250 to 5000, after removal of one hydroxy hydrogen therefrom.

4,094,869

THERMALLY STABLE, RIGID, CELLULAR ISOCYANURATE POLYURETHANE FOAMS

Jerome B. Biranowski, Bronx, N.Y., and Donald H. Lorenz, Basking Ridge, N.J., assignors to GAF Corporation, New York, N.Y.

Filed Jun. 16, 1975, Ser. No. 587,063
Int. Cl.² C08G *18/14*
U.S. Cl. 260—2.5 AW **25 Claims**

1. A process for preparing a thermally stable, rigid cellular

isocyanurate polyurethane foam that comprises reacting the polyols including an unhalogenated polyol and 2,3-dibromo-2-butenediol-1,4; wherein said 2,3-dibromo-2-butenediol-1,4 is incorporated in said reaction mixture in a proportion by weight of about 30 percent to about 60 percent of the total polyol incorporated in said reaction mixture; a polymethylene polyphenyl polyisocyanate in proportions such that the active hydrogen groups present in the total of the polyols are less than fifty percent of the number of isocyanato groups present in the polymethylene polyphenyl polyisocyanate of said reaction mixture; antimony oxide and hydrated alumina; each of said antimony oxide and said hydrated alumina being present in a proportion by weight of said polyisocyanate of about 1 percent to 20 percent and 10 percent to 100 percent respectively; together with a blowing agent and trimerization catalyst; and subjecting said reaction mixture to postcuring.

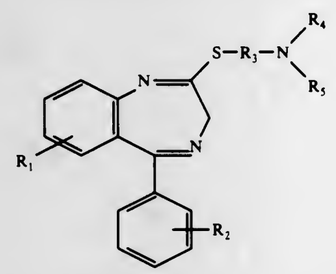
4,094,870

2-SUBSTITUTED THIO-1,4-BENZODIAZEPINE DERIVATIVES

Ikuo Ueda, Yao, and Masaaki Matsuo, Toyonaka, both of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 559,886, Mar. 19, 1975, abandoned. This application Oct. 15, 1976, Ser. No. 732,929
Claims priority, application Japan, Mar. 20, 1974, 49-31905
Int. Cl.[2] A61K *31/395;* **C07D** *243/22*
U.S. Cl. 260—239 BD **21 Claims**

1. A 2-substituted thio-1,4-benzodiazepine compound of the formula



and non-toxic pharmaceutically acceptable salts, wherein
R_1 is halogen or nitro,
R_2 is hydrogen, halogen, alkoxy having 1 to 6 carbons or hydroxy,
R_3 is alkylene having 1 to 10 carbons, and
R_4 and R_5 are alkyl groups having 1 to 6 carbons.

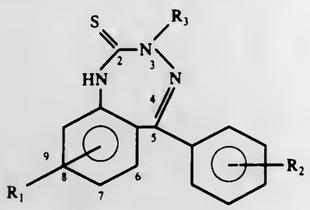
4,094,871

1,3,4-BENZOTRIAZEPINE-2-THIONES

Donald L. Trepanier, and Thomas C. Britton, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 16, 1977, Ser. No. 769,126
Int. Cl.[2] C07D *255/04, 413/06, 401/06*
U.S. Cl. 260—239.3 B **4 Claims**

1. A compound having the formula



I

wherein R_1 and R_2 independently represent hydrogen, lower alkyl, or halo and R_3 represents a lower alkyl or substituted lower alkyl wherein the substitution is selected from the group comprising hydroxy, morpholino, piperidino, dimethylamino, or diethylamino and further including the pharmaceutically-acceptable salts thereof.

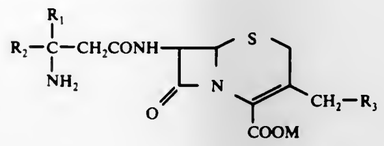
4,094,872

7-(β-AMINOACYLAMINO)-3-HETEROCYCLIC-THIOMETHYL-3-CEPHEM-4-CARBOXYLIC ACID DERIVATIVES

Kunihiko Tanaka, Hattori; Masaru Kurita, Takatsuki, and Osamu Nishiwaki, Sakai, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Sep. 12, 1973, Ser. No. 396,580
Claims priority, application Japan, Nov. 17, 1972, 47-115983
Int. Cl.[2] C07D *501/54, 501/56;* **A61K** *31/545*
U.S. Cl. 544—26 **8 Claims**

1. Compounds of the formula



wherein
R_1 is hydrogen, lower alkyl having one to six carbon atoms, lower alkenyl having two to six carbon atoms, cyclohexyl, phenyl, or thienyl,
R_2 is hydrogen or lower alkyl having one to six carbon atoms, or
R_1 and R_2 taken together with the carbon to which they are attached is a cycloalkyl or cycloalkenyl group having from 5 to 7 carbon atoms,
R_3 is heterocyclicthio wherein the heterocyclic group is selected from the group consisting of 1,3,4-thiadiazolyl or 1,2,4-thiadiazolyl, and their lower alkyl derivatives, lower alkyl-1-H-tetrazolyl, and
M is hydrogen or a non-toxic, pharmaceutically acceptable cation.

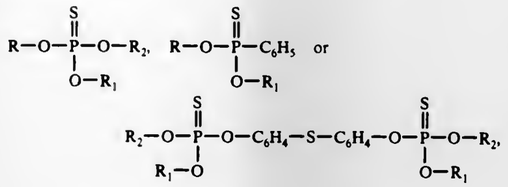
4,094,873

PROCESS FOR PREPARING PHOSPHOROTHIOATES AND PHENYLPHOSPHONOTHIOATES

Lorraine M. Kroposki, Walnut Creek, Calif.; Masao Yoshimine, Midland, Mich., and Harold H. Freedman, Newton Center, Mass., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 600,542, Jul. 31, 1975, Pat. No. 4,028,439, which is a division of Ser. No. 354,040, Apr. 24, 1973, Pat. No. 3,917,621, which is a continuation-in-part of Ser. No. 229,171, Feb. 24, 1972, abandoned. This application Jan. 21, 1977, Ser. No. 761,176
Int. Cl.[2] C07F *9/09, 9/165*
U.S. Cl. 544—243 **17 Claims**

1. In the process of preparing a compound corresponding to the formula

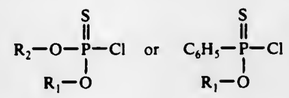


wherein:
R_1 and R_2 are each independently

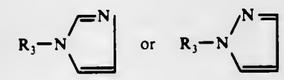
wherein:
n is 0, 1, 2 or 3; and
X is nitro, cyano, halo, lower alkyl, lower alkoxy, lower alkylthio or lower alkylsulfinyl, with the proviso that R does not bear more than one nitro group, lower alkylthio group or lower allkylsulfinyl group; by reacting in an inert liquid reaction medium and under neutral or alkaline conditions (a) a compound corresponding to the formula

$$R\text{-}O^{\ominus}M^{\oplus} \text{ or } M^{\oplus\ominus}O\text{—}C_6H_4\text{—}S\text{—}C_6H_4\text{—}O^{\ominus}M^{\oplus}$$

with (b) a compound corresponding to the formula



wherein M is an alkali metal and R, R_1 and R_2 have the aforesaid meaning;
the improvement consisting of conducting the process in the presence of a small but catalytic amount of (1) a quaternary ammonium salt having a mininum solubility of at least 1 weight percent in the liquid reaction medium at 25° C and (2) a diazole corresponding to the formula



wherein R_3 is hydrogen or alkyl of 1 to 6 carbon atoms.

4,094,874

PROCESS FOR THE PRODUCTION OF 2-AMINO-4-HYDROXY-6-METHYLPTERIDINE

Enrico Catalucci, Visp, Switzerland, assignor to Lonza, Ltd., Gampel, Switzerland

Filed Jan. 13, 1977, Ser. No. 759,047
Claims priority, application Switzerland, Jan. 13, 1976, 313/76
Int. Cl.[2] C07D *475/04*
U.S. Cl. 544—258 **11 Claims**

1. The process for the production of 2-amino-4-hydroxy-6-methylpteridine from 2,4,5-triamine-6-hydroxypyrimidine and 1,1-dichloroacetone which is characterized in that the 2,4,5-triamino-6-hydroxypyrimidine in the form of one of its stable salts is converted with 1,1-dichloro acetone, such being present in a 1 to 2 times equivalent quantity, in relation to said 2,4,5-triamino-6-hydroxypyrimidine, to 2-amino-4-hydroxy-6-methylpteridine, in a solvent of solvent mixture at a pH value of 3.5 to 4.5 in the presence of sodium bisulfite, from 1.2 mole of said sodium bisulfite per mole of said stable salt of 2,4,5-triamino-6-hydroxypyrimidine at 5 liters of reaction solution up to 3 moles of the sodium bisulfite per mole of said stable salt of 2,4,5-triamino-6-hydroxypyrimidine at 50 liters of reaction solution being used.

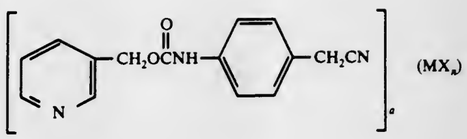
4,094,875

3-PYRIDYLMETHYL N-(4-CYANOMETHYLPHENYL)CARBAMATE AND DERIVATIVES

Ernest D. Weiler, Ambler, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 475,709, Jun. 3, 1974, Pat. No. 3,929,810. This application Oct. 3, 1975, Ser. No. 619,277
Int. Cl.[2] C07F *3/06, 3/04, 3/14, 1/10*
U.S. Cl. 260—270 PY **2 Claims**

1. A metal salt complex of the structure



wherein
M is a metal cation of cadmium, calcium, cobaltous, cupric, ferrous, ferric, manganous, mercuric, nickel, silver, stannous or zinc;
X is a bromide, chloride, iodide, perchlorate, carbonate, bicarbonate, nitrate, phosphate, sulfate, bisulfate, acetate, maleate, oxalate, or p-toluene sulfonate anion forming a salt with the cation M in which the salt has sufficient solubility to form a complex with 3-pyridylmethyl N-(4-cyanomethylphenyl)carbamate;
a is an integer corresponding to the valence of cation M; and
n is an integer which for the anion X satisfies the valence of cation M.

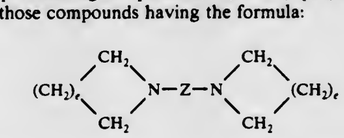
4,094,876

CHELATED LITHIUM ALUMINUM COMPOUNDS

Arthur W. Langer, Jr., Watchung, and Thomas A. Whitney, Roselle, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 344,230, Mar. 23, 1973, Pat. No. 3,933,879, which is a continuation-in-part of Ser. No. 808,328, Mar. 18, 1969, now Pat No. Re. 28,456. This application Oct. 16, 1975, Ser. No. 622,840
Int. Cl.[2] C07D *401/10, 401/06;* **C07F** *1/02, 5/06*
U.S. Cl. 260—270 PD **7 Claims**

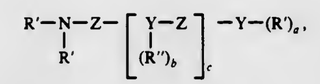
1. A complex comprising: (a) an inorganic lithium salt having a lattice energy less than 210 kilocalories per mole at 18° C and (b) a chelating polyfunctional Lewis base selected from the group consisting of sparteine, N,N'-di-(C_1-C_4 alkyl) bispidins and those compounds having the formula:



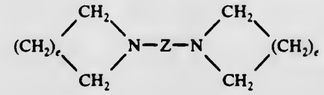
II

wherein *e* is an integer of 0 to 3 inclusive; Z is a radical selected from the group consisting of (1) C_4–C_{10} cycloaliphatic or C_6–C_{10} aromatic radicals and their lower alkyl derivatives wherein said radicals are attached to the nitrogen atoms in Formula II at the 1,2 position on the aromatic rings or 1,2- or 1,3-positions on the cycloaliphatic rings, and (2) 1 to 4 methylenic radicals wherein each methylenic radical contains 0 to 2 monovalent hydrocarbon radicals of 1 to 6 carbon atoms.

7. A chelated mono- or di- lithio aromatic radical anion having the formula Chel•Li^+[Ar] wherein said Chel is a polyfunction Lewis base selected from the group consisting of sparteine, N,N'-di-(C_1-C_4 alkyl) bispidins, tris-(β-C_1-C_4-dialkyl aminoethyl) amine and those compounds having the formulas:



I



II

wherein *a* is 1 or 2, depending on the valence of Y; *b* is 0 or 1, depending on the valence of Y; *c* is an integer of 0 to 4, inclusive; *e* is an integer of 0 to 3, inclusive; R' is the same or differ-

ent C_1-C_4 alkyl radical, R'' is one selected from the group consisting of C_1-C_4 alkyl, C_6-C_{10} aryl or aralkyl radical; Y is a nitrogen or oxygen atom; Z is a nonreactive radical selected from the group consisting of:

(1) C_4-C_{10} Cycloaliphatic or C_6-C_{10} aromatic radicals and their lower alkyl derivatives wherein said radicals are attached to the nitrogen and oxygen atoms in Formula I and the nitrogen atoms in Formula II at 1,2-positions on the aromatic rings or 1,2- or 1,3-positions on the cycloaliphatic rings; and

(2) 1 to 4 methylenic radicals, wherein each methylenic radical contains 0 to 2 monovalent hydrocarbon radicals of 1 to 6 carbon atoms;

and Ar is an aromatic compound whose reduction potential is that of biphenyl or greater.

4,094,877

TRI- OR TETRASUBSTITUTED DIPHENYLPHTHALIDES

Nathan N. Crounse, Cincinnati, and Paul J. Schmidt, Sharonville, both of Ohio, assignors to Sterling Drug Inc., New York, N.Y.

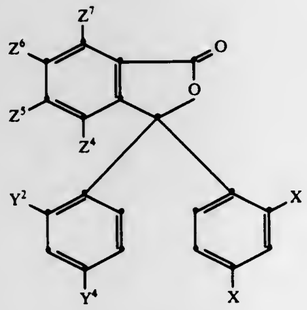
Continuation-in-part of Ser. No. 527,757, Nov. 27, 1974, Pat. No. 4,032,527, which is a continuation-in-part of Ser. No. 314,443, Dec. 12, 1972. This application Nov. 10, 1976, Ser. No. 740,592

Claims priority, application Canada, Dec. 5, 1973, 187401

Int. Cl.[2] C07D *307/87*

U.S. Cl. 260—293.58 **52 Claims**

1. 3-(2-X-4-X-Phenyl)-3-(2-Y^2-4-Y^4-phenyl)-4-Z^4-5-Z^5-6-Z^6-7-Z^7-phthalide of the formula



wherein:

X is dialkylamino wherein alkyl is non-tertiary alkyl of one to four carbon atoms;

Y^2 is hydrogen, non-tertiary alkyl of one to four carbon atoms, dialkylamino wherein alkyl is non-tertiary alkyl of one to four carbon atoms, alkanoylamino of two to five carbon atoms, non-tertiary alkoxy of one to four carbon atoms or halo;

Y^4 is the same as Y^2 when Y^2 is dialkylamino; or dialkylamino, pyrrolidino, piperidino, alkylbenzylamino, alkyl(4-alkoxyphenyl)amino or alkyl(Q-$(CH_2)_n$-amino, wherein alkyl is non-tertiary alkyl of one to four carbon atoms, alkoxy is non-tertiary alkoxy of one to four carbon atoms, Q is hydroxy or chloro and *n* is two to four when Y^2 is other than dialkylamino;

Z^4 is hydrogen or halo;

Z^5 is hydrogen or halo; or non-tertiary alkyl of one to four carbon atoms, nitro, amino or dialkylamino wherein alkyl is non-tertiary alkyl of one to four carbon atoms when Z^4, Z^6 and Z^7 are each hydrogen;

Z^6 is hydrogen or halo; or non-tertiary alkyl of one to four carbon atoms, nitro, amino or dialkylamino wherein alkyl is non-tertiary alkyl of one to four carbon atoms when Z^4, Z^5 and Z^7 are each hydrogen; and

Z^7 is hydrogen or halo.

4,094,878

CHEMICAL SYNTHESIS OF FLAVIPUCINE

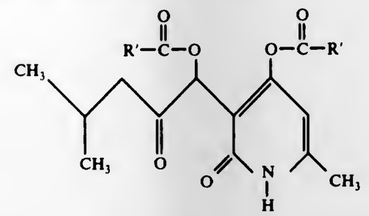
Norman L. Wendler, Summit; Narindar N. Girotra, Fords, both of N.J., and Zbigniew S. Zelawski, deceased, late of Piscataway, N.J. (by Maria W. Zelawski, administrator), assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 705,201, Jul. 14, 1976. This application May 19, 1977, Ser. No. 798,288

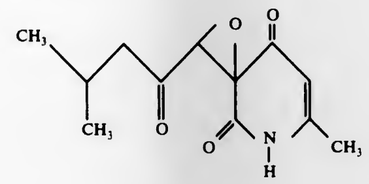
Int. Cl.[2] C07D *211/40*

U.S. Cl. 260—297 Z **4 Claims**

1. A process for preparing (±) flavipucine and (±) isoflavipucine comprising reacting a diester of the formula:



where R' is C_1 to C_4 alkyl, phenyl, or C_1 to C_4 alkyl substituted phenyl with at least one equivalent of alkali and a hydroperoxide ROOH where R is H or a C_4 to C_{10} t-alkyl hydroperoxide to form the product



4,094,879

PRODUCTION OF 5-NITROTETRAZOLE SALTS

Leslie Raymond Bates, Cheshunt, and John Michael Jenkins, Sevenoaks, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Nov. 1, 1976, Ser. No. 737,692

Claims priority, application United Kingdom, Nov. 11, 1975, 46605/75

Int. Cl.[2] C07F *3/14, 1/10, 1/08*

U.S. Cl. 260—299 **20 Claims**

1. A method of preparing a silver or mercury 5-nitrotetrazole, which comprises forming an acid solution of a complex of cupric 5-nitrotetrazole with an aliphatic chelating amine, adding to said acid solution at a temperature of at least 50° C, a solution of a soluble silver or mercury salt to precipitate the required 5-nitrotetrazole salt, and filtering off the 5-nitrotetrazole salt.

4,094,880

BIS(CHLOROMETHYLTHIO)THIADIAZOLES

Christian T. Goralski, Midland, and George A. Burk, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 24, 1976, Ser. No. 726,346

Int. Cl.[2] C07D *285/08, 285/12*

U.S. Cl. 260—302 SD **2 Claims**

1. the compound 2,5-bis(chloromethylthio)-1,3,4-thiadiazole.

2. The compound 3,5-bis(chloromethylthio)-1,2,4-thiadiazole.

4,094,881

PROCESS FOR PREPARING TRIAZOLETHIOLS

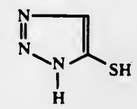
David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Continuation of Ser. No. 665,607, Mar. 10, 1976, abandoned. This application Dec. 16, 1976, Ser. No. 751,243

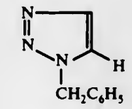
Int. Cl.[2] C07D *249/04*

U.S. Cl. 260—308 A **8 Claims**

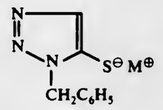
1. A process for preparing 1,2,3-triazole-4(5)-thiol of the formula:



comprising (1) treating 1-benzyl-1H-1,2,3-triazole of the formula



with a base sufficiently strong to generate an anionic charge at the 4-position of said triazole (2) treating the resulting anionic triazole with sulfur to give a 4-thiolate of the formula



where $M^{\oplus}$ is the cation of said base, (3) removing said benzyl group be reductive means, and (4) acidifying the resulting 4-thiolate with strong acid to give the triazole thiol.

4,094,882

4,5-DIDEHYDRO-6-HYDROXY-2β-ARYLMETHOXYMETHYL-3α-TETRAHYDROPYRANACETIC ACID ε-LACTONES

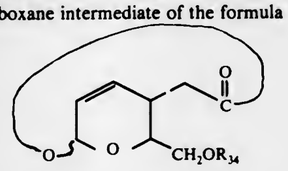
Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 676,895, Apr. 14, 1976, Pat. No. 4,032,542. This application Apr. 4, 1977, Ser. No. 784,176

Int. Cl.[2] C07D *493/02*

U.S. Cl. 260—343 **2 Claims**

1. A thromboxane intermediate of the formula



wherein R_{34} is an arylmethyl hydroxy-hydrogen replacing group selected from the group consisting of

(a) benzyl,

(b) benzyl substituted by one to five alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive,

(c) benzhydryl,

(d) benzhydryl substituted by one to ten alkyl of one to four carbom atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 atoms, inclusive,

(e) trityl, and

(f) trityl substituted by one to 15 alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive.

4,094,883

5-IODO-6-OXO-3-(2'-ARYLMETHOXY-1'-HYDROXYETHYL)-4-HYDROXY-HEXANOIC ACID, γ-LACTONE DIALKYL ACETALS

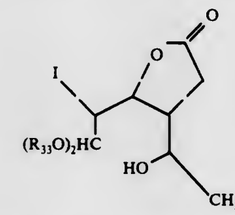
Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 676,895, Apr. 14, 1976, Pat. No. 4,032,542. This application Apr. 4, 1977, Ser. No. 784,177

Int. Cl.[2] C07D *307/32*

U.S. Cl. 260—343.6 **2 Claims**

1. A thromboxane intermediate of the formula



wherein R_{34} is an arylmethyl hydroxy-hydrogen replacing group selected from the group consisting of

(a) benzyl,

(b) benzyl substituted by 1 to 5 alkyl of 1 to 4 carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive,

(c) benzhydryl,

(d) benzhydryl substituted by one to ten alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive,

(e) trityl, and

(f) trityl substituted by 1 to 15 alkyl of 1 to 4 carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive; and

wherein R_{33} is alkyl of 1 to 5 carbon atoms, inclusive.

4,094,884

4α-HYDROXY-6-OXO-2β-ARYLMETHOXY-METHYL-3α-TETRAHYDROPYRANACETIC ACID γ-LACTONES

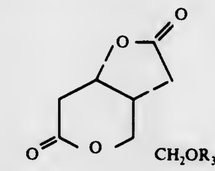
Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 676,895, Apr. 14, 1976, Pat. No. 4,032,542. This application Apr. 4, 1977, Ser. No. 784,173

Int. Cl.[2] C07D *493/04*

U.S. Cl. 260—343.6 **2 Claims**

1. A thromboxane intermediate of the formula



wherein R_{34} is an arylmethyl hydroxy-hydrogen replacing group selected from the group consisting of

(a) benzyl,

(b) benzyl substituted by one to five alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive,

(c) benzhydryl,

(d) benzhydryl substituted by one to ten alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive,

(e) trityl, and
(f) trityl substituted by one to 15 alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive.

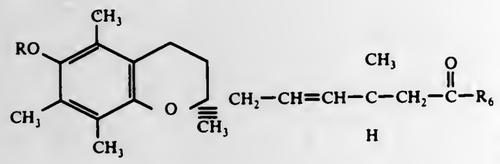
4,094,885

6(6-SUBSTITUTED-2,5,7,8-TETRAMETHYL-2-CHROMANYL)-3-METHYL-4-HEXENOIC ACID DERIVATIVES

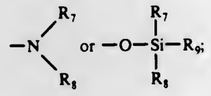
Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 638,382, Dec. 8, 1975, Pat. No. 4,029,678, which is a continuation-in-part of Ser. No. 544,153, Jan. 27, 1975, Pat. No. 4,000,169. This application Feb. 22, 1977, Ser. No. 770,336
Int. Cl.² C07D *311/72*
U.S. Cl. 260—345.5 **3 Claims**

1. A compound of the formula



wherein R_6 is hydrogen, hydroxy, lower alkoxy,



R_7, R_8 and R_9 are lower alkyl and R is lower alkanoyl, benzyl, benzhydryl or trityl.

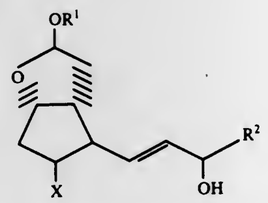
4,094,886

PROCESS FOR PRODUCING ALLYL ALCOHOL DERIVATIVES USEFUL IN PROSTAGLANDIN SYNTHESIS

Kiyosi Kondo, Yamato, and Daiei Tunemoto, Sagamihara, both of Japan, assignors to (Zaidanhojin) Sagami Chemical Research Center, Tokyo, Japan

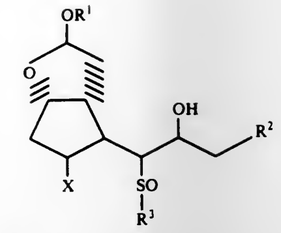
Filed Feb. 9, 1977, Ser. No. 767,165
Claims priority, application Japan, Mar. 1, 1976, 51-21161; Mar. 4, 1976, 51-22667
Int. Cl.² C07D *307/93*
U.S. Cl. 260—345.9 P **3 Claims**

1. A process fo producing an allyl alcohol derivative having the formula



(XI),

which comprises treating a β-hydroxysulfoxide derivative having the formula



(X),

with a base; wherein R^1 represents H or lower alkyl, R^2 represents an alkyl group which can have an inert substituent, R^3 represents an aryl group which can have an inert substituent, and X represents H, OH, alkoxy, tetrahydropyranyloxy, or a silyloxy group.

4,094,887

PROCESS FOR PREPARING CYCLIC ETHERS

Yasuo Tanabe, Kurashiki, Japan, assignor to Mitsubishi Chemical Industries, Ltd., Tokyo, Japan

Filed Mar. 7, 1977, Ser. No. 774,899
Claims priority, application Japan, Mar. 16, 1976, 51-28453
Int. Cl.² C07D *307/08*
U.S. Cl. 260—346.11 **10 Claims**

1. A process for preparing a cyclic ether by interacting an acetic acid ester of 1,4-butanediol or 1,4-dihydroxybutene-2 and water in the presence of a non-volatile liquid acid catalyst in two reaction zones arranged in series, which process comprises the steps of:
(a) continuously feeding to the first reaction zone said acetic acid ester and a mixture of the cyclic ether and water recycled from a first and a second distilling columns to effect the catalytic reaction,
(b) withdrawing a mixed gas composed of a produced cyclic ether, water and acetic acid from the first reaction zone and feeding said mixed gas to the second distilling column,
(c) feeding the solution discharged from the first reaction zone and fresh water to the second reaction zone for further catalytic reaction and withdrawing the resulting mixed gas composed of the cyclic ether, water and acetic acid from said second reaction zone,
(d) feeding for distillation the mixed gas discharged from the second reaction zone to the first distilling column and recycling a mixture of the cyclic ether and water distilled from the column top to the first reaction zone while discharging acetic acid as a bottom product,
(e) feeding a mixture of the cyclic ether and water distilled from the top of the second distilling column to the first reaction zone and at the same time, taking out a substantially water-free cyclic ether-containing product from the bottom of the second distilling column, and
(f) subjecting said product obtained in the step (e) to further distillation to obtain the cyclic ether.

4,094,888

MALEIC ANHYDRIDE PROCESS

Alan E. Straus, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed May 23, 1975, Ser. No. 580,443
Int. Cl.² C07D *307/60*
U.S. Cl. 260—346.75 **6 Claims**

1. A process for the catalytic production of maleic anhydride from n-butane with sustained high activity for the catalyst which comprises contacting the n-butane feed with oxygen gas and a catalyst comprising oxides of vanadium and phosphorus and maintaining between 3 and 50 mole percent propane in the feed, based on propane plus n-butane, during the normal on-stream time.

4,094,889

RESTORING SELECTIVITY OF ALKALI METAL PROMOTED SILVER CATALYSTS AND PRODUCTION OF OLEFINE OXIDES

Percy Hayden, and Richard William Clayton, both of Middlesbrough, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Feb. 25, 1977, Ser. No. 772,280
Claims priority, application United Kingdom, Mar. 5, 1976, 8897/76
Int. Cl.² C07D *301/10*; B01J *23/96*
U.S. Cl. 260—348.34 **11 Claims**

1. A process of restoring selectivity to unstable silver containing catalysts promoted with an alkali metal selected from the group consisting of sodium, potassium, rubidium and cesium for the oxidation of olefines to olefine oxides which have lost selectivity in that reaction, which comprises wetting the catalyst with water and drying it.

10. A process which comprises producing an olefine oxide by contacting an olefine with oxygen in the presence of an unstable silver containing catalyst promoted with an alkali metal selected from the group consisting of sodium, potassium, rubidium and cesium in which the selectivity of the catalyst is restored by wetting the catalyst with water and drying it.

4,094,890

9β,10α-CHOLESTA-5,7-DIENE-3β,25-DIOL

William G. Salmond, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 551,698, Feb. 21, 1975, Pat. No. 4,001,096. This application Aug. 26, 1976, Ser. No. 717,876
Int. Cl.² C07J *9/00, 15/00*
U.S. Cl. 260—397.2 **1 Claim**

1. Crystalline 9β,10α-cholesta-5,7-diene-3β,25-diol.

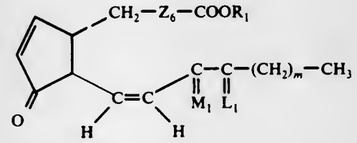
4,094,891

CIS-13-9-DEOXY-9,10-DIDEHYDRO-PGD$_2$ COMPOUNDS

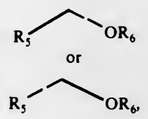
Douglas Ross Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,242, Sep. 17, 1975, Pat. No. 4,016,184. This application Dec. 30, 1976, Ser. No. 755,990
Int. Cl.² C07C *121/00*
U.S. Cl. 260—413 **9 Claims**

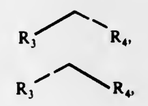
1. A prostaglandin analog of the formula



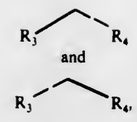
wherein *m* is one to 5, inclusive; wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the outer is hydrogen; wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein Z_6 is
(1) cis—CH=CH—CH_2—$(CH_2)_g$—CF_2—,
(2) cis—CH=CH—CH_2—$(CH_2)_g$—CH_2—, or
(3) cis—CH_2—CH=CH—$(CH_2)_g$—CH_2—,
wherein g is one, 2, or 3.

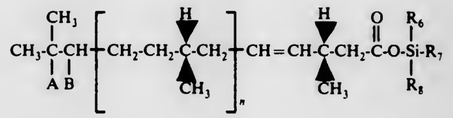
4,094,892

PROCESS FOR PREPARING OPTICALLY ACTIVE ESTERS

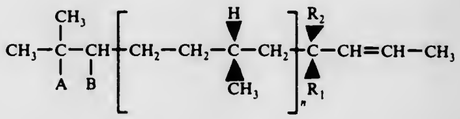
Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 723,401, Sep. 15, 1976, Pat. No. 4,045,475, which is a division of Ser. No. 544,153, Jan. 27, 1975, Pat. No. 4,000,169. This application May 16, 1977, Ser. No. 796,918
Int. Cl.² C11C *3/02*
U.S. Cl. 260—410.9 R **1 Claim**

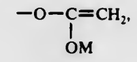
1. A process of preparing a compound of the formula:



wherein *n* is an integer from 0 to 1; A and B are individually hydrogen or taken together form a carbon to carbon bond;
R_6, R_7 and R_8 are lower alkyl;
comprising subjecting an optically active isomer of the formula:



wherein *n*, A and B are as above, one of R_1 and R_2 is hydrogen and the other is



R_1 is hydrogen, the 2-3 double bond has a trans configuration and that when R_1 is other than hydrogen, the 2-3 double bond has a cis configuration, M is an alkali metal;
by Claisen rearrangement by reaction with an agent of the formula:

wherein X is halogen, and R_6, R_7 and R_8 are as above.

4,094,893

ISONITRILE INTERCALATION COMPLEXES

Martin B. Dines, Westfield, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Nov. 24, 1976, Ser. No. 744,637
Int. Cl.[2] C07F *11/00, 7/00, 7/28*
U.S. Cl. 260—429 R **15 Claims**

1. Complexes of the formula:

$$TX_2(RNC)_y$$

wherein TX_2 is the inorganic host in which T is a transition metal selected from the group consisting of titanium, zicronium, hafnium, vanadium, niobium, tantalum, molybdenum and tungsten and mixtures thereof and X is a chalcogenide selected from the group consisting of sulfur, selenium and tellurium and RNC is the isonitrile organic guest wherein R is selected from the group consisting of C_1 to C_{18} linear and branched alkyls, C_3 to C_{18} cyclic alkyls and C_7 to C_{18} aryl alkyls and *y* is a number ranging from 0.10 to 2.0.

4,094,894

PROCESS OF PURIFYING ALIPHATIC ISOCYANATES

Julian Theron Blackwell, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 23, 1977, Ser. No. 780,345
Int. Cl.[2] C07C *119/042*
U.S. Cl. 260—453 SP **11 Claims**

1. A process for purifying an aliphatic isocyanate containing hydrolyzable chlorine which comprises mixing finely divided dry alkali metal carbonate with the aliphatic isocyanate containing the hydrolyzable chlorine, at a temperature between 180° and 235° C.

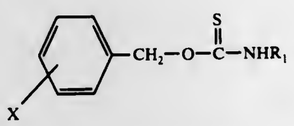
4,094,895

PROCESS FOR PREPARATION OF O-(SUBSTITUTED)BENZYL THIOCARBAMATES

Harry Tilles, El Cerrito, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

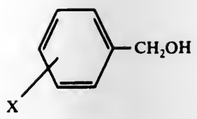
Division of Ser. No. 710,505, Aug. 2, 1976. This application Aug. 29, 1977, Ser. No. 828,456
Int. Cl.[2] C07C *153/09*
U.S. Cl. 260—455 A **2 Claims**

1. A process for production of a compound having the formula



in which X is hydrogen, mono- or dihalo or 2-methyl and R_1 is lower alkyl, lower alkenyl or p-chlorobenzyl, comprising:

(a) reacting an alcohol having the formula



with sodium hydride in the presence of tetrahydrofuran; and

(b) reacting the product of step (a) with a compound having the formula R_1-SCN.

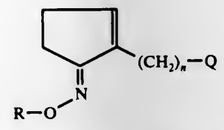
4,094,896

1-ALKOXIMINO-2-(ω-SUBSTITUTED-ALKYL)-2-CYCLOPENTENES

Karel Francis Bernady, Suffern; John Frank Poletto, Nanuet, both of N.Y., and Martin Joseph Weiss, Oradell, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 552,686, Feb. 24, 1975, Pat. No. 4,006,179, which is a division of Ser. No. 480,908, Jun. 19, 1974, Pat. No. 3,884,953, which is a division of Ser. No. 335,842, Feb. 26, 1973, Pat. No. 3,836,581, which is a continuation-in-part of Ser. No. 208,951, Dec. 16, 1971, abandoned. This application Dec. 2, 1976, Ser. No. 746,902
Int. Cl.[2] C07C *137/00*
U.S. Cl. 260—456 A **3 Claims**

1. Compounds of the formula:



wherein *n* is an integer from 3 to 8, inclusive; R is lower alkyl; and Q is p-toluenesulfonyloxy.

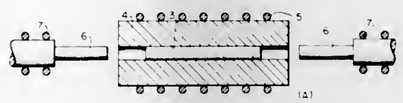
2. The compound according to claim **1** wherein R is methyl, *n* is 5, and Q is p-toluenesulfonyloxy.

4,094,897

RESIN-BONDED GRAPHITE BODY FOR A DRY CELL

Masahiro Nagasawa; Tomio Ishida, both of Hirakata, and Yoshitaka Yoshikawa, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Aug. 3, 1976, Ser. No. 711,377
Claims priority, application Japan, Aug. 12, 1975, 50/98207
Int. Cl.[2] B32B *19/00*
U.S. Cl. 264—105 **11 Claims**



1. A method of making a resin-bonded graphite body, comprising:

uniformly mixing, to form a dry powder mixture, 3 to 12 weight % of a thermosetting resin and 88 to 97 weight % of a carbonaceous powder which includes at least 50 weight % of natural crystalline graphite particles,

compressing said dry mixture by a first uniaxial pressure into a compressed powder rod having crystalline orientation;

inserting said compressed powder rod into a hollow of a mold which has a shape similar to the shape of said compressed powder rod;

pre-heating the thus inserted powder rod to the softening temperature of said thermosetting resin;

compressing the thus pre-heated rod by a second uniaxial pressure, the direction of which is perpendicular to the direction of said first uniaxial pressure and parallel to the direction of the length of said powder rod as well as to the basal plane of said crystalline graphite particles;

heating said rod to the curing temperature of said thermosetting resin so as to harden said thermosetting resin, said orientation being maintained after said curing; and

removing the thus treated rod from said mold.

4,094,898

PROCESS FOR THE PREPARATION OF SODIUM METHALLYL SULFONATE

Wilhelm Knepper, and Dieter Jüergen Mueller, both of Marl, Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Filed Mar. 4, 1977, Ser. No. 774,567
Claims priority, application Germany, Mar. 11, 1976, 2610092
Int. Cl.[2] C07C *143/16*
U.S. Cl. 260—513 B **10 Claims**

1. In a process for the preparation of an aqueous solution of sodium methallyl sulfonate by the reaction of methallyl chloride and aqueous sodium sulfite solution in an emulsion, the improvement which comprises employing technical methallyl chloride containing isocrotyl chloride; maintaining the pH of the reaction mixture at a constant value of from 7-11 during the reaction by metered addition thereto of sodium hydroxide solution; and conducting the reaction in two stages in a cyclical process wherein, in the first of the two stages, excess sodium sulfite is employed and the reaction is continued until the methallyl chloride therein is substantially entirely consumed and the resulting reaction product is fractionated by distillation to remove the isocrotyl chloride therefrom and leave as the residue an aqueous solution of sodium methallyl sulfonate and unreacted sodium sulfite; and wherein, in the second of the two stages, the thus-obtained aqueous solution of sodium methallyl sulfonate and unreacted sodium sulfite is reacted with excess technical methallyl chloride containing isocrotyl chloride, the reaction is continued until the sulfite therein has been substantially entirely consumed and the thus-obtained reaction product is fractionated by distillation to give as the distillate a mixture of methallyl chloride and isocrotyl chloride, which is recycled to the first of the two stages, and as the residue, an aqueous solution of sodium methallyl sulfonate.

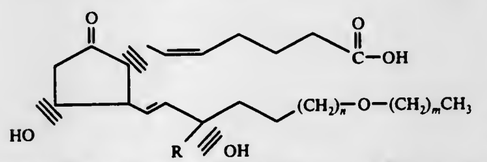
4,094,899

OXAPROSTAGLANDINS

Hans-Jurgen E. Hess, Old Lime, China /Taiwan, assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 259,215, Jun. 2, 1972, abandoned. This application Apr. 30, 1973, Ser. No. 355,644
Int. Cl.[2] C07C *177/00*
U.S. Cl. 260—514 D **4 Claims**

1. A compound of the structure



wherein R is hydrogen or alkyl having 1 to 3 carbon atoms, *n* is an integer of from 0 to 1 and *m* is an integer of from 0 to 4.

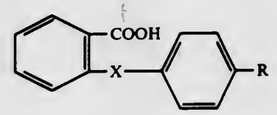
4,094,900

METHOD OF PREPARING ARYLOXYBENZOIC AND ARYLTHIOBENZOIC ACIDS

Elvin Lowell Anderson, Moorestown, N.J., and Gerald Aloysius Connelly, Darby, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed May 19, 1977, Ser. No. 798,283
Int. Cl.[2] C07C *149/40, 63/33*
U.S. Cl. 260—520 E **5 Claims**

1. A process for preparing aryloxybenzoic and arylthiobenzoic acids of the formula:

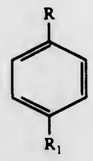


in which:

X is oxygen or sulfur;

R is halo, lower alkyl, lower alkoxy, thiomethyl or trifluoromethyl;

which comprises reacting 2-chlorobenzoic acid with a compound of the formula:



in which:

R_1 is hydroxy or mercapto; and

R is halo, lower alkyl, lower alkoxy, thiomethyl or trifluoromethyl;

in the presence of an alkali metal iodide and an alkali metal hydroxide or alkoxide base and heating at a temperature of from about 150° to about 220° C.

4,094,901

PROCESS FOR PREPARING ACETIC ACID

Helmut Schaum, Bad Soden am Taunus; Friedrich Schenk, Gotzenhain; Hartmut Voigt, Tarragona, and Rudolf Sartorius, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 29, 1976, Ser. No. 671,442
Claims priority, application Germany, Mar. 29, 1975, 2514095
Int. Cl.[2] C07C *51/26*
U.S. Cl. 260—530 R **5 Claims**

1. A process for preparing acetic acid by oxidation of acetaldehyde with oxygen or oxygen containing gases in the presence of a manganese acetate catalyst, which comprises subjecting the crude acetic acid prepared by said oxidation of acetaldehyde and still containing from 1 to 10% by weight of acetaldehyde, together with the gases formed in the acetic acid synthesis and still containing acetaldehyde, to an afteroxidation with oxygen or oxygen containing gases, distilling off the low-boiling by-products and acetic acid and directly recycling for reuse as catalyst in the initial oxidation the residue comprising manganese acetate, high-boiling by-products and acetic acid.

4,094,902

PROCESS FOR THE MANUFACTURE OF PHOSPHORIC ACID-TRIS-(DIMETHYLAMIDE)

Heinz Liberda; Hellmuth Spes, and Alfred Trommet, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Dec. 6, 1976, Ser. No. 747,573
Claims priority, application Germany, Dec. 23, 1975, 2558186
Int. Cl.[2] C07F 9/22
U.S. Cl. 260—551 P 10 Claims

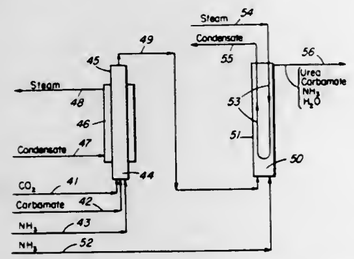
1. A process for the manufacture of phosphoric acidtris-(dimethylamide), which comprises two stages carried out in repeated succession, wherein the first stage comprises reacting phosphorus oxychloride, dimethylammonium chloride, in an average amount of approximately 1.5 moles per mole of phosphorus oxychloride, and a member of the group consisting of phosphoric dimethylamide dichloride, phosphoric bis-dimethylamide chloride, and a mixture thereof, under anhydrous conditions and at a temperature within the range of from 130°-240° C, to give a mixture consisting of phosphoric bis-dimethylamide chloride and phosphoric dimethylamide dichloride; and wherein a second stage comprises reacting at least a portion of said last-mentioned mixture containing on average approximately 1.5 gram-atoms of phosphorus-bonded chlorine per mole of phosphorus oxychloride used in the first stage and containing not more than 50 mole % of phosphoric dimethylamide dichloride, with dimethylamine in an average amount of approximately 3 moles per mole of phosphorus oxychloride used in the first stage, under anhydrous conditions; and wherein, after completion of the reaction of the second stage, the phosphoric acid tris-(dimethylamide) produced in the second stage is separated off and the dimethylammonium chloride produced in the second stage is returned to the first stage.

4,094,903

UREA SYNTHESIS WITH IMPROVED HEAT RECOVERY AND CONVERSION

Ivo Mavrovic, 530 E. 72nd St., New York, N.Y. 10021

Division of Ser. No. 650,973, Jan. 21, 1976, which is a division of Ser. No. 190,519, Oct. 19, 1971, Pat. No. 3,952,055. This application Sep. 22, 1976, Ser. No. 725,442
Int. Cl.[2] C07C 126/02
U.S. Cl. 260—555 A 7 Claims



1. In a urea synthesis process wherein fluid NH_3 and fluid CO_2 are contacted and reacted at elevated pressure and temperature to form ammonium carbamate, and ammonium carbamate is converted to urea in a vertical cylindrical urea synthesis reactor, the improvement which comprises

(a) contacting from about 5 mol percent to less than 100 mol percent of a fluid NH_3 reactor feed stream and a fluid CO_2 reactor feed stream at substantially reactor pressure in a heat exchanger external (1) to the urea synthesis reactor to form ammonium carbamate in said heat exchanger and simultaneously removing from said external heat exchanger (1) heat of reaction evolved from reaction of NH_3 and CO_2 from said external heat exchanger (1), the NH_3 to CO_2 molar ratio inside said external heat exchanger (1) being from about 2.5 to about 3.5 to 1,

(b) charging the resulting reaction mixture into the lower portion of a reactor having an indirect heat exchanger (2) positioned therein which extends from the top portion to the lower portion of the reactor, said heat exchanger (2) including a heat exchange medium therein and having its inlet and its outlet located at the upper portion of the reactor,

(c) passing heated heat exchange medium from said inlet to said lower portion of said reactor thereby transferring heat therefrom to the total reaction mixture formed in (d) as the total reaction mixture passes upwardly in said reactor, and removing heat exchange medium from said outlet, said heat exchange medium being substantially cooler at said outlet than at said inlet, and

(d) charging remaining NH_3 reactor feed stream to said lower portion of said reactor, and mixing said remaining NH_3 with said resulting reaction mixture of (a) discharged from said external heat exchanger (1) into the lower portion of said reactor to form a total urea synthesis mixture having a NH_3 to CO_2 molar ratio of from about 2.8 to about 7 to 1.

4,094,904

PROCESS OF RACEMIZING AN OPTICALLY ACTIVE PHENYL GLYCINE AMIDE WITH OR WITHOUT A SUBSTITUTED PHENYL GROUP

Wilhelmus H. J. Boesten, Sittard, Netherlands, assignor to Stamicarbon, B.V., Geleen, Netherlands

Filed Dec. 8, 1976, Ser. No. 748,398
Claims priority, application Netherlands, Dec. 9, 1975, 7514301
The portion of the term of this patent subsequent to Jul. 19, 1994, has been disclaimed.
Int. Cl.[2] C07C 103/28
U.S. Cl. 260—558 A 7 Claims

1. A process for racemizing an optically active form of phenyl glycine amide, consisting essentially of:

mixing an optically active form of phenyl glycine amide, a solvent for said phenyl glycine amide, a ketone, selected from the class of acetone, methylethyl ketone, pentanone, cyclohexanone, and mixtures thereof, and an acid having a dissociation constant below 1.8×10^{-4}, said ketone being present in an amount of at least 0.1 mole of ketone per mole of phenyl glycine amide; and

heating said mixture to a temperature between 30° and 150° C.

4,094,905

PROCESS FOR PRODUCING DIMETHYL FORMAMIDE

Kinichi Mizuno; Masao Saito; Yuzi Onda; Tetsuo Aoyama, and Kumiko Kato, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Ltd, Tokyo, Japan

Filed Jun. 1, 1977, Ser. No. 802,524
Claims priority, application Japan, Jun. 10, 1976, 51-68122
Int. Cl.[2] C07C 102/00
U.S. Cl. 260—561 R 12 Claims

1. A process for producing dimethyl formamide, which comprises making monomethyl formamide react with trimethylamine and carbon monoxide in the presence of a catalyst.

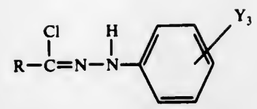
4,094,906

ALKANOYL CHLORIDE PHENYLHYDRAZONES

Girts Kaugars, Cooper Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 326,804, Jan. 26, 1973, Pat. No. 3,870,505, which is a division of Ser. No. 874,976, Nov. 7, 1969, Pat. No. 3,745,215. This application Sep. 16, 1974, Ser. No. 505,965
Int. Cl.[2] C07C 109/14
U.S. Cl. 260—566 B 20 Claims

1. New alkanoyl chloride (trihalophenyl)hydrazones of the formula:



wherein R is alkyl of from 2 to 5 carbon atoms, inclusive; Y is halogen, and the Y's may be selected independently.

4,094,907

PROCESS FOR THE PREPARATION OF POLYAMINES

Hartmut Knöfel, Leverkusen, and Günther Ellendt, Krefeld, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 17, 1976, Ser. No. 751,626
Claims priority, application Germany, Dec. 19, 1975, 2557500
Int. Cl.[2] C07C 85/24
U.S. Cl. 260—570 D 16 Claims

1. A process for the preparation of multinuclear aromatic polyamines by condensation of aromatic amines with formaldehyde in the presence of aqueous acid catalysts followed by neutralization of the catalyst and processing of the resulting reaction mixture in known manner, characterized in that free amine is removed from the reaction mixture leaving the last condensation stage by means of a hydrophobic solvent, optionally after partial neutralization of the catalyst but before neutralization of the total quantity of catalyst put into the process, and the amine thus removed is returned to the catalyst-containing aqueous phase by return of the resulting amine-containing solvent phase into said aqueous, catalyst-containing phase at any point before the last condensation stage.

4,094,908

ALPHA-SUBSTITUTED BENZHYDROL DERIVATIVES

Edit Toth; Jozsef Torley; Szabolcs Szeberenyi; Eva Palosi; Laszlo Szporny; Sandor Gorog, and Csilla Meszaros, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

Continuation-in-part of Ser. No. 495,847, Aug. 8, 1974, Pat. No. 4,039,589. This application Sep. 9, 1976, Ser. No. 722,063
Claims priority, application Hungary, Aug. 15, 1973, 2251/RI-521
Int. Cl.[2] C07C 93/08
U.S. Cl. 260—570 R 2 Claims

1. 4-(β-diethylaminoethoxy)-α-ethyl-benzyhydrol for a pharmaceutically acceptable salt thereof.

2. 3,4,5-trimethoxy-α-ethyl-benzyhydrol.

4,094,909

PROCESS FOR THE DECARBOXYLATION-OXIDATION OF BENZOIC ACID COMPOUNDS

Johan P. H. Von den Hoff, Geleen, Netherlands, assignor to Stamicarbon, B.V., Geleen, Netherlands

Filed Feb. 28, 1977, Ser. No. 773,127
Claims priority, application Netherlands, Feb. 28, 1976, 7602078; Aug. 27, 1976, 7609526
Int. Cl.[2] C07C 45/24, 27/26, 27/00, 29/24
U.S. Cl. 206—586 P 19 Claims

1. A process for the decarboxylation-oxidation of a substituted or unsubstituted benzoic acid compound, comprising:

heating said substituted or unsubstituted benzoic acid compound and forming a liquid phase,

reacting said liquid phase substituted or unsubstituted benzoic acid compound with molecular oxygen in the presence of a copper catalyst thereby forming a substituted or unsubstituted phenol compound by decarboxylation-oxidation of said substituted or unsubstituted benzoic acid compound and also forming a viscous tar-like product, and

hydrogenating said viscous tar-like product to form at least one low-boiling organic compound selected from the group consisting of substituted or unsubstituted benzene, phenol, cyclohexane, cyclohexanol and cyclohexanone.

4,094,910

PROCESS FOR PREPARING HALOGENATED AROMATIC HYDROXY ETHERS

Arthur Lawrence Austin, Southgate, and William Walter Levis, Jr., Wyandotte, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 23, 1976, Ser. No. 753,650
Int. Cl.[2] C07C 41/02
U.S. Cl. 260—613 B 6 Claims

1. A process for the selective oxyalkylation of a halogenated phenol to produce hydroxy ethers wherein the process is carried out at a reaction temperature of about 90° to about 250° C. for a period of about 1 hour to 100 hours using a catalyst concentration by weight of about 50 to about 20,000 parts per million, comprising:

(a) reacting a composition comprising said halogenated phenol with

(b) an alkylene oxide selected from the group consisting of ethylene oxide, propylene oxide, the isomeric normal butylene oxides, hexylene oxide, octylene oxide, dodecene oxide, methoxy and other alkoxy propylene oxides, styrene oxide, and cyclohexene oxide; halogenated alkylene oxides selected from the group consisting of epichlorohydrin, epiiodohydrin, epibromohydrin, 3,3-dichloropropylene oxide, 3-chloro-1,2-epoxypropane, 3-chloro-1,2-epoxybutane, 1-chloro-2,3-epoxybutane, 3,4-dichloro-1,2-epoxybutane, 1,4-dichloro-2,3-epoxybutane, 1-chloro-2,3-epoxybutane, and 3,3,3-trichloropropylene oxide; and mixtures of any said alkylene oxides in the presence of

(c) a catalyst selected from the group consisting of zinc, magnesium, a weak acid salt of zinc or magnesium, a zinc or magnesium halide or nitrate and mixtures thereof wherein said weak acid salt is selected from the group consisting of the carbonate, silicate, acetate, benzoate, citrate, formate, oxylate, stearate, tartrate, and mixtures thereof.

4,094,911

POLY(PERFLUOROALKYLENE OXIDE) DERIVATIVES

Ronald A. Mitsch, Little Canada, and Joseph La Mar Zollinger, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation-in-part of Ser. No. 805,885, Mar. 10, 1969, abandoned, which is a continuation-in-part of Ser. No. 70,540, Sep. 8, 1970, Pat. No. 3,810,874. This application Jun. 25, 1973, Ser. No. 373,200
Int. Cl.[2] C07C 43/30
U.S. Cl. 260—615 A 11 Claims

1. Linear functionally-terminated poly(perfluoroalkylene oxide) compounds having the formula

$$A—CF_2—O—(CF_2CF_2O)_m(CF_2O)_nCF_2—A'$$

where A and A' are $—X_aYZ_b$ or $—X'_{a'}Y'Z'_{b'}$, X and X' are each a polyvalent linking organic radical, Y and Y' are each a polyvalent linking organic radical free of non-aromatic double bonds, Z and Z' are each a polymerizable functional group, a and a' are zero or one, b and b' are integers of 1 to 3, m and n designate the number of randomly distributed perfluoroethyleneoxy and perfluoromethyleneoxy subunits, respectively, the ratio m/n being 0.2/1 to 5/1, said compounds having a number average molecular weight of 500 to 20,000, a glass transition temperature lower than −78° C, and polymerizable to polymers having recurrent backbone units of the formula $—CF_2O(CF_2CF_2O)_m(CF_2O)_n—CF_2—$ which impart to the polymers a glass transition temperature lower than −78° C.

4,094,912

PROCESS FOR CONVERTING AROMATIC ALDEHYDES TO PHENOLIC COMPOUNDS

Allen I. Feinstein, Wheaton; Shantaram G. Kane, Naperville, and Ellis K. Fields, River Forest, all of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Nov. 2, 1976, Ser. No. 738,084
Int. Cl.[2] C07C *39/04*
U.S. Cl. 568—802 11 Claims

1. A continuous process for the production of phenolic compounds from aromatic aldehydes having the chemical formula RCHO wherein R is selected from the group consisting of phenyl, biphenyl, naphtyl, anthacyl and phenanthryl radicals, which comprises the step of (1) continuously premixing in a preheat zone a composition consisting essentially of oxygen-containing gas, said aldehyde and inert gaseous diluent at a temperature of about 300° to 350° C wherein said inert gaseous diluent is selected from the group consisting of nitrogen, argon, steam, carbon dioxide and mixtures thereof and is present in a concentration sufficient for said composition to be outside the explosive limits, (2) continuously introducing said composition into a reactor and reacting said aldehyde and said oxygen-containing gas at a temperature of from about 400° to 600° C in the vapor phase in mole ratios of from 0.4 to 1 to 40 to 1 in said reactor maintained at 1 to 10 atmospheres pressure, maintaining said reactants in said reaction chamber for up to 10 seconds, thereby converting at least a portion of said aldehyde to phenolic compounds, and (3) quenching the reaction by continuously withdrawing and quenching the reaction products from said reactor at a temperature of from about 0° to about −80° C.

4,094,913

PROCESS FOR THE PREPARATION OF 2,5-DICHLOROPHENOL

Arthur W. Carlson, Crystal Lake, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Jan. 7, 1977, Ser. No. 757,527
Int. Cl.[2] C07C *39/30*
U.S. Cl. 568—778 8 Claims

1. A process for preparing 2,5-dichlorophenol which comprises reacting 100 parts by weight 1-bromo-2,5-dichlorobenzene with 40 to 150 parts by weight of an alkali metal hydroxide and at least 120 parts by weight methanol in the presence of from about 0.1 percent to about 5.0 percent by weight based on the starting 1-bromo-2,5-dichlorobenzene of copper catalyst selected from the group consisting of cupric acetate, cupric ammonium chloride, cupric bromate, cupric bromide, cupric chlorate, cupric chloride, cupric formate, cupric lactate, cupric nitrate, cupric potassium chloride, cupric salicylate, cupric sulfate, cuprous bromide, cuprous chloride and cuprous sulfite at a temperature of from about 150° to about 210° C, acidifying the products, and thereafter recovering the desired product.

4,094,914

PROCESS FOR THE PRODUCTION OF DIVALENT ALCOHOLS

Walter Rottig; Hans Tummes, both of Oberhausen-Sterkrade-Nord; Boy Cornils, Dinslaken, and Jurgen Weber, Oberhausen-Holten, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen-Holten, Germany

Continuation of Ser. No. 469,658, May 14, 1974, abandoned, which is a continuation of Ser. No. 193,994, Oct. 29, 1971, abandoned. This application May 12, 1976, Ser. No. 685,899
Claims priority, application Germany, Nov. 6, 1970, 2054601
Int. Cl.[2] C07C *29/14*
U.S. Cl. 568—862 9 Claims

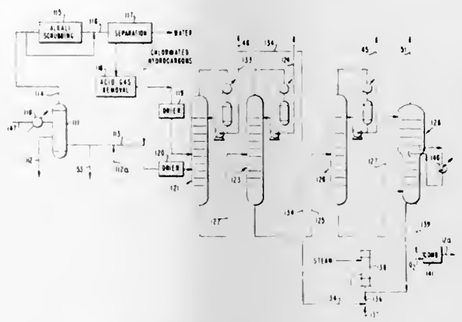
1. In a process for preparing a divalent alcohol by the catalytic hydrogenation of the hydroxyaldehyde corresponding to said divalent alcohol, the improvement which comprises hydrogenating at a temperature of 100° to 200° C., in a gaseous phase and in the presence of a hydrogenation catalyst, a mixture comprising up to 50% of a hydroxyaldehyde obtained through the aldol condensation of unsubstituted aldehydes, and a primary or secondary alcohol having 1 to 10 carbon atoms or an aldehyde or ketone which forms said alcohol, said alcohol being a solvent for and having a lower boiling point than the divalent alcohol and further being a solvent for the hydroxyaldehyde.

4,094,915

RECOVERY OF 12-DICHLOROETHANE FROM VINYL CHLORIDE PRODUCTION EFFLUENT

Utah Tsao, Jersey City, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Division of Ser. No. 498,081, Aug. 16, 1974, Pat. No. 3,963,584.
This application Jun. 11, 1976, Ser. No. 695,117
Int. Cl.[2] C07C *21/02*
U.S. Cl. 260—656 R 13 Claims



1. In the production of vinyl chlorine wherein there is separated from a vinyl chloride production reaction effluent a mixture comprising 1,2-dichloroethane and heavier chlorinated hydrocarbons, an improved process, comprising:
introducing said mixture comprising 1,2-dichloroethane and heavier chlorinated hydrocarbons into a stripping column;
introducing a stripping gas comprising ethane, ethylene or mixtures thereof into the heavier chlorinated hydrocarbon in the bottom of said stripping column to reduce the partial pressure of 1,2-dichloroethane over the heavier chlorinated hydrocarbons and strip 1,2-dichloroethane from said mixture, said stripping gas being introduced in a molar proportion and said stripping column being operated at a temperature and pressure to produce an overhead of 1,2-dichloroethane and stripping gas and a bottoms of heavier chlorinated hydrocarbons containing no greater than 1 weight % of 1,2-dichloroethane;
recovering from said stripping column a bottoms product of heavier chlorinated hydrocarbons containing no greater than 1 weight % of 1,2-dichloroethane;
recovering from the stripping column an overhead product of 1,2-dichloroethane and said stripping gas; and
introducing recovered overhead product into a dehydrochlorination reaction zone to produce vinyl chloride.

4,094,916

PROCESS FOR THE PRODUCTION OF ENDO-ENDO HEXACYCLIC DIMER OF NORBORNADIENE

Jeffrey R. Thomas, Aston, Pa., assignor to Suntech, Inc., Wayne, Pa.

Filed Feb. 10, 1977, Ser. No. 767,600
Int. Cl.[2] C07C *1/00*
U.S. Cl. 260—666 A 7 Claims

1. Process for the dimerization of norbornadiene to its endo-endo hexacyclic dimer and hydrogenation of the dimer comprising:
(a) contacting a feed consisting essentially of norbornadiene with diethylaluminum chloride and a catalyst mixture of ferric acetylacetonate and triphenylphosphine at a temperature between the range of from about 100° F to about 200° F and at a pressure between the range of from about atmospheric to about 500 psig and the amount of both the diethylaluminum chloride and the catalyst mixture is sufficient to dimerize the norbornadiene to the endo-endo hexacyclic dimer;
(b) maintaining the contacting for a residence time sufficient to form the endo-endo hexacyclic dimer;
(c) removing from the contacting a product mixture containing the formed endo-endo hexacyclic dimer and treating the mixture with methanol or water to deactivate the diethylaluminum chloride and the catalyst mixture;
(d) separating from the treated contacting product mixture aluminum hydroxide sludge formed during the deactivation;
(e) distilling the treated contacting product mixture from which the sludge was removed at a temperature below about 500° F to obtain both a distillate mixture and a bottom mixture wherein the distillate mixture contains any methanol or water not reacted during deactivation, unreacted norbornadiene and any solvent used with the diethylaluminum chloride; and the bottom mixture contains the endo-endo hexacyclic dimer, and other polymers formed during the contacting and any residue from the ferric acetylacetonate, triphenylphosphine, and the diethylaluminum chloride;
(f) vacuum distilling the bottoms mixture at a temperature below about 500° F to obtain both a distillate and bottoms and wherein the distillate has a boiling range of about 440° to about 560° F and the bottoms has an initial boiling point of about 550° F and contains the other polymers formed and any residue; and
(g) hydrogenating the about 550° F to about 550° F distillate so that essentially no unsaturation of the distillate containing the endo-endo hexacyclic dimer remains.

4,094,917

PROCESS FOR THE PRODUCTION OF EXO-EXO HEXACYCLIC DIMER OF NORBORNADIENE

Jeffrey R. Thomas, Aston, Pa., assignor to Suntech, Inc., Wayne, Pa.

Filed Feb. 10, 1977, Ser. No. 767,598
Int. Cl.[2] C07C *1/00*
U.S. Cl. 260—666 A 6 Claims

1. Process for the dimerization of norbornadiene to its exo-exo hexacyclic dimer and hydrogenation of the dimer comprising:
(a) contacting a feed consisting essentially of norbornadiene with diethylaluminum chloride and a catalyst mixture of ferric acetylacetonate and bis(1,2-diphenylphosphino)ethane at a temperature between the range of from about 100° F to about 220° F and at a pressure between the range of from about atmospheric to about 500 psig and the amount of both the diethylaluminum chloride and the catalyst mixture is sufficient to dimerize the norbornadiene to the exo-exo hexacyclic dimer:
(b) maintaining the contacting for a residence time sufficient to form the exo-exo hexacyclic dimer;
(c) removing from the contacting a product mixture containing the formed exo-exo hexacyclic dimer and treating the mixture with methanol or water to deactivate the diethylaluminum chloride and the catalyst mixture;
(d) separating from the treated contacting product mixture aluminum hydroxide sludge formed during the deactivation;
(e) distilling the treated contacting product mixture from which the sludge was removed at a temperature below about 500° F to obtain both a distillate mixture and a bottom mixture wherein the distillate mixture contains any methanol or water not reacted during deactivation, unreacted norbornadiene and any solvent used with the diethaluminum chloride; and the bottom mixture contains the exo-exo hexacyclic dimer, other polymers formed during the contacting and any residue from the ferric acetylacetonate, bis(1,2 diphenylphosphino)ethane, and diethylaluminum chloride;
(f) vacuum distilling the bottoms mixture at a temperature below 500° F to obtain both a distillate and bottoms and wherein the distillate has a boiling range of about 450° F to about 550° F and the bottoms has an initial boiling point of about 550° F and contains the other polymers formed and any residue; and
(g) hydrogenating the about 450° F to about 550° F distillate so that essentially no unsaturation of the distillate containing the exo-exo hexacyclic dimer remains.

4,094,918

HYDROALKYLATION PROCESS USING MULTI-METALLIC ZEOLITE CATALYST

Timothy P. Murtha, and Ernest A. Zuech, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 10, 1977, Ser. No. 767,413
Int. Cl.[2] C07C *15/00*
U.S. Cl. 260—668 R 14 Claims

1. A process for producing monocycloalkyl aromatic hydrocarbons comprising:
contacting an aromatic hydrocarbon under hydroalkylation conditions and in the presence of hydrogen with a catalyst comprising at least one component selected from the group consisting of rhodium and palladium compounds and mixtures thereof supported on a calcined, acidic, nickel and rare earth-treated crystalline zeolite selected from the Group consisting of Type X and Type Y zeolite.

4,094,919

HYDROCARBON CONVERSION PROCESSES AND CATALYSTS

Ivan James Samuel Lake, and Roy John Sampson, both of Middlesbrough, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 29, 1976, Ser. No. 671,545
Claims priority, application United Kingdom, Apr. 10, 1975, 14794/75; Apr. 10, 1975, 14793/75
Int. Cl.[2] C07C *5/24*
U.S. Cl. 260—668 A 16 Claims

1. A process which comprises isomerising an alkyl aromatic hydrocarbon in the presence of a silica/alumina catalyst of which the alumina content has been reduced by at least 1% of the total alumina originally present, the catalyst comprising before treatment to lessen the alumina content 2 to 40% by weight of alumina and containing, after treatment from 2 to 5% of by weight.

4,094,920

HYDROALKYLATION USING MULTI METALLIC ZEOLITE CATALYST

Timothy P. Murtha, and Ernest A. Zuech, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 8, 1977, Ser. No. 766,640
Int. Cl.[2] C07C *15/00*
U.S. Cl. 260—668 R 14 Claims

1. A process for producing monocyclicalkyl aromatic hydrocarbon and alkyl-substituted monocyclicalkyl aromatic hydrocarbon which comprises:
contacting a monocyclic aromatic hydrocarbon under hydroalkylation conditions and in the presence of hydrogen with a catalyst consisting essentially of at least one platinum compound supported on a calcined, acidic, nickel and rare earth-treated crystalline zeolite selected from the group consisting of Type X and Type Y zeolite which additionally has a halide content sufficient to promote the

selectivity of the catalyst to produce a desired cycloalkyl aromatic hydrocarbon.

4,094,921

SELECTIVE ETHYLATION OF MONO ALKYL BENZENES

Warren W. Kaeding, Westfield, and Lewis B. Young, Kendall Park, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 706,981, Jul. 19, 1976. This application Apr. 15, 1977, Ser. No. 787,716

Int. Cl.² C07C *3/52, 15/10*

U.S. Cl. 260—671 C **20 Claims**

1. Process for the ethylation of a mono alkyl benzene wherein the alkyl substituent contains 1 to 2 carbon atoms to selectively produce the para and meta derivatives of said mono alkyl benzene to the substantial exclusion of the ortho derivative thereof which comprises contacting said mono alkyl benzene under conversion conditions, with ethylene in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, which zeolite is characterized by an activity, in terms of alpha value, of between about 2 and about 5000, a xylene sorption capacity greater than 1 gram/100 grams of zeolite and an ortho xylene sorption time for 30 percent of said capacity of greater than 10 minutes, said sorption capacity and sorption time being measured at 120° C. and a xylene pressure of 4.5 ± 0.8 mm. of mercury, said crystalline aluminosilicate zeolite further being characterized by a silica to alumina ratio of at least about 12, and a constraint index within the approximate range of 1 to 12, said catalyst having been subjected to steam treatment at a temperature between about 250° and about 1000° C. for a period of between about 0.5 and about 100 hours.

14. A process for the ethylation of a mono alkyl benzene wherein the alkyl substituent contains 1 or 2 carbon atoms to selectively produce the para and meta derivatives of said mono alkyl benzene to the substantial exclusion of the ortho derivative thereof which comprises contacting said mono alkyl benzene, under conversion conditions, with ethylene in the presence of a catalyst comprising a crystalline aluminosilicate zeolite characterized by a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12 and an alkali metal content of less than about 1.5 weight percent, said catalyst having been treated, prior to use, with an atmosphere containing from about 5 to about 100 percent steam at a temperature of from about 250° to about 1000° C for a period of between about 0.5 and about 100 hours.

4,094,922

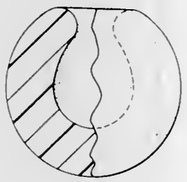
ALKYLATION OF AROMATICS USING AMPHORA SHAPED CATALYSTS

Joseph P. Bartek, University Heights, and Robert K. Grasselli, Chagrin Falls, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 550,892, Feb. 18, 1975, abandoned. This application Feb. 24, 1977, Ser. No. 771,482

Int. Cl.² C07C *3/52*

U.S. Cl. 260—671 C **11 Claims**



1. In a process for the alkylation of an aromatic hydrocarbon wherein the aromatic hydrocarbon is contacted with an alkylating agent in the presence of a fixed-bed acid catalyst at an elevated temperature, the improvement wherein at least a part of said catalyst has the amphora shape and a diameter of 1–10 mm.

4,094,923

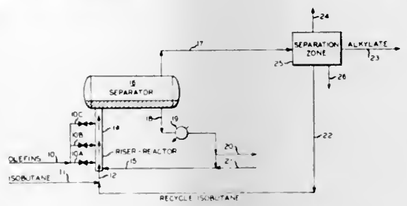
ALKYLATION PROCESS UTILIZING DECREASING AMOUNTS OF OLEFIN IN RISER-REACTOR

Rolland E. Dixon, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 3, 1977, Ser. No. 765,328

Int. Cl.² C07C *3/54*

U.S. Cl. 260—683.48 **4 Claims**



1. In a process for producing alkylate by reacting an olefin with an isoparaffin in the presence of liquid HF acid catalyst, wherein said acid catalyst passes through a cyclic path through a vertical extended reaction zone into a settling zone for separating reaction mass into an alkylate phase and an HF acid phase, and a cooling zone for cooling HF acid phase returning from the settling zone to the inlet end portion of said reaction zone, the steps of producing high octane number alkylate which comprise:

(a) charging the total isoparaffin feed, including recycle isoparaffin, along with HF acid catalyst to said inlet end portion of said reaction zone forming an upwardly flowing mass that is flowing continuously through said reaction zone,

(b) introducing separate spaced streams of olefin into said reaction zone in decreasing quantities along the length of the reaction zone, the amounts of olefin introduced at each spaced point being sufficient to effect high isoparaffin to olefin molar ratios along the flow path of said mass, thereby avoiding the detrimental effects of unavoidable increases in reaction temperature along the reaction flow path of said mass, and

(c) recovering high octane alkylate product from said alkylate phase

---

4,094,924

PROCESS FOR THE ALKYLATION OF LIGHT PARAFFINS WITH LOWER OLEFINS

Michael Siskin, Maplewood, and Ivan Mayer, Summit, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 586,591, Jun. 13, 1975, abandoned. This application Jul. 18, 1977, Ser. No. 816,801

Int. Cl.² C07C *3/54*

U.S. Cl. 260—683.51 **28 Claims**

1. An alkylation process wherein a paraffinic hydrocarbon feedstock comprising a component selected from the group consisting of methane, ethane, propane, n-butane and mixtures thereof, is alkylated under substantially anhydrous alkylation conditions with a C_2–C_5 olefin in the presence of a substantially liquid phase catalyst comprising (a) one or more Lewis acids selected from the group consisting of the fluorides, chlorides and bromides of vanadium, niobium, tantalum, chromium, molybdenum, tungsten, arsenic, antimony, phosphorus, bismuth and the chlorides and bromides of gallium and (b) a hydrogen halide, wherein the hydrogen halide is hydrogen fluoride, hydrogen chloride or hydrogen bromide, the molar ratio of said hydrogen halide to said Lewis acid ranging between 1:1 and about 100:1, and forming an alkylate having an average molecular weight greater than that of the feedstock.

4,094,925

COMPOUND AND ITS USE IN SYNTHETIC RESIN MIXTURES HAVING HIGH REACTIVITY UNDER THE ACTION OF IONIZING RAYS

Karl Jellinek, Letmathe, and Rudi Oellig, Duisburg-Meiderich, both of Germany, assignors to Rutgerswerke Aktiengesellschaft, Frankfurt am Main, Germany

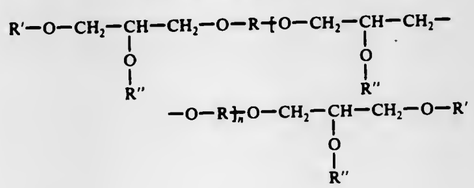
Filed Aug. 12, 1974, Ser. No. 497,168

Claims priority, application Germany, Aug. 25, 1973, 2343085

Int. Cl.² C08L *63/10*; C08F *8/00*; C08L *75/08*

U.S. Cl. 260—836 **11 Claims**

1. A composition polymerizable by ionizing radiation said composition comrising a compound of the formula:



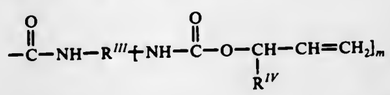
(I)

wherein

R is an organic radical;

R′ is an alkyl, cycloalkyl, aryl, aralkyl or acyl group;

at least half of all R″ radicals have the formula:



(II)

in which m is 1 or 2; and the remaining R″ radicals are hydrogen atoms;

R^{III} is a bivalent (when $m = 1$) or a trivalent (when $m = 2$) alkyl, cycloalkyl, aryl, aralkyl, carbamate or carbamide group;

R^{IV} is hydrogen or a methyl group; and

n is zero or a number up to 30; and

at least one vinyl monomer coplymerizable with said compound.

4,094,926

POLYMERIC PHOSPHORUS COMPOUNDS AND FLAME RETARDANT POLYETHYLENETEREPHTHALATE CONTAINING SAID POLYMERS

Dennis Richard Sheard, and Ian Stuart Fisher, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

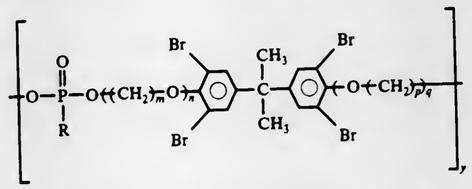
Filed Feb. 20, 1976, Ser. No. 659,628

Claims priority, application United Kingdom, Mar. 11, 1975, 10057/75

Int. Cl.² C08G *65/40*; C08L *67/02*

U.S. Cl. 260—860 **12 Claims**

1. A phosphorus-containing compound of the formula:



wherein R is phenyl or alkyl of 1 to 4 carbon atoms.

m and p are each independently integers from 2 to 6,

n and q are each independently integers from 1 to 10,

y is an integer of at least 2.

7. Flame retardant polyethylene terephthalate comprising a minor proportion of a compound according to claim 1.

4,094,927

PROCESS FOR IMPROVING THE PROCESSABILITY OF POLYOLEFINS, IMPROVED POLYOLEFIN COMPOSITIONS, AND MODIFIER COMPOSITIONS

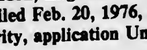
William H. Harrop, Downingtown; David Witiak, Yardley, both of Pa., and Russell A. LaBar, Grafton, Wis., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 587,482, Jun. 16, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,514

Int. Cl.² C08F *2/00*; C08L *23/00*; C08F *220/04, 4/38*

U.S. Cl. 260—897 B **9 Claims**

1. A composition comprising a blend of a polyolefin of the formula



wherein R is H, C_nH_{2n+1} and n is 1 to 4, C_6H_5, or $C_6H_4CH_3$, and a minor amount of the acrylic polymer of one or more C_{10} to C_{22} alkyl methacrylates with one or more monomers selected from the group consisting of acrylic acid, methacrylic acid and isobornyl methacrylate wherein the molecular weight ratio of methacrylates to other monomers is about 91:9 to 87:13.

4,094,928

CARBONYLALDIMINOMETHANEPHOSPHONATES

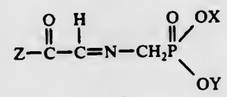
Van Russell Gaertner, Ballwin, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 531,586, Dec. 11, 1974, abandoned. This application Jul. 29, 1977, Ser. No. 820,195

Int. Cl.² C07F *9/40*

U.S. Cl. 260—944 **6 Claims**

1. A carbonylaldiminomethanephosphonate compound of the formula



wherein X and Y are each individually hydrogen or lower alkyl and Z is hydrogen, hydroxyl or lower alkoxyl.

4,094,929

PROCESS FOR MANUFACTURE OF AMIDOPHOSPHATES

Hermann Nachbur, Dornach, and Peter Rohringer, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 10, 1976, Ser. No. 684,988

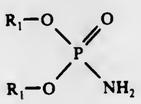
Claims priority, application Switzerland, May 15, 1975, 6264/75

Int. Cl.² C07F *9/24*; D06M *1/00*

U.S. Cl. 260—968 **8 Claims**

1. Process for the manufacture of amidophosphate reaction products which comprises reacting together at temperatures of 20° to 80° C. with or without acidic or basic catalysts

(1) 1 or 2 moles of an amidophosphate of the formula



(1)

wherein

R_1 is alkyl with 1 to 3 carbon atoms, or both R_1's together are alkylene with 2 to 5 carbon atoms,

(2) 1 mole of formaldehyde or an agent releasing formaldehyde,

(3) an aliphatic diol with 2 to 6 carbon atoms, and/or

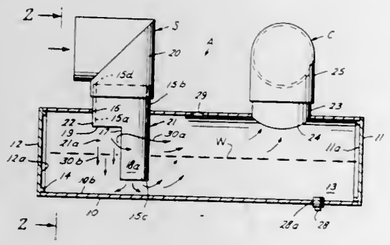
(4) an alkanol with 1 to 3 carbon atoms, and if the constituent (3) is used, R_1 in the amidophosphate of the formula (1) is also alkenyl or halogenoalkyl with 2 or 3 carbon atoms.

4,094,930

MOISTURIZED AIR-FILTER FOR INTERNAL COMBUSTION ENGINES

Henry F. W. Mueller, P.O. Box 524, 901 Edgar St., Yoakum, Tex. 77995

Filed Feb. 14, 1977, Ser. No. 768,166
Int. Cl.² F02M *25/02*
U.S. Cl. 261—18 A **10 Claims**



1. An apparatus for moisturizing air for an air intake of an internal combustion engine, comprising:

container means forming a chamber holding a quantity of water to only partially fill same so as to leave an air passageway above the water;

air inlet means for admitting air into the container means at one area thereof and communicating with the air passageway;

discharge means for discharging air from an area of the container means remote from said inlet means and communicating with the air passageway for conveying moisturized air from the chamber to an internal combustion engine air intake;

said air inlet means comprising a tubular member, sealingly secured to an opening in the container means, with a portion thereof extending internal to the container means; and

said portion internal to the container means having a semi-tubular portion removed on a side which is opposite to the discharge means thereby forming a substantially horizontal wall surface which is below the opening, at its lower-most point, in the container means and a remaining semi-tubular portion which extends substantially below the water surface in such a manner as to partially segregate the container means into two areas and forming a passageway below the water surface permitting communication between said areas of the container means.

4,094,931

CARBURETOR ASSEMBLY

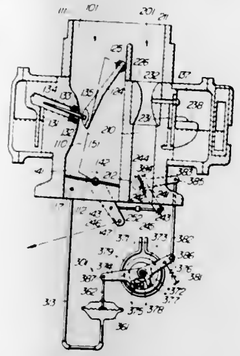
Kimiji Karino, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Nov. 23, 1976, Ser. No. 744,399
Claims priority, application Japan, Nov. 28, 1975, 50-141618
Int. Cl.² F02M *13/04*
U.S. Cl. 261—23 B **12 Claims**

8. In a carburetor assembly for internal combustion engines of the type having a main carburetor for supplying a lean air-fuel mixture to the engine, an auxiliary carburetor for supplying an air-fuel mixture to the engine which is rich relative to that supplied by said main carburetor, and first and second throttle valves mounted in said main and auxiliary carburetor respectively, the improvement comprising:

temperature responsive means for producing a closing movement of said second throttle in accordance with increases in the temperature of said engine;

negative pressure responsive means for producing a closing movement of said second throttle valve in accordance with negative pressures on a downstream side of said main throttle valve; and



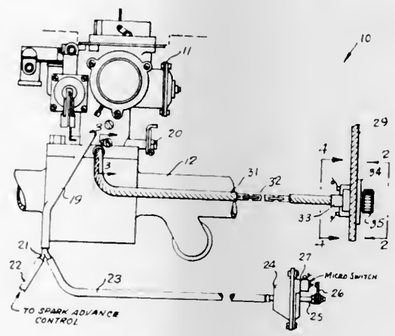
a mechanical linkage means interconnected directly between said second throttle valve, said temperature responsive means, and said negative pressure responsive means for effectuating the closing of said second throttle means by said negative pressure responsive means and by said temperature responsive means displaceably engaging said linkage means, said linkage means permitting said temperature responsive means to cause closing movement of said second throttle beyond that caused by said pressure responsive means and independent of said first throttle means as said engine warms up.

4,094,932

CARBURETOR CHECKING AND ADJUSTING APPARATUS

Kenneth L. Knox, Sr., 1796 Hillboro Ave., Reno, Nev. 89502

Filed Dec. 9, 1976, Ser. No. 749,079
Int. Cl.² F02M *3/08*
U.S. Cl. 261—41 D **3 Claims**



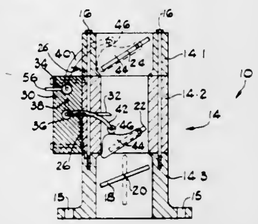
1. In a motor vehicle of the type having an instrument panel dashboard, an engine including, an intake manifold, a carburetor mounted on the intake manifold with the carburetor having a throttle valve controlled throat immediately adjacent the intake manifold and an idle mixture control screw having a transverse slot, said screw being adjacent the intake manifold in combination with a carburetor checking and adjusting apparatus comprising a vacuum conduit extending from the carburetor, a vacuum actuated normally closed electric switch connected to said vacuum conduit and responsive to the vacuum in the carburetor to open said electric switch, an indicator bulb mounted on said dashboard, a hand controlled electric switch on said dashboard, electric wiring connecting said electric switch, said hand controlled electric switch and said bulb to energize said bulb when said switches are both closed, a flexible cable connected on one end to said idle mixture control screw wherein said cable and said screw are interconnected by coupling means having a first blade which engages said slot of said control screw at one extremity and a second blade which engages a slot associated with said flexible cable remote from said first blade for transmitting rotation therethrough, and bracket means overlying said cable fastening said cable to a portion of the engine to maintain alignment between said cable and said screw, and a hand controlled knob on said dashboard connected to the opposite end of said cable to rotate said mixture control screw on rotation of said knob to control the mixture in said carburetor and thus varying the vacuum in said carburetor.

4,094,933

SUPPLYING FUEL TO INTERNAL COMBUSTION ENGINES

Marthinus Johannes Schoeman, 13-14th Avenue, Edenvale, Transvaal Province, South Africa

Filed Aug. 26, 1976, Ser. No. 717,929
Claims priority, application South Africa, Sep. 23, 1975, 75/6062
Int. Cl.² F02M *7/22*
U.S. Cl. 261—50 A **13 Claims**



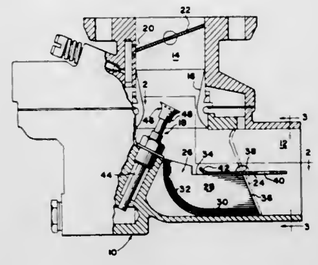
1. A carburettor for an internal combustion engine, which includes a duct connectable to a combustible charge inlet of the engine; a butterfly valve pivotally mounted within the duct and connectable to a throttle linkage of the engine to permit control of airflow through the duct; a fuel control vane and a vacuum inducing vane pivotally mounted within the duct upstream of the butterfly valve and biassed by biassing means to operate in conjunction with airflow through the duct; and a housing provided exteriorly of the duct, the housing having an inlet adapted for connection to a fuel source, an outlet passage leading into the duct, and at least one valve means intermediate the inlet connection and the outlet passage for regulating fuel flow into the duct, the valve means including an independently operable control valve and a regulating valve which are connected in series intermediate the inlet connection and the outlet passage, the fuel control vane being linked by a link to the regulating valve to control fuel flow through the regulating valve dependent upon the rate of airflow through the duct as determined by the fuel control vane, and the vacuum inducing vane being linked by a link to the control valve thereby to control fuel flow through the control valve dependent upon the pivotal movement of the vacuum inducing vane caused by airflow through the duct.

4,094,934

HORIZONTAL UPDRAFT CARBURETOR

Charles H. Tuckey, and Roy J. Tuckey, both of Caro, Mich., assignors to Tuckey Corporation, Caro, Mich.

Filed Feb. 23, 1977, Ser. No. 771,817
Int. Cl.² F02M *1/02*
U.S. Cl. 261—64 R **4 Claims**



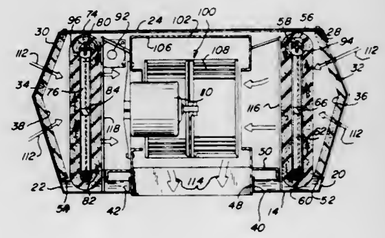
1. In a carburetor having housing means defining a vertically extending mixing chamber communicating at its lower end with a horizontally extending air intake passage, nozzle means projecting into the lower portion of said mixing chamber for discharging a fuel mixture into said chamber, and a choke plate mounted within said housing for pivotal movement about a horizontal axis extending transversely of said intake passage between a closed position blocking said inlet passage and an open position wherein said plate lies in a horizontal general plane within said passage; the improvement comprising a pair of spaced parallel vertical side plates projecting upwardly from the bottom of said inlet passage at locations spaced inwardly from the sides of said inlet passage between said choke plate and said mixing chamber, a rear wall extending transversely between said side plates and curving smoothly upwardly from said bottom of said inlet passage beneath said nozzle means, said side plates and said rear wall defining a flow passage in the lower central portion of said intake passage of a cross-sectional area substantially less than that of said intake passage for smoothly deflecting air flowing therethrough upwardly toward said nozzle means, said side plates having parallel front edges engageable with the rearward side of said choke plate when said choke plate is in said closed position, and means defining a restricted opening through said choke plate constituting an inlet to said flow passage when said choke plate is in said closed position.

4,094,935

EVAPORATIVE COOLING SYSTEM

Wesley M. Walker; Robert W. Walker, and Dean M. Walker, all of Loveland, Colo., assignors to Walker Manufacturing Company, Ft. Collins, Colo.

Filed Dec. 3, 1976, Ser. No. 747,396
Int. Cl.² B60H *1/26*
U.S. Cl. 261—80 **1 Claim**



1. An evaporative cooling system comprising:

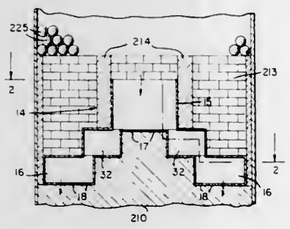
a housing having generally upright respectively-opposing side walls and end walls joined by generally horizontal top and bottom walls;
means defining a pair of inlet openings individually in respective ones of said side walls;
means defining an outlet opening in another of said walls of said housing;
a pair of vertically-oriented generally planar rigid frames individually locatable within said housing adjacent to and substantially spanning respective ones of said inlet openings, each of said frames including space-opposed vertical end bars;
vertical channelways secured to said end walls and disposed individually on each respective side of said inlet openings, said channelways slidingly receiving corresponding different ones of said end bars;
a pair of upper rollers individually journaled for rotation between the upper end portions of the corresponding ones of said end bars of respective ones of said frames;
a pair of lower rollers individually journaled for rotation between the lower end portions of the corresponding ones of said end bars of respective ones of said frames;
a pair of endless belts individually wrapped around respective different ones of the respective combinations of said rollers and frames so as to have a hollow oblong cross section elongated in a vertical direction, said belts each being of a material to which a liquid may cling and sufficiently transparent to the flow of air therethrough to achieve evaporation of said liquid on said belt by the air;
means defining a reservoir of said liquid disposed in the lower portion of said housing and into which said lower rollers normally are immersed in use so that a portion of said belts also are immersed;
motive drive means disposed within said housing;
coupling means on each of said upper rollers for engagement with said motive drive means to drive such rollers in rotation, directly upon seating of said end bars within said channelways;
means, in addition to said belts, individually coupled between respective different ones of said upper and lower rollers for driving said lower rollers from the corresponding ones of said upper rollers;
and blower apparatus disposed in said housing and substantially occupying the space between said frames for drawing air through said inlet openings and said belts and exhausting said air through said outlet opening.

4,094,936

PACKED BED GAS-LIQUID CONTACTOR

Jorge M. Fernandez-Baujin, North Bergen, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Feb. 16, 1977, Ser. No. 768,958
Int. Cl.[2] B01D *47/14, 53/20*
U.S. Cl. 261—96 **6 Claims**



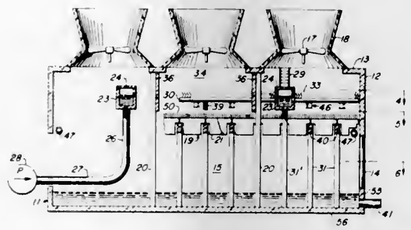
1. A gas-liquid contactor apparatus, comprising:
a vessel;
a gas inlet in the lower portion of the vessel;
a gas outlet in the upper portion of the vessel;
a liquid inlet in the upper portion of the vessel;
a liquid outlet in the lower portion of the vessel;
a packed bed within said vessel;
a plurality of liquid distributors for distributing liquid into the packed bed, said plurality of liquid distributors being supported within and solely by said packed bed, said liquid inlet introducing the liquid into the liquid distributors, said packed bed including a lower portion below the liquid distributors and an upper portion above the liquid distributors, said lower portion of the packed bed being comprised of process packing, said upper portion of the packed bed being comprised of an imperforate structure and non-process packing, said imperforate structure blocking a portion of the upper portion of the packed bed and being comprised of a plurality of separate imperforate columns which extend from liquid distributors upwardly to the top of the packed bed, the remaining portion of said upper portion of the packed bed being comprised of said non-process packing whereby gas flows through a limited portion of the upper portion of the packed bed defined by the non-process packing to reduce the gas residence time in the upper portion of the bed.

4,094,937

CYLINDRICAL MULTI-FAN COUNTERFLOW COOLING TOWER

Gaylord E. Bodick, and Martin V. Gruber, both of Erie, Pa., assignors to Zurn Industries, Inc., Erie, Pa.

Filed Apr. 15, 1976, Ser. No. 677,401
Int. Cl.[2] B01F *3/04*
U.S. Cl. 261—111 **11 Claims**



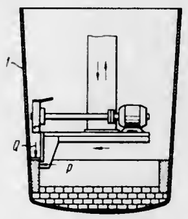
1. A round, counterflow, multi-fan, mechanical draft cooling tower comprising,
a cylindrical cold water basin,
a cylindrical shell substantially the same size as said basin, closed at its upper end by a horizontal planar deck,
means supporting said cylindrical shell over said cold water basin in spaced relation thereto,
said deck being attached to the upper end of said cylindrical shell,
spaced columns extending from said deck to said cold water basin supporting said deck at positions spaced inwardly from said cylindrical shell,
said deck having at least five symmetrically arranged, uniformly spaced openings therein with at least four openings adjacent the periphery of said shell and at least one opening in the center,
a fan supported in each said opening,
a fill pack of generally cylindrical configuration having a diameter substantially equal to the inside diameter of said cylindrical shell and positioned below said deck defining a plenum chamber between said deck and said fill pack,
a drift eliminator in said plenum chamber above and adjacent said fill pack,
and means below said drift eliminator above said fill pack for distributing water to be cooled generally uniformly over said fill pack,
said fans being adapted to draw air through said space between said cold water basin and said shell, through said fill pack, and through said drift eliminator,
whereby some of said water is evaporated and discharged by said fans,
the remaining portion of said water releases heat to said evaporated water and is thereby cooled and flows to said cold water basin for use as cold water,
said cylindrical fill pack being supported below said drift eliminator in closely spaced relation to said drift eliminator,
said drift eliminator being supported below said deck at a distance approximately equal to the diameter of said fans,
said fill pack being supported above said cylindrical cold water basin defining a generally cylindrical open space between said fill pack and said basin adapted to contain air at a substantially uniform pressure throughout, whereby the air adjacent the lower side of said fill pack is at a generally uniform pressure, radially-extending partition walls provided in said plenum chamber comprising barriers preventing the recirculation of air inside said plenum chamber and providing a flow passage for air to each said fan whereby said fans operate independently of one another.

4,094,938

METHOD AND APPARATUS FOR LINING LADLES

Serafim Vasilievich Kolpakov, ulitsa Ryazanskaya, 12; Zinovy Lvovich Gurkov, ulitsa Parkovaya, 4, kv. 42; Oleg Leonidovich Bondarenko, ulitsa M. Gorkogo, 13/2, kv. 1; Vladimir Viktorovich Valtsov, ulitsa Anosova, 2, kv. 25; Alexandr Mikhailovich Pozhivanov, ulitsa Zhelyabova, 16, kv. 8; Eduard Dmitrievich Gugnin, ulitsa Gagarina, 167, kv. 8; Stanislav Vyacheslavovich Radilov, ulitsa Tereshkovoi, 38b, kv. 34, and Alexandr Andreevich Bogdanov, ulitsa Parkovaya, 6, kv. 4, all of Lipetsk, U.S.S.R.

Continuation of Ser. No. 449,466, Mar. 8, 1974, abandoned. This application May 28, 1976, Ser. No. 691,079
Int. Cl.[2] F27D *1/16*
U.S. Cl. 264—30 **6 Claims**



1. A method for high-density lining inner spaces, confined by the inner surface of a ladle and by a backing shaping element therein, with a refractory mass along the inner circumferential perimeter of the ladle wall and along the entire height thereof, comprising the steps of:
feeding the mass at a speed of 60 m/sec. into spaces confined between the inner surface of the ladle and the backing shaping element therein along a helical trajectory;
applying the fed-in mass to the inner surface with at least one blasting means in close proximity to the inner ladle perimeter, with a force applied perpendicularly to the upper surface of the lining layer as the lining is being applied;
positioning the backing shaping element initially at a distance equal to the initial thickness of the lining in the bottom of the ladle;
imparting to the blasting means a continuous circular movement along the inner perimeter and parallel thereto;
positioning the backing shaping element behind the blasting means and free of physical contact with the inner ladle perimeter to ensure a predetermined narrow gap being filled with the mass to deliver the refractory mass along the ladle wall being lined into said space between the ladle wall and the shaping element;
additionally imparting to the blasting means continuous vertical movement along the entire height of the ladle as the lining is completing the perimeter; the backing shaping element also being moved upward continuously, in addition to and simultaneously with its continuous circular movement along the inner ladle perimeter;
maintaining the distance between the blasting means and the upper surface of the lining constant during the vertical movement to create identical conditions for the passage of the refractory mass applied to the blasting means;
maintaining the lining layer at a minimum thickness in accordance with the narrow gap;
simultaneously and continuously moving the blasting means radially with respect to the surfaces being lined, together with the backing shaping element, thereby obtaining a continuous and successive filling of the lining with the minimum thickness along a helical trajectory over the entire height of the ladle; and,
reducing the scattering of the mass by the blasting means during said feeding and said applying steps.

4,094,939

METHOD OF REPAIRING ADOBE MASONRY

Robert J. Rowlands, #20 3940 N. Romero Rd., Tucson, Ariz. 85705, assignor to Robert J. Rowlands and Letha B. Rowlands, as JTWTROS, Tucson, Ariz.

Filed Jun. 30, 1976, Ser. No. 658,690
Int. Cl.[2] E04B *1/16*
U.S. Cl. 264—35 **3 Claims**

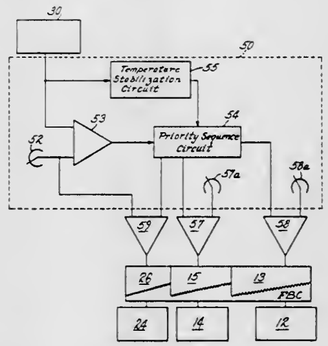
1. The method of repairing adobe members having a deteriorated, broken or chipped portion and a body portion comprising: removing any residual broken or chipped pieces of the chipped portion to expose a surface of said body portion; cleaning said exposed surface; coating said cleaned exposed surface with a coating composition formed of a modified acetate homopolymer and water; filling said chipped portion with a patching composition of trowelling consistency formed from an admixture of water, Portland cement, washed sand and sufficient adobe dust to match the color of said body portion; shaping the filling composition to conform to the shape or the original adobe member; and coating the shaped filling with said coating composition.

4,094,940

INJECTION MOLDING MACHINE CONTROLS

Peter Hold, Milford, Conn., assignor to USM Corporation, Farmington, Conn.

Division of Ser. No. 435,348, Jan. 21, 1974, Pat. No. 3,937,776, which is a continuation of Ser. No. 194,280, Nov. 1, 1971, abandoned. This application Apr. 22, 1974, Ser. No. 462,960
Int. Cl.[2] B29F *1/08*
U.S. Cl. 264—40.6 **3 Claims**



1. A method for controlling the parameters of an injection molding process, said molding process including: feeding material into a plasticating chamber, applying, by the use of heaters, a predetermined amount of heat to the chamber which is calculated to cause the plasticated material to reach a predeter-

mined standard temperature, rotating a plasticating screw located in the chamber at a predetermined speed to plasticate the material, slidably retracting the screw during plastication, under a predetermined back pressure, to a charged position to collect a predetermined quantity of plasticated material ahead of the screw, and injecting the material into a mold by a forward sliding thrust of the screw, said control method comprising:

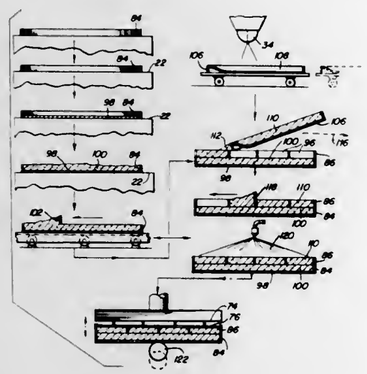
A. detecting the temperature of the plasticated material;
B. comparing the temperature of the plasticated material with the predetermined standard temperature; and
C. adjusting the supply of heat energy to the plasticating chamber to compensate for any difference in the temperature of the plasticated material and the standard temperature, for subsequent injection cycles by selectively adjusting rotational screw speed, back pressure, and the heat applied by the chamber heaters according to a priority sequence which maximizes the input of mechanical energy.

4,094,941

METHOD AND APPARATUS FOR MAKING DECORATIVE PANELS IN RELIEF

Stanley H. Manners and Gerhard Borbonus, both of Boise, Id., assignors to Stanley H. Manners, Boise, Id., a part interest

Filed May 3, 1976, Ser. No. 682,893
Int. Cl.[2] B28B *1/08, 1/16*
U.S. Cl. 264—71 **6 Claims**



1. The method of forming a multi-ply building panel including a back ply and a face ply and with the face ply defining a relief pattern, said method including:

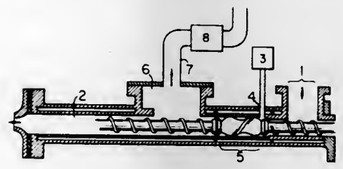
(a) placing a first hardenable fluent mix layer material in an upwardly opening shallow receptacle;
(b) supporting a grid in position over the first layer with the grid including intersecting members defining said pattern and the lower marginal portions of said intersecting members at least slightly downwardly depressed into said first layer while the latter is still fluent;
(c) placing a second hardenable fluent mix layer material, of an appearance when hardened different than the appearance of the first mix material when hardened, on top of the first mix layer within the voids of the grid defined and bound by adjacent intersecting members of the grid;
(d) vibrating and compressing said first and second layers thus causing the interface portions of the mix layer materials within the voids to intermix; and
(e) allowing said mix layers to at least slightly harden.

4,094,942

METHOD FOR REMOVING UNREACTED MONOMER

Setsuo Nakai, and Hiroshi Ochi, both of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and The Japan Steel Works, Ltd., Tokyo, both of, Japan

Filed Jan. 19, 1976, Ser. No. 650,440
Int. Cl.[2] B29F *3/03*
U.S. Cl. 264—102 **6 Claims**



1. A method for removing unreacted monomer or monomers from a molten ethylene homopolymer or a copolymer of ethylene with at least one monomer copolymerizable with ethylene during the course of pelletization by use of an extruder, said polymer having been formed by high-pressure polymerization by use of a radiation or a radical initiator, discharged from the reactor by way of a separator, and fed to said extruder to be pelletized, which method comprises injecting into a nose portion of a mixing section of said extruder 0.1 to 10% by weight, based on said polymer of water or steam, intermixing the polymer and the water or steam in the mixing section of the extruder screw, and removing the unreacted monomer and water or steam contained in the mix from the venting zone provided after the mixing section in the extruder under application of a vacuum of 500 mmHg absolute or less.

4,094,943

PROCESS FOR SPINNING FLAME RETARDANT ELASTOMERIC COMPOSITIONS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; John T. Howarth, Reading; Suresh Sheth, Somerville; Kenneth R. Sidman, Wayland, and Arthur A. Massucco, Natick, all of Mass.

Division of Ser. No. 374,421, Jun. 28, 1973, Pat. No. 3,956,233. This application Feb. 13, 1976, Ser. No. 657,998
Int. Cl.[2] B29H *21/04*
U.S. Cl. 264—130 **6 Claims**

1. A method of producing a fire retardant, elastomeric filament comprising:

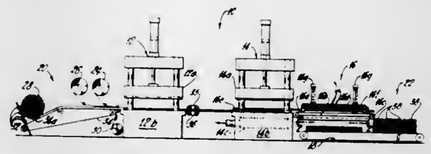
(a) forming a solution of an elastomeric composition in a solvent, said elastomeric composition being selected from the class consisting of (1) a polyurethane comprising an organic polyisocyanate and a halogen containing polyol, the reactive groups of said polyol being hydroxyl groups, (2) an elastomeric normally flammable polyurethane and a fire retardant additive selected from the class consisting of hexabromobenzene, decabromodiphenyl, tricresyl phosphate, tris-1-bromochloropropyl phosphate, tris-2,3-dibromopropyl phosphate and mixtures thereof and (3) mixtures thereof;
(b) forming a plurality of fibers from the solution of Step (a);
(c) passing said plurality of fibers formed in Step (b) through an aqueous bath, said aqueous bath containing in addition the solvent of Step (a);
(d) removing said excess aqueous solution and forming said plurality of fibers into a coalesced filament; and
(e) drying said coalesced filament obtained from Step (d).

4,094,944

MACHINE FOR AND CONTINUOUS PROCESS OF MAKING MOLDED TILE

Frederic Harold Paetz, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Oct. 22, 1976, Ser. No. 734,772
Int. Cl.[2] B29C *27/22;* B29D *3/02*
U.S. Cl. 264—137 **5 Claims**



1. A continuous process of making molded ceiling tile comprising intermittently feeding a strip of fibrous glass wool having uncured binder thereon and a strip of facing material into a molding press having multi-cavity upper and lower die plates relatively movable toward and away from each other, molding the wool and facing material in the molding press into a cluster of molded tiles by clamping them between the upper and lower die plates under pressure while applying heat to cure the binder, said molding including the forming of a pair of oppositely projecting tabs on each of said tiles, feeding the cluster of molded tiles from the molding press into a severing press while feeding other portions of the strips attached to the cluster into the molding press, said feeding including drivingly engaging said tabs with movable driving means, and severing the cluster in the severing press from the strips and the molded tiles in the cluster into separate tiles arranged in a plurality of rows of tiles by operation of the severing press while molding another cluster of tiles in the molding press.

4,094,945

SPINNING OF POLYPYRROLIDONE

A. Charles Tanquary, Birmingham, Ala., assignor to Chevron Research Company, San Francisco, Calif.

Filed Aug. 16, 1976, Ser. No. 714,461
Int. Cl.[2] D01F *6/00*
U.S. Cl. 264—184 **10 Claims**

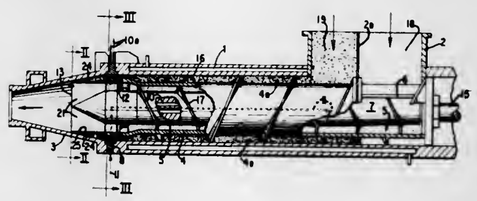
1. A process for forming filaments of polypyrrolidone which comprises extruding through a spinneret a solution comprising polypyrrolidone, formic acid and methylene chloride.

4,094,946

STRIPED SOAP, ITS PRODUCTION AND APPARATUS FOR ITS PRODUCTION

Friedhelm Finkensiep; Reinhold Walter Meye, both of Krefeld, and Gunter Thor, Krefeld-Traar, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Germany

Filed Jun. 14, 1976, Ser. No. 695,455
Claims priority, application Germany, Jun. 16, 1975, 2526917
Int. Cl.[2] B29F *3/06*
U.S. Cl. 264—171 **3 Claims**



1. A process for the production of two-color striped pieces of soap comprising the steps of continuously extruding two strands of colored soap from a single extruder having an inner and an outer extrusion path, the outer strand encompassing the inner strand and each strand having a different color, said extrusion being at an equal rate for each strand, passing said two strands of colored soap through separate die orifices within a radial cross-section whereby said two strands of colored soap are combined in a predetermined cross-section with said inner strand having a cross-section other than circular, and compressing said combined strand, cutting said compressed combined strand and recovering two-colored striped pieces of soap.

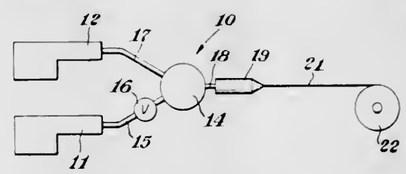
2. A single extruder provided with a hopper at one end and a restricted nozzle at the opposite end and two press-screws arranged coaxially in one another within an outer jacket, each of said screws being provided with a male thread for feeding in the direction of said nozzle, said male threads extending into an outer annular space between said jacket and the outer press-screw and extending into an inner annular space between said two press-screws, said threads being oppositely oriented, means to rotate the outer of said two press-screws and means to maintain the inner of said two press-screws stationary, said outer press-screw being provided with window-like openings communicating with said inner press-screw in the area of said hopper and separate feed means in said hopper to separately feed to the area between said outer jacket and said outer press-screw and to the area between said outer press-screw and said inner press-screw through said window-like openings, whereby said material being conveyed by said outer press-screw and said material being conveyed by said inner press-screw are substantially equal and conveyed at substantially the same rate by rotation of the outer press-screw, the improvement consisting in that said restricted nozzle is provided with two channels having a predetermined outlet cross-section with the outer channel at the inlet completely encompassing the inner channel, said outer channel at the inlet being fed from said outer press-screw and said inner channel at the inlet being fed from said inner screw, the outlet cross-section of said inner channel being other than circular, whereby the outer edge of said inner channel cross-section at the outlet is coextensive with the other channel cross-section.

4,094,947

MULTILAYER COEXTRUSION PROCESS FOR PRODUCING SELECTIVE REFLECTIVITY

Turner Alfrey, Jr., Midland, and Walter J. Schrenk, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 3, 1976, Ser. No. 720,481
Int. Cl.[2] B29F *3/06*
U.S. Cl. 264—171 **3 Claims**



1. In a method for the preparation of a plastic film or sheet composed of a plurality of generally parallel layers, the parallel layers being generally parallel to the major surfaces of the film or sheet, the film being composed of at least two diverse synthetic resinous materials arranged in layers in such a manner that selective reflectivity is obtained in the ultraviolet, infrared or visible region of the electromagnetic radiation spectrum, the steps of the method comprising providing at least a first stream and a second stream of heat-plastified extrudable thermoplastic material, dividing the first stream into a plurality of first substreams and the second stream into a plurality of second substreams, combining at least a major portion of the substreams to form a composite stream having at least a major portion of the first substreams and the second substreams interdigitated

deforming the composite stream to a generally sheet-like configuration wherein the interfaces between the substreams are generally parallel to the major surfaces of the sheet-like configuration and at least one external surface of the substream being composed of material of the first stream, the number and thickness of the substreams being sufficient to provide a film or sheet having said reflectivity characteristics after cooling below the thermoplastic temperature,

the improvement which comprises varying the reflectivity of the film or sheet by varying the quantity of material supplied to the combining of first and second substreams and a first substream forming an external surface of the sheet, the quantity of material provided for the first and second streams being maintained generally constant to thereby provide bands of apparent reflectivity extending laterally across the film or sheet.

4,094,948

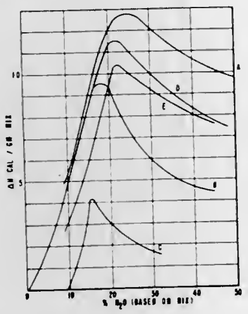
IMPROVED ACRYLONITRILE POLYMER SPINNING PROCESS

Robert Alan Blickenstaff, Charlottesville, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 294,184, Oct. 2, 1972, Pat. No. 3,984,601, which is a continuation-in-part of Ser. No. 189,202, Oct. 14, 1971, abandoned. This application Jun. 4, 1976, Ser. No. 692,936

Int. Cl.² D01F *6/18*

U.S. Cl. 264—206 **2 Claims**



1. Process for spinning fibers of an acrylonitrile polymer which comprises adding water to an acrylonitrile polymer that contains at least about 40 weight percent units of acrylonitrile, in an amount equivalent as a minimum to either 45% of that required to hydrate all the nitrile groups or 80% of that required to hydrate the coupled nitrile groups (on a 1/1 water molecule/nitrile group basis), whichever is larger, and as a maximum the amount combined as hydrate plus 7 weight percent water based on polymer, the total water not to exceed the amount necessary to hydrate all nitrile groups in the polymer and maintaining the resulting substantially single phase composition under at least autogenous pressure at a temperature ranging between about 25° C less to about 10° C more than the temperature of hydration as determined by Laser Raman Spectroscopy and then extruding the composition under pressure through an extrusion orifice to obtain acrylonitrile polymer filaments.

4,094,949

METHOD FOR PREPARING SHAPED ARTICLES OF A FLUORINATED ELASTOMER

Kiyoshi Yokokawa, and Noboru Shimamoto, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co. Ltd., Tokyo, Japan

Filed May 28, 1976, Ser. No. 690,971

Claims priority, application Japan, Jun. 9, 1975, 50-69303

Int. Cl.² C08F *29/22*

U.S. Cl. 264—234 **9 Claims**

1. A method for preparing a heat-shrinkable article from a resin blend of a fluorinated elastomer and a poly(vinylidene fluoride) resin which comprises the steps of

(a) mixing from 50 to 200 parts by weight of the poly(vinylidene fluoride) resin with 100 parts by weight of the fluorinated elastomer at a temperature between the melting temperature of the poly(vinylidene fluoride) resin and the decomposition temperature of the same resin to form the resin blend,

(b) adding a curing catalyst to the thus formed resin blend,

(c) shaping the resin blend into an article,

(d) heating the article under forced deformation at a temperature not lower than the melting temperature of the resin to effect curing, and

(e) cooling the article as such to a temperature below 100° C at which the deforming force is released.

4,094,950

METHOD AND APPARATUS FOR FORMING A SOLE ON AN UPPER BY DIP-COATING

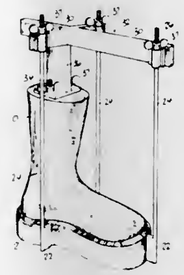
Frederick Oldham, Pinetown, South Africa, assignor to Robert Tilden Clark, Brighton Beach, South Africa

Filed May 3, 1977, Ser. No. 793,422

Claims priority, application South Africa, May 6, 1976, 76/2707

Int. Cl.² B29C *13/00, 5/00*

U.S. Cl. 264—259 **7 Claims**



1. In a method for making an article of footwear having an upper and a sole unit comprising a sole region and a heel, including dipping a last in a fluid plastics material and hardening said plastics material about said last, the improvement comprising:

supporting an element spaced from a sole portion of said last during said dipping so that said last and said element are immersed in said plastics material and said plastics material flows between said last and said mold element; and

retaining said material between said element and said last to form at least a part of said sole unit of said article.

4,094,951

COMPOSITES OF OXIDIZED GRAPHITE MATERIAL AND EXPANDED GRAPHITE MATERIAL

Toshikatsu Ishikawa, Tokyo; Toyonosuke Kanemaru, Zushi; Haruo Teranishi, Machida, and Kazumasa Onishi, Yokohama, all of Japan, assignors to Nippon Carbon Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1976, Ser. No. 668,112

Int. Cl.² B29C *3/00*

U.S. Cl. 264—325 **5 Claims**

1. A process for producing a composite graphite material in a molded form having high density, high tensile strength and impermeability, characterized by incorporating expanded graphite material with oxidized graphite material in amounts of 1 – 60% by weight of expanded graphite material to form a mixture and then compression molding the resulting mixture.

4,094,952

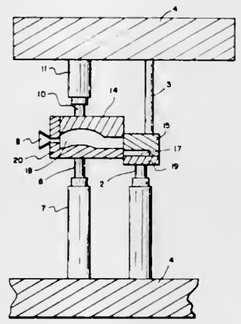
METHOD OF MOLDING POLYMERIC MATERIAL

Alan I. W. Frank, Pittsburgh, Pa., assignor to Alan I. W. Frank Corporation, Exton, Pa.

Continuation-in-part of Ser. No. 539,483, Jan. 8, 1975, abandoned. This application Jun. 10, 1976, Ser. No. 694,597

Int. Cl.² B29F *1/06*

U.S. Cl. 264—328 **2 Claims**



1. A method for producing a molded polymeric product having a utility body with an attached longitudinal handle having anisotropic properties in a mold having a variable cavity defining said utility body and part of said handle and a fixed mold adapted for communication with the variable mold and defining in part said longitudinal handle, said method comprising

a. introducing into said variable mold cavity when said variable mold is not in communication with said fixed mold an amount of polymeric material at least sufficient to form said product, said material being heated at least as early as the introduction into the cavity;

b. reducing the volume of the variable cavity and substantially simultaneously therewith, placing said variable and fixed cavities in communication to

(i) define said utility body of the product and said handle and

(ii) flow at least a sufficient amount of material longitudinally from the variable cavity into the fixed cavity; and

c. cooling the polymeric material while reducing the volume of the variable mold cavity whereby at least a portion of the handle includes a greater stiffness along the longitudinal direction than in any other direction.

4,094,953

PROCESS FOR RECOVERING MOLYBDENUM-99 FROM A MATRIX CONTAINING NEUTRON IRRADIATED FISSIONABLE MATERIALS AND FISSION PRODUCTS

Ali Sameh Abdel Hadi, Ettlinger-Schluttenbach; Johann Reinhardt, Eggenstein-Leopoldshafen, and Jutta Knapp, Karlsruhe, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Mar. 14, 1977, Ser. No. 777,627

Claims priority, application Germany, Mar. 16, 1976, 2610948

Int. Cl.² C01G *32/00;* B01J *1/08*

U.S. Cl. 423—2 **18 Claims**

1. Process for recovering molybdenum-99 from a matrix which has been irradiated with neutrons and contains fissionable materials and fission products, wherein the matrix is decomposed in an aqueous alkali hydroxide solution and the molybdenum-99 and part of the fission products are dissolved, the solution containing the molybdenum-99 is separated from a residue of particles containing at least actinides and lanthanides and is treated with thiocyanate ions to form a molybdenum complex comprising the steps of:

(a) conditioning the alkali solution containing molybdenum in the form of molybdate (MoO_4^{--}) with an iodine reduction agent in a quantity corresponding to a concentration range between 10^{-4} Mol and 0.2 Mol per liter alkali solution;

(b) adding mineral acid to the alkali solution until a hydronium ion concentration in the range from 0.1 to 6 Mol/l has been reached;

(c) reducing the molybdenum contained in the acidified solution of step b) to form a three-valent molybdenum Mo(III) and complexing the Mo(III) with SCN^- ions to form $[Mo(SCN)_6]^{3-}$ ions, said SCN^- ions being present in an ion concentration in the range between 0.1 Mol/l and 3 Mol/l of the solution being subjected to the reduction;

(d) treating the $[Mo(SCN)_6]^{3-}$ ion containing acid solution from step (c) with a previously conditioned, organic ion exchanger of the type of a chelate forming synthetic resin on the basis of a styrene divinyl benzene copolymer containing methylene nitrilo diacetate groups as functional groups and having a particle size in the range between 35μ and 840μ for selectively sorping the molybdenum;

(e) separating the ion exchanger from step (d), which is charged with molybdenum, from the solution now free of molybdenum;

(f) washing the separated molybdenum charged ion exchanger with a wash solution of diluted mineral acid containing a weak concentration of an iodine reduction agent, the quantity of the wash solution corresponding to 5 to 10 times the volume of the quantity of ion exchanger employed, in order to remove residual quantities of the molybdenum free solution;

(g) eluting the molybdenum from the washed ion exchanger with a liquor at an elution temperature in the range from about 20° C to about 70° C.

4,094,954

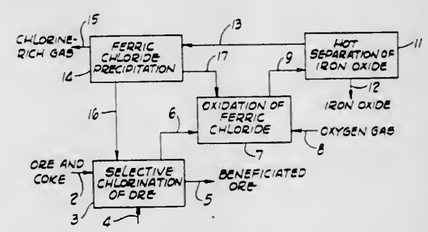
OXIDATION OF FERRIC CHLORIDE FROM SELECTIVE CHLORINATION OF TITANIFEROUS MATERIAL

James Paul Bonsack, Aberdeen, and George R. Walker, Severna Park, both of Md., assignors to SCM Corporation, New York, N.Y.

Filed Apr. 8, 1974, Ser. No. 458,791

Int. Cl.² C01G *49/06, 23/04;* C22B *1/08*

U.S. Cl. 423—69 **2 Claims**



1. In a process for the selective chlorination of a volume of titaniferous material with chlorine gas in a chlorination zone under selective chlorination conditions wherein ferric chloride vapors are produced as a chlorination product and ferric chloride is oxidized with molecular oxygen in a ferric chloride oxidation zone under ferric chloride oxidizing conditions to obtain solid byproduct iron oxide and chlorine gas, the improvement for recovery of chlorine gas which comprises:

in said oxidizing zone which is a single oxidizing zone oxidizing between about 40% and 80% of the ferric chloride present therein;

venting from said oxidizing zone a stream containing unreacted ferric chloride vapor and chlorine gas;

converting unreacted ferric chloride vapor in said stream into solid state particles;

separating said particles from said stream; and

passing at least a portion of said particles into said chlorina-

tion zone, said particles being volatilized in the chlorination zone for absorbing heat generated therein and for oxidation in said single oxidation zone.

4,094,955

ACID PROCESS FOR RECOVERY OF ALUMINA FROM CLAY

Donald J. Bauer; Judith A. Eisele, and Barlane R. Eichbaum, all of Reno, Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jun. 24, 1977, Ser. No. 809,882
Int. Cl.² C01F 7/66, 7/24
U.S. Cl. 423—123 **1 Claim**

1. A method for production of alumina monohydrate comprising:

forming an aqueous leach solution of aluminum nitrate by leaching calcined clay with nitric acid,

treating the leach solution to remove iron impurity,

subjecting the iron-free aluminum nitrate solution to a pressure hydrolysis treatment at a temperature of about 250° to 350° C and a pressure of about 500 to 2500 psig for a time sufficient to convert a major proportion of the nitrate to monohydrate,

discharging the volatiles and heat resulting from the pressure hydrolysis treatment into a chamber containing calcined clay and water, whereby the calcined clay is leached to produce an aqueous leach solution of aluminum nitrate.

4,094,956

METHOD OF REDUCING THE SODIUM SULFATE CONTENT OF HALITE

Barrie H. Bieler, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 12, 1977, Ser. No. 824,006
Int. Cl.² C01D 3/04, 3/14, 5/00
U.S. Cl. 423—179 **10 Claims**

1. The method of reducing the sulfate content of a halite, which comprises:

(a) providing pieces of halite which have effective diameters greater than about 2.5 millimeters and are aggregates of sodium chloride crystals, said aggregates containing from about 1 to about 20 volume percent of saturated sodium chloride brine and from about 0.5 to 5.0 weight percent of sulfate bodies which have effective diameters less than about 0.5 millimeters and are embedded in or between said crystals,

(b) crushing said halite pieces and converting said aggregates to crystalline sodium chloride particles, all of which have effective diameters less than 2.5 millimeters and not more than 30 weight percent of which have diameters of less than 0.4 millimeters, thereby exposing a major proportion of said sulfate bodies,

(c) attrition-washing said particles by agitating them with a washing brine which is about 80% or more saturated with sodium chloride and contains less than an amount of sulfate as specified below, said agitation being of such character and intensity that said particles make contact with each other and, as a consequence, a major proportion of said exposed bodies are dislodged from said surfaces,

(d) separating those sodium chloride particles larger than 0.5 millimeter in effective diameter from said brine, and from the dislodged sulfate bodies, the dissolved sulfate content of said washing brine and the amount thereof retained on said larger particles, after said separation, being controlled so that the amount of sulfates added to said particles by the retained washing brine is about 0.05 weight percent or less of their sodium chloride content.

4,094,957

PROCESS FOR REMOVING ACID GASES WITH HINDERED AMINES AND AMINO ACIDS

Guido Sartori, Linden, and David W. Savage, Summit, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Dec. 14, 1976, Ser. No. 750,520
Int. Cl.² B01D 53/34
U.S. Cl. 423—223 **24 Claims**

1. A process for the removal of [acidic components] CO_2 from a gaseous stream *containing* CO_2 which comprises contacting said gaseous stream (1) in an absorption step with an aqueous absorbing solution comprising (a) a basic alkali metal salt or hydroxide selected from the group consisting of alkali metal bicarbonates, carbonates, hydroxides, borates, phosphates and their mixtures, and (b) an activator for said basic alkali metal salt or hydroxide comprising (i) at least one sterically hindered amine containing at least one secondary amino group attached to either a secondary or tertiary carbon atom or a primary amino group attached to a tertiary carbon atom, said sterically hindered amine being a member selected from the group consisting of aminoethers, aminoalcohols, di- and triamines, and (ii) an aminoacid having 4 to 8 carbon atoms *which has the capability to increase the solubility of said sterically hindered amines in alkaline aqueous conditions at elevated temperatures;* and (2) in a desorption and regeneration step desorbing at least a portion of the absorbed [acidic components] CO_2 from said absorbing solution.

4,094,958

PROCESS FOR THE SEPARATION OF NH_3 FROM A GASEOUS MIXTURE CONTAINING NH_3 AND HCN

Ralph Miller, Pleasantville, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 5, 1977, Ser. No. 784,771
Int. Cl.² C01C 3/00
U.S. Cl. 423—238 **8 Claims**

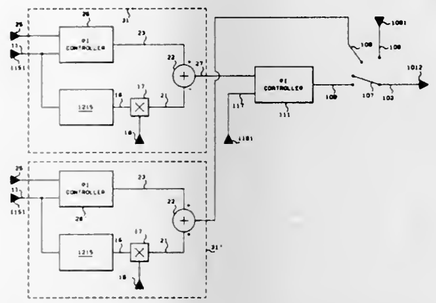
1. A process for the separation of ammonia from a gaseous mixture containing ammonia and hydrogen cyanide which comprises contacting said gaseous mixture in an absorption stage with an absorbent liquor comprising an acidified ammonium nitrate solution thereby selectively absorbing ammonia from said gaseous mixture and forming a solution of diminished acidity, adding nitric acid to the ammonium nitrate-containing solution of diminished acidity to restore its acidity to its initial level and recycling said restored solution to said absorption stage, said nitric acid being present in the liquid and vapor phase of said ammonium nitrate-containing solution in an amount sufficient to inhibit azulmic acid formation.

4,094,959

PROCESS MEASUREMENT AND CONTROL

Donald H. Ball; Robert W. Rutledge, and James D. Voelkers, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 2, 1977, Ser. No. 764,926
Int. Cl.² C01C 1/04; G06F 15/18, 15/46; G06G 7/58
U.S. Cl. 423—359 **23 Claims**



15. A process for the production of ammonia comprising:

a. introducing a fresh feed stream resulting from a first feed stream from a hydrogen source and a second feed stream from a nitrogen source into a reaction zone, said fresh feed stream being a portion of a total feed stream being introduced into said reaction zone,

b. reacting said total feed stream in said reaction zone to convert hydrogen and nitrogen to ammonia and to generate a hydrogen, nitrogen and ammonia-comprising reaction effluent,

c. separating an ammonia product stream from said reaction effluent as the product of the process,

d. recycling a portion of said reaction effluent comprising hydrogen, nitrogen and ammonia as a recycle stream to said reaction zone, said recycle stream being another portion of said total feed stream,

e. measuring the composition of said total feed stream and generating a first process parameter measurement signal representative of the hydrogen to nitrogen ratio of said feed stream,

f. generating in response to first process parameter measurement signal and a process parameter setpoint signal a first intermediate control signal related to the deviation of said first process parameter measurement singal from said process parameter setpoint signal,

g. generating a first transformed signal from said first process parameter measurement signal which is related thereto by the relationship:

$$PP_1 = \frac{k_{41}S}{(1 + c_1S)\ (1 + c_2S) \ldots (1 + c_nS)} \cdot MP_1$$

wherein

MP_1 is said first process parameter measurement signal,

PP_1 is said transformed signal,

S is the Laplace transform operator (d/dt),

k_{41} is a constant not equal to 0,

$c_1, c_2 \ldots c_n$ are constants not equal to 0,

n is an integer of at least 2,

h. combining said first intermediate control signal and said first transformed signal to generate a first process variable signal constituting the weighted sum or difference of the first intermediate control signal and the transformed signal.

i. controlling the relative size of said first feed stream from said hydrogen source and said second feed stream from said nitrogen source in response to said first process variable signal.

4,094,960

PROCESS FOR PRODUCTION OF CARBON BLACK

John W. Vanderveen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 4, 1976, Ser. No. 663,891
Int. Cl.² C01B 31/02; C09C 1/48
U.S. Cl. 423—456 **5 Claims**

1. A process for producing carbon black having a tint of about 113 or higher and a structure of about 117 or higher comprising:

(A) introducing a normally liquid hydrocarbon feedstock into a carbon black reactor essentially in axial direction along the reactor axis, said carbon black reactor comprising:

a. an upstream confining wall,

b. a downstream confining wall,

c. a tubular confining wall between said upstream and said downstream confining wall, which tubular confining wall comprises

aa. connected to said upstream confining wall a longitudinal tubular axial section, at least the downstream portion thereof having essentially triangular cross-section and confining an axial zone,

bb. in open communication and axial alignment with and operatively connected to said axial section a vortex section having an essentially plane upstream wall and connected to said essentially plane upstream wall a cylindrical wall confining a vortex zone, said cylindrical wall having an internal diameter that is larger than the diameter of a circle inscribed into the triangle cross-section of said axial zone, said axial zone opening through said essentially plane upstream wall into said vortex zone,

cc. in open communication and axial alignment with and operatively connected to said vortex section a reaction section confining a reaction zone,

d. first conduit means for the introduction of hydrocarbon feedstock along the reactor axis into the axial zone,

e. vortex generating means for generating a vortex of hot combustion gases in said vortex zone, and

f. second conduit means for the withdrawal of carbon black-containing smoke from the reactor,

(B) generating a vortex of hot combustion gases in said vortex zone close to said cylindrical wall and close to said plane upstream wall,

(C) introducing a stream of essentially oxygen-free gas into said axial zone,

(D) contacting said hydrocarbon feedstock with said hot combustion gases in said reactor to produce a reaction admixture and to pyrolytically decompose said hydrocarbon feed to form carbon black,

(E) passing said reaction admixture through said reaction zone to said downstream confining wall, and

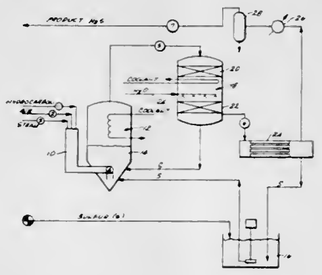
(F) withdrawing a carbon black-containing smoke via said second conduit means from said carbon black reactor.

4,094,961

HYDROGEN SULFIDE PRODUCTION

David K. Beavon, Pasadena, Calif., assignor to Ralph M. Parsons Company, Pasadena, Calif.

Filed Nov. 7, 1974, Ser. No. 521,831
Int. Cl.² C01B 17/16
U.S. Cl. 423—564 **13 Claims**



1. A process for the production of hydrogen sulfide from elemental sulfur which comprises:

(a) forming a reducing gas containing hydrogen and carbon monoxide by combustion of a carbonaceous fuel in the presence of an amount of oxygen insufficient for complete oxidation of the carbonaceous fuel;

(b) passing the reducing gas through a sulfur vaporization zone containing molten sulfur to simultaneously cool the reducing gas and vaporize sulfur while further cooling the sulfur vaporization zone to provide a resultant gaseous mixture containing hydrogen, carbon monoxide and sulfur vaporized by the reducing gas in which the mole ratio of the sum of the hydrogen and carbon monoxide to vaporized sulfur, calculated as S_1, in the resultant gas stream is at least approximately 1.15; and

(c) combining the resultant gaseous mixture with water in an amount sufficient to form a mixture having a water vapor content of at least 10 mole percent in a catalytic conversion zone wherein the sulfur is essentially completey hydrogenated to hydrogen sulfide at a temperature maintained from about 500 to about 800° F by reaction with the

hydrogen present in the reducing gas and hydrogen formed by the reaction of water with the carbon monoxide present in the reducing gas in the presence of a catalyst consisting of at least one supported metal selected from Group Va, VIa, and VIII and the Rare Earth Series of the Periodic Table.

4,094,962

PROCESS FOR PRODUCING HYDROGEN AND SULFUR FROM HYDROGEN SULFIDE

Gioacchino Cocuzza, Catania, and Giuseppe Musso, Osmate (Varese), both of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Apr. 1, 1977, Ser. No. 783,597
Int. Cl.[2] C01B *17/04, 17/06, 1/05*
U.S. Cl. 423—573 R **12 Claims**

1. A process for producing hydrogen and sulfur from hydrogen sulfide, which comprises:

(a) contacting hydrogen sulfide and iodine in a molar excess of said hydrogen sulfide with respect to said iodine, in an aqueous solution of hydriodic acid containing from 50 to about 20% by weight of hydrogen iodide, at a temperature of from 10° to 80° C and at a pressure equal to or higher than atmospheric, thereby to convert said iodine into hydrogen iodide and form sulphur by reaction between said iodine and hydrogen sulfide, the amount of iodine being such as to obtain an aqueous suspension of sulphur, containing in dissolved form unreacted hydrogen sulfide, having a content of hydrogen iodide not exceeding 50% by weight;

(b) recovering said sulphur from said suspension;

(c) desorbing hydrogen sulfide from the resulting solution and recycling said desorbed hydrogen sulfide to stage (a);

(d) rectifying in a distillation column the residual solution obtained in (c), at superatmospheric pressure, thereby to recover hydrogen iodide at the top and an aqueous solution of hydriodic acid at the bottom, said aqueous solution having a content of hydrogen iodide equal to or higher than that of the water-hydrogen iodide azeotrope at the operating pressure, and recycling said aqueous solution of (d) to stage (a);

(e) forming hydrogen and iodine by thermal dissociation of the hydrogen iodide recovered in (d), at a temperature of at least 400° C and a pressure of at least 10 atmospheres, while removing hydrogen from the resulting mixture by diffusion through one or more membranes of palladium alloy and recovering said hydrogen having diffused, recovering iodine from the resulting residual mixture and recycling said recovered iodine to stage (a).

4,094,963

MEANS FOR TESTING FOR PREGNANCY

Brij B. Saxena, Englewood, N.J., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Division of Ser. No. 522,760, Nov. 11, 1974, Pat. No. 4,016,250, which is a continuation-in-part of Ser. No. 454,145, Mar. 22, 1974, abandoned. This application May 20, 1976, Ser. No. 688,277
The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.
Int. Cl.[2] A61K *43/00, 39/00*
U.S. Cl. 424—1 **5 Claims**

1. Means for the determination of human chorionic gonadotropin (HCG), luteinizing hormone (LH) or HCG-like material in an aqueous sample, comprising

(a) a container having therein a first reagent ; and

(b) a separate second container having therein a second reagent;

(c) said first reagent comprising in substantially pure form the specific fraction of plasma membrane extract from the corpus luteum of a species having the receptor for human chorionic gonadotropin capable of selectively binding biologically active human chorionic gonadotropin; and

(d) said second reagent comprising labeled human chorionic gonadotropin capable of emitting radiation, said first reagent being intended to be contacted with the sample containing the hormone to be measured and with the second reagent to bind part of the labeled and unlabeled hormone to said receptor

the emitted radiation therefrom being a function of the concentration of the hormone in the aqueous sample.

4,094,964

CLONIDINE ASSAY

Bevyn Jarrott, Nutley, and Sidney Spector, Livingston, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed May 10, 1977, Ser. No. 795,576
Int. Cl.[2] G01N *33/16;* **A61K** *43/00;* **C07G** *7/00;* **A61K** *39/00*
U.S. Cl. 424—1 **8 Claims**

6. A method for the assay of clonidine in a sample, which method comprises mixing said sample with a known amount of labelled clonidine and an antibody which will selectively complex with clonidine, measuring the degree of binding of said labelled clonidine compound with said antibody, and determining the amount of clonidine present in said sample by comparing said degree of binding to a standard curve obtained by mixing known amount of clonidine with fixed amounts of said labelled clonidine and said antibody and determining the degree of binding for each known amount of clonidine.

4,094,965

DIAGNOSTIC AGENTS CONTAINING ALBUMIN AND METHOD FOR MAKING SAME

Warren W. Layne, Boston, and Eugene L. Saklad, Sudbury, both of Mass., assignors to New England Nuclear Corporation, Boston, Mass.

Filed Apr. 1, 1977, Ser. No. 783,673
Int. Cl.[2] A61K *29/00, 43/00*
U.S. Cl. 424—1.5 **29 Claims**

23. A method of concentrating technetium-99m in vivo in a target tissue of a mammal comprising intravenously administering to the mammal a radioactive composition comprising a mixture of technetium-99m, a reducing agent and delipidized serum albumin.

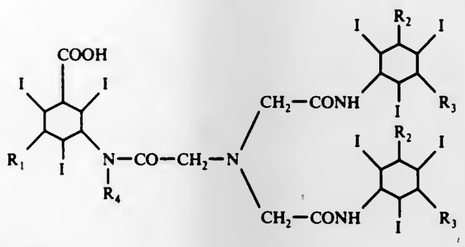
4,094,966

IODOBENZENE DERIVATIVES AND X-RAY CONTRAST MEDIA CONTAINING THE SAME

Guy Tilly; Michel Jean Charles Hardouin, and Jean Lautrou, all of Aulnay-sous-Bois, France, assignors to Laboratoires Andre Guerbet, Aulnay-sous-Bois, France

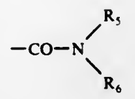
Division of Ser. No. 579,279, May 20, 1975, Pat. No. 4,014,986. This application Dec. 7, 1976, Ser. No. 748,323
Claims priority, application United Kingdom, May 31, 1974, 24169/74; Jul. 31, 1974, 33900/74
Int. Cl.[2] A61K *29/02;* **C07C** *101/68*
U.S. Cl. 424—5 **7 Claims**

1. An iodobenzene derivative selected from the group consisting of a compound of formula

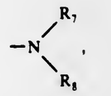


in which:

R_1 is selected from the group consisting of hydrogen, a radical having the formula

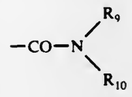


R_5 and R_6 being selected from the group consisting of hydrogen, lower alkyl and lower hydroxy alkyl, and a radical of the formula



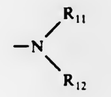
R_7 being a lower alkanoyl radical and R_8 being selected from the group consisting of hydrogen, lower alkyl and lower hydroxylakyl,

R_2 is selected from the group consisting of hydrogen, a radical having the formula



in which

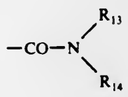
R_9 and R_{10} have the meanings given for R_5 and R_6, and a radical of the formula



in which

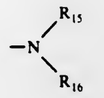
R_{11} has the meaning given for R_7 or represents a hydrogen atom and R_{12} has the meaning given for R_8,

R_3 is selected from the group consisting of hydrogen, a radical having the formula



in which

R_{13} and R_{14} have the meanings given for R_5 and R_6, and a radical of the formula



in which

R_{15} has the meaning given for R_7 or represents hydrogen and R_{16} has the meaning given for R_8,

R_4 is selected from the group consisting of hydrogen, lower alkyl and lower hydroxylakyl, a lower alkyl ester thereof and a salt with a pharmaceutically acceptable base.

5. An X-ray contrast mdium comprising an aqueous solution of an effective amount of a compound as claimed in claim 1.

4,094,967

IODINE-POLYVINYLPYRROLIDONE SOLID PRODUCT AND METHOD OF PREPARATION

Joseph G. Gilbert, Lighthouse Point, Fla., assignor to Allor Foundation, Boston, Mass.

Filed Oct. 22, 1976, Ser. No. 735,088
Int. Cl.[2] A01N *11/00;* **A61K** *31/79, 33/18*
U.S. Cl. 424—28 **12 Claims**

1. A method of making a polyvinylpyrrolidone-iodine composition in which the iodine is stored in solid form protected from light and air-exposure deterioration and is continuously releasable for active pharmacological use by application of at least one of heat and moisture, that comprises, preparing an alcohol or aqueous solution of finely powdered crystalline iodine; forming a solution of polyvinylpyrrolidone; admixing the iodine solution with the polyvinylpyrrolidone solution; adding cinnamic alcohol and thoroughly dispersing the same in the iodine solution-polyvinylpyrrolidone solution; and drying the solution to solid state.

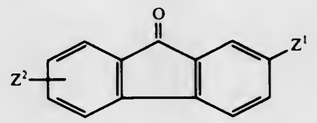
4,094,968

TREATMENT FOR ALLERGY AND METHOD OF COMPOSITION THEREOF

Harold Francis Hodson, Hayes, and John Frederick Batchelor, Beckenham, both of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 394,423, Sep. 5, 1973, Pat. No. 3,939,173. This application Nov. 26, 1975, Ser. No. 635,768
Int. Cl.[2] A61K *9/14;* **A61L** *9/04;* **A61K** *31/41*
U.S. Cl. 424—46 **30 Claims**

1. A method of inhibiting the symptoms of asthma or allergic rhinitis in a mammal susceptible to asthma or allergic rhinitis which comprises the administration to said mammal of a prophylactically effective, non-toxic amount of a compound of formula (I)



(I)

wherein one of Z^1 and Z^2 is a 5-(1-R)tetrazolyl or a 5-(2-R) tetrazolyl group in which R is hydrogen or alkyl having 1 to 6 carbon atoms, and the other is selected from the group consisting of carboxy, 5-(1-R) tetrazolyl and 5-(2-R)tetrazolyl as defined, provided that when Z^2 is 5-(1-R)tetrazolyl or 5-(2-R)tetrazolyl then Z^1 is carboxy; and Z^2 is also selected from the group consisting of hydrogen, nitro, cyano, halogen, alkylsulphinyl and alkylsulphonyl, acyl, alkyl, or alkoxy wherein the "alkyl" moiety of each of the acyl, alkyl, alkoxy, alkylsulphinyl and alkylsulphonyl groups has 1 to 6 carbon atoms; together with salts, and, when Z^1 or Z^2 is carboxy, alkyl esters having 1 to 6 carbons and unsubstituted amides or amides substituted by one or two alkyl groups having 1 to 6 carbons of said compounds of formula (I).

4,094,969

PESTICIDE COMPOSITIONS STABILIZED WITH SULFONATED CATECHIN/LEUCOCYANIDIN COPOLYMER AND METHOD OF USING SAME

Othmer F. Batzer, Libertyville, Ill., and Carlo M. Ignoffo, Columbia, Mo., assignors to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 410,488, Oct. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 124,598, Mar. 15, 1971, abandoned. This application Jun. 16, 1975, Ser. No. 587,068
Int. Cl.[2] A61K *31/74;* **A01N** *15/00*
U.S. Cl. 424—78 **24 Claims**

1. An agricultural pesticidal composition comprising an agronomically acceptable carrier having dispersed therein a light-degradable agricultural pesticide selected from the group consisting of pyrethrin, allethrin, and microbial insecticides in

an amount sufficient to control a target pest and as a stabilizer for said pesticide a sunlight degradation retarding effective amount of a sulfonated copolymer selected from the group consisting of: (a) the products produced by sulfonating hemlock bark copolymers consisting essentially of catechin and leucocyanidin in a mol ratio of about 1:1 to a sulfonic acid content expressed as sulfur dioxide of 9.5 to 12 percent by weight of the total sulfonated copolymer, said sulfonated copolymer having a molecular weight in the range of about 3,000 to 6,000, and (b) non-phytotoxic metal and ammonium salts thereof.

4,094,970

ELASTOMERIC POLYURETHANE-BASED ARTICLES HAVING AN INSECTICIDAL DEPOT GAS ACTION

Wolfgang Behrenz, Overath-Steinenbrueck; Dietmar Schäpel, Cologne, and Manfred Dahm, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 12, 1976, Ser. No. 714,077
Claims priority, application Germany, Aug. 26, 1975, 2537894
Int. Cl.² A01N *9/36;* A61K *31/74*
U.S. Cl. 424—78 **5 Claims**

1. A solid insecticidal article comprising an insecticidally effective amount of at least one volatile phosphoric or thiophosphoric acid ester and about 1 to 10 times its weight of a solid elastomeric polyurethane carrier material formed from a polyisocyanate and units of a long chain polyol having a molecular weight of about 1,000 to 10,000, and of at least one of a short chain polyol and/or polyamine having a molecular weight of about 62 to 1,000, the weight ratio of units of long chain polyol to units of short chain polyol plus polyamine ranging from about 1:1 to 9:1.

4,094,971

IMMUNOLOGICAL ADJUVANT AGENTS ACTIVE IN AQUEOUS SOLUTION

Louis A. Chedid, Paris, and Francoise Marguerite Audibert, Neuilly-sur-Seine, both of France, assignors to Agence Nationale de Valorisation de la Recherche, Neuilly-sur-Seine, France

Filed Aug. 25, 1976, Ser. No. 717,509
Claims priority, application France, Aug. 29, 1975, 75 26704
Int. Cl.² A61K *39/02*
U.S. Cl. 424—92 **40 Claims**

1. A compound, a water-soluble adjuvant which has immunological activity in-vivo when administered to a host in an oil-free aqueous solution, which adjuvant is an acylated peptidoglycane fragment having saccharide units of N-acetylglucosamine and N-acylmuramyl, the acyl radical being glycolyl or acetyl, and the muramyl group having peptide chains linked thereto,

wherein the acyl groups of the peptidoglycane are of a physiologically acceptable polycarboxylic acid, or its anhydride, and the physiologically acceptable salts of the acylated compound.

4,094,972

PROSTAGLANDIN USE IN PROLONGING AND INTENSIFYING FERTILITY IN POULTRY

Bernard James Marquez, East Lansing, Mich., assignor to The Board of Trustees, Michigan State University, East Lansing, Mich.

Filed Aug. 4, 1977, Ser. No. 821,672
Int. Cl.² A61K *35/52, 31/215, 31/19*
U.S. Cl. 424—105 **19 Claims**

1. A mixture comprising

(1) neat poultry semen and

(2) a conventional poultry semen diluent containing per volume of said mixture to be inseminated into a hen, an amount of a poultry-fertility enhancing prostaglandin (POFEN-PG) effective to intensify or prolong fertility in an egg-laying hen into which said mixture is inseminated, said semen and diluent being combined in a ratio sufficiently large to ensure an adequate number of spermatozoa per volume of mixture of fertilization and sufficiently small to ensure easy and complete intermixing of semen and diluent.

4,094,973

MEDICAL PROTEIN HYDROLYSATE AND PROCESS OF USING THE SAME

Harry J. Robertson, Robertson Resource Ltd., Wesley Drive, Salisbury, Md. 21801

Continuation-in-part of Ser. No. 409,145, Oct. 24, 1973, abandoned. This application May 10, 1976, Ser. No. 685,050
Int. Cl.² A61K *37/18, 37/02, 35/12*
U.S. Cl. 424—177 **16 Claims**

1. A therapeutic agent comprising a non-antigenic, protein hydrolysate having polypeptides and amino acids derived by:

comminuting the immature poultry feet and washing them;

commingling said comminuted immature poultry feet with a dilute, mild organic acid at a pH between 6.5 and 3.6 at an elevated temperature up to 155° F;

removing the fat constituent; and

removing the solubilized protein and dissolved minerals at the elevated temperature.

11. The process of treating damaged higher animal tissue for therapeutic purposes comprising the applying to said tissue an effective amount of a non-antigenic protein hydrolysate as claimed in claim 1.

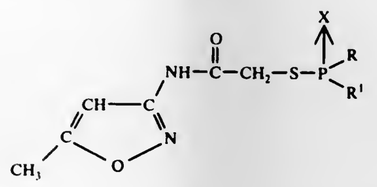
4,094,974

ISOXAZOLE PHOSPHATES AND PHOSPHONATES

Llewellyn W. Fancher, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Feb. 24, 1977, Ser. No. 771,716
Int. Cl.² C07D *261/14;* A01N *9/36*
U.S. Cl. 424—200 **24 Claims**

1. A compound having the formula



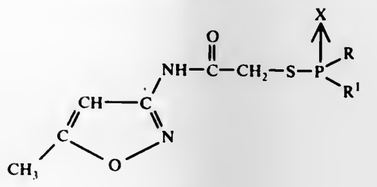
in which

R is alkyl or alkoxy each having 1 to 6 carbon atoms,

R^1 is alkoxy having 1 to 6 carbon atoms, and

X is oxygen or sulfur.

9. A method of controlling insects comprising applying to said insects or the habitat or feedstuff of said insects an insecticidally effective amount of a compound having the formula



in which

R is alkyl or alkoxy each having 1 to 6 carbon atoms,

R^1 is alkoxy having 1 to 6 carbon atoms, and

X is oxygen or sulfur.

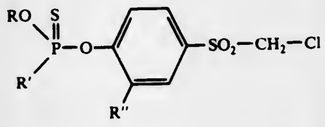
4,094,975

O-ALKYL-O-CHLOROMETHYLSULFONYLPHENYL-THIONOPHOSPHONIC ACID ESTERS AND NEMATICIDAL AND ARTHROPODICIDAL USE

Fritz Maurer; Hans-Jochem Riebel; Rolf Schroder, all of Wuppertal; Wilhelm Sirrenberg, Sprockhoevel; Ingeborg Hammann, Cologne; Bernhard Homeyer, Leverkusen, and Herbert Thomas, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 2, 1977, Ser. No. 764,798
Claims priority, application Germany, Feb. 13, 1976, 2605889
Int. Cl.² A01N *9/36;* C07F *9/18*
U.S. Cl. 424—216 **10 Claims**

1. An O-alkyl-O-(4-chloromethylsulfonylphenyl)thionophosphonic acid ester of the formula



in which

R represents alkyl with 1 to 6 carbon atoms,

R' represents alkyl with 1 to 6 carbon atoms or phenyl, and

R" represents hydrogen or halogen.

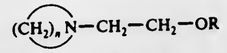
4,094,976

ANTICOCCIDIAL CYCLICAMINO ETHANOLS AND ESTERS THEREOF

Richard A. Dybas, Somerville; Donald W. Graham, Mountainside, and Jeannette E. Brown, Summit, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 586,006, Jun. 11, 1975, abandoned. This application Dec. 29, 1976, Ser. No. 755,366
Int. Cl.² A61K *31/63, 31/65, 31/40*
U.S. Cl. 424—228 **15 Claims**

1. An anticoccidial composition comprising an anticoccidially effective amount of a cyclicamino ethanol compound of the formula:



wherein R is hydrogen or an acyl radical derived from a non-toxic carboxylic acid selected from the group consisting of $C_{1\text{-}10}$ alkanoyl; substituted $C_{1\text{-}5}$ alkanoyl wherein the substituent is halophenyl and diphenyl; carbocyclic alkanoyl containing up to 5 carbon atoms; benxoyl; nitrobenzoyl; nicotinyl, orotoyl; and $C_{1\text{-}10}$ alkane dicarbonyl; wherein *n* is 3, 4 or 5 or a non-toxic acid addition salt thereof, in a chicken feed.

4,094,977

COMBINATION PREPARATION OF ESTROGEN AND PROSTAGLANDIN

Karl Seeger, Hofheim, Taunus, and Fritz Bauer, Bad Soden am Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jun. 24, 1976, Ser. No. 699,262
Claims priority, application Germany, Jun. 26, 1975, 2528419
Int. Cl.² A61K *31/56, 31/215, 31/19*
U.S. Cl. 424—240 **8 Claims**

1. A leutolytically-active pharmaceutical composition comprising an injectable or orally-administrable carrier and, as the active ingredient, a combination of at least one luteolytically effective prostaglandin or a physiologically acceptable salt or ester thereof and at least one estrogen or an ester or ether thereof in a weight ratio from 1:1 to 1:5000.

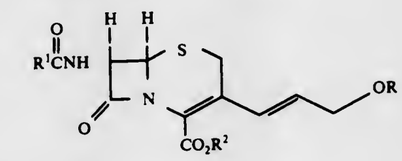
4,094,978

3-PROPENYL DERIVATIVES OF CEPHALOSPORIN, COMPOSITIONS AND THEIR USE

Philip J. Beeby, Melbourne, Australia, assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jul. 29, 1976, Ser. No. 709,696
Int. Cl.² A61K *31/545;* C07D *501/24*
U.S. Cl. 424—246 **36 Claims**

1. A compound having the formula:

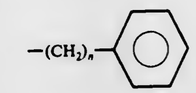


I

wherein

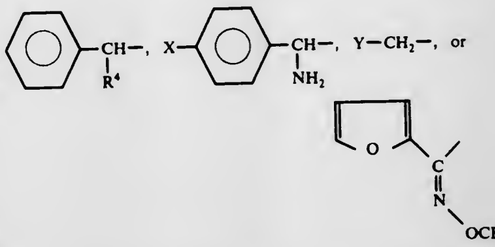
R is hydrogen or a group having the formula

in which R^3 is hydrogen, alkyl having one to six carbon atoms, or the group



in which *n* is 0 to 3, inclusive;

R^1 is a group having the formula



wherein R^4 is hydrogen, hydroxy or carboxy; X is hydrogen or hydroxy; Y is thiophen-2-yl, (1H)-tetrazol-1-yl, 4-pyridylthio, phenoxy or cyano;

R^2 is hydrogen or a protecting group selected from the group of benzhydryl, benzyl, o-nitrobenzyl, p-nitrobenzyl, 3,5-dinitrobenzyl, p-methoxybenzyl, tert-butyl, pivaloyloxymethyl, phenacyl and polyhaloalkyl having two to six carbon atoms; and the pharmaceutically acceptable salts thereof.

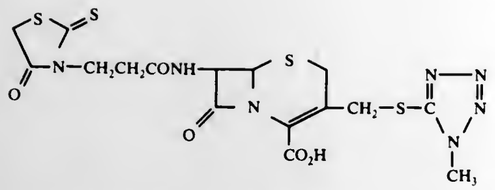
4,094,979

ORALLY ACTIVE CEPHALOSPORINS

Daniel M. Teller, Devon, and John H. Sellstedt, Pottstown, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

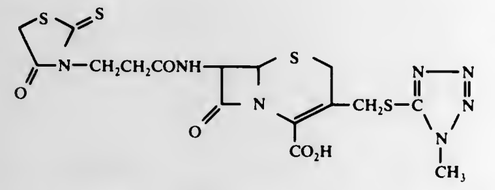
Filed Sep. 24, 1976, Ser. No. 726,709
Int. Cl.² C07D *501/36;* A61K *31/545*
U.S. Cl. 424—246 **7 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof.

7. A pharmaceutical composition for oral administration comprising an antibacterial amount of a compound of the formula:



or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable non-toxic diluent therefor.

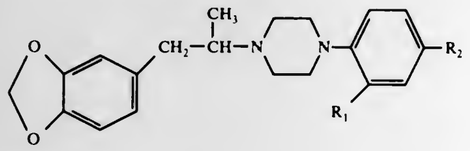
4,094,980

N-[1-(3',4'-METHYLENEDIOXY-PHENYL)-PROPYL-(2)]-N'-PHENYL-PIPERAZINES AND SALTS THEREOF

Ernst-Otto Renth; Anton Mentrup; Kurt Schromm, and Wilhelm Frölke, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 608,455, Aug. 28, 1975, abandoned. This application Dec. 10, 1976, Ser. No. 749,344
Claims priority, application Germany, Sep. 3, 1974, 2442158
Int. Cl.[2] A61K *31/495;* **C07D** *295/08*
U.S. Cl. 424—250 **5 Claims**

1. A compound of the formula



wherein

R_1 and R_2 are chlorine, or

R_1 is methyl and R_2 is methoxy,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective anti-hyperlipidemic or anti-hypercholesteremic amount of a compound of claim 1.

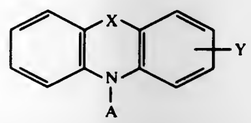
4,094,981

SMOOTH MUSCLE RELAXANT EMPLOYING 10-IMIDOYLACRIDANS

Yao Hua Wu, and Walter G. Lobeck, Jr., both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 670,600, Mar. 26, 1976, Pat. No. 4,046,891, which is a division of Ser. No. 561,462, Mar. 24, 1975, Pat. No. 3,962,252, which is a division of Ser. No. 336,671, Feb. 28, 1973, Pat. No. 3,888,852. This application Jul. 1, 1977, Ser. No. 812,292
Int. Cl.[2] A61K *31/47*
U.S. Cl. 424—257 **8 Claims**

1. The process for producing a smooth muscle relaxant effect in a mammal which comprises administering thereto a non-toxic dose of from about 0.01 to 10 mg./kg. of body weight of said mammal of a compound selected from the group consisting of 10-imidoylacridans having the formula



and a non-toxic pharmaceutically acceptable acid addition salt thereof wherein

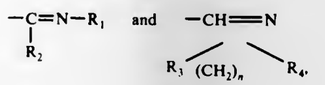
X represents a divalent methylene radical of the formula $-C(Z_1Z_2)-$

wherein

Z_1 and Z_2 are independently selected from hydrogen or straight chain lower alkyl of from 1 to 4 carbon atoms inclusive;

Y represents hydrogen, trifluoromethyl, halogen, dihalogen, lower alkyl of 1 to 4 carbon atoms inclusive, lower alkoxy of 1 to 4 carbon atoms inclusive; and

A is selected from the group consisting of



wherein

R_1 is lower alkyl of 1 to 4 carbon atoms inclusive or cycloalkyl of 3 to 6 carbon atoms inclusive;

R_2 is hydrogen or lower alkyl of 1 to 4 carbon atoms inclusive;

R_3 and R_4 are independent members selected from the group consisting of hydrogen or lower alkyl of 1 to 4 carbon atoms inclusive;

n is an integer of 3 to 5.

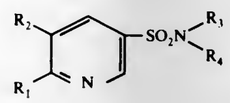
4,094,982

PYRIDINE SULFONAMIDES AND THEIR USE AS ANTICOCCIDIAL AGENTS

Yasuhiro Morisawa; Mitsuru Kataoka; Noritoshi Kitano, and Toshiaki Mastuzawa, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Apr. 28, 1976, Ser. No. 681,154
Claims priority, application Japan, May 15, 1975, 50-58180; Dec. 9, 1975, 50-146501
Int. Cl.[2] C07D *213/02;* **A01N** *9/22*
U.S. Cl. 424—263 **60 Claims**

1. A compound having the formula



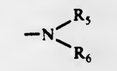
wherein

R_1 represents hydrogen atom, amino group or a group

in which R_5 and R_6 may be the same or different and each represents an alkyl group of 1 to 4 carbon atoms or R_5 is hydrogen atom and R_6 represents an alkyl group of 1 to 4 carbon atoms, an alkenyl group of 3 or 4 carbon atoms or a benzyl group optionally substituted with halogen, cyano, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms;

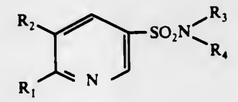
R_2 represents nitro group or an alkylamino group of 1 to 3 carbon atoms;

R_3 and R_4 individually represent hydrogen atom, an alkyl group of 1 to 4 carbon atoms, an alkoxyalkyl group which has 1 to 4 carbon atoms in the alkoxy moiety and 2 to 4 carbon atoms in the alkyl moiety, an alkenyl group of 3 or 4 carbon atoms, an alkanoyl group of 1 to 18 carbon atoms or a benzyl group optionally substituted with halogen, cyano, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms; provided that when R_1 is hydrogen atom and R_2 is nitro group, R_3 and R_4 may be the same or different and each represents said alkyl group or said alkoxyalkyl group or R_3 is hydrogen atom and R_4 is hydrogen atom, said alkyl group, said alkoxyalkyl group, said alkenyl group, said alkanoyl group or said benzyl group, when R_1 is hydrogen atom and R_2 is said alkylamino group, R_3 and R_4 individually is hydrogen atom or they may be the same or different and each represents said alkyl group, when R_1 is amino group and R_2 is nitro group, R_3 and R_4 may be the same or different and each represents said alkyl group or R_3 is hydrogen atom and R_4 is said alkyl group or said alkenyl group, and when R_1 is said group



and R_2 is nitro group, R_3 and R_4 are the same as defined above with respect to the R_5 and R_6.

37. An anticoccidal composition containing an amount, sufficient to inhibit coccidiosis, of a compound having the formula



intimately mixed with an inert carrier, wherein

R_1 represents hydrogen atom, amino group or a group

in which R_5 and R_6 may be the same or different and each represents an alkyl group of 1 to 4 carbon atoms or R_5 is hydrogen atom and R_6 represents an alkyl group of 1 to 4 carbon atoms, an alkenyl group of 3 or 4 carbon atoms or a benzyl group optionally substituted with halogen, cyano, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms;

R_2 represents nitro group or an alkylamino group of 1 to 3 carbon atoms;

R_3 and R_4 individually represent hydrogen atom, an alkyl group of 1 to 4 carbon atoms, an alkoxyalkyl group which has 1 to 4 carbon atoms in the alkoxy moiety and 2 to 4 carbon atoms in the alkyl moiety, an alkenyl group of 3 or 4 carbon atoms, an alkanoyl group of 1 to 18 carbon atoms or a benzyl group optionally substituted with halogen, cyano, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms; provided that when R_1 is hydrogen atom and R_2 is nitro group, R_3 and R_4 may be the same or different and each represents said alkyl group or said alkoxyalkyl group or R_3 is hydrogen atom and R_4 is hydrogen atom, said alkyl group, said alkoxyalkyl group, said alkenyl group, said alkanoyl group or said benzyl group,

when R_1 is hydrogen atom and R_2 is said alkylamino group, R_3 and R_4 individually is hydrogen atom or they may be the same or different and each represents said alkyl group, when R_1 is amino group and R_2 is nitro group, R_3 and R_4 may be the same or different and each represents said alkyl group or R_3 is hydrogen atom and R_4 is said alkyl group or said alkenyl group, and when R_1 is said group

and R_2 is nitro group, R_3 and R_4 are the same as defined above with respect to the R_5 and R_6.

4,094,983

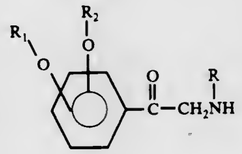
METHOD FOR REDUCING INTRAOCULAR PRESSURE IN WARM-BLOODED ANIMALS

Nicholas S. Bodor, Lawrence, Kans., assignor to Interx Research Corporation, Lawrence, Kans.

Filed Jan. 17, 1977, Ser. No. 759,779
Int. Cl.[2] A61K *31/455;* **A01N** *9/24*
U.S. Cl. 424—266 **21 Claims**

1. A method for lowering intraocular pressure in a warm-blooded animal in need of such treatment which comprises topically applying to the eye thereof, an effective opthalmologically acceptable amount for lowering intraocular pressure of a compound selected from the group consisting of:

Formula I



wherein R represents a memeber selected from the group consisting of hydrogen or a C_1–C_5 straight or branched alkyl group; and wherein R_1 and R_2, which may be the same or different, represents an acyl member selected from the group consisting of alkanoyl having 1–22 carbon atoms, alkenoyl having one or two douple bonds and having 4–22 carbon atoms,

having a total of 4–10 carbon atoms of which 3–7 are ring carbon atoms in cycloalkyl and wherein n is zero, one, or two, phenoxyacetyl, naphthalenecarbonyl, pyridinecarbonyl,

wherein n is zero, one or two and phenyl is unsubstituted or is substituted by 1–3 alkyl having 1–4 carbon atoms, alkoxy having 1–4 carbon atoms, halo, trifluoromethyl, dialkylamino having 2–8 carbon atoms, and alkanoylamino having 1–6 carbon atoms; and an ophthalmologically acceptable acid addition salt thereof.

4,094,984

6-PHENYL-8-BROMO-4H-S-TRIAZOLO-[3,4C]-THIENO-[2,3E]-1,4-DIAZEPINES AND SALTS THEREOF

Karl-Heinz Weber, Gau-Algesheim; Adolf Bauer, Ingelheim am Rhein; Peter Danneberg, Ockenheim, and Franz Josef Kuhn, Bingen, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

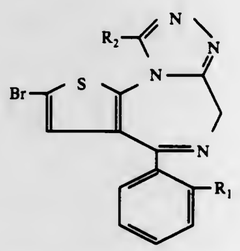
Continuation of Ser. No. 672,280, Mar. 31, 1976, abandoned, which is a continuation-in-part of Ser. No. 554,309, Feb. 28, 1975, abandoned. This application Oct. 6, 1977, Ser. No. 839,792

Claims priority, application Germany, Mar. 2, 1974, 2410030; Jul. 20, 1974, 2435041; Sep. 24, 1974, 2445430; Dec. 21, 1974, 2460776

Int. Cl.[2] **A61K** *31/55;* **C07D** *495/04, 495/14*

U.S. Cl. 424—269 **8 Claims**

1. A compound of the formula



wherein R_1 is hydrogen, fluorine, chlorine, bromine, nitro or trifluoromethyl; and

R_2 is hydrogen, alkyl of 1 to 4 carbon atoms or hydroalkyl of 1 to 4 carbon atoms; or a non-toxic, pharmacologically acceptable acid addition salt thereof.

8. The method of relieving anxiety, relieving tension, relaxing the muscles or suppressing convulsions in a warm-blooded animal, which comprises perorally, parenterally or rectally administering to said animal an effective anxiolytic, tension-relieving, muscle relaxing or anticonvulsive amount of a compound of claim 1.

4,094,985

FUNGICIDAL ISOTHIAZOLES

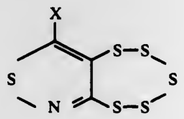
Susan Anne Vladuchick, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 731,981, Oct. 13, 1976, abandoned, which is a continuation-in-part of Ser. No. 625,132, Oct. 23, 1975, abandoned. This application Mar. 17, 1977, Ser. No. 777,881

Int. Cl.[2] **A61K** *31/425;* **C07D** *513/04*

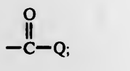
U.S. Cl. 424—270 **18 Claims**

1. A compound of the formula



wherein

X is cyano or



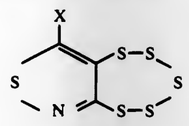
Q is Cl, $—OR_1$, $—SR_1$ or $—NR_2R_3$;

R_1 is hydrogen, alkyl of 1–2 carbon atoms;

R_2 is hydrogen or methyl; and

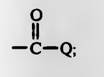
R_3 is hydrogen, alkyl of 1–4 carbon atoms or phenyl, with the proviso that (a) when R_2 is hydrogen, R_3 is hydrogen or alkyl of 1–3 carbon atoms or phenyl and (b) when Q is SR_1, R_1 is not hydrogen.

7. A fungicidal composition consisting essentially of a fungicidally effective amount of a compound of the formula



wherein

X is cyano or



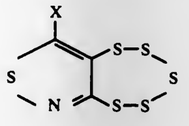
Q is $—OR_1$, $—SR_1$ or $—NR_2R_3$;

R_1 is alkyl of 1–2 carbon atoms;

R_2 is hydrogen or methyl;

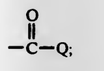
R_3 is hydrogen, alkyl of 1–4 carbon atoms or phenyl; with the proviso that when R_2 is hydrogen, R_3 is hydrogen or alkyl of 1–3 carbon atoms or phenyl, and at least one of (a) an inert diluent and (b) a surface active agent.

13. A method for controlling fungi consisting essentially of applying to the area to be protected a fungicidally effective amount of a compound of the formula



wherein

X is cyano or



Q is $—OR_1$, $—SR_1$ or $—NR_2R_3$;

R_1 is alkyl of 1–2 carbon atoms;

R_2 is hydrogen or methyl;

R_3 is hydrogen, alkyl of 1–4 carbon atoms or phenyl, with the proviso that when R_2 is hydrogen, R_3 is hydrogen or alkyl of 1–3 carbon atoms or phenyl.

4,094,986

2-R-SUBSTITUTED-1,2,5-THIADIAZOLE-3-ONE ANTIMICROBIALS

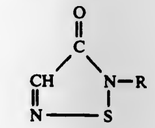
Joshua Rokach, Chonedey-Laval, and Grant W. Reader, Montreal, both of Canada, assignors to M. S. & D. (I.A.) Corp., Rahway, N.J.

Continuation-in-part of Ser. No. 684,137, May 7, 1976, abandoned. This application Jul. 5, 1977, Ser. No. 813,015

Int. Cl.[2] **C07D** *285/10;* **A61K** *31/425*

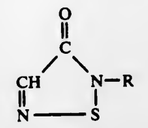
U.S. Cl. 424—270 **14 Claims**

1. A compound of the formula:



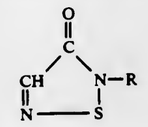
where R is an alkyl group of from 1 to 16 carbon atoms, benzyl or phenyl.

8. A composition for inhibiting growth of bacteria and fungi on agriculturally desirable plants and crops comprising a microbiologically effective amount of a compound of the formula:

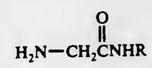


where R is an alkyl group of from 1 to 16 carbon atoms, benzyl, or phenyl and an inert carrier.

12. A method of preparing compounds of the formula:



where R is a hydrocarbon of from 1 to 16 carbon atoms comprising reacting a mole of a compound of the formula:



with from 2 to 5 moles of sulfur monohalide.

4,094,987

2-(3-M-HYDROXY-PHENYL-1-SUBSTITUTED-3-PYRROLIDINYL)-ETHANOLS

Klaus Hasspacher, Riehen, and Michael Strasser, Binningen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

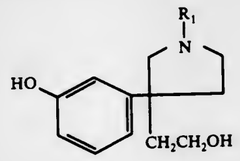
Filed Jan. 24, 1977, Ser. No. 762,209

Claims priority, application Switzerland, Jan. 28, 1976, 1070/76; Jan. 28, 1976, 1071/76

Int. Cl.[2] **C07D** *207/44;* **A61K** *31/40*

U.S. Cl. 424—274 **16 Claims**

1. A compound of formula I,



I

wherein

R_1 is alkyl of 4 to 8 carbon atoms; cycloalkyl of 4 to 6 carbon atoms; phenethyl or phenethyl monosubstituted in the phenyl residue with fluorine, chlorine, bromine, methoxy or alkyl of 1 to 4 carbon atoms,

or a pharmaceutically acceptable salt form thereof.

4. A method of treating pains in animals which comprises administering to an animal in need of such treatment a therapeutically effective amount of a compound of claim 1.

4,094,988

METHOD OF TREATING GASTRIC ULCERS USING 5,6-DIHYDRO-1,4-DITHIINOXIDES

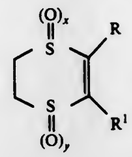
Richard C. Johnson, Ambler, Pa., assignor to Warren-Teed Laboratories, Inc., Columbus, Ohio

Filed Oct. 12, 1976, Ser. No. 731,153

Int. Cl.[2] **A61K** *31/385*

U.S. Cl. 424—277 **7 Claims**

1. A method of treating ulcers which comprises administering to a person in need of such treatment an effective amount of the compound of the formula:



wherein R is lower alkyl having from one to 6 carbon atoms or phenyl; R^1 is lower alkyl of from 1 to 6 carbon atoms and x and y are integers each having a value of 0 to 2 with the sum of x and y being in the range of from 1 to 4.

4,094,989

METHYLENEDIOXY SUBSTITUTED BENZENE DERIVATIVES

Friedrich Karrer, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

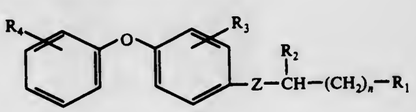
Division of Ser. No. 460,404, Apr. 12, 1974, Pat. No. 3,987,102. This application Oct. 4, 1976, Ser. No. 729,055

Claims priority, application Switzerland, Apr. 18, 1973, 5635/73; Mar. 18, 1974, 3705/74

Int. Cl.[2] **A01N** *9/28*

U.S. Cl. 424—282 **12 Claims**

1. A compound of the formula



(I)

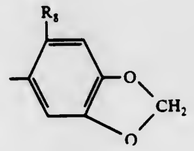
wherein

n represents the numbers 0 or 1,

Z represents oxygen,

or sulphur,

R_1 represents



R_8 represents hydrogen or n-propyl,

R_2 represents hydrogen, methyl or ethyl,

R_3 and R_4 each represent hydrogen, methyl, ethyl, methoxy, ethoxy, nitro or halogen, and

R_7 represents hydrogen or C_1–C_2-alkanoyl.

11. An insecticidal or acaricidal agent containing an insecticidal or acaricidal effective amount of a compound of claim 1 together with a suitable carrier therefor.

12. A method for the control of insects or members of the order Acarina which comprises applying to the locus thereof an insecticidal or acaricidal effective amount of a compound of claim 1.

4,094,990

CERTAIN PHYTOFUNGICIDAL N-FURANYL CARBONYL AND TETRAHYDROFURANYL CARBONYL, N-(SUBSTITUTED)PHENYL ALANINES

Adolf Hubele, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

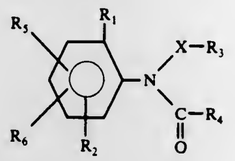
Continuation-in-part of Ser. No. 563,035, Mar. 28, 1975, abandoned. This application Jul. 27, 1976, Ser. No. 709,066

Claims priority, application Switzerland, Apr. 2, 1974, 4572/74; Feb. 10, 1975, 1591/75

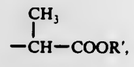
Int. Cl.[2] C07D *307/68;* **A01N** *9/28*

U.S. Cl. 424—285 **17 Claims**

1. A compound of the formula



wherein R_1 represents methyl, R_2 is in ortho-position to the amino group and represents methyl, ethyl or chlorine, —X—R_3 is



R_5 represents hydrogen, alkyl of 1 to 3 carbon atoms or halogen, R_6 represents hydrogen or methyl, the total number of carbon atoms of the substituents R_1, R_2, R_5 and R_6 in the phenyl ring not exceeding 8, R′ is hydrogen, methyl or ethyl, and R_4 is 2-furanyl or 2-tetrahydrofuranyl which may be substituted by methyl or halogen, with the proviso that the phenyl ring contains a further substituent other than hydrogen if it is substituted in 2,6- or in 2,3,6-position by methyl and if at the same time R_4 represents the 2-furanyl radical and —X—R_3 represents the α-propionic acid methyl ester.

14. A phytofungicidal composition comprising as active substance a phytofungicidally effective amount of a compound according to claim 1, together with a suitable carrier therefor.

4,094,991

SUBSTITUTED N-(CARBOXYMETHYL)-3-AMINOPROPAN-2-OL DERIVATIVES

Hiromu Murai; Katsuya Ohata; Hiroshi Enomoto; Shoichi Chokai; Mitsuhiro Machara; Katsuhide Saito, and Takayuki Ozaki, all of Kyoto, Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

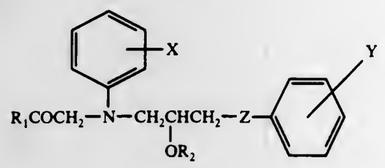
Division of Ser. No. 692,878, Jun. 4, 1976, Pat. No. 4,064,252. This application Jan. 24, 1977, Ser. No. 761,721

Claims priority, application Japan, Jun. 17, 1975, 50-74014; Jun. 17, 1975, 50-74015

Int. Cl.[2] C07C *101/44;* **A61K** *31/195, 31/21*

U.S. Cl. 424—309 **18 Claims**

1. A compound of the formula:



wherein

Z is oxygen or sulfur;

X is hydrogen, halogeno, lower alkyl, lower alkoxy, carboxy, carbo(lower alkoxy) or carbamoyl;

Y, when Z is sulfur, is hydrogen, halogeno or lower alkyl, or, when Z is oxygen, hydrogen, halogeno, lower alkyl, lower alkoxy, aralkoxy, hydroxy, carboxy, carbo(lower alkyl) or cyano;

R_1 is hydroxy or lower alkoxy, unsubstituted or substituted by hydroxy or lower alkoxy; and

R_2 is hydrogen, lower alkyl or alkanoyl of 1 to 7 carbon atoms,

and the pharmaceutically acceptable salts thereof.

17. A pharmaceutical composition for reducing serum cholesterol and triglycerides, which comprises a serum cholesterol- and triglyceride-reducing amount of the compound of claim 1 in combination with a pharmaceutically acceptable solid or liquid inert carrier.

4,094,992

BENZYLIDENE DERIVATIVES

Jean-Pierre Kaplan, Plessis Robinson; Maurice Jalfre, Paris Cedex, and Don Pierre Rene Lucien Giudicelli, Fontenay Sous Bois, all of France, assignors to Synthelabo, Paris, France

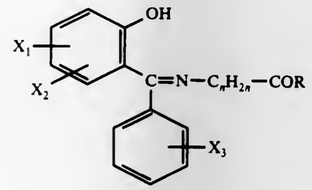
Filed Jul. 16, 1976, Ser. No. 705,938

Claims priority, application France, Aug. 1, 1975, 75 24065

Int. Cl.[2] C07C *103/29*

U.S. Cl. 424—324 **13 Claims**

1. Compound of claim 1



in which one of X_1 and X_3 is halogen, methyl, or methoxy, and X_2 and the other of X_1 and X_3 are each independently hydrogen, halogen, methyl or methoxy, *n* represents an integer from 1 to 10, and R is NH_2, NH-(C_{3-6} cycloalkyl), NH-phenyl, NH-benzyl, NH-(C_{1-4} alkyl), N-(C_{1-4} alkyl)$_2$ or N-(C_{1-4} alkyl)-(benzyl), where each benzyl may be substituted by halogen and/or trifluoromethyl.

4,094,993

ETHERS

Friedrich Karrer, Zofingen, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

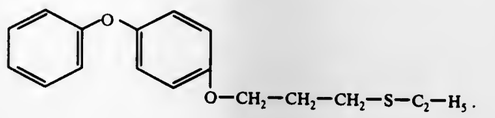
Filed Aug. 18, 1976, Ser. No. 715,353

Claims priority, application Switzerland, Aug. 26, 1975, 11036/75; Jul. 20, 1976, 9281/76

Int. Cl.[2] A01N *9/12;* **C07C** *149/32*

U.S. Cl. 424—337 **1 Claim**

1. A method for the combatting insects and acarids which comprises applying to the locus thereof an insecticidally and acaricidally effective amount of a compound of the formula



4,094,994

NOVEL DI-(3′-HYDROXYPHENYL)-ALKANE COMPOUNDS, PROCESS OF PREPARATION AND THEIR USE IN MEDICINE

Helmut Schonenberger, Unterhaching; Gerhard Kranzfelder, and Helga Schmitt-Wallenborn, both of Munich, all of Germany, assignors to Klinge Pharma GmbH, Munich, Germany

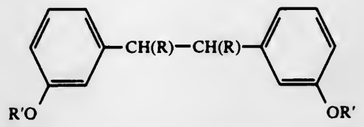
Filed May 3, 1977, Ser. No. 793,321

Claims priority, application Germany, Dec. 22, 1976, 2658307

Int. Cl.[2] A61K *31/05, 31/09;* **C07C** *39/16, 43/12*

U.S. Cl. 424—341 **9 Claims**

1. A di-(3′-hydroxyphenyl)-alkane compound of the general formula (1)



wherein R is a straight or branched alkyl of 1–6 carbon atoms and R′ is hydrogen or methyl.

9. A method for treating breast carcinoma in a mammal comprising orally, parenterally, or subcutaneously administering to said mammal a breast-carcinoma-growth-inhibiting amount of the compound of claim 1.

4,094,995

ETHYNYLBENZENE COMPOUNDS AND DERIVATIVES THEREOF TO TREAT PAIN, FEVER AND INFLAMMATION

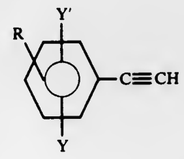
Julius Diamond, Lafayette Hill, Pa., assignor to William H. Rorer, Inc., Fort Washington, Pa.

Division of Ser. No. 574,837, May 14, 1975, which is a continuation of Ser. No. 431,254, Jan. 7, 1974, Pat. No. 3,923,910, which is a division of Ser. No. 268,419, Jul. 3, 1972, Pat. No. 3,852,364. This application Jan. 11, 1977, Ser. No. 758,458

Int. Cl.[2] A61K *31/03;* **C07C** *25/00*

U.S. Cl. 424—353 **73 Claims**

1. A method of treating inflammation, pain or fever in a warm-blooded animal which comprises administering to the animal an effective amount of an active agent which is a compound of the formula



where

R is hydrogen, alkyl of 1 to 7 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, 1 to 7 carbon atoms alkyl substituted cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms, phenyl or substituted phenyl where the substituent is Y″,

Y and Y′ are each selected from the group consisting of hydrogen, halo and trifluoromethyl;

Y″ is selected from the group consisting of Y, and lower alkyl,

with the proviso that at least one of Y and Y′ is other than hydrogen.

4,094,996

PACKAGE OF CONVENIENCE FOOD

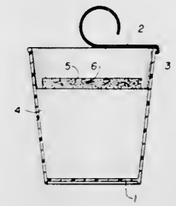
Sakuichi Sakakibara, Kobe; Ko Sugisawa; Takashi Kimura, both of Nara, and Atsushi Yasuda, Sakai, all of Japan, assignors to House Food Industrial Company Limited, Higashi-Osakashi, Japan

Filed May 12, 1977, Ser. No. 796,343

Claims priority, application Japan, May 14, 1976, 51-60170[U]

Int. Cl.[2] B65B *29/06*

U.S. Cl. 426—115 **7 Claims**



1. A package of convenience food comprising:

(a) a container of water-resistant material having an open side;

(b) a body of a first dehydrated food and at least one separate body of a second dehydrated food in said container,

(1) each of said bodies being capable of being reconstituted by contact with hot water,

(2) said first food consisting essentially of at least one source of carbohydrate substantially insoluble in and lighter than water and having a surface directed toward said open side,

(3) said at least one body consisting essentially of foamed or cellular dehydrated solid material substantially insoluble in water but capable of absorbing hot water more quickly than said first food, most of said surface being covered by said at least one body which absorbs water quickly in an amount sufficient to reduce the floating tendency of the carbohydrate material such that the uniform reconstitution of said first dehydrated food is accelerated.

4,094,997

BEEF FLAVOR SUBSTANCE, PROCESS FOR PRODUCING SAME AND BEEF-FLAVORING AGENT

Tetsuo Aishima, and Akio Nobuhara, both of Kasukabe, Japan, assignors to Kikkoman Shoyu Co., Ltd., Noda, Japan

Filed Mar. 10, 1977, Ser. No. 776,367

Claims priority, application Japan, Mar. 12, 1976, 51-26119

Int. Cl.[2] A23L *1/238*

U.S. Cl. 426—533 **17 Claims**

1. A beef flavor substance which is prepared by mixing 1 part by weight of an animal fat with 0.1 to 1.5 parts by weight of a brewed soy sauce, and reacting the resulting mixture at 130° to 220° C. for 5 to 30 minutes.

4,094,998

FLAVORING WITH 1,8-DIHYDROXY-2,9-DITHIA-TRICYCLO TETRADECANE AND DERIVATIVES THEREOF

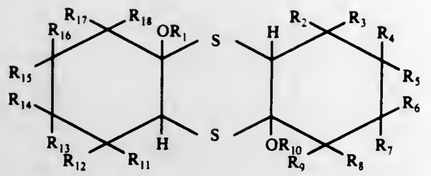
Michael J. Greenberg, Chicago, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Feb. 17, 1977, Ser. No. 769,520

Int. Cl.[2] A23L *1/231*

U.S. Cl. 426—535 **23 Claims**

1. A process for altering the flavor of a foodstuff comprising adding to the foodstuff an amount of a flavorant 1,8-dihydroxy-2,9-dithia-tricyclo[8.4.0.0^{3,8}]tetradecane effective to impart a meat flavor and represented by the formula:



wherein R_2 to R_9 and R_{11} to R_{18} are the same or different, and are an alkyl group containing from 1 to 4 carbon atoms, hydrogen, or a hydroxyl group; and R_1 and R_{10} are the same or different, and are an alkyl group containing from 1 to 4 carbon atoms, an acetyl group, a phenacyl group, or a benzyl group.

4,094,999

ANTIOXIDANT FOR FOODS

Murray S. Cohen, Convent Station, N.J., and Donald E. O'Connell, Marietta, Ohio, assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 8, 1977, Ser. No. 822,599
Int. Cl.[2] A23D *5/04;* A23L *3/00*
U.S. Cl. 426—547 **4 Claims**

1. A food composition stabilized by the presence therein of a minor proportion sufficient to inhibit oxidation thereof a dialkyl pentaerythritol diphosphite wherein the alkyl groups each contain 10–18 carbon atoms.

4,095,000

PROTEIN-SAVING FOODSTUFF AND FODDER ADDITIVE

Max Brenner, Basel, Switzerland, assignor to Max Brenner, Basel, Switzerland

Filed May 16, 1975, Ser. No. 578,228
Claims priority, application Switzerland, May 17, 1974, 6801/74
Int. Cl.[2] A23J *1/00, 3/00;* A61K *37/00;* C07C *103/52*
U.S. Cl. 426—656 **9 Claims**

1. Protein-saving foodstuff and fodder additive, comprising the following linked components:

(1) nutritive substances consisting of essential aminoacids and derivatives thereof selected from the group consisting of methionine, methionylmethionine, glycylmethionine, glycylglycylmethionine, methionylglycine, lysine, glycyllysine, isoleucine, tryptophane and threonine; and mixtures of methionine and lysine, and mixtures of methionine, lysine, leucine, isoleucine, valine, tyrosine, phenylalanine, tryptophane and threonine; and esters and amides of said compounds and of said mixtures of compounds; and α-amino-γ-methylmercapto-butyronitrile; and

(2) polyhydroxy compounds selected from the group consisting of non-reducing disaccharides, oligosaccharides and polysaccharides, all being derived from pentoses and hexoses, derivatives of said polysaccharides which are chemically modified, reducing saccharides, and mixtures thereof, said polyhydroxy compounds being modified by cyanation or phosgenation;

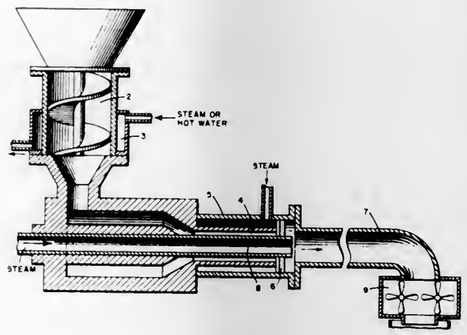
whereby components (1) and (2) are linked by hydrolyzable carbon atoms which upon hydrolysis are released in the form of carbon dioxide, the bonding from said hydrolyzable carbon atoms to component (1) being to primary or secondary amino groups that constitute part of the amino acid or amino acid derivative structure, and the bonding from said hydrolyzable carbon atoms to component (2) being to oxygen or nitrogen atoms attached to carbon atoms of said polyhydroxy compounds, both mutually bonded components being liberated upon hydrolysis at the same time as the carbon dioxide originating from the bonding carbon atoms.

4,095,001

PROTEIN TEXTURIZATION

William M. Hildebolt, Mickleton, and Murray T. Hundt, Maple Shade, both of N.J., assignors to Campbell Soup Company, Camden, N.J.

Filed Dec. 31, 1975, Ser. No. 645,613
Int. Cl.[2] A23J *3/00*
U.S. Cl. 426—656 **16 Claims**



1. A method for producing texturized protein in the form of a relatively dense protein segment having a unidirectional laminated surface structure, said method comprising:

a. mixing untextured protein material and water to form a protein dough, said dough containing from about 60 to about 73% solids;

b. advancing said dough to an extrusion die at a temperature below that at which texturization takes place;

c. continuously extruding said dough in the form of a thin sheet of protein material through said extrusion die while simultaneously texturizing both surfaces of said thin sheet as it passes through said die by applying heat to both surfaces of said sheet from a source external to the die walls;

d. passing the surface-texturized extruded sheet directly into a confined treating zone while simultaneously directing a heated gaseous stream at said extruded sheet as it enters said confined treating zone, said heated gaseous stream being at a pressure such that said extruded thin sheet of protein material is retained in unbroken form for a short distance into said confined treating zone before the shear forces created by said gaseous stream reach sufficient strength to break off a segment of said sheet whereby said unbroken sheet is subjected to the conditions in said confined zone for an extended period of time;

e. breaking off a segment of said extruded sheet with said gaseous stream, said gaseous stream further propelling said segments through said confined treatment zone, said heated gaseous stream being at a temperature such that the protein in the segments which has not yet been texturized is texturized in said confined zone;

f. passing said texturized protein segments through means for maintaining back pressure disposed at the discharge end of said confined treating zone; and

g. recovering said texturized protein segments.

4,095,002

HEAT-CURABLE PULVERULENT COATING AGENT OF A MIXTURE OF COPOLYMERS CONTAINING GLYCIDYL GROUPS AND AN ADDUCT OF ALIPHATIC DICARBOXYLIC ACID AND 2,4,6-TRIS(N',N'',N'''-DIMETHYLAMINOMETHYL)-PHENOL

Themistoklis Katsimbas, Hamburg, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

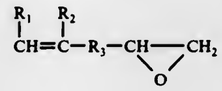
Filed Mar. 21, 1975, Ser. No. 560,636
Claims priority, application Germany, May 22, 1974, 2424809
Int. Cl.[2] C08L *63/00*
U.S. Cl. 427—27 **12 Claims**

1. A pulverulent coating agent comprising a mixture of

A. a copolymer which contains glycidyl groups and which is a copolymer of several ethylenically unsaturated compounds and has a relatively low molecular weight, and

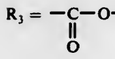
B. an adduct of at least one aliphatic dicarboxylic acid, in an amount of from about 0.8 - 1.1 acid groups per glycidyl group of the copolymer, characterized in that component (A) consists of 80 to 96 percent by weight of copolymers, containing epoxide groups and hydroxyl groups, which copolymers have Durran softening points of about 90° - 120° C and are soluble in organic solvents, of

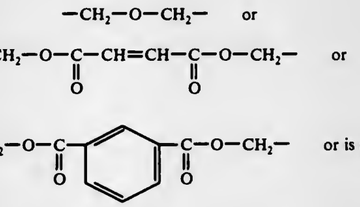
a. 4 to 28 percent by weight of ethylenically unsaturated epoxide monomers with 6 - 12 carbon atoms of the general formula



wherein

R_1 and R_2 = H or $-CH_3$

R_3 =  or



b. 10 - 96 percent by weight of acrylic acid esters or methacrylic acid esters of aliphatic saturated monoalcohols with 1 - 8 carbon atoms, and

c. up to 70 percent by weight of styrene or vinyltoluene; and (B) consists of 4 -20 percent by weight of an adduct of a saturated straight-chain aliphatic dicarboxylic acid of the formula $HOOC-(CH_2)_n-COOH$, wherein n is a whole number from 5 to 12, and 2,4,6-tris(N',N'',N'''-dimethylaminomethyl)-phenol, and these components of the adduct can be present in a weight ratio of 97:3 to 99:1.

4,095,003

DUPLEX COATING FOR THERMAL AND CORROSION PROTECTION

Merle Howard Weatherly, Indianapolis, and Robert Clark Tucker, Jr., Brownsburg, both of Ind., assignors to Union Carbide Corporation, New York, N.Y.

Filed Sep. 9, 1976, Ser. No. 721,863
Int. Cl.[2] C23C *7/00;* C23D *5/00*
U.S. Cl. 427—34 **6 Claims**

1. Method for producing a duplex coating on a substrate to impart thermal and corrosion resistance thereto comprising:

a. plasma depositing on said substrate as a primary layer a first sublayer wherein the particle size of the powder is less than 44 microns and then depositing a second sublayer on said first sublayer wherein the particle size of the powder has a significant fraction greater than 44 microns using powder consisting of a metal alloy selected from the class consisting of nickel alloys, cobalt alloys, iron alloys and mixtures thereof with additions of at least one metal selected from the group consisting of 10 to 50 wt.% chromium, 5 to 25% aluminum, 0.5 to 10wt.% of another metal selected from the class consisting of yttrium, rare earth metals, hafnium, tantalum, tungsten, zirconium, platinum, rhodium, paladium, and silicon, and said layer having a surface roughness of at least 250×10^{-6} inches AA;

b. plasma depositing an oxide layer on said rough primary layer surface such oxide layer consisting of an oxide taken from the class consisting of zirconia, stabilized zirconia, magnesium zirconate and alumina and having a density of less than 88%;

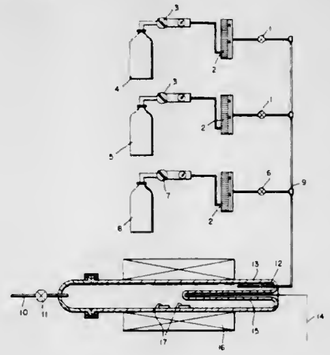
c. and heat treating said duplex coating in a non-oxidizing atmosphere at a time and temperature to permit sintering of the components of the primary layer to cause effective sealing of the primary layer.

4,095,004

PROCESS FOR LOW TEMPERATURE STOICHIOMETRIC RECRYSTALLIZATION OF COMPOUND SEMICONDUCTOR FILMS

Lewis M. Fraas, Malibu, and William P. Bleha, Jr., Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 563,890, Mar. 31, 1975, abandoned. This application Mar. 31, 1977, Ser. No. 783,257
Int. Cl.[2] H01L *21/363, 21/203*
U.S. Cl. 427—74 **6 Claims**



1. A vapor phase controlled processing method for producing recrystallized MX films with improved photoelectric properties where M is a metal taken from Group II or III Of the periodic table and X is a high vapor pressure element taken from Group V or VI of the periodic table comprising the steps of:

(a) depositing an MX compound onto an amorphous substrate taken from the group comprised of soda-lime glass, soda-lime glass overcoated with ITO, sapphire, borosilicate glass, and fused silica via physical vapor deposition to form a thin film;

(b) placing said film into a reaction chamber equipped with a means for introducing alternatively an inert and reactive gaseous atmosphere;

(c) raising the temperature of said film in said chamber to its recrystallization temperatures while purging said chamber with an inert gas;

(d) passing a reactive atmosphere of XH_n where n may be 2 or 3 and H_2 through said chamber whereby a vapor pressure ratio is induced and maintained at the MX compound

stoichiometric level while maintaining said recrystallization temperature over a period ranging from 5 to 50 minutes; and

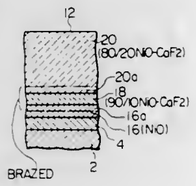
(e) subsequently cooling said film by reintroducing an inert gas until the temperature of said film has returned to room temperature.

4,095,005

METHOD OF PRODUCING LOW WEAR COATING REINFORCED WITH BRAZING SOLDER FOR USE AS RUBBING SEAL

Katsuhiro Kishida, and Akira Oyamada, both of Yokohama, Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed Aug. 10, 1976, Ser. No. 713,264
Claims priority, application Japan, Aug. 18, 1975, 50-99455
Int. Cl.² F01D *11/08*
U.S. Cl. 427—376 B **7 Claims**



1. A method of producing a low wear coating useful as a high temperature rubbing contact seal layer on a metal substrate, the method comprising the steps of:

forming at least one intermediate layer on said substrate by individually flame spraying a powdered material containing at least a major amount of a wear resistant metal oxide selected from the group consisting of NiO and CoO optionally with the addition of a minor amount of a solid lubricating material selected from the group consisting of MgF_2, CaF_2, BaF_2, $Mg_2P_2O_7$, $Ca_2P_2O_7$, CaB_4O_7 and PbO, said powdered material used for at least an outmost one of said at least one intermediate layer containing from 10 to 50 Wt% of a powder of a brazing solder selected from the group consisting of a nickel base solder, a copper base solder and a silver base solder;

forming a surface layer on said outmost intermediate layer by flame spraying a powdered material consisting of a major amount of said metal oxide and a minor amount of said lubricating material; and thereafter

heating said substrate with said at least one intermediate layer and said surface layer thereon to a temperature about the melting point of said brazing solder thereby to cause said brazing solder to melt and partially permeate into an inmost region of said surface layer.

4,095,006

CADMIUM SULFIDE FILM

John Francis Jordan, and Curtis Magill Lampkin, both of El Paso, Tex., assignors to Photon Power, Inc., El Paso, Tex.

Filed Mar. 26, 1976, Ser. No. 670,625
Int. Cl.² H01C *31/00*
U.S. Cl. 427—427 **14 Claims**

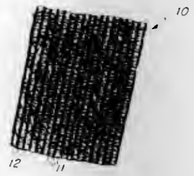
1. The method of forming a film including cadmium sulfide crystals, comprising the step of spraying a solution comprising a water soluble cadmium salt other than cadmium chloride, a water soluble organic sulfur containing compound capable of reacting with a cadmium salt in the presence of chloride ions to form cadmium sulfide crystals, and a water soluble chlorine containing compound, other than cadmium chloride, which freely disassociates chloride ions in aqueous solution to catalyze a reaction involving said cadmium salt and said sulfur containing compound to form a film of said cadmium sulfide crystals on a heated substrate.

4,095,007

BIAXIALLY ORIENTED NONWOVEN FABRICS AND METHOD OF MAKING SAME

Preston F. Marshall, Walpole, Mass., assignor to The Kendall Company, Boston, Mass.

Continuation-in-part of Ser. No. 506,843, Sep. 17, 1974, Pat. No. 3,969,561. This application Jul. 12, 1976, Ser. No. 704,582
The portion of the term of this patent subsequent to Jul. 13, 1993, has been disclaimed.
Int. Cl.² B32B *5/12*
U.S. Cl. 428—113 **5 Claims**



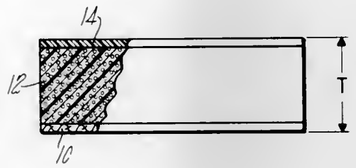
1. In a biaxially oriented nonwoven fabric of fibers having adjacent and alternating striped areas of low fiber density and areas of high fiber density, a majority of the fibers in said low fiber density areas being uniformly distributed therein and oriented in a direction substantially normal to the axis of the striped area and, a majority of the fibers in the high fiber density area that lies directly adjacent to low fiber density areas being uniformly distributed therein and oriented in a direction substantially parallel with the stripes of the low fiber density area, the improvement comprising a majority of the fibers in said low fiber density area are pulled straight thereacross, while a majority of the fibers in said high fiber density area are accordian folded in a manner as to have the fiber segments therein aligned substantially parallel to each other; said fabric having a machine direction to cross direction tensile strength ratio of less than 2 to 1.

4,095,008

SYNTACTIC FOAM MATRIX BOARD

Donald W. Sundstrom, Storrs, and Richard L. Maine, Willimantic, both of Conn., assignors to Rogers Corporation

Filed Aug. 13, 1975, Ser. No. 604,187
Int. Cl.² B32B *3/26, 5/18*
U.S. Cl. 428—215 **10 Claims**



1. A matrix board for molding printing plates including:

a carrier sheet; and

a layer of syntactic foam on said carrier sheet, said layer of syntactic foam including, by weight, from 25–50% thermosetting resin, said thermosetting resin being not more than partially cured, from 25–75% hollow particles and from 5–25% an aqueous latex dispersion binder;

said matrix board being deformable under pressure of from 25 psi to 125 psi and curable on exposure to heat to form a matrix board for the molding of printing plates.

3. A matrix board as in claim 1 wherein:

said carrier sheet is a relatively thin layer of from 0.004 to 0.020 inches; and

said syntactic foam layer is a relatively thick layer of from 0.060 to 0.500 inches.

4,095,009

Patent Not Issued For This Number

4,095,010

GLASS FIBER WOOL BINDER

Wade V. Zellar, and Carl R. Strauss, Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Feb. 9, 1977, Ser. No. 767,089
Int. Cl.² B32B *17/02;* C03C *25/02;* C08L *61/06, 89/04*
U.S. Cl. 428—375 **12 Claims**

1. At least one glass fiber at least a portion of the surface of which is in contact with a residue produced by removing water from an aqueous composition comprising: (1) a phenolic resole resin, (2) animal bone glue, (3) a sulfite process lignin and (4) dicyandiamide.

7. An aqueous composition comprising: (1) a phenolic resole resin, (2) animal bone glue, (3) a sulfite process lignin, and (4) dicyandiamide.

4,095,011

ELECTROLUMINESCENT SEMICONDUCTOR DEVICE WITH PASSIVATION LAYER

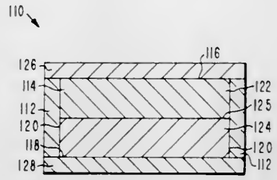
Frank Zygmunt Hawrylo, Trenton, and Henry Kressel, Elizabeth, both of N.J., assignors to RCA Corp., New York, N.Y.

Filed Jun. 21, 1976, Ser. No. 698,482
Int. Cl.² B32B *15/04*
U.S. Cl. 428—469 **4 Claims**

1. An electroluminescent semiconductor device comprising:

a body of III–V semiconductor material having as a constituent component arsenic, said body having a first surface, a second surface opposite said first surface, side surfaces substantially perpendicular to said first and second surfaces, said body being capable of emitting electroluminescence from at least one of said side surfaces, and

a passivation layer on at least said emission surfaces, said passivation layer being of a material selected from the



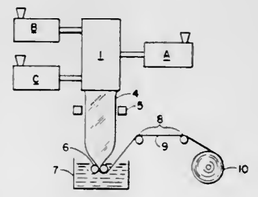
group consisting of arsenic sulfide, As_2S_3, arsenic selenide, As_2Se_3, and arsenic telluride, As_2Te_3.

4,095,012

ORIENTED NYLON AND LAMINATES THEREOF

Henry G. Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co., Duncan, S.C.

Continuation-in-part of Ser. No. 535,772, Dec. 22, 1974, abandoned. This application Aug. 2, 1976, Ser. No. 710,511
Int. Cl.² B28B *3/20;* B29C *'/00;* C08L *77/00;* B32B *27/34*
U.S. Cl. 428—474 **5 Claims**



1. A laminated film article comprising:

(a) a moisture-free layer comprising a blend of 20 to 80% by weight of nylon 6 and 80 to 20% by weight of nylon 66; and,

(b) polymeric layers laminated to each side of said blended nylon layer, said polymeric layers comprising polymers selected from the group consisting of olefin polymers and copolymers.

4. A film comprising:

(a) a blend of 20 to 80% by weight of nylon 6 with 80 to 20% by weight of nylon 66; and,

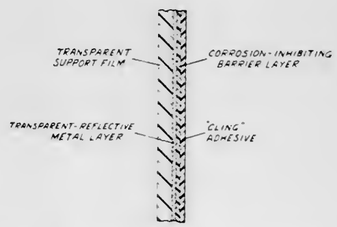
(b) said film being oriented in at least one direction.

4,095,013

REUSABLE SOLAR CONTROL FILM AND METHOD OF MAKING

Thomas J. Burger, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 16, 1977, Ser. No. 796,873
Int. Cl.² B32B *27/30*
U.S. Cl. 428—522 **6 Claims**



1. In a solar control sheet material comprising a self-supporting transparent film, a transparent-reflective coat of metal

bonded to one face of said film, and a layer of polymeric material protectively overlying said metal coat, said sheet material having particular utility for application to the room side of windowpanes to reduce light transmission and heat transmission from outside,

the improvement comprising, bonded to said product over said layer of polymeric material, a thin, transparent stratum of plasticized resin composition, said composition consisting essentially of a blend of

1. 100 parts by weight of solvent-soluble copolymer of vinyl monomers, consisting essentially of either
   a. 80–97 parts by weight of vinyl chloride and 3–20 parts by weight of monomers selected from the group consisting of vinyl acetate, vinyl alcohol and dibasic acid, or
   b. vinylidene chloride:acrylonitrile copolymer,
2. 5 to 100 parts by weight of at least one plasticizer for vinyl resins,
3. 1 to 5 parts by weight of at least one lubricating, chlorine-scavenging light stabilizer for vinyl resins, said stabilizer being a liquid soap selected from the class consisting essentially of
   a. soaps of at least two divalent metals selected from the group consisting essentially of barium, cadmium and zinc, and
   b. tin soaps,
4. 5 to 200 parts of at least one tack-controlling, adhesion buildup-inhibiting polymeric modifier selected from the class consisting of polymethylmethacrylate, polyethylmethacrylate, polyisobutylmethacrylate, poly-n-butylmethacrylate, poly-n-butylmethylmethacrylate, and n-butylmethacrylate: isobutylmethacrylate copolymer,

said stratum being further characterized by adhesion to glass in the range of 2–40 grams per centimeter of width throughout a temperature range of 20° - 65° C., even after exposure to a temperature of 65° C. for 2 weeks,

whereby said product can be repeatedly utilized in the cycle of being applied to and firmly bonded to a windowpane, thereafter subjected to a wide range of sun exposure and temperatures for a period of months without either degradation or excessive adhesive buildup, and removed without distortion.

4,095,014

WEAR-RESISTANT ZINC ARTICLES

Richard C. Iosso, 301 South Lancaster Ave., Mt. Prospect, Ill. 60056

Filed Jul. 6, 1976, Ser. No. 702,533
Int. Cl.² B32B *15/00*
U.S. Cl. 428—658 **2 Claims**

1. An article of manufacture which comprises a zinc base metal having a substantially continuous, wear-resistant chromium skin layer on at least one surface thereof and a chromium-enriched subsurface layer of said zinc base metal immediately below said chromium skin layer; said subsurface layer containing at least about 0.1 percent by weight chromium, having a gradually decreasing chromium content in a direction inwardly away from said skin layer, being at least as thick as said skin layer, and having a hardness greater than the hardness of said zinc base metal below said subsurface layer.

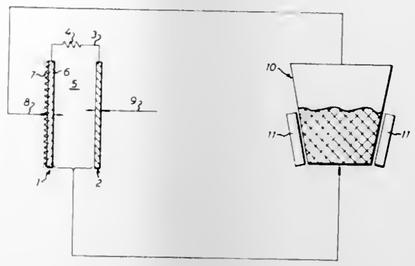
4,095,015

GALVANIC PROCESSES AND ANODES FOR CARRYING THE PROCESSES INTO EFFECT

Olle Lennart Siwersson, Helsingborg; Arne Evert Wall, Landskrona, and Olle Nilsson, Lund, all of Sweden, assignors to AB S. T. Powercell, Helsingborg, Sweden

Continuation of Ser. No. 594,093, Jul. 8, 1975, abandoned. This application Aug. 2, 1976, Ser. No. 710,643
Claims priority, application Sweden, Jul. 15, 1974, 7409209
Int. Cl.² H01M *8/20*
U.S. Cl. 429—15 **9 Claims**

1. A process of counteracting the formation of a passivating anode coating in the operation of a galvanic primary cell comprising an alkaline electrolyte, an anode, a cathode and an electrolyte chamber therebetween which are interconnected via an outer circuit for tapping electric energy, the active material of the anode consisting essentially of iron, particularly iron powder, while the cathode is an oxygen or an air elec-



trode, comprising supplying oxygen in liquid complexed form obtained by complexing oxygen with an oxygen complexing agent which is an aromatic compound, and complexing the iron ions formed at the anode with a complexing agent for iron ions.

4,095,016

PROCESS FOR THE POLYMERIZATION OF α-OLEFINS

Frederick Elias Carrock, Paramus; Peter James Perron, Pompton Plains, and Edward August Zukowski, Clark, all of N.J., assignors to Dart Industries, Inc., Los Angeles, Calif.

Filed Dec. 15, 1976, Ser. No. 750,751
Int. Cl.² C08F *4/66, 10/06*
U.S. Cl. 526—137 **8 Claims**

1. In a process for the continuous polymerization of at least one α-olefin monomer having from 2 to 8 carbon atoms per molecule wherein monomer feed and catalyst components are fed continuously to the reactor and product is withdrawn in a substantially continuous fashion as a slurry in liquid monomer, said slurry having a solids content between about 15 and about 50 percent by weight, the improvement which comprises: polymerizing the α-olefin monomer at a temperature between about 125° F and about 175° F and at a pressure of at least 150 psi and sufficient to maintain monomer in the liquid phase in the presence of a catalyst system comprising:

(1) between about 0.02 and about 0.3 percent by weight based on the α-olefin monomer feed rate of a modified titanium trichloride component obtained by agitating in the presence of a liquid aromatic hydrocarbon diluent at a temperature of from about 140° F to about 176° F a titanium trichloride of the formula $n{\cdot}TiCl_3{\cdot}AlCl_3$, where n has a value between about 1 and about 5, with sufficient phosphorus oxitrichloride to provide a titanium to phosphorus mole ratio of about 3:1 to about 10:1 in the modified component, separating said component from the diluent and drying said component;

(2) an organoaluminum compound selected from aluminum trialkyls or dialkyl aluminum halides or mixtures thereof in amounts from about 1.9 moles to about 4 moles per mole of titanium chloride, and

(3) between about 40 and about 150 ppm by weight based on the α-olefin monomer feed rate of a trialkyltrithiophosphite, wherein each of the alkyl groups contain from 1 to 20 carbon atoms.

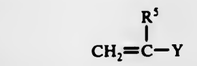
4,095,017

VINYL MONOMER POLYMERIZATION OR COPOLYMERIZATION CATALYZED BY ORGANOALUMINUM-ORGANOPHOSPHINE-METAL SALT OF A BETA-DIKETONE CATALYST SYSTEM

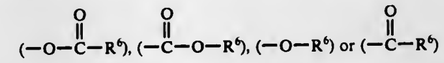
Henry L. Hsieh, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 577,137, May 13, 1975, Pat. No. 4,020,018, which is a division of Ser. No. 416,816, Nov. 19, 1973, Pat. No. 3,925,317. This application Jan. 21, 1977, Ser. No. 761,081
Int. Cl.² C08F *4/52*
U.S. Cl. 526—188 **22 Claims**

1. A process for the polymerization of at least one vinyl monomer selected from the group consisting of vinyl esters, vinyl ethers, and vinyl ketones, represented by



wherein R^5 represents hydrogen or an alkyl, aryl, alkaryl, or aralkyl, radical containing up to 8 carbon atoms, and Y is



wherein R^6 represents an alkyl, aryl, alkaryl, or aralkyl, radical containing up to 20 carbon atoms under polymerization conditions, employing a catalyst system comprising (I) a hydrocarbon aluminum compound R_nAlH_m wherein each R is a hydrocarbon radical, n is an integer of 1 to 3, inclusive, and m is 0 or an integer of 1 or 2, such that $n + m$ equals 3, (II) a triorganophosphine compound R'_3P wherein R' is hydrocarbon or alkoxy-substituted hydrocarbon, and (III) a beta-diketone substantially as the metal salt of said beta-diketone, in catalytically effective ratios, wherein said metal of said (III) is beryllium, magnesium calcium, strontium, barium, boron, aluminum, gallium, indium, thallium, germanium, tin, lead, zinc, cadmium, or mercury.

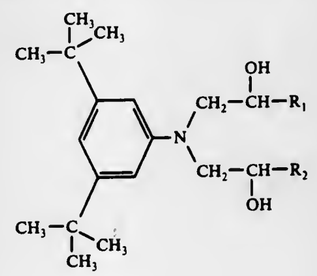
4,095,018

N,N-BIS-HYDROXYALKYL-3,5-DI-T-BUTYL ANILINES ACCELERATORS FOR REDOX POLYMERIZATION OF UNSATURATED COMPOUNDS

Werner Schmitt; Robert Purrmann, both of Starnberg, and Peter Jochum, Hechendorf, all of Germany, assignors to ESPE Fabrik Pharmazeutischer Praparate GmbH, Germany

Filed Dec. 17, 1976, Ser. No. 751,726
Claims priority, application Switzerland, Dec. 24, 1975, 16787/75
Int. Cl.² C08F *4/40, 20/04, 20/10, 20/14*
U.S. Cl. 526—211 **5 Claims**

1. In a method for the redox polymerization of unsaturated compounds, the improvement which comprises using as the accelerator in said polymerization N,N-bis-hydroxyalkyl-3,5-di-t-butyl anilines having the structural formula



wherein R_1 and R_2 are the same or different and are H or a lower alkyl group having 1 to 4 carbon atoms.

4,095,019

FREE RADICAL POLYMERIZATION PROCESS UTILIZING NOVEL INITIATORS

Kenneth H. Markiewitz, and Alfred J. Restaino, both of Wilmington, Del., assignors to ICI Americas Inc., Wilmington, Del.

Filed Apr. 5, 1976, Ser. No. 673,539
Int. Cl.² C08F *4/00, 20/70, 26/00, 116/00*
U.S. Cl. 526—215 **27 Claims**

1. A method of polymerizing a monomer composition containing one or more ethylenically unsaturated compounds susceptible to free radical polymerization which comprises initiating polymerization by contacting the composition with an effective amount of dissolved initiating compound of the formula $R_1{-}N{-}(CH_2COOH)_2$ where R_1 is substituted or unsubstituted aryl radical, provided that the ethylenically unsaturated compounds do not contain any group with which the acid group of the initiator will preferentially react chemically.

4,095,020

PROCESS FOR CONTROLLED PHASE TRANSFORMATION OF ALPHA PHASE OF POLY(VINYLIDENE FLUORIDE) TO THE GAMMA PHASE

William M. Prest, Jr., Webster, and David J. Luca, Marion, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 25, 1977, Ser. No. 772,069
Int. Cl.² C08F *6/00*
U.S. Cl. 528—494 **2 Claims**

1. A process for enhancement in the electret behavior of poly(vinylidene fluoride), said process comprising:

(a) providing a sample of poly(vinylidene fluoride), said sample comprising predominately the alpha and/or beta phase of said polymer;

(b) contacting said sample with a phase transformation agent, said phase transformation agent comprising a block copolymer having at least one siloxane segment and at least one oxyalkylene segment

the siloxane segment of said block copolymer comprising at least one trifunctional silicon atom and at least three difunctional silicon atoms,

the trifunctional silicon atom being bonded to three oxygens and a single monovalent hydrocarbon radical and joined to the difunctional silicon atoms through oxysilicon bonds,

the difunctional silicon atoms having bonded thereto two monovalent hydrocarbon radicals and the oxyalkylene segment of the block copolymer,

the oxyalkylene segment of the block copolymer comprising at least five oxyalkylene groups bonded to one another by oxycarbon bonds and bonded at one end to the siloxane segment of the copolymer and encapped at the other end with a monoether radical;

(c) heating the sample of poly(vinylidene fluoride) either concurrent with or subsequent to contact with the phase transformtion under controlled conditions,

whereby the temperature of the sample is elevated to 30K° below the point at which substantially all of alpha phase of the sample is melted and thereafter allowed to increase at rate of less than about 5K° per minute through the melt region of the polymer to a temperature about 5K° in excess of the peak endotherm of the alpha phase; and

(d) cooling the sample sufficiently to result in its recrystallization to the gamma phase of the polymer.

4,095,021

3-CARBAMOYLOXYMETHYL OR N-METHYL-CARBAMOYLOXYMETHYL-7-[2-CARBOXYMETHOXYIMINO-2-(FUR-2-YL OR THIEN-2-YL)ACETAMIDO]CEPH-3-EM-4-CARBOXYLIC ACIDS AND DERIVATIVES THEREOF

Janice Bradshaw, Harrow; Martin Christopher Cook, Liverpool, and Gordon Ian Gregory, Chalfont St. Peter, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

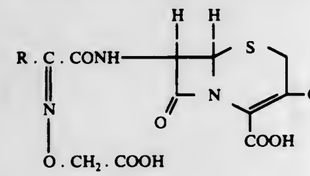
Division of Ser. No. 533,451, Dec. 16, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 668,244

Claims priority, application United Kingdom, Dec. 21, 1973, 59517/73

Int. Cl.[2] C07D *501/34;* A61K *31/545*

U.S. Cl. 544—22 **4 Claims**

1. A compound selected from the group consisting of a cephalosporin antibiotic of the formula



wherein

R is thienyl or furyl; and

R' is hydrogen or methyl and a physiologically acceptable salt, ester or 1-oxide thereof.

4,095,022

PRODUCTION OF BIS-(MORPHOLINO-N-ALKYL) ETHERS

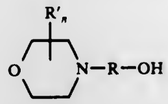
Michael E. Brennan; Philip H. Moss, and Ernest L. Yeakey, all of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 583,014, Jun. 2, 1975, Pat. No. 4,026,935. This application Apr. 23, 1976, Ser. No. 679,590

Int. Cl.[2] C07D *265/28*

U.S. Cl. 544—87 **13 Claims**

1. A process for producing a bis-(morpholino-N-alkyl) ether compound from the corresponding N-(hydroxyalkyl)morpholine compound, said N-(hydroxyalkyl)morpholine compound having the formula:



wherein R is a straight chain or a branched chain alkyl radical of from 2 to 10 carbon atoms, R' is a lower alkyl radical, and n is an integer from 0 to 4 comprising the steps of:

contacting said N-(hydroxyalkyl)morpholine compound with a catalytically effective amount of a phosphorus-containing substance selected from the group consisting of acidic metal phosphates, phosphoric acids and their anhydrides, or phosphorous acids and their anhydrides, alkyl or aryl phosphate esters, alkyl or aryl phosphite esters, alkyl or aryl substituted phosphorous and phosphoric acids, alkali metal monosalts of phosphoric acid, the thioanalogs of the foregoing, phosphoric acid-impregnated silicas having from about 10 to about 30 wt. % phosphoric acid and mixtures thereof, at a temperature of from about 200° C to about 300° C under a pressure sufficient to maintain the mixture substantially in liquid phase; and

recovering said bis-(morpholino-N-alkyl) ether compound from the reaction mixture.

4,095,023

6-METHOXY-N-VANILLYLIDENE-4-CHROMANAMINE

George C. Wright, and Marvin M. Goldenberg, both of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jul. 1, 1977, Ser. No. 812,105

Int. Cl.[2] C07D *311/68*

U.S. Cl. 542—422 **1 Claim**

1. The compound 6-methoxy-N-vanillylidene-4-chromanamine.

4,095,024

PROCESS FOR THE MANUFACTURE OF 1-ARYL-3-CARBOXYPYRAZOLID-5-ONES

Ian George Cameron Fleming, and Raymond Vincent Heavon Jones, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

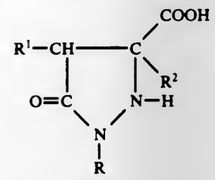
Filed Jan. 30, 1976, Ser. No. 653,832

Claims priority, application United Kingdom, Jan. 31, 1975, 4291/75

Int. Cl.[2] C07D *231/08*

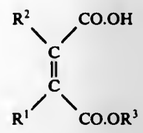
U.S. Cl. 548—367 **6 Claims**

1. A process for the manufacture of a 1-aryl-3-carboxypyrazolid-5-one compound of the formula: Ser. No. 653,832 - Fleming et al



(1)

wherein R^1 and R^2 represent hydrogen and R represents phenyl; phenyl substituted with a member of the group consisting of methyl, chloro, nitro, carboxy and sulpho; naphthyl; sulphonaphthyl; nitro-disulphostilbenyl; diphenyl; diphenylamine; diphenyloxide; diphenyl sulphide; diphenylethane and their mono- or di-sulphonated derivatives which comprises heating, in an aqueous medium and in the presence of an acid-binding agent, a mixture of a hydrazine of the formula $R.NH.NH_2$ with an ester of the formula:



(2)

wherein R_3 is an alkyl, cycloalkyl, aralkyl or aryl group.

4,095,025

1,3-DIARYL-PYRAZOL-4-ACRYLIC ACID AND DERIVATIVES

Robert Anthony Newberry, Bourne End, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

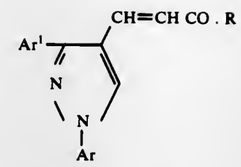
Filed Nov. 30, 1971, Ser. No. 203,458

Claims priority, application United Kingdom, Dec. 7, 1970, 58051/70

Int. Cl.[2] C07D *231/12*

U.S. Cl. 548—378 **2 Claims**

1. A compound having the formula



in which Ar and Ar^1 are aryl radicals selected from the group consisting of phenyl, halophenyl, lower alkyl phenyl, lower alkoxyphenyl, dimethoxyphenyl, hydroxyphenyl, nitrophenyl, di-(lower alkyl)aminophenyl, trifluoromethylphenyl, methylthiophenyl, furyl, thienyl and pyrryl with the proviso that at least one of Ar and Ar^1 is phenyl or substituted phenyl; and R is a member of the group consisting of hydroxy, lower alkoxy and amido.

4,095,026

PYRAZOLINE COMPOUNDS HAVING INSECTICIDAL ACTIVITY

Rudolf Mulder, and Kobus Wellinga, both of Weesp, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

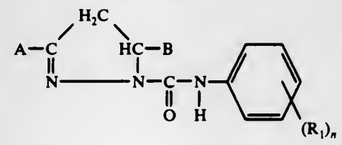
Division of Ser. No. 547,991, Feb. 7, 1975, Pat. No. 3,991,073, which is a continuation of Ser. No. 329,690, Feb. 5, 1973, abandoned. This application Aug. 19, 1976, Ser. No. 715,706

Claims priority, application Netherlands, Feb. 9, 1972, 7201674

Int. Cl.[2] C07D *231/06*

U.S. Cl. 548—379 **19 Claims**

1. A compound of the formula



wherein:

A is phenyl, phenyl substituted by 1 or 2 **substituents selected from the group consisting of halogen, cyano, alkyl of from** 1 to 4 carbon atoms and may be substituted by halogen, cycloalkyl, alkoxy of from 1 to 4 carbon atoms, alkylthio of from 1 to to carbon atoms and amino substituted by 1 or 2 alkyls of from 1 to 4 carbon atoms or thienyl which may be substituted by a halogen atom or a lower alkyl,

B is phenyl, phenyl substituted by from 1 to 3 substituents selected from the group consisting of a halogen atom, alkoxy consisting of from 1 to 4 carbon atoms, alkyl of from 1 to 4 carbon atoms and may be substituted by halogen, cycloalkyl, thioalkyl of from 1 to 4 carbon atoms, sulfonylalkyl of from 1 to 4 carbon atoms, dioxy alkylene of from 1 to 4 carbon atoms amino substituted by 1 or 2 alkyls each of from 1 to 4 carbon atoms furyl or thienyl which may be substituted by halogen or lower alkyl,

R_1 is halogen, alkoxy of from 1 to 4 carbon atoms, alkyl of from 1 to 4 carbon atoms and may be substituted by halogen, cycloalkyl, thioalkyl of from 1 to 4 carbon atoms, sulfonylalkyl of from 1 to 4 carbon atoms, cyano, nitro or amino group substituted by 1 or 2 alkyls,

n is 1 or 2, with the provisio that when A represents a disubstituted phenyl these substituents do not occupy the 2,6 positions of the phenyl group, and that when n is 2 the substituents represented by R_1 are not attached to the 2 and 6 positions of the phenyl group to which they are attached.

4,095,027

2-CARBALKOXY-2'-AMINOCARBONYLDIPHENYL SULFIDES

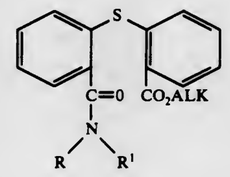
Nariman Bomanshaw Mehta, and Lawrence Edward Brieaddy, both of Raleigh, N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 597,697, Jul. 21, 1975, Pat. No. 3,997,540. This application Sep. 23, 1976, Ser. No. 725,923

Int. Cl.[2] C07C *149/41*

U.S. Cl. 560—18 **10 Claims**

1. The compound of the formula



where R and R^1 are the same or different and are each hydrogen or lower alkyl and ALK is alkyl of 1 to 4 carbon atoms, in the above lower alkyl has 1 to 4 carbon atoms.

4,095,028

SUBSTITUTED DIOXAMIC ACID ESTERS

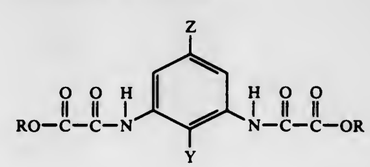
Charles M. Hall, and John B. Wright, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 382,762, Jul. 26, 1973, Pat. No. 3,993,679, which is a continuation-in-part of Ser. No. 317,005, Dec. 20, 1972, abandoned. This application Aug. 16, 1976, Ser. No. 714,572

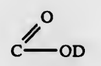
Int. Cl.[2] C07C *125/00;* A61K *31/24*

U.S. Cl. 560—44 **13 Claims**

1. A compound of the formula

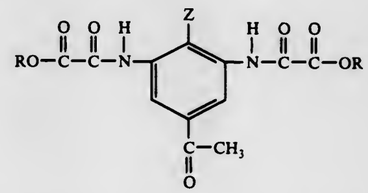


wherein R is alkyl of one to three carbon atoms, inclusive; Z is trifluoromethyl or



wherein D is hydrogen or alkyl of one to three carbon atoms, inclusive; Y is hydrogen, methyl or chloro, with the proviso that when Z is trifluoromethyl, Y is chloro.

10. Compounds of the formula

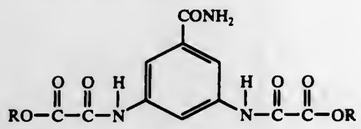


wherein R is selected from the group consisting of, alkyl of from one to three carbon atoms

Z is selected from the group consisting of hydrogen, alkyl of from one to three carbon atoms, inclusive, alkoxy of from

one to three carbon atoms, inclusive, fluoro, chloro, and bromo.

12. A compound of the formula



wherein R is alkyl of one to three carbon atoms, inclusive.

4,095,029

2-HYDROXY-3-ALKYLSULFOXYPROPYL-1 ESTERS OF ARENE POLYCARBOXYLIC ACIDS

Ellis K. Fields, River Forest, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jan. 17, 1977, Ser. No. 760,013
Int. Cl.² C07C *69/82, 147/14*
U.S. Cl. 560—87 **9 Claims**

1. Poly (2-hydroxy-3-alkylsulfoxypropyl-1)$_n$ esters of arene polycarboxylic acids wherein the said esters are of the formula

wherein n is 2 to 6, R is an n-valent radical derived from benzene, biphenyl, naphthalene, anthracene or phenanthrene wherein R can be substituted by nitro, halogen and alkoxy of 1 to 12 carbon atoms and R′ is selected from the group consisting of alkyl moieties containing from 1 to 22 carbon atoms, and aralkyl moieties, alkylated aryl moieties and cycloalkyl moieties containing 4 to 40 carbon atoms, the ring radicals of said moieties being selected from the group consisting of phenyl, biphenyl and cyclohexyl radicals, where R′ can be substituted with nitro, halogen and alkoxy of 1 to 12 carbon atoms.

4,095,030

ISOMERIZATION OF DIACYLOXYOLEFINS

Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

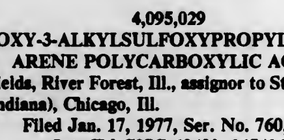
Filed Jan. 21, 1977, Ser. No. 761,083
Int. Cl.² C07C *67/28, 69/02, 69/16, 69/78*
U.S. Cl. 560—100 **10 Claims**

1. A process comprising:

producing a mixture by mixing at least one diacyloxyolefin represented by the general fomulas I and II as follows

(I)

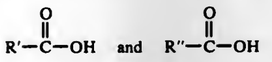
and



(II)

wherein R is hydrogen or an alkyl radical of from 1–4 carbon atoms, and wherein R′ and R″ can be the same or different and can be R or an aryl radical of from 6–10 carbon atoms, and wherein at least one of said R's attached to the carbon atoms numbered 1 and 4 in said formulas I and II is hydrogen;

a reagent selected from the group consisting of an alkali metal, an alkaline earth metal and an ammonium salt of a carboxylic acid represented by the general formulas



wherein R′ and R″ are as defined above, and

a polar diluent having a dielectric constant of at least 10 when measured at a temperature ranging from 20° C. to 30° C. and having no —OH groups so that the diacyloxyolefin is isomerized wherein the mixture is under sufficient pressure to maintain the mixture predominantly in the liquid phase.

4,095,031

PERFUMED COPOLYMERS OF ETHYLENE AND POLAR MONOMER

Edward Jacob Engle, Hockessin, Del., assignor to Polak's Frutal Works, Inc., Middletown, N.Y.

Filed Feb. 8, 1977, Ser. No. 766,631
Int. Cl.² C08K *5/00*
U.S. Cl. 526—1 **3 Claims**

1. A thermoplastic resin body consisting essentially of a thermoplastic copolymer of ethylene and about 6 to 60% by weight of a polar vinyl monomer selected from the class consisting of

(a) vinyl acetate;
(b) ethyl acrylate;
(c) methyl acrylate;
(d) butyl acrylate; and
(e) acrylic acid and about 1 to 30% by weight of perfume oil.

4,095,032

PHOTOSENSITIVE POLYMERIC MATERIAL AND ELECTROPHOTOMETRIC MATERIAL PREPARED BY REACTING SECONDARY AROMATIC AMINE WITH VINYL ALKYLETHER OR VINYL ACETATE IN THE PRESENCE OF STRONG ACID AND HG (II) OR PB (IV) CATALYST

Ekaterina Egorovna Sirotkina, prospekt Lenina, 87, kv. 6; Vadim Petrovich Lopatinsky, prospekt Lenina, 43, kv. 10a; Viktor Dmitrievich Filimonov, ulitsa Usova, 25b, kv. 9; Rita Moiseevna Kogan, ulitsa Vershinina, 37, kv. 205; Vyacheslav Dmitrievich Pirogov, Studgorodok, 2, kv. 8; Sofya Ivanovna Kudinova, Komsomolsky prospekt, 39/2, kv. 6; Ljubov Sergeevna Sizova, ulitsa Osipenko, 31, kv. 215; Svetlana Stepanovna Reznikova, ulitsa Usova, 11a, kv. 109; Georgy Nikolaevich Ivanov, prospekt Kirova, 1, kv. 3a; Nina Alexandrovna Tsekhanovskaya, poselok Sputnik 8, kv. 316, all of Tomsk; Jonas-Donatos Bronyaus Sidaravichus, ulitsa R. Charno, 1, kv. 48, Vilnjus; Larisa Vasilievna Randina, prospekt Lenina 30, Tomsk; Svetlana Leonidovna Bocharova, prospekt Lenina 30, Tomsk; Galina Petrovna Gulyaeva, prospekt Lenina 30, Tomsk; Raisa Ivanovna Bondarenko, prospekt Lenina 30, Tomsk; Galina Ivanovna Rybalko, ulitsa Zhirmanu, 20 kv. 82, Vilnjus, and Yanina Antono Adomanite, ulitsa Antokalne, 96 kv. 75, Vilnjys, all of U.S.S.R.

Division of Ser. No. 307,224, Nov. 16, 1972, abandoned. This application Jan. 31, 1975, Ser. No. 546,187
Int. Cl.² C08F *7/12;* C08J *3/00*
U.S. Cl. 526—11.1 **7 Claims**

1. A method for preparing a photosensitive polymeric material possessing photoelectric properties comprising reacting in a medium of an organic solvent an aromatic secondary amine or mixture thereof with a heterocyclic secondary amine, with a vinyl ether of an aliphatic alcohol in the presence of a strong acid.

4,095,033

PROCESS FOR THE POLYMERIZATION OF CYCLOOLEFINS

Friedrich-Wilhelm Küepper, Marl, Germany, assignor to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Filed Mar. 15, 1977, Ser. No. 777,798
Claims priority, application Germany, Apr. 1, 1976, 2613999
Int. Cl.² C08F *4/22*
U.S. Cl. 526—90 **10 Claims**

1. In a process for the polymerization of a cycloolefin monomer of 8 or 12 carbon atoms having one or more non-conjugated double bonds in the ring with the aid of a catalyst consisting of tungsten hexachloride and a cocatalyst,

the improvement which comprises employing cis,trans-1,5-cyclodecadiene as the cocatalyst in a molar ratio to tungsten hexachloride of at least 2 : 1.

4,095,034

MANUFACTURE OF α-NAPHTHYL-N-METHYL-CARBAMATE

Dietrich Mangold, Neckargemuend; Karl-Heinz Koenig, Frankenthal, and Christian Reitel, Heidelberg, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Germany

Filed Apr. 9, 1976, Ser. No. 675,580
Claims priority, application Germany, May 2, 1975, 2519584
Int. Cl.² C07C *125/06*
U.S. Cl. 560—134 **3 Claims**

1. A process for the manufacture of α-naphthyl-N-methylcarbamate by the reaction of methylcarbamyl chloride and α-naphthol containing β-naphthol as an impurity, which comprises reacting methylcarbamyl chloride, which is essentially free from phosgene and hydrogen chloride, in the absence of an acid-binding agent, with α-naphthol containing β-naphthol as an impurity at a temperature in the range of 60° to 130° C in, as solvent, cumene, the starting concentration of said naphthol in the cumene being in the range of 20 to 40% by weight, based on the cumene, and cooling the reaction mixture to precipitate the α-naphthyl-N-methylcarbamate as a pure crystalline solid, the β-naphthyl-N-methylcarbamate formed in the reaction remaining in solution in the cumene when the reaction mixture is cooled.

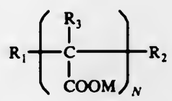
4,095,035

ALIGOMERIC POLYACRYLATES

Vincent Lamberti, Upper Saddle River, and Chester R. Willis, Mapleshade, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 461,060, Apr. 15, 1974, Pat. No. 3,922,230, which is a continuation of Ser. No. 169,101, Aug. 4, 1971, abandoned. This application Jun. 27, 1975, Ser. No. 591,220
Int. Cl.² C07C *69/66*
U.S. Cl. 560—180 **3 Claims**

1. An oligomeric polyacrylate having an average molecular weight of greater than about 500 and less than about 10,000 and a formula represented by:



wherein N is a whole number interger, R_1, and R_2 are moieties which do not impair biodegradability of the molecule and are selected from the group consisting of biodegradable hydroxy containing moieties, R_3 is selected from the group consisting of hydrogen and alkyl groups having from one to six carbon atoms and M is selected from the group consisting of hydrogen, alkali metals, ammonium and substituted ammonium cations.

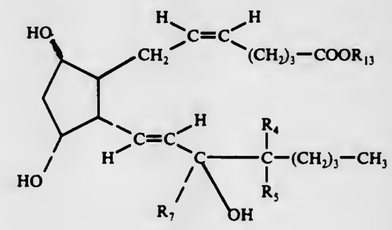
4,095,036

8β,12α,15β-PGF$_2$β COMPOUNDS

Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 518,695, Oct. 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 289,312, Sep. 15, 1972, abandoned. This application Feb. 23, 1976, Ser. No. 660,306
Int. Cl.² C07C *172/00*
U.S. Cl. 560—121 **9 Claims**

1. An optically active compound of the formula



wherein R_4, R_5, and R_7 are hydrogen or methyl, being the same or different;

wherein R_{13} is hydrogen, alkyl of one to 10 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof wherein R_{13} is hydrogen.

4,095,037

METHOD FOR THE OXIDATION OF A CONJUGATED DIOLEFIN

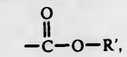
Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 8, 1976, Ser. No. 721,645
Int. Cl.² C07C *67/05;* B01J *23/16*
U.S. Cl. 560—246 **11 Claims**

1. A method for producing diacyloxyalkenes comprising:

reacting a conjugated diolefin with oxygen and at least one compound selected from the group consisting of a carboxylic acid and a carboxylic acid anhydride using a catalyst consisting essentially of a compound of bismuth, an alkali metal compound and a source of nitrate ion wherein the conjugated diolefin is selected from unsubstituted and substituted acyclic and cyclic compounds wherein the number of carbon atoms in the conjugated diolefin ranges

from about 4 to about 16, and the substituents are selected from the group consisting of F—, Cl—, Br—, I—, C≡N,



and monovalent hydrocarbyl radicals of up to 12 carbon atoms; —R′ is selected from the group consisting of —H, alkyl and aryl radicals of up to 10 carbon atoms; the carboxylic acid and carboxylic acid anhydrides are selected from the group consisting of mono and dicarboxylic aliphatic and aromatic acids and acid anhydrides having from about 2 to about 18 carbon atoms per molecule; the bismuth compound is selected from the group consisting of oxides, nitrates, halides and mixtures thereof; the alkali metal compound is selected from the group consisting of halide, carboxylate, oxide, nitrate and mixtures thereof, and the source of nitrate ion is provided by an inorganic compound in which the cationic portion of the compound is essentially inert to the oxidizing conditions employed if said cationic portion is other than bismuth or an alkali metal.

4,095,038

OPTICALLY ACTIVE CYCLOHEXANE DERIVATIVES

Walter Boguth, Riehen; Hans Georg Wilhelm Leuenberger, Arlesheim; Hans Johann Mayer, Fullinsdorf; Erich Widmer, Munchenstein, and Reinhard Zell, Rodersdorf, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 601,770, Aug. 4, 1975, Pat. No. 3,988,205.

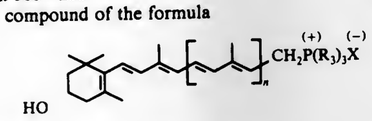
This application Jul. 20, 1976, Ser. No. 707,146

Claims priority, application Switzerland, Aug. 21, 1974, 11434/74; Nov. 1, 1974, 14674/74; Jul. 15, 1975, 9303/75

Int. Cl.[2] C07C *175/00*

U.S. Cl. 560—255 **3 Claims**

1. A compound of the formula



wherein R_3 is phenyl, X is halogen and *n* is an integer from 0 to 1.

ELECTRICAL

4,095,039

POWER CABLE WITH IMPROVED FILLING COMPOUND

Paul F. Thompson, Millington, N.J., assignor to General Cable Corporation, Greenwich, Conn.

Filed Apr. 16, 1976, Ser. No. 677,531

Int. Cl.[2] H01B *7/28, 7/18*

U.S. Cl. 174—23 C **13 Claims**

1. A high voltage, power transmission cable including a conductor surrounded by insulation material, a filler in contact with the conductor on the outside thereof and in any interstices of the conductor and between the conductor and the insulation material, the filler being a low molecular weight isobutylene rubber compounded with sufficient electrically conductive carbon to make the filler semi-conducting and of a putty-like consistency with good adhesiveness to the conductor and the insulation material at room temperature, the electrically conductive carbon being greater than 29% by weight of the filler, the filler having retention of its flexibility and adhesiveness in spite of repeated heating and cooling resulting from load cycling of the high voltage power transmission cable, said filler contacting with the conductor and insulating material and preventing migration of moisture lengthwise along the conductor and insulating material, the filler consisting essentially of the isobutylene rubber, and the electrically conductive material and possible trace materials.

4,095,040

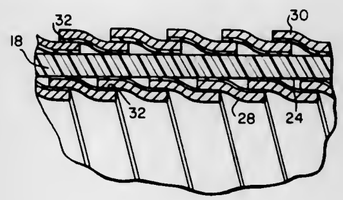
GAS INSULATED TRANSMISSION LINE HAVING LOW INDUCTANCE INTERCALATED SHEATH

Alan H. Cookson, Southboro, Mass., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 10, 1976, Ser. No. 740,445

Int. Cl.[2] H01B *9/02*

U.S. Cl. 174—28 **8 Claims**



1. A gas insulated transmission line comprising:
an elongated cylindrical outer sheath having a radial inner radius;
an elongated, cylindrical inner conductor disposed within said outer sheath, said inner conductor having a radial outer radius;
an insulating gas disposed within said outer sheath, said insulating gas electrically insulating said inner conductor from said outer sheath; and
at least one spacer assembly disposed within said outer sheath, said spacer assembly insulatably supporting said inner conductor within said outer sheath, said spacer assembly comprising:
a first member having a radial shape defined along its radial extremities by an inner radius substantially the same as said inner conductor outer radius and by an outer radius being substantially the same as said outer sheath inner radius, said first member along its inner radial extremity extending for an arc distance of 180°, said first member being disposed intermediate said inner conductor and said outer sheath, said first member inner radial extremity being positioned adjacent said inner conductor, said first member having a pair of cavities therein extending inwardly from said outer radial extremity;
a second member having a radial shape defined along its radial extremities by an inner radius substantially the same as said inner conductor outer radius and by an outer radius less than said outer sheath inner radius, said second member being disposed intermediate said inner conductor and said outer sheath, said second member inner radial extremity extending for an arc distance of 180° and being positioned adjacent said inner conductor, said first and second member outer radial extremities together extending for an arc distance of 360°; and
a curved plate having inner and outer radial extremities defined by an inner radius substantially the same as said second member outer radius and by an outer radius substantially the same as said outer sheath inner radius, said plate being positioned intermediate said second memer and said outer sheath, said plate having an inwardly projecting nub at each circumferential end thereof, said plate circumferentially extending beyond said second member outer radial extremity to said first member cavities such that said nubs are disposed within said first member cavities, said plate securing said first member to said second member.

4,095,041

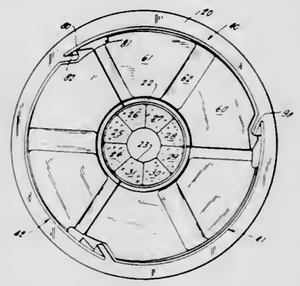
MULTIPLE PART INSULATOR FOR FLEXIBLE GAS-INSULATED TRANSMISSION LINE CABLE

Philip C. Netzel, Milmont Park, and Jonathan Z. Ponder, Lansdale, both of Pa., assignors to Electric Power Research Institute, Palo Alto, Calif.

Filed Jun. 21, 1977, Ser. No. 808,707

Int. Cl.[2] H01B *9/04*

U.S. Cl. 174—28 **18 Claims**



1. An insulator support disk for supporting the central conductor of a gas-insulated transmission line within an outer grounded housing which is coextensive with said central conductor; said insulator support disk consisting of a plurality of identical pie-shaped segments, each extending over an angle less than 180° around said central conductor, and each having a central axial extending rim for gripping the central conductor of a transmission line, an axially extending outer rim for gripping the interior of the housing of a transmission line, and a central web extending between said outer rim and said central rim, and means for securing said plurality of segments to one another to define a continuous support disk.

4,095,042

WOVEN SHIELDED CABLE

Edgar A. Ross, Greenville, S.C., assignor to Southern Weaving Company, Greenville, S.C.

Filed Sep. 7, 1976, Ser. No. 720,964
Int. Cl.[2] H01B *7/08*
U.S. Cl. 174—36 **8 Claims**

1. A woven shielded cable comprising:

a plurality of elongated conductor wires extending longitudinally in said cable each said wire having a coating of insulation;

a substantially solid outer woven cover formed from metallic fiber strands woven about said conductor wires isolating said wires from external electromagnetic interference;

said woven cover including at least one metallic warp binder strand woven between adjacent conductor wires to separate and shield at least one of said conductor wires between adjacent warp binder strands for reducing internal interference between conductor wires; and a metallic fill strand woven about said conductor wires and said warp binder strand;

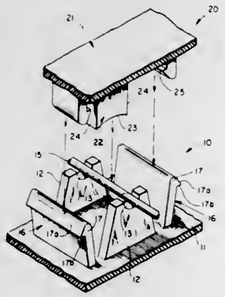
whereby said conductor wires are uniformly shielded from external and internal interference.

4,095,043

ENCLOSURE WITH STRAIN RELIEF

Harold B. Martin, West Caldwell, and Erwin O. Wagner, Kenilworth, both of N.J., assignors to Graber-Rogg, Inc., Cranford, N.J.

Filed May 14, 1976, Ser. No. 686,476
Int. Cl.[2] H01R *13/58*
U.S. Cl. 174—65 R **2 Claims**



1. In an enclosure wherein a first surface is capable of being connected independently to a second surface to form the assembled enclosure, a strain relief formed by the connection of said surfaces for holding a power cord when extending from the interior of said enclosure which comprises:

a pair of spaced posts each extending from the first surface and each terminating in a free end, each post of said pair of spaced posts having within its free end a recess for receiving and captivating a power cord therein,

a post extending from said second surface and terminating in a free end, said second surface post being of a length sufficient to enter into the space between said pair of spaced posts when the first and second surfaces are joined,

all of said posts cooperating to engage, deform and hold a power cord in a path defined by their free ends when the first and second surfaces are joined and the second surface post is located in the space between the first surface posts, and

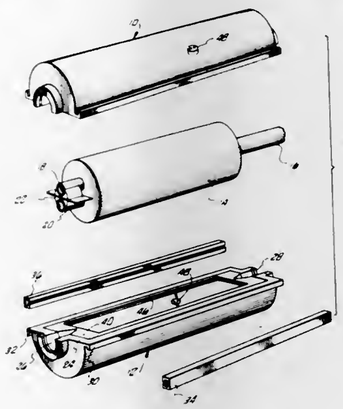
means integrally associated with said first and second surfaces for securely holding the first and second surfaces together simultaneously to form the enclosure, said means including a latching member located on either side of the first surface posts and extending perpendicularly thereto, each latching member having a hook thereon for engagement with latch receiving means on the second surface.

4,095,044

MULTIPLE CABLE ADAPTER AND SPLICE CASE INCLUDING THE SAME

David August Horsma, Palo Alto, Calif., and Francis De Blauwe, Lubbeek, Belgium, assignors to Raychem Corporation, Menlo Park, Calif.

Filed Oct. 26, 1976, Ser. No. 735,587
Int. Cl.[2] H02G *15/10, 15/18*
U.S. Cl. 174—138 F **10 Claims**



1. A splice case comprising

a shell defining a cavity therein for enclosing a splice, said shell including a longitudinal split and having an opening at one end thereof along said longitudinal split to receive in-coming cable;

a thermally responsive sealant positioned along said longitudinal split;

a heating element positioned in said shell along said longitudinal split, said thermally responsive sealant being outwardly of said heating element to seal said shell upon heating of said heating element; and

an adapter of thermally responsive sealant sized to fit in said opening, said adapter having a plurality of channels extending the length of said adapter for receipt of cables extending into said shell and a sheet exhibiting high thermal conductivity extending from said insert into said split in said shell for heat conduction from said heating element to said adapter.

6. An adapter for sealing a plurality of cables in an access opening of a splice case, comprising

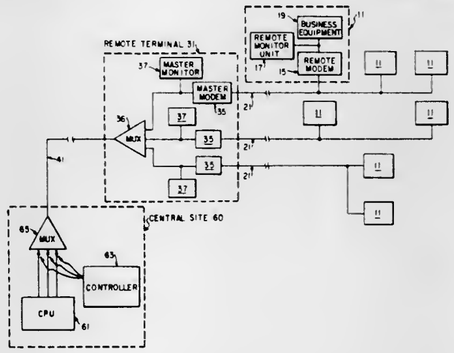
a body of hot melt sealant sized to fit in the access opening of the splice case, said body having a plurality of channels extending the length thereof for receipt of cables extending to the splice case, and a sheet exhibiting high thermal conductivity extending from said body outwardly to enhance thermal conductivity between the splice case and said body.

4,095,045

METHOD AND APPARATUS FOR SIGNALING IN A COMMUNICATION SYSTEM

Charles P. Johnson, Westport, and Frederick A. Lucas, Brookfield, both of Conn., assignors to General DataComm Industries, Inc., Wilton, Conn.

Filed Jan. 19, 1977, Ser. No. 760,666
Int. Cl.[2] H04L *11/00*
U.S. Cl. 178—2 R **36 Claims**



1. In a digital communication system using data and control signals and comprising a signal source, at least one communication channel and at least one terminal, a signal detection method comprising the steps of:

detecting a first signal event transmitted from said signal source to said terminal;

detecting a second signal event transmitted from said signal source to said terminal, said second signal event being detected within a specified time interval commencing after said first event;

detecting thereafter at least one additional signal event transmitted from said signal source to said terminal, said additional signal event being detected within a time limit related to either said first or said second event, at least one of said first, second and additional signal events occurring in a control signal; and

producing an output signal indicating that said second event and said additional event were detected within the time interval and time limit specified.

4,095,046

ELECTRONIC ENCIPHERING- AND DECIPHERING APPARATUS IN THE FORM OF A POCKET CALCULATOR

Peter Frutiger, Wangen, and Bruno Gemperle, Steinhausen, both of Switzerland, assignors to Anstalt Europaische Handelsgesellschaft, Vaduz, Liechtenstein

Filed Nov. 1, 1976, Ser. No. 737,285
Claims priority, application Switzerland, Nov. 11, 1975, 14587/75
Int. Cl.[2] H04K *1/02*; H04L *9/02*
U.S. Cl. 178—22 **20 Claims**

1. An integrated enciphering and deciphering apparatus having a size and shape adapted to be hand held, said apparatus comprising:

A. input means for entering key and text data to be processed;

B. mode select means for selectively placing said apparatus in either a text data entry mode, a key data entry mode, a text data display mode, and enciphering mode or a deciphering mode;

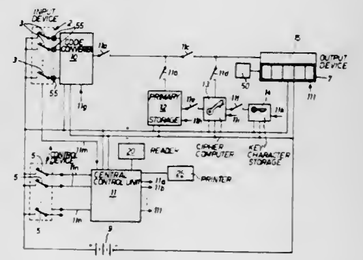
C. primary storage means for storing text data entered by said input means when said apparatus is in said text data entry mode;

D. key storage means for storing key data entered by said input means when said apparatus is in said key data entry mode;

E. output means for displaying data applied thereto;

F. cipher computer means for respectively enciphering and deciphering said text data stored in said primary storage means as a function of said key data stored in said key storage means when said apparatus is in said enciphering and deciphering modes;

G. circuit control means for;



1. causing said text data to be applied to said output means as it is entered by said input means when said apparatus is in said text data input mode;

2. causing said stored text data to be applied to said output means when said apparatus is in said text data display mode; and

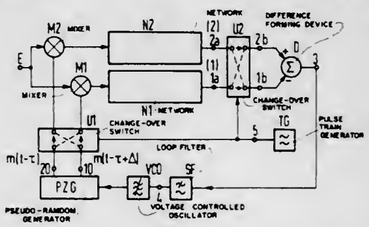
3. causing said enciphered and deciphered data to be applied to said output means when said apparatus is in said enciphering or deciphering modes, respectively.

4,095,047

PHASE REGULATING CIRCUIT

Klaus von Pieverling, Wolfratshausen; Hermann Sepp, Munich, and Walter Baier, Kaiserslautern, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 1, 1976, Ser. No. 737,534
Claims priority, application Germany, Nov. 7, 1975, 2549955
Int. Cl.[2] H04L *7/04*
U.S. Cl. 178—69.1 **8 Claims**



1. A phase follow-up regulating circuit operating according to the delay lock loop principle, for phase-coherent synchronization of the pulse sequence of a receiver pseudo-random generator controlled by a pulse train oscillator with the incoming pulse sequence which may be modulated on a carrier, a transmitter having a pseudo-random generator identical to the receiver, first and second identical signal channels, two mixers with one included in each of said first and second signal channels and each controlled by the pulse sequence output of the receiver pseudo-random generator, two filtering networks respectively receiving the outputs of said two mixers, said first and second signal channels having their inputs connected in parallel, a difference forming device receiving the output signals of said first and second signal channels from said two filtering networks, a loop filter receiving the output of said difference forming device, a voltage controlled oscillator which is controllable in frequency receiving an input from said

loop filter and supplying an input to said receiver pseudo-random generator, further including a first commutator switch receiving two outputs of said receiver-end pseudo-random generator and supplying inputs to said two mixers and a second commutator switch receiving the outputs of said two filtering networks and supplying inputs to said difference forming device and a pulse train oscillator for switching said two commutator switches back and forth between their two switching states periodically and in synchronism with a pulse train from said pulse train oscillator.

4,095,048

METHOD OF SYNCHRONIZING A PULSE CODE MODULATION (PCM) JUNCTION AND AN ARRANGEMENT FOR APPLYING THIS METHOD

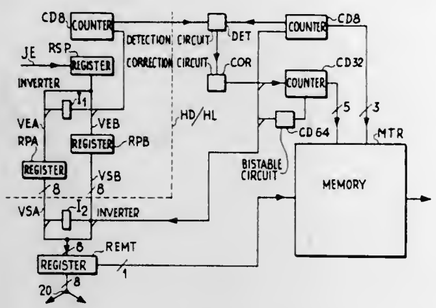
Claude Athénes, and Jean Pierre Landez, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jun. 15, 1976, Ser. No. 696,197

Claims priority, application France, Jun. 17, 1975, 75 18960

Int. Cl.² H04L *7/00*

U.S. Cl. 178—69.1 **3 Claims**



1. In a PCM switching network wherein time intervals comprise *n* bits, a junction synchronization system in a local switching center equipped with a local clock connected with a distant switching center equipped with a distant clock, comprising:

means for comparing said local and said distant clock signals;

means for detecting the risk of error which occurs when a n-bit register loaded at the frequency of the distant clock is read at the frequency of said local clock;

means for successively recording at the frequency of said distant clock the pulse trains relating to the successive channels of one and the same frame alternately in a register A and in a register B;

means for counting the time intervals at the frequency of said local clock and determining the time of correction;

means for carrying out said correction by repeating the reading of one of the two registers A and B at the frequency of said local clock;

means for recording the time intervals in a frame memory;

means for detecting the loss of a frame locking code; and

means for shifting the pulse trains recorded in said registers A and B in successive jumps of one bit until said frame locking code is detected.

4,095,049

NON-ROTATIONALLY-SYMMETRIC SURROUND-SOUND ENCODING SYSTEM

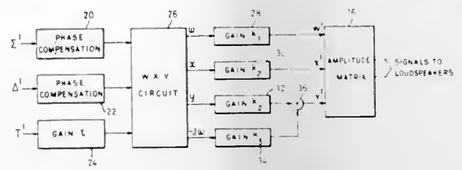
Michael Anthony Gerzon, Oxford, England, assignor to National Research Development Corporation, London, England

Filed Mar. 11, 1977, Ser. No. 776,916

Claims priority, application United Kingdom, Mar. 15, 1976, 10191/76; Jan. 22, 1977, 2686/77

Int. Cl.² H04R *5/00*

U.S. Cl. 179—1 GQ **22 Claims**



1. A system for transmitting or recording an aximuthal directional sound comprising encoding means producing a plurality of transmission channel signals comprising complex linear combinations of omnidirectional signal components, signal components having gains equal to the cosine of the encoded sound azimuthal angle and signal components having gains equal to the sine of the encoded sound azimuthal angle, the encoding means comprising a phase-amplitude matrix arranged to produce first, second and third transmission channel signals, the first and second transmission channel signals having gains for sounds associated with an azimuth angle θ which are respective independent linear combinations of Σ_{gain} and Δ_{gain} given by:

$$\Sigma_{gain} = a + c\cos\theta + je\sin\theta$$
$$\Delta_{gain} = jb + jd\cos\theta + f\sin\theta$$

where j $(=-1)$ represents a 90+ **phase shift and where** a, b, c, c, e and f are real gains such that, for any chosen angle θ', the quantities given substantially by:

$$h = v^{-1}\left\{\frac{1 + u^2\sin^2\theta'}{1 - (u/v)^2\cos^2\theta'}\right\}^{\frac{1}{2}}$$

$$g = \frac{h^2}{1 + vh}\left\{\frac{u(\cos^2\theta' + v^2\sin^2\theta')}{1 + u^2\sin^2\theta'}\right\}$$

where:

$$u = cf + ed/bc - ad \quad v = -be + af/bc - ad$$

are such that $1 - 0\ (u/v)\cos^2\theta'$ is positive and that the pair (u, v) has neither of the values (0, 1) and (0, −10, the third transmission channel signal having a gain T_{gain} given by:

$$T_{gain} = q(jg + jh\cos\theta + i\sin\theta)$$

where q is a non-zero complex gain, g and h are real gains and $= -1$.

4,095,050

MONITOR AND CONTROL SYSTEM

Ronald Beachem, Mound, and Dennis Covington, Minneapolis, both of Minn., assignors to Leon O. Shaw, Minneapolis, Minn.

Filed Apr. 19, 1976, Ser. No. 678,237

Int. Cl.² H04M *11/00*

U.S. Cl. 179—2 A **29 Claims**

1. A remote monitoring device connectable to a telephone line to be used with a system having a plurality of system components which can be called by a telephone caller on any telephone and controlled by frequency signals transmitted by the telephone caller over the telephone line, comprising:

sensing means connected to the telephone line for sensing a ringing signal transmitted over the telephone line;

line seize means for connecting the device to the telephone line after a ringing signal has been sensed by the sensing means;

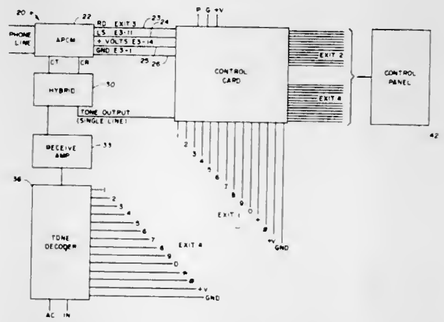
receiving means for receiving the frequency signals transmitted by the telephone caller oer the telephone line;

decoding means connected to the receiving means for decoding the frequency signals transmitted over the telephone line;

a plurality of sensors, each sensor associated with a system component, the operating status of which is to be monitored;

audible sound producing means for producing tonal patterns to indicate which system component is being monitored and the operating status of the system component, comprising;

an audible tone producing device for producing a plurality of audible single frequency tones to be transmitted to the telephone caller; and



a tone varying device connected to the sensors for causing a variation in the tones produced by the tone producing device depending on the operating status of the system component being monitored by the selected sensor;

programmable logic means for selectively monitoring the operating status of selected system components according to predetermined frequency signals transmitted over the telephone line by the telephone caller, comprising;

gating means connected to and controlled by the decoding means and connected to the sensors and the sound producing means so that different audible single frequency tones are produced by the tone producing device for each sensor and the tonal pattern is controlled by the tone varying device depending on the operating status of the system component being monitored by the selected sensor; and

transmitting means for transmitting the audible tones produced by the sound producing means to the telephone line whereby the operating status of each selected system parameter being monitored is transmitted to the listener.

4,095,051

DEMULTIPLEXER CIRCUIT

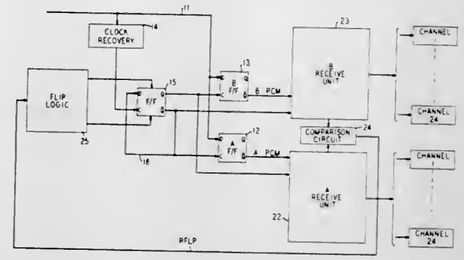
Charles R. Crue, West Newbury, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 15, 1976, Ser. No. 750,903

Int. Cl.² H04J *3/06*

U.S. Cl. 179—15 BS **5 Claims**

1. In a communication system wherein a pair of n-channel digroup signals, each of which includes framing bits, are synchronously multiplexed into a composite signal by bit interleaving the digroup signals, a demultiplexer comprising a pair of gating means to which the composite signal is coupled, means for recovering the timing of said composite signal and for generating therefrom a pair of phase inverted clock signals each at the digroup bit rate, means for respectively coupling said clock signals to said gating means to alternately enable the same and thereby steer the interleaved digroup bits of said composite signal to separate digroup receive units, means for comparing the relative timing of the bits coupled to each of the receive units and for generating a predetermined signal when the digroup bit streams are being sent to the wrong receive



units, means responsive to said predetermined signal to advance the phase of one clock signal and retard the phase of the other by a preselected amount to thereby effectively phase reverse said clock signals and reverse the steering of the digroup bit streams, and means for avoiding loss of frame in either receive unit when the steering of the digroup bit streams is reversed.

4,095,052

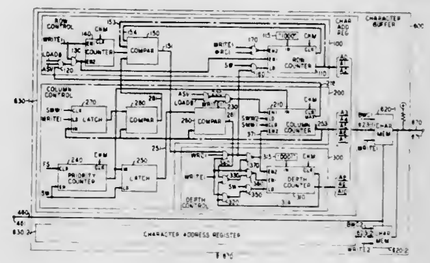
DIGITAL SPEECH INTERPOLATION TRUNK PRIORITY ROTATOR

Yau-Chau Ching, Morganville, and David Gavin Messerschmitt, Middletown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 2, 1977, Ser. No. 821,242

Int. Cl.² H04J *6/02*

U.S. Cl. 179—15 AS **6 Claims**



1. Apparatus for providing a priority rotation to digitized message samples;

said apparatus including an input terminal adapted to receive said samples from a plurality of trunks;

activity status means for signalling which ones of said trunks are active and which ones are inactive;

means for buffering said received samples;

means for assigning active samples from said buffer to a frame;

an output terminal adapted to transmit said frame;

overload mitigating means operable on said assigned samples during overload; and

CHARACTERIZED IN THAT said apparatus further comprises;

means responsive to active trunks for adaptively adjusting a sample assignment starting point,

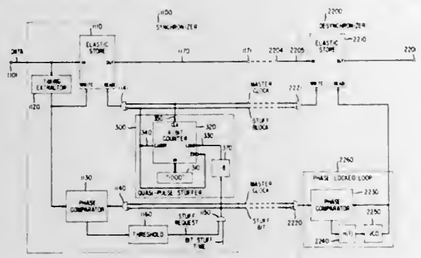
said starting point being adjusted on a frame-by-frame basis according to which trunks are active during said frame whereby a substantially uniform signal degradation is obtained during overload.

4,095,053

QUASI-PULSE STUFFING SYNCHRONIZATION

Donald Lars Duttweiler, Colts Neck, and Allan Michael Hofmann, Jackson, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 1, 1977, Ser. No. 829,664
Int. Cl.[2] H04J 3/06
U.S. Cl. 179—15 AF 4 Claims



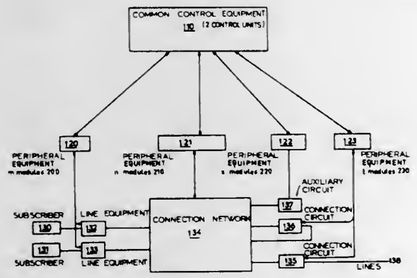
1. Synchronization apparatus including apparatus for extending a digital signal from an input terminal through an elastic store to an output terminal and including pulse stuffer apparatus coupled to said extending apparatus for providing a stuff bit signal responsive to the detection of a request to insert a pulse in said digital signal, and CHARACTERIZED IN THAT said synchronization apparatus further comprises quasi-pulse stuffing means for mitigating signal distortion, said quasi-pulse stuffing means including means for detecting a predetermined number of said stuff bit signals, means responsive to the detection of said predetermined number for providing a stuff block signal, means responsive to said stuff block signal for stuffing a block in said digital signal and means adapted for extending said stuff block and said stuff bit signals to a desynchronizer.

4,095,054

ELECTRONIC TELEPHONE SWITCHING SYSTEM OF THE STORED PROGRAM TYPE COMPRISING TWO ACTIVE STAGES AND ONE PASSIVE STAGE

Pierre Anizan; Jean Paul Ducournau, both of Paris; Paul Gilberton, Saint-Ouen-l'Aumone, and Yves Mevel, Colombes, all of France, assignors to Societe Francaise des Telephones Ericsson, Saint-Ouen-l'Aumone, France

Continuation-in-part of Ser. No. 440,272, Feb. 6, 1974, abandoned. This application Jan. 27, 1976, Ser. No. 652,760
Claims priority, application France, Feb. 8, 1973, 73.04548
Int. Cl.[2] H04Q 3/54
U.S. Cl. 179—18 ES 14 Claims



1. An improved electronic telephone switching system of the stored program type, connected to a trunk-telephone network, including first and second active stages and one passive stage each constituted by several elements, in which

(a) said first active stage comprises a common control equipment responsible solely for information processing and formed by at least one control unit each comprising at least one program memory to allow an independent control of peripheral circuits in the second active stage and to receive information from them and an instruction library, and one data memory divided in distinct zones containing only temporarily the information required for the connections in the course of establishment and connected to said program memory, and by a plurality of liaison circuits connected to said data memory and comprising registers, in order that the control unit forms a self-contained equipment adapted to route all the traffic of the telephone installation by means of the programs recorded in the memory,

(b) said second active stage comprises independent individual peripheral equipments each with at least a program, including scanning, decision-taking, control and marking means to cooperate with respect to said passive stage, each peripheral equipment serving as interface between said first active stage and independent elements of the said passive stage and each being formed at least by liaison circuits to realize the connection between the said peripheral equipments and the said liaison circuits in the said common control equipment and comprising a register and a priority logic to control the transfers between the peripheral equipment to which it belongs and each of said two other stages, by a monitoring device to survey the said elements of the passive stage, by storage means to receive the information necessary to survey the said elements, and by an internal logic unit which delivers a comparison signal to the priority logic of said liaison circuits in said peripheral equipment depending on the information from said storage means and said monitoring device, at least one peripheral equipment further including intervention circuits to control the working of said elements of the said passive stage, in order to provide to each peripheral equipment an autonomy in operation in respect of its own speciality since it calls upon said common control equipment only to obtain information it cannot itself provide, and to give to said equipment the information useful to the other peripheral equipment relative to the connection network,

(c) said first active stage is linked to said passive stage through said second active stage which is directly connected to said passive stage, and

(d) said passive stage comprises a conversion network including independent elements each respectively connected to one of said peripheral equipments in the second active stage, these elements being line equipments, one connection network, auxiliary circuits, local connection circuits, and connection circuits to connect said switching system to a trunk network, said line equipments, auxiliary circuits, local connection circuits and connection circuits to connect to the trunk network being connectable to each other through said connection network in order to effect the routing of the telephone traffic by means of the programs stored in the program memory.

4,095,055

MULTI-STAGE SWITCHING NETWORK IN A TELECOMMUNICATION SWITCHING SYSTEM

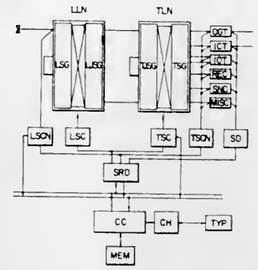
Kazuhiko Gotoh, Fuchu; Hiroshi Kawashima, Kodaira, and Tsuyoshi Katayama, Hachioji, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Nov. 11, 1976, Ser. No. 740,822
Claims priority, application Japan, Nov. 17, 1975, 50-137952
Int. Cl.[2] H04Q 3/42, 3/52
U.S. Cl. 179—18 GF 3 Claims

1. A multi-stage switching network in a telecommunication switching system having a path selection system which is independent of the switching network, comprising a degenerative type switching network including:

a virtual link frame comprised of a plurality of virtual switches,

means for inserting said link frame into any specified intermediate stage of said multi-stage switching network according to the switching system size required by the application range of telephone traffic,



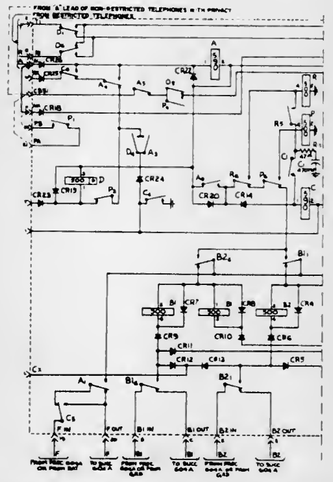
said virtual switches being normally closed and being arranged to form fixed crosspoints, whereby the stage size of real switches in said multi-stage switching network can be incremented according to the application range.

4,095,056

TOLL RESTRICTOR ACCESS CIRCUIT

Joel J. Ewen, Lithia, Va., assignor to Tele-Path Industries, Inc., Roanoke, Va.

Continuation-in-part of Ser. No. 506,602, Sep. 16, 1974, abandoned. This application Feb. 28, 1977, Ser. No. 774,089
Int. Cl.[2] H04M 1/66
U.S. Cl. 179—18 DA 12 Claims



1. A toll restrictor access circuit for use with at least one toll restrictor which may be shared by a group of telephone lines comprising:

access means connected to said toll restrictor and enabled by the initiation of a telephone call from a restricted telephone instrument on one of said telephone lines for connecting said toll restrictor to the telephone line, said toll restrictor thereafter monitoring said telephone line to detect a dial tone,

polarity-reversal means connected to the telephone line of the restricted telephone for normally disabling the telephone dial but responsive to said toll restrictor after the detection of a dial tone for reversing the polarity of the telephone line and enabling the telephone dial, and

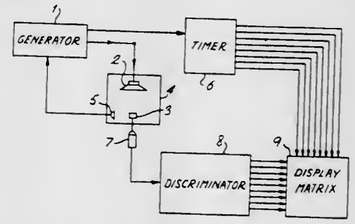
restrict means controlled by said toll restrictor for disconnecting the restricted telephone from the telephone line in the event that a prohibited number is dialed and detected, said restrict means also causing said polarity reversal means to resume its normal condition to prevent further operation of the telephone dial and releasing said toll restrictor for use by another telephone line.

4,095,057

FREQUENCY RESPONSE TESTING APPARATUS

Ronald Frederick Power, Rayleigh; Alan Anthony Barker, Gravesend; Michael Charles Martin, Kingston-upon-Thames, and Brian Clifford Grover, Woking, all of England, assignors to National Research Development Corporation, London, England

Filed Mar. 9, 1977, Ser. No. 775,941
Claims priority, application United Kingdom, Mar. 19, 1976, 11182/76
Int. Cl.[2] H04R 29/00
U.S. Cl. 179—175.1 A 11 Claims



11. Frequency response testing apparatus comprising:

a waveform generator for providing an electrical signal having a linearly increasing frequency, representative of an input for application to a device to be tested;

means responsive to a signal indicative of the output signal of said device for generating a signal indicative of the amplitude of said device output signal;

a matrix of electrically-operable light-emitting elements, interconnected in columns and rows; and

means responsive to a signal indicative of said increasing frequency signal and said signal indicative of said device output signal, for selectively activating respective elements in said matrix disposed in columns in accordance with said frequency varying signal and rows in accordance with said tested device output signal amplitude, to provide thereby a display of the frequency response of said tested device.

4,095,058

TELEPHONE SWITCHING SYSTEM TEST SET

Orrin Bernard O'Dea, Garden Grove, Calif., assignor to Communication Mfg. Company, Long Beach, Calif.

Filed Jan. 7, 1977, Ser. No. 757,625
Int. Cl.[2] H04M 3/22, 1/26
U.S. Cl. 179—175.2 D 34 Claims

1. A variable number of pulses generating circuit comprising:

pulse initiating means;

a multiple state circuit having first and second states;

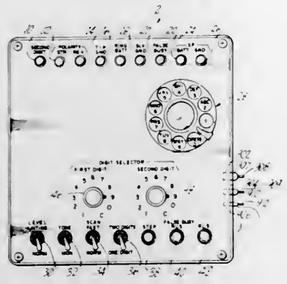
means for delivering a pulse for each occurrence of said first state;

counting means for counting the occurrence of said second state;

means for indicating a desired number of pulses, including one or more than one;

means for enabling the first state of said multiple state circuit

either responsive to said pulse initiating means or for each occurrence of said second state; and



means for enabling said second state of said multiple state circuit upon the concurrence of such indication of a number of pulses greater tha one and said first state.

4,095,059

INTERLOCKED PUSH-LOCK PUSH-BUTTON SWITCH ASSEMBLY HAVING CONDUCTIVE MUTING SPRING

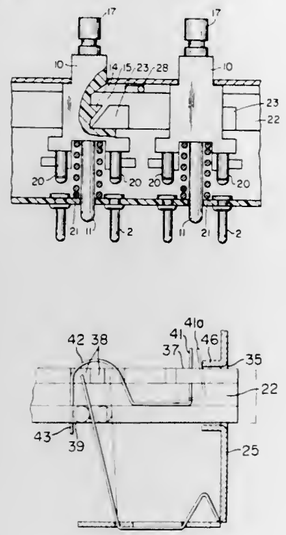
Matsuo Nishioka, and Shunzo Oka, both of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sep. 16, 1975, Ser. No. 613,898

Claims priority, application Japan, Sep. 20, 1974, 49-114246[U]; Jun. 19, 1975, 50-84323[U]

Int. Cl.² H01H *9/26, 13/72, 1/18*

U.S. Cl. 200—5 B **12 Claims**



9. An interlocked pushbutton switch assembly, comprising a terminal plate having a plurality of pairs of stationary contacts mounted thereon;

a housing adjacent said terminal plate;

a sliding locking member within said housing, said member being mounted for sliding movement parallel to said terminal plate and having a plurality of locking means thereon;

a plurality of operating members within said housing and mounted for vertical movement in a direction normal to said terminal plate, each of said operating members having locking means adjacent a corresponding locking means of said sliding locking member, each of said operating members having at least one movable-contact-member retaining means formed therein adjacent said terminal plate;

an inverted U-shaped movable contact member having two movable contacts adjacent corresponding ones of a pair of said stationary contacts, said contact member being retained in position by said retaining means;

said housing having at least two adjacent slots elongated in a direction parallel to said terminal plate;

an L-shaped bias spring having first and second leg portions, said first leg portion extending into said housing through one of said slots and engaging said sliding locking member to urge said locking member in a direction parallel to said terminal plate, said second leg having an inverted V-shaped portion extending into the other of said slots to retain said spring in position;

a muting switch spring comprising an electrically conductive and resilient material mounted on said sliding locking member for movement therewith, said housing having an electrically conductive part, one end of said muting spring being disposed adjacent said part for electrical contact therewith when said sliding locking member is displaced as a result of engagement of said locking means thereof with the locking means of one of said operating members; and

means for providing an electrical connection to a portion of said muting spring remote from said end thereof.

4,095,060

SLIDE SWITCH ASSEMBLY HAVING TERMINALS FOR MOUNTING SWITCH HOUSING SIDEWALL PARALLEL TO A PRINTED CIRCUIT BOARD

Jaroslav Keprda, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

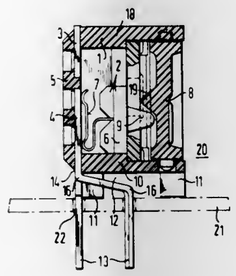
Continuation-in-part of Ser. No. 540,558, Jan. 13, 1975, Pat. No. 3,974,346. This application Aug. 2, 1976, Ser. No. 710,878

Claims priority, application Germany, Sep. 5, 1975, 2539581

The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.

Int. Cl.² H01H *15/02, 1/00, 9/02*

U.S. Cl. 200—16 D **2 Claims**



1. In a switch assembly of the type incorporating a plurality of slider switches arranged each one next to another in a block-shaped, elongated housing having generally spaced, parallel side walls, and end walls, and a floor joining said side walls and end walls, each of said slider switches being independently activatable transversely to the longitudinal extension of said housing and parallel to said floor of said housing, and each one having a pair of fixed contacts inset into said floor, each of said contacts being connected in one piece to a terminal connection element which is provided for plugging into holes of a carrier plate, the improvement which comprises having a side wall of such housing extend perpendicularly to the floor thereof, and providing such side wall with a plurality of outwardly extending spacer bodies which extend parallel to said floor and are distributed over side wall edge portions, and further having said terminal connection elements extend from said sidewall in the same direction as said spacer bodies and terminate in a predetermined pattern, said terminal connection elements

extending out of said housing coplanarly from said contacts, and being offset from one connection element to another in a staggered manner in the area which is fenced by said spacer bodies.

4,095,061

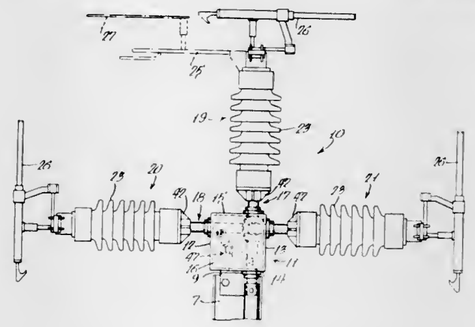
GROUP OPERATED CIRCUIT DISCONNECT APPARATUS FOR OVERHEAD ELECTRIC POWER LINES

Ronald P. Bridges, 9 S. 681 Brookeridge Rd., Downers Grove, Ill. 60515

Filed Apr. 1, 1977, Ser. No. 783,940

Int. Cl.² H01H *31/00*

U.S. Cl. 200—48 KB **14 Claims**



1. A group operated electric circuit disconnect apparatus for a plurality of overhead electric power distribution lines carried on poles, said apparatus comprising, in combination:

a base adapted to be mounted adjacent the top of a pole;

a first disconnect switch surmounting the base;

second and third disconnect switches mounted at opposite sides of the base;

an upright shaft means journalled on said base, said upright shaft means being operatively connected to said first switch so that axial rotation of the shaft means opens and closes the first switch, said upright shaft means having a lower end adapted to be operatively connected to means by which it may be manually rotated;

transverse shaft means journalled on said base and operatively connected to said second and third switches so that axial rotation of said transverse shaft means opens and closes said second and third switches;

and a mechanical connection between said upright shaft means and said transverse shaft means so that axial rotation of the upright shaft means causes axial rotation of the transverse shaft means.

4,095,062

STOP-MOTION APPARATUS

Richard J. Savageau, Seneca, S.C., assignor to Platt Saco Lowell Limited, Helmshore, England

Filed Sep. 3, 1976, Ser. No. 720,508

Int. Cl.² B65H *25/14;* **D01G** *31/00;* **D01H** *13/16*

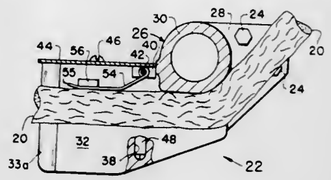
U.S. Cl. 200—61.13 **12 Claims**

1. Stop-motion apparatus for use with a convergent running array of a pluarlity of adjacent textile sliver strands, said apparatus comprising:

a plurality of strand engaging members;

strand separating and guiding means mounting said strand engaging members in adjacent relationship to each other and to respective ones of said strands for pivotal movement independent of one another between first and second positions, each of said strand engaging members being supported in its first position by engagement with an associated one of said strands, and being movable when unsupported to its second position;

said strand separating and guiding means having a magnetically actuable stop-motion switch element mounted therein adjacent said second position of an intermediate each two of said strand engaging members, and having strand divergent means for diverting each strand in a direction away from that of said convergence of said array; and



magnetic means carried by each of said strand engaging members and movable therewith for actuating said stop-motion switch element upon movement of either of adjacent ones of said strand engaging members to said second position thereof.

4,095,063

DETECTION DEVICE FOR PAPER OR FILM IN WEB FORM

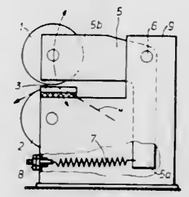
Peter Herzhoff, Leverkusen; Hans Gref, Cologne, and Wolfgang Schweicher, Leverkusen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 8, 1976, Ser. No. 664,497

Claims priority, application Germany, Mar. 11, 1975, 2510451

Int. Cl.² B65H *25/14*

U.S. Cl. 200—61.13 **5 Claims**



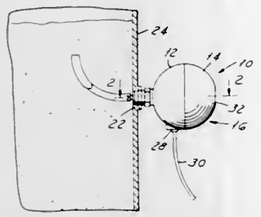
1. A device for mechanically detecting local thickenings in a web, comprising a guide roller; a sensor roller arranged with its axis of rotation parallel to the guide roller and mounted on a pair of pivotal levers for movement away from the guide roller; a stop provided on each pivotal lever and engageable with a support to determine a minimum gap between the guide roller and the sensor roller through which in use the web is guided, each stop and its associated support forming an electrical switch; an electrical circuit including both switches and a source of electrical power, the circuit being such that the flow of current is temporarily interrupted when one or both stops is lifted off its respective support when a thickening passes through the gap, drive means for the guide and sensor rollers which are constructed and arranged for driving the rollers in directions counter-current to each other whereby their direction of travel in portions adjacent the web corresponds to the direction of the web, and are substantially equal in surface speed, whereby tearing of the web is prevented when a local thickening in the web passes between the rollers and opens the electrical circuit.

4,095,064

PADDLE FOR USE IN A ROTATING-PADDLE BIN LEVEL INDICATOR

Paul P. Fleckenstein, Port Huron, Mich., assignor to Bindicator Company, Port Huron, Mich.

Filed Sep. 27, 1976, Ser. No. 727,273
Int. Cl.² H01H *35/00*
U.S. Cl. 200—61.21 **4 Claims**



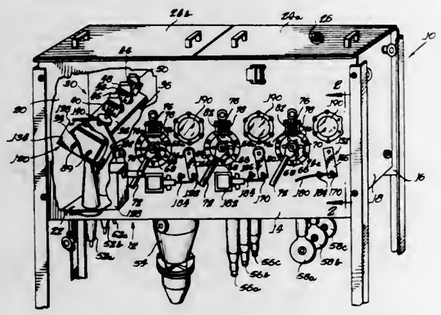
1. In a material bin level indicator of the type comprising an indicator housing having a mounting nipple extending therefrom adapted to engage a corresponding gland on a bin wall for mounting said housing, a motor carried within said housing and operatively coupled to a driveshaft having an axis of rotation extending through said nipple, and a paddle operatively coupled to and extending from said shaft to a free end of said paddle; the improvement wherein said paddle comprises a curved hollow cylindrical tube having a tubular portion adjacent said shaft and a flattened portion comprising opposed tube walls flattened in a plane coplanar with said axis and flaring into said tubular portion, and means disposed within said tubular portion for coupling said paddle to said shaft, both said tubular and said flattened portions being curved at fixed radius from adjacent said coupling means over an arc of substantially ninety degrees, said flattened portion extending over substantially fifty degrees of said arc and terminating at said free end, said paddle being dimensioned such that the same may be inserted into a bin through the mounting nipple while said paddle is coupled to said shaft.

4,095,065

SAFETY TRIP MECHANISM FOR MULTI-POSITION SWITCH

Donald J. Akers, Chicago, Ill., assignor to G & W Electric Specialty Company, Blue Island, Ill.

Filed Mar. 15, 1977, Ser. No. 777,936
Int. Cl.² H01H *19/32*
U.S. Cl. 200—63 R **7 Claims**



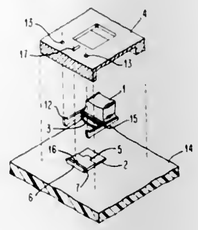
1. In switchgear which includes a casing, switch contact means disposed within said casing and including at least one pair of switch contacts at least one of which is movable relative to the other between a position spaced from said other in open electrical circuit therewith and a position contacting said other in closed electrical circuit therewith, actuating means for moving said movable switch contact between said spaced and contacting positions relative to said other of said contacts, said actuating means including a movable arming handle, energy storage means operatively associated with said arm handle and said movable switch contact and adapted to create potential energy during movement of said arming handle, said actuating means further including release means operative to release said potential energy and facilitate snap-action movement of said movable switch contact between its said spaced and contacting positions; the combination therewith comprising latch plate means operatively associated with said movable switch contact and movable therewith, said latch plate means having detent means thereon, and latch lever means pivotally supported by said casing and movable between a first position cooperating with said detent means to prevent movement of said latch plate means and associated movable switch contact, and a second position released from said detent means to facilitate movement of said latch plate means and snap-action movement of said movable switch contact between its said spaced and contacting positions relative to the other of said switch contacts.

4,095,066

HINGED FLYPLATE ACTUATOR

Richard Hunter Harris, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 4, 1976, Ser. No. 711,658
Int. Cl.² H01H *5/30*
U.S. Cl. 200—67 A **8 Claims**



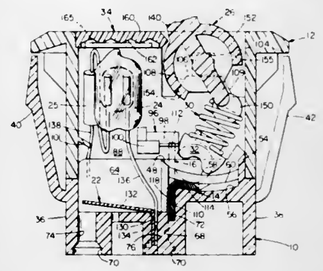
1. A push-button operated, pivoting snap-action toggle switch operating apparatus, comprising:
- a two-ended switch actuating member having a pivot axis near one end thereof;
- a two-ended force application member having a pivot axis near one end thereof and a push-button force application means near the other end thereof;
- a framework for holding said pivot axes of said members with said members being spaced apart from one another and supported by their said pivot axes in said framework with said pivot axis ends of said members, respectively, adjacent to one another and with said pivot axes parallel to one another;
- a compression spring means for resiliently resisting forces applied thereto along a line of action, said spring means being fixed between and retained in compression by said force application and actuating members, whereby said spring means resiliently urges said members apart by pivoting them on their said axes in a direction causing separation between said ends of said members which are opposite the ends in which said pivot axes are located;
- said framework having means for restraining said members from being separated in said manner by said spring means beyond an amount necessary to maintain said spring means in compression; and
- said compression spring means being arranged so that said line of action of compression is angled with respect to said members to pass first to one side, but to be movable to the other side of, said pivot axis of said actuating member in response to pivoting of said force application member about its said pivot axis which is occasioned by forces applied to said push-button means to pivot said force application member towards said actuating member, thereby causing said line of compression to move to the other side of said pivot axis of said actuating member and create a rotational moment of said member about its said axis, thereby causing said member to pivot toward said force application member in a sudden snap action.

4,095,067

APPLIANCE SWITCH

Anthony Rosario LaScola, Bellingham, Mass., assignor to Ark-Les Switch Corporation, Watertown, Mass.

Filed Mar. 16, 1977, Ser. No. 778,101
Int. Cl.² H01H *13/28*
U.S. Cl. 200—67 AA **4 Claims**



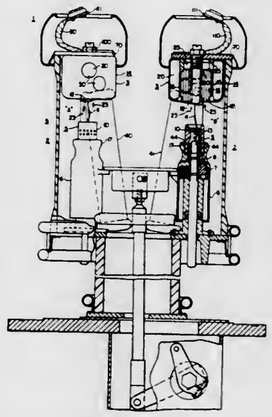
1. A compact snap-action appliance switch comprising
- an insulating base, an insulating case adapted for assembly to said base, two fixed contacts carried in said base,
- a paddle actuator movable in said case, and a roller contact movable by said actuator,
- said insulating base having
  - a generally vertical wall element extending upwardly from said base and defining a base roller contact track portion and a further portion
  - said track portion having
    - a roller stop wall generally parallel with said wall element
    - side walls connecting said roller stop wall and said wall element
    - a track floor bounded by said walls and said wall element and having a raised roller guide extending between said wall element and said roller stop wall,
  - contact spacer portions on either side of said roller quide, each said spacer portion extending lengthwise generally parallel with said guide between said wall element and said roller stop wall, each said spacer portion extending widthwise from said roller guide toward the adjacent said side wall and having a narrower widthwise extension adjacent said wall element than adjacent said roller stop wall, the upper surface of a said spacer portion being intermediate in height between said track floor and said roller guide upper surface,
    - said track floor, said roller guide upper surface, and said contact spacer portion upper surfaces being generally concave upwardly with respect to said base,
  - said further portion having
    - wire apertures adjacent said wall element, extending entirely through said base, and wire retaining means adjacent thereto and cooperating with said fixed contacts and said case to retain a wire for electrical contact,
  - said insulating case having
    - wire stop means carried on the inner surfaces of said case and positioned for cooperation with said base wire apertures,
  - each said fixed contact having
    - a vertical base portion, a vertical connector portion integral therewith and extending above said base portion, and a generally horizontal extending portion declined slightly downwardly from said vertical portion, said fixed contact vertical base portion being fixed in a said base fixed contact receiving slot, said extending portion overlying said track floor and having its upper surface generally parallel with the upper surface of said contact spacer portion, said vertical connector portion engaging said case contact retaining means,
  - said paddle actuator having
    - a tapered paddle extending exterior of said case frame for manual actuation of said switch,
    - a downwardly extending generally flat projection having on its lower edge a spring positioner,
    - a closure element generally convex outwardly of said switch,
  - said actuator being pivotably fixed in said case,
  - said roller contact being electrically conductive and having two roller elements and a guide track follower portion connecting said roller elements, said follower portion being of smaller cross section than said roller elements, said roller being positioned in said base track for movement therealong,
  - said switch further including an insulating guide element having an upper neck portion and a lower roller engaging surface, and a compression spring secured between said actuator spring position and said guide neck, said guide lower surface engaging said roller element follower portion for movement of said roller element responsive to motion of said paddle, from
  - an open circuit condition in which said roller contact is urged by said spring against said roller stop wall and said roller elements are spaced from said fixed contacts,
  - an initial closed circuit condition in which each said roller element engages only a said fixed contact extending portion, and
  - a steady-state closed circuit condition in which said roller contact is urged against said fixed contacts and said roller elements engage said vertical connector portions.

4,095,068

STATIONARY-CONTACT-AND VOLTAGE-SHIELD ASSEMBLY FOR A GAS-PUFFER-TYPE CIRCUIT-INTERRUPTER

Jeffry R. Meyer, Penn Hills Township, Allegheny County, and Robert L. Hess, North Versailles, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 12, 1976, Ser. No. 685,465
Int. Cl.² H01H *33/82, 9/30*
U.S. Cl. 200—144 AP **12 Claims**



1. Gas-type circuit-interrupter equipment including separable contact means to establish an arc, said separable contact means including a relatively-stationary contact and a cooperable movable contact, means defining a source of gas under pressure, means directing a flow of compressed gas from said

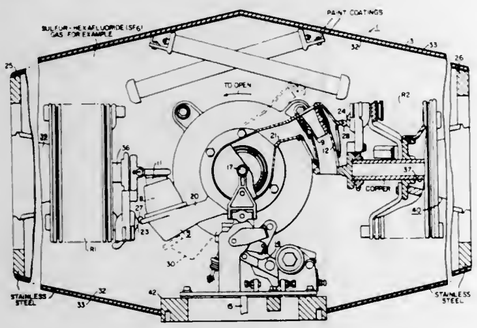
source to the established arc to effect the extinction thereof, a generally-cylindrically-shaped metallic electrostatic shield exposed to the surrounding ambient and encompassing the relatively-stationary contact and ensuring a low-gradient electrostatic field at its forward end facing the movable contact and located between the said separated contact in the fully-open-circuit position of the gas-type circuit-interrupter, and said openly-exposed metallic electrostatic shield defining an exhaust-gas collecting chamber in open pace for receiving at its forward end the hot exhaust arced gases emanating from the arcing region during the arcing period of the said gas-type circuit-interrupter.

4,095,069

STAINLESS-STEEL INTERRUPTER-HEAD CONSTRUCTION FOR CIRCUIT-INTERRUPTERS CONTINUOUSLY CARRYING HIGH-VALUE-AMPERAGE CURRENTS

Russell N. Yeckley, Murrysville, and Zeno Neri, Wilkins Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 23, 1976, Ser. No. 660,745
Int. Cl.² H01H *33/56*
U.S. Cl. 200—148 B **6 Claims**



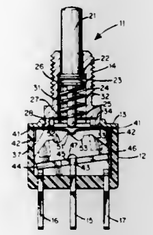
1. A high power, high-voltage circuit-interrupter including, in combination, means defining a high-voltage interruptering pressurized metallic head-unit capable of carrying currents in excess of 4,000 amperes, upstanding hollow insulating column means for supporting said interrupting pressurized metallic head-unit high up in the air an adequate distance and height from ground potential, a pair of terminal-bushings having terminal-studs extending interiorly within said interrupting pressurized metallic head-unit, at least a pair of separable contacts disposed interiorly within said pressurized head-unit and separable away from each other to establish an arc during the opening operation, conducting means electrically interconnecting said separable contacts with the terminal-studs extending through the pair of terminal-bushings, operating means for effecting separation of the separable contacts within said interrupting head-unit and subjecting the established arc to a blast of compressed gas to thereby effect the extinction thereof, said high-voltage interrupting metallic pressurized head-unit being composed substantially entirely of stainless-steel material, the pressurized metallic interrupting head-unit having an insulating outer surface coating provided thereon about its outside surface and also another insulating coating around its inside surface to assist in rapid heat transfer from the pressurized metallic head-unit to the outer external ambient atmosphere.

4,095,070

MINIATURE PUSHBUTTON SWITCH

Kenneth A. Simpson, Lynnfield, Mass., assignor to C & K Components, Inc., Watertown, Mass.

Filed Dec. 27, 1976, Ser. No. 754,848
Int. Cl.² H01H *3/00*
U.S. Cl. 200—153 J **16 Claims**



1. A pushbutton switch comprising:
a housing comprised partially of dielectric material;
a plurality of electrical terminals mounted in and projecting outwardly from one side of said housing;
a first contact member pivotably mounted within said housing, said first contact member having at least two operative positions and being adapted to selectively interconnect some of said terminals when in at least one of said operative positions;
a first insulative member mounted on and pivotable with said first contact member;
a leaf spring mounted within said housing and being shaped and configured to be normally in interference contact with said first insulative member;
a pivot pin extending downwardly within said housing and having an end adapted to selectively contact said first insulative member, said first insulative member being configured to receive said end of said pivot pin; and
means for longitudinally moving said pivot pin into and out of engagement with said first insulative member;
whereby upon being moved longitudinally downwardly, said pivot pin engages said first insulative member so as to cause said first insulative member and first contact member to pivot to one operative position, said first insulative member being retained in said one operative position by interference contact with said leaf spring.

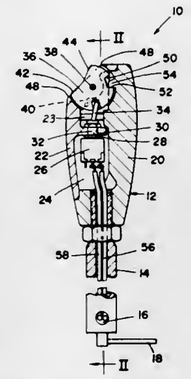
4,095,071

SWITCH MOUNTED IN A LEVER HANDLE

Richard W. Chamberlain, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 12, 1976, Ser. No. 704,133
Int. Cl.² H01H *9/06*
U.S. Cl. 200—157 **2 Claims**

1. A combined lever and switch control assembly, comprising:
(a) a lever having means for defining a hollow housing at an upper end of said lever for gripping by the hand of an operator, said housing having an elongated front member extending along said lever and shaped to be gripped by the fingers of a hand, an elongated rear member extending along said lever and shaped to be gripped by the heel of a hand, and means for releasably securing said front member to said rear member, said rear member having a sloping top surface;
(b) switch means for operating a remote member, including a toggle switch mounted within said housing on said rear member and having a movable arm extending upwardly inside said housing;
(c) thumb controlled means, rotatably mounted on said rear member, for actuating said toggle switch, including means for receiving said arm to move said arm, and first and second surfaces alternately extending above and flush with said top sloping surface for ease of actuation by the thumb of a hand, said thumb controlled means being rotatably mounted to permit a pushing action on either said first surface or said second surface to change the state of said toggle switch; and



(d) means for stopping rotary movement of said thumb controlled means when said toggle switch is in either state, including a fixed projection extending from said front member internally of said housing, and a pair of spaced-apart shoulders on said thumb controlled means straddling said projection, either of said shoulders contacting said projection depending on the direction of rotation of said thumb controlled means.

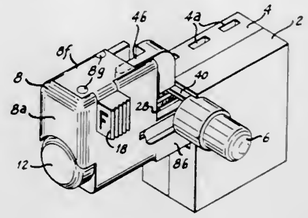
4,095,072

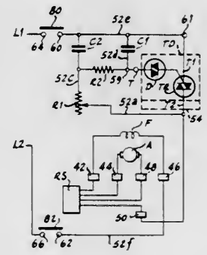
INDUSTRIAL SPEED CONTROL TRIGGER SWITCH WITH INTEGRAL REVERSING SWITCH

Earl T. Piber, Oconomowoc, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Aug. 2, 1976, Ser. No. 710,922
Int. Cl.² H01H *13/08;* **H02P** *7/00*
U.S. Cl. 200—157 **15 Claims**

1. An industrial trigger switch for mounting in the insulated handle of a portable electric tool comprising:
an insulating housing having a forward opening and wire apertures;
an insulating, spring-biased depressible trigger having a forwardly extending finger engaging portion and a slidable portion extending rearwardly through said opening into said housing;
interfitting means between said trigger and said housing limiting reciprocal movement of said trigger;
switching means in said trigger switch for selectively connecting an electric power source to the tool motor;
terminals for said power source connections and said motor connections accessible from the outside of said housing through said wire apertures to enable external conductors to be connected thereto;
a relatively large surface relatively thin heat sink contiguous to inner surfaces of three vertical outside walls of said housing;
controllable thyristor means mounted on said heat sink;
an insulating substrate mounted horizontally on the upper edge of said heat sink in said housing;
a speed control circuit mounted on said substrate and connected to said controllable thyristor means and comprising a variable resistor;
means coupling said slidable portion of said trigger to vary said variable resistor when said trigger is depressed;
said switching means comprising a double-pole on-off switch having bridging contacts including two pairs of stationary contacts mounted on said substrate and a pair of bridging contacts carried by said trigger for bridging the stationary contacts of the respective pairs thereof when said trigger is depressed, and each pole of said switch being connected to said terminals;





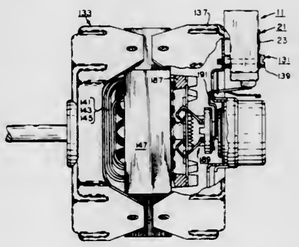
and no metal parts being exposed to the user when said trigger switch is mounted in the insulating handle of a portable electric tool.

4,095,073

SWITCH AND TERMINAL ASSEMBLY HAVING STRIP TERMINAL AND MOUNTING MEMBER ADAPTED TO GROUND DYNAMOELECTRIC MACHINE CASING ON SIMILAR CONDUCTIVE SURFACE

James P. Frank, Rock Falls, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Filed Mar. 30, 1976, Ser. No. 671,965
Int. Cl.² H01H *9/12;* **H01R** *3/02;* **H02K** *11/00;* **H05K** *5/02*
U.S. Cl. 200—293 **48 Claims**

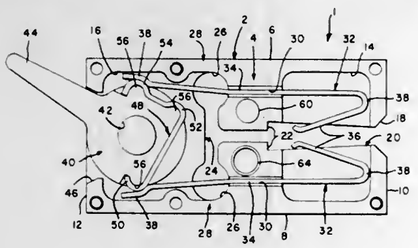


36. A switch and terminal assembly comprising a casing having a pair of separable casing members with an opening therethrough, a switch means accommodating chamber within said casing and generally isolated from said opening, a grounding device on said casing disposed at least in part exteriorly thereof, and means associated with said grounding device and at least one of said casing members generally about said opening for retaining said casing members against separation and said grounding device against displacement from said casing.

48. A switch and terminal assembly comprising:
a casing including a pair of separable casing members;
a chamber within said casing members;

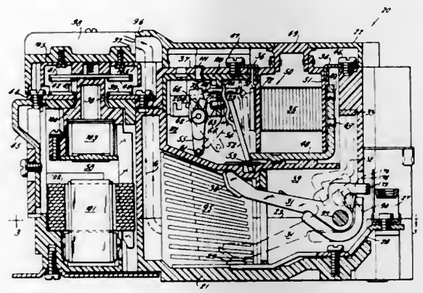
a plurality of switch means in said casing adapted for selective switching engagement;
a grounding device disposed on said casing so as to be electrically disassociated from said switch means plurality;
means for retaining said casing members against separation and said grounding device against separation from said casing; and
means associated with said grounding device and said retaining means for acommodating thermal expansion and contraction of said casing members.

4,095,074
SWITCH FOR CARD EDGE
Joseph LaRue Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Oct. 12, 1976, Ser. No. 731,076
Int. Cl.[2] H01H *1/22, 19/50, 21/04*
U.S. Cl. 200—295 **2 Claims**



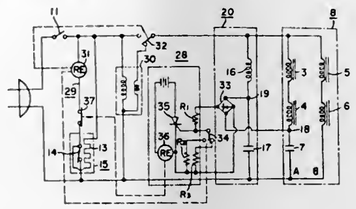
1. A switch for mounting on a printed circuit board edge, comprising:
A housing having a first end bifurcated by a first slot with shoulders on opposite sides of said first slot for abuttingly receiving an edge of a printed circuit board,
said first slot tapering from said shoulders toward said first end to grippingly receive opposite sides of a printed circuit board inserted into said first slot and stopped against said shoulders,
a second slot extending transversely of said first slot and forming together with said first slot a T-shaped opening, each end of said second slot terminating in enlarged circular apertures adjacent corresponding side walls of said housing, said circular apertures defining resiliently yieldable hinge portions integral with said side walls allowing resilient deflection of said bifurcated housing away from said first slot in response to enlargement of said first slot by the presence therein of a printed circuit board, a rotor mounted for rotation in said housing and carrying a bridging contact, a pair of elongated conducting spring contacts mounted in said housing lengthwise of said first slot and having first end portions protruding into said slot from opposite sides thereof, said rotor being mounted between spaced apart second end portions of the said spring contacts continuously biasing said second end portions resiliently away from each other and thereby pivoting said first ends of said spring contacts toward each other independently of pivotable motion of said housing side walls,
a lever on said rotor for manually rotating said rotor to a first position bridging said bridging contact electrically across said spring contacts and said rotor being rotatable to a second position disengaging said bridging contact from at least one of said spring contacts.

4,095,075
VISIBLE BLADE SWITCH
Bernard DiMarco, Bellefontaine, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.
Filed Apr. 28, 1976, Ser. No. 681,253
Int. Cl.[2] H01H *9/16*
U.S. Cl. 200—308 **8 Claims**



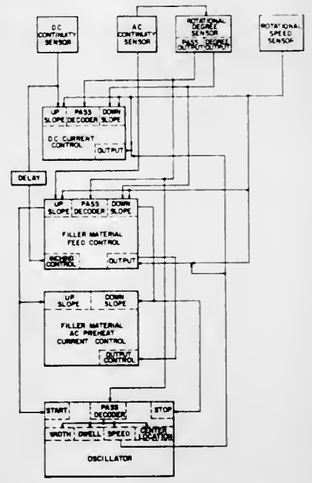
1. An electrical switching device including a housing, cooperating movable and stationary contacts within said housing, an elongated arm within said housing; said movable contact being mounted at one end of said arm; a pivot means near the other end of said arm mounting the latter for movement between a first and a second position wherein said contacts are opened and closed, respectively; said arm at a position remote from said one end including an indicating portion operatively positioned for direct viewing from positions in front of said housing, and without opening any portion of said housing, when said arm is in one of its said positions whereat said indicating portion projects through a side opening in said housing; with said arm in the other of its said positions said indicating portion being retracted from viewing from positions in front of said housing.

4,095,076
PROTECTIVE DEVICE FOR INDUCTION HEATING APPARATUS
Akihiro Tsumori, Shizuoka, and Kenji Shima, Amagasaki, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Division of Ser. No. 582,154, May 30, 1975, Pat. No. 4,015,084.
This application Aug. 30, 1976, Ser. No. 718,838
Claims priority, application Japan, Jul. 15, 1974, 49-83619
The portion of the term of this patent subsequent to Mar. 29, 1994, has been disclaimed.
Int. Cl.[2] H05B *5/04*
U.S. Cl. 219—10.49 R **2 Claims**



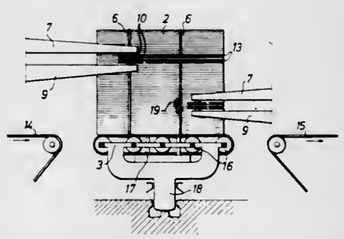
1. A protective device for induction heating apparatus comprising:
a specific heating element for holding a substance to be cooked,
an excitor for induction heating the specific heating element,
means for applying an operating voltage to the excitor,
a power switch for turning on the excitor,
means for delaying the application of the operating voltage to the excitor for a predetermined time after the turning on of the power switch,
means for detecting immediately after the turning on of the power switch and thereafter the presence of a heating element other than the specific heating element, the absence of the specific heating element or any other heating element or an undesirably high temperature of the specific heating element,
means for preventing the application of operating voltage to the excitor in response to detection of the presence of a heating element other than the specific heating element, the absence of the specific heating element or any other heating element or an undesirably high temperature of the specific heating element,
the excitor comprising a first series circuit of a group of excitation windings and a capacitor, the detecting device comprising a second series circuit of a mimic winding and a capacitor, the second series circuit being connected in parallel to the first series circuit to pass current having substantially the same phase as that of the current passing through the first series circuit during normal operation, and
means for applying a voltage lower than the operating voltage to the excitor during the predetermined time for detecting the presence of a heating element other than the specific heating element, the absence of the specific heating element or any other heating element or an undesirably high temperature of the specific heating element.

4,095,077
AUTOMATIC HOT FILLER WIRE WELDING METHOD AND APPARATUS
Urban A. Schneider, and Robert D. Sigman, both of Pensacola, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Jun. 25, 1976, Ser. No. 699,769
Int. Cl.[2] B23K *9/12*
U.S. Cl. 219—61 **4 Claims**



1. A method of welding tubular members of generally circular cross section along a circumferential weld seam characterized in that substantially identical welds are simultaneously produced at a plurality of spaced stationary welding stations positioned around the weld seam in radial symmetry of the tubular member wherein the welding process comprises:
supporting the tubular members in a vertical orientation;
rotating the tubular members continuously in one direction about their axes of revolution;
monitoring the speed of rotation and the number of revolutions of the weld seam and its circumferential position relative to the welding stations and providing corresponding outputs indicative thereof;
feeding filler material into a weld zone along the seam adjacent each of the welding stations at a given deposition rate which is automatically, programmably varied proportionally with and as a direct function of the monitored output corresponding to the speed of rotation of the tubular member;
automatically, programmably varying the filler material feed speed, in a preestablished manner, at each welding station, as a direct function of the circumferential position of the weld seam relative to each welding station and the cycle of rotation as identified by the corresponding monitored outputs;
preheating of the filler material at each of the welding stations to a temperature approaching its melting temperature prior to deposit within the weld zone;
automatically controlling the power employed to preheat filler material at its operating level at each of the welding stations as a predesignated function of the filler material feed speed;
simultaneously heating the deposited filler material and the weld zone adjacent each welding station at a rate sufficient to form an integral weldment; and
automatically controlling the power employed to heat the weld zone adjacent each weld station to vary incrementally at predetermined spaced speed of rotation intervals and remain constant between the predetermined speed levels.

4,095,078
PACKING WIRE CUTTING DEVICE
Lars Waenerlund, Munkedal, and Torsten Bobäck, Sodertalje, both of Sweden, assignors to Munkedals Aktiebolag, Munkedal, Sweden
Filed Jan. 6, 1976, Ser. No. 646,654
Int. Cl.[2] B23K *11/22*
U.S. Cl. 219—68 **2 Claims**



1. A packing wire cutting device for cutting packing wire wrapped in the form of a parallelogram around a paper pulp bale in the form of a parallelepiped, the packing wire cutting device functioning to cut the packing wire on one side of the paper pulp bale, comprising
an electrode comprising two electrode halves separated by a gap,
means for causing relative movement between the electrode halves and said one side of the paper pulp bale,
the packing wire on said one side of the paper pulp bale being disposed transverse to the direction of relative movement of the electrode halves and said one side of the paper pulp bale so that the packing wire on said one side of the paper pulp bale will intersect the electrode halves irrespective of the exact position of the electrode halves during relative movement between the electrode halves and said one side of the paper pulp bale,
means for forcing the two electrode halves into said one side of the paper pulp bale to cause the electrode halves to be bridged by the packing wire during relative movement

between the electrode halves and said one side of the paper pulp bale, and

means for applying electrical power to the two electrode halves to melt and thereby sever the packing wire passing therebetween during relative movement of the electrode halves and said one side of the paper pulp bale.

4,095,079

TOOL HOLDER FOR A SPARK EROSION MACHINE TOOL

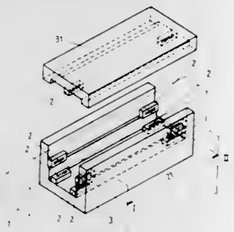
Werner Ullmann, Locarno; Paul Fricker, Losone, and Maurice Guenin, La Chaux-de-Fonds, all of Switzerland, assignors to A.G. für industrielle Elektronik AGIE Losone b. Locarno, Losone, Switzerland

Filed Dec. 13, 1976, Ser. No. 749,872

Claims priority, application Germany, Aug. 6, 1976, 2635520

Int. Cl.² B23P *1/08*

U.S. Cl. 219—69 E **10 Claims**



1. An assembly for use in a machine tool, for example a spark erosion machine tool, the assembly being for holding a device, for example, a tool element for the machine tool, the assembly comprising:

an elongate member (1) comprising portions defining first, second, third and fourth external bearing surfaces of the member, which bearing surfaces extend along the length of the member, the first and second bearing surfaces being mutually opposed and the third and fourth bearing surfaces being mutually opposed, one end of the member being suitable for having said device connected thereto,

a housing (3) within which part of the member (1) is housed, and

bearing means (2) mounted inside the housing (3) for supporting the member (1) for movement in the direction of its length with respect to the housing,

the bearing means (2) being in abutting contact with said member at each of first, second, third, fourth and fifth positions in each of two planes (I and II), which planes are spaced apart in, and are transverse to, the direction of the length of the member, the first and second positions being spaced apart on the first bearing surface, the third position being on the second bearing surface and the fourth and fifth positions being on respective ones of the third and fourth bearing surfaces.

4,095,080

METHOD FOR MEASURING THE EXTENT OF SHIELDING FUNCTION OF AN ARC ATMOSPHERE AND AN ARC WELDING MACHINE INCLUDING A NITROGEN OXIDE MEASURING DEVICE MEASURING THE EXTENT OF SHIELDING FUNCTION

Fumio Ueyama, Nara, and Takao Yoshimitsu, Kobe, both of Japan, assignors to Osaka Denki Co., Ltd., Osaka, Japan

Filed Jan. 7, 1976, Ser. No. 647,180

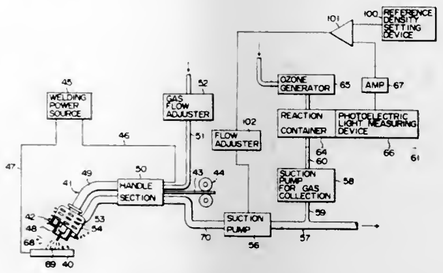
Int. Cl.² B23K *9/16*

U.S. Cl. 219—74 **10 Claims**

1. An arc welding method comprising the steps of:

supplying a predetermined amount of shielding gas around a tip portion of a welding electrode to shield the welding arc from atmospheric gas;

supplying arc welding power between said welding electrode and a mother metal to generate an arc therebetween;



measuring the concentration of nitrogen oxide in an arc atmosphere which is created in an outer atmosphere around said arc; and

controlling during welding said amount of said supplied shielding gas in response to the measured concentration of nitrogen oxide.

4,095,081

ELECTRIC ARC METAL SPRAYING DEVICES

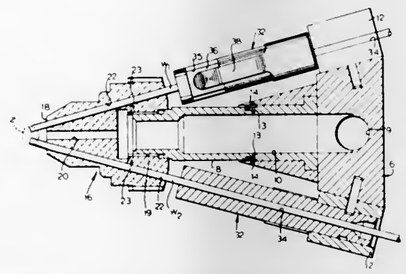
Stewart John Ashman, Dudley, England, assignor to Metallisation Limited, Dudley, England

Filed Apr. 6, 1976, Ser. No. 674,134

Claims priority, application United Kingdom, Apr. 9, 1975, 14509/75

Int. Cl.² B23K *9/04*; B05B *1/24*

U.S. Cl. 219—76.16 **15 Claims**



15. A head for use in a metal spraying device, said head comprising:

a body member fabricated from electrically insulating material;

recess means provided in said body member for securely receiving a body portion of the metal spraying device;

said body member having a leading face;

air passage means longitudinally extending axially through said body member and emerging at said leading face for conveying air to said leading face, said leading face being at a right angle to said air passage means;

inlet means provided in said body member for connecting said air passage means to a source of air under pressure;

aperture means provided longitudinally through said body member for permitting metallising wire in electrical contact to be fed therethrough in engagement with sidewalls of said aperture means, said sidewalls consisting of said insulating material of said body member;

said aperture means consisting of two guide passages, said two guide passages converging continuously towards each other in a direction towards said leading face and extending from a rear surface of said body member to said leading face, and said two guide passages emerging at said leading face on opposite sides of said air passage means to provide an arcing zone for two metallising wires as the two wires emerge from said two guide passages respectiveiy.

4,095,082

APPARATUS FOR WELDING ELECTRICAL CONTACTS

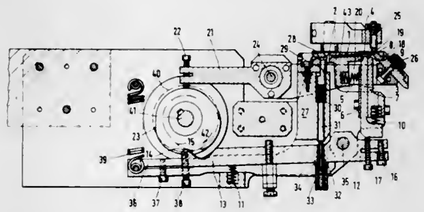
Hans Rudolf Zollinger, Geroldswil, Switzerland, assignor to H. A. Schlatter AG, Schlieren, Switzerland

Filed Jun. 14, 1976, Ser. No. 695,816

Claims priority, application Switzerland, Jun. 27, 1975, 8363/75

Int. Cl.² B23K *11/00*

U.S. Cl. 219—78.15 **7 Claims**



1. An apparatus for the production of electrical contacts on contact carriers, comprising:

a cutting device adapted to cut a contact piece from a strip of wire or ribbon-like contact material;

a first guide means positioned for guiding the strip of contact material to said cutting device;

an electrical resistance welding device spaced from said cutting device for welding a cut contact piece to a contact carrier;

a second guide means arranged between said cutting and said welding device for guiding contact material from said cutting to said welding device;

said first and second guide means connected in alignment;

said welding device having a first stationary electrode and a second electrode liftably arranged beneath said first electrode;

a holder for holding the contact carrier at the underside of said first electrode;

said second electrode having a groove for receiving a lower part of the cut contact piece and being liftable from a rest position, in which said groove is connected in alignment to said second guide means, to a welding position, in which it is pressed towards said first electrode, gripping means adapted to grip and move the remaining strip of contact material; and

driving means for actuating said cutting device, said gripping means and said second electrode in such a manner that, in sequence, said cutting device cuts a contact piece from the strip of contact material, said gripping means advances the remaining strip of contact material into said second guide means to push the cut contact piece from said cutting device through and out of said second guide means in said groove of said second electrode, being in its rest position, and subsequently withdraws the remaining strip of contact material from said second guide means by a distance which is smaller by the length of the cut contact piece than the distance by which the cut contact piece is advanced to said groove of said second electrode by the strip of contact material, and upon the beginning of said withdrawing of the remaining strip of contact material said second electrode is lifted from said rest position to said welding position and thereafter descented to said rest position.

4,095,083

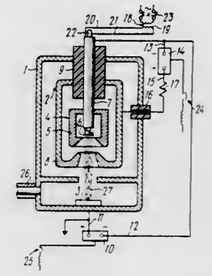
ELECTRON-BEAM APPARATUS FOR THERMAL TREATMENT BY ELECTRON BOMBARDMENT

Boris Grigorievich Sokolov, Nosovikhinskoe Shosse, 11, kv. 64, Zheleznodorozhny, and Georgy Fomich Zaboronok, pereulok Obukha, 4, kv. 56, Moscow, both of U.S.S.R.

Filed Jul. 24, 1974, Ser. No. 491,556

Int. Cl.² B23K *15/00*

U.S. Cl. 219—121 EB **3 Claims**



1. An electron-beam apparatus for thermal treatment by electron bombardment, comprising:

a vacuum chamber accomodating an object being treated;

an electron gun housed in said vacuum chamber and including a cathode which is the source of an electron flow and an accelerating electrode forming, together with said cathode, said electron gun, said cathode and said accelerating electrode forming said electron flow into an electron beam directed to said object being treated, and being electrically insulated from each other and from said object being treated;

a power supply which is a source of d-c voltage, the negative terminal of which is connected to said cathode and the positive terminal is connected to said object being treated; and

a supplementary source of accelerating voltage, which is a d-c voltage source, the negative terminal of which is connected to said cathode and the positive terminal is connected to said accelerating electrode, the potential difference created by said accelerating voltage source between said cathode and said accelerating electrode exceeding that created by said power supply by no less than 50 V.

4,095,084

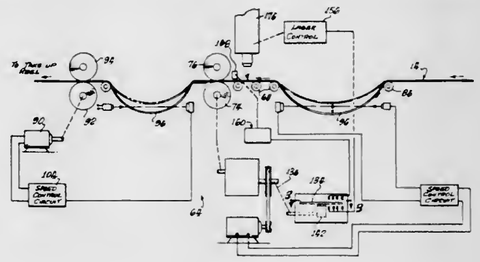
METHOD AND APPARATUS FOR PERFORATING ELONGATE MEMBERS

George V. Shutt, 918 Willow Springs La., Glendora, Calif. 91740

Filed Apr. 14, 1977, Ser. No. 787,553

Int. Cl.² B23K *9/00*; B26D *5/00*

U.S. Cl. 219—121 LM **28 Claims**



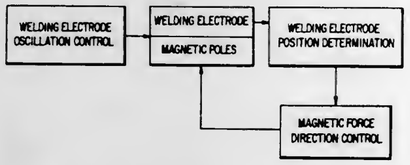
1. The method of perforating an elongate member comprising the steps of:

(a) intermittently and relatively feeding said member endwise through a perforating station in a manner such that said member is periodically arrested with a portion of the member located at said station,
(b) pulsing a laser in timed relation to the intermittent motion of said member though said station to produce a laser beam pulse of sufficient duration and intensity to penetrate the member when the member is arrested and directing each pulse against the portion of the member currently located at said station to form a hole in the member, and
(c) said member being tubular, and including the step of maintaining the member in a flattened condition at said station with a gap between upper and lower flattened sections defined by the member, and with the upper section facing toward the laser beam.

4,095,085
HIGH EFFICIENCY ARC WELDING PROCESS AND APPARATUS

Makoto Tomita, Yokohama; Hisaaki Yokota, Chigasaki; Syozi Koga, Kamakura, and Toshisada Kashimura, Tokyo, all of Japan, assignors to Kobe Steel, Limited, Kobe, Japan

Filed Sep. 29, 1976, Ser. No. 727,705
Claims priority, application Japan, Sep. 29, 1975, 50-118078; Sep. 29, 1975, 50-118076
Int. Cl.² B23K *9/08*
U.S. Cl. 219—123 **18 Claims**

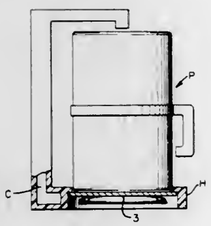


1. An arc welding process comprising the steps of:
preparing a welding groove between plates forming a welding line;
generating a welding arc between a welding electrode and the plates to be welded;
oscillating the welding electrode;
generating a magnetic force;
oscillating the direction of the welding arc by the magnetic force in synchronism with the oscillating of the welding electrode;
whereby the welding arc is directed to the groove face of each plate to be welded.

4,095,086
VAPORIZING AND WARMING DEVICE FOR BEVERAGE-PREPARING MACHINES

Helmut Ohnmacht, and Ernst Brechner, both of Kandel, Germany, assignors to Firma Fritz Eichenauer, Germany

Filed Mar. 19, 1976, Ser. No. 668,402
Claims priority, application Germany, Jul. 11, 1975, 2530967
Int. Cl.² A47J *31/44*; H05B *3/00*
U.S. Cl. 219—283 **14 Claims**

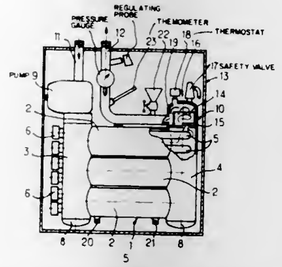


1. Vaporizing and warming device for beverage-preparing machines, especially for household coffee machines and the like; said device comprising:
a hot plate for keeping the thus-prepared beverage warm, said hot plate having at least two sides,
a vaporizer tube carrying water for preparing the beverage, and said vaporizer tube being thermally connected to one side of said hot plate,
a heating element yielding the heat required for respective vaporization and warming processes, said heating element being thermally conductively connected with the vaporizer tube and being arranged together with the vaporizer tube at one side of the hot plate, said heating element being arranged laterally offset with respect to the vaporizer tube and with its portion closest to the hot plate being spaced from said hot plate at a perpendicular distance which is smaller than the height of the vaporizer tube perpendicularly to the hot plate,
said arrangement of said heating element and the vaporizer tube providing optimum transfer of heat, including primarily radiant heat, to the hot plate, while minimizing the development of localized hot spots in the hot plate.

4,095,087
MINIATURE SYSTEM FOR CENTRAL HEATING AND WATER HEATING

Gabriel Giraud, 191, rue du Commandant Roland, 13008 Marseilles, France

Filed Dec. 1, 1975, Ser. No. 636,361
Claims priority, application France, Dec. 2, 1974, 74 40708
Int. Cl.² H05B *1/00*; F24H *3/06*; F24D *3/02*; F24H *1/10*
U.S. Cl. 219—298 **6 Claims**



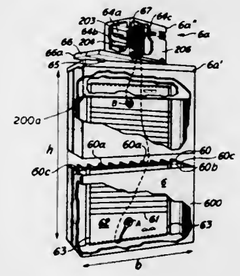
1. A compact system for central heating and water heating, comprising;
a heat-insulated water-heating enclosure shaped as a single metallic block, normally filled with heat-absorbing water and consisting of a plurality of horizontal water-heating tubes and a pair of vertical water-distributing tubes disposed at ends of the horizontal water-heating tubes and interconnecting the respective horizontal tubes in parallel flow relation, so that the shape and the size of the block correspond to the shape and size defined by the horizontal and vertical tubes and so that the water between the vertical tubes fills substantially the entire space defined by the horizontal tubes;
electric immersion heating resistors mounted to extend substantially entirely through each horizontal tube and through adjacent parts of each vertical tube and distributed over the water flow space defined thereby, for electric resistive heating of the water;
a water-circulating pump mounted directly on an upper end of one of the vertical tubes for pumping water through the horizontal tubes to be heated therein by the resistors and to be circulated for central heating and water heating, the pump having an inlet means for receiving water to be heated and outlet means communicating with the upper end of said one vertical tube through which the water to be heated is pumped into the vertical tube for distribution to the horizontal tubes; and

a water-mixing device mounted directly on an upper end of the other vertical tube and housed within a vertical extension thereof for mixing portions of the water pumped through the several horizontal tubes before its being circulated for central heating and water heating, said device having an inlet communicating with the upper end of the other vertical tube for receiving the heated water therefrom, an outlet for supplying the heated water to the point of use, and means intermediate the inlet and outlet for causing mixing of the heated water.

4,095,088
ELECTRICAL ENERGY SUPPLIED HEAT-EMITTING RADIATOR

Verner Andersson, Stationsgatan 1B, 824 00 Hudiksvall, and Hans Jonason, Rubinvagen 29, 852 40 Sundsvall, both of Sweden

Filed Mar. 31, 1976, Ser. No. 672,271
Claims priority, application Sweden, Apr. 2, 1975, 7503759
Int. Cl.² F24H *9/08*; F24D *13/02*; H05B *3/02*
U.S. Cl. 219—345 **12 Claims**



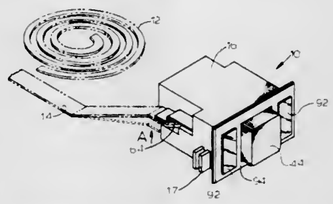
1. A heat-emitting radiator supplied with electrical energy and adapted for mounting on a building interior structure, such as a wall, comprising:
a contact rail adapted for mounting on a structure and including current conducting means;
a guide rail also adapted for mounting on said structure in spaced-apart relationship from said contact rail;
a connecting cassette supported by said contact rail and said guide rail and having contact means for feeding current to said contact rail current-conducting means, and having means for connecting said contact means to a source of electrical power; and,
at least one heating cassette supported by said guide rail and said contact rail and including heat-emitting resistance means fed by current applied to said contact rail and having means for contacting said current-conducting means in said contact rail for feeding current to said resistance means.

4,095,089
SEQUENCING SWITCH ASSEMBLY

Albert F. Ditzig, Hoffman Estates, Ill., assignor to Molex Incorporated, Lisle, Ill.

Filed Oct. 18, 1976, Ser. No. 733,145
Int. Cl.² F27D *11/00*
U.S. Cl. 219—441 **11 Claims**

1. A switch assembly for use in association with a heating element which heats a medium comprising:
a housing;
a first switch mounted in the housing and movable between on and off positions and electrically connected to the heating element to turn the element on and off, said first switch including resilient means tending to keep said second switch in a normally off position and a movable lock member associated between said first switch and thermally responsive actuating means to maintain said resilient means;
a second switch mounted in the housing movable between on and off positions and mechanically associated with the first switch so that said second switch is movable from its off position to its on position when said first switch is moved from its off position to its on position;

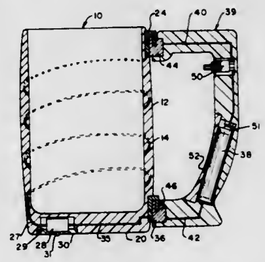


manually operable actuating means mounted on the housing and associated with said first switch for moving said first switch from it off position to its on position; and
thermally responsive actuating means associated between said first switch and the medium for moving said first switch from its on position to its off position when the medium reaches a given temperature.

4,095,090
ELECTRICALLY-HEATED CONTAINER

Anthony Pianezza, 3445 Donna St., Springfield, Ill. 62707

Filed Dec. 27, 1976, Ser. No. 754,907
Int. Cl.² F27D *11/02*
U.S. Cl. 219—441 **9 Claims**



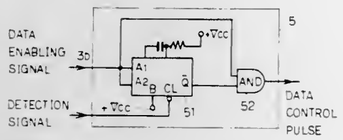
1. A device for heating liquid material comprising a container formed of dielectric material with a base, a sidewall and a detachable handle, an electrical heating unit embedded in said container, said heating unit having two heating leads, the first heating lead connected to a first electricity conducting tang mounted on the sidewall and the second heating lead connected to a switch mounted on the base, said switch having a switch lead connected to a second electricity conducting tang mounted on the sidewall, said handle including a battery with first and second battery leads connected to cooperating electricity conducting sockets, said tangs cooperating with said sockets and providing means for structural and electrical connection of the detachable handle to the sidewall, said switch responsive to changes in the position of the container when the container is picked up by the user.

4,095,091

METHOD FOR CONTROLLING INFORMATION RECOGNIZING OPERATION

Yoshiaki Nakano, Gifu, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Apr. 11, 1977, Ser. No. 786,625
Claims priority, application Japan, Apr. 21, 1976, 51-45995
Int. Cl.[2] G06K *7/10*
U.S. Cl. 235—462 **3 Claims**



1. A method for controlling information recognizing operation comprising the steps of:

transferring an object on a predetermined route at a constant speed, said object being recorded with information on the surface thereof;

generating a detection signal while said object passes through a predetermined position on said route;

scanning said information recorded on said object to thereby generate a data enabling signal per each object after the start of said detected signal;

generating a timer signal having a constant time period preset to be not longer than a period in which said object completes passing through said predetermined position, said timer signal being triggered by either one of said detection signal or said data enabling signal whereby said timer signal is generated per each object; and

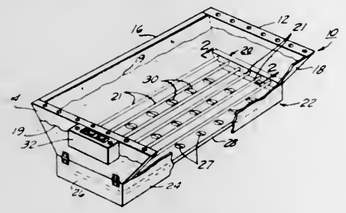
controlling information recognizing operation in response to said timer signal so that said information recorded on said object is recognized with said constant time period.

4,095,092

AQUATIC ANIMAL COUNTING

Gregor N. Neff, 85 Myrtle Ave., Dobbs Ferry, N.Y. 10522

Filed Sep. 13, 1976, Ser. No. 722,417
Int. Cl.[2] G06M *11/00*; A01K *61/00*
U.S. Cl. 235—92 PK **21 Claims**



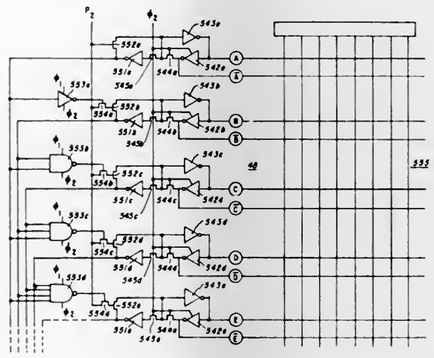
1. A device for aquatic animal measurement, said device comprising, in combination, sorting means for sorting said animals as to size, said sorting means including barrier means for restraining the movement of said animals, said barrier means having a plurality of openings of a size predetermined to pass animals smaller than a selected size and restrain other of said animals, detecting means adjacent each of said openings to detect the passage of one of said animals through it, said detecting means including signaling means for each opening for developing an electrical signal upon the passage of an animal through said opening, storage means for storing each such signal, sampling means for sequentially sampling the signals stored in said storage means, and counting means for counting the number of animals detected by said detecting means, said counting means being adapted to count the signals taken from the storage means by said sampling means.

4,095,093

SYNCHRONOUS STATE COUNTER

Larry L. Miles, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 27, 1976, Ser. No. 735,918
Int. Cl.[2] H03K *23/24*
U.S. Cl. 235—92 GT **1 Claim**



1. A state time counter for a microprocessor system, said counter being responsive to a clock in said microprocessor system for counting state times, said counter comprising:

(a) a plurality of latches for storing bits providing a binary representation of the state time the microprocessor system is in, each one of said latches including a pair of first inverters and means coupling said pair of first inverters in series;

(b) a plurality of second inverters, each of said second inverters being coupled at the inputs thereof to an output of one of the inverters in said pair of first inverters, said second inverters outputting a carry control signal;

(c) a plurality of transistors, each one of said transistors coupling the output of one of said plurality of second inverters to the input of the other inverter in one of said pairs of first inverters;

(d) means coupling said clock to the control element of the one of said plurality of transistors coupled to the other inverter in said pair of first inverters forming the latch storing the least significant bit of the state time in said microprocessor system for changing the state of the latch storing the least significant bit in response to said clock;

(e) means coupling said clock and selected ones of said carry control signals to each of said plurality of transistors coupled to the other inverter in said pairs of first inverters forming the latches storing bits more significant than said least significant bit for changing the state of the latches storing bits more significant than the least significant bit in response to the carry control signal outputted from all second inverters associated with latches storing bits less significant than the latch to be switched being of a preselected state and further in response to said clock.

4,095,094

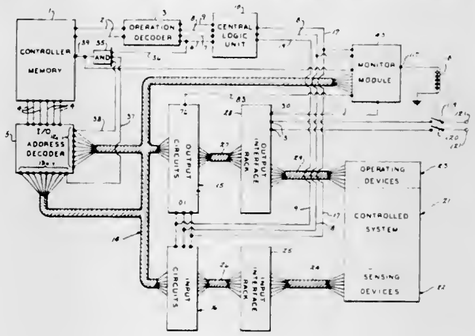
MALFUNCTION DETECTION SYSTEM FOR A PROGRAMMABLE CONTROLLER

Odo J. Struger, Chagrin Falls; William W. Searcy, Richmond Heights, and Ernest F. John, Willoughby, all of Ohio, assignors to Allen-Bradley Company, Milwaukee, Wis.

Continuation of Ser. No. 434,333, Jan. 17, 1974, abandoned. This application Mar. 21, 1977, Ser. No. 779,916
Int. Cl.[2] G06F *1/00*; G05B *11/00*
U.S. Cl. 235—304.1 **4 Claims**

1. In a programmable controller having a memory which stores a control program that is continuously and repeatedly executed to direct a logic unit to operate operating devices on a controlled system in response to the logic states of sensing

devices on the controlled system, the improvement therein comprising a diagnostic module for periodically checking the operation of said programmable controller while it is on line, said diagnostic module including means for periodically operating said logic unit in a prescribed pattern, said means including a first set of instructions stored in said memory with the control program which directs the logic unit to operate an



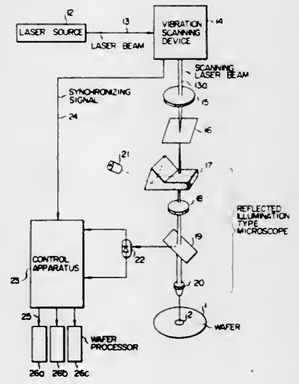
output in a prescribed pattern, means for detecting deviations in the operation of said logic unit from said prescribed pattern including a second set of instructions stored in said memory which direct the logic unit to examine the logic state of said output, and a diagnostic register for indicating a malfunction when a deviation is detected, wherein the execution of said first and second set of instructions are interleaved with the execution of the control program instructions.

4,095,095

APPARATUS FOR MANUFACTURING SEMICONDUCTOR DEVICES

Hisashi Murasoka, Yokohama, and Teruo Yoneyama, Yokosuka, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Mar. 30, 1977, Ser. No. 782,757
Claims priority, application Japan, Mar. 31, 1976, 51-34414; Mar. 31, 1976, 51-35661; Mar. 31, 1976, 51-35662
Int. Cl.[2] G06C *15/00*; G06K *7/10, 19/06*; B01J *17/00*
U.S. Cl. 235—419 **7 Claims**



1. An apparatus for manufacturing semiconductor devices, comprising:

a scanning device for scanning a binary-coded pattern formed on a selected region of a semiconductor wafer, having high and low reflection portions and containing an item of wafer processing information based on which a semiconductor device is to be manufactured in the semiconductor wafer, thereby to obtain an item of scanned information;

a control apparatus for storing a plurality of items of wafer processing information and reading out, in response to an item of scanned information from said scanning device, an item of wafer processing information which corresponds to the item of scanned information, thereby to produce a control signal corresponding to the item of wafer processing information thus read out; and

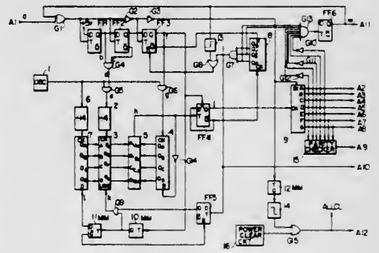
at least one wafer processor for processing, upon receipt of the control signal from said control apparatus, the wafer in accordance with the item of wafer processing information which corresponds to the control signal.

4,095,096

CODE DISCRIMINATOR

Shuzi Harada, and Tetsuo Yamaguchi, both of Yokohama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Aug. 23, 1976, Ser. No. 716,711
Claims priority, application Japan, Sep. 2, 1975, 50-106740
Int. Cl.[2] G06K *7/14, 19/06*
U.S. Cl. 235—463 **5 Claims**



1. A code discriminator for discriminating code consisting of modules of bars and spaces and including guard patterns, characters and a center bar pattern, comprising:

means for scanning the code and transforming the code into an electric signal;

first discriminator means for counting the width of the basic module of the bar and the width of the basic module of the space in the guard pattern and averaging the widths, and for discriminating the first character following the guard pattern by sampling the first character in start-stop synchronization using said average as a standard width; and

second discriminator means for counting the total width of the character before the character to be discriminated, dividing said total width by the number of modules constituting one character to provide another standard width, and for discriminating the character by sampling in start-stop synchronization.

4,095,097

PULSED LIGHT SIGNAL RECEIVER

Gerome R. Reeve, Longmont, Colo., assignor to Gerald F. Titus, Denver, Colo.

Filed Dec. 22, 1976, Ser. No. 753,414
Int. Cl.[2] H04B *9/00*
U.S. Cl. 250—199 **6 Claims**

1. A receiver for pulsed light signals comprising:

a pulsed light detecting means including a phototransistor having base and collector and emitter electrodes,

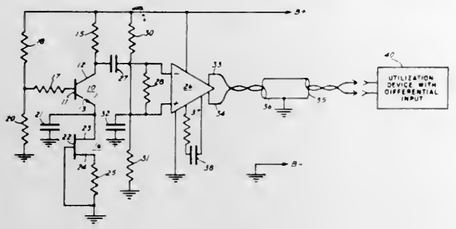
means for biasing the base of said transistor to a constant voltage,

a load resistance in the collector circuit of said transistor,

a signal output connected to said load resistance,

a constant current device in the emitter circuit of said transistor, and

a capacitor for bypassing current within a predetermined range of frequencies around said constant current device



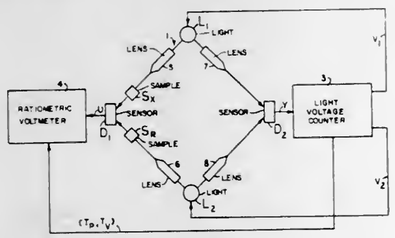
whereby the gain of said phototransistor is high for signals in said range of frequencies.

4,095,098

RATIOMETRIC TRANSPARENCY METER

Norman G. Looper, 7969 Engineer Rd., San Diego, Calif. 92111

Filed Feb. 17, 1977, Ser. No. 769,635
Int. Cl.² G01J *1/32*
U.S. Cl. 250—205 **10 Claims**



1. In the control and measurement of a physical parameter P_X in response to a voltage controlled energy source, an apparatus for ratiometrically measuring P_X in a particular setting S_X by comparison to the value P_R obtained for such parameter in a reference setting S_R, which comprises:

two voltage controlled energy sources L_1, L_2;

a sensor D_1 exposed to the combined effect of L_1 and L_2, and having an electrical output signal proportionally responsive to the combined powers of L_1 and L_2;

a sensor D_2 exposed to the effect of L_1 through S_X and to the effect of L_2 through S_R, having an electrical output signal proportionally responsive to the combined effects of L_1 through S_X and of L_2 through S_R;

means for impressing a square-wave-shaped voltage supply V_2 to L_2;

means for impressing a continuous voltage supply V_1 to L_1;

means for regulating the voltage supply impressed upon one of said energy sources in proportion to the intensity of the effect of the other energy source upon D_2;

means for detecting the output signal amplitude U_{T_P} of D_1 during the peak period T_P of V_2 and the output signal amplitude U_{T_V} of D_1 during the valley period T_V of V_2.

whereby P_X can be determined from the equation:

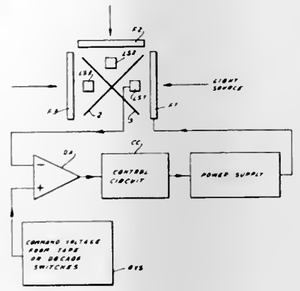
$$P_X = (P_R U_{T_V} / U_{T_P} - U_{T_V})$$

4,095,099

ADDITIVE COLOR SYSTEM WITH COMPENSATION OF REPEATABILITY ERRORS OF VARIABLE-DENSITY ELECTROOPTICAL FILTER UNITS

Franz F. Ehrenhaft, Forest Hills, N.Y., assignor to Anamorphic Ltd., Forest Hills, N.Y.

Filed Feb. 17, 1977, Ser. No. 769,838
Int. Cl.² G01J *1/32*
U.S. Cl. 250—205 **9 Claims**



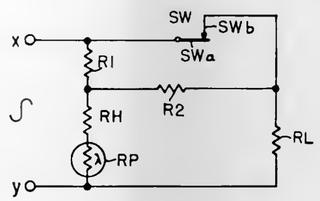
1. In an additive color system, in combination, light source means providing three component light beams; combining means operative for receiving the three component light beams and combining the same to form a composite light beam; three variable-density electrooptical filter units, each arranged in the path of a respective one of the three component light beams, each filter unit being provided with control electrodes and being operative for attenuating the respective component light beam to an extent dependent upon the control voltage applied across the control electrodes; transmission-value-establishing means operative for setting the filter units to different transmission levels, comprising selecting means operative for selecting the transmission values to be established, control-voltagegenerating means connected to the selecting means and operative for generating and applying to the control electrodes of the filter units control voltages dependent upon the selected transmission values and including compensating means operative for compensating for repeatability errors in the response of the filter units.

4,095,100

LIGHT RESPONSIVE SWITCH

David Selick, Tenafly, N.J., assignor to Selco Electronics, Inc., Palisades Park, N.J.

Filed Jul. 30, 1976, Ser. No. 710,356
Int. Cl.² H01H *47/24, 61/013*
U.S. Cl. 250—206 **6 Claims**



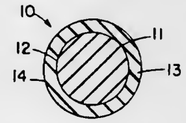
1. A light responsive switch device comprising an electric resistance heating element, a thermostatic switch exposed to the heat from said heating element and including a single pair of contacts transferrable between open and closed positions in response to the temperature of said switch being at relatively high and low temperatures respectively, a load connected to a current source through said pair of contacts, means including a photoconductor connecting said heating element through said photoconductor to said source of current and regulating means and responsive to the opening and closing of said pair of contacts for respectively decreasing and increasing the current through said heater element.

4,095,101

LIGHT CONDUCTOR HAVING ELECTRICAL CONDUCTORS EXTENDING LONGITUDINALLY OF SURFACE

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation of Ser. No. 863,768, Oct. 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 649,264, Jun. 27, 1967, abandoned, and a continuation-in-part of Ser. No. 439,529, Mar. 15, 1965, abandoned. This application Dec. 10, 1973, Ser. No. 423,464
Int. Cl.² G02B *5/14;* H02G *3/00*
U.S. Cl. 250—227 **11 Claims**



1. A composite electrical assembly comprising in combination:

an elongated core member which is flexible throughout its length and is made of an electrically insulating material,

a plurality of non-contacting strip-like electrical conducting elements extending parallel to each other and longitudinally along the outer surface of said elongated flexible core member wherein each of said strip-like conducting elements is bonded in integral assembly with said flexible core member,

an electrical wave energy transducing means secured to said outer surface of said flexible core member,

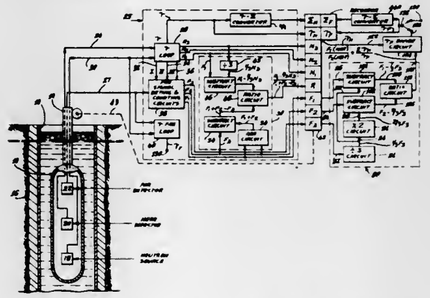
said electrical wave energy transducing means being electrically connected and in circuit with respective of said strip-like conducting elements extending longitudinally along said outer surface of said flexible core member whereby said strip-like conducting elements may serve as conductors of electrical energy with respect to said wave energy transducing means.

4,095,102

HYDROCARBON DETECTION UTILIZING NEUTRON BOREHOLE MEASUREMENTS

Maurice P. Tixier, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 728,330, Sep. 30, 1976, abandoned, which is a continuation of Ser. No. 579,536, May 21, 1975, abandoned. This application Apr. 8, 1977, Ser. No. 785,806
Int. Cl.² G01V *5/00*
U.S. Cl. 250—265 **26 Claims**



1. A machine method of automatically indicating the presence of hydrocarbons in subsurface earth formations traversed by a borehole, comprising:

(a) operating a neutron source for a predetermined time period;

(b) operating a plurality of detectors differently spaced from said source to produce neutron-dependent responses during predetermined times relative to the operation of said source;

(c) combining at least some of said responses to produce a first pore volume indication which is primarily dependent upon the hydrogen content of the fluid in the pore space of a formation adjacent said detectors;

(d) combining at least some of said responses to produce a function representative of a thermal neutron absorption characteristic of said formation; and

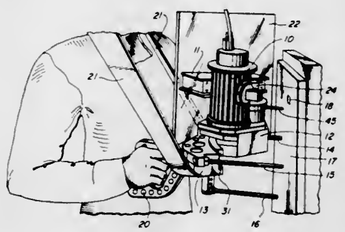
(e) combining the absorption characteristic function of said formation with a predetermined absorption characteristic for the water component of said formation to produce a second pore volume indication which is uncompensated for differences between the thermal neutron absorption characteristics of the matrix and any hydrocarbons present in the formation such that the presence of hydrocarbons is indicated by differences between said produced first and second pore volume indications.

4,095,103

APPARATUS AND METHOD FOR DETERMINATION OF RESIDUAL STRESS IN CRYSTALLINE SUBSTANCES

Jerome B. Cohen, Glencoe, Ill., and Michael R. James, Groningen, Netherlands, assignors to Northwestern University, Evanston, Ill.

Continuation-in-part of Ser. No. 666,393, Mar. 12, 1976, abandoned. This application Jul. 28, 1977, Ser. No. 819,985
Int. Cl.² G01N *23/20*
U.S. Cl. 250—277 CH **7 Claims**



1. A quick and precise method for determination of residual stress in crystalline substances by locating a plurality of X-ray diffraction peaks with a single X-ray detector and without diffractometer shifting of said X-ray detector, said method comprising the steps of

(a) focusing an X-ray source to direct X-rays at an angle with respect to a principal surface of a crystalline substance;

(b) diffracting said X-rays;

(c) receiving X-rays emanating from the substance in a single position-sensitive X-ray detector responsive to said X-rays to produce a multiplicity of ionizing events clustered about a position corresponding to a diffraction peak, said single position-sensitive X-ray detector including a collecting element providing first and second voltage pulses at respective first and second output ends of said detector in response to ionized particles, said first and second voltage pulses each having a rise time proportional to respective distances between the position of an ionizing event occurring within said detector and said first and second output ends of the collecting element;

(d) locating a diffraction peak of said X-rays correlated with a first diffraction angle by determining rise times of the

first and second voltage pulses produced in said collector, thereby indicating a position of an ionizing event occurring within said detector corresponding to a first diffraction peak;

(e) varying a preselected angle the relationship between said X-ray source and said principal surface of the crystalline substance; and

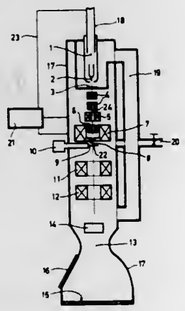
(f) locating a second diffraction correlated with a second diffraction angle by repeating steps (a) through (d), step (c) being performed with the same position-sensitive X-ray detector used for locating said first diffraction peak, a difference between the first and second diffraction angles being indicative of magnitude and direction of residual stress in the substances.

4,095,104

ELECTRON MICROSCOPE

Jan Bart LePoole, Delft, and Karel Diederick van der Mast, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 24, 1976, Ser. No. 717,193
Int. Cl.² H01J *37/26*
U.S. Cl. 250—311 **7 Claims**



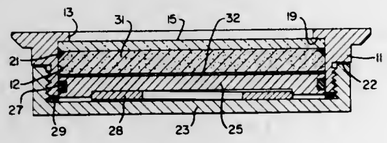
1. An electron microscope, comprising an electron gun for generating an illuminating electron beam objective lens means directing said beam to an object plane, projection lens means directing said beam from said object plane to an image plane, and a device for the apparent enlargement of the aperture of the illuminating electron beam, characterized in that the device for the apparent enlargement of the aperture comprises a beam deflection device which includes a power supply source for tilting the illumination electron beam about a point situated in said object plane.

4,095,105

STANDARDIZING TEST SAMPLE

Robert D. Rosenthal, Gaithersburg, Md., assignor to Neotec Corporation, Silver Spring, Md.

Filed Feb. 3, 1977, Ser. No. 765,308
Int. Cl.² G01J *1/00*
U.S. Cl. 250—338 **12 Claims**



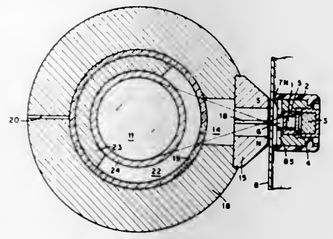
1. In a standard test sample comprising a closed container including a window transparent to irradiation of a predetermined wavelength, the improvement wherein a mixture of organic material and a second material is in said container positioned against said window, said second material being impervious to water and transparent to said predetermined wavelength, said organic material being present in an amount effective to be analyzed by irradiation, said second material being present in an amount effective to resist migration of moisture in said mixture.

4,095,106

RADIATION ATTENUATION GAUGE WITH MAGNETICALLY COUPLED SOURCE

Steven A. Wallace, Knoxville, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 16, 1977, Ser. No. 778,196
Int. Cl.² G01N *23/00*
U.S. Cl. 250—358 R **9 Claims**



1. An apparatus for measuring thickness and density of a material comprising in combination:

a source of gamma radiation contained within a housing comprising magnetic or ferromagnetic material;

means for measuring the intensity of gamma radiation, said measuring means having an aperture for admitting radiation to be measured; and

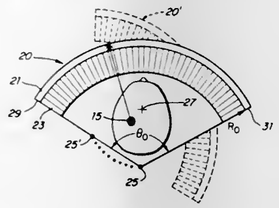
magnetic means disposed adjacent said aperture of said measuring means, said housed source being held by magnetic attraction in a position before said aperture such that gamma radiation from said source passes through said aperture and is measured by said measuring means.

4,095,107

TRANSAXIAL RADIONUCLIDE EMISSION CAMERA APPARATUS AND METHOD

Sebastian Genna, 618 Belmont St., Watertown, Mass. 02172, and Sing-Chin Pang, 860 Harrison Ave., Boston, Mass. 02118

Filed Apr. 15, 1976, Ser. No. 677,205
Int. Cl.² G01T *1/20*
U.S. Cl. 250—363 S **12 Claims**



1. In an apparatus for imaging distributions of a source of penetrating radiation contained within a body and wherein said apparatus includes means for collimating emitted radiation and means for detecting the trajectory of emitted, collimated radiation:

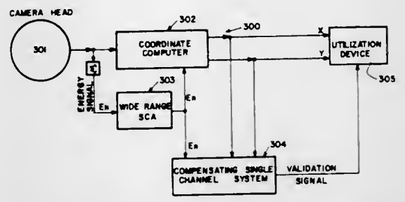
the improvement wherein said means for detecting is arcuately shaped and said means for collimating converges to the center of an arc defined by said means for detecting.

4,095,108

SIGNAL PROCESSING EQUIPMENT FOR RADIATION IMAGING APPARATUS

Dan Inbar, Haifa, and Yitzhak Klein, Kirvat Yam, Haifa, both of Israel, assignors to Elscint Ltd., Haifa, Israel

Filed Sep. 14, 1976, Ser. No. 723,620
Claims priority, application Israel, Sep. 17, 1975, 48111
Int. Cl.² G01T *1/20, 1/164*
U.S. Cl. 250—369 **5 Claims**



1. In signal processing equipment for use with radiation imaging apparatus of the type having a scintillation crystal responsive to radiation stimuli for producing light events at spatial locations corresponding to the locations at which the stimuli interact with the crystal, and a plurality of photodetectors arranged in a predetermined array with respect to the crystal for viewing light events therein and producing output signals in response thereto, wherein the signal processing equipment includes means responsive to the output signals for generating an energy signal E_n representative of the total energy of the light event producing such signals; and coordinate computation circuitry responsive to the output signals produced by the occurrence of a light event for computing its spatial coordinates, the improvement in the signal processing equipment comprising;

means for validating the event only if E_n lies within an energy window functionally related to the coordinates of the light event.

4,095,109

RADIATION DETECTOR FOR AN AUTOMATIC X-RAY EXPOSURE TIMER

Horst Aichinger, Fuerth, and Hans Ebersberger, Nuremberg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 2, 1977, Ser. No. 773,500
Claims priority, application Germany, Mar. 15, 1976, 2610875
Int. Cl.² H05G *1/44;* H01J *39/28*
U.S. Cl. 250—374 **5 Claims**

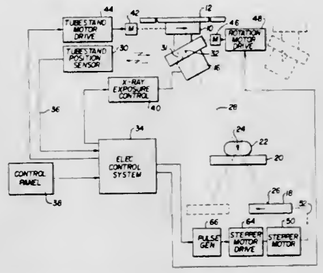
1. A radiation detector for automatic x-ray exposure control comprising two walls of synthetic material fixed at a distance from one another, each of which being covered with a shielding layer on its exterior side and having an electrode layer on the side thereof facing the other wall, characterized in that the shielding layer is a graphite layer, and the electrode layer comprises a vacuum deposited electrically conductive material having a low atomic number.

4,095,110

MEANS FOR STEPPING X-RAY RECEPTOR IN DIRECTION OPPOSITE TO POSITION CHANGE OF SOURCE

Laverne R. Bunch, Baltimore, Md., assignor to CGR Medical Corporation, Baltimore, Md.

Filed Nov. 4, 1976, Ser. No. 739,017
Int. Cl.² A61B *6/02*
U.S. Cl. 250—445 T **9 Claims**



1. Apparatus for translating X-ray receptor means such as a film holder relative to the X-ray source in diagnostic X-ray apparatus a typical example of which is a linear tomography system, comprising the improvement of:

an elongated ball screw shaft positioned to provide translational movement of said X-ray receptor means in a predetermined direction when rotated;

ball screw nut means threaded on said shaft and attached to said X-ray receptor means;

an electrical stepper motor having a rotary output shaft coupled to said ball screw shaft and being responsive to drive pulses applied thereto to incrementally rotate said output shaft for each drive pulse applied; and

drive pulse circuit means coupled to said stepper motor and being operable to generate said drive pulses in response to a position change of said X-ray source, said drive pulse circuit means including electrical pulse generator means providing electrical drive pulses of predetermined polarity for operating said stepper motor to rotate said ball screw shaft in a direction which translates said X-ray receptor means in an opposite direction with respect to the direction of the position change of said X-ray source.

4,095,111

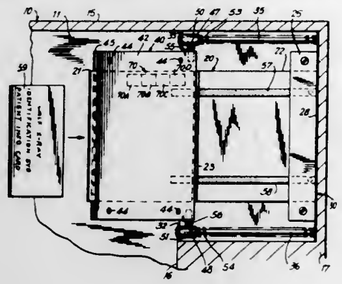
LIGHT DENSITY SCALE IMAGING APPARATUS AND METHOD FOR USING SAME

Seymour Katz, Glen Cove, and Victor R. Brown, West Hempstead, both of N.Y., assignors to AGFA-GEVAERT, Antwerp, Belgium

Continuation-in-part of Ser. No. 653,127, Jan. 28, 1976, Pat. No. 4,001,592. This application Jan. 3, 1977, Ser. No. 756,402
Int. Cl.² G03B *41/16;* G03C *5/16*
U.S. Cl. 250—476 **11 Claims**

4. A method of monitoring photographic variables, comprising the steps of loading a cassette with X-ray film; exposing the film while in said cassette to a light-density scale; exposing said film to a subject independently of its exposure to said light-density scale; developing said exposed film to form a viewable

image of said subject and to reproduce said scale; repeating the foregoing steps for successive films; and evaluating the reproductions of the light-density scale of the successive films to detect variations therebetween.



4,095,112

DEVICE FOR AND A METHOD OF CALIBRATING ELECTRON-OPTICAL APPARATUS

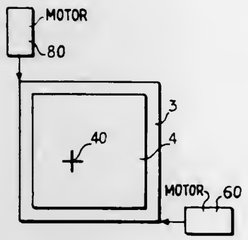
Jacques Trotel, Paris, France, assignor to Thomson-CSF, Paris, France

Continuation of Ser. No. 543,949, Jan. 24, 1975, abandoned. This application Feb. 25, 1977, Ser. No. 771,982

Claims priority, application France, Jan. 25, 1974, 74 02572

Int. Cl.² G01N *21/00*; G21G *5/00*

U.S. Cl. 250—492 A **4 Claims**



1. A calibrating method for an electron pattern generator, said generator having a sample holder, means for displacing said sample holder in two mutually perpendicular directions, a data processing system for sweeping said sample area by area, and each area line by line, and each line, point by point, said calibrating method comprising the following steps of:

manufacturing a marker upon said sample, at a given area bombarded by said beam at its rest position with a material capable of upon the impact of the electron beam, scattering electrons, and generating in response to this impact an electric signal;

transducing said signal into an image upon the screen of a cathode ray oscilloscope, by applying said signal upon the control electrode of said tube;

applying a programmed pattern simultaneously and synchronously to said oscilloscope and to said generator deflection system for displaying on said screen a predetermined figure centered about the image of said marker;

giving a predetermined mechanical displacement to said holder, and applying the voltage corresponding to said displacement to said deflection system of said pattern generator; and

centering again said figure about said image of said marker.

4,095,113

APPARATUS FOR PRODUCING ULTRAVIOLET RADIATION

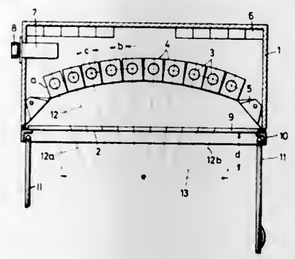
Friedrich Wolff, Bertholdstrasse 18, Frankfurt, Germany

Filed Aug. 20, 1976, Ser. No. 716,253

Claims priority, application Germany, Aug. 26, 1975, 2537855; Jan. 30, 1976, 2603460; Feb. 12, 1976, 2605487; May 31, 1976, 2624297

Int. Cl.² G01J *1/00*

U.S. Cl. 250—494 **39 Claims**



1. Apparatus for producing ultraviolet radiation, particularly a quick-tanning sunlamp, comprising at least one source of substantially uniform ultraviolet radiation including at least five closely adjacent rod-shaped low-pressure mercury lamps; reflector means associated with said source and defining at least one exit opening for ultraviolet radiation, said reflector means including a discrete trough-shaped reflector for each of said lamps and each of said reflectors surrounding the respective lamp along an arc of at least 180°, said source and said reflector means being constructed and assembled to establish a high-density radiation field of predetermined area in the region of said exit opening and the heat output of said lamps being sufficiently low to insure that the temperature in the region of said field is within a range which is below the range of discomfort to a person exposed to said field; and means for intercepting at least the major percentage of wavelength bands of ultraviolet radiation below approximately 315 nm ahead of said field so that said field consists essentially of the remaining wavelength band of ultraviolet radiation.

4,095,114

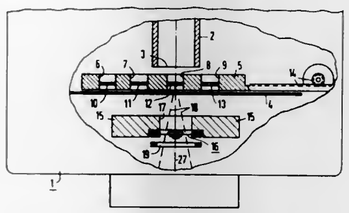
ARRANGEMENT FOR SCATTERING ELECTRONS

Leonhard Taumann, Lafayette, Calif., assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 18, 1977, Ser. No. 779,166

Int. Cl.² G21F *3/02*

U.S. Cl. 250—510 **11 Claims**



1. An arrangement for scattering electrons in an electron accelerator with selectable acceleration energies, comprising:

(a) acceleration means for providing a beam of electrons;

(b) first and second scattering foils arranged at a mutual spacing from one another along a direction of the beam for producing scattering properties;

(c) the first scattering foil in the beam direction having a constant thickness;

(d) the second scattering foil having a thickness decreasing from its center towards its margin;

(e) means for adapting the scattering properties to the selected acceleration energy including a set of scattering foils, each having a scattering property corresponding to a selected acceleration energy, the scattering properties of the set of foils decreasing with decreasing acceleration energy, a corresponding one of said set of foils being placed by said means into the beam path of said first scattering foil for a second acceleration energy; and

(f) said second scattering foil remaining unchanged in the beam.

4,095,115

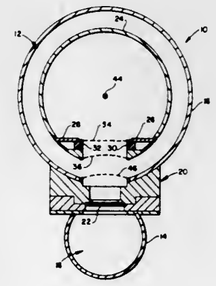
OZONE GENERATION APPARATUS AND METHOD

F. D. Orr, Jr.; L. F. Templeton, and Larry L. Keutzer, all of Austin, Tex., assignors to Accelerators, Inc., Austin, Tex.

Filed Dec. 27, 1976, Ser. No. 754,615

Int. Cl.² C01B *13/00*

U.S. Cl. 250—538 **10 Claims**



1. Apparatus for generating ozone, comprising:

a vessel enclosing a volume maintained at an appropriate subatmospheric pressure;

a hollow cathode plasma discharge device disposed within the vessel for producing a beam of electrons;

an electron-transmissive window in the wall of the vessel positioned to receive the beam of electrons and communicating with an oxygen-containing atmosphere;

means within the vessel for speading the beam of electrons produced by the hollow cathode plasma discharge device over substantially the entire surface of the electron-transmissive window to provide an electron beam density below about 0.1mA/cm²; and

means for moving the oxygen-containing atmosphere past said window and within a suitable distance therefrom at velocities in excess of about 4000 feet per minute.

4,095,116

ELECTRO-OPTICAL COUPLING ELEMENT

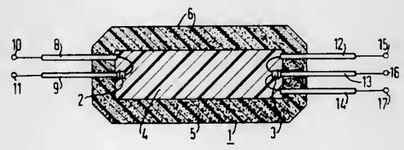
Gerfried Felkel, Neubiberg; Gerhard Maier, Munich; Wolfgang Guenzel, Munich, and Guenther Waitl, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jun. 13, 1977, Ser. No. 805,992

Claims priority, application Germany, Jun. 22, 1976, 2627944

Int. Cl.² G02B *27/00*

U.S. Cl. 250—551 **16 Claims**



1. In an electro-optical coupling device having a coupling medium mechanically and optically connecting an optical transmitter and an optical receiver and an encapsulating mass about such coupling medium, wherein the coupling medium is optically transmissive and the encapsulating mass reflects the radiation emitted from said optical transmitter and is relatively impermeable by optical radiation exterior of such coupling device for the sensitivity range of said optical receiver, the improvement comprising wherein:

said encapsulating mass is a single substantially homogeneous layer containing therein an amount of a substantially uniformly dispersed first material particles which renders said encapsulating mass into a highly reflective medium for radiation emitted from said optical transmitter and contains an amount of substantially uniformly dispersed second material particles which render said encapsulating mass highly impermeable to optical radiation from outside said coupling device.

4,095,117

CIRCUIT FOR DEFINING THE DYE DILUTION CURVES IN VIVO AND IN VITRO FOR CALCULATING THE CARDIAC BLOOD FLOWRATE VALUE PER MINUTE

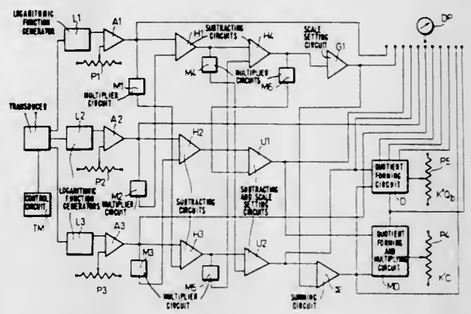
Ferenc Nagy, Budapest, Hungary, assignor to Medicor Muvek, Budapest, Hungary

Filed Jun. 30, 1974, Ser. No. 701,214

Claims priority, application Hungary, Jun. 30, 1975, ME 1872

Int. Cl.² G01N *21/28*

U.S. Cl. 250—564 **8 Claims**

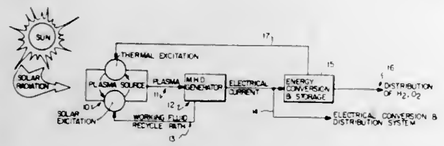


1. An apparatus for determining the concentration of a dye in a biological liquid, such as blood, comprising an optical sensing system, a counting system, a feed and control system and an indicating apparatus, said counting system having an input with three channels in accordance with the number of channels of the optical system, each of said channels of said counting system having a logarithmic circuit or the three channels together having a logarithmic circuit operating in time multiplex operation, and having three amplifiers, and four subtraction circuits connected to said channel amplifiers; three subtraction and scale setting circuits, each having an input, the outputs of said subtraction circuits being connected to the inputs of said three subtraction and scale setting circuits; a summing circuit; quotient forming circuit means; any two of the outputs of the last mentioned subtraction and scale setting circuits being connected to the input of said summing circuit, and the output of said summing circuit being connected to said indicating apparatus and to the input of said quotient forming circuit means; the outputs of said subtraction and scale setting circuits being connected to the quotient forming circuit means; the outputs of the quotient forming circuit means being connected to said indicating apparatus; and a fine adjustment potentiometer connected to further inputs of said quotient forming circuit means.

4,095,118
SOLAR-MHD ENERGY CONVERSION SYSTEM

Kenneth R. Rathbun, P.O. Box 12637, Austin, Tex. 78711

Filed Nov. 26, 1976, Ser. No. 745,198
Int. Cl.[2] H02P 9/04; H02K 45/00
U.S. Cl. 290—2 16 Claims



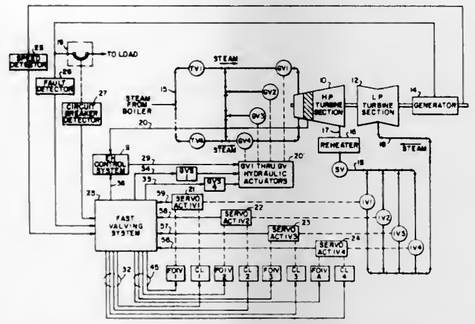
1. An energy conversion system comprising
an ionizable working fluid;
a magnetohydrodynamic generator including
conduit means for providing a path through said generator for said fluid, said conduit means having input and output ends,
means for establishing a magnetic field in said conduit means, and
means for collecting charged particles from within said conduit means and for delivering electrical energy to a load device;
means for providing a closed flow path for said working fluid from the output of said generator conduit means and to the input thereof, including
means adjacent the input end of said generator conduit means for exciting said working fluid to an elevated energy level at which said fluid is at least partially ionized into a plasma,
means for inducing flow of said plasma into said MHD conduit means,
heat exchanger means coupled to the output of said MHD generator conduit means for reducing the temperature of said working fluid by extractinng heat therefrom, and
means for delivering said working fluid from said heat exchanger to said means for exciting; and
a plurality of heliostats arranged to receive solar radiation and to direct said radiation onto said means for exciting;
said means for exciting including
first wall means transparent to solar radiation for permitting solar radiation to pass therethrough, and
second wall means opaque to solar radiation for absorbing energy from solar radiation incident thereon;
said first and second wall means being interconnected to form a conduit chamber through which said working fluid can pass, said first and second wall means being substantially perpendicular to the direction of radiation reflected from said heliostats with said first wall means between said second wall means and said heliostats;
whereby said working fluid is excited toward non-equilibrium thermal ionization by energy absorbed from said radiation by said second wall means and is at least partially photo-ionized by radiation passing through said first wall means and by radiation re-emitted by said second wall means.

4,095,119
SYSTEM FOR RESPONDING TO A PARTIAL LOSS OF LOAD OF A TURBINE POWER PLANT

Bernard Nangle; Patrick L. McGaha, both of West Chester; Thomas J. Wallace, Upper Chichester, all of Pa., and Todd B. Anderson, Hammond, Ind., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 23, 1976, Ser. No. 699,295
Int. Cl.[2] F01K 13/02
U.S. Cl. 290—40 R 10 Claims

1. A system for momentarily interrupting the total steam flow to the lower pressure turbine section of a power plant upon the occurrence of a partial loss of electrical load, comprising:
(a) a plurality of electrohydraulically adapted interceptor valves for controlling the admission of motive steam to the lower pressure turbine section, each said valve having a servo system operative to generate an electrical signal representative of its actual valve position,
(b) means to combine the generated actual position signals of each of the valves,

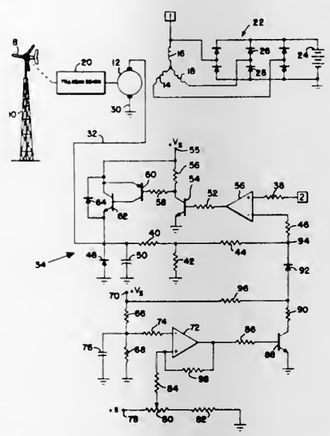


(c) means response to a detection of partial loss of electrical load to operate each of the plurality of interceptor valves from an open to a substantially closed condition,
(d) means to control the interceptor valves to operate at a predetermined speed toward an open position, and
(e) means governed by the combined actual valve position signals to change the controlled speed of opening each of the interceptor valves.

4,095,120
LOAD CONTROL FOR WIND-DRIVEN ELECTRIC GENERATORS

Kevin E. Moran, Riverton, and Eugene C. Korzeniewski, Willingboro, both of N.J., assignors to Louis Michael Glick, Cumberland, Md.

Filed Oct. 22, 1976, Ser. No. 735,003
Int. Cl.[2] H02P 9/04
U.S. Cl. 290—44 14 Claims

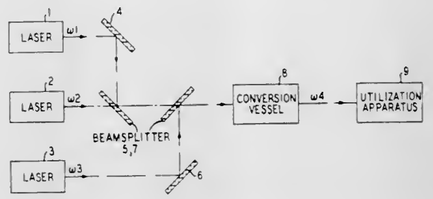


1. In a wind-driven electric power plant comprising a wind-responsive rotor and a rotating electric generator connected to be driven thereby, said generator having an electrically energizable field winding, apparatus for controlling the loading of said generator comprising:
means for sensing the rotational speed of said generator and providing a signal the amplitude of which varies as a function of said rotational speed; and
control means, responsive to said signal, for controlling the current in said field winding in accordance with the rotational speed of said generator whereby the load imposed by the generator closely follows but does not substantially exceed the available power from said rotor through a wide range of rotational speeds;
wherein said sensing and signal-providing means comprises means for establishing at least four speed ranges, said speed ranges together constituting said wide range of rotational speeds, and means for establishing for each of said speed ranges a predetermined amplitude for said signal, said amplitudes being different for adjacent ranges;
wherein said control means comprises amplification means connected to receive said signal as an input, and having its output connected to deliver said current to said field winding; and
in which said means for sensing the rotational speed of said generator comprises means for providing a series of pulses the repetition rate of which is proportional to said rotational speed, means for repetitively establishing a predetermined time interval, counting means for repetitively counting the number of said pulses occurring in said predetermined time interval, and means for establishing said predetermined amplitude for said signal in dependence on the count in said counting means.

4,095,122
TUNABLE INFRARED AND FAR-INFRARED SOURCE BY FOUR-PHOTON MIXING

Theodoar Charlouis Damen, Colts Neck; Erich Gornik, Red Bank; Van-Tran Nguyen, Holmdel, and Chandra Kumar Naranbhai Patel, Summit, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 4, 1977, Ser. No. 821,699
Int. Cl.[2] H02M 5/04
U.S. Cl. 307—88.3 4 Claims



1. An apparatus for generating tunable infrared radiation comprising first, second and third input lasers generating input beams of frequency ω_1, ω_2 and ω_3, respectively
a nonlinear interaction medium comprising a crystal having exciton states,
means for directing said input beams collinearly into said nonlinear interaction medium, whereby an output frequency ω_4 is generated, where

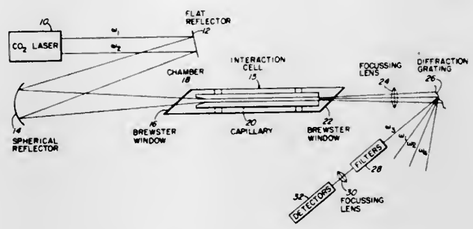
$$\omega_4 = \omega_1 + \omega_2 - \omega_3,$$

in which apparatus ω_1 and ω_2 are selected such that ω_1 is close to the frequency of a single-photon exciton state and the sum of ω_1 and ω_2 is very close to the frequency of a two photon exciton state, so that the output power of frequency ω_4 is resonantly enhanced by both of said exciton states.

4,095,121
RESONANTLY ENHANCED FOUR-WAVE MIXING

Richard F. Begley, Los Alamos, and Norman A. Kurnit, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 14, 1977, Ser. No. 787,415
Int. Cl.[2] H03F 7/04
U.S. Cl. 307—88.3 21 Claims

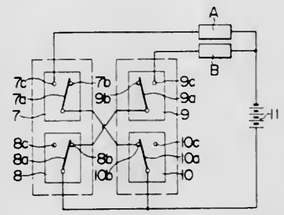


1. A method for generating tunable infrared radiation by four-wave mixing in a molecular gas comprising the steps of:
generating a first coherent, variable excitation signal ω_1 which is near resonant with at least one infrared transition of said molecular gas;
generating second coherent, variable excitation signal ω_2 which is near resonant with at least one infrared transition of said molecular gas;
irradiating said molecular gas with said first and second coherent, variable excitation signals in a waveguide to increase focal interaction length and enhance phase matching to increase efficiency;
whereby $\omega_1 - \omega_2$ is resonant with a Raman allowed rotational transition thereby enhancing third order susceptibility and intensity.

4,095,123
SWITCH CONTROLLER

Naoyuki Takahashi, Hino, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 25, 1977, Ser. No. 790,841
Claims priority, application Japan, Jun. 28, 1976, 51-84860[U]
Int. Cl.[2] H01H 3/12
U.S. Cl. 307—115 4 Claims



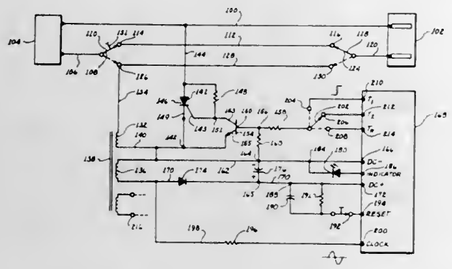
1. A switch controller comprising a first and a second push-button each carrying a pair of actuator pins of different lengths, first and second normally open switches respectively located below each shorter one of the actuator pins, and first and second normally closed switches respectively located below each longer one of the actuator pins, the first normally open switch and the second normally closed switch being connected in series in a first controlled circuit, and the first normally closed switch and the second normally open switch being connected in series in a second controlled circuit.

4,095,124

TRANSFORMER/SWITCH DEVICE

John J. O'Farrell, Jr., 2525 N. Alvernon Way, C-6, Tucson, Ariz. 85712

Filed Aug. 16, 1976, Ser. No. 714,314
Int. Cl.[2] H01H *43/00*
U.S. Cl. 307—141.4 **21 Claims**



1. An integrated transformer and switch device for controlling the flow of electrical power from a power source to a load, said device comprising:

a. a transformer means including a primary winding means electrically energizable by the power source for generating a magnetic field and a secondary winding means for generating an output signal, said secondary winding means being magnetically responsive to the magnetic field generated by said primary winding means;

b. first switch means having a normally closed state and a normally open state for supplying power to said primary winding means, said first switch means being maintained in the normally open state during energization of said primary winding means;

c. second switch means in series with said primary winding means for maintaining a flow of power through said primary winding means upon switching of said first switch means to the normally open state, said second switch means having a conducting state and a non-conducting state;

d. a selectively positionable third switch means for electrically connecting the load to the power source, said third switch means having a first state electrically connecting the load to the power source when said first switch means is in the normally closed state and the second state electrically connecting the load to the power source when said first switch means is in the normally open state;

e. fourth switch means responsive to the electrical energy pulses provided by said secondary winding means for changing said second switch means from the conducting state to the non-conducting state;

whereby, dependent upon the state of said third switch means, the load is connected or disconnected from the power source upon actuation of said first switch means and the load is disconnected or connected to the power source upon actuation of said fourth switch means.

4,095,125

PULSE SIGNAL DETECTOR AND/OR FILTER

Edwin Coy Ingle, Julian, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 28, 1977, Ser. No. 773,006
Int. Cl.[2] H03K *9/08*
U.S. Cl. 307—234 **18 Claims**

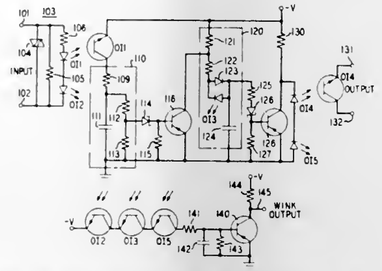
1. A pulse signal detector which comprises:

first timing means for yielding a first predetermined output only after being controllably enabled for a first predetermined interval in response to an applied input signal;

first means for yielding a first representation indicative of an operative state of said first timing means;

second timing means for yielding a second predetermined output only after being controllably enabled for a second predetermined interval in response to said first predetermined output;

second means for yielding a second representation indicative of an operative state of said second timing means; and



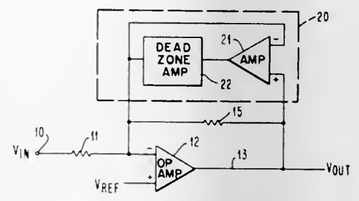
third means responsive to said first representation, said second representation and an output from said second timing means for yielding an indication when said applied signal has a width greater than said first predetermined interval and less than said first predetermined interval plus said second predetermined interval.

4,095,126

BI-POLAR AMPLIFIER WITH SHARPLY DEFINED AMPLITUDE LIMITS

Charles Reeves Hoffman, Raleigh, and William Burrell Nunnery, Cary, both of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 16, 1977, Ser. No. 777,990
Int. Cl.[2] H03K *5/08*
U.S. Cl. 307—237 **3 Claims**



1. An amplitude limiting circuit for the output of a primary amplifier comprising an operational amplifier having a pair of input connections and an operational amplifier output terminal, a reference voltage source connected to one of said operational amplifier inputs, a resistor connecting said other of said operational amplifier input connections to a source of a signal to be amplified, and a resistor connecting said operational amplifier output terminal with said other operational amplifier input connection, said limiting circuit comprising:

a primary amplifier having at least two inputs and two outputs with an input connected to said operational amplifier output terminal to generate on said two primary amplifier outputs an amplified representation of the signal at said operational amplifier output terminal; and

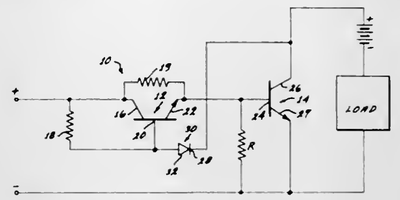
a dead zone amplifier having two inputs connected to the output of said primary amplifier and an output connected to the other said input of said primary amplifier and to said other input of said operational amplifier, said dead zone amplifier acting to generate a voltage signal of opposite polarity to said signal to be amplified when the amplitude of the output signal of said operational amplifier is outside of a predetermined zone.

4,095,127

TRANSISTOR BASE DRIVE REGULATOR

Arne Nerem, San Diego, Calif., assignor to Rohr Industries, Incorporated, Chula Vista, Calif.

Filed Mar. 29, 1976, Ser. No. 671,094
Int. Cl.[2] H03K *17/60*
U.S. Cl. 307—253 **5 Claims**



1. A base drive regulator for a first transistor having base, emitter and collector elements, which comprises,

(a) a source of base drive voltage,

(b) active single element regulator means for controlling said first transistor; said regulator means connected between said source and said base element of said first transistor,

(c) said regulator means including an additional transistor having a base, emitter and collector and responsive to said source and directly connected to said base of first transistor for supplying drive voltage to said base of said first transistor and,

(d) resistive bi-directional means connected between the emitter and collector of said additional transistor for maintaining a bias voltage on said base of said first transistor of a value above the normal voltage on said base of said first transistor when said additional transistor responsive to said source is non-conducting and a drive voltage is present, and

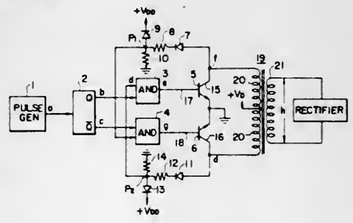
(e) a diode connected between the base of said additional transistor and the collector element of the first transistor so as to maintain a substantially zero differential voltage between said collector element and said base element of said first transistor.

4,095,128

PUSH-PULL SWITCHING CIRCUIT WITH MINORITY CARRIER STORAGE DELAY

Hidetoshi Tanigaki, Nishinomiya, Japan, assignor to Furuno Electric Co., Ltd., Nagasaki, Japan

Filed Feb. 1, 1977, Ser. No. 764,609
Claims priority, application Japan, Feb. 3, 1976, 51-10976
Int. Cl.[2] H03K *17/60*; H03F *3/26*
U.S. Cl. 307—254 **4 Claims**



1. In a push-pull semiconductor switching circuit including an output transformer, first and second grounded emitter transistors whose collectors are connected to opposite ends of the primary winding of the transformer, and a pulse generator for alternately controlling the conduction of the transistors, the improvements characterized by:

(a) a flip-flop circuit for producing Q and $\overline{Q}$ output signals in response to the pulse generator,

(b) first and second AND gates each having one of its inputs respectively coupled to the Q and $\overline{Q}$ outputs of the flip-flop circuit, and their outputs connected to the bases of the first and second transistors, respectively,

(c) means connecting the collector of the first transistor to the other input of the second AND gate, and

(d) means connecting the collector of the second transistor to the other input of the first AND gate,

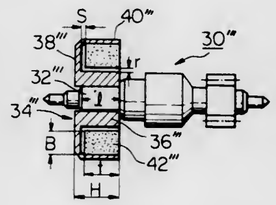
(e) each connecting means comprising a first resistor, a second, grounded resistor connected to the first resistor to form a voltage divider therewith, and a voltage limiter connected to the junction of the first and second resistors.

4,095,129

ROTOR ASSEMBLY FOR ELECTRO-MECHANICAL TRANSDUCER OF ELECTRONIC TIMEPIECE

Kunio Tanai, Sayama; Yasuaki Nakayama, Hanno; Yoshiro Hirai; Shigeru Aoyama, both of Tokorozawa, and Yoshinobu Kashima, Tanashi, all of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Sep. 15, 1976, Ser. No. 723,273
Claims priority, application Japan, Sep. 22, 1975, 50-1114557; Dec. 25, 1975, 50-159494; Jan. 21, 1976, 51-005751
Int. Cl.[2] H02K *37/00*
U.S. Cl. 310—49 R **4 Claims**



1. A rotor assembly for a stepping motor of an electronic timepiece comprising:

a rotor pinion;

a metallic protecting member including a boss portion fixedly mounted on said rotor pinion, a radial wall radially extending from said boss portion, and a cylindrical wall integral with said radial wall; and

a rare earth magnet press fitted to said cylindrical wall and having an inner wall larger in diameter than said boss portion to provide an annular space therebetween, said rare earth magnet being formed in a ring-shape and having an inner diameter less than about 4 mm, the ratio of the outer radius of said rare earth magnet to the inner radius thereof ranging between 1.2 and 3 and said rare earth magnet having an energy product of at least 16 MGOe.

4,095,130

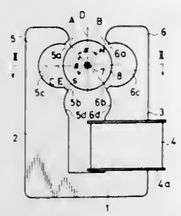
SYNCHRONOUS MOTOR

Kenji Oshima; Tomohisa Matsumoto; Hiroshi Yamazaki, and Tamotsu Yoshioka, all of Tokyo, Japan, assignors to Kabushiki Kaisha Seikosha, Japan

Filed Sep. 16, 1976, Ser. No. 723,950
Claims priority, application Japan, Sep. 23, 1975, 50-115199
Int. Cl.[2] H02K *21/00*
U.S. Cl. 310—162 **4 Claims**

1. A synchronous electric motor comprising a stator having two spaced stator arms with like magnetic pole portions formed at fore ends thereof and opposing each other, an energizing coil on said stator, and a rotor rotatably disposed between said magnetic pole portions and having a pair of N- and S-poles, each of said magnetic pole portions having two static

magnetic poles at equal distance from said rotor and an indent between said poles spaced at a greater distance than said poles



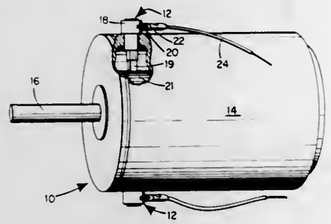
from said rotor, whereby said stator is quadripolar statically and bipolar dynamically.

4,095,131

BRUSH HOLDER FOR MOTOR OR GENERATOR

Richard J. Febonio, Salem, Mass., assignor to Torque Systems, Inc., Waltham, Mass.

Filed Jun. 17, 1976, Ser. No. 697,196
Int. Cl.² H02K *13/00*
U.S. Cl. 310—239 **5 Claims**



1. A brush holder for containing a carbon brush having an external terminal which includes a generally circular portion conforming to and disposable within a recess of the brush holder, and an outwardly extending tab, and comprising:
a unitary hollow body of electrically insulative material and including a head portion at one end thereof having a continuous wall defining an internally threaded recess;
said recess being configured to receive in threaded relationship a threaded cap therein for retention of a carbon brush in said body;
an opening extending through the body along the longitudinal axis thereof and of configuration to slidably contain a carbon brush disposed therein;
said head portion having a narrow slit therein communicating between the outer surface of said head portion and said recess at a portion adjacent to the bottom of said recess and extending transversely to the axis of said body, said slit adapted to receive the electrical terminal tab of a brush, said recess being adapted to receive the generally circular portion of the electrical terminal for retention by said threaded cap.

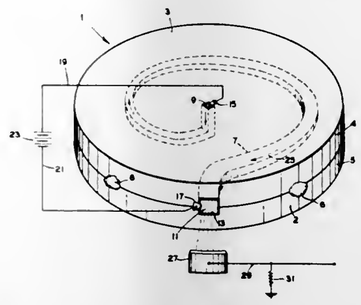
4,095,132

ELECTRON MULTIPLIER

Anthony V. Fraioli, Essex Fells, N.J., assignor to Galileo Electro-Optics Corp., Sturbridge, Mass.

Filed Sep. 11, 1964, Ser. No. 395,801
Int. Cl.² H01J *43/00*
U.S. Cl. 313—103 CM **9 Claims**

1. An electron multiplier comprising wall means of secondary electron emissive material defining a spiral passage, means for providing a current flow through said wall means to supply electrons for secondary emission, a resistance means provided in said wall means and connected in parallel across a portion of



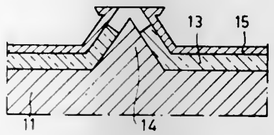
the spiral passage defined by said wall means to provide more uniform current multiplication along said passage length.

4,095,133

FIELD EMISSION DEVICE

Arthur Marie Eugene Hoeberechts, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 24, 1977, Ser. No. 780,963
Claims priority, application Netherlands, Apr. 29, 1976, 7604569
Int. Cl.² H01J *1/16, 1/05*
U.S. Cl. 313—336 **3 Claims**



1. A field emission device comprising a substrate on which at least one conical electrode having a punctiform tip is provided, a layer of a dielectric material covering the substrate about the electrode with the tip free of dielectric material, a conductive layer over said dielectric layer, said conductive layer extending in the direction of the punctiform tip of the electrode to beyond the dielectric layer, said conductive layer having an aperture above the tip so that the conductive layer forms a cap-shaped accelerating electrode surrounding the conical electrode.

4,095,134

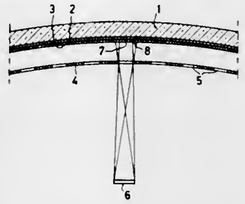
ELECTROPHOTOGRAPHIC PREPARATION OF COLOR TELEVISION DISPLAY TUBE INCLUDING RINSING PHOSPHOR PATTERN WITH SOLUTION OF ANTISTATIC AGENT IN APOLAR SOLVENT

Francis Bernardus Strik, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 6, 1976, Ser. No. 646,975
Claims priority, application Netherlands, Jan. 10, 1975, 7500288
Int. Cl.² G03G *13/10, 13/01;* H01J *31/08, 31/20*
U.S. Cl. 313—470 **4 Claims**

1. In the method of electrophotographically manufacturing a display screen for a color television display tube wherein a combustible conducting coating is first applied to the faceplate of said tube, a combustible photo-conducting coating is applied to said combustible coating, a first pattern of phosphor zones is formed on said combustible photo-conducting coating by first uniformly electrically charging said photo-conducting coating, forming a latent charge pattern with the charged portions corresponding to the desired phosphor zones of said first pattern by exposing to light the zones on said electrically

charged photoconducting coating between said desired phosphor zones, and then precipitating phosphor particles, having charges opposite to the charge on said unexposed portions of said electrically charged photo-conducting coating, from a suspension thereof in an apolar suspending medium, on said unexposed zones of said light electrically charged photo-conducting coating to thereby form the first pattern of phosphor zones, at least one subsequent pattern of phosphor zones is formed on said first pattern of phosphor zones by proceeding in a manner analogous to the formation of said first pattern of phosphor zones and said face-plate is then heated to remove by



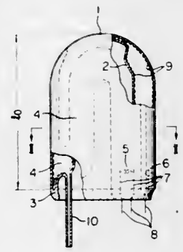
combustion said combustible conducting coating and said combustible photo-conducting coating, the improvement wherein after the formation of each phosphor pattern and before the formation of the subsequent charge pattern the resultant screen is wetted with a solution consisting essentially of an antistatic agent in an apolar solvent said antistatic agent being selected from the group consisting of soaps of bivalent metals, soaps of multivalent movalent metals and mixtures of said soaps, the conductivity of which soaps in said apolar solvent is between 5×10^{-12} and 10^{-10} ohm^{-1}cm^{-1}(500–10,000 p S/m) the electrical conductivity of which solvent is less than 10^{-4} ohm^{-1} cm^{-1}(1 p S/m) and dried.

4,095,135

SPHERICAL-BULB FLUORESCENT LAMP

Haruo Yamazaki, Moriyama, and Hidezoh Akutsu, Hyogo, both of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan

Filed Mar. 16, 1977, Ser. No. 778,146
Claims priority, application Japan, Mar. 19, 1976, 51-30659
Int. Cl.² H01J *61/16, 61/30, 61/44*
U.S. Cl. 313—493 **1 Claim**



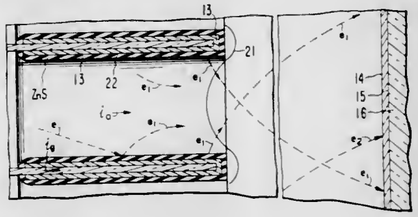
1. A fluorescent lamp comprising:
an outer bulb having a generally spherical or dome-shaped configuration;
an inner bulb disposed within said outer bulb, said bulbs being configured to define a zig-zag discharge path comprising a series of adjacent legs between the inner wall surface of the outer bulb and the outer wall surface of the inner bulb, the portions of said bulbs adjacent said path being spaced apart a distance in the range of 0.1 to 0.5 millimeter from each other to permit communication between adjacent legs of said path in a direction substantially perpendicular to said legs, the distance between said adjacent legs measured along said path being L, and the distance between adjacent legs measured in a direction substantially perpendicular to said legs being *l*;
an electrode at each end of said discharge path;
a radiation-emitting discharge gas comprising Neon, Argon or Krypton disposed in the space between said bulbs; and
a phosphor coating on a wall surface of one of said bulbs adjacent said discharge gas,
wherein the ratio of *l* to L is (i) at least 6:600 when said gas comprises Neon, (ii) at least 10:600 when said gas comprises Argon, (iii) at least 20:600 when said gas comprises Krypton, and (iv) at least $(6x_{Ne} + 10x_{Ar} + 20x_{Kr})$:600 when said gas comprises a mixture of Neon, Argon and Krypton, where x_{Ne} x_{Ar} and x_{Kr} are the volumetric mole fractions of Neon, Argon and Krypton respectively.

4,095,136

IMAGE TUBE EMPLOYING A MICROCHANNEL ELECTRON MULTIPLIER

Wilfrid F. Niklas, Portola Valley, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Oct. 28, 1971, Ser. No. 194,765
Int. Cl.² H01J *31/48*
U.S. Cl. 315—11 **3 Claims**



1. In an image tube, means for producing an electron image in the tube, a multichannel electron multiplier means having an electron image input face and an output face, means for accelerating and for directing said electron image upon the input face of said multichannel electron multiplier means for multiplying the electron current of said received image, an output means spaced from said output face of said electron multiplier means for receiving the multiplied output electron image of said electron multiplier means, metallic electrode means formed on the output face of said multichannel electron multiplier means for applying an operating potential to said output face of said electron multiplier means, said electrode means extending into the output ends of the channels and over the inside walls of said channels in said multichannel electron multiplier means, and a layer of semiconductive material overlaying said metallic electrode means, said semiconductive layer extending over said electrode means and into an output end portion of said channels, the remaining portion of said channels being free of said semiconductive material, for improving the information transfer of the electron image as directed from the output face of said multichannel electron multiplier onto said output means.

4,095,137

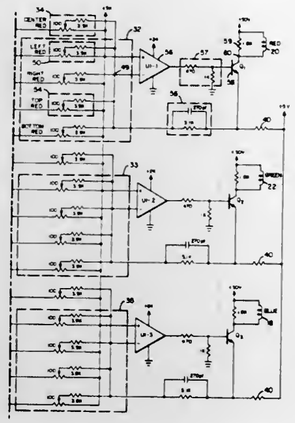
DIGITAL CONVERGENCE SYSTEM FOR A MULTI-GUN CRT

Robert Clement Oswald, St. Paul, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Mar. 18, 1977, Ser. No. 778,900
Int. Cl.² H01J *29/51*
U.S. Cl. 315—13 C **16 Claims**

1. A convergence correction system, comprising:
a CRT having a plurality of electron beam generating guns, a phosphor face comprised of a plurality of phosphor dots, four quadrants and a plurality of segments defined within each of said quadrants;
digital means for producing signals corresponding to the

horizontal and vertical coordinates of each of said segments; and,



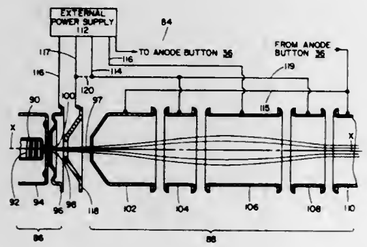
convergence correcting means coupled to each of said electron beams, produced by said guns, and responsive to said signals for independently converging the associated electron beams within each of said quadrants.

4,095,138

ELECTRON GUN HAVING AN ARC-INHIBITING ELECTRODE

James W. Schwartz, Deerfield, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Nov. 29, 1976, Ser. No. 745,889
Int. Cl.² H01J *29/46*
U.S. Cl. 315—16 **1 Claim**



1. For use in a television cathode ray tube having associated therewith a power supply for developing discrete supply voltages, an electron gun for receiving supply voltages from the power supply to produce a focused beam of electrons, comprising:

electron source means comprising cathode means and grid means; and

focus lens means for receiving electrons from said electron source means and a predetermined pattern of supply voltages from the power supply to form an electron spot at a distance from said electron source, comprising:

initial and final tubular end electrodes for receiving relatively high supply voltages;

a low voltage tubular electrode located between said initial and final electrodes for receiving a relatively low supply voltage; and,

intermediate voltage electrode means between said low voltage electrode and at least one of said end electrodes for receiving a relatively intermediate supply voltage, said lens establishing an extended, axially continuously active focusing field which is substantially shielded from external field disturbances and establishing an axial potential distribution which decreases steady in value from said initial end electrode to said low voltage electrode and increases steadily in value from said low voltage electrode to said final end electrode;

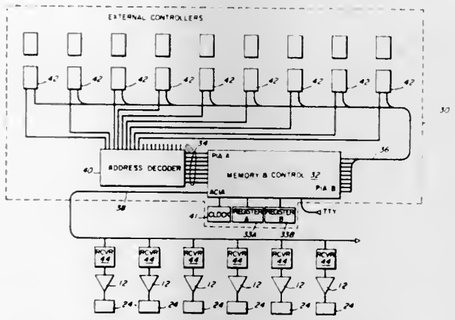
wherein said grid means receives an applied potential of such value that there exists a potential difference in the range of tens of kilovolts across the gap between said grid means and said initial end electrode of said focus lens means, said potential difference being sufficient to introduce a tendency towards destructive arcing between said grid means and said initial end electrode, said gun being characterized by having at least one arc-inhibiting electrode disposed between said grid means and said initial end electrode, and having a potential thereon that is intermediate to said potentials applied to said grid means and to said initial end electrode to provide an arc-inhibiting voltage gradient between said grid means and said initial end electrode.

4,095,139

LIGHT CONTROL SYSTEM

Alan P. Symonds, 14 Bobsled Dr., Needham Heights, Mass. 02194, and William K. Durfee, 3 Dana St., Apt. 8A, Cambridge, Mass. 02139

Filed May 18, 1977, Ser. No. 798,259
Int. Cl.² H05B *37/02, 39/04*
U.S. Cl. 315—153 **15 Claims**



1. A system for controlling the light intensity level of a light group including one or more lights, said system comprising, in combination:

control means for generating a parallel binary-coded signal representative of a predetermined signal level to be applied to said light group;

signal generating means for generating a unique and predetermined serially-coded address signal corresponding to said light group and for generating a serially-coded data signal representative of said signal level in response to said parallel binary-coded signal;

receiver means for applying said signal level to said light group only in response to said address signal and said data signal; and

a common bus for transmitting said address and data signals from said signal generating means to said receiver means.

4,095,140

TRIGGER CIRCUIT FOR FLASH LAMP DIRECTLY COUPLED TO AC SOURCE

Ellison H. Kirkhuff, Needham, and James C. Morris, Wakefield, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Mar. 7, 1977, Ser. No. 775,122
Int. Cl.² H05B *41/16, 41/30*
U.S. Cl. 315—199 **14 Claims**

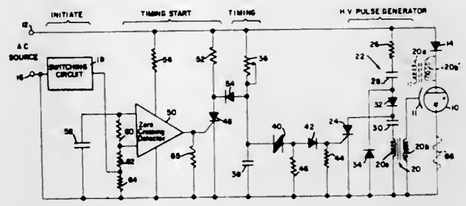
1. In an electrical circuit for operating an arc discharge flash lamp which is directly coupled through series circuit means across a source of alternating current, a circuit arrangement for triggering said lamp comprising:

high voltage pulse generating means connected to said alternating current source to be energized thereby and coupled to said flash lamp for applying pulsed high voltage to ignite the lamp;

a timing circuit connected to said alternating current source to be energized thereby and coupled to said pulse generating means for controlling the time of pulsed ignition of said lamp with respect to the phase of the alternating current waveform of said source;

means for initiating operation of said circuit arrangement for triggering said lamp; and

circuit means responsive to said initiating means for starting said timing circuit at a predetermined point on said alternating current waveform.

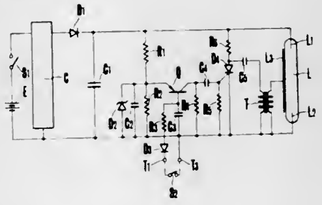


4,095,141

ELECTRONIC FLASH DEVICE

Zenzo Nakamura, Urawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 13, 1976, Ser. No. 658,123
Claims priority, application Japan, Feb. 21, 1975, 50/21573
Int. Cl.² H05B *41/32*
U.S. Cl. 315—241 P **7 Claims**



1. An electric flash device for a camera comprising:

(a) flash means for producing a light energy and having trigger and cathode electrodes;

(b) a capacitor coupled to said flash means for storing an electrical energy to be converted into the light energy in said flash means;

(c) a voltage divider circuit connected in parallel with said capacitor and having an output terminal;

(d) trigger pulse producing means coupled to said trigger electrode for supplying a trigger pulse to the trigger electrode of said flash means and including a thyristor having a control electrode;

(e) a PNP transistor coupled to the voltage divider circuit for impressing a voltage derived from the voltage divider circuit on the control electrode of said thyristor; the transistor having an emitter electrode connected to an output terminal of the voltage divider circuit, a collector electrode connected to the control electrode of said thyristor and a base electrode;

(f) a camera flash synchronizing switch connected to said base electrode of said PNP transistor for actuating the PNP transistor; and

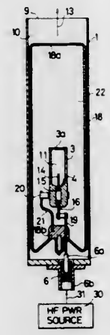
(g) a one-way conductive element connected in series with said synchronizing switch to prevent high voltages at the synchronizing switch from appearing at said PNP transistor.

4,095,142

HIGH FREQUENCY DISCHARGE LAMP FOR A SPECTRAL-LINE SOURCE

Seiichi Murayama, Kokubunji; Manabu Yamamoto, Odawara; Masaru Ito, Kodaira; Makoto Yasuda, Kokubunji, all of Japan; Makoto Watanabe, Hinsdale, Ill., and Kunifusa Kayama, Tokyo, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 24, 1977, Ser. No. 762,174
Claims priority, application Japan, Feb. 2, 1976, 51-9378
Int. Cl.² H05B *41/24, 9/00*
U.S. Cl. 315—248 **3 Claims**



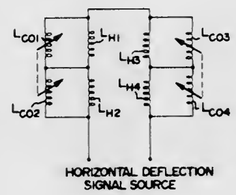
1. A high frequency discharge lamp for a spectral-line source comprising a discharge envelope which is made of an electrically-insulating material and at least a part of which has a transmissivity for spectral lines, a filling substance which is contributive to radiation of the several spectral lines and which is contained in said discharge envelope, an electrode which is provided in said discharge envelope, a casing having the interior evacuated to a vacuum and at least a part of which has a transmissivity for the spectral lines, said discharge envelope being disposed in said casing, a metallic container which surrounds said casing and said discharge envelope and which has at a part thereof an opening for taking out the spectral lines, and voltage supply means for supplying a high frequency voltage between said electrode and said metallic container.

4,095,143

ELECTRON BEAM CROSSOVER CORRECTION CIRCUITRY

Lawrence W. Pridmore, Elba, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jul. 21, 1976, Ser. No. 707,190
Int. Cl.² H01J *29/56*
U.S. Cl. 315—370 **4 Claims**



1. In a color cathode ray tube deflection system having horizontal and vertical axis and an in-line color cathode ray tube providing planar electron beams and an associated toroid-wound deflection yoke having first and second horizontal

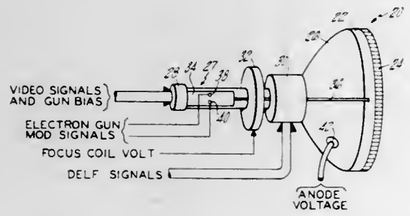
deflection windings oppositely disposed about said vertical axis and coupled to a horizontal deflection signal source and each horizontal winding having first and second series connected winding portions oppositely disposed about said horizontal axis, an electron beam crossover compensating circuit comprising an adjustable ganged and differentially connected inductance impedance means shunting all of at least one of said first and second winding portions of one of said first and second horizontal deflection windings to effect an imbalance of current in said first and second winding portions of at least one of said first and second horizontal deflection windings.

4,095,144

MASK-LESS SINGLE ELECTRON GUN, COLOR CRT

Charles Mendelsohn, Monsey, N.Y., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 17, 1976, Ser. No. 751,560
Int. Cl.² H01J *29/80*
U.S. Cl. 315—375 **19 Claims**



1. A color cathode ray tube (CRT) for providing a color video display in response to video signals, horizontal and vertical deflection signals, anode voltage signals, electron beam focusing signals, and electron beam modulation signals, presented from a system having s source of video signals, a source of horizontal and vertical deflection signals, a source of anode voltage signals, a source of electron beam focusing signals, and a source of electron beam modulation signals, comprising:

a vacuum envelope having a hollow funnel portion with a large diameter flared end enclosed in a vacuum sealing relationship by a faceplate portion and a small diameter tapered end disposed in a vacuum sealing relationship with a hollow neck portion extending rearward from said funnel portion along a central longitudinal axis thereof, said faceplate portion having a transparent major surface;

electron gun means, disposed inside said neck portion along said longitudinal axis and connected for response to the source of video signals, the source of anode voltage signals, and the source of beam modulation signals, for providing a hallow electron beam having a determined instantaneous inner and outer diameter in dependence on the magnitude of the beam modulation signals and having a beam axis coincident with said longitudinal axis, said electron gun means providing said hollow electron beam at an emitted current density in dependence on the magnitude of the video signal;

electron beam deflection means, disposed on the outside surface perimeter of said vacuum envelope at the junction of said neck and funnel portions and connected for response to the source of horizontal and vertical deflection signals, for providing deflection of the electron beam across said transparent major surface in each of two orthogonal directions in response to the deflection signals; and

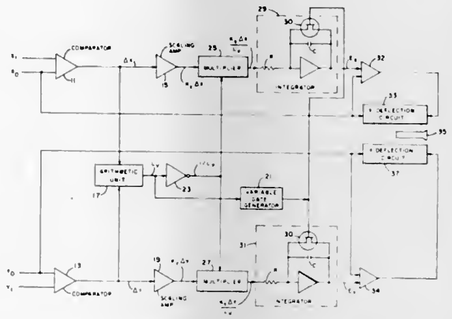
a video screen formation, disposed inside said vacuum glass envelope on said transparent major surface, said video screen formation including a plurality of noncontiguous picture elements disposed substantially in a matrix configuration of rows and columns, each of said picture elements having a determined surface area boundary and each including a plurality of different color phosphors disposed in a determined concentric pattern within the determined surface area boundary, said video screen formation further including a high work function dielectric material disposed interposingly with said plurality of picture elements on said transparent major surface for providing in response to bombarding electrons from the incident hollow electron beam, an electrostatic field which is negative with respect to the anode voltage signal and which has a gradient in a direction opposed to the trajectory of the incident electron beam, said negative electrostatic field providing in combination with said beam deflection means, registration of the incident electron beam on each of said picture element successively, for a determined time period, and stepping of the incident electron beam from the center of one picture element to the center of a next adjacent picture element in each row at the end of the determined time period.

4,095,145

DISPLAY OF VARIABLE LENGTH VECTORS

A. P. Terranova, North Andover, and F. J. Murphy, Billerica, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 13, 1976, Ser. No. 750,107
Int. Cl.² H01J *29/52*
U.S. Cl. 315—383 **6 Claims**



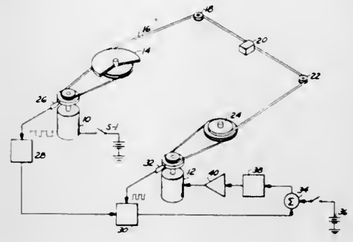
1. A variable length vector display circuit comprising: a cathode ray tube having X deflection means and Y deflection means; first and second comparators each having first and second inputs disposed to receive input voltage signals and an output; first and second operational amplifier sweep generators each having an input, an output, and a control input; the input of said first sweep generator being coupled to the output of said first comparator and the input of said second sweep generator being coupled to the output of said second comparator, the output of said first sweep generator being coupled to the X deflection means of said cathode ray tube and the output of said second sweep generator being coupled to the Y deflection means of said cathode ray tube; an arithmetic unit having first and second inputs and an output, said first input being connected to the output of said first comparator and said second input being connected to the output of said second comparator; a variable gate generator having an input coupled to the output of said arithmetic unit and an output coupled to the respective control inputs of said sweep generators for gating said sweep generators to controllably vary the sweep output voltage of said generators coupled to said deflection means.

4,095,146

REEL-TO-REEL DRIVE WITH SPEED CONTROL

Donald R. Spaman, and David C. Schilke, both of Middletown, Conn., assignors to Raymond Engineering Inc., Middletown, Conn.

Filed May 10, 1976, Ser. No. 685,077
Int. Cl.² H02P *5/46*
U.S. Cl. 318—7 **18 Claims**



1. A method for minimizing the linear speed variations of a strip being drawn off a supply reel and delivered to a take-up reel comprising the steps of:

sensing the speed of the supply reel;

sensing the speed of the take-up reel;

determining the product of the speeds of the supply and take-up reels; and

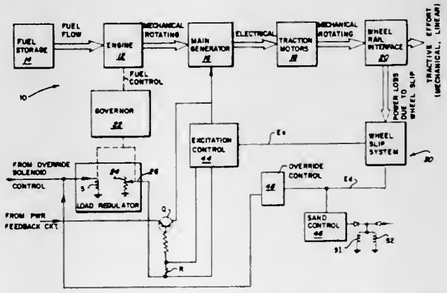
varying the speed of the take-up reel to maintain the product of the speeds of the supply and take-up reels constant whereby the linear speed of the strip will be maintained approximately constant.

4,095,147

WHEEL SLIP CORRECTION METHOD, SYSTEM AND APPARATUS

John M. Mountz, 1503 Windsor Dr., Arlington Heights, Ill. 60004

Filed Feb. 26, 1976, Ser. No. 661,509
Int. Cl.² H02P *5/50*
U.S. Cl. 318—52 **17 Claims**



1. An improved system for correcting wheel slip between any one of a plurality of locomotive wheels and a track occurring in response to the application of power to said wheels for rotating said wheels along a track to move the locomotive relative said track, the improvement comprising:

means common to said wheels for deriving a first signal proportional to locomotive speed;

means controlled by said first signal for deriving a respective correction signal for each wheel proportional to the power dissipated by the respective wheel in response to a slip condition of the respective wheel;

means for utilizing each correction signal for controlling the slip condition of the respective wheel to eliminate the slip; and

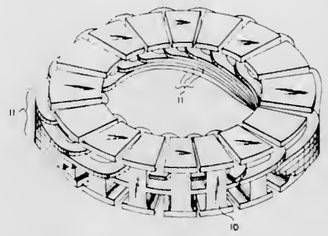
memory means operated by said correction signal for retaining said first signal until said slip condition is eliminated.

4,095,148

DIRECT CURRENT MOTORS

Louis W. Parker, 2408 Sunrise Key Hwy., Fort Lauderdale, Fla. 33304

Filed Jul. 22, 1976, Ser. No. 707,578
Int. Cl.² H02K *23/00*
U.S. Cl. 318—138 **17 Claims**



1. A direct current motor comprising a stator consisting of a plurality of coils connected in series with one another in a closed loop configuration, means connecting the junction between adjacent pairs of said coils to diametrically opposed ones of said junctions in said closed loop coil configuration, a plurality of pairs of oppositely poled silicon controlled rectifiers connected respectively to the junctions of different adjacent pairs of said coils for selectively conducting current into and out of said stator coil junctions, a direct current source for energizing each of said pairs of silicon controlled rectifiers, a rotor mounted for rotation adjacent said stator, means including a distributor driven by said rotor for energizing the gate electrodes of different ones of said silicon controlled rectifiers in sequence thereby to produce a plurality of stator poles which are angularly displaced from the rotor poles and which stator poles shift in position about said closed loop coil configuration with rotation of said rotor, centrifugal switch means coupled to said rotor, and control means responsive to the operating state of said centrifugal switch means for controlling the possible conduction of said silicon controlled rectifiers to effect a starting mode of operation when said rotor is rotating below a predetermined speed and to effect a running mode of operation different from said starting mode when said rotor is rotating above said predetermined speed, said centrifugal switch means and said control means being operative to prevent continuous conduction of any of said silicon controlled rectifiers in said starting mode of operation and being operative to permit continuous conduction of different successive ones of said pairs of rectifiers in said running mode of operation.

4,095,149

OPTIMIZED ELECTRIC MOTOR HAVING CONTROLLED MAGNETIC FLUX DENSITY

Cravens L. Wanlass, 9871 Overhill Dr., Santa Ana, Calif. 92705

Filed Apr. 7, 1976, Ser. No. 674,406
Int. Cl.² H02P *1/44*
U.S. Cl. 318—220 A **21 Claims**

1. An electric motor comprising:

a stator core including a plurality of poles and magnetic material joining said poles;

a rotor;

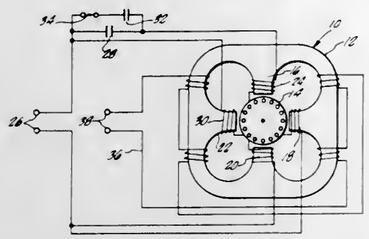
main stator winding means wound on said core and encompassing the magnetic material to generated magnetic flux which links said rotor;

an input adapted to be connected to a source of AC voltage;

capacitor means;

means connecting the main stator winding means and said capacitor means in a series circuit across said input; and

means for introducing a control magnetic flux into said joining magnetic material to vary the amount of magnetic



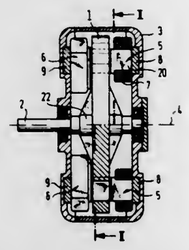
material effectively encompassed by said main stator winding without substantially linking said rotor with said control flux.

4,095,150

TWO-PHASE ASYNCHRONOUS MOTOR

Karlheinz Senckel, Goethering 54, 8015 Markt Schwaben, Germany

Filed Jul. 12, 1976, Ser. No. 704,466
Int. Cl.² H02K *1/00*
U.S. Cl. 318—227 **10 Claims**



1. A two-phase asynchronous motor comprising:

a stator having stator windings, said stator including a first stator portion and a second like stator portion spacedly disposed parallel to said first stator portion, said stator portions including ferromagnetic cores which together with said stator windings define field magnets, said cores having widened pole shoes, and said stator windings being arranged in said stator portions on said ferromagnetic cores, the stator windings of one phase being accommodated in said first stator portion only and the stator windings of a second phase being accommodated in said second stator portion only, said stator windings being displaced with respect to each other in a direction of movement according to the phase angle; and,

a member arranged between said stator portions and mounted for movement with respect thereto, said member including a short-circuit electrically conductive element of planar configuration adapted for induction therein of an electrical current by said field magnets and further including ferromagnetic bridges magnetically separated from each other by said short-circuit element and extending from one side of said element to the other and including broadened end plates thereon,

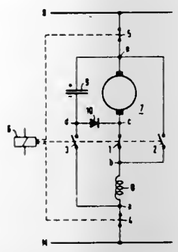
wherein said pole shoes and said end plates will complete a magnetic circuit between two adjacent stator poles of one stator portion directly via a pole shoe of said other stator portion.

4,095,151

CIRCUIT ARRANGEMENT FOR AN A-C SERIES MOTOR

Paul Mourick, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Sep. 15, 1976, Ser. No. 723,549
Claims priority, application Germany, Sep. 15, 1975, 2541113
Int. Cl.² H02P *3/12, 3/00*
U.S. Cl. 318—266 **1 Claim**



1. In a circuit arrangement for an a-c series motor having an armature and a field winding with a switching device for changing from motor to braking operation comprising:

a. a first switch contact between the armature winding and the field winding;

b. a second switch contact across a series circuit consisting of the first switch contact and the armature winding;

c. a third switch contact across the series circuit consisting of the first switch contact and the field winding;

d. a capacitor and a charging diode in series associated with the a-c series motor, the improvement comprising;

e. the series circuit consisting of the capacitor and the charging diode shunting the armature winding; and

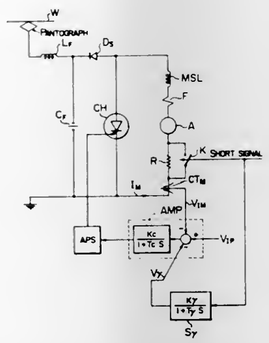
f. the third switch contact disposed between the center of said series circuit consisting of the capacitor and the charging diode and the external terminal of the field winding, whereby in motor operation a series circuit consisting of the capacitor, the charging diode and the field winding is connected between the terminals of the a-c series motor and, during braking operation, the field winding is shunted by the capacitor.

4,095,152

REGENERATIVE BRAKE CONTROL SYSTEM FOR DC MOTOR

Hiroshi Narita, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Jun. 10, 1976, Ser. No. 694,726
Claims priority, application Japan, Jun. 16, 1975, 50-71883
Int. Cl.² H02P *3/14*
U.S. Cl. 318—376 **6 Claims**



1. A regenerative brake control system for DC motors comprising

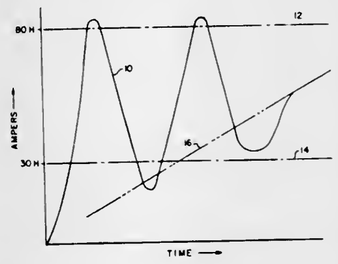
a series circuit including a DC motor circuit and a resistor, means responsive to a shorting signal for shorting said resistor, a chopper connected in parallel with said series circuit, a filtering circuit including a filtering capacitor connected through a diode to said parallel circuit of said chopper and said series circuit, and a power supply connected to said filtering circuit, current control means for controlling the duty cycle of said chopper in accordance with the deviation between a current command and the value of current flowing in said motor circuit, and a phase shifter for controlling the on-off operation of said chopper in accordance with the output of said current control means, and duty cycle control means responsive to said shorting signal for reducing the duty cycle of said chopper before said resistor is shorted.

4,095,153

TRANSIT VEHICLE ELECTRICAL BRAKE CONTROL APPARATUS AND METHOD

Thomas C. Matty, North Huntingdon, and James H. Franz, Jr., Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 29, 1976, Ser. No. 709,684
Int. Cl.² H02P *3/14*
U.S. Cl. 318—376 **11 Claims**



1. In control apparatus for a chopper responsive to a brake effort request signal for determining an ON operation and an OFF operation and being operative with a transit vehicle electric motor having a known brake effort characteristic for determining the brake effort provided by said electric motor, the combination of:

means responsive to the actual current of the motor,

means for establishing an upper motor current limit in relation to said brake effort characteristic and establishing a lower motor current limit in relation to the provision of said motor current, and

means operative with said actual motor current for making a first comparison of the actual motor current with said upper limit to determine the ON operation of the chopper until the actual motor current is greater than said upper limit and making a second comparison of the actual motor current with said lower limit to permit the OFF operation of the chopper in response to the brake effort request signal.

4,095,154

REGENERATIVE BRAKING SYSTEM FOR A CHOPPER CONTROLLED ELECTRIC TRACTION MOTOR

Dennis F. Williamson, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Oct. 18, 1976, Ser. No. 744,591
Int. Cl.² H02P *3/14*
U.S. Cl. 318—376 **29 Claims**

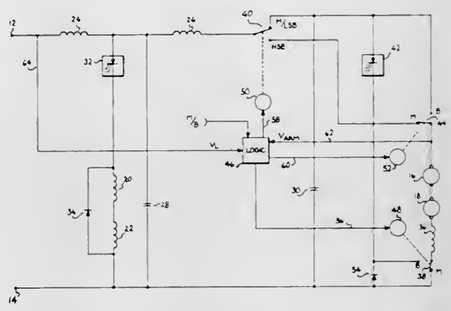
1. A d-c electric traction motor control system comprising:

a. first and second source terminals adapted for connection to a d-c power source;

b. a first d-c electric traction motor operable in a motoring mode and in an electrical braking mode;

c. power control means responsive to a command signal for regulating current therethrough;

d. switch means operable during said motoring mode to serially connect said power control means and an armature of said traction motor between said first and second source terminals whereby electrical energy may be provided to said traction motor, said switch means being operable during said electrical braking mode to serially connect said power control means in a reverse direction



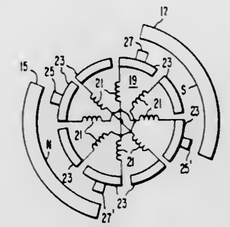
whereby electrical energy may be transferred from said traction motor armature to said source terminals through said power control means when the terminal voltage magnitude of said traction motor exceeds the voltage magnitude at said source terminals, and said switch means being operable when said terminal voltage magnitude of said traction motor is less than said voltage magnitude at said source terminals during said electrical braking mode to connect said power control means in parallel circuit arrangement with said traction motor between said source terminals.

4,095,155

DIRECTION REVERSING DIRECT CURRENT MOTORS AND THEIR CONTROL

Ronald Robert Brooks, Hamilton Square, and Jack Edward Wojslawowicz, Bayonne, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,650
Claims priority, application United Kingdom, Mar. 13, 1975, 10516/75
Int. Cl.² H02P *3/00*
U.S. Cl. 318—541 **7 Claims**



1. A rotation reversing direct current motor apparatus, comprising:

a stator for providing a fixed magnetic field;

an armature mounted for rotation in said magnetic field, said armature having a plurality of both electrically independent windings and commutator segments radially distributed about the rotational axis thereof, said commutator segments being electrically isolated from one another, and

each of said windings being successively connected between two of said opposingly disposed commutator segments;

first and second pairs of opposingly disposed brushes fixedly mounted relative to said stator for electrically and mechanically contacting said commutator segments, said first pair of brushes being disposed for passing current of a given polarity successively through said windings in a given direction to produce an armature field that interacts with said fixed magnetic field to cause rotation in one direction and said second pair of brushes being disposed for passing current of the same said given polarity successively through said windings in the same said given direction to produce an armature field that interacts with said fixed magnetic field to cause rotation in an opposite direction, said first pair of brushes being separated from the second by at least one commutator segment; and

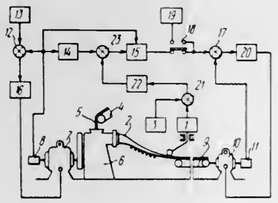
means for selectively applying a voltage across either said first pair of brushes to obtain clockwise motor rotation or said second pair of brushes to obtain counter-clockwise motor rotation.

4,095,156

DEVICE FOR AUTOMATIC DIMENSION CONTROL OF EXTRUDED BLANKS

Vladimir Alexeevich Borisov, ulitsa Andrianova, 38, kv. 35; Ravil Abdrakhmanovich Akhmedzhanov, ulitsa Tsiolkovskogo, 4a, kv. 14, and Jury Vsevolodovich Chistyakov, prospekt Mira, 2b, kv. 47, all of Omsk, U.S.S.R.

Filed Mar. 21, 1977, Ser. No. 779,535
Int. Cl.² G05B *19/24*
U.S. Cl. 318—571 **1 Claim**



1. A device for automatic dimension control of extruded blanks, comprising:

a means for measuring the blank width;

a means for presetting the blank dimensions;

a first, a second and a third adders;

said means for measuring the blank width having an output connected to an input of said third adder;

said third adder having a second input connected to said means for presetting the blank dimensions; an amplifier-converter having an input connected to the output of said third adder;

an extruder screw drive motor; socket when seperated

a sensor for measuring the extruder screw rpm, kinematically associated with said extruder screw drive motor; a motor for driving an extrudate drawing-off device; means.

a sensor for measuring the extrudate draw-off speed, kinematically associated with said drawing-off device drive motor;

a means for presetting the extrudate draw-off speed; axis

inputs of said first adder, connected, respectively, to said extruder screw rpm presettting means and to said extruder screw rpm sensor;

a first and a second amplifiers;

sad first adder having an output connected, via said first amplifier, to said extruder screw drive motor;

said second adder having a first input connected to said draw-off speed sensor;

said second adder having an output connected, via said second amplifier, to said drawing-off device drive motor;

a compensator unit;

a fourth adder having a first input connected to the output of said compensator unit;

said compensator unit having an input connected to said extruder screw rpm sensor;

a nonlinearity unit having a first input connected to the output of said fourth adder and a second input connected to said extruder screw rpm sensor and receiving a bias voltage;

said amplifier-converter having an output connected to a second input of said fourth adder;

a switch;

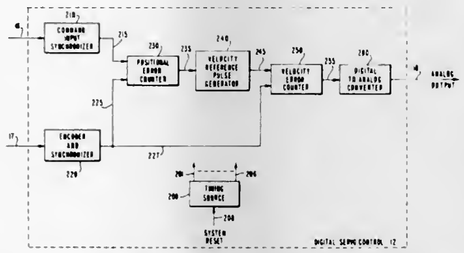
said nonlinearity unit and draw-off speed sensor having outputs connected to a first input of said third adder via said switch.

4,095,157

DIGITAL SERVOMECHANISM CONTROL SYSTEM

John G. Klauser, Holliston, Mass., assignor to Boston Digital Corporation, Hopkinton, Mass.

Filed Sep. 7, 1976, Ser. No. 721,318
Int. Cl.² H02P *5/00*
U.S. Cl. 318—603 **14 Claims**



1. A control network for use in a system for controlling the movement of a device, said control system including means for moving said device, a source of a command signal representing desired movement of the device, a source of a sensed signal representing the actual movement of said device, said command and sensed signals being pulse trains in which each pulse represents an incremental displacement of said device, so that the speed of movement is encoded in the repetition rate of the pulses, said network comprising; timing pulse generator means includng a single clock pulse source operative to produce timing signals having particular repetition rates defined by said clock pulse source, respectively, for controlling operations to be performed by said network, first counter means coupled to said command signal source and said sensed signal source for producing a first positional error signal functionally related to the difference between the desired and actual positions of said device, reference generator means coupled to said timing generator means and said first counter means for generating a reference pulse signal in response to both said timing signals and said first positional error signal, said reference pulse signal having a repetition rate functionally related only to the magnitude of said first positional error signal, and output means coupled to said reference generator means for applying an output signal corresponding to said reference pulse signal to said device moving means.

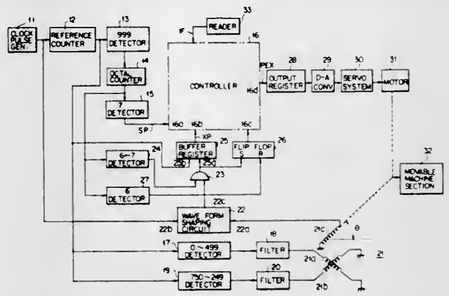
4,095,158

POSITION-CONTROLLING SYSTEM

Mitsuo Matsumoto, Kokubunji, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sep. 20, 1976, Ser. No. 724,863
Claims priority, application Japan, Sep. 19, 1975, 50-112722
Int. Cl.² G05B *19/28*
U.S. Cl. 318—603 **5 Claims**

1. A position-controlling system for calculating, upon receipt of a position-controlling instruction changing with time, each instructed position incremental moving value of a movable machine section per prescribed period of time, thereby to control the position of the movable machine section through a servo system, which comprises a reference counter for periodically providing a referential pattern numeral upon receipt of a clock pulse issued from a clock pulse oscillator; a phase type position detector for shaping an exciting waveform from a count made by the reference counter, thereby to detect the momentarily changing position of the movable machine section; means for producing a sampling control signal and a detection control signal from an output from the reference counter; a buffer register for storing the content of the reference counter according to a control signal supplied from the control signal-generating means and a phase data read out from the phase type position detector or preferably at a timing immediately preceding the sampling signal; and a controller for calculating each instructed position incremental moving



value of the movable machine section per prescribed period of time upon receipt of a data on the detected position of the movable machine section read out from the buffer register, sampling signal and position control signal, thereby giving an accumulative position errors occurring per prescribed period of time; the controller comprising a calculating unit for calculating a numeral denoting each instructed incremental moving of the movable machine section per prescribed period of time from a position-controlling instruction; means for accumulatively adding a numeral denoting each instructed incremental moving of the movable machine section for each said prescribed period of time; means for carrying out the accumulative subtraction of each detected actual incremental moving of the movable machine section read out from the buffer register for each said prescribed period of time; and a position error register for generating an output denoting an actual position error per prescribed period of time from a difference between outputs from the addition and subtraction means.

4,095,159

ELECTRONIC APPARATUS FOR AUTOMATIC CLOSED LOOP POSITIONING OF MOBILE MEMBERS ASSOCIATED WITH AN ELECTROMAGNETIC TRANSDUCER WITH TWO PAIRS OF WINDINGS

Paolo Tirelli, Taino (Varese), Italy, assignor to Exo Elettronica Industriale S.r.l., Milan, Italy

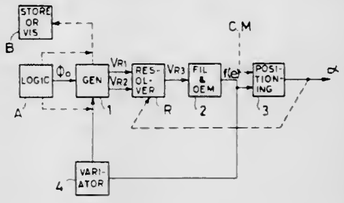
Filed Dec. 9, 1975, Ser. No. 639,126
Int. Cl.² G05B *19/30*
U.S. Cl. 318—605 **5 Claims**

1. In a system responsive to the relative position of first and second relatively movable members of a measuring device, one of said members having a pair of windings disposed in quadrature and the other of said members likewise having a pair of windings disposed in quadrature, said members being relatively movable between a first portion in which the pairs of windings are aligned and other positions in which the pairs of windings are rotatably displaced from said first position, the combination of:

circuit means connected to one pair of said windings for applying respective voltages VR_1 and VR_2thereto whereby voltages VR_3 and VR_4 appear at the respective windings of said other pair; and

demodulating means connected to one winding of said other pair for demodulating one of said voltages VR_3 and VR_4 to recover an error voltage $f(e)$ proportional to the phase $\phi_o - \alpha$ where α is the relative angular position of said other pair of windings with respect to said one pair of windings and ϕ_o is an imaginary angle established by VR_1 and VR_2;

said circuit means comprising a first counter having an n bit output, clock means connected to said first counter for causing said first counter to count its full capacity 2^n for each of successive time periods T where T is the period of said voltages VR_1 and VR_2, a second counter having an n bit output, means for setting said second counter to contain a count corresponding to said angle ϕ_o, summing



means connected to the least significant $n-2$ bits of said first and second counters for producing the respective outputs Σ_{n-2} and Σ_{n-2} which respectively are the instantaneous sum and instantaneous differences of the count represented by said $n-1$ bits of said first counter and the count represented by said $n-2$ bits of said second counter, and voltage generating means having the following inputs:

(1) the two most significant bits of said first counter,

(2) the two most significant bits of said second counter,

(3) said instantaneous sum, and

(4) said instantaneous difference for producing said voltages VR_1 and VR_2 respectively in the form of bipolar pulse pairs of period T and having the pulses thereof of time duration corresponding to $2\phi_o$ and centered on T/4 and 3T/4 and bipolar pulse pairs of period T and having the pulses thereof of time duration corresponding to $2(90° - \phi_o)$ and centered on T/4 and 3T/4.

4,095,160

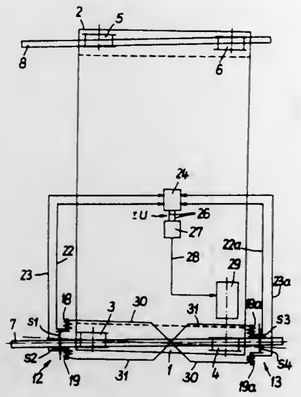
CONTROL ARRANGEMENT FOR CAUSING TRACK SUPPORTED IMPLEMENT TO REMAIN IN PARALLELISM WITH ITSELF

Franz Sedlmayer, and Peter Müller, both of Wilhelmshaven, Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Jun. 4, 1976, Ser. No. 693,202
Claims priority, application Germany, Jun. 25, 1975, 2528293
Int. Cl.² G05B *11/01*
U.S. Cl. 318—675 **7 Claims**

1. A control device for causing an implement such as a crane having laterally spaced wheeled carriages rollingly supported on respective laterally spaced tracks to remain in parallel with itself while moving along the tracks; said device comprising in combination; pick-up means on at least one carriage spaced longitudinally along the carriage and also spaced laterally from the respective track and each operable to develop a signal in conformity with lateral movement of the pertaining region of the carriage on the respective track as brought about by movement of said implement out of a position of parallelism with itself, a comparator connected to receive said pick-up signals and operable to develop a control signal in conformity with the difference therebetween, and control means connected to

receive said control signal and operable in conformity with said control signal to apply corrective vertical axis influences

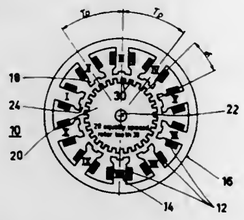


on said implement tending to restore the implement to said condition of parallelism with itself.

4,095,161
VARIABLE STEPPING-ANGLE SYNCHRONOUS MOTOR

Günter Heine, Seelbach, and Claus Schäffer, Heiligenzell, both of Germany, assignors to Gerhard Berger GmbH & Co. Fabrik Elektrischer Messgeräte, Lahr, Germany

Filed Jun. 15, 1976, Ser. No. 696,310
Claims priority, application Germany, Jun. 13, 1975, 2526564
Int. Cl.² G05B *19/40*
U.S. Cl. 318—696 **6 Claims**

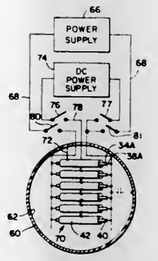


1. In a five-phase stepping motor including
a permanent magnet rotor having on its periphery a plurality of circumferentially spaced, radially outwardly directed rotor teeth,
a stator surrounding said rotor and having a plurality of circularly arranged, radially inwardly directed stator poles disposed in u pole groups of five poles each, each of said stator poles having $n + 1$ pole teeth on its end face directed toward said rotor with n being a whole number $\geqq 0$, and
a corresponding plurality of stator windings wound about said stator poles, respectively, said stator windings forming a plurality of connecting points adapted to be selectively connected by respective control means to a power source for selective energization of said stator windings;
the improvement which comprises the provision, in combination with a single stator, of a set of eight rotors having respective different numbers of rotor teeth Z_R but with each such number defined by the relation $Z_R = 5u\,(n + 1) + gu$, where g is a whole number from 1 to 4, so that with one and the same stator and associated control of the stator windings the number of rotor teeth can be selectively varied to provide a motor with any one of eight different step angles.

4,095,162
CAPACITY CHANGER

Joseph Herman Arnold Peter Hiddink, 147 Burcher Road, Ajax, Ontario, Canada (L1S 2R6)

Filed Nov. 3, 1975, Ser. No. 627,899
Int. Cl.² H02M *9/04*; H01G *7/00*
U.S. Cl. 320—1 **9 Claims**

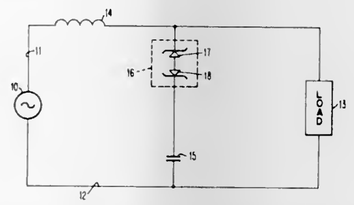


1. A capacity changer device comprising first capacitor means, second capacitor means, first power supply means and second power supply means, first means including normally open switch means for selectively connecting said first power supply means to said first capacitor means, and second means for selectively connecting said second power supply means to said second capacitor means, said first capacitor means including at least one evacuated air-free glass tube having an ionizable gas disposed therewithin, a pair of spaced electrodes disposed within said glass tube and having a corresponding electrode terminal extending outwardly through said glass, of said tube to the outside thereof, and said first connection means being operable to connect said first power supply means to said electrode terminals through said switch means.

4,095,163
TRANSIENT VOLTAGE SUPPRESSION CIRCUIT

Herbert R. Montague, Binghamton, N.Y., assignor to Control Concepts Corporation, Binghamton, N.Y.

Filed Jun. 1, 1976, Ser. No. 692,013
Int. Cl.² G05F *3/00*
U.S. Cl. 323—8 **8 Claims**

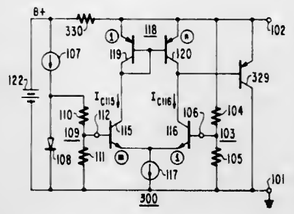


1. In a circuit having a source of varying electrical potential and a load connected across said source, a filter circuit for damping oscillations caused by transient noise pulses consisting of:
an inductor connected to one side of said source in series with said load;
a capacitor connected between the load side of said inductor and the other side of said source in parallel with said load; and
breakdown means in series with said capacitor and having a predetermined breakdown potential.

4,095,164
VOLTAGE SUPPLY REGULATED IN PROPORTION TO SUM OF POSITIVE- AND NEGATIVE-TEMPERATURE-COEFFICIENT OFFSET VOLTAGES

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 5, 1976, Ser. No. 729,796
Int. Cl.² G05F *1/56, 1/60*
U.S. Cl. 323—8 **37 Claims**



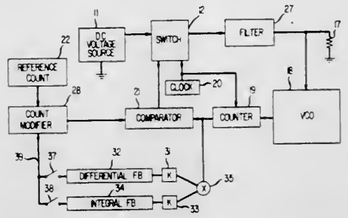
1. A regulated potential supply comprising:
first and second terminals;
current conductive means between said first and said second terminals;
first and second transistor means of the same conductivity type, each having an output current conduting path and a control terminal, the output current of each of said first and said second transistor means being controlled responsive to the potential appearing between its control terminal and said first terminal;
means responsive to potential appearing between said first and second terminals to continuously supply a fraction thereof between said first terminal and the control terminal of said first transistor means, which fraction is between zero and unity;
means for generating a negative-temperaturecoefficient potential;
means responsive to said negative-temperaturecoefficient potential to continuously supply a fraction thereof between said first terminal and the control terminal of said second transitor means, which fraction is between zero and unity;
means responsive to the difference between fixed proportions of the output currents of said first and said second transistor means for supplying an error signal, said fixed proportions chosen to cause said error signal to be substantially zero-valued when a positive-temperature-coefficient potential appears between the respective control terminals of said second and said first transistor means that summed with said fraction of negative temperature coefficient potential results in a substantially zero-temperature-coefficient potential; and
means responsive to said error signal to supply a current directly related in amplitude to said error signal to said second terminal, thereby completing a degenerative feedback loop for regulating the potential between said first and said second terminals to a substantially-temperature-independent voltage proportional to said substantially zero-temperature-coefficient potential.

4,095,165
SWITCHING REGULATOR CONTROL UTILIZING DIGITAL COMPARISON TECHNIQUES TO PULSE WIDTH MODULATE CONDUCTION THROUGH A SWITCHING DEVICE

Victor Bert Boros, New York, N.Y., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 18, 1976, Ser. No. 733,058
Int. Cl.² G05F *1/56*
U.S. Cl. 323—17 **8 Claims**

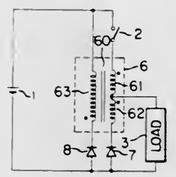
1. A switching type voltage regulator comprising input means, output means, switching means coupling said input and output means, means for periodically initiating conduction in said switching means, a voltage controlled oscillator coupled to be responsive to a voltage magnitude at said output means, counting means responsive to an output of said voltage controlled oscillator, means for determining a difference in successive counts as accumulated by said counting means for recording a first count during one period of operation of said switching device and means coupled to said voltage controlled oscillator for counting down from said first count to derive a second count, a reference count register, comparator means, a first up-down counter coupling said reference count register to said comparator, said second count being coupled to said first up-down counter, said comparator means coupled to respond to an equality of a count in said counting means with a reference count modified by said first up-down counter and operative to terminate conduction in said switching means.



4,095,166
DC VARIABLE VOLTAGE DEVICE

Nobuho Shibata, Katano; Tutomu Seri, Kyoto; Norio Umezawa, Hirakata, and Takeshi Morofuji, Kadoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 15, 1976, Ser. No. 750,975
Claims priority, application Japan, Feb. 19, 1976, 51-17630; Mar. 3, 1976, 51-23571; Mar. 5, 1976, 51-24455; Mar. 25, 1976, 51-33365
Int. Cl.² G05F *1/58*
U.S. Cl. 323—17 **18 Claims**



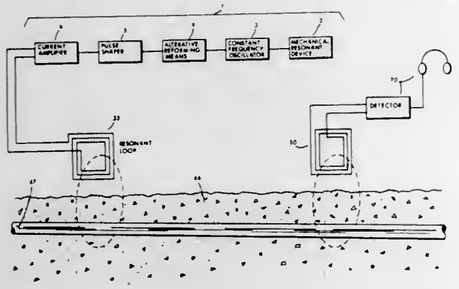
1. A DC variable voltage device comprising a first switch connected to one terminal of a DC power supply,
a transformer having a first coil connected in series with said first switch,
said transformer having a second coil connected in series aiding with said first coil, said coils being mounted on a common magnetic core,
a diode interconnected between said second coil and another terminal of said DC power supply for preventing short-circuiting of said DC power supply when said core is saturated when said first switch is closed,
means for interconnecting a load between the junction between said first and second coils and said other terminal of said DC power supply, and
a circuit coupled to said transformer and to a terminal of said power supply for restoring to an initial state the flux variation in said core produced when said first switch is closed, whereby said load may be controlled by the alternate opening and closing of said first switch.

4,095,167

CONCEALED STRUCTURE LOCATING AND SURVEYING EXCITER

Harold James Weber, 20 Whitney Dr., Sherborn, Mass. 01770

Division of Ser. No. 643,606, Dec. 22, 1975, Pat. No. 4,044,299.
This application Jun. 9, 1976, Ser. No. 694,386
Int. Cl.[2] G01V *3/10*; G01D *21/04*; G01V *3/08*
U.S. Cl. 324—3 **19 Claims**



1. An inductive exciter means which has the capacity to stimulate sympathetic electromagnetic vibrations of a constant frequency in a concealed structure for the purpose of locating and surveying the said concealed structure including in combination:

(a) stabilized oscillator means operative to produce a source of first alternating current frequency,

(b) alterative reforming means coupled to the output of said oscillator means wherein said reforming means is operative to produce a source of squared waveform second alternating current frequency signal the periodicity of which is derived from the said first alternating current frequency, wherein said reforming means includes an output means therefrom for providing said signal,

(c) current amplifier means, including an input means for accepting voltage pulses, said current amplifier means being operative to increase the elctrical amplitude of the said voltage pulses at the output of the said amplifier,

(d) resonant winding means of goodly size and high operating "Q" loosely inductively coupled to the said current amplifier means output and operative so as to cause an electromagnetic field of large proportions and area, such field being caused to be sympathetically coupled into the concealed structure through suitable orientation of the said resonant winding so as to inductively excite the said structure to again reradiate electromagnetic field lines along the length and breadth of the said structure at a replica rate of the originating inductive signal frequency,

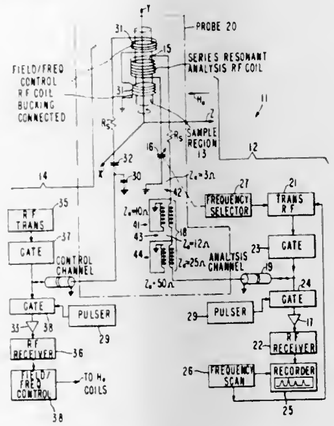
(e) a source of direct current power connected so as to be operative to provide the electrical operating potentials as required for the proper functioning of the said stabilized oscillator means, said alterative reforming means, and said current amplifier means, and pulse shaper means, consisting of at least one input and at least one output, wherein said pulse shaper is comprised of at least one resistor and at least one capacitor arranged in the general form of a differentiator with the input thereto operatively coupled to the said source of squared waveform second alternating frequency signal provided by the said reforming means output, and with the output thereto coupled to the said current amplifier means input, the time constant of said differentiator resistor and capacitor being somewhat shorter than the half-cycle period of the output signal from the reforming means, wherein said pulse shaper means produces output voltage pulses, in response to said inputed squared waveform second alternating frequency signal which are improved in waveform efficaciousness by reducing the width, or "on time", of the exciting drive pulse delivered through the said current amplifier means to the said resonant winding means until the amplitude of the induction field emanating from said winding means reaches a maximum, whereupon the said pulse width is, in a small degree, re-increased until the said issuing field just starts to decline in amplitude by not more than a few percent, such condition being found to be that which is necessary to provide sufficient power from the said current amplifier to overcome the losses sustained in the energy storage ability of the high "Q" resonant winding, yet prevent the said current amplifier from shunting, or loading, and thereby dissipating any significant portion of the stored energy contained in the said resonant winding.

4,095,168

RF PICK-UP COIL CIRCUIT FOR A WIDE TUNING RANGE NUCLEAR MAGNETIC RESONANCE PROBE

Lloyd F. Hlavka, Palo Alto, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 22, 1977, Ser. No. 770,477
Int. Cl.[2] G01R *33/08*
U.S. Cl. 324—0.5 AH **12 Claims**



1. In a resonance pick-up circuit of a nuclear magnetic resonance spectrometer:

magnetic pick-up coil means disposed in radio frequency magnetic field exchanging relation to a nuclear magnetic resonance sample region for sensing nuclear magnetic resonance of a sample in the sample region;

tuning capacitor means series connected for RF current flow with said pick-up coil means for series resonating the inductance of said magnetic pick-up coil means at a nuclear magnetic resonant frequency of the resonance sample material;

transmission line transformer means series connected for the series resonant radio frequency current flow with said pick-up coil means and said tuning capacitor means at said series resonance frequency for transforming the relatively low series resonance impedance of said series resonated pick-up coil means to a substantially higher impedance of the input to a radio frequency amplifier;

said transformer means including first and second elongated conductors having an axially coextensive elongated portion, said transmission line comprising the distributed inductance and capacitance of said first and second coextensive conductors, said first conductor being series connected with said series resonated pick-up coil for flow of series resonant radio frequency current therethrough of one phase and for inducing a radio frequency current flow of opposite phase in said second conductor; and

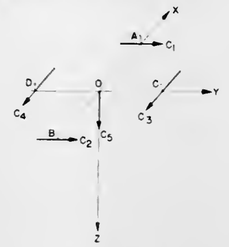
means for coupling the induced current in said second conductor onto the end of said first conductor, which faces toward said pick-up coil means, in phase with the current flow in said first conductor so that at the end of said first conductor facing said pick-up means there is the sum of the current flow in said first and second conductors and at the opposite end of said first conductor, which faces toward the amplifier, there is only the series resonant current flow on said first conductor.

4,095,169

METHOD FOR LOCATING DISCONTINUITIES IN THE ELECTRICAL CONDUCTIVITY OF THE SUB-SOIL USING A PLURALITY OF MAGNETIC DETECTORS IN A PREDETERMINED SPATIAL ARRANGEMENT

Louis Marcel Musé, Rocquencourt, France, assignor to General Electro-Magnetic Prospecting, Inc., Santa Rosa, Calif.

Filed Mar. 9, 1976, Ser. No. 665,212
Claims priority, application France, Apr. 7, 1975, 75 10761
Int. Cl.[2] G01V *3/08, 3/00*
U.S. Cl. 324—8 **15 Claims**



1. A method for obtaining an indication of the electro-magnetic characteristics of the sub-soil underlying a ground surface comprising the steps of:

a. placing on the ground in a substantially horizontal plane at least four directional magnetic field detectors in two sets wherein each set comprises a spaced pair of detectors oriented in the same direction with the detectors of each set oriented at right angles to the detectors of the other set;

b. simultaneously monitoring the output signal from each of said detectors over a period of time, each of said output signals being made up of a plurality of spectral components;

c. electronically processing said output signals by characterizing each of said spectral components as being of the form $H = H_O e\, t/\tau$ where t is time and τ is a time-constant to derive for each of said spectral components in each of said output signals a magnetic field amplitude value H_O;

d. combining amplitude values corresponding to the same spectral component from each of said output signals to obtain a non-variable physical parameter associated with said spectral component which is related to the electrical conductivity of the sub-soil beneath the detectors and is independent of any phase shift existing between the output signals from the pair of detectors in each of said sets.

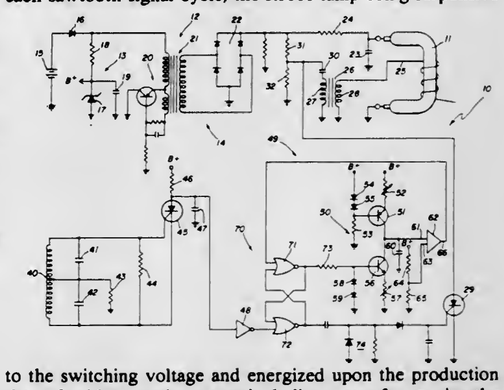
4,095,170

METERLESS IGNITION ADVANCE MEASURING DEVICE FOR INTERNAL COMBUSTION ENGINES

Herbert R. Schmitt, Lake Forest, Ill., assignor to Snap-on Tools Corporation, Kenosha, Wis.

Filed Dec. 6, 1976, Ser. No. 747,642
Int. Cl.[2] F02P *17/00*
U.S. Cl. 324—16 T **15 Claims**

1. In an advance measuring device having a strobe lamp and being adapted to determine the spark advance of an internal combustion engine having at least one spark plug and means for producing a sequence of spark voltages for the spark plug, the combination comprising: sawtooth signal generating means for generating a sawtooth signal each cycle of which has first and second portions, and threshold detector means coupled to said generating means and responsive to the instantaneous amplitude of said sawtooth signal exceeding a predetermined fixed threshold for producing a switching voltage, said generating means being coupled to said threshold detector means and being responsive to the switching voltage to initiate the first portion of each sawtooth signal cycle, said generating means being coupled to the spark producing means and being responsive to a spark voltage to initiate the second portion of each sawtooth signal cycle, the strobe lamp being responsive



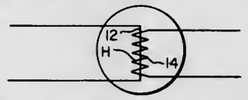
to the switching voltage and energized upon the production thereof, said generating means including means for varying the duration of the second portion of each sawtooth signal cycle to select the amount of delay between the occurrence of a spark voltage and the energization of the strobe lamp.

4,095,171

ALKALI METAL IONIZATION DETECTOR

James E. Bauerle, Plum Borough; William H. Reed, Monroeville, and Edgar Berkey, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 7, 1976, Ser. No. 674,513
Int. Cl.[2] G01N *27/00*
U.S. Cl. 324—33 **10 Claims**



1. In an alkali metal ionization detector having a heated filament electrode for thermally ionizing alkali metal atoms or alkali metal-containing particles in a monitored gas environment to form positive ions and a source of electrical potential connected to a collector electrode to attract the positive ions and establish an ion current flow which is indicative of the concentration of the alkali metal atoms or alkali metal-containing particles, the combination of

an electrode arrangement comprising a single collector electrode and a plurality of heated filament electrodes adapted to be selectively activated in combination with the collector electrode to develop said ion current flow, only one of said heated filament electrodes being activated in combination with the collector electrode at any given time, said plurality of filament electrodes being disposed with respect to said collector electrode such that the ion current flow in response to the monitored gas environment is substantially identical regardless of which of the filament electrodes is selectively activated for operational combination with said collector electrode.

4,095,172

VEHICLE ANTENNA TESTER

William Strand, 747 Station Rd., Victoria, B. C., Canada (V9B 2S1)

Filed Feb. 9, 1977, Ser. No. 767,202
Int. Cl.[2] G01R *31/02*
U.S. Cl. 324—51 **2 Claims**

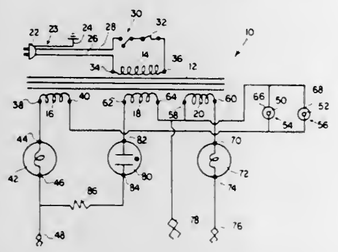
1. A vehicle antenna tester for checking the continuity of both the conductor and the shielding conductor of an antenna lead wire thereof and for checking the insulation between them

and for checking the electrical grounding of them to said vehicle comprising;

(a) three clamps, the first of said three clamps for coupling to said conductor, the second of said three clamps for coupling to said shielding conductor, the third of said three clamps for connection to the chassis of said vehicle,

(b) a pair of lamps, one terminal of one of said lamps coupled to said first clamp, one terminal of the other of said lamps coupled to said second clamp,

(c) a transformer, the primary winding of said transformer in a series electrical circuit with a manually operated operating switch and a fuse and a source of alternating current, the transformer having three secondary windings, each of said three windings terminating in a pair of terminals, one terminal of the first of said three secondary windings electrically coupled to the other terminal of said one of said lamps, one terminal of the second of said three secondary windings electrically coupled to the other terminal of said other of said lamps, one terminal of the third of said three secondary windings coupled electrically to the other terminal of said first winding,



(d) said third clamp electrically coupled to said one terminal of said third winding,

(e) a glow emitting discharge device, said discharge device having a pair of terminals, one of said discharge device terminals electrically coupled to the other terminal of said third winding, the other terminal of said discharge device electrically coupled to said second clamp, and

(f) at least one electrical receptacle, the receptacle having a pair of contacts for electrical connection with said lead wire, one of said contacts electrically coupled to said one terminal of said third winding, the other of said contacts electrically coupled to the other terminal of said second winding.

4,095,173

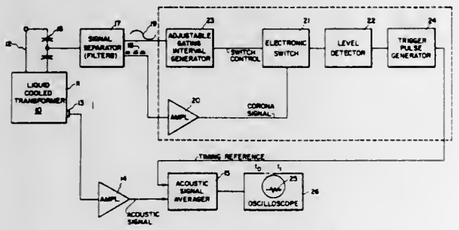
METHOD AND SYSTEM FOR CORONA SOURCE LOCATION BY ACOUSTIC SIGNAL DETECTION

Bernard Darrel, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,910

Int. Cl.[2] G01R *31/08, 31/06*

U.S. Cl. 324—52 **12 Claims**



7. A corona fault locating system for determining the location of one or more corona sources within the housing of encased electrical apparatus having a high potential conductor, said system comprising

an acoustic transducer mounted at a known position for sensing the acoustic vibrations within the housing including those produced by a corona discharge at the corona source and for generating an acoustic electrical signal representative of said acoustic vibrations,

filter means for filtering a voltage proportional to the voltage at said high potential conductor to derive an excitation frequency component signal and a radio frequency component corona signal caused by electrical disturbances accompanying corona discharge,

adjustable corona signal gating means for cyclically gating said corona signal to a level detector only during a preselected gating interval which has an adjustable delay with respect to a reference derived from said excitation frequency signal whereby various corona pulses can be selected for level detecting,

said level detector being operative to generate an output timing reference pulse upon detecting a predetermined corona signal amplitude occurring during the gating interval,

a signal averager to which said acoustic signal is fed continuously, said signal averager being repeatedly triggered by said timing reference pulse to repeatedly average said acoustic signal over a preset period and generate an averaged acoustic signal, and

means for displaying said averaged acoustic signal to provide an indication of the distance from the known acoustic transducer position to the corona source.

4,095,174

SYSTEM FOR DETECTING LEAKAGE FAULTS IN A PIPELINE BY MEASURING THE DISTRIBUTED CAPACITANCE OF SECTIONS OF A SENSING CABLE BURIED PARALLEL TO SAID PIPELINE

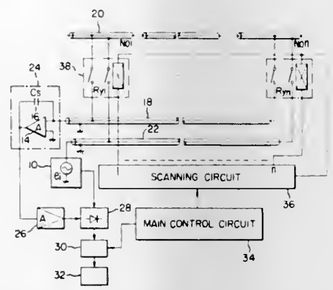
Yasuhiro Ishido, Sayama, Japan, assignor to Towa Electric Co., Ltd., Japan

Filed Jan. 18, 1977, Ser. No. 760,223

Claims priority, application Japan, Jan. 22, 1976, 51-005482

Int. Cl.[2] G01R *31/08, 27/26;* **G01M** *3/04*

U.S. Cl. 324—52 **4 Claims**



1. A system for detecting leakage in an elongated pipeline comprising:

(a) a sensing elongated coaxial cable (**20**) with inner and outer conductors divided into a plurality of sections of substantially equal electrical characteristics and arranged in substantial geometric parallel with the pipeline wherein there is a variation in the distributed capacity of said inner and outer conductors upon penetration by an oily substance, said variation serving to sense leakage of oily substance from the pipeline;

(b) an input cable (**18**) and an oscillator cable (**22**) arranged substantially along said coaxial cable, switching circuits (**38**) connected to each of said sections, said switching circuits connecting said input and oscillator cables (**18, 22**) to the inner and outer conductors, respectively of said coaxial cable;

(c) an input measuring circuit (**24**) connected to said input cable (**18**);

(d) an oscillator (**10**) connected to said oscillator cable (**22**); and,

(e) scanning means (**34, 36**) electrically coupled to said switching circuits for scanning the switching circuits and causing all the sections of said coaxial cable to be scanned in sequence, to thereby connect the sensing coaxial cable through said input cable to said input measuring circuit thereby successively measuring the distributed capacity of the sections of said coaxial cable by means of a signal given from said oscillator cable.

4,095,175

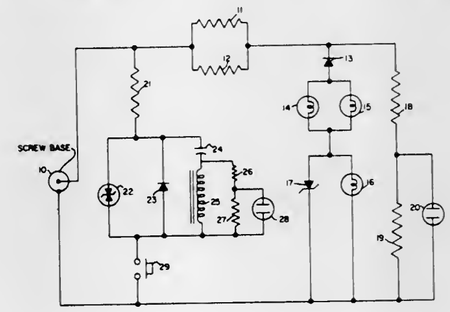
ARC DISCHARGE LAMP BALLAST TESTER

Fredrick W. Paget, Rockport, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Mar. 24, 1977, Ser. No. 780,737

Int. Cl.[2] G01R *27/00*

U.S. Cl. 324—57 R **5 Claims**



1. An arc discharge lamp ballast tester comprising first circuit means for detecting steady DC current in the output of the ballast, second circuit means for determining if the peak voltage output of the ballast is greater than about 400 volts, third circuit means for detecting third harmonics in the output voltage of the ballast, and means to connect the tester to an arc discharge lamp ballast.

4,095,176

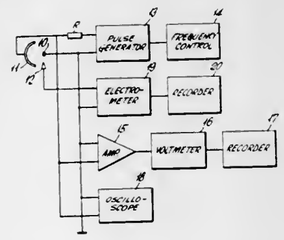
METHOD AND APPARATUS FOR EVALUATING CORROSION PROTECTION

Jean Pierre Maes, Oostakker, and Alan Molyneux, Mariakerke, both of Belgium, assignors to s.a Texaco Belgium n.v., Brussels, Belgium

Filed Oct. 6, 1976, Ser. No. 730,054

Int. Cl.[2] G01R *27/02*

U.S. Cl. 324—65 CR **11 Claims**



1. A method of evaluating corrosion protection afforded to a metallic surface by a surface layer thereon, wherein said metallic surface is contacted by a corrosive fluid, comprising the steps of establishing a circuit path through a working electrode and an inert electrode in the corrosive fluid, causing a pulsed current not exceeding 100 micro-amps and of predetermined frequency not less than 100 Hz to flow in said circuit path, and measuring the response of said circuit path to the said current flow to determine the solution resistivity and the double-layer capacitance at the interface between said working electrode and the corrosive fluid.

4,095,177

TRANSDUCER

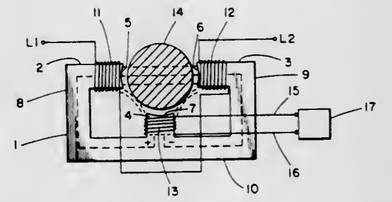
Geoffrey John Harris, Burton, England, assignor to Square D Company, Park Ridge, Ill.

Continuation of Ser. No. 613,827, Sep. 16, 1975, abandoned, which is a continuation of Ser. No. 471,411, May 20, 1974, abandoned. This application Dec. 3, 1976, Ser. No. 747,468

Claims priority, application United Kingdom, May 29, 1973, 25587/73

Int. Cl.[2] G01P *3/46;* **H02K** *17/42*

U.S. Cl. 324—164 **3 Claims**



1. An electromagnetic sensing assembly for detecting the rotation of a metal shaft having a uniform arcuate surface of any one of a plurality of different diameters and rotatable about an axis coaxial with said surface, the improvement comprising:

an E shaped ferrous stator defining a pair of spaced outer poles and an intermediate pole with each outer pole having an outer free end in closely spaced relationship to the outer free end of the intermediate pole, each pole having an end surface with the end surface of each outer pole spaced from the end surface of each other outer pole by a distance substantially less than said different diameters,

means for adjustably spacing the end surfaces of said poles adjacent said uniform arcuate surface with the angular spacing between the end surface of said intermediate pole and each end surface of said outer poles subtending an arc of said uniform arcuate surface substantially less than 90° and spaced a substantially uniform small distance from said surface,

a generating coil on each of said outer legs, means for connecting each generating coil in series with each other generating coil to a common source of alternating current to generate a respective magnetic field in series aiding relationship with each field extending through a respective portion of said shaft between the free end of each outer pole and the free end of said intermediate pole,

and a detecting coil on said intermediate pole for detecting an alternating current voltage proportional to the velocity of rotation of said shaft in response to rotation of said shaft and the presence of each said respective magnetic field.

4,095,178

TACHOMETER CIRCUIT

Fenwick R. McLeod, Jr., Prospect Heights, Ill., assignor to Sun Electric Corporation, Chicago, Ill.

Filed Oct. 21, 1976, Ser. No. 734,646

Int. Cl.[2] G01R *13/42*

U.S. Cl. 324—169 **6 Claims**

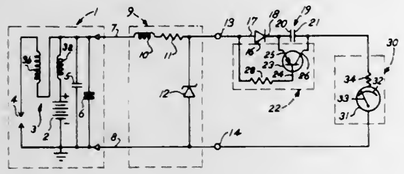
1. A tachometer for displaying the speed of an engine includ-

ing an ignition circuit for producing ignition pulses containing oscillations comprising in combination:

pulse-forming means for removing at least some of the oscillations from the ignition pulses to form corresponding timing pulses;

meter means for displaying the speed of the engine in response to the timing pulses;

a first capacitor connected in series with the meter means, said capacitor having a first plate and a second plate for accumulating charge;



rectifier means for enabling the transmission of a current pulse through the first capacitor and meter means in response to each timing pulse, whereby the first capacitor is charged to a predetermined voltage during each timing pulse; and

discharge means for momentarily interconnecting the first and second plates of the first capacitor in response to the termination of each timing pulse, whereby the voltage on the first capacitor is dissipated without transmitting a current pulse through the meter, so that the meter indicates the speed of the engine in response to the timing pulses.

4,095,179

LOCATING SYSTEM TO DETERMINE THE POSITION OF MOVABLE BODIES WITH RESPECT TO A REFERENCE

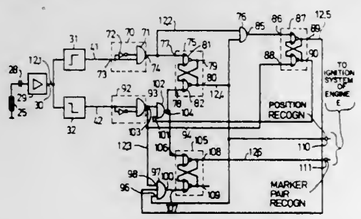
Wolfgang Bremer, Oberweier; Frieder Heintz, Blankenloch-Buchig; Ulrich Flaig, Markgroningen; Uwe Kiencke, Ludwigsburg, and Wolfram Glauert, Bamberg, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 13, 1975, Ser. No. 604,228

Claims priority, application Germany, Aug. 29, 1974, 2441437; Sep. 27, 1974, 2446193

Int. Cl.² G01R *33/12*

U.S. Cl. 324—207 **14 Claims**



1. Locating system to determine the position of a movable body (**20, 65**) comprising

at least four marker elements (**21, 22; 66, 67; 68, 69**) coupled to move with the body, a stationary transducer means (**23**) responsive to the marker elements and providing output signals staggered in time as the marker elements pass by the transducer means, the marker elements, in combination with the transducer means, forming a wave signal source;

wherein two marker elements (**21, 22; 66, 67; 68, 69**) each have different characteristics from the other two and the four elements are sequentially arranged on the body in pairs, with the elements of each pair being spaced by a predetermined distance to define a predetermined distance range on the body, and with the elements of each pair having respectively different characteristics;

the transducer means (**23**), upon scanning individual marker elements of the pairs (**21** and **22**; **66** and **67**; **68** and **69**) providing wave signals of respectively different initial polarity;

means (**70**) to distinguish between specific pairs of marker elements on the body, said distinguishing means comprising an additional marker element (**70**) located between the marker elements of at least one of the pairs (**68, 69**) and having the characteristic of one of the markers thereof;

and logic means (**70, 92, 75; 87, 105, 76**) connected to the transducer means and having two output terminals (**110,111**), said logic means (a) providing a first output pulse (**12.6**) at a first output terminal representative of the time between the null passage of sequential wave signals of opposite initial polarity and (b) a second output pulse (**12.4**) at the second output terminal (**110**) indicative of the occurrence of two sequential wave signals of like initial polarity,

whereby presence of an output pulse at said second output terminal (**110**) will be indicative of said additional marker element (**70**) between a pair of marker elements of unlike characteristic.

4,095,180

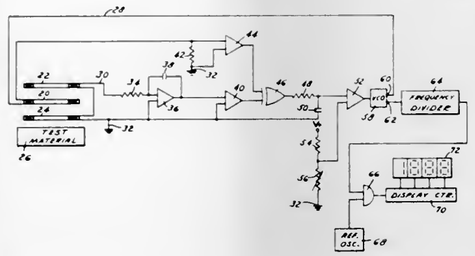
METHOD AND APPARATUS FOR TESTING CONDUCTIVITY USING EDDY CURRENTS

Gordon Ralph Brown, Livonia, Mich., assignor to K. J. Law Engineers, Inc., Detroit, Mich.

Filed Dec. 29, 1975, Ser. No. 644,809

Int. Cl.² G01R *33/12*

U.S. Cl. 324—233 **32 Claims**



24. Apparatus for measuring conductivity of a test material comprising means providing a periodic signal, means responsive to said periodic test signal to electromagnetically induce eddy currents in said test material, sensing means responsive to said eddy currents to develop a test signal as a function of said eddy currents, means for measuring the phase relationship between said periodic signal and said test signal, means for varying the frequency of said periodic signal until said phase relationship reaches a preselected specific level, means responsive to the period of said periodic signal to determine conductivity of the material as a direct linear function of said period when said phase relationship reaches said preselected level.

4,095,181

ROTATING POT SHAPED EDDY CURRENT PROBE IN WHICH ONLY A SMALL FRACTION OF THE LIP FORMING THE OUTER CORE PORTION IS RETAINED

Walter Jefferson Harris, Kent, and Ronald Murray Neufeld, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 17, 1976, Ser. No. 751,512

Int. Cl.² G01R *33/12*

U.S. Cl. 324—238 **3 Claims**

2. An eddy current probe for inspecting a workpiece having

a hole formed therein and having a fastener disposed therein for defects, said probe including the combination of:

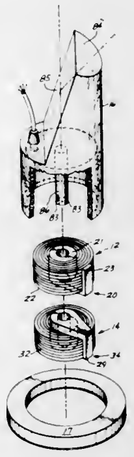
a first ferromagnetic pot core member in which only a small fraction of the lip forming the outer core portion is retained and **20** having a center cylindrical portion **21**;

a second ferromagnetic pot core member in which only a small fraction of the lip forming the outer core portion is retained and **34** having a center cylindrical portion **21**;

a first winding **22** circumferentially wound about said center cylindrical portion **21** of said first ferromagnetic pot core member **20**;

a second winding (**32**) circumferentially wound about said center cylindrical portion **21** of said second ferromagnetic pot core member **34**;

a cylindrically shaped optically clear probe housing **16** for maintaining said center cylindrical portions **21** in coaxial alignment;



said cylindrically shaped optically clear probe housing **16** having a portion of the top section angularly cut forming a flat viewing surface **84** and remaining top section cut off at a cooperating angle to that of the viewing surface forming a reflecting surface **85**, and said cylindrically shaped optically clear probe housing having an inner centrally located cylindrically shaped portion **86** extending through said center cylindrical portions **21** of said first and second pot core members **20, 34**, said inner centrally located cylindrically shaped portion **86** having cross hairs **93** embedded in and crossing at the center bottom surface thereof so that said reflective surface provides reflection of cross hairs **83** to the eye of the operator viewing the centering of probe **10** over said fastener **86** through viewing surface **84**; and means permitting rotation of said outer lip portions through 360° once the latter is centered over said fastener.

4,095,182

DISPLAY DEVICE FOR TRANSCEIVER AND LIKE

Takao Kakigi, Kawasaki, Japan, assignor to Cybernet Electronic Corporation, Kanagawa, Japan

Filed Sep. 17, 1976, Ser. No. 724,173

Claims priority, application Japan, Oct. 8, 1975, 50/137843; Oct. 8, 1975, 50/137844

Int. Cl.² H04B *1/40*

U.S. Cl. 325—17 **6 Claims**

1. A display device for a transceiver and the like comprising:

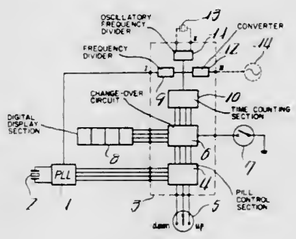
a phase-locked loop,

a pulse generating section,

a phase-locked loop control section for channel selecting connected to said phase-locked loop,

a time-counting section for time-counting connected to said pulse-generating section,

a change-over circuit connected to the phase-locked loop control section and to the time-counting section for selectively transmitting channel selecting signals received from said phase-locked loop control section and time counting signals received from said time-counting section,



an electronic display section connected to said change-over circuit and responsive to the channel selecting and the time-counting signals transmitted therefrom for selectively carrying out channel display and time display; and

a change-over switch for controlling the switching operation of said change-over circuit.

4,095,183

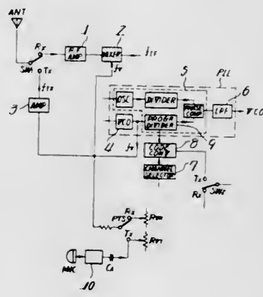
TUNING CIRCUIT

Takao Kakigi, Inagi, Japan, assignor to Cybernet Electronic Corporation, Kanagawa, Japan

Filed Jan. 25, 1977, Ser. No. 762,281

Int. Cl.² H04B *1/54*

U.S. Cl. 325—17 **3 Claims**



1. In a transmitter-receiver having a receiving circuit for converting a received carrier frequency into an intermediate frequency by mixing it with a local oscillation frequency which is the controlled output frequency of a voltage-controlled oscillator of a phase locked loop, and a transmitting circuit connected to said receiving circuit through a transmission-and-reception change-over switch; the improvement which comprises a tuning circuit having first and second variable-capacity elements provided in parallel with an oscillation inductor of said voltage-controlled oscillator, said first element receiving a DC voltage corresponding to said intermediate frequency and simultaneously receiving a DC voltage necessary for frequency modulation using transmitting audio signals while interlocking with the switching action of a press-to-talk switch for reception and transmission, said second variable-capacity element receiving voltages ranging within the controllable limits of said voltage-controlled oscillator from said phase locked loop so that the follow-up control of said phase locked loop may be achieved, and DC power supply means for said first variable-capacity element including a first and a second variable-resistance means, means for connecting said

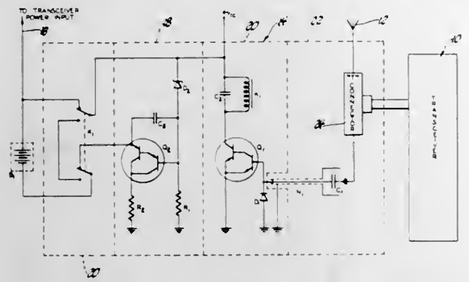
first variable-resistance means across the terminals of an external DC power supply, means for connecting said second variable-resistance means across the terminals of the external DC power supply, and a switching means for selectively applying divided voltages produced by said first and second variable-resistance means to said first variable capacity element according to the position of said press-to-talk switch, whereby frequency phase synchronization is achieved by one phase locked loop.

4,095,184

RADIO TRANSCEIVER POWER BOOSTER

Peter A. Hochstein, 14020 15 Mile Rd., Sterling Heights, Mich. 48077, and Kelvin Shih, 1481 Skylark Dr., Troy, Ohio 45373

Filed Nov. 1, 1976, Ser. No. 737,221
Int. Cl.² H04B *1/44*
U.S. Cl. 325—22 **10 Claims**



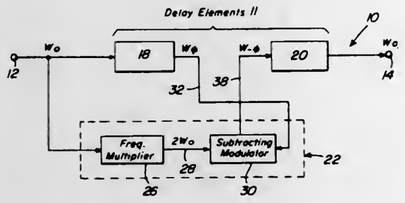
1. A transceiver assembly having a transmit mode and a receive mode for transmitting and receiving radio communication and comprising; a primary power supply, a secondary power supply which is rechargeable, recharging means for recharging said secondary power supply from the primary power supply, and switching means for placing said secondary power supply in series with the primary power supply during the transmit mode of the transceiver and taking said secondary power supply out of direct electrical contact with the primary power supply and into electrical contact with said recharging means for recharging said secondary power supply during the receive mode.

4,095,185

ELECTRICAL ENERGY TRANSMISSION NETWORK

Paul N. Winters, P.O. Box 327, Trumann, Ark. 72472

Filed Apr. 14, 1977, Ser. No. 787,373
Int. Cl.² H03K *5/159*
U.S. Cl. 328—55 **19 Claims**



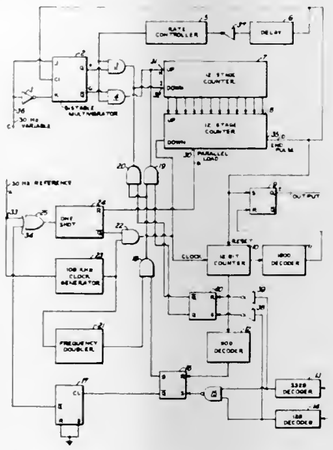
1. A method of maintaining a substantially constant phase relationship between transmitted energy at input and output terminals of an energy transmission network having energy storing delay elements producing a change in phase of the transmitted energy with respect to an input frequency thereof, including the steps of: dividing the energy storing delay elements into separate delay portions respectively producing changes in phase of the transmitted energy; passing the transmitted energy through said divided delay portions in sequence to phase shift the transmitted energy; doubling the input frequency of the transmitted energy at a reference phase angle; and subtracting the input frequency of the transmitted energy passed through only one of the divided delay portions from the doubled frequency at said reference phase angle to reverse the phase shift of the transmitted energy passed through said one of the divided delay portions, whereby the phase shift effected by the other of the divided portions of the delay elements produces a net change in phase substantially equal to zero.

4,095,186

VARIABLE PHASE SHIFTER

Andrew M. Vesel, Mount Arlington, N.J., assignor to The Cessna Aircraft Company, Wichita, Kans.

Division of Ser. No. 561,466, Mar. 24, 1975, Pat. No. 4,014,025.
This application Dec. 7, 1976, Ser. No. 748,340
Int. Cl.² H03K *5/13*
U.S. Cl. 328—133 **13 Claims**



1. A variable phase digital phase shifter for shifting the phase of an input signal comprising:
- storage means for storing a signal indicative of the amount by which the phase of the input signal is to be shifted;
- a source of clock pulses;
- a first input signal terminal;
- counting means connected to said first input signal terminal, to said storage means and to said clock pulse source and responsive to receipt of an input signal at said first input signal terminal for counting a number of pulses, from said clock pulse source, determined by the signal stored in said storage means;
- output means coupled to said counting means for generating an output signal when said counting means has counted said number of pulses; and
- adjusting means for adjusting the signal stored in said storage means to adjust the phase difference between the output signal and the input signal.

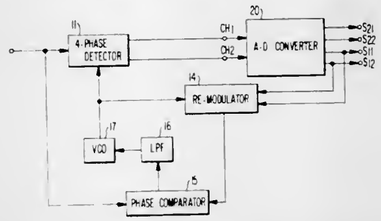
4,095,187

DEMODULATION SYSTEM FOR A MULTI-LEVEL MULTI-PHASE SUPERPOSITION-MODULATED CARRIER WAVE

Yasuharu Yoshida, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1977, Ser. No. 779,853
Claims priority, application Japan, Mar. 22, 1976, 51-31022
Int. Cl.² H03D *3/20*
U.S. Cl. 329—50 **3 Claims**

1. A demodulation system for demodulating into first and second demodulated signals a multi-level, multi-phase, superposition-modulated carrier wave formed by combining first and second phase-modulated carrier waves synchronized with each other, comprising
- an oscillator of a frequency controllable in response to a control signal,
- a phase-detector circuit for detecting said superposition-modulated carrier wave with the output of said oscillator serving as a phase reference,
- means for processing at least the output of said phase-detector circuit to produce said control signal,



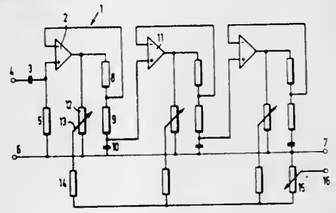
- a first demodulator circuit for discriminating the output of said phase-detector circuit to reproduce said first demodulated signal, and
- a second demodulator circuit including squaring means for squaring the output of said phase-detector circuit, discriminator-shaper means for discriminating the output of said squaring means with respect to a given level, and logic means for obtaining the Exclusive-OR function of the output of said first demodulator circuit and the output of said discriminator-shaper means, whereby said second demodulated signal is reproduced.

4,095,188

CASCADED AMPLIFIER WITH FREQUENCY SENSITIVE COUPLING

Robert Ronald Laupman, Wijchen, Netherlands, assignor to Novanex Automation N.V., Wijchen, Netherlands

Filed Aug. 31, 1977, Ser. No. 829,468
Claims priority, application Netherlands, Sep. 1, 1976, 7609730
Int. Cl.² H03F *1/36, 3/68*
U.S. Cl. 330—84 **1 Claim**



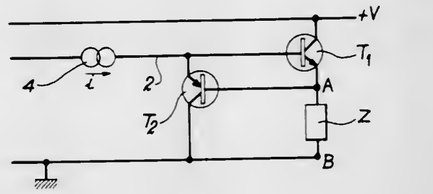
1. An amplifier having a plurality of cascaded stages each comprising an amplifying element, the output of each amplifying element being connected through a capacitor to a first output terminal of the amplifier, said capacitors being of increasing capacitance from the input stage of the final stage, characterized in that each amplifying element comprises an operational amplifier, the output of which is connected to said first output terminal through two series-connected resistors and the respective capacitor, the junction point of said two resistors being connected to the negative input of the operational amplifier, and the junction point of the capacitor and one of the series-connected resistors being connected to the positive input of a next operational amplifier, the output of each operational amplifier being additionally connected to the first output terminal through a variable resistor, the movable contact of which variable resistor is connected to the second output terminal of the amplifier.

4,095,189

ELECTRONIC POWER AMPLIFIER FOR DELIVERING A CONSTANT POWER INTO A LOAD IMPEDANCE

Paul Nguyen-Tan Tai, 56, rue des Pyrenees, 75020 Paris, France

Filed Feb. 7, 1977, Ser. No. 766,536
Claims priority, application France, Feb. 9, 1976, 76 03500
Int. Cl.² H03F *3/183*
U.S. Cl. 330—265 **6 Claims**



1. An electronic power amplifier for delivering into a load impedance a constant power which does not depend on variations in the value of said impedance, the level of said power being controlled by the value of an input current, wherein said amplifier comprises at least two transistors T_1 and T_2 of complementary type, the base of the first transistor T_1 being connected to a line for the supply of current delivered by a control current source, the emitter of said transistor T_1 being connected on the one hand to one end of the load impedance and on the other hand connected directly to the base of the second transistor T_2, the collector of said transistor T_1 being connected to a voltage supply of suitable polarity, the emitter of said transistor T_2 being connected to the current supply line and the collector of said transistor T_2 being connected to another end of the load impedance.

4,095,190

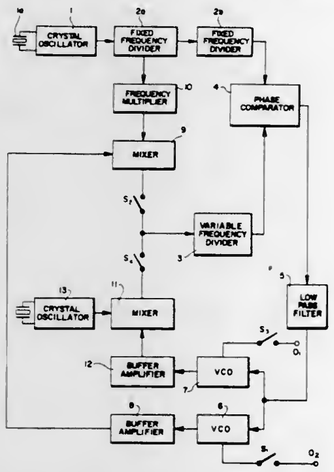
TUNING SYSTEM

Kazuyoshi Imazeki, and Koichi Kazami, both of Tokyo, Japan, assignors to General Research of Electronics, Inc., Tokyo, Japan

Filed Jul. 20, 1977, Ser. No. 817,366
Int. Cl.² H03B *3/04*
U.S. Cl. 331—2 **6 Claims**

1. A system for generating a plurality of preselected frequencies in a radio frequency device, comprising: means for generating a first reference signal having a predetermined frequency; means for generating a second reference signal having a predetermined frequency; means, including first and second controllable variable-frequency oscillators, first and second mixers, and a programmable frequency divider, for generating first and second output signals, with said first mixer being coupled to said first reference signal generating means and to said first variable-frequency oscillator to generate said first output signal having a frequency corresponding to the difference between the frequency of said first reference signal and the frequency of said first variable-frequency oscillator, and with said second mixer being coupled to said second reference signal generating means and to said second variable-frequency oscillator to generate said second output signal having a frequency corresponding to the difference between the frequency of said second reference signal and the frequency of said second variable-frequency oscillator; switch means; means coupled to said first reference signal generating means and selectively coupled to said first and second mixers by said switch means and said programmable frequency divider and selectively responsive to said first and second output signals for selectively comparing said first reference signal with said first output signal and said

first reference signal with said second output signal and developing a corresponding control signal which varies systematically in accordance with the frequency difference therebetween, with said control signal being applied to both said controllable variable-frequency oscillators to vary the oscillation frequencies thereof until the frequency of the selected



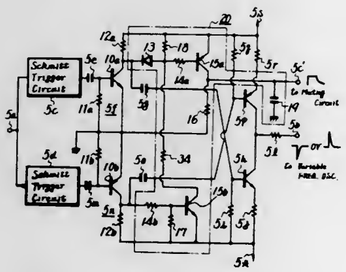
output signal is substantially equal to the predetermined frequency of said first reference signal, whereby the output signal of the corresponding controllable oscillator has a frequency which corresponds to one of the plurality of predetermined receiver frequencies as selected by both the programmable frequency divider and the mixer output signal selected by the switch.

4,095,191

PHASE LOCKED LOOP CIRCUIT

Michio Shibuya, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 9, 1977, Ser. No. 767,024
Claims priority, application Japan, Feb. 16, 1976, 51-15702
Int. Cl.² H03B *3/04*
U.S. Cl. 331—4 **7 Claims**



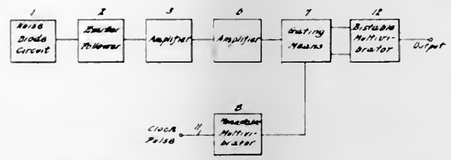
1. In a phase locked loop circuit having a variable frequency oscillator, a reference signal oscillator, a phase comparator supplied with output signals of said variable frequency oscillator and said reference signal oscillator, respectively, and detecting a phase difference therebetween to provide a corresponding output signal and a low pass filter supplied with said output signal of the phase comparator to provide a corresponding DC voltage for controlling the variable frequency oscillator so as to phase-lock the phase of said variable frequency oscillator into the phase of said reference signal oscillator, the frequency of said variable frequency oscillator being varied manually in such a way that the frequency of said variable frequency oscillator equals an integral multiple of the frequency of said reference signal oscillator; means for detecting said DC voltage from the low pass filter, circuit means for generating a control signal when said DC voltage exceeds a predetermined value, with said control signal having a polarity different from the polarity of said DC voltage from said low pass filter and with the amplitude of said control signal being larger than that of said DC voltage, means for combining said DC voltage and said control signal to provide a combined output signal, and means for controlling the frequency and phase of said variable frequency oscillator in response to said combined output signal of said combining means in such a way that the frequency of said variable frequency oscillator is varied outside of the lock range of the phase locked loop and toward the capture range of the phase locked loop until the next succeeding phase locking state is obtained: said circuit means for generating the control signal including an input terminal connected to said low pass filter; first and second Schmitt trigger circuits each connected to said input terminal and supplied with said DC voltage therefrom so as to produce respective pulse control signals when the DC voltage exceeds said predetermined value in opposite polarities, respectively; first and second differentiating circuits connected to said first and second Schmitt trigger circuits and producing respective output signals; first and second inverting amplifiers for receiving the output signals from said first and second differentiating circuits and producing respective phase inverted output signals; third and fourth differentiating circuits connected to said first and second inverting amplifiers, respectively, and producing spike-like pulse signals at the front and back edges of the respective phase inverted output signals; and a transistor switching circuit supplied with said spike-like pulse signals from said third and fourth differentiating circuits so as to generate said control signal.

4,095,192

RANDOM STATE GENERATOR

Edward E. Atkinson, Arlington, Va., and William E. Queen, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 25, 1968, Ser. No. 715,933
Int. Cl.² H03B *29/00*
U.S. Cl. 331—78 **4 Claims**



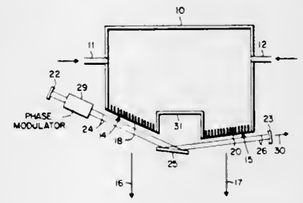
1. A random state generator comprising:
means for generating a randomly varying voltage, said voltage having positive- and negative-going variations;
gating means for controlling the flow therethrough of said positive- and negative-going variations, including a transformer having a primary winding with two ends, a secondary winding with two ends, and a secondary center tap connection, said primary winding ends being connected to said randomly varying voltage means and said center tap connection being connected to said actuating means;
a capacitor for tuning said transformer to a desired bandpass frequency and filtering a power spectrum generated by the randomly varying voltage means connecting said two said secondary winding ends, for minimizing distortion of said randomly varying voltage signal and yielding a random gaussian distribution output across said secondary winding of the transformer; and
two diodes each having an anode and a cathode, each anode being connected to one of said two secondary winding ends, each cathode being connected to said state generating means;
actuating means for opening and closing said gating means; and
means connected to the output of said gating means, having two stable states, and controlled by said positive- and negative-going variations for generating one of said two states.

4,095,193

BROADBAND GAS LASER

George L. Clark, Manhattan Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Jan. 22, 1976, Ser. No. 651,493
Int. Cl.² H01S *3/00*
U.S. Cl. 331—94.5 G **4 Claims**



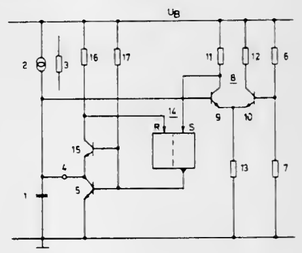
1. A broadband gas laser of the type having supersonic flow of the lasing gases, said laser comprising:
(a) a supply of lasing gases;
(b) means for creating a population inversion in the lasing gases;
(c) a plurality of nozzles through which the lasing gases issue, each of said nozzles having a face, said faces being aligned substantially along a straight line, and each of said nozzles having a central axis defining substantially the direction of flow of the gases; and
(d) means providing an optical cavity and for causing a lasing beam to propagate adjacent to the faces of said nozzles, said nozzles being so disposed and arranged that the direction of flow of the gases forms a predetermined acute angle substantially less than 90° with the laser beam, whereby the doppler distribution of the laser frequency is shifted by an amount depending on said predetermined angle.

4,095,194

MONOLITHIC INTEGRATED CIRCUIT FOR AN RC OSCILLATOR

Wolfgang Hoehn, Kirchzarten, and Wolfgang Sauer, Freiburg, both of Germany, assignors to ITT Industries, Incorporated, New York, N.Y.

Filed Feb. 7, 1977, Ser. No. 766,177
Claims priority, application Germany, Feb. 27, 1976, 2608026
Int. Cl.² H03K *3/26*
U.S. Cl. 331—108 D **6 Claims**



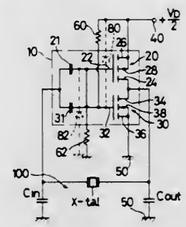
1. A monolithic integrated circuit for an RC oscillator whose capacitor is charged and discharged between two voltage values corresponding to the maximum and minimum oscillator voltage when one terminal of said capacitor is coupled to ground and the other terminal of such capacitor is coupled to a terminal of said integrated circuit and, via a current source, to the live terminal of a source of supply voltage comprising:
a switching stage having a threshold corresponding to the maximum oscillator voltage, said switching stage having an input connected to the other terminal of the capacitor and an output that provides a signal when an input signal at least equals the threshold;
a switching transistor having base, emitter and collector terminals for discharging said capacitor when the voltage across said capacitor reaches the threshold voltage of said switching stage, the saturation voltage of said switching transistor serving as the threshold corresponding to the minimum oscillator voltage;
control means connected to the output of said switching stage and responsive to the signal therefrom for providing a signal to the base of said switching transistor for turning said switching transistor on; and
means responsive to the saturation voltage of said switching transistor for providing an inhibit signal to said control means, said control means being responsive to the inhibit signal for removing the signal from the base of the switching transistor, thereby allowing said capacitor to be charged.

4,095,195

LOW POWER DISSIPATION CRYSTAL OSCILLATOR

Takahito Saito, Tokyo, Japan, assignor to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Mar. 25, 1977, Ser. No. 781,497
Int. Cl.² H03B *5/36*
U.S. Cl. 331—116 R **12 Claims**



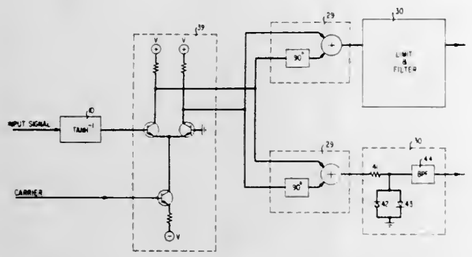
1. A low power dissipation crystal oscillator comprising:
an inverter circuit including a P-channel insulated gate field-effect transistor and a N-channel insulated gate field-effect transistor connected in series,
a single power supply connected to said inverter circuit,
an excitation circuit connected between an output and an input of said inverter circuit, said excitation circuit comprising a crystal resonator and a pair of capacitive loads connected between ground and an input and an output of said crystal resonator, respectively,
means for applying different DC bias potentials to the gates of said field-effect transistors, respectively,
said means comprising a first resistor of high resistance value connecting the power supply to the gate of said N-channel insulated gate field-effect transistor, and a second resistor of high resistance value connecting the gate of said P-channel insulated field-effect transistor to ground.

4,095,196

ARC-COSINE PHASE MODULATORS

Harold Seidel, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 20, 1977, Ser. No. 817,352
Int. Cl.[2] H03C *3/00*
U.S. Cl. 332—16 T **10 Claims**



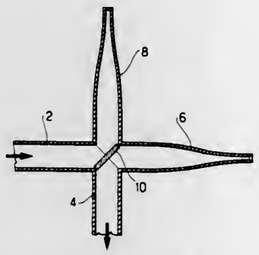
1. A phase modulator responsive to an input signal and to a carrier signal comprising:
first means for developing a signal proportional to the inverse hyperbolic tangent of said input signal;
second means, responsive to said first means and to said carrier signal for generating a signal which is proportional to a sum of two signals that are exponentially related to the output signal of said first means and which is amplitude modulated with said carrier signal; and
third means for hard limiting the output signal of said second means.

4,095,197

PROPAGATION TIME EQUALIZER FOR CIRCULAR WAVE GUIDES

Gerard Le Coz, St Cheron, and Jean-Noel Marchalot, St Michel sur Orge, both of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel S.A., Paris, France

Filed Feb. 3, 1977, Ser. No. 765,331
Claims priority, application France, Feb. 3, 1976, 76 02921
Int. Cl.[2] H01P *1/20*; H03H *7/14*
U.S. Cl. 333—28 R **3 Claims**



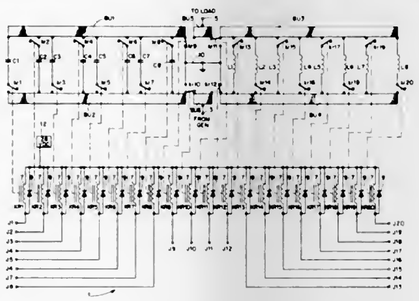
1. A delay equalizer for a circular wave guide comprising:
a circular input wave guide;
a circular output wave guide having the same diameter as the input wave guide and being connected to the input wave guide by a common end with the axes of these two wave guides meeting at an angle;
a first progressive reflector constituted by a circular wave guide whose input diameter is equal to that of the input wave guide and the output wave guide and whose cross-section decreases from its input so that the waves which enter the first progressive reflector will be reflected after having travelled along a path which is longer for increasing frequency, said first progressive reflector being placed in the line of the input wave guide beyond said common end and being connected thereto by its input;
a second progressive reflector identical to the first reflector and placed in the line of the output wave guide beyond said common end and being connected thereto by its input; and
a plane semi-reflecting plate of the "quarter wave" type occupying the interior cross-section of said wave guides at their common end and being disposed so that the axis of the input wave guide will be symmetrical to the axis of the output wave guide in relation to this plate, the material and the thickness of this plate being chosen so that it passes half the energy of the waves which it receives with a phase shift of a quarter of a wavelength and reflects the other half of this energy.

4,095,198

IMPEDANCE-MATCHING NETWORK

Thomas J. Kirby, Hillsboro, N.H., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jan. 31, 1977, Ser. No. 763,820
Int. Cl.[2] H03H *7/38*
U.S. Cl. 333—32 **13 Claims**



1. An impedance-matching network for impedance-matching a source and a load, comprising:
a first pair of busses;
a second pair of busses;
a first plurality of reactive elements;
a second plurality of reactive elements;
first control means operative selectively to connect one or more of the first plurality of reactive elements across the first pair of busses thereby to achieve an effective first reactance across the first pair of busses, and operative selectively to connect one or more of the second plurality of reactive elements across the second pair of busses thereby to achieve an effective second reactance across the second pair of busses; and
second control means operative to interconnect the source and load with the first and second pairs of busses having the effective reactances thereacross in any one of a plurality of different possible circuit configurations.

4,095,199

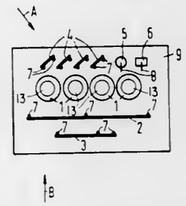
ELECTRICAL LC RESONANT CIRCUIT

Reinhard Behn; Harald Loebl, both of Munich, and Karl-Heinz Preissinger, Taufkirchen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 20, 1976, Ser. No. 734,101
Claims priority, application Germany, Oct. 27, 1975, 2548059
Int. Cl.[2] H03H *7/10*; H01G *5/36, 4/34*
U.S. Cl. 333—70 R **12 Claims**

1. An arrangement of coils and capacitors for narrow tolerance resonant circuits in channel filters in the carrier frequency technology within the frequency range of between approximately 10 and 100 kHz, comprising:

(a) a mounting plate carrying and connecting the coils and capacitors;
(b) at least one fixed-tuned coil whose inductance is set in a fixed non-adjustable manner, said coil having a magnetic core and at least one wire winding;
(c) at least one self-healing laser trimmable capacitor comprising a flat stack of at least two metal layers which are separated by a dielectric layer and which are covered by a laser light permeable non-destructing cover film, at least two connecting wires contacting with the metal layers, the self-healing capacitor being oriented towards an edge of the base plate with respect to the fixed-tuned coil so



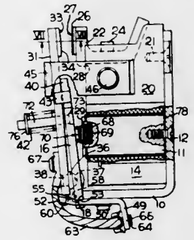
that at least a first of the metal layers can be burned off through the cover film by means of an incident laser beam, said fixed-tuned coil being positioned inwardly of the self-healing capacitor from the edge of the mounting plate, said laser-trimmable capacitor cover film being substantially undamaged when the capacitor is trimmed by a laser beam; and
(d) a narrow-tolerance channel-filter resonant circuit being formed which includes said fixed-tuned coil and self-healing capacitor and has a resonant frequency within the frequency range of approximately 10 to 100 kHz, any additional coils forming the resonant circuit being fixed tuned and non-adjustable.

4,095,200

CONTACTOR HAVING REDUCED CONTACT BOUNCE AND SHORTER ARC TIME

Paul M. Gallatin, Brookfield, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 22, 1976, Ser. No. 753,310
Int. Cl.[2] H01H *3/60*
U.S. Cl. 335—193 **8 Claims**



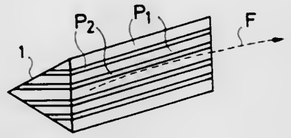
1. A DC contactor having reduced contact bounce and shorter arc time comprising, in combination,
a magnetic yoke,
a magnetic core affixed to said yoke,
an energizing coil surrounding said core,
a magnetic armature pivotally mounted on said yoke and forming a closed magnetic circuit together with said yoke and said core,
a contact carrier bar,
a stationary contact,
a movable contact affixed to said contact carrier bar and cooperating with said stationary contact,
return spring means for resiliently urging said armature to open position,
said contact carrier bar being carried on said armature so that they move together during armature closing until said movable and stationary contacts engage and being pivotable relative to said armature during further travel of said armature,
pre-loaded contact pressure spring means for urging said contact carrier bar toward said armature, and
stop means in interfering relation with said contact carrier bar for limiting opening movement of said armature,
said contactor having a generally hyperbolic magnetic pull characteristic plotting magnetic pull on said armature versus magnet gap between said armature and said core for a given excitation of said coil, the magnet gap between said armature and said core when said stationary and movable contacts engage being less than the magnet gap therebetween at the knee of said hyperbolic characteristic,
said contact pressure spring being pre-loaded to a force greater than said magnetic pull on said armature at the knee of said characteristic.

4,095,201

DEVICE FOR THE MAGNETIC CORRECTION OF THE TRAJECTORIES OF A BEAM OF ACCELERATED PARTICLES EMERGING FROM A CYCLOTRON

Jacques Kervizic, and Bernard Hurt, both of Paris, France, assignors to C.G.R. MeV, Paris, France

Filed Aug. 5, 1976, Ser. No. 711,801
Claims priority, application France, Aug. 8, 1975, 75 24803
Int. Cl.[2] H01F *7/00*
U.S. Cl. 335—210 **9 Claims**



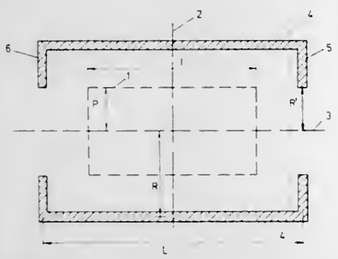
1. A magnetic correcting device for correcting the trajectories of a beam of accelerated charged particles emerging from an accelerator of cyclotron type, said cyclotron being associated with an electromagnet having two parallel circular pole-pieces between which said particles are accelerated, said cyclotron being provided with a peripheral extractive electrode for extracting said particles from said cyclotron, said device, which is designed for modifying the mean path of said particle beam emerging from said cyclotron and for focusing said emergent beam, being located at the periphery of said pole-pieces in the neighborhood of said extractive electrode, said device comprising at least a block of magnetic material having a predetermined shape, said block being constituted by a laminated composite magnetic material formed by a stack of plates made of materials having different permeabilities, said plates being arranged in planes which make predetermined angles in relation to the plane of the mean paths of said beam.

4,095,202

COIL FOR PRODUCING A HOMOGENEOUS MAGNETIC FIELD IN A CYLINDRICAL SPACE

Nils Allan Danielsson, Sollentuna, Sweden, and Karl-Peter Christian Lindblom, Nagu, Finland, assignors to Applied Research Laboratories S.A., Ecublens, Switzerland

Filed Nov. 14, 1975, Ser. No. 631,876
Claims priority, application Finland, Dec. 20, 1974, 3738/74
Int. Cl.² H01F *5/00*
U.S. Cl. 335—213 **4 Claims**



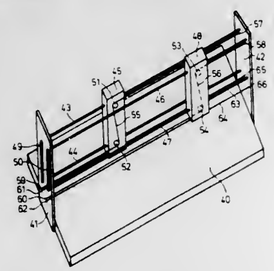
1. Coil for producing in a substantially cylindrical space a homogeneous magnetic field in a direction parallel to the axis of said cylindrical space, comprising at least one substantially cylindrical winding concentric with said cylindrical space, having a length exceeding that of said cylindrical space and having a substantially constant winding density over its longitudinal extension, said coil further comprising at least one pair of mutually identical windings disposed symmetrically with reference to a plane perpendicular to the longitudinal axis of said cylindrical winding through the centre thereof, extending in planes substantially perpendicular to the longitudinal axis of said cylindrical winding inwardly therefrom to a minimum radius being larger than the radius of said cylindrical space, and having a substantially constant winding density over their radial extension.

4,095,203

ARRANGEMENT FOR OBTAINING AN ELECTRICAL SIGNAL PROPORTIONAL TO A DISTANCE

Wolfgang Lesche, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 4, 1977, Ser. No. 793,502
Int. Cl.² H01F *21/04*
U.S. Cl. 336—20 **10 Claims**



1. An arrangement for deriving an electrical signal corresponding to a distance comprising:

a conductor loop adapted to be arranged in a magnetic a-c field with its plane transverse to said field, said loop having first and second ends and first and second conductor sections extending from said first and second ends to a first fixed member;

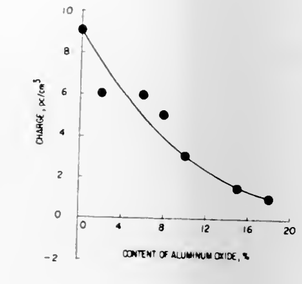
and a movable adjusting means whose movement is related to said distance, said adjusting means being arranged so that a first conductor portion of said first conductor section extends from its respective end of said loop to said adjusting means and a second conductor portion of said first conductor section extends from said adjusting means to said fixed point, and said adjusting means including means for deflecting said first conductor section so as to offset said second conductor portion from said first conductor portion.

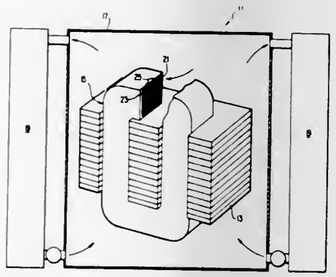
4,095,204

TRANSFORMER HAVING FORCED OIL COOLING SYSTEM

Teruo Miyamoto; Toshiji Ishii; Yoshikazu Miura, and Tohei Nitta, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 15, 1976, Ser. No. 649,271
Claims priority, application Japan, Jan. 27, 1975, 50-11708
Int. Cl.² H01F *27/12*
U.S. Cl. 336—57 **11 Claims**





1. In a transformer having a forced oil cooling system, in combination, an insulating oil forcibly movable in the transformer, and an insulating sheet in contact with the insulating oil and partially covered with an inorganic material, the inorganic material producing a static charge of opposite polarity to the charge produced by the base material of the insulating sheet when relative motion between the insulating sheet and the insulating oil takes place due to forced flow of the insulating oil.

4,095,205

TRANSFORMER WITH IMPROVED INSULATOR

Stephen M. Schroeder, and George P. Michel, both of South Boston, Va., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 28, 1977, Ser. No. 819,804
Int. Cl.² H01C *27/32*
U.S. Cl. 336—92 **13 Claims**

1. Electrical apparatus comprising:

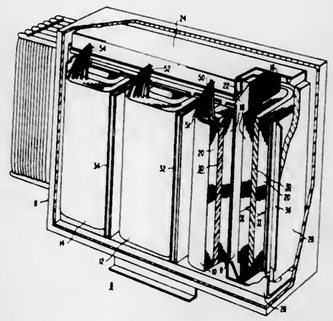
an enclosure;

an electrical winding disposed within said enclosure and adapted for connection to an electrical potential;

a dielectric fluid disposed within said enclosure; and

solid insulating means for electrically insulating at least a portion of said electrical winding;

said solid insulating means including a first layer of a paper



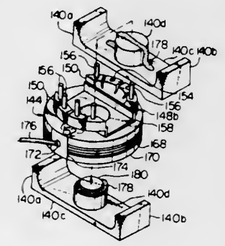
consisting essentially of a fibrous web formed of wholly aromatic polyamide fibers, a second layer of a polyethylene terephthalate film having a thickness greater than 0.005 inches disposed in registry with said first layer and a third layer of a paper consisting essentially of a fibrous web formed of wholly aromatic polyamide fibers disposed in registry with said second layer.

4,095,206

ENCAPSULATED TRANSFORMER ASSEMBLY

Hideo Hishiki, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Japan

Filed Feb. 9, 1976, Ser. No. 656,702
Claims priority, application Japan, Feb. 10, 1975, 50-17103; Apr. 4, 1975, 50-40399; Feb. 10, 1975, 50-18977[U]; Feb. 10, 1975, 50-18978[U]
Int. Cl.² H01F *27/02, 27/30*
U.S. Cl. 336—96 **10 Claims**



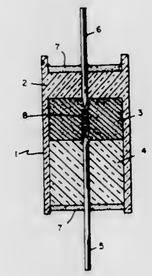
1. A transformer assembly comprising a ferromagnetic core structure comprising two generally E-shaped core sections each consisting of a pair of spaced parallel arm portions, an intermediate portion integrally joining said arm portions together and a cylindrical land portion projecting from said intermediate portion substantially in parallel with said arm portions and located intermediate between said arm portions, said core sections being held together with the end faces of the arm portions of one of the core sections respectively in contact with the end faces of the arm portions of the other core section, the respective land portions of the two core sections having end faces which are spaced apart from each other to define a gap therebetween, primary and secondary coil units each including at least one winding arranged in layers and having at least two lead wires, the primary coil unit comprising a bobbin including a tubular portion having open axial ends and a plurality of radial portions projecting radially outwardly from one of said open axial ends and circumferentially spaced apart from each other to define gaps therebetween, each of said radial portions having connected thereto a terminal element projecting axially outwardly from each radial portion, the winding of the primar coil unit being mounted on said tubular portion and concentrically supporting the secondary coil unit thereon, each of said lead wires except for a high-voltage lead wire for the secondary coil unit being connected to each of the terminal elements on said radial portions through each of said gaps, said primary and secondary coil units being mounted on said core structure substantially in concentric relationship to said land portions of said core sections with said land portions received in said tubular portion of said bobbin, and a unitary void-free insulating envelope of a heat-resistant, elastic dielectric material impregnating the interstices between the turns and layers of the windings of said coil units, totally encapsulating the coil units and filling all the spaces between said core structure and said coil units with leading end portions of said lead wires projecting outwardly from said envelope.

4,095,207

THERMAL FUSE

Warren H. Hay, Hamilton; Stephen F. Kimball, Georgetown, and Roy C. Martin, Salem, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Sep. 18, 1975, Ser. No. 614,564
Int. Cl.² H01H *85/04*
U.S. Cl. 337—20 **2 Claims**



1. A thermally responsive electric switch comprising an elongated cylindrical body having an integral intermediate section at one end thereof, said section having a small diameter axial hole therethrough; a cylindrical meltable pellet coaxially disposed within said elongated cylindrical body and bearing against said integral intermediate section, said pellet having a small diameter axial hole therethrough; a cylindrical plug coaxially disposed within, and closing off the other end of, said elongated cylindrical body and bearing against said pellet, said plug having a small diameter axial hole therethrough; a lead-in wire extending through the hole in said integral intermediate section and slightly into the hole in said pellet; another lead-in wire extending through the hole in said cylindrical plug and slightly into the hole in said pellet; and a pool of mercury filling the hole in said pellet and in contact with both lead-in wires so as to establish electrical continuity therebetween.

4,095,208

INTERMITTENTLY OPERABLE ELECTRICAL SWITCH ASSEMBLY

Maurice Harrold, Rowley Regis, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Oct. 20, 1976, Ser. No. 733,979
Claims priority, application United Kingdom, Nov. 8, 1975, 46304/75
Int. Cl.² H01H *61/06*
U.S. Cl. 337—125 **12 Claims**

1. An intermittently-operable electrical switch assembly

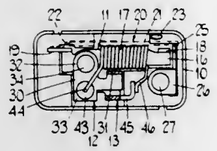
comprising an electrically insulating base having a pair of opposed surfaces; first, second and third electrical terminals mounted on said base in spaced relation and extending from one of said opposed surfaces thereof, said first, second and third electrical terminals being for respective connection to an electrical power supply, an electrical apparatus to be operated intermittently by said switch assembly, and at least one indicator lamp; an electrically conducting fixing element securing each of said first, second and third electrical terminals to said base, each said fixing element being electrically connected with its respective electrical terminal and extending through said base to the other of said opposed surfaces thereof;

a first support mounted on the said other surface of said base, said first support terminating at one end adjacent the fixing element for said second electrical terminal and at its other end adjacent the fixing element for said third electrical terminal; an electrical winding on said first support, said first support providing a core therefor, said electrical winding being disposed with its axis substantially parallel to said base; an armature mounted on said first support at the said one end thereof and extending substantially parallel to said electrical winding axis;

a first fixed electrical contact mounted on the said other surface of said base adjacent the said other end of the first support, said first fixed electrical contact being electrically connected to the fixing element for the third electrical terminal and being engageable by said armature, said armature normally being biassed away from said first fixed electrical contact but being engaged with said first fixed electrical contact when said electrical winding is energised in use;

a second support mounted on the said other surface of said base and including a portion upstanding from said base and a mounting flange integral therewith, said mounting flange extending in a direction transversely of said electrical winding axis and terminating at one end adjacent the fixing element for the second electrical terminal and at its other end adjacent the fixing element for the first electrical terminal, said second support being secured to said base by means of said mounting flange; a snap-action circuit breaker mounted on said upstanding portion of said second support;

a second fixed electrical contact carried by the said other surface of said base and engageable with said circuit breaker; and a heat-expansible element normally biassing said circuit breaker into a first position and being arranged, when heated by an electric current passing therethrough in use, to release said circuit breaker to move into a second position, said circuit breaker engaging said second fixed electrical contact in one of its said first and second positions.

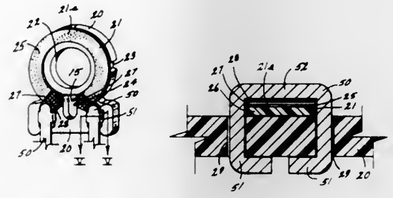


4,095,209

ELECTRICAL RESISTOR AND METHOD OF MAKING SAME

H. Eugene Wiswell, Elkhart, Ind., and Danny R. Hardwick, Edwardsburg, Mich., assignors to CTS Corporation, Elkhart, Ind.

Filed Apr. 29, 1976, Ser. No. 681,479
Int. Cl.² H01C *10/34*
U.S. Cl. 338—174 **9 Claims**



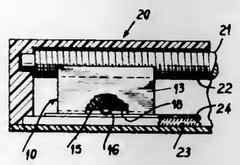
1. A variable resistance control comprising an apertured base having a surface, an arcuate resistance path provided on the surface of the base, a collector carried by the base in spaced relationship to the resistance path, a knob rotatably supported relative to the base, a first skirt extending from the knob and slideably engaging the base and spacing the knob from the base, a contactor constrained to rotate with the knob, the contactor wipably engaging and electrically connecting the collector and the resistance path intermediate the ends thereof, and a second skirt integral with one of the knob and the base and disposed outwardly from the first skirt and extending towards the periphery of the other of the knob and the base, the peripheral portions of the knob and the base and the outer surface of the first skirt defining an annular channel, the second skirt radially enclosing the annular channel.

4,095,210

HELICAL COIL SPRING WIPER POTENTIOMETER CONTACT DEVICE

Randall C. Ragan, Rancho Santa Fe, Calif., assignor to North American Philips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 642,328, Dec. 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 452,130, Mar. 18, 1974, Pat. No. 3,964,011. This application Sep. 16, 1976, Ser. No. 723,931
Int. Cl.² H01C *10/40*
U.S. Cl. 338—180 **4 Claims**



1. A potentiometer contact device comprising:

a contact body of electrically insulative material containing a cavity in one side thereof;

a helical coil spring wiper bound in said cavity by adhesive means for restraining rotation of said wiper relative to said contact body so that at least an arcuate portion of said coil wiper extends beyond said one side of said contact body; and

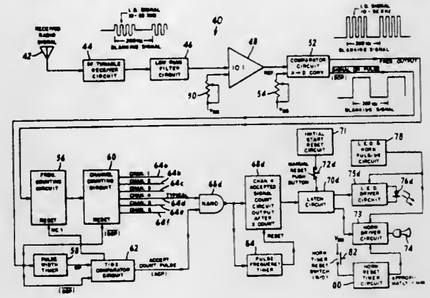
engagement means on said contact body for enabling said contact body to be moved along a resistance element with said arcuate portion of said coil wiper making uniform electrical contact therewith for providing minimal contact resistance variation during such movement.

4,095,211

CODED ELECTRONIC SECURITY SYSTEM

Frank J. Shaughnessy, Hartford, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Jul. 31, 1975, Ser. No. 600,935
Int. Cl.² G08B *1/08*
U.S. Cl. 340—224 **4 Claims**



1. An electronic security system for detecting, identifying and reporting the occurrence of alarm activating events at remote locations, comprising:

a plurality of transmitters, each located at one of said remote locations and each for transmitting a signal comprising a plurality of transmissions at a selected transmission repetition frequency and with a selected transmission duration less than the interval between said transmissions, said frequency and duration being common to all transmitters in the system, each of said transmissions comprising a series of pulses of RF energy at a selected identical pulse repetition frequency, said pulse repetition frequency being unique to each transmitter in the system;

a plurality of transmitter activating means, one for each of said transmitters, each for activating its corresponding transmitter for a selected time period on the occurrence of a particular alarm activating event;

a receiver, responsive to said transmitted signal, including separate means for comparing said transmission repetition frequency and transmission duration to selected values, thereby to verify the authenticity of said signal as one originating in one of said transmitters, counting means for measuring said pulse repetition frequency, thereby to determine which of said transmitters originated said signal, and means for providing an output signal representative of the occurrence of an alarm activating event at one of said transmitters if said signal is verified as authentic and determined to have a pulse repetition frequency corresponding to one of said transmitters;

and indicator means, responsive to said receiver output signal, for indicating the occurence of an alarm activating event.

4,095,212

REMOTE ELECTRIC STATE TESTER

Billy Paul Pruitt, 3511 La Prada, Mesquite, Tex. 75150

Filed Jun. 27, 1977, Ser. No. 810,498
Int. Cl.² G08B *1/08*
U.S. Cl. 340—224 **7 Claims**

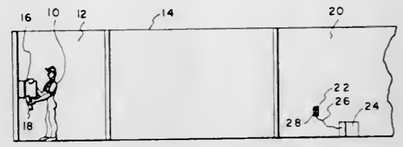
1. A remote live circuit tester for determining the condition of a circuit to be tested comprising, in combination:

a transmitter with an input and an output responsive to the receipt of an electrical signal at the input, the output having two states, one state corresponding to power on in the circuit and one state corresponding to power off in the circuit,

means for electrically connecting the circuit to be tested to the input of the transmitter,

a receiver responsive to the output states transmitted from the transmitter, and

an indicator responsive to the states received by the receiver



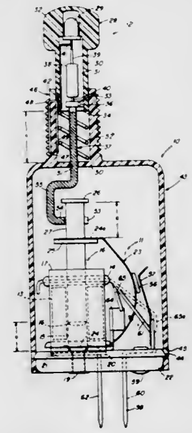
whereby the state of the indicator indicates the condition of the circuit to be tested.

4,095,213

MECHANICALLY ACTUABLE CONTROL RELAY

Rodney Hayden, Stoney Creek, Canada, assignor to TRW Inc., Cleveland, Ohio

Filed Jan. 7, 1977, Ser. No. 757,523
Int. Cl.² G08B *21/00*; H01H *1/12, 51/06*
U.S. Cl. 340—252 R **7 Claims**



1. A control relay comprising an insulate base, an electrically nonconductive coil form part joined to said base and having an axially extending bore formed therein, a relay coil wound about the external surface of said coil form part, a fixed core part disposed about said coil form part, said fixed core part having an opening therethrough in registration with said bore and being magnetizable responsive to electrical energization of said coil, a removable core part in the form of a plunger slidably seated in said opening in said fixed core part and said bore in said coil form part, said plunger having a radial shoulder proximate one end thereof normally located in spaced superposed relationship to said fixed core part, the end of said plunger remote from its end proximate said shoulder being normally disposed in said bore in said coil form part proximate but gapped from the end of said bore proximate said base, a spring metal armature having two ends, one of which is fixed to said coil form part proximate said base and the other end of which is fixed to said shoulder, a movable relay contact carried by said armature, a fixed contact fastened to said base and rising therefrom to a position where it is engageable by said movable contact responsive to downward movement of said plunger in said coil form part to substantially close the gap between the said end of said plunger remote from said shoulder and the end of said bore proximate said base, at least a pair of current carrying terminals fixed to said base, one of said terminals being electrically connected to one end of said relay coil

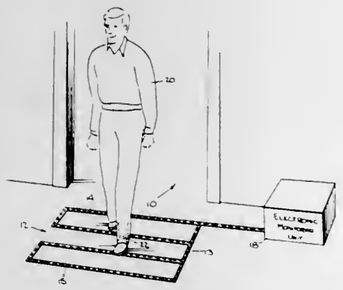
and the other of said terminals being electrically connected to said fixed contact and the other end of said relay coil, a relay housing joined to said base, and a mechanical actuator mounted on said housing and operably connected to said plunger at said shoulder, said actuator being operable to depress said plunger into said coil form part and thereby move said armature to a position where said movable and fixed contacts are engaged and said relay coil is energized.

4,095,214

ELECTRONIC MONITORING SYSTEM AND RESPONDER DEVICE

Arthur J. Minasy, Woodbury, N.Y., assignor to Knogo Corporation, Hicksville, N.Y.

Filed Jun. 17, 1976, Ser. No. 697,128
Int. Cl.[2] G08B *13/00*; G01D *21/04*
U.S. Cl. 340—258 C **3 Claims**



1. An electronic monitoring system for detecting the passage of objects past a given monitoring station, said system comprising an essentially flat loop antenna means which lies in a single plane, said antenna means being disposed at the surface of the floor adjacent a passageway through said given monitoring station so that said plane of said antenna is substantially parallel to the plane of the floor, electromagnetic monitoring means connected to said antenna means, said monitoring means being operable to energize said antenna means in a predetermined frequency range and to detect predetermined electromagnetic responses produced upon said antenna means when a resonant circuit is present in the vicinity of said antenna means, and a responder device comprising an elongated bar of ferromagnetic material, an insulated electrically conductive wire coiled about said bar, a capacitor connected to the ends of said wire to form a resonant circuit and means mounting said bar, wire and capacitor on the leg of an object whose movement is to be monitored, said mounting means comprising a casing which holds said bar, said coil and said capacitor and a fastening element for holdmg said casing to the leg of said object, said fastening element being oriented with respect to said casing such that the longitudinal axis of said bar is maintained substantially perpendicular to said plane of said loop antenna means, whereby said predetermined electromagnetic responses cause a signal change in said antenna which change is detected by said monitoring means.

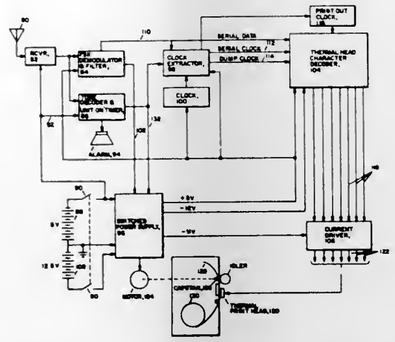
4,095,215

PAGER SUBSYSTEMS

Thomas J. Mortimer, Amherst, N.H., assignor to Sanders Associaties, Inc., South Nashua, N.H.

Division of Ser. No. 580,092, May 22, 1975, Pat. No. 4,028,661.
This application Mar. 10, 1977, Ser. No. 776,405
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—311 **14 Claims**

1. In a low-power drain paging unit for receiving predetermined sequential tone-coded address signals followed by multitone FSK message signals and for printing out the message after decoding of the address signals which includes battery operated means for receiving said signals, for decoding a predetermined address and for actuating normally quiescent electrical apparatus of said pager in response thereto, said normally quiescent electrical apparatus being battery powered and including means for decoding the FSK message and means for displaying the decoded message, the improvement wherein



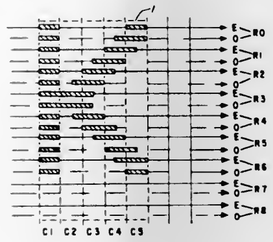
said FSK message decoding means including means for producing a signal indicative of said FSK message by detecting only one of the tones of said FSK signal, whereby said one tone FSK decoding means contributes to reduce batter drain and extend the life of the pager.

4,095,216

METHOD AND APPARATUS FOR DISPLAYING ALPHANUMERIC DATA

Denis Frank Spicer, Bedford, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 26, 1976, Ser. No. 708,524
Claims priority, application United Kingdom, Aug. 7, 1975, 33014/75
Int. Cl.[2] G06K *15/20*
U.S. Cl. 340—324 AD **10 Claims**



1. Apparatus for generating video signals suitable to produce an alphanumeric display on a display panel by deflection of an energetic beam over the panel in an interlaced raster having first and second field scans, the apparatus including:

(a) digital storage means having a plurality of storage locations respectively allocated to different alphanumeric characters to be displayed, there being at each storage location a plurality of groups of storage elements storing data representing the particular character allocated to the location in a rectangular dot matrix form, each group of storage elements storing the dot pattern for a particular row of the matrix;

(b) first address means for selecting a storage location of the digital storage means in accordance with a character to be displayed;

(c) second address means for selecting at a series of instants in a particular order the groups of storage elements at the location selected by the first address means and producing

corresponding first output data signals from the groups of storage elements, and also for selecting between the instants of the series the groups of storage elements in the same order to produce second output data signals from the groups of storage elements and such that a group selected between instants is associated with a group selected at the next preceding or the next succeeding instant depending on whether the data from the group selected is to be used in the said first or the said second field scan;

(d) first and second registers connected to receive the first and second output data signals respectively and store the corresponding data;

(e) means for sequentially selecting the data in both registers synchronously;

(f) logic means responsive to a pair of adjacent data elements in each of the first and second registers to detect a diagonal portion of said character to produce a control signal in response to said detection; and

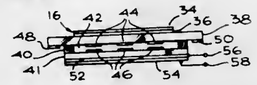
(g) means for modifying the data selected sequentially from the first register by the addition to it of (1) a leading edge dot elongation signal in response to a control signal produced by the logic means in response to a positive slope diagonal during a said first scan and in response to a negative slope diagonal during a said second scan and (2) a trailing edge dot elongation signal in response to a control signal produced by the logic means in response to a positive slope diagonal during a said second scan and in response to a negative slope diagonal during a said first scan, said modified data forming the video signal.

4,095,217

COMBINED LIQUID CRYSTAL DISPLAY AND PHOTOVOLTAIC CONVERTER

Hirotsugu Tani; Kyoji Taguchi, and Shigeru Arita, all of 251 E. Victoria Ave., Carson, Calif. 90746

Filed Mar. 7, 1977, Ser. No. 775,261
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 R **10 Claims**



1. A combination liquid crystal display and electrical generator, including:

a liquid crystal chamber having a first and a second transparent wall and containing liquid crystal material;

first transparent electrodes of a predetermined shape carried by said first transparent wall;

second transparent electrodes of a predetermined shape carried by said second transparent wall and juxtaposed to said first transparent electrodes; and,

combination light reflector and photovoltaic conversion means positioned along said second transparent wall in line with the lightpath through, sequentially, said first transparent wall, said liquid crystal material and said second transparent wall.

4,095,218

HYBRID PULSE WIDTH-PULSE RATE DIGITAL-TO-ANALOG CONVERTER METHOD AND APPARATUS

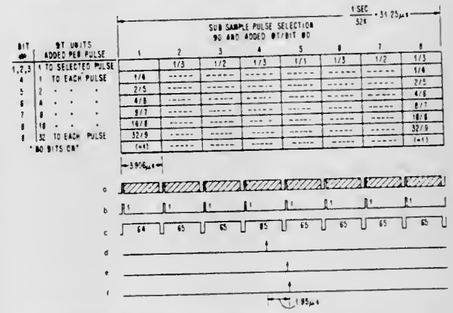
William George Crouse, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,728
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 DA **9 Claims**

1. In a digital-to-analog converter in which multi bit digital representations of instantaneously measured analog wave form voltages are received as inputs and from which it is desired to produce analog voltage outputs by controlling the total energy content of the output spectrum produced by an output voltage from a switched supply means, which waveform spectrum is applied to an integrator to reconstruct the desired analog waveform, the method of operating said converter comprising steps of:

allocating the total duration of a voltage output from said switched voltage supply into n discontinuous periods of time, each of said periods having at least a minimum duration; and

controlling the duration of each of said allocated discontinuous periods of time independently and in correspondence with the digital value of said received inputs, said periods being increased in duration over said minimum period by



a number of said minimum sized increments the total number of said increments of increase being equal to the binary value of the totality of the high order bits contained in said multi bit digital input, said total incremental increase in duration being divided equally among said *n* discontinuous periods;

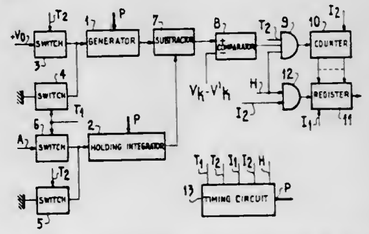
and also increasing certain of said n discontinuous periods of time by one said minimum increment each, the number of said periods so increased being in correspondence with the binary value of the individual low order bits of said multi bit digital input.

4,095,219

ARRANGEMENT FOR CODING WITH COMPRESSION THE ABSOLUTE VALUE OF AN ANALOG SIGNAL

Sylvain Fontanes, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Sep. 28, 1976, Ser. No. 727,538
Claims priority, application France, Oct. 2, 1975, 75 30233
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 NT **5 Claims**



1. An arrangement for coding with compression the absolute value of an analog signal, said arrangement comprising integrating means for integrating said analog signal during first periodic time intervals having a duration T_1 and referred to as intervals T_1 separated by second periodic time intervals having a duration T_2 and referred to as intervals T_2, and holding for the duration T_2 the integrated signal resulting from the integration of said analog signal during an interval T_1; means for generating in the course of each interval T_2 *n* ramp signals having a common absolute value, *n* being a positive integer; means for comparing during each interval T_2 the absolute value of the integrated signal obtained during the preceding interval T_1 with the absolute value of said ramp signals; means

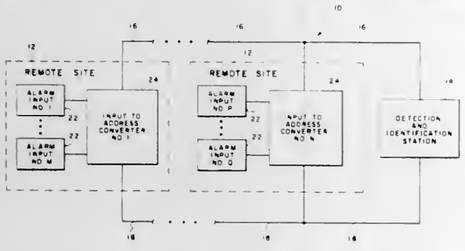
for generating clock pulses; and means for, in the course of each one of said second time intervals, counting said pulses for a duration determined by the instant when the absolute value of said n ramp signals is equal to the absolute value of the integrated signal, wherein, T_1 and T_2 being multiples of a common duration T, said integrating means comprise: at least one integrating charge transfer device having $(p+q)$ successive stages having identical weighting coefficients, with $p = T_1/T$ and $q = T_2/T$, an injection circuit coupled to the first of these stages, and an output circuit for delivering, with a possible constant voltage added thereto, a signal resulting from the integration of the signal applied to said injection circuit; means for alternately applying to said injection circuit said analog signal and a fixed voltage so that the charges injected in the first of said stages are a function of said analog signal during said intervals T_1 and have a fixed value during said intervals T_2, whereby said output circuit delivers, with said possible constant voltage added thereto, said integrated signal during each interval T_2.

4,095,220

ALARM DETECTION AND IDENTIFICATION SYSTEM

Joe A. Sadler, 327 Main St., Humble, Tex. 77338

Filed Aug. 18, 1976, Ser. No. 715,316
Int. Cl.² G08B *19/00*
U.S. Cl. 340—409 **9 Claims**



1. An alarm detection and identification system comprising, in combination:

a detection and identification station including a source of electrical power and means for responding to a plurality of different analog current address signals to provide a distinctive indication of each of said signals to distinguish it from any of the other of said signals;

a plurality of remote alarm stations each of which includes a means for generating an alarm signal in response to an alarm condition and a means powered by the source of electrical power for converting the alarm signal into an analog current address signal for identifying the particular remote station, each of said remote stations requiring relatively little power during non-alarm periods; and

a means for electrically connecting each of the remote stations in parallel to the detection and identification station to supply electrical power to each of said remote stations, and to conduct said analog address signals to said detection and identification stations.

4,095,221

ELECTRICAL STORM FORECAST SYSTEM

Chester D. Slocum, Jr., 1811 SW. 98th Ave., Miami, Fla. 33165

Filed Mar. 29, 1976, Ser. No. 671,028
Int. Cl.² G08B *21/00*
U.S. Cl. 340—421 **6 Claims**

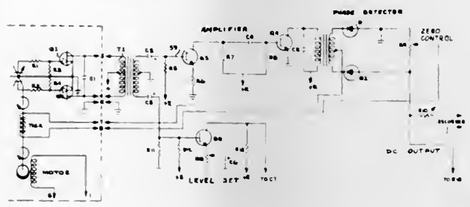
1. A storm forecast system including a sensor unit for receiving electrostatic field information, an amplitude and phase detector coupled to said sensor unit, and information processing means coupled to said amplitude phase detector, said system comprising:

(a) sensor board means (**26**) having two alternately conductive sections (**A, B**) radially disposed around a center;

(b) a rotor (**22**) with blades corresponding to said sections for rotation in a plane adjacent to said sensor board means;

(c) first and second resistors (**R3, R4**) in series with a center point, said resistors each having an outer end coupled to one of said sections;

(d) first and second field effect transistors (**Q1, Q2**) coupled to said first and second resistors, said field effect transistors each having an output side;



(e) a transformer (T1) with a center tapped primary and a secondary winding, said primary winding having two ends, one end each being connected to an output side;

(f) a rotating phase reference generator (**28**) coupled to said sensing board means (**2***b*);

(g) a phase detector including first and second diodes (D1, D2);

(h) amplifier means coupling the output of said sensor unit to said phase detector; and,

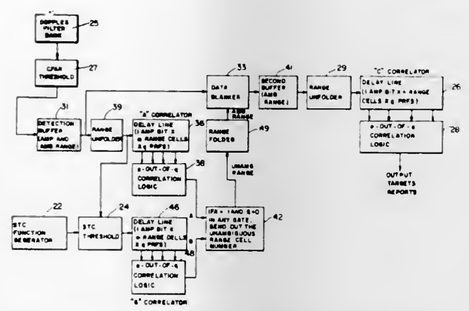
(i) recorder terminals for coupling a recorder to said phase detector.

4,095,222

POST-DETECTION STC IN A MEDIUM PRF PULSE DOPPLER RADAR

David H. Mooney, Jr., Arnold, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 665,138, Mar. 8, 1976, abandoned. This application May 27, 1976, Ser. No. 690,754
Int. Cl.² G01S *7/28, 9/02, 9/42*
U.S. Cl. 343—7 A **15 Claims**



12. A pulse doppler radar receiver for detecting the range of a target from received signals which include target returns, main beam clutter returns, area sidelobe clutter returns and discrete sidelobe clutter returns, said receiver comprising:

means for filtering the main beam clutter returns from said received signals;

means for providing an adaptive threshold signal which varies in response to the amplitude of the area sidelobe clutter returns said providing means being responsive to said filtering means to remove said area sidelobe clutter returns from said received signals;

means for unfolding the output of said providing means over a predetermined range, said unfolding means being responsive to the output of said providing means to provide an unambiguous range signal;

means for thresholding the unambiguous range signal in response to the output of said unfolding means, the threshold being such that the discrete sidelobe clutter returns are rejected over a selected range of said unambiguous range signal;

means for detecting discrete sidelobe clutter returns in the unambiguous range signal of said unfolding means said detecting means being responsive to said unfolding means and to said thresholding means to provide a blanking signal;

means for blanking the discrete sidelobe clutter returns detected by said detecting means from the output of said providing means, said blanking means being responsive to said detecting means to provide the target returns of the received signals; and

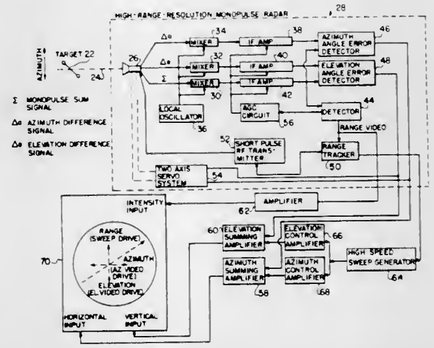
means for determining the range of the target in response to said target returns provided by said blanking means.

4,095,223

FOUR-DIMENSIONAL ISOMETRIC RADAR TARGET IMAGE DISPLAY

Dean D. Howard, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 8, 1977, Ser. No. 785,976
Int. Cl.² G01S *7/20*
U.S. Cl. 343—7.9 **2 Claims**



1. In a target-indicating system including a high-range-resolution monopulse radar which produces a range trigger signal and elevation angle error data, azimuth angle error data and range video data from the echo signals received from a target, and further includes a display system having an x-y display with vertical, horizontal and intensity inputs for controlling a display trace, said range video data being provided to said intensity input, the improvement to said display system which comprises:

sweep generator means receiving said range trigger signal for generating a sweep voltage in response to said range trigger signal;

elevation summing amplifier means for receiving and summing said elevation angle error data and said sweep voltage generated by said sweep generator, the output of said elevation summing amplifier being fed to said vertical input of said display system for driving said display trace vertically and modulating said elevation angle error data on said display trace; and

azimuth summing amplifier means for receiving and summing said azimuth error data and said sweep voltage generated by said sweep generator, the output of said azimuth summing amplifier being fed to said horizontal input of said display system for driving said display trace horizontally and modulating said azimuth angle error data on said display trace; and

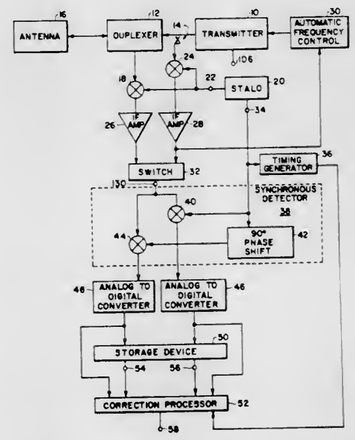
said outputs of said azimuth and elevation summing amplifiers causing said display trace to be driven diagonally and generating an isometric presentation of said target data.

4,095,224

DIGITAL PHASE CORRECTION FOR COHERENT-ON-RECEIVE PULSED RADAR SYSTEM

Eric A. Dounce, Audubon, Pa., and Guy V. Morris, Scottsdale, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 741,253, Nov. 12, 1976, abandoned, which is a continuation of Ser. No. 594,134, Jul. 7, 1975, abandoned. This application May 27, 1977, Ser. No. 801,124
Int. Cl.² G01S *7/40*
U.S. Cl. 343—17.1 R **3 Claims**



1. In a pulsed radar system having transmitted signals, received signals and a reference signal, there being relative phase relationships therebetween, the phase relationships changing from each transmitted pulse to the next, the combination comprising:

free running oscillator means for generating the reference signal;

means for providing each relative phase relationship between the transmitted signal and the reference signal in the form of a complex digital reference number;

means for storing said complex digital reference number;

means for sequentially sampling the subsequent received signals;

means for converting said sequentially sampled subsequent received signals to a series of complex digital numbers; and

means for digitally correcting the phases of said series of complex digital numbers representing said sequentially sampled subsequent received signals, utilizng said stored complex digital reference number.

4,095,225

RANGE SIDE LOBE SUPPRESSION METHOD FOR A PHASE MODULATED RADAR PULSE

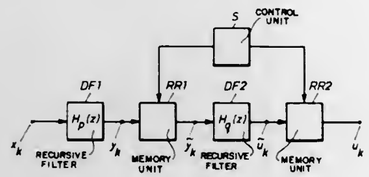
Erik Östen Erikmats, Vastra Frolunda, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Nov. 22, 1976, Ser. No. 743,777
Claims priority, application Sweden, Nov. 24, 1975, 7513178
Int. Cl.² G01S *7/28*
U.S. Cl. 343—17.2 PC **2 Claims**

1. In a radar equipment, a method for eliminating unwanted range side lobes in a received radar pulse when compressing the pulse, said pulse when transmitted being coded according

to a certain code pattern and when received being converted to a sequence of digital values, said method comprising the steps of:

filtering the sequence of digital values in a first digital filter whose digital transfer function has a number of poles with positions in the complex z-plane all corresponding to the positions of the zeros of the z-transform defining the certain code pattern situated within the unity circle $|z| = 1$ whereby a first digital sequence is obtained;



reversing said first digital sequence to obtain a second digital sequence in which the digital values appear in reverse order relative to the digital values in said first digital sequence; and

filtering said second digital sequence in a second digital filter whose digital transfer function has a number of poles with positions in the complex z-plane corresponding to the positions of the inverted values of the zeros outside the unity circle $|z| = 1$ of the z-transform of said code pattern.

4,095,226

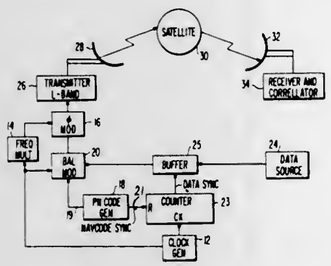
SYSTEM FOR COMMUNICATION

Dale L. Kratzer, Medford Lakes, N.J., assignor to Harris Corporation, Cleveland, Ohio

Division of Ser. No. 389,796, Aug. 20, 1973, Pat. No. 4,004,237, which is a continuation-in-part of Ser. No. 33,748, May 1, 1970, Pat. No. 3,755,816. This application Feb. 23, 1976, Ser. No. 660,656

Int. Cl.² G01S 1/30

U.S. Cl. 343—105 R **14 Claims**



2. A system for synchronized data communication by means of transmitted signals having synchronization and data portions, said system comprising the steps of:

generating local synchronizing signals and combining said synchronizing signals with the received synchronization portion;

controlling the phase of said synchronizing signals for adjustment in a direction to place said synchronizing signals in a certain phase relation with said received synchronization portion;

and synchronizing the detection of the received data portion signals with said adjusted synchronizing signals.

4,095,227

ASYMMETRICALLY FED MAGNETIC MICROSTRIP DIPOLE ANTENNA

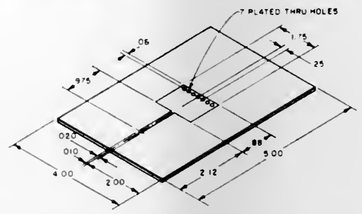
Cyril M. Kaloi, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 10, 1976, Ser. No. 740,695

The portion of the term of this patent subsequent to Jul. 27, 1993, has been disclaimed.

Int. Cl.² H01Q 1/38

U.S. Cl. 343—700 MS **10 Claims**



1. An asymmetrically fed magnetic microstrip dipole antenna having low physical profile and conformal arraying capability, comprising:

a. a thin ground plane conductor;

b. a thin rectangular radiating element spaced from said ground plane;

c. said radiating element being electrically separated from said ground plane by a dielectric substrate;

d. said radiating element being shorted to the ground plane at one end of the length thereof;

e. said radiating element having a feedpoint located between the shorted end and opposite end of the element along the centerline of the length thereof;

f. said radiating element being fed from a coaxial-to-microstrip adapter, the center pin of said adapter extending through said ground plane and dielectric substrate to said radiating element;

g. the length of said radiating element determining the resonant frequency of said antenna;

h. the antenna input impedance being variable to match most practical impedances as said feedpoint is moved moved along said centerline between the antenna radiating element center point and the end of the radiating element in either direction without affecting the antenna radiation pattern;

i. the antenna bandwidth being variable with the width of the radiating element and the spacing between said radiating element and said ground plane, said spacing between the radiating element and the ground plane having somewhat greater effect on the bandwidth than the element width;

j. optimum match for the resonant mode of oscillation being obtained by varying the location of said feed point along the element edge.

4,095,228

WINDSHIELD ANTENNA DEFROSTER COMBINATION WITH RADIO INTERFERENCE REDUCTION

Hans Heinrich Meinke, Gauting; Heinz Lindenmeier, Planegg; Friedrich Landstorfer, Munich; Gerhard Flachenecker, Ottobrunn, and Jochen Hopf, Garching, all of Germany, assignors to Hans Kolbe & Co., Bad Salzdetfurth, Germany

Filed Nov. 18, 1976, Ser. No. 743,466

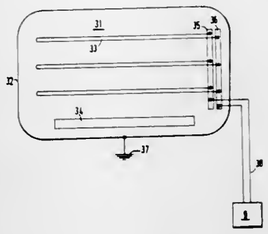
Claims priority, application Germany, Nov. 20, 1975, 2552049

Int. Cl.² H01Q 1/02, 1/32

U.S. Cl. 343—704 **5 Claims**

1. In an automotive vehicle having a window and havng a vehicle body, in combination, a window heater comprising an arrangement of heating conductor sections provided on the window; and a radio receiving antenna located in the vicinity

of the heating conductor sections, the heating conductor sections being comprised of at least two heating conductor sections together forming a bifilar conductor section group, the two heating conductor sections of each bifilar conductor sec-



tion group being arranged approximately parallel and closely spaced to each other, the heating conductor sections being so interconnected that the heating current flowing through one of the sections of each group also flows through the other section of the group but in the opposite direction.

4,095,229

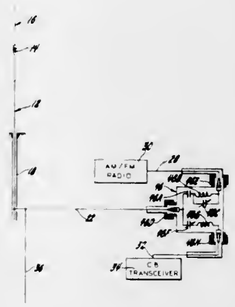
TRIBAND VEHICLE ANTENNA

James O. Elliott, Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 22, 1977, Ser. No. 770,814

Int. Cl.² H01Q 1/32, 5/00

U.S. Cl. 343—715 **3 Claims**



1. A system suitable for CB transceiver operation and AM/FM radio receiver operation in a vehicle having a substantially horizontal conducting panel defining a ground plane, including: means defining a substantially vertical well extending downwardly below the panel; an antenna element coaxial with said well and movable between a retracted position telescoped into the well and in operating position extending upwardly from the well, the antenna element in operating position having a lower conductor length above the panel, a loading coil extending above the first conductor length, and an upper conductor length extending above the loading coil, the whole having a length of the order of 3 feet; a splitter unit adapted to receive input connection from a transmission line and defining output connections adapted to be connected to the radio frequency input of an AM/FM radio or the like and the radio frequency input/output terminals of a CB transceiver unit, respectively; means defining a signal-carrying transmission line of substantially half wave electrical length in the FM band and connected from the input connections of the splitter unit and the antenna element, said transmission line having a relatively large characteristic impedance in relation to the attached input impedance of the splitter and therefore low capacity per unit length; means defining an open stub transmission line attached to said last transmission line adjacent the connection of the antenna element, said open stub transmission line exhibiting an inductive reactance in the FM frequency band offsetting the capacitive reactance of the antenna element so providing impedance in the FM band at the junction of the first transmission line and the antenna element substantially equal to the impedance of the input terminals of the radio receiver at FM frequencies, whereby the length of the open stub may be adjusted to provide impedance match in the FM frequencies without substantially affecting operation in the AM band or the CB band, and the length of the signal-carrying transmission line may be adjusted to provide proper impedance match for the CB frequency range.

4,095,230

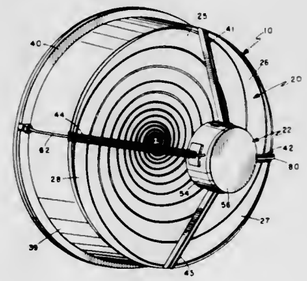
HIGH ACCURACY BROADBAND ANTENNA SYSTEM

William E. Salmond, Fullerton, and Ronald L. Auletti, Alta Loma, both of Calif., assignors to General Dynamics Corporation, Pomona, Calif.

Filed Jun. 6, 1977, Ser. No. 803,710

Int. Cl.² H01Q 19/12, 1/36

U.S. Cl. 343—729 **16 Claims**



1. An antenna system comprising,

a parabolic reflector dish having a dielectric substrate and a conductive material coating on the substrate,

antenna feed means positioned at the focus of said paraboloid and directed at the reflector dish for providing a narrow beam radiation pattern, and

means for coupling energy to and/or from the antenna feed means,

wherein the improvement comprises,

the conductive material coating on the reflector dish substrate defining a plurality of conductive spiral arms for providing a wide beam radiation pattern,

means defining a cavity for backing the conductive spiral arms, and

means for coupling energy to and/or from the conductive spiral arms on the reflector dish substrate,

whereby the parabolic reflector dish is operable as a primary antenna providing a wide beam radiation pattern.

4,095,231

BASE STATION ANTENNA

Larry D. Carter, Anderson, S.C., assignor to True Temper Corporation, Cleveland, Ohio

Filed Dec. 10, 1976, Ser. No. 749,714

Int. Cl.² H01Q 1/48, 9/34

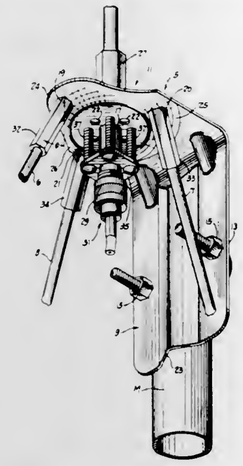
U.S. Cl. 343—846 **9 Claims**

1. A base station antenna comprising:

a bracket including a first section for attachment to an external support; and a second section transverse to said first section, said second section having top and bottom sides, a flattened central portion having a central opening for receiving the base portion of an upwardly extending first antenna whip, and a peripheral portion around the central portion and having a plurality of other openings spaced radially from said central opening for receiving the base

portions of a plurality of downwardly extending second antenna whips, said peripheral portion being inclined to render second antenna whips received in said other openings inclined downwardly and outwardly from a first antenna whip received in said central opening;

a first antenna whip having a base portion including means for mounting said first antenna whip in said central open-



ing, said first antenna whip extending from the top side of said second section in an upward direction; and

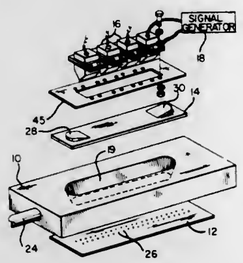
a plurality of second antenna whips, each having a base portion including mounting means for mounting said second antenna whips in said other openings, said second antenna whips extending downwardly and outwardly from the bottom side of said second section.

4,095,232

APPARATUS FOR PRODUCING MULTIPLE UNIFORM FLUID FILAMENTS AND DROPS

Charles L. Cha, Xenia, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Jul. 18, 1977, Ser. No. 816,607
Int. Cl.[2] G01D *15/18*
U.S. Cl. 346—75 **8 Claims**



1. Apparatus for producing a plurality of streams of fluid droplets, comprising:

reservoir means for containing a fluid under pressure;

orifice plate means forming a bottom portion of said reservoir means and having a plurality of orifices defined therein through which said fluid can be expelled from said reservoir means;

elongated pressure plate means forming a top portion of said reservoir means opposite said bottom portion;

a plurality of pressure plate stimulator means contacting a surface of said pressure plate means opposite another surface thereof which is in contact with said fluid in said reservoir, for bending said pressure plate means transverse to the longitudinal dimension of said pressure plate means so as to cause a uniform pressure disturbance in said fluid issuing from said plurality of orifices;

support means for supporting said plurality of stimulator means independently of and above said pressure plate means; and

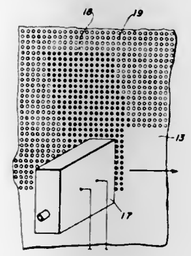
means for simultaneously repetitively activating said stimulator means to cause a series of said disturbances.

4,095,233

METHOD FOR FORMING A CHARGE PATTERN

William L. Goffe, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 30, 1976, Ser. No. 701,323
Int. Cl.[2] G01D *15/18*; G03G *15/00*
U.S. Cl. 346—75 **15 Claims**



1. A method for forming a charge pattern on an insulating surface, comprising:

(a) producing substantially colorless charged droplets and uncharged droplets by means of an ink jet apparatus;

(b) depositing both said charged and uncharged droplets on said insulating surface wherein said charged droplets are in a patterned configuration; and

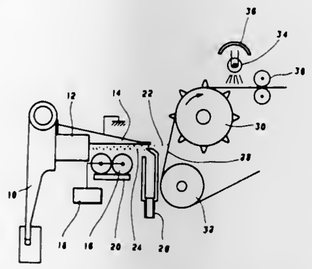
(c) allowing the droplets to dry so that a charge pattern remains on said insulating surface in said patterned configuration.

4,095,234

RECORDING APPARATUS FOR PROVIDING LUSTROUS PRINTING

Sanai Mito, Takarazuka; Shinji Kinpara; Yuji Sumitomo, both of Nara, and Toshio Kobayashi, Osaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 5, 1977, Ser. No. 813,329
Claims priority, application Japan, Jul. 8, 1976, 51-81692
Int. Cl.[2] G01D *15/18*; B41M *5/00*
U.S. Cl. 346—75 **7 Claims**



1. In a recording apparatus which prints desired symbols on a record receiving member through the use of preferably colored heat ray absorbing material, the improvement comprising:

a heat ray source for heating the record receiving member carrying the printed symbols thereon;

a roller impregnated with luster; and

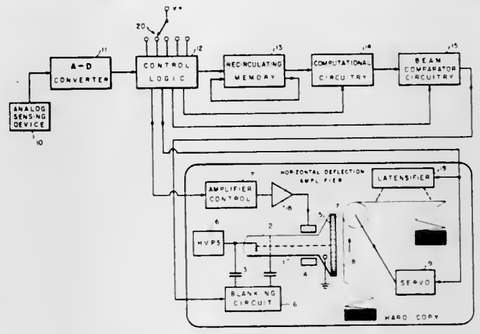
means for depressing said roller to the record receiving member carrying the heated, printed symbols thereon.

4,095,235

RECORDING APPARATUS

William T. Quarton, and Peter R. Lowe, both of Englewood, Colo., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 22, 1977, Ser. No. 771,022
Int. Cl.[2] G01D *9/42*
U.S. Cl. 346—110 R **3 Claims**



1. In a graphic recording system wherein a scanning beam, operated at a constant scanning repetition frequency, is selectively unblanked in response to input signals to produce a trace representative of the input signal on a moving record member, means for providing a substantially constant trace intensity on said record member notwithstanding a selectively variable speed of movement of said record member, said means comprising:

a speed correlated selecting means,

a frequency division means responsive to said speed correlated selecting means,

means for producing a signal having a frequency equal to said scanning repetition frequency and being connected to an input of said frequency division means,

said frequency division means being operative to provide an output signal the frequency of which is a division of said scanning repetition frequency correlated to the selected speed of movement of said record member, and

enabling means responsive to said output signal to enable the unblanking of said scanning beam at a repetition frequency equal to said frequency of said output signal correlated with the selected speed of movement of said record member.

4,095,236

ELECTRONIC STENCIL ENGRAVING MACHINE STYLUS AND SUPPORT

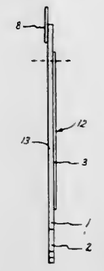
Julio G. Tauszig, Buenos Aires, Argentina, assignor to A. B. Dick Company, Chicago, Ill.

Continuation of Ser. No. 611,821, Sep. 9, 1975, abandoned. This application Mar. 11, 1977, Ser. No. 776,594
Claims priority, application Argentina, Feb. 27, 1975, 257801
Int. Cl.[2] G01D *15/00*
U.S. Cl. 346—139 C **3 Claims**

1. A replaceable stylus support unit for use in an electronic engraving machine of the type wherein a stencil or the like is removably affixed to a rotatable drum and swept past an adjacent stylus, the machine being provided with a base member for receiving the stylus unit, a magnet mounted adjacent to the base member and means for selectively bending the unit onto the drum, the stylus support unit comprising

a first blade having a front end portion and a rear portion having an edge, which rear portion is made of a magnetic material, and which front portion has a stylus mounted thereon;

a second blade attached at one of its ends only to said first blade and positioned in an overlying and normally contacting relationship with respect thereto, the opposite end of said second blade being freely movable forward and



away from said first blade for dampening vibrations of said stylus by the friction created due to the movement of said second blade against said first blade;

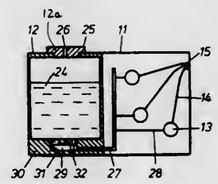
whereby, said stylus support unit has its rear portion received by the base means and releasably captivated there by the magnet in a position overlaying the drum and may be bent into the drum by the means for selectively bending the unit, and whereby the stylus support unit may be selectively and easily removed and released from the stencil engraving machine by moving it away from the magnet.

4,095,237

INK JET PRINTING HEAD

Jan Roger Amberntsson; Roger Ingemar Andersson, both of Angered, and Stig Bertil Sultan, Floda, all of Sweden, assignors to Aktiebolaget Electrolux, Sweden

Continuation of Ser. No. 536,553, Dec. 26, 1974, abandoned. This application Mar. 19, 1976, Ser. No. 668,301
Int. Cl.[2] G01D *15/16*
U.S. Cl. 346—140 R **5 Claims**



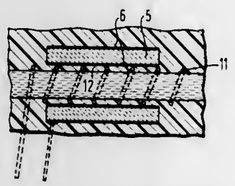
1. An ink jet printer having a movable printing head provided with a plurality of pumping chambers, said printing head being movable adjacent to a recording medium, an outlet channel for each of said pumping chambers terminating adjacent to said recording medium comprising a liquid reservoir moving and co-acting with said printing head, at least one conduit communicating with said reservoir with the respective pumping chambers, a housing mounting said movable printing head and associated liquid reservoir for simultaneous movement therewith, and a foamed material element located in the flow path of the liquid from said reservoir to said pumping chambers, said element being constituted of porous material, the pores of which form capillaries for said liquid and prevent the passage of air into said conduit.

4,095,238

PIEZOELECTRIC DRIVE ELEMENT FOR THE PRINTER HEADS USED IN INK-OPERATED MOSAIC PRINTER UNITS

Erich Kattner, Munich; Max Guntersdorfer, Zorneding, and Joachim Heinzl, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sep. 17, 1976, Ser. No. 724,114
Claims priority, application Germany, Sep. 29, 1975, 2543420
Int. Cl.[2] G01D *15/16*; B41J *3/04*
U.S. Cl. 346—140 R **2 Claims**



1. A piezoelectric drive element for a printer head cast of a dielectric material for use in an ink mosaic printer device, the drive element cylindrically surrounding a passage for ink extending through the printer head and comprising:

a ceramic body having radially internal and external cylindric faces, the internal face being spaced from the ink in the ink passage;

a pair of electrodes, one on each of the internal and external cylindric faces of the ceramic body; and

a metal spiral bearing elastically upon the internal one of the electrodes, the spiral having axially-spaced turns and the cast dielectric material of the printer head filling spaces formed axially between said turns and radially between the ink passage and the internal electrode,

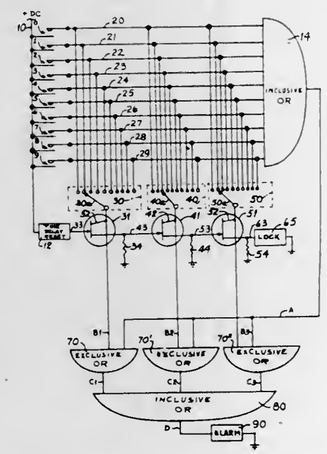
whereby said printing ink is ejected droplet fashion upon piezoelectric contraction of the ceramic body.

4,095,239

DIGITAL COMBINATION LOCK AND MEANS FOR REMOTELY PRESETTING COMBINATION THEREIN

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Continuation of Ser. No. 578,991, May 19, 1975, abandoned. This application Jan. 31, 1977, Ser. No. 764,514
Int. Cl.[2] H04Q *3/02, 3/00*
U.S. Cl. 340—147 MD **14 Claims**



1. Digital combination locking means having an alarm circuit, comprising the combination:

a plurality of push buttons;

combination selection means electrically connected to the push buttons, each one of the combination selection means having capability of being preset to any one of 10 digit positions;

an inclusive OR gate, each of said push buttons being connected to the input of said inclusive OR gate and to said combination selection means;

a plurality of semiconductor switches serially interconnected directly to each other, electrically connected to each of the push buttons, said switches being sequentially activated during operative mode of said locking means when said push buttons are momentarily depressed in a preselected order determined by particular settings of the combination selection means;

lock means in series circuit with the last in sequence of activation of said switches;

a plurality of logic means, connected to the inclusive OR gate and the combination selection means, for obtaining from each of said plurality of logic means a binary logic ZERO output when inputs thereto are of the same logic state and for obtaining a binary logic ONE output therefrom when inputs thereto are of different logic states; and

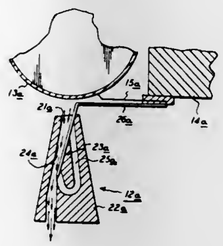
additional logic means connected to the plurality of logic means for activating said alarm circuit.

4,095,240

EXHAUST SYSTEM FOR PYROGRAPHIC PRINTER

Takayuki Tsutsui, Ebina, Japan, assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 13, 1976, Ser. No. 722,945
Int. Cl.[2] B41M *5/00*
U.S. Cl. 346—163 **6 Claims**



1. In combination with a pyrographic printer having a stylus mounted for movement along a predetermined path to print an image on a recording medium, an exhaust system for collecting waste products released by said recording medium as the image is being printed; said exhaust system comprising

means for defining an elongated inlet opening substantially adjacent to and coextensive with the entire path of movement for said stylus;

means for establishing a non-uniform vacuum substantially entirely along said inlet opening, including means for maintaining a relatively strong portion of said vacuum in alignment with said stylus as said stylus moves along said path.

4,095,241

PHOTO-SENSING CIRCUIT

Seiichi Matsumoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 459,216, Apr. 8, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,460
Claims priority, application Japan, Apr. 11, 1973, 48-40999
Int. Cl.[2] G03B *7/08*; G01J *1/42*
U.S. Cl. 354—31 **7 Claims**

1. A circuit for detecting an amount of incident light, comprising;

an operational amplifier having a feedback path connected between its output and input terminals for amplifying an electrical input signal and producing an electrical output in response thereto;

photo-electromotive means connected between the input terminals of said operational amplifier for supplying said operational amplifier with the electrical input signal corresponding to the amount of incident light thereon;

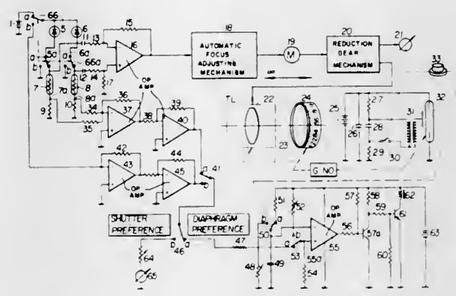


photo-conductive means provided in the feedback path of said operation amplifier for reducing the load resistance of said photo-electromotive means corresponding to the increase of the amount of incident light thereon, said photoconductive means being provided for expanding the measuring range of said circuit; and

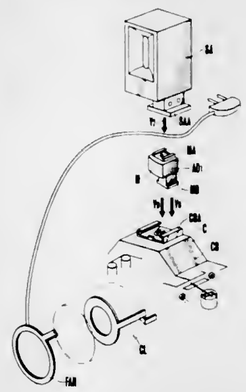
an electrical output terminal connected to said amplifier means.

4,095,242

MATCHING DEVICE FOR FLASH LIGHT PHOTOGRAPHIC DEVICE

Tokuichi Tsunekawa; Masanori Uchidoi, both of Yokohama; Zenzo Nakamura, Urawa; Tetsuya Taguchi, Kawasaki; Hiroshi Aizawa, Machida, and Takashi Uchiyama, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 7, 1976, Ser. No. 748,155
Claims priority, application Japan, Dec. 12, 1975, 50-148967; Dec. 12, 1975, 50-148968
Int. Cl.[2] G03B *15/05*
U.S. Cl. 354—33 **7 Claims**



1. A matching apparatus mountable between a camera and a flash light device for the flash light device with at least a first terminal mounted on the flash light device for transferring a first signal including a diaphragm value signal and a charge completion signal and the camera with at least a second terminal mounted on the camera for receiving the diaphragm value signal and a third terminal mounted on the camera for receiving the charge completion signal comprising;

(a) a first matching terminal mounted on the matching apparatus to be connected to the first terminal for receiving the first signal from said first terminal,

(b) a control means for receiving the first signal through said first matching terminal so as to electrically separate the diaphragm value signal from the charge completion signal contained in the first signal, and

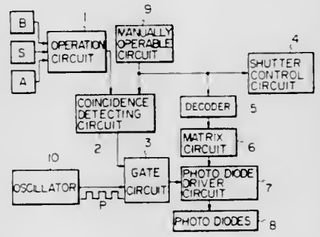
(c) a second and a third matching terminal connected to an output terminal of said control means for receiving the two signals separated by means of said control means, whereby said second matching terminal being connected to the second terminal for transferring the diaphragm value signal to the second terminal of said camera while said third matching terminal being connected to the third terminal for transferring the charge completion signal to the third terminal of said camera.

4,095,243

WARNING DEVICE FOR A CAMERA

Saburo Numata, and Shin-ichiro Fujino, both of Omiya, Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Mar. 15, 1976, Ser. No. 667,071
Claims priority, application Japan, Mar. 19, 1975, 50-32305
Int. Cl.[2] G03B *7/00, 17/20*
U.S. Cl. 354—60 L **3 Claims**



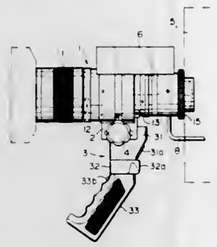
1. Warning device for a camera having an operation circuit for determining the proper exposure condition of exposure information such as the shutter time according to the informations of the brightness of the object, exposure information such as the diaphragm aperture of the objective and the film sensitivity, a manually operable circuit for manually setting the condition of the shutter time and an optical indicating circuit operated by the manually operable circuit for digitally indicating the condition of the shutter time set by said manually operable circuit, the improvement comprising: a coincidence detecting circuit with inputs connected to the output of the operation circuit and the manually operable circuit, respectively, a gate circuit, said coincidence detecting having an output connected to a first input of said gate circuit, and an oscillator with output connected to a second input of said gate circuit, the output of said gate circuit being connected to said optical indicating circuit, thereby causing blinking of the optical indication of said optical indicating circuit when the output of said manually operable circuit differs from that of said operation circuit, the optical indication of said optical indicating circuit being in a lighted state when the output of said manually operable circuit corresponding to the set shutter time coincides with the output of said operation circuit.

4,095,244

HANDY CAMERA WITH A GRIP

Tsuneo Yokoyama; Toshiyuki Yajima; Kazumichi Tsuchiya, and Hisao Takemae, all of Omiya, Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Oct. 26, 1976, Ser. No. 735,446
Claims priority, application Japan, Oct. 27, 1975, 50-129123
Int. Cl.² G03B *29/00*
U.S. Cl. 354—82 **11 Claims**



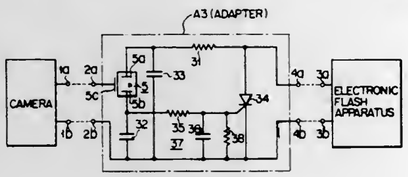
1. A handy type camera with a grip including a focal length varying means, a diaphragm aperture varying means, and a focus adjusting means, wherein at least one of said means is electrically controlled by use of a servomotor which is controlled by a potentiometer and at least one of the other two means is manually controlled by means of a manual control member provided on the camera, wherein the improvement comprises a grip extending obliquely downward and forward from the camera, a manually operable horizontally movable control member provided immediately above the portion of the grip which is held by a hand so as to be operated by the thumb of the hand, a movable member provided within the grip and connected or secured to said control member for moving the potentiometer within the grip by movement thereof, whereby one of said means is controlled with the thumb of the hand which holds the grip and at least one of the other two means is controlled with the other hand.

4,095,245

ADAPTER FOR ELECTRONIC FLASH APPARATUS

Kaoru Kuraishi, Tokyo, Japan, assignor to Toshiba Photo Products Co., Ltd., Tokyo, Japan

Filed Aug. 9, 1976, Ser. No. 712,539
Claims priority, application Japan, Aug. 15, 1975, 50-999376
Int. Cl.² G03B *15/02*
U.S. Cl. 354—141 **2 Claims**



1. In combination: an adapter and an electronic flash unit having a trigger circuit, said adapter comprising:

a pair of first external connection terminals detachably connected to high tension pulse take out terminals of a camera incorporating a high tension pulse generating means for generating the high tension pulse in response to the action of a shutter of said camera;

a pair of second external connection terminals detachably connected to a pair of external connection terminals of said trigger circuit,

and circuit means including at least a cold cathode thyratron having a control electrode directly connected to one of said first external connection terminals and a pair of main electrodes,

said cold cathode thyratron being connected across said second external connection terminals through a first capacitor;

a second capacitor connected in parallel with the series circuit of said cathode thyratron and said first capacitor, the junction between said first and second capacitors being connected to the other first external connection terminal;

a semiconductor switching element connected between said second external connection terminals; and

a delay circuit connected across said first capacitor and adapted to apply to the gate electrode of said semiconductor switching element a control signal for causing said semiconductor element to conduct a predetermined time after said cold cathode thyratron is rendered conductive,

said circuit means being so arranged as to render said cold cathode thyratron conductive when said first external connection terminals receive said high tension pulse through said high tension pulse take out terminals of said camera and to short circuit said second external connection terminals in response to said conduction of said cold cathode thyratron;

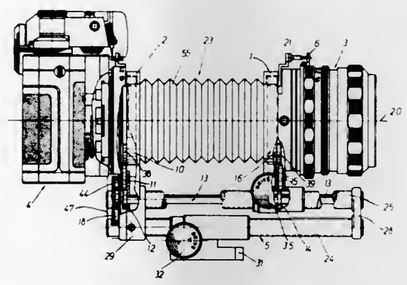
said electronic flash unit comprising a discharge lamp connected across a power supply and an energy storage capacitor charged by said power supply, and adapted to flash through discharge of said energy storage capacitor; and said trigger circuit being connected to receive said power supply voltage so as to permit said flash discharge lamp to be started when said pair of external connection terminals of said trigger circuit are short circuited.

4,095,246

BELLOWS SETTING EQUIPMENT

Ferdinand Kellner, Buxach 14, 8940 Memmingen, Germany

Filed Mar. 3, 1977, Ser. No. 774,021
Claims priority, application Germany, Mar. 27, 1976, 2613161
Int. Cl.² G03B *17/04*
U.S. Cl. 354—187 **10 Claims**



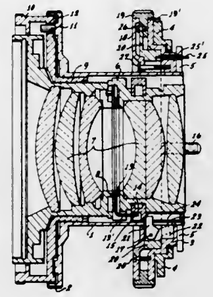
1. In equipment for setting the bellows between a camera and a relatively movable objective in front of said camera, this equipment being of the kind comprising a front standard for connection to the objective, a rear standard for connection to the camera, a guide frame on which said front and rear standards are mounted for relative adjustment to vary the spacing between them, and an assembly including a gear train associated with said standards and said guide frame for coupling diaphragm control elements associated respectively with the objective and with the camera, the improvement which consists in the provision of a member for coordinated operation of said control elements, said operating member acting on an intermediate element of said gear train.

4,095,247

INTERCHANGEABLE OBJECTIVE FOR CAMERAS

Heinz Rehn, Braunschweig, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Nov. 30, 1976, Ser. No. 746,224
Claims priority, application Germany, Dec. 17, 1975, 2556771
Int. Cl.² G03B *7/20, 9/02, 17/00*
U.S. Cl. 354—286 **4 Claims**



1. Interchangeable objective for a camera to provide diaphragm control, said objective comprising:

(a) an objective tube; a lens mounting being disposed in and axially movable in said objective tube;

(b) a lens or lens system and a diaphragm mounted in said lens mounting;

(c) a bayonet ring for connecting said objective tube to the camera, said objective tube being axially movably disposed in the bayonet ring for purposes of inserting the tube into the camera and pulling the tube out of the camera;

(d) releasable means for engaging said objective tube with the bayonet ring in a position ready for exposure after the tube has been pulled out of the camera and for disengaging the tube from the ring for pushing the tube into the ring and the camera;

(e) a diaphragm adjustment ring being rotatably mounted on said bayonet ring;

(f) a diaphragm control ring for transmitting the adjustment of said adjustment ring upon the diaphragm, said control ring being rotatably disposed on said lens mounting; and

(g) a coupling element being movably disposed on said diaphragm adjustment ring and capable of being engaged with and disengaged from the diaphragm control ring, respectively, when the objective tube has a pulled out and an inserted position.

4,095,248

REDUNDANCY REDUCTION SYSTEM FOR FACSIMILE TRANSCEIVERS

Carl R. Kolker, San Gabriel; John Scott Campbell, Pasadena, both of Calif.; Robert L. La Fond, New York, N.Y., and JaMi Smith, Monrovia, Calif., assignors to Faxon Communications Corporation, Pasadena, Calif., by said Kolker, Campbell and LaFond

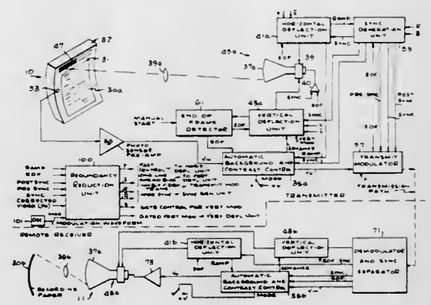
Filed Jun. 16, 1976, Ser. No. 696,744
Int. Cl.² H04N *3/34*
U.S. Cl. 358—288 **50 Claims**

1. In a document scanning system employing a predetermined fast search velocity for searching the document and a predetermined slow scan velocity for reading the document, the method of performing a single wide area fast search pass for detecting presence of data anywhere in a wide band document area composed of a predetermined plurality of vertically successive narrow horizontal bands of predetermined width of the document, said method comprising the steps of:

(a) Directing at a selected one of the predetermined plurality of successive horizontal bands of the document, a narrow spot of radiation having a spot width approximating the width of a single narrow horizontal band of the document;

(b) Horizontally sweeping said spot of radiation across said document in a single fast search pass at a predetermined fast search velocity;

(c) During said single fast search pass, rapidly deflecting the spot of radiation up and down vertically across the predetermined plurality of successive narrow horizontal bands



to sweep the spot in a vertically reciprocating path across the predetermined plurality of successive horizontal bands;

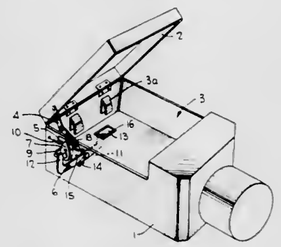
whereby the spot of radiation during the single wide fast search pass, narrowly illuminates any data in any of the predetermined plurality of successive horizontal bands of the document so as to detect the presence of such data in the wide band area.

4,095,249

FILM CARTRIDGE EJECTING DEVICE FOR A CAMERA

Jiro Miura, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Japan

Filed May 27, 1977, Ser. No. 801,334
Claims priority, application Japan, May 28, 1976, 51-69511[U]
Int. Cl.² G03B *17/02, 23/02*
U.S. Cl. 354—288 **13 Claims**



1. A film cartridge ejecting device for use in a camera comprising:

means forming a cartridge chamber for receiving a film cartridge therein including side walls and a floor;

a movable lid member connected to one of said side walls for providing access to said cartridge chamber;

an ejecting means which is movable to a first position wherein said ejecting means projects into said cartridge chamber and a second position wherein said ejecting means is retracted out of said cartridge chamber;

a drive means for moving said ejecting means from said second position to said first position; and

an operating means movable in opposite directions with respect to the respective opening and closing of said lid member, said operating means being positioned to contact and operate said drive means when said lid member is

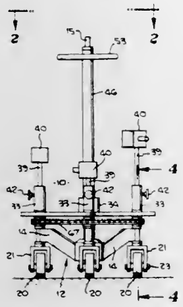
partly opened, but which is positioned out of contact with said drive means when said lid member is fully opened, and which contacts but does not operate said drive means when said lid member is closed.

4,095,250

STEERABLE CAMERA CARRIAGE

Frederick G. Giglioli, 400 S. Sunkist, Anaheim, Calif. 92806

Filed Apr. 19, 1976, Ser. No. 678,215
Int. Cl.[2] G03B *17/00*
U.S. Cl. 354—293 **7 Claims**



1. A steerable camera carriage comprising:
a base member having bearing openings at the corners thereof and a bearing opening intermediate the corners thereof;
an upright shaft journaled in each of said corner bearing openings for rotation about a vertical axis;
each of said shafts having a support wheel rotatably mounted on the lower end thereof and a wheel sprocket disposed thereon below said base member;
support means for individual camera equipment mounted on the upper end of each of said shafts so as to rotate therewith about the vertical axis thereof;
a steering post journaled in said intermediate bearing opening for rotation about a vertical axis;
said steering post having a control sprocket disposed thereon below said base member; and
an endless chain for interlocking the control sprocket and each of the wheel sprockets;
the rotation of said steering post being operable to drive said chain to rotate each of said shafts about its vertical axis and thereby control the angular displacement of the support means for the individual camera equipment mounted on each of said shafts while said carriage is maintained in a given position.

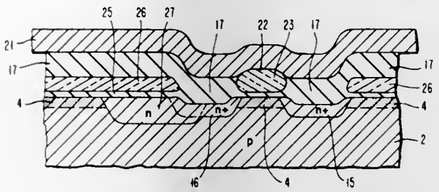
4,095,251

FIELD EFFECT TRANSISTORS AND FABRICATION OF INTEGRATED CIRCUITS CONTAINING THE TRANSISTORS

Robert H. Dennard, Croton-on-Hudson, and Dominic P. Spampinato, Ozone Park, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 19, 1976, Ser. No. 715,948
Int. Cl.[2] H01L *29/78*
U.S. Cl. 357—23 **24 Claims**

1. A field effect transistor (FET) which comprises:
(A) semiconductive substrate of a first conductive type containing active impurities of a first conductive type;
(B) FET channel region containing active impurities of said first conductive type;
(C) FET gate insulator over the channel region;
(D) doped polycrystalline silicon gate over said channel region and said FET gate insulator; wherein the boundaries of said polycrystalline silicon gate determine the boundaries of said channel region in both the width and length directions;
(E) doped source region of second and opposite conductive type; said source region being self-aligned with respect to one end of the FET gate in the length direction;
(F) doped drain region of a second and opposite conductive type; said drain region being self-aligned with respect to the other end of the FET gate in the length direction;
(G) field oxide to isolate said FET from other like FETs and from other structures and circuits on the same semiconductive substrate;
(H) said field oxide being nonrecessed with respect to the source and drain regions;
(I) said field oxide isolation being self-aligned with respect to



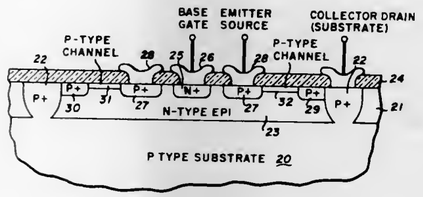
the sides of the FET gate in the width direction, and said gate neither overlapping nor underlapping said field oxide isolation;
(J) insulation layer at least over the FET source, and FET drain, but not over the FET gate;
(K) a metallic-type high electrical conductivity interconnection line;
(L) a self-registering electrical connection between the polycrystalline silicon gate and said interconnection line;
(M) contact holes to provide vias for achieving electrical connection to FET source and drain regions;
(N) metallic-type high electrical conductivity interconnection lines making electrical connection to said FET source and drain regions through said vias; and
(O) electrical connections to said semiconductive substrate.

4,095,252

COMPOSITE JFET-BIPOLAR TRANSISTOR STRUCTURE

Sam S. Ochi, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Dec. 27, 1976, Ser. No. 754,290
Int. Cl.[2] H01L *27/02, 29/80, 29/72, 29/06*
U.S. Cl. 357—43 **6 Claims**



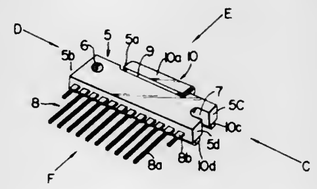
1. A monolithic integrated circuit comprising:
a semiconductor substrate of a first conductivity type;
an epitaxial layer deposited on said substrate and having a second conductivity type;
a ring of diffused semiconductor material passing through said epitaxial layer and having said first conductivity type, said ring isolating a section of said epitaxial layer;
an emitter region of said first conductivity type contained within and extending from the surface thereof and part way through said isolated section of said epitaxial layer;
a contact region of said second conductivity type making ohmic contact with said isolated portion of said epitaxial layer; and
a channel region of said first conductivity type extending between said emitter region and said isolation region over a portion of said epitaxial layer and extending into said epitaxial layer a distance that is small compared to the distance said emitter region extends into said epitaxial layer.

4,095,253

SINGLE IN-LINE HIGH POWER RESIN-PACKAGED SEMICONDUCTOR DEVICE HAVING AN IMPROVED HEAT DISSIPATOR

Masayoshi Yoshimura, Tokyo; Keizo Otsuki, Higashiyamato; Senji Shoji, Tokorozawa; Tomio Yamada; Ichio Shimizu, both of Kodaira, and Yuji Arai, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 23, 1976, Ser. No. 744,397
Claims priority, application Japan, Nov. 29, 1975, 50-142794
Int. Cl.[2] H01L *23/38, 23/42, 23/44*
U.S. Cl. 357—81 **17 Claims**



1. A resin-packaged semiconductor device having a resin-molded package defined by a plurality of principal surfaces interconnected by a plurality of side surfaces, a plurality of external leads projecting in parallel to each other from one side surface of said resin-molded package, comprising:
a heat sink fin mounting plate projecting from a side surface of the resin-molded package opposite to said one side surface from which said external leads project; and
a heat sink fin having one end portion overlapping said heat sink fin mounting plate and the remaining portion extending from said fin mounting plate into overlapping contact with substantially the entire area of at least one of said plurality of principal surfaces of said resin-molded package, said one end portion of the heat sink fin being connected in close contact with said heat sink fin mounting plate.

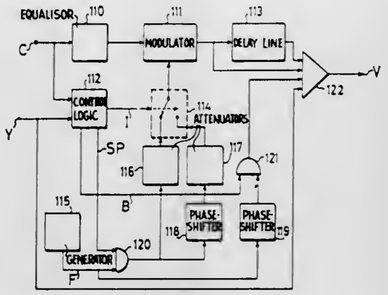
4,095,254

TRANSCODER FOR COLOR TELEVISION SIGNALS

Rene Romeas, Paris, France, assignor to Thomson-Brandt, Paris, France

Filed Oct. 13, 1976, Ser. No. 731,938
Claims priority, application France, Oct. 17, 1975, 75 31902
Int. Cl.[2] H04N *9/42*
U.S. Cl. 358—11 **13 Claims**

1. A colour television transcoder for transcoding an input signal comprising a first sequence of a first and a second chrominance signals having respectively a first and a second fixed amplitude, a common duration and alternating at a line frequency, into an output signal comprising a sub-carrier modulated by simultaneously said two chrominance signals, said transcoder comprising:
equalising means receiving said input signal for bringing the amplitude/frequency curves of said chrominance signals to one and the same contour, delivering a first and a second equalized chrominance signals;
means for generating a second sequence of a first and a second sub-carriers alternating at said line frequency and synchronously with said first sequence; said first and second sub-carriers having respectively a third and a fourth fixed amplitude and a fixed common frequency, and the second sub-carrier being in quadrature with the first sub-carrier;
means for setting the ratio of said first fixed amplitude to said third fixed amplitude at a first value, and for setting the ratio of said second fixed amplitude to said fourth fixed amplitude at a second value;
a single balanced modulator receiving said first and second sequence for modulating respectively said first and second sub-carriers with said first and second equalized chrominance signals, delivering a modulated signal;



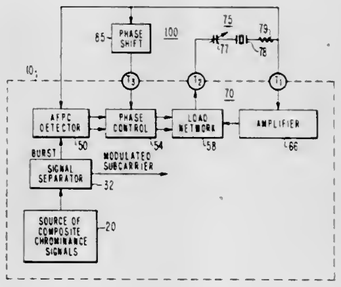
means for delaying said modulated signal by said duration, delivering a delayed signal;
adding means for adding said modulated signal and said delayed signal, delivering said output signal; and
control means for extracting from said first sequence a chrominance synchronisation signal and for combining said chrominance synchronisation signal with an external line synchronisation signal and an external field synchronisation signal for emitting a switch signal for controlling the alternance of said first and second sub-carriers and the setting of said first and second value of said ratios.

4,095,255

CONTROLLED OSCILLATOR WITH INCREASED IMMUNITY TO PARASITIC CAPACITANCE

Willem Hendrik Groeneweg, Ottenbach; Alois Vaclav Tuma, Schlieren, both of Switzerland, and Leopold Albert Harwood, Bridgewater, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 7, 1977, Ser. No. 785,591
Int. Cl.[2] H04N *9/44*; H03B *3/04, 5/00*
U.S. Cl. 358—17 **11 Claims**



1. A controlled oscillator comprising:
an amplifier including an active device having an output terminal, said output terminal having a parasitic capacitance associated therewith;
a filter network arranged in a feedback loop of said amplifier for providing regenerative feedback of sufficient magni-

tude to produce an oscillatory signal at said output terminal of said active device;

a source of control signals providing control signals at an output terminal, said output terminal having a parasitic capacitance associated therewith; and

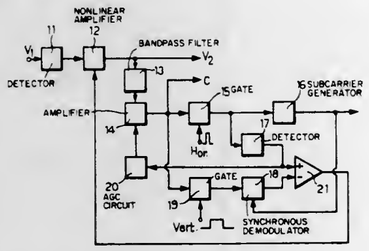
a common load network for said oscillatory and control signals coupled to said filter network, said common load network comprising amplifying means having a low input impedance relative to an impedance presented by said parasitic capacitances to said oscillatory and control signals.

4,095,256

DIFFERENTIAL GAIN ERROR CORRECTION IN COLOR TELEVISION SYSTEMS

Armando Camploni, Turin, Italy, assignor to Indesit Industria Elettrodomestici Italiana S.p.A., Rivalta (Turin), Italy

Filed Jun. 23, 1976, Ser. No. 699,298
Claims priority, application Italy, Jul. 1, 1975, 68681 A/75
Int. Cl.² H04N *9/535*
U.S. Cl. 358—35 **5 Claims**



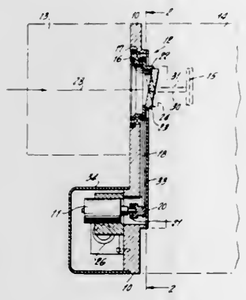
1. A color television system, comprising a transmitter means for transmitting an amplitude-modulated carrier, and including means for inserting into the transmitted signal during the line blanking interval a color synchronizing burst signal with constant amplitude having the frequency of a subcarrier, means for inserting periodically into the said transmitted signal, at least once in every field scan, a second signal having a different mean amplitude and a different phase from the burst signal and a constant amplitude, and receiver means including means for comparing the amplitude of the second signal with that of the burst signal to correct differential gain distortion.

4,095,257

ORBITER FOR PYROELECTRIC FOCUSING DEVICES

Frank G. Back, Glen Cove, N.Y., assignor to Zoomar, Inc., Glen Cove, N.Y.

Filed Sep. 20, 1976, Ser. No. 724,705
Int. Cl.² H04M *3/06*
U.S. Cl. 358—113 **3 Claims**



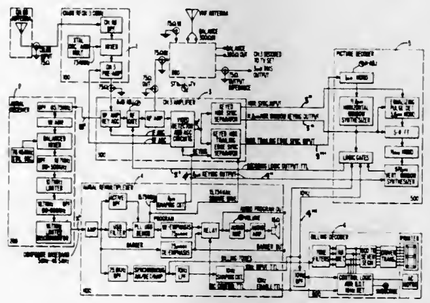
1. An orbiter for pyroelectric focusing devices having an image plane comprising means for focusing infrared radiation upon the image plane; a pyroelectric target positioned in the image plane for showing an image of the focused radiation; a plate, transparent to infrared radiation, mounted in front of the image plane, said plate having parallel inclined entry and exits faces; a rotatable mounting means for said plated disposed normal to the optical axis of the focusing device; means to rotate the mounting means about the optical axis; an adjustable speed control for the said rotating means; and an elastomer belt driven by the rotating means and operatively connected to the mounting means for turning said mounting means.

4,095,258

APPARATUS FOR DECODING SCRAMBLED TELEVISION AND SIMILAR TRANSMISSIONS

Martin Sperber, Cranford, N.J., assignor to Blonder-Tongue Laboratories, Inc., Old Bridge, N.J.

Filed Oct. 15, 1976, Ser. No. 732,607
Int. Cl.² H04N *1/44*
U.S. Cl. 358—120 **12 Claims**



1. In a system for decoding radio-frequency broadcasted scrambled television transmissions containing a modulation-suppressed train of horizontal synchronizing signals within a predetermined time window and at a predetermined line rate and including equalizing pulses, vetical synchronizing signals periodically modulation-suppressed at reference equalizing signals in the horizontal synchronizing signal train within an encoded video carrier signal, a modulation frequency signal corresponding to that used for the suppression modulation but advanced in time, and a pilot signal of frequency substantially the same as that or a multiple of the horizontal synchronizing signal line rate; apparatus having, in combination, means for receiving as radio-frequency signals said transmissions; radio-frequency gating means connected with the receiving means to receive said transmissions; video detector means connected to said radio-frequency gating means to demodulate said video carrier containing modulation-suppressed horizontal and vertical synchronizing signals; horizontal synchronizing signal and horizontal trailing edge synchronzing signal separator means connected with said video detector means; aural demodulation means connected to said receiving means for demodulating said pilot signal independently of and isolated from said video detector means and for recovering said advanced modulation frequency signal; means connected with the pilot signal demodulating means for controlling the said horizontal trailing edge synchronizing signal separator means in response to said demodulated pilot signal and in response to the keying of a pulse of width less than said window substantially centered at the trailing edge of the suppressed horizontal synchronizing signal; picture decoder means comprising means responsive to the outputs of the horizontal synchronizing signal separator means and the horizontal trailing edge synchronizing signal separator means for generating a delay for the said horizontal synchronizing signal window of a horizontal line and thereby providing a horizontal window decoding pulse; and means for applying said horizontal window decoding pulse to said radio-frequency gating means to restore the suppressed synchroniz-

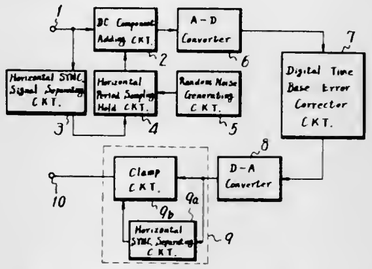
ing signals, thereby to restore an unscrambled television transmission.

4,095,259

VIDEO SIGNAL CONVERTING SYSTEM HAVING QUANTIZATION NOISE REDUCTION

Kiyoshi Sawagata, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jun. 21, 1976, Ser. No. 698,003
Claims priority, application Japan, Jun. 24, 1975, 50-77973
Int. Cl.² H04N *7/04, 5/78*
U.S. Cl. 358—141 **6 Claims**



1. A video signal converting system comprising:

circuit means for receiving an analog video signal that includes a DC level and having respective information intervals;

level shifting means connected to said circuit means to shift the DC level of said video signal to different random values at equally spaced intervals, said level shifting means comprising random noise generating means for generating a noise signal having a level which changes randomly from one information interval to the next and which remains constant throughout each respective information interval, and means for changing the DC level of said video signal in successive information intervals with said noise signal such that said video signal DC level is constant throughout a respective information interval and then changes in the next successive interval;

digitizing means connected to said level shifting means to receive therefrom the analog video signal with the shifted DC level;

signal utilization means for receiving and utilizing the digitized level-shifted video signal from said digitizing means;

converting means connected to said signal utilization means for receiving and converting the digitized video signal to an analog level-shifted video signal; and

clamping means connected to said converting means to restore said analog video signal to its original DC level.

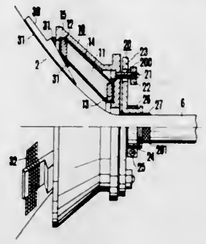
4,095,260

COLOR PICTURE TUBE DEVICE

Hirofumi Suzuki, Mobara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 15, 1977, Ser. No. 787,749
Claims priority, application Japan, Apr. 19, 1976, 51-43541; Apr. 19, 1976, 51-48099[U]
Int. Cl.² H04N *5/657*
U.S. Cl. 358—248 **6 Claims**

1. In an electromagnetic deflection in-line electron gun type colour picture tube device including a colour picture tube with a neck portion and funnel portion and a deflection yoke device mounted near the joint between said neck portion and said funnel portion and provided with a deflection yoke assembly having an inner diameter sufficiently larger than the joint neck portion and funnel portion such that said deflection yoke assembly can move in a direction perpendicular to the tube axis, the improvement wherein said deflection yoke device comprises supporting means for supporting said deflection yoke assembly having a first portion movable along said neck portion and a second portion disposed substantially perpendicular to said first portion but tiltable with respect to the tube axis,



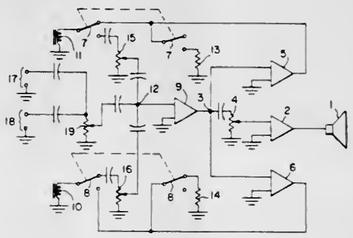
means for securing said deflection yoke assembly to said second portion of said supporting means, and at least two wedge means inserted and fixed in a gap between said funnel portion and said deflection yoke assembly.

4,095,261

AUDIO TAPE RECORDER, EDITOR AND AMPLIFYING SYSTEM

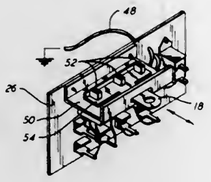
Jesus Rodriguez, 1966 First Ave., No. 3C, New York, N.Y. 10029

Filed Jan. 7, 1976, Ser. No. 647,079
Int. Cl.² G11B *27/02*
U.S. Cl. 360—13 **6 Claims**



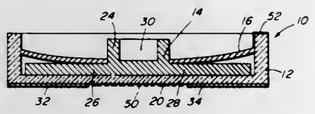
1. A public address apparatus comprising dual track magnetically sensitive tape transport means, first and second recording heads being also capable of reproducing and electromagnetically coupled to individual longitudinal recording tracks on a unitary magnetically sensitive tape strip and not to each other, a signal input terminal electrically coupled to the input terminals of a first audio voltage amplifier having an audio speaker at the output terminals thereof, second and third audio voltage amplifiers, said second and said third audio voltage amplifiers having input terminals, said second and said third audio voltage amplifier input terminals connected to said signal input terminal, the output terminals of said second audio voltage amplifier connected to a first switch means, the output terminals of said third audio voltage amplifier connected to a second switch means, said first switch means adapted to alternatively selectively connect said first recording head to the output terminals of said second audio voltage amplifier and said signal input terminals, said second switch means adapted to alternatively selectively connect said second recording head to the output terminals of said third audio voltage amplifier and said signal input terminal, means to connect an audio frequency voltage signal to said signal input terminal.

4,095,262
LIGHTNING PROTECTION CIRCUIT
Homer F. St. Clair, Levanna Rd., Aurora, N.Y. 13026
Filed Dec. 27, 1976, Ser. No. 754,355
Int. Cl.[2] H02H *1/04*
U.S. Cl. 361—1 **7 Claims**



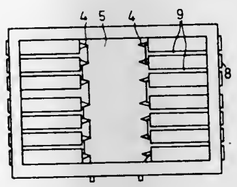
1. A circuit arrangement for protecting an electrical appliance having a chassis ground, an antenna input circuit and a power supply circuit from the effects of lightning, said circuit arrangement comprising, in combination:
(a) a power lead-in wire connected at one end to first terminal means on the appliance and at the other end to a source of electrical power;
(b) first switch means interposed between said power lead-in wire and the power supply circuit of the appliance and movable between first and second positions, connecting and disconnecting, respectively, said power lead-in wire and the power supply circuit;
(c) at least one antenna lead-in wire connected at one end to second terminal means on the appliance and at the other end to an antenna;
(d) second switch means interposed between said one antenna lead-in wire and the antenna input circuit of the appliance and movable between first and second positions, connecting and disconnecting, respectively, said antenna lead-in wire and the antenna input circuit;
(e) a single line electrically connecting the power supply circuit and antenna input circuit of the appliance in a common circuit and leaving said first and second terminal means open in response to movement of said first and second switch means to said second positions thereof; and
(f) switch control means operable to move said first and second switch means simultaneously between said first and second positions of each.

4,095,263
ADJUSTABLE CAPACITORS
John E. Johanson, Boonton, N.J., assignor to Johanson Manufacturing Corporation, Boonton, N.J.
Filed Aug. 31, 1976, Ser. No. 707,152
Int. Cl.[2] H01G *5/06, 5/04*
U.S. Cl. 361—292 **10 Claims**



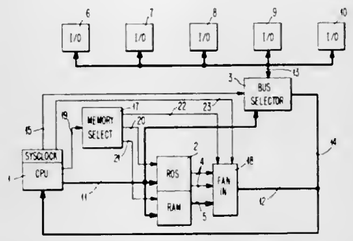
1. An adjustable capacitor comprising:
a unitary dielectric housing means having a base and a sidewall emanating therefrom, said housing means integrally fabricated from a material having specific dielectric characteristics, and serving as a dielectric for said capacitor;
an electrically conductive rotor member placed within said housing, said rotor member having a central hub and at least one thin blade plate member emanating perpendicularly from the base of said hub to communicate with the inner dielectric surface of said housing base, the outer extent of said blade plate terminating short of abutting said housing means sidewall;
a bendable metal retainer member having a dimension slightly greater than the inner dimensions of said dielectric housing means sidewall and having centrally disposed bore circumscribing said rotor hub such that said retainer captivates itself in a spring-like manner within said housing means sidewall, its surface being in a convex-concave relation to exert inward and outward pressure to seal said capacitor assembly about said sidewall and about said rotor hub and to exert downward pressure upon said rotor blade plate member; and
a recess within the upper end portion of said hub to provide means of adjustment;
at least one metalized electrode layer secured to the lower side of the base of said dielectric housing base to complete the dielectric path and to afford means of connection to circuitry, said metalized layer extending to the periphery of said housing means base and said metalized electrode layer serving as a stator.

4,095,264
CAPACITOR BANK
Ake Danemar, Lidingo; Arne Johansson, Grangesberg, and Owe Nerf, Farsta, all of Sweden, assignors to Asea AB, Vasteras, Sweden
Filed Sep. 8, 1976, Ser. No. 721,500
Claims priority, application Sweden, May 7, 1976, 7605216
Int. Cl.[2] H01G *1/08*
U.S. Cl. 361—274 **3 Claims**



1. A capacitor bank for use in high voltage electric plants, comprising capacitor units:
a rack of insulating material for supporting and electrically insulating said capacitor units from one another;
a tank enclosing said rack and said capacitor units and including an insulating fluid for regulating the temperature in said tank;
said rack including guide conduits for circulating at least part of said fluid to each of said capacitor units to maintain the temperature thereof at a predetermined value;
said capacitor units are mounted within said rack to provide channels between the capacitor units and between the capacitor units and the tank for circulation of said fluid therein, and said capacitor units are mounted in two spaced columns, the capacitors in each column being mounted with their respective terminal bushings extending into the space formed between said two columns;
said rack includes wall members for separating the rack into an upper and a lower half and in turn for separating each of said upper and lower halfs into two columns with a shaft extending therebetween from said lower half to said upper half; and
said tank including conduits for introducing said fluid into said shaft and each of said columns.

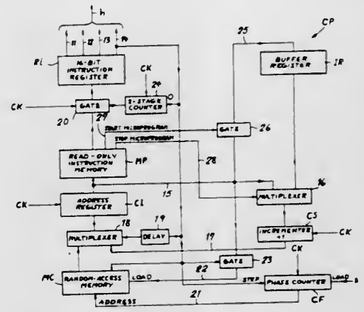
4,095,265
MEMORY CONTROL STRUCTURE FOR A PIPELINED MINI-PROCESSOR SYSTEM
Richard Alan Vrba, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Jun. 7, 1976, Ser. No. 693,816
Int. Cl.[2] G06F *13/00*; G11C *7/00*
U.S. Cl. 364—200 **5 Claims**



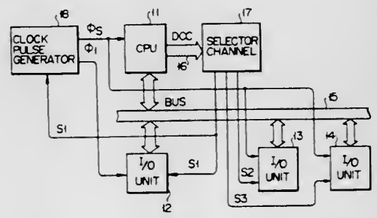
1. In a word processing system including a pipelined processor having an input bus, a system clock, and an output bus, and including a plurality of random access memory blocks and a plurality of read only storage memory blocks, said random access memory blocks and said read only storage memory blocks having different operating characteristics, a memory control system interconnected to said processor and said memory blocks for controlling access to the memory blocks by the processor, wherein the memory control system comprises:
means for receiving clock signals from said processor;
means responsive to said clock signals for generating memory cycle timing signals having a plurality of frequencies required to operate said memory blocks;
means for receiving an address and an instruction from said processor;
decoding means responsive to said address and instruction for generating and applying power selection signals and one of said memory cycle timing signals only to the memory block which contains the address equivalent to the address received from said processor; and
sampling means for latching the output of the selected memory block onto the input bus to the processor concurrent with the receipt of the next address and instruction from the processor.

4,095,266
DATA-PROCESSING SYSTEM WITH A SET OF PERIPHERAL UNITS REPETITIVELY SCANNED BY A COMMON CONTROL UNIT
Giovanni Carubia, Mariano Comense; Roberto Papa, and Cesare Pratelli, both of Milan, all of Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy
Filed Nov. 1, 1976, Ser. No. 737,269
Claims priority, application Italy, Oct. 30, 1975, 28867 A/75
Int. Cl.[2] G06F *9/16*
U.S. Cl. 364—200 **8 Claims**

1. In a data-processing system wherein a central unit successively communicates with a multiplicity of associated peripheral units in respective phases of a recurrent scanning cycle individually assigned to said peripheral units, said central unit including a processor and a programmer delivering to said processor a series of instructions for the exchange of data with any peripheral unit during respective subphases of a phase assigned thereto,
the improvement wherein said programmer comprises:
storage means containing instructions to be read out to said processor;
address-counting means connected to said storage means for identifying the locations of instructions to be read out during consecutive subphases of each phase of a scanning cycle, certain of said instructions carrying a characteristic portion commanding a phase change;
phase-counting means connected to said storage means for stepping in response to said characteristic portion of an instruction read out therefrom;
memory means controlled by said phase-counting means for introducing an initial count into said address-counting means at the beginning of each new phase to identify the location of the first of a series of instructions to be fed to said processor during said new phase; and
stepping means for progressively increasing the count of said address-counting means during successive subphases of each phase.



4,095,267
CLOCK PULSE CONTROL SYSTEM FOR MICROCOMPUTER SYSTEMS
Takao Morimoto, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan
Filed Nov. 24, 1976, Ser. No. 744,519
Claims priority, application Japan, Nov. 29, 1975, 50-142567
Int. Cl.[2] G06F *1/04*
U.S. Cl. 364—200 **8 Claims**



1. A clock pulse control system for microcomputer systems, comprising:
a central processing unit (**11**);
a plurality of first input/output units (**13,14**) connected to said central processing unit (**11**);
at least one second input/output unit (**12**) connected to said central processing unit (**11**);
a selector channel (**17**) connected between said central processing unit (**11**) and said first and second input/output units and adapted to selectively issue a select signal (**S1**) and to select at least one of said first and second input/output units according to a programmed control instruction from said central processing unit; and
a clock pulse generator (**18**) connected to said selector channel **17**, to said central processing unit (**11**) and to said first and second input/output units for supplying clock pulses to said central processing unit and to said first and second input/output units, and adapted to generate a first clock pulse (ϕs) having a frequency (*fs*) to operate said central

processing unit and said first input/output units (13,14) and a second clock pulse ($\phi 1$) having an optimum frequency ($n \cdot fs$) to operate said at least one second input/output unit (12) when no select signal (S1) is applied to the generator (18) from the selector channel (17) and having the operating frequency (fs) of said central processing unit when a select signal (S1) is applied to the generator (18) from the selector channel (17),

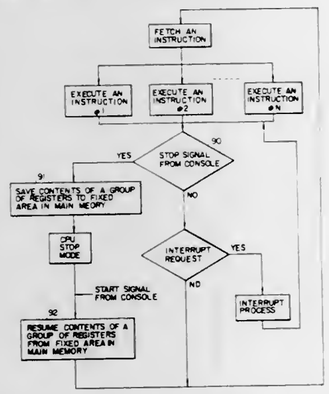
whereby said at least one second input/output unit (12) is operated by said second clock pulse ($\phi 1$) having the operating frequency (fs) of said central processing unit only when information is transferred between the central processing unit and said at least one second input/output unit (12), and is operated by said second close pulse ($\phi 1$) having the optimum frequency ($n \cdot fs$) when no information is transferred between said central processing unit and said at least one second input/output unit.

4,095,268

SYSTEM FOR STOPPING AND RESTARTING THE OPERATION OF A DATA PROCESSOR

Yoshiki Kobayashi; Tadaaki Bandoh; Hideo Maejima, all of Hitachi, and Hajime Yasuda, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 9, 1976, Ser. No. 712,803
Claims priority, application Japan, Aug. 8, 1975, 50-95770
Int. Cl.² G06F *1/04, 3/02*
U.S. Cl. 364—200 **5 Claims**



1. A system for stopping and restarting the operation of a data processor, which has a central processing unit which is operative under the existence of a timing signal, a console from which start and stop signals are supplied to the central processing unit, and a main memory, the contents of which can be directly accessed by the central processing unit and the console, the system comprising

means for suspending an executed program and assigning the contents of a group of registers within said central processing unit to predetermined fixed areas of said main memory in response to a stop signal from said console,

means for stopping the timing signal of said central processing unit after said assignment of the contents, and

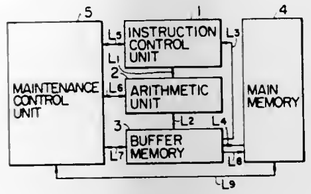
means for restarting the timing signal of said central processing unit and restoring the contents of said fixed areas to said group of registers in response to the start signal from said console.

4,095,269

DATA PROCESSING SYSTEM HAVING A HIGH SPEED BUFFER MEMORY

Shun Kawabe, Hino, and Kouichiro Omoda, Kokubunji, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 1, 1976, Ser. No. 728,625
Claims priority, application Japan, Oct. 1, 1975, 50-117732
Int. Cl.² G06F *13/00*
U.S. Cl. 364—200 **5 Claims**



1. In a data processing system having:

a main memory for storing data which includes instruction words and operands;

a buffer memory, coupled to said main memory, for storing, by way of data transfer from said main memory, part of the data stored in said main memory;

an instruction control unit, coupled to said buffer memory, for decoding instruction words read out of said buffer memory and for obtaining operand addresses; and

an arithmetic unit, coupled to said instruction control unit and said buffer memory, for processing instruction words decoded by said instruction control unit in response to operands read out from said buffer memory in accordance with operand addresses from said instruction control unit;

the improvement comprising:

first means, including said instruction control unit, for detecting that an instruction word read out from said buffer memory corresponds to a prescribed type of instruction in accordance with which said arithmetic unit successively utilizes a sequence of operands which are stored in successive regions of said main memory; and

second means, coupled to said main memory, said buffer memory, said instruction control unit, and said first means, for successively causing each operand in said sequence of operands to be transferred from said main memory to said buffer memory in accordance with an operand address from said instruction control unit, in response to said first means detecting said prescribed type of instruction.

4,095,270

METHOD OF IMPLEMENTING MANUAL OPERATIONS

Arnold Blum, Gechingen; Horst von der Heyden, Boeblingen; Fritz Irro, Boeblingen; Guenter Knauft, Boeblingen; Stephan Richter, Boeblingen, and Hermann Schulze-Schoelling, Gaertringen, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 11, 1977, Ser. No. 776,576
Claims priority, application Germany, May 19, 1976, 2622140
Int. Cl.² G06F *9/18*
U.S. Cl. 364—200 **4 Claims**

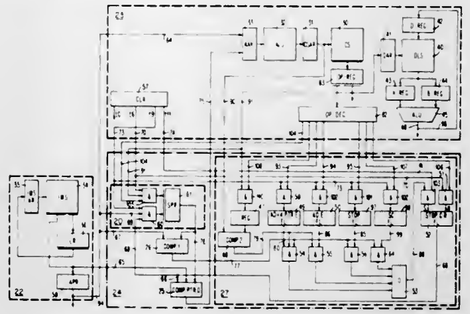
1. A method of implementing manual operations in a processor in which several programs are executed under time slice control, wherein one of the programs is a designated control program to control manual operations as a function of controllable operating mode latches for selecting the required manual operations, comprising:

entering a program pointer for a selected program for which a manual operation is to be implemented into a stop pointer register;

generating an output signal indicating a stop condition has been reached;

comparing the access pointers supplied by a program pointer logic with the program pointer entered in the stop pointer register, said comparison occurring before the next instruction of said selected program is again executed;

transferring in the case of a match the program pointer of the control program to force the execution of an instruction of



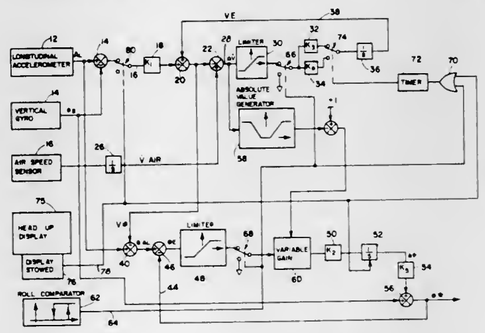
the control program for the manual operations, whereby, without stopping the execution of the unaffected programs, each time an instruction cycle occurs for the selected program for which a manual operation is to be implemented, these steps are repeated until the manually inputted operation is completed.

4,095,271

AIRCRAFT PITCH ATTITUDE SIGNAL GENERATOR

Hans Rudolf Muller, Kirkland, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Apr. 20, 1977, Ser. No. 789,153
Int. Cl.² G06G *7/78*
U.S. Cl. 364—434 **35 Claims**



1. A computed pitch circuit for aircraft, responsive to a longitudinal acceleration signal source representing aircraft longitudinal acceleration, and a gyroscope based signal source representing aircraft pitch, comprising:

means for combining the acceleration signal with the gyroscope pitch signal to generate a computed acceleration signal;

means responsive to the acceleration signal and said computed acceleration signal for generating an inertial pitch signal; and

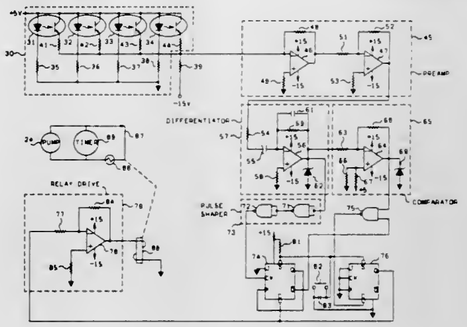
means responsive to said inertial pitch signal and the gyroscope pitch signal for generating a computed pitch signal.

4,095,272

AUTOMATIC TURBIDIMETRIC TITRATION

G. Jay Janzen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 11, 1977, Ser. No. 758,524
Int. Cl.² G06G *7/58*; G01N *31/16*
U.S. Cl. 364—497 **12 Claims**



1. Automatic turbidimetric titration apparatus comprising

means adapted to contain a liquid medium to be titrated;

titrant supply means adapted to introduce a turbidimetric titrant into said medium at a gradual rate;

optoelectronic means adapted to produce an analog measurement signal representative of the turbidity of the medium being titrated;

differentiating means adapted to produce, responsive to said analog measurement signal, a differentiated signal representative of the first derivative of said analog measurement signal;

means adapted to compare said differentiated signal with a reference signal and to produce a control signal when said differentiated signal has a predetermined relationship with said reference signal, said predetermined relationship being representative of the occurrence of the titration end-point; and

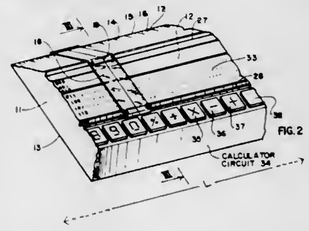
means responsive to said control signal adapted to produce a titration end-point signal representative of the amount of said titrant added to the medium being titrated in order to achieve said predetermined relationship between said reference signal and said differentiated signal.

4,095,273

ELECTRONIC SLIDE RULER CALCULATOR

James Gonzalez, Monroe, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Feb. 25, 1977, Ser. No. 771,892
Int. Cl.² G06F *7/38, 3/00*
U.S. Cl. 364—705 **4 Claims**



1. An electronic slide ruler calculator for indicating a measured distance to a precise fraction of a predetermined scale, said ruler calculator comprising

an elongated ruler member having spaced opposite parallel first and second surfaces and a measuring straight edge at

the second surface, said measuring edge having a plurality of spaced distance indications marked thereat;

a distance marker slidably mounted for free movement along the length of the ruler member on the first surface thereof and having a hair sight extending transversely to the ruler member across the first surface and at the measuring edge for visually indicating a distance on the ruler device, said distance marker having electrically conductive contacts thereon along the hair sight;

a plurality of spaced electrical contacts on the first surface of the ruler member in a predetermined pattern whereby a plurality of fractional divisions of each distance indication marked at the measuring edge are provided, the distance marker being spring mounted on the ruler member in a manner whereby the contacts of the marker and those of the ruler member directly thereunder make electrical contact when said marker is manually depressed; and

calculator circuit means electrically connected to the contacts on the ruler member for indicating the exact position of the distance marker when said marker is manually moved into position and manually depressed so that the contacts of said marker make electrical contact with contacts of said ruler member directly thereunder.

4,095,274

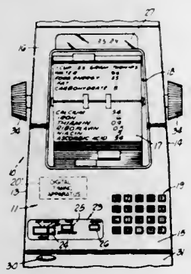
APPARATUS FOR DETERMINING FOOD CONTENT

Carl Gordon, 1203 S. Spaulding Ave., Los Angeles, Calif. 90019

Filed Apr. 27, 1977, Ser. No. 791,321

Int. Cl.² G06F *15/42*

U.S. Cl. 364—715 **4 Claims**



1. A device comprising:

a hollow housing having a top wall, side walls and a bottom wall, the top wall having a first substantially horizontal portion and a second portion integral with the first portion which extends angularly upwardly therefrom;

said housing top wall including walls defining an opening which is in both said first and second portions;

an axle having its ends rotatably mounted in the housing side walls;

a plurality of information bearing elements carried by said axle and so arranged as to extend within the housing opening and adapted for viewing from the housing exterior;

a pushbutton digital calculator having the pushbuttons mounted on the housing top wall portion; and

a display means for the digital calculator mounted on the housing top wall second portion above the opening therein.

4,095,275

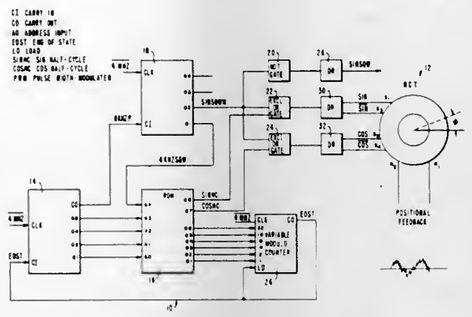
PULSE WIDTH MODULATED SINE COSINE GENERATOR

Francis A. Fluet, Longwood, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 14, 1977, Ser. No. 768,130

Int. Cl.² G06F *15/34*

U.S. Cl. 364—721 **8 Claims**



1. A digital waveform generator for deriving sine and cosine waves by pulse width modulation comprising:

counting means having a plurality of states, comprising a plurality of lesser significant bits and a most significant output bit;

read only memory (ROM) means having a plurality of address inputs for receiving said lesser significant bits and having a plurality of programmed output bits, two of said latter bits defining a sine half cycle (SINHC) and a cosine half cycle (COSHC), the remaining ROM output bits defining a modulo,

variable modulo counting means having a plurality of inputs connected to receive said modulo output from said ROM means, and to deliver an end of state (EOST) signal to said counting means;

means for clocking connected to said counting means and to said variable modulo counting means, whereby

when the variable modulo counter has counted to its capacity the EOST signal is sent to said counting means, and said variable modulo counter is enabled, the counting means then advancing to its next state to provide the next ROM address and the next programmed ROM modulo output, the ROM modulus output from the previous state of said counting means now becoming the next modulo for said variable modulo counter; and

logic means for receiving said most significant output bit and said SINHC and COSHC bit signals, for performing algebraic logic operations to provide pulse width modulated sine and cosine waveforms respectively, the modulated width of said waves being a function of the duration of the states of said counting means respectively.

4,095,276

DIGITAL SIGNAL PROCESSING ARRANGEMENT INCLUDING A WAVE DIGITAL FILTER

Gerard Verkroost, Mierlo, and Hans-Jurgen Butterweck, Geldrop, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 16, 1976, Ser. No. 751,548

Claims priority, application Netherlands, Dec. 22, 1975, 7514908

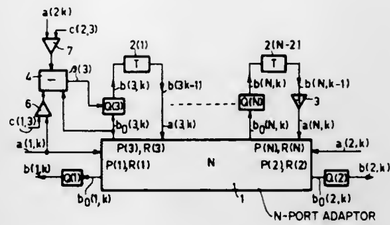
Int. Cl.² G06F *15/34;* **H03H** *7/10*

U.S. Cl. 364—724 **8 Claims**

1. A digital signal processing arrangement comprising at least one wave digital filter including at least one N-port adaptor with ports P(*i*), (*i* = 1, 2, . . . N), each port including an input and an output, at least one of the ports P(*i*) being of the purely capacitive type;

means connected to said filter for supplying digital information signal waves *a*(1,*k*), *a*(2,*k*), . . . *a*(*r*,*k*) through the input of each of *r* ports (*r* < N);

means connected to said filter for supplying auxiliary digital signal waves *a*(*i*,*k*), where *i* = *r*+1, . . . N, through the input of each of the remaining ports; and



quantizing means connected to the output of each of said ports P(*j*), (*j* = 1, 2, . . . N), for producing a digital output signal wave *b*(*j*,*k*) quantized at a predetermined word-length, said quantizing means producing at each of said purely capacitive ports P(*i*) a digital output signal wave *b*(*j*,*k*) such that each *b*(*j*,*k*) satisfies the relationship

$$|b(j,k) - \sum_{i=1}^{r} c(i,j)a(i,k)| \leqq |b_o(j,k) - \sum_{i=1}^{r} c(i,j)a(i,k)|$$

in which *c*(*n*,*j*), with *n* = 0, 1, 2, . . . *r*, represents a constant characteristic of the *j*th purely capacitive port, and $b_o(j,k)$ represents a non-quantized version of the digital output signal wave *b*(*j*,*k*).

4,095,277

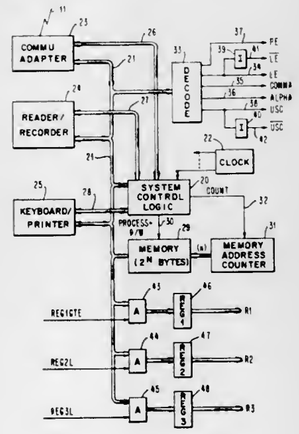
METHOD FOR COMMUNICATING TEXT COMMANDS AND INSTRUCTIONS USING CONVENTIONAL CODED TEXT CHARACTERS AND A STRUCTURE FOR DECODING AND PRESENTING COMMAND AND INSTRUCTION SIGNALS

Robert Glenn Bluethman, and William Weller Boyd, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 7, 1976, Ser. No. 693,822

Int. Cl.² G06F *3/12*

U.S. Cl. 364—900 **12 Claims**



1. A method of transmitting conventional coded text and printer control signals representing text, printer control, command and instruction signals in a transparent and unstructured format comprising the steps of:

providing a command delimiter including a conventional line end signal (LE) and a conventional comma signal (,) immediately preceding each command to be transmitted for entering a command mode;

encoding a following command in conventional alphabetic characters of which at least the first character represents the command;

providing an instruction delimiter including a conventional line end signal (LE) for each concatenated instruction following a command;

encoding a following instruction in conventional alphabetic characters of which at least the first character represents the instruction; and

providing a conventional page end (PE) character following commands and instructions as set forth above for terminating the command mode and returning to text mode in which a recipient device will reproduce all conventionally encoded text characters received and utilize as device control characters all conventional encoded control characters received.

4,095,278

INSTRUCTION ALTERING SYSTEM

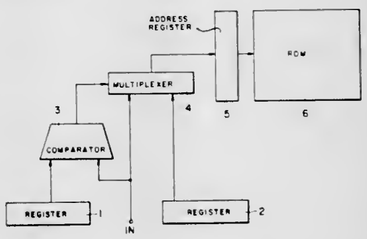
Toshimasa Kihara, Kodaira, Japan, assignor to Hitachi, Ltd., Japan

Filed Oct. 6, 1976, Ser. No. 729,983

Claims priority, application Japan, Oct. 8, 1975, 50-120702

Int. Cl.² G06F *9/06*

U.S. Cl. 364—900 **5 Claims**



1. An instruction altering system to be used with program and microprogram control systems having instruction storage means and address register means connected with said instruction storage means comprising:

first register mean for storing an operation code for an instruction stored in said storage means which is to be altered;

second register means for storing a second operation code for an instruction stored in said storage means;

input means for providing an operation code of an instruction which is to be executed;

comparator means connected with said first register means and said input means for comparing said first operation code and said operation code of the instruction which is about to be executed and for generating a coincidence signal when said codes coincide; and

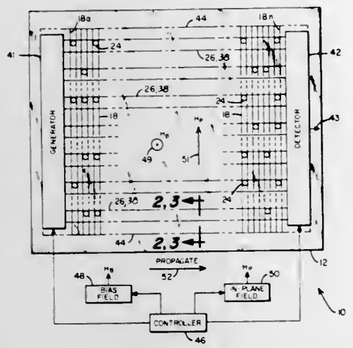
multiplexer means connected with said second register means, said input means, said comparator means and said address register means for transferring said second operation code to said address register instead of the operation code of said instruction which is about to be executed when said coincidence signal is received from said comparator means.

4,095,279

ORTHOGONAL POTENTIAL WELL MATRIX AND AMPLITUDE MODULATED BIAS FIELD FOR BUBBLE DOMAIN PROPAGATION

Stanley James Lins, Bloomington, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Apr. 8, 1977, Ser. No. 785,807
Int. Cl.² G11C *19/08*
U.S. Cl. 365—29 **4 Claims**



1. A bubble domain propagation apparatus, comprising:
a first layer of a magnetizable material in which are formed a plurality of parallel, spaced-apart first periodic potential wells;
a second layer of a magnetizable material in which are formed a plurality of parallel, spaced-apart second periodic potential wells which are orthogonally oriented with respect to said plurality of parallel, spaced-apart first periodic potential wells in said first layer for forming a plurality of first periodic potential well, second periodic potential well intersections;
bubble generator means coupled to said second periodic potential wells for selectively coupling bubble domains into selected ones of said intersections along a first one of said first periodic potential wells;
in-plane field generator means for coupling an in-plane field H_P in the plane of said second layer; and,
bias field generator means for coupling an amplitude modulated bias field H_B normal to the planes of said first and second layers, said bias field H_B having an amplitude modulated frequency F for propagating the bubble domains along the associated second periodic potential well from upstream to next adjacent downstream intersection at said frequency F at successive cycles of said amplitude modulated bias field H_B.

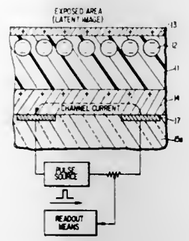
4,095,280

ELECTRICAL INFORMATION STORAGE SYSTEM USING A LAYER OF PARTICULATE PHOTOSENSITIVE MATERIAL

Koji Okumura, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 539,913, Jan. 9, 1975, Pat. No. 4,059,443. This application Jul. 2, 1976, Ser. No. 702,154
Int. Cl.² G11C *11/42*
U.S. Cl. 365—112 **5 Claims**

1. A method of retrieving electrical information from an electrical information storage member, comprising:
providing an electrical information storage member comprising a layer of substantially electrically insulating material containing a layer of particulate electrically photosensitive material, a semiconductor layer contacting one surface of said layer of substantially electrically insulating material, a substantially transparent electrode layer of electrically conductive material contacting the opposite surface of said layer of substantially electrically insulating material and a plurality of electrode pairs contacting said semiconductor layer, said storage member having electrical information stored as charges established in selected ones of the photosensitive particles,
selectively pulsing a current to each of said electrode pairs,



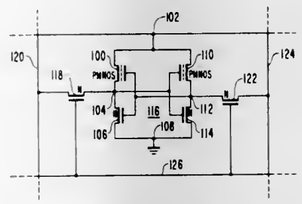
and detecting the relative magnitudes of currents channeling through the semiconductor layer between each of said electrode pairs, the relative magnitudes of said currents corresponding to the presence of charges in selected ones of the photosensitive particles.

4,095,281

RANDOM ACCESS-ERASABLE READ ONLY MEMORY CELL

George Denes, Austin, Tex., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 4, 1976, Ser. No. 663,752
Int. Cl.² G11C *11/40, 17/00*
U.S. Cl. 365—156 **4 Claims**



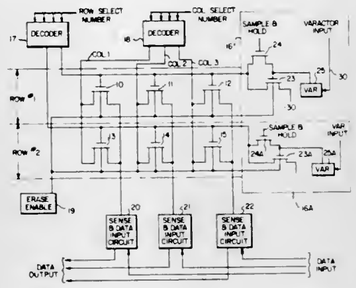
1. In a memory of the kind selectively operable in RAM and ROM modes, said memory comprising first and second inverters, each inverter having an output node cross-coupled to an input node of the other for forming a static RAM cell, the output node of each inverter of said RAM cell being selectively connected via the conduction paths of separate access transistors to respective digit lines, the control electrodes of said access transistors being connected to a common control line and each inverter including at least a first field effect transistor having an unbalanced impedance means associated therewith for providing ROM data retention, the improvement for providing RAM and EAROM operation of said memory, characterized in that:
said unbalanced impedance means comprises a first variable-threshold transistor connected as a load in the drain circuit of said first field effect transistor in said first inverter and having a control electrode connected to the output of said second inverter; and a second variable threshold transistor connected as a load in the drain circuit of said first field effect transistor in said second inverter and having a control electrode connected to the output of the first inverter.

4,095,282

MEMORY INCLUDING VARACTOR CIRCUIT TO BOOST ADDRESS SIGNALS

Harry G. Oehler, Glen Burnie, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 23, 1976, Ser. No. 744,377
Int. Cl.² G11C *11/40*
U.S. Cl. 365—204 **3 Claims**



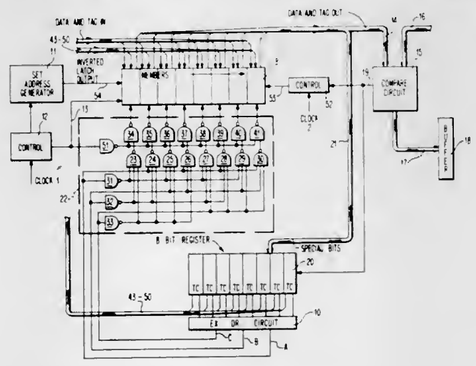
1. An MNOS memory array comprising:
a. an array of MNOS memory transistors, said array being arranged in columns and rows;
b. first addressing means responsive to a first digital signal to generate a column select signal;
c. second addressing means responsive to a second digital signal to generate a row select signal; and
d. varactor means responsive to said row select signal and a write mode signal to boost said row select signal when said memory is in the write mode.

4,095,283

FIRST IN-FIRST OUT MEMORY ARRAY CONTAINING SPECIAL BITS FOR REPLACEMENT ADDRESSING

John Edward Campbell, and Gerhard Robert Thompson, both of Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 2, 1976, Ser. No. 702,363
Int. Cl.² G11C *8/00*
U.S. Cl. 365—230 **9 Claims**



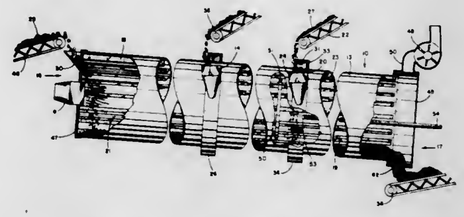
1. A first in - first out memory comprising:
at least three storage members,
each said member including a plurality of bit storage means, one of said means storing a special bit,
Gray code encoding circuit means,
means for coupling each said special bit storage means to the input of said encoding circuit means,
member selection means coupled between said encoding circuit means and said members for selecting one of said members in accordance with the output of said circuit means, and
means for changing the state solely of the special bit storage means included within the member selected by said selection means.

4,095,284

DIRECT HEATING ASPHALT-AGGREGATE RECYCLE APPARATUS AND METHOD

Robert L. Mendenhall, 1770 Industrial Rd., Las Vegas, Nev. 89102

Continuation-in-part of Ser. No. 603,357, Aug. 11, 1975, Pat. No. 3,999,743, and a continuation-in-part of Ser. No. 729,705, Oct. 5, 1976. This application Dec. 27, 1976, Ser. No. 754,315
Int. Cl.² B28C *5/20*
U.S. Cl. 366—7 **9 Claims**



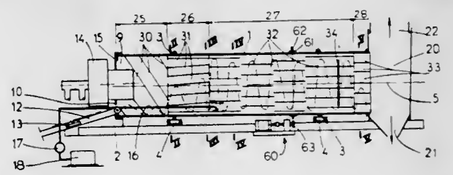
1. An apparatus for heating and mixing asphalt-aggregate composition comprising:
an elongated rotatable cylindrical drum having means for supplying hot gases of combustion therein at a first end and means for recovering composition at a second opposite end,
means for introducing coarse composition particles into said drum in a hot zone adjacent said first end,
means for introducing smaller composition particles into said drum in a cooler zone spaced from said first end, and
a plurality of lifters secured along the drum interior adjacent the first end and spaced apart from the interior surface.

4,095,285

DEVICE FOR THE PREPARATION OF COATED PRODUCTS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS

Pierre Malbrunot, Saint-Cloud, France, assignor to Creusot-Loire, Paris, France

Filed Oct. 1, 1976, Ser. No. 728,793
Claims priority, application France, Oct. 8, 1975, 75 30788
Int. Cl.² B28C *5/08*
U.S. Cl. 366—23 **16 Claims**



1. A device for the preparation of coated products from aggregate, powdery matter and binder, comprising a platform, a cylindrical dryer and mixer drum having an inlet end and an outlet end, means mounting said drum for rotation about its longitudinal axis on said platform, means for driving said drum in rotation, means for continuously feeding aggregate and powdery matter to said inlet end of said drum, a burner projecting into said inlet end of said drum, a fixed chamber for discharge of coated product and for exhaust of the gases in circulation in the drum, said fixed chamber being in communication with said outlet end of said drum, means for supplying

binder to said drum, said drum being arranged so that said inlet end is at a level higher than the level of said outlet end to promote the circulation of the products in said drum, said drum comprising in succession in the direction of flow of the products therethrough from said inlet end;

a first zone for introduction of aggregate and powdery matter supplied by said feeding means, and including blades projecting inwardly of the drum arranged in a spiral on the inner surface of the wall of said drum,

a second zone for preheating and predrying of the aggregate and homogenization of the mixture of aggregate and powdery matter, and including means for lifting the aggregate and powdery matter provided on the inner surface of said drum, the transverse section of said lifting means taken in a plane perpendicular to the axis of said drum being variable along said second zone such that the capability of retention of said lifting means increases in the direction of advance of the products, said capability of retention being low at the inlet to said second zone, such that relatively little material will be lifted and dropped at said inlet to said second zone and thus will not interfere with the flame from the burner,

third zone for drying, mixing and heating the products, said binder supplying means discharging at the inlet of said third zone, the inner surface of the wall of said drum being provided in said third zone with further lifting means, the transverse section of which is identical with the transverse section of said lifting means at the outlet of said second zone, said further lifting means having a high capability of retention such that the products form a substantially continuous curtain across the whole transverse section of said drum at the inlet of the third zone to isolate the third zone and the binder supplying means from the second zone.

4,095,286

AGITATOR FOR PAINT SPRAY CANS

Jerry Ellis, 6520 Shadowlawn, Dearborn Heights, Mich. 48127

Filed Jan. 5, 1976, Ser. No. 646,537
Int. Cl.[2] B01F *7/18*
U.S. Cl. 366—293 **7 Claims**

1. An agitator for a paint spray assembly, comprising:

(a) a housing adapted to be disposed within a cup, the housing having an internal cavity,

(b) a shaft removably mounted to the housing and extending through the housing, the shaft having an enlarged splined section disposed within the cavity,

(c) a vaned paddle wheel mounted on the shaft exteriorly of the housing,

(d) a first lateral bore formed in the housing and extending radially outwardly from the cavity and defining means for delivering pressurized fluid to the cavity to rotate the shaft by the impingement of fluid on the spline, and

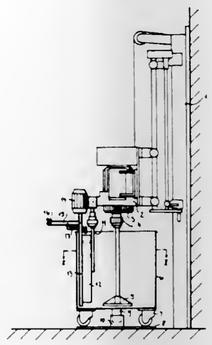
(e) a second lateral bore formed in the housing and extending laterally outwardly from the cavity, the bore being axially offset from the first bore, the second bore defining means for exhausting the fluid from the cavity.

4,095,287

EMPTYING APPARATUS FOR PASTY MATERIALS

Hans-Josef Felser, and Kurt Paul Kley, both of Cologne, Germany, assignors to Bonaval-Werke GmbH, Bonn, Germany

Filed Mar. 3, 1976, Ser. No. 663,425
Int. Cl.[2] B01F *15/02, 7/20, 9/10*
U.S. Cl. 366—194 **4 Claims**



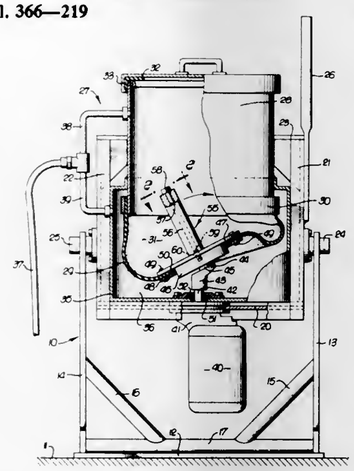
1. An emptying apparatus for pasty materials comprising a cylindrical container which is rotatable about its axis by means of an eccentrically located stirring element within the container, a strip-shaped baffle extending along the wall of the cylindrical container approximately parallel to the container axis, said baffle having one vertical edge mounted to rotate in fixed vertical positions about its vertical axis and the other free edge being free and movable to different vertical positions, so that the angle which the said baffle makes with the container wall can be adjusted, a spiral pump, means attaching said spiral pump to the free edge of the baffle and an outlet pipe attached to the pump outlet.

4,095,288

VARIABLE AGITATOR MIXER

Leslie H. Garlinghouse, 1585 Sierra Madre Villa, Pasadena, Calif. 91107

Continuation of Ser. No. 575,141, May 7, 1975, abandoned, Ser. No. 340,670, Mar. 13, 1973, abandoned, and Ser. No. 364,881, May 29, 1973, Pat. No. 3,962,892. This application Mar. 3, 1977, Ser. No. 774,193
Int. Cl.[2] B01F *13/00*
U.S. Cl. 366—219 **6 Claims**



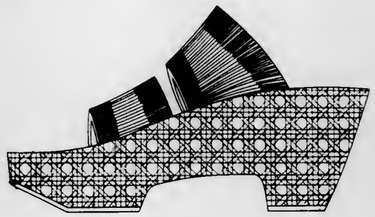
1. In an oscillatory type mixer employing a container for material to be mixed having a rigid upper wall portion, a flexible lower wall and bottom portion, said lower wall portion

extending upwardly from said flexible bottom portion defining an inner first chamber of variable shape inside said container, said rigid upper wall portion forming a second chamber of fixed shape and size in axial alignment with the first chamber and having a capacity comparable to the capacity of said first chamber, said chambers having a common vertical axis, and an annular connection between said upper and lower wall portions lying in a plane transverse to the common axis of said portions, said chambers being adapted to receive a mixing charge filling said first chamber and extending into the second chamber to provide an exposed level of said charge above the top of said first chamber and within said second chamber, a rigid disc at the center of said flexible lower wall and bottom portion having an inwardly facing surface comprising a bottom for said first chamber and a motor-driven oscillatory wobble drive for said disc, said surface having a continuous tilt relative to said plane and a continuously varying wobble motion during operation, an agitator assembly having a relatively fixed end with an attachment to said rigid disc at a location substantially coincident with said surface, said agitator assembly having a length exceeding the depth of the first chamber and extending from the disc inwardly through the first chamber and into the second chamber through said plane and that portion of the mixing charge contained in said second chamber, said agitator assembly having a continuous tilt relative to said plane and a path of travel passing cyclically continuously into and out of those portions of the chambers which receive the mixing charge.

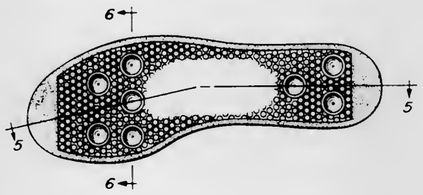
DESIGNS

JUNE 13, 1978

248,126
SHOE
Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.
Filed Apr. 12, 1976, Ser. No. 676,166
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—292

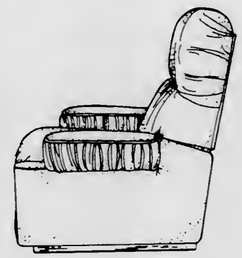


248,127
OUTER SOLE FOR FOOTWEAR
Vijay Batra, 685 Oak St., Brockton, Mass. 02401
Filed Feb. 6, 1976, Ser. No. 655,748
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320



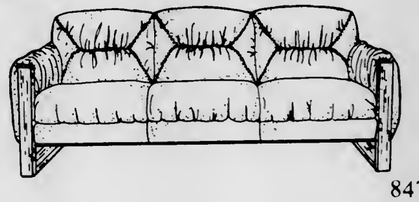
248,128
COMBINED RAZOR BLADE CARRIER AND DISPENSER
Joseph Scott Mineo, 22119 Runnymede St., Canoga Park, Calif. 91303
Filed Jul. 12, 1976, Ser. No. 704,516
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400

248,129
LOUNGE CHAIR
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, Morristown, Tenn.
Filed Jul. 19, 1976, Ser. No. 706,734
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—37

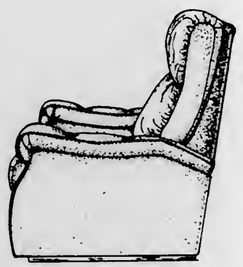


248,130
CHAIR
Warren D. Petersen, St. Charles, Ill., assignor to Burd, Inc., Howell Division
Filed Jun. 15, 1976, Ser. No. 696,214
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

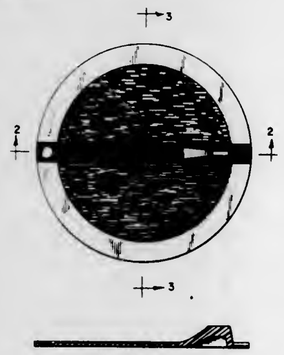
248,131
SEAT
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, Morristown, Tenn.
Filed Jul. 19, 1976, Ser. No. 706,736
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



248,132
LOUNGE CHAIR
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, Morristown, Tenn.
Filed Jul. 19, 1976, Ser. No. 706,735
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



248,133
SINK STOPPER
Sidney J. Shames, 57 Holly Pl., Briarcliff Manor, N.Y. 10510, and Harold Shames, 5 Agnes Cir., Ardsley, N.Y. 10502
Filed Aug. 19, 1976, Ser. No. 715,714
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—86



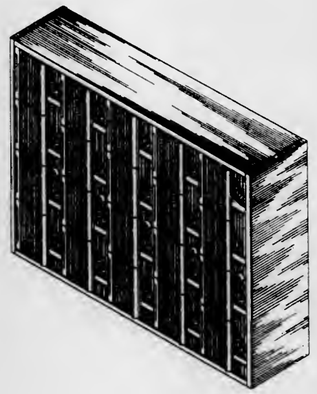
248,134
TUB STOPPER
Sidney J. Shames, 57 Holly Pl., Briarcliff Manor, N.Y. 10510, and Harold Shames, 5 Agnes Cir., Ardsley, N.Y. 10502
Filed Aug. 19, 1976, Ser. No. 715,729
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—86

248,135
HANGER FOR COLLAPSIBLE TUBES
Albert H. Torongo, Jr., Yardley, Pa., assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Dec. 6, 1976, Ser. No. 748,023
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—87

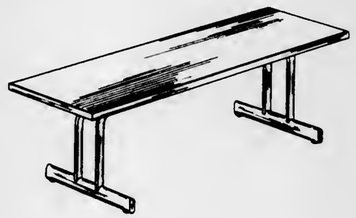
248,136
DRESSER OR SIMILAR ARTICLE
Harold V. Aulbert, High Point, N.C., assignor to Vaughan Furniture Company, Incorporated
Filed Nov. 2, 1976, Ser. No. 738,125
Term of patent 3½ years
Int. Cl. D6—*04*
U.S. Cl. D6—154

248,137
TABLE OR SIMILAR ARTICLE
Warren D. Petersen, St. Charles, Ill., assignor to Burd, Inc., Howell Division
Filed Nov. 8, 1976, Ser. No. 739,996
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—146

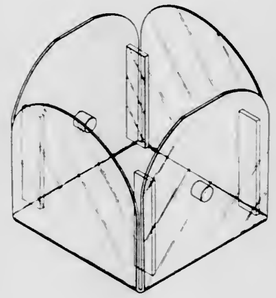
248,138
LOCKER
Wells F. Stackhouse, Ashville, and Douglas A. Barth, Sinclairville, both of N.Y., assignors to American Locker Security Systems, Inc., Jamestown, N.Y.
Filed Oct. 19, 1976, Ser. No. 735,610
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—170



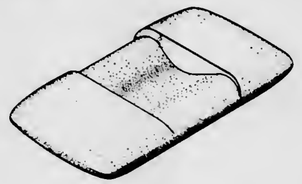
248,139
TABLE OR SIMILAR ARTICLE
Warren D. Petersen, St. Charles, Ill., assignor to Burd, Inc., Howell Division
Filed Nov. 8, 1976, Ser. No. 739,997
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



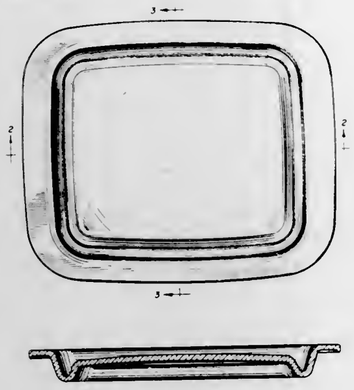
248,140
ACCESSORY HOLDER FOR FOOD PROCESSORS
Barbara Comfort, Landgrove, and Frederik George Richard von Roth, Peru, both of Vt., assignors to Acrylic Designs, Inc., South Londonderry, Vt.
Filed Jun. 4, 1976, Ser. No. 692,925
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—181



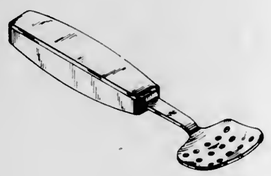
248,141
PILLOW
Audre C. Forsland, 923 23rd Ave. West, Virginia, Minn. 55792
Filed Jan. 13, 1976, Ser. No. 648,750
Term of patent 14 years
Int. Cl. D6—*09*
U.S. Cl. D6—201



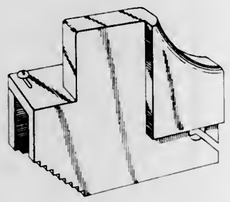
248,142
BROWNING GRIDDLE OR THE LIKE FOR MICROWAVE OVENS
Richard W. Greger, Corning, N.Y., assignor to Corning Glass Works
Filed Feb. 20, 1976, Ser. No. 659,661
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—87



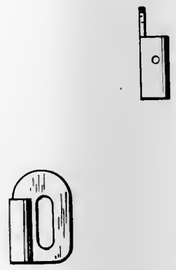
248,143
SERVING SPOON
Thomas G. Cannon, Ft. Collins, Colo., and Spencer L. Mackay, Glendale, Calif., assignors to Teledyne Industries, Ft. Collins, Colo.
Filed Dec. 13, 1976, Ser. No. 757,792
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—140



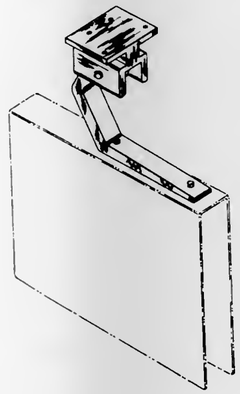
248,144
MULTI-PURPOSE JIG FOR USE WITH TABLE SAWS
Lloyd D. Kreitz, P.O. Box 60, Pequot Lakes, Minn. 56472
Filed Dec. 27, 1976, Ser. No. 753,986
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—14



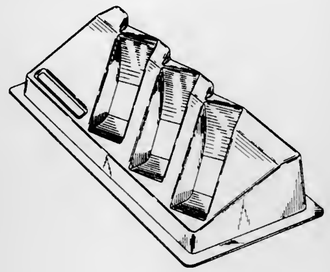
248,145
LOCKING PLATE
Junius T. Moore, Jr., Charleston, W. Va., assignor to The Moore Company, Inc., Charleston, W. Va.
Filed Mar. 7, 1977, Ser. No. 775,412
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—344



248,146
BOOK SUPPORT BRACKET
Gerard Drag, Morton Grove, Ill., assignor to General Binding Corporation
Filed Aug. 9, 1976, Ser. No. 712,733
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—363

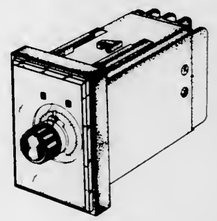


248,147
RIBBON CARTRIDGE CADDY
Joseph A. Rauch, Tivon, Israel, and Arthur P. Wales, Riverside, Conn., assignors to SCM Corporation, New York, N.Y.
Filed Oct. 18, 1976, Ser. No. 733,615
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—89



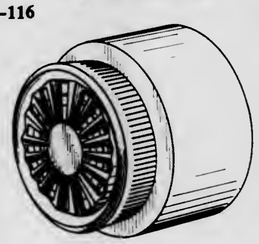
248,148
DEVELOPER POWDER CONTAINER
Davis W. Chamberlin, Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.
Filed Nov. 24, 1976, Ser. No. 744,689
Term of patent 14 years
Int. Cl. D9—*04;* D16—*04*
U.S. Cl. D9—224

248,149
MOTOR TIMER
Teizo Fujita, and Toshiro Ohashi, both of Osaka, Japan, assignors to Izumi Denki Company Limited, Osaka, Japan
Filed Aug. 2, 1976, Ser. No. 711,084
Claims priority, application Japan, Apr. 5, 1976, 51-12571; Apr. 5, 1976, 51-12572; Apr. 5, 1976, 51-12573; Apr. 5, 1976, 51-12574
Term of patent 14 years
Int. Cl. D10—*03*
U.S. Cl. D10—40

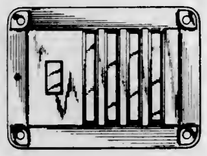


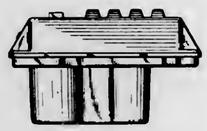
248,150
COMBINED MOISTURE AND LIGHT METER FOR PLANTS
Samuel J. Koch, 51 El Pueblo, Scotts Valley, Calif. 95066
Filed Oct. 28, 1975, Ser. No. 625,944
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—56

248,151
ELECTRIC BUZZER
Rudolph M. Duris, Norwalk, Conn., assignor to General Signal Corporation
Filed May 11, 1976, Ser. No. 685,206
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—116

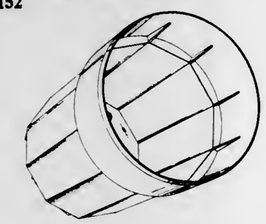


248,152
SIREN
Hank Hastings, Rocky Mount, N.C., assignor to Carolina Enterprises, Inc., Tarboro, N.C.
Filed Aug. 19, 1976, Ser. No. 716,001
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—120

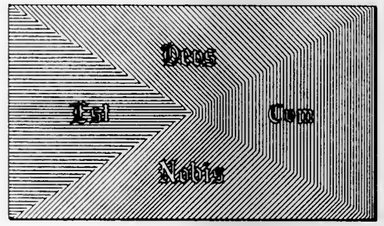




248,153
PLANT POT
Saburo Yoshida, Hayward, Calif.; Harold R. Appelblom, deceased, late of South San Francisco, Calif., by Mae H. Appelblom, administratrix, assignors to Sunnyside Nurseries, Inc., Hayward, Calif.
Filed May 25, 1977, Ser. No. 800,471
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—152

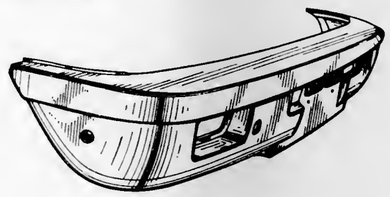


248,154
FLAG
Everardo P. Sierra, 1809 W. Buckeye Rd., Space #20, Phoenix, Ariz. 85007
Filed Nov. 1, 1976, Ser. No. 737,663
Term of patent 14 years
Int. Cl. D11—*05*
U.S. Cl. D11—167

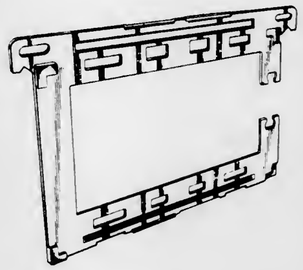


248,155
ELECTRIC CAR
Cheston Lee Eshelman, 621 NE. 30th Ter., Miami, Fla. 33137
Filed Oct. 6, 1976, Ser. No. 729,886
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—92

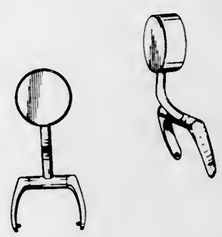
248,156
CAR FRONT BUMPER
Michel Tixier, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France
Filed Dec. 23, 1975, Ser. No. 643,674
Claims priority, application France, Jul. 1, 1975, 75 73,993
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—169

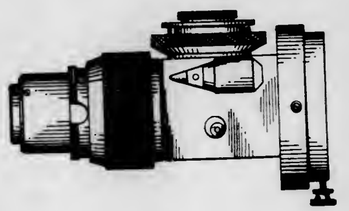


248,157
ELECTRODE FRAME FOR USE IN AN ELECTROLYTIC FILTER PRESS CELL APPARATUS OR THE LIKE
Gary C. Ganzi, Watertown; Kenneth O'Donoghue, Cambridge, and Anil D. Jha, Littleton, all of Mass., assignors to Ionics, Inc., Watertown, Mass.
Filed May 19, 1976, Ser. No. 688,431
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—40

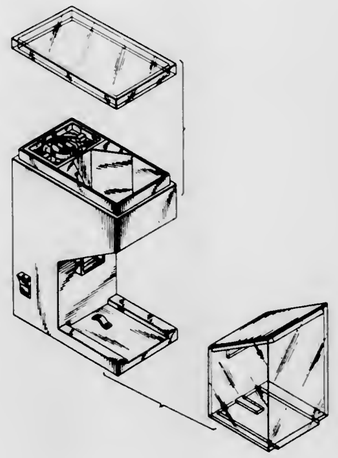


248,158
HEADSET-HARDHAT ADAPTER
Clifford D. Read, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada
Filed Aug. 16, 1976, Ser. No. 714,621
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—94



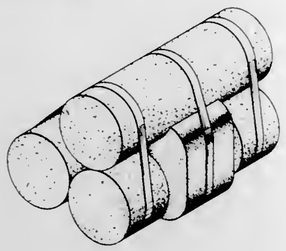


248,159
COFFEE MILL
Husazo Maejima, Tokyo, Japan, assignor to Sachie Andov, Tokyo, Japan
Filed Sep. 9, 1976, Ser. No. 722,057
Term of patent 14 years
Int. Cl. D7—*04;* D15—*08*
U.S. Cl. D15—100



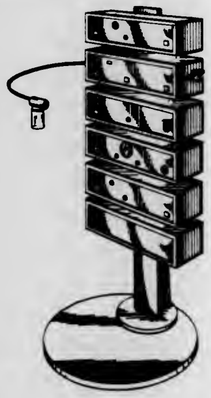
248,160
PHOTO ADAPTER MICROSCOPE ACCESSORY
Richard E. Feinbloom, New York, and Laszlo Endrodi, Elmhurst, both of N.Y., assignors to Designs for Vision, Inc., New York, N.Y.
Filed Jun. 7, 1976, Ser. No. 693,633
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—38

248,161
COMBINED SOLID FUEL UNIT AND IGNITER
Charles J. Dalzell, 940 N. 6th Ave., Yakima, Wash. 98902
Filed Nov. 11, 1976, Ser. No. 741,140
Term of patent 14 years
Int. Cl. D23—*05*
U.S. Cl. D23—166



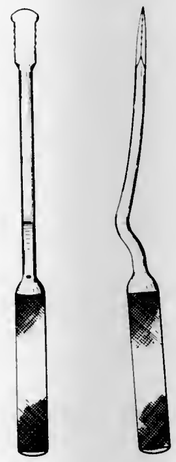
248,162
FIRE LIGHTER
Genevieve S. Cavanaugh, 359 Parkview Ave., Golden, Colo. 80401, assignor to Genevieve S. Cavanaugh
Filed Dec. 15, 1976, Ser. No. 750,712
Term of patent 14 years
Int. Cl. D23—*05*
U.S. Cl. D23—166

248,163
SKIN CARE EQUIPMENT AND STAND APPARATUS
Wallace A. Roberts, 88 N. Main St., Bellingham, Mass. 02019
Filed Jan. 5, 1977, Ser. No. 757,072
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—1.1

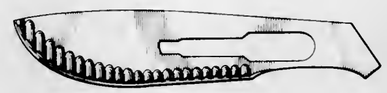


248,164
SPHYGMOMANOMETER
Mace Hudson Bell, 14 Pine Point Rd., Rowayton, Conn. 06853, and David Lee Haas, 80 County St., Norwalk, Conn. 06852
Filed Apr. 14, 1977, Ser. No. 787,355
Term of patent 14 years
Int. Cl. D24—*02;* D10—*07*
U.S. Cl. D24—21

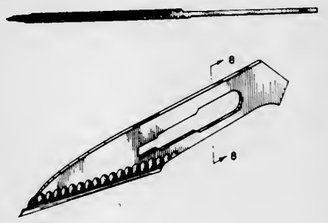
248,165
INFRAMAMMARY DISSECTOR INSTRUMENT
Charles A. Wilson, 1704 Riggins Rd., Tallahassee, Fla. 32303
Filed Jun. 7, 1976, Ser. No. 693,802
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—28



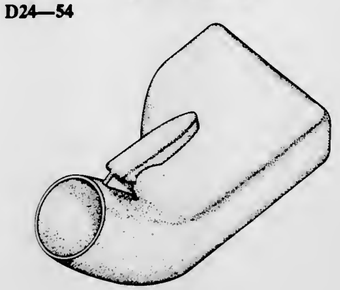
248,166
BLADE FOR SURGICAL KNIFE
Ryoji Kanai, Seki, Japan, assignor to Feather Kogyo Kabushiki Kaisha, Mino, Japan
Filed Aug. 27, 1975, Ser. No. 608,403
Claims priority, application Japan, Jun. 13, 1975, 50-23977
Term of patent 14 years
Int. Cl. D24—*02;* D28—*03*
U.S. Cl. D24—29



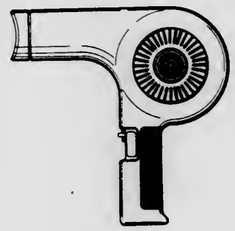
248,167
BLADE FOR SURGICAL KNIFE
Ryoji Kanai, Seki, Japan, assignor to Feather Kogyo Kabushiki Kaisha, Mino, Japan
Filed Aug. 27, 1975, Ser. No. 608,404
Claims priority, application Japan, Jun. 13, 1975, 50-23976
Term of patent 14 years
Int. Cl. D24—*02;* D28—*03*
U.S. Cl. D24—29



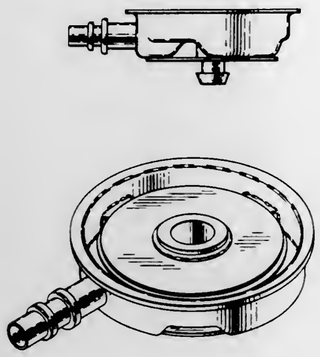
248,168
MALE URINAL
Gordon Kelly, Elm Grove, Wis., assignor to Bamis Manufacturing Company, Sheboygan Falls, Wis.
Filed Apr. 11, 1977, Ser. No. 786,307
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—54



248,169
HAIR DRYER
Shinji Yamamoto, Kadoma, Japan, assignor to Matsushita Electric Works, Ltd., Kadoma, Japan
Filed Sep. 28, 1976, Ser. No. 727,544
Claims priority, application Japan, Apr. 2, 1976, 51-12327
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—13

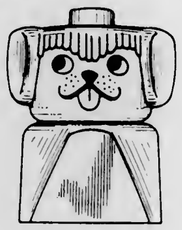


248,170
MANUAL CONTROL VALVE FOR ANESTHETIC GASES
Allan M. Steigerwald, Rte. 3, Box 1000, Port Angeles, Wash. 98362
Filed Dec. 1, 1976, Ser. No. 746,621
Term of patent 14 years
Int. Cl. D29—*02, 99*
U.S. Cl. D29—7



248,171
CREMATION URN
Sanford A. Sugarman, Shaker Heights, Ohio, assignor to Superior Funeral Supply Corporation
Filed Aug. 18, 1975, Ser. No. 605,531
Term of patent 14 years
Int. Cl.[2] D31—*00*
U.S. Cl. D31—5

248,172
TOY FIGURE
Erik Peter Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,849
Term of patent 14 years
Int. Cl.[2] D21—*01*
U.S. Cl. D34—2 R



248,173
TOY FIGURE
Erik Peter Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,663
Term of patent 14 years
Int. Cl.[2] D21—*01*
U.S. Cl. D34—4 R

248,174
TOY FIGURE
Erik Peter Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,661
Term of patent 14 years
Int. Cl.[2] D21—*01*
U.S. Cl. D34—4 R

248,175
TOY FIGURE
Erik Peter Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,662
Term of patent 14 years
Int. Cl.[2] D21—*01*
U.S. Cl. D34—4 R

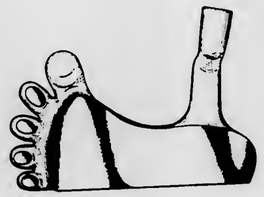
248,176
TOY FIGURE
Erik Peter Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,847
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

248,177
TOY FIGURE
Erik Peter Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,848
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

248,178
TOY FIGURE
Erik Peter Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Aug. 2, 1976, Ser. No. 710,851
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

248,179
GOLF CLUB
Edward J. Riley, Pebble Beach, Calif., assignor to The Pinseeker Corporation, Pacific Grove, Calif.
Filed Jul. 12, 1976, Ser. No. 704,488
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GC

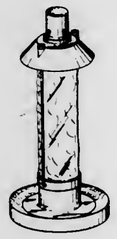
248,180
GOLF PUTTER HEAD
Raymond E. Carrier, 1017 N. Lake St., Burbank, Calif. 91502
Filed Aug. 2, 1976, Ser. No. 711,052
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



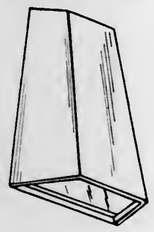
248,181
GOLF PUTTER HEAD
Walter I. Cervantes, 789 Promontory Dr. West, Newport Beach, Calif. 92660
Filed Dec. 29, 1976, Ser. No. 755,250
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

248,182
CANDLE HOLDER
John Anthony Mason Garcia, 1818 Hancock St., Los Angeles, Calif. 90031
Filed Nov. 15, 1976, Ser. No. 741,974
Term of patent 14 years
Int. Cl. D26—*01, 05*
U.S. Cl. D48—2

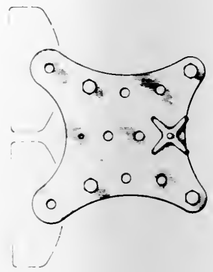
248,183
CANDLE HOLDER
John Anthony Mason Garcia, 1818 Hancock St., Los Angeles, Calif. 90031
Filed Nov. 15, 1976, Ser. No. 741,975
Term of patent 14 years
Int. Cl. D26—*01, 05*
U.S. Cl. D48—2

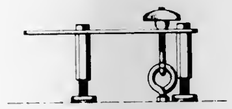


248,184
LAMP FOR ILLUMINATING DOOR LOCKS AND THE LIKE
Thomas Peter Roberts, 11 Lyons St., Glenroy, Victoria, 3046, Australia
Filed May 27, 1976, Ser. No. 690,739
Claims priority, application Australia, Nov. 27, 1975, 68196/75
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—4 B



248,185
DETACHABLE MULTI-PURPOSE LIGHT PLATFORM
Stanley J. Keyawa, 6500 Rexford Way, Carmichael, Calif. 95608
Filed Feb. 16, 1977, Ser. No. 768,974
Term of patent 14 years
Int. Cl. D26—*99*
U.S. Cl. D48—4 A

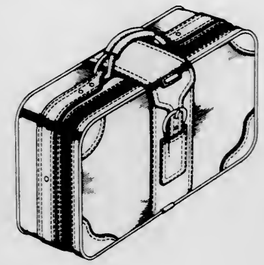




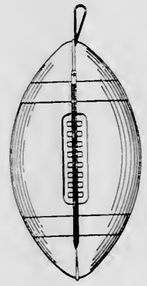
248,186
COVER FOR YARD LIGHT
Minas P. Hazerjian, 72 Stivaletta Dr., Dedham, Mass. 02026, and Kevork P. Hazerjian, 19 Woodard Rd., West Roxbury, Mass. 02132
Filed Dec. 20, 1976, Ser. No. 753,535
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—38

248,187
BAGPIPE PRACTICE CHANTER
George J. Roe, 2650 Lansing Ave. NE., Salem, Oreg. 97303
Filed Apr. 26, 1976, Ser. No. 679,887
Term of patent 14 years
Int. Cl. D17—*02*
U.S. Cl. D56—1 C

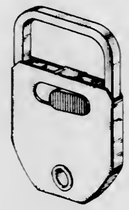
248,188
LUGGAGE CASE
Thomas D. Tweedie, Monrovia, Calif., assignor to Samsonite Corporation, Denver, Colo.
Filed Dec. 16, 1975, Ser. No. 641,300
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G



248,189
UTILITY BAG
Judith J. Loomis, 232 Lafayette St., Memphis, Tenn. 38111
Filed Oct. 12, 1973, Ser. No. 405,762
The portion of the term of this patent subsequent to Feb. 13, 1987, has been disclaimed.
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 C



248,190
KEY RETAINER
Alfred E. Motzer, Meriden, Conn., assignor to The W. E. Bassett Company, Derby, Conn.
Filed Aug. 12, 1976, Ser. No. 713,895
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—8



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 13TH DAY OF JUNE, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See—*
Tauszig, Julio G., 4,095,236, Cl. 346-139.00C.

A P Products Incorporated: *See—*
Cacolici, Santo J., 4,094,564, Cl. 339-14.00L.

Aafjes, Herman: *See—*
Hyams, Irving; Koch, Harold S.; and Aafjes, Herman, 4,094,212, Cl. 81-3.800.

AAI Corporation: *See—*
Barr, Irwin R., 4,094,717, Cl. 156-197.000.

AB S. T. Powercell: *See—*
Siwersson, Olle Lennart; Wall, Arne Evert; and Nilsson, Olle, 4,095,015, Cl. 429-15.000.

Abend, Karl-Ludwig: *See—*
Scheyhing, Hans; Fleischer, Helmut; and Abend, Karl-Ludwig, 4,094,378, Cl. 180-105.00E.

Accelerators, Inc.: *See—*
Orr, F. D., Jr.; Templeton, L. F.; and Keutzer, Larry L., 4,095,115, Cl. 250-538.000.

Ad-Tec Products, Inc.: *See—*
Whelan, James P., 4,094,443, Cl. 221-63.000.

Adachi, Keiichi: *See—*
Tsujino, Nobuyuki; Ogawa, Akira; Shishido, Tadao; and Adachi, Keiichi, 4,094,683, Cl. 96-95.000.

Adams, Herbert. Two wheeled electrically powered vehicle. 4,094,374, Cl. 180-31.000.

Addmaster Corporation: *See—*
Busch, Richard E., 4,094,483, Cl. 248-73.000.

Addressograph-Multigraph Corporation: *See—*
Valancius, James P., 4,094,674, Cl. 96-1.0SD.

Adomanite, Yanina Antono: *See—*
Sirotkina, Ekaterina Egorovna; Lopatinsky, Vadim Petrovich; Filimonov, Viktor Dmitrievich; Kogan, Rita Moiseevna; Pirogov, Vyacheslav Dmitrievich; Kudinova, Sofya Ivanovna; Sizova, Ljubov Sergeevna; Reznikova, Svetlana Stepanovna; Ivanov, Georgy Nikolaevich; Tsekhanovskaya, Nina Alexandrovna; Sidaravichus, Jonas-Donatos Bronyaus; Randina, Larisa Vasilievna; Bocharova, Svetlana Leonidovna; Gulyaeva, Galina Petrovna; Bondarenko, Raisa Ivanovna; Rybalko, Galina Ivanovna; and Adomanite, Yanina Antono, 4,095,032, Cl. 526-11.100.

Agence Nationale de Valorisation de la Recherche: *See—*
Chedid, Louis A.; and Audibert, Francoise Marguerite, 4,094,971, Cl. 424-92.000.
Roig, Joseph Antoine, 4,094,540, Cl. 292-214.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Boucher, Bernard; Luzet, Daniel; and Sella, Claude, 4,094,764, Cl. 204-298.000.
Doncque, Pierre M., 4,094,375, Cl. 180-33.00A.

AGFA-GEVAERT: *See—*
Katz, Seymour; and Brown, Victor R., 4,095,111, Cl. 250-476.000.

Agfa-Gevaert Aktiengesellschaft: *See—*
Botta, Artur; von Konig, Anita; Moll, Franz; Rasp, Christian; and Hartl, Johannes, 4,094,811, Cl. 252-313.00R.
Haseler, Helmut; and von der Kall, Gunter, 4,094,448, Cl. 222-342.000.
Herzhoff, Peter; Gref, Hans; and Schweicher, Wolfgang, 4,095,063, Cl. 200-61.130.
Hujer, Friedrich; and Zangenfeind, Helmut, 4,094,726, Cl. 156-502.000.
Payrhammer, Bernd; and Treiber, Helmut, 4,094,604, Cl. 355-68.000.

Ahmed, Adel Abdel Aziz, to RCA Corporation. Voltage supply regulated in proportion to sum of positive- and negative-temperature-coefficient offset voltages. 4,095,164, Cl. 323-8.000.

Aichinger, Horst; and Ebersberger, Hans, to Siemens Aktiengesellschaft. Radiation detector for an automatic X-ray exposure timer. 4,095,109, Cl. 250-374.000.

Aigl, Miroslav: *See—*
Stein, Klaus; Aigl, Miroslav; and Richter, Gerhard, 4,094,033, Cl. 15-41.00R.

Aimono, Yuuji: *See—*
Omori, Eiji; Aimono, Yuuji; Mukoyama, Yoshiyuki; and Sugitani, Hatuo, 4,094,835, Cl. 260-22.0CB.

Aishima, Tetsuo; and Nobuhara, Akio, to Kikkoman Shoyu Co., Ltd. Beef flavor substance, process for producing same and beef-flavoring agent. 4,094,997, Cl. 426-533.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Fukumoto, Ryoichi; and Igarashi, Toshiro, 4,094,100, Cl. 49-348.000.
Takeda, Shinji; Kobayashi, Shoji; and Watanabe, Yutaka, 4,094,056, Cl. 29-527.200.
Takeda, Shinji; Mitsui, Noriyoshi; and Kato, Nobuharu, 4,094,725, Cl. 156-497.000.
Yoshimura, Noboru, 4,094,489, Cl. 248-429.000.

Aizawa, Hiroshi: *See—*
Tsunekawa, Tokuichi; Uchidoi, Masanori; Nakamura, Zenzo; Taguchi, Tetsuya; Aizawa, Hiroshi; and Uchiyama, Takashi, 4,095,242, Cl. 354-33.000.

Aizawa, Hitomi, to Kabushiki Kaisha Suwa Seikosha. Electronic timepiece inspection circuit. 4,094,136, Cl. 58-23.00R.

Akers, Donald J., to G & W Electric Specialty Company. Safety trip mechanism for multi-position switch. 4,095,065, Cl. 200-63.00R.

Akhmedzhanov, Ravil Abdrakhmanovich: *See—*
Borisov, Vladimir Alexeevich; Akhmedzhanov, Ravil Abdrakhmanovich; and Chistyakov, Jury Vsevolodovich, 4,095,156, Cl. 318-571.000.

Aktiebolaget Electrolux: *See—*
Amberntsson, Jan Roger; Andersson, Roger Ingemar; and Sultan, Stig Bertil, 4,095,237, Cl. 346-140.00R.

A.G. fur industrielle Elektronik AGIE Losone b. Locarno: *See—*
Ullmann, Werner; Fricker, Paul; and Guenin, Maurice, 4,095,079, Cl. 219-69.00E.

Akutsu, Hidezoh: *See—*
Yamazaki, Haruo; and Akutsu, Hidezoh, 4,095,135, Cl. 313-493.000.

Alan I. W. Frank Corporation: *See—*
Frank, Alan I. W., 4,094,952, Cl. 264-328.000.

Aldridge, Clyde L.: *See—*
Bearden, Roby, Jr.; and Aldridge, Clyde L., 4,094,765, Cl. 208-8.000.

Alexander, Martin; and Odeyemi, Oluwasuyi, to Cornell Research Foundation, Inc. Method for preparing a pesticidally resistant rhizobium and agronomic composition thereof. 4,094,097, Cl. 47-57.600.

Alexander, Robert R.: *See—*
Lester, David; and Alexander, Robert R., 4,094,685, Cl. 260-2.50B.

Alford, Frank A.: *See—*
Newton, David W.; and Alford, Frank A., 4,094,320, Cl. 128-303.140.

Alforge Metals Corporation, Limited: *See—*
Cook, Lloyd A.; Reynolds, Kim A.; and Mark, Werner J., 4,094,453, Cl. 228-265.000.

Alfrey, Turner, Jr.; and Schrenk, Walter J., to Dow Chemical Company, The. Multilayer coextrusion process for producing selective reflectivity. 4,094,947, Cl. 264-171.000.

All American Industries, Inc.: *See—*
Schlegel, William R.; and Mayhew, Harry E., Jr., 4,094,143, Cl. 60-352.000.

Alleau, Thierry; and Moracchioli, Robert, to Commissariat a l'Energie Atomique. Circuit for the supply of condensable fluid to a solar engine. 4,094,147, Cl. 60-641.000.

Allee, John W., to Brown & Root, Inc. Method for installing an offshore tower. 4,094,162, Cl. 61-96.000.

Allen-Bradley Company: *See—*
Struger, Odo J.; Searcy, William W.; and John, Ernest F., 4,095,094, Cl. 235-304.100.

Allen, Roy A.; and Scott, Leroy W., to Shell Oil Company. Waterborne epoxy resin coating compositions. 4,094,844, Cl. 260-29.300.

Alliance Machine Company, The: *See—*
Polen, Karl L., 4,094,493, Cl. 254-144.000.

Allied Chemical Corporation: *See—*
Nozik, Arthur J., 4,094,751, Cl. 204-80.000.

Allis-Chalmers Corporation: *See—*
Gallatin, Paul M., 4,095,200, Cl. 335-193.000.
Sanderson, Gerald D., 4,094,401, Cl. 198-827.000.

Allor Foundation: *See—*
Gilbert, Joseph G., 4,094,967, Cl. 424-28.000.

Alt, Gerhard H.; and Franz, John E., to Monsanto Company. Plant growth regulators. 4,094,661, Cl. 71-88.000.

Altair, Inc.: *See—*
Moore, Vincent; and Levesque, Paul N., 4,094,019, Cl. 4-312.000.

Altendorfer, Alois; and Stahrlinger, Anton, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Apparatus for simultaneously pivoting, tilting and rotating a lining brick. 4,094,418, Cl. 214-1.0BC.

Altenpohl, Paul J.: *See—*
Altenpohl, William F.; and Altenpohl, Paul J., 4,094,413, Cl. 209-121.000.

Altenpohl, William F.; and Altenpohl, Paul J. Poultry weighing and packing method. 4,094,413, Cl. 209-121.000.

Aluminum Company of America: *See—*
Cedro, Vito, III; Kinosz, Donald L.; and Lamberti, Thomas G., II, 4,094,815, Cl. 252-415.000.
Scanga, Theodore P.; and Callender, Robert E., 4,094,460, Cl. 229-43.000.

Byrne, Peter Cyril; and Moore, Desmond F., to PCB Controls Ltd. Anti-skid control method and apparatus for a brake-equipped vehicle wheel. 4,094,555, Cl. 303-100.000.
C.G.R. MeV: *See—*
Kervizic, Jacques; and Hurt, Bernard, 4,095,201, Cl. 335-210.000.
C & K Components, Inc.: *See—*
Simpson, Kenneth A., 4,095,070, Cl. 200-153.00J.
Cabagnero, Ramon Jane, to Jane, S.A. Foldable stroller for children. 4,094,531, Cl. 280-649.000.
Cabot Corporation: *See—*
Rostler, Fritz S., 4,094,697, Cl. 106-280.000.
Cacolici, Santo J., to A P Products Incorporated. Multiple conductor electrical connector with ground bus. 4,094,564, Cl. 339-14.00L.
Cairnes, Denis Alan; and Maltby, Derrick John, to Cairnes Maltby Associates Limited. Shelving and display systems and the like. 4,094,417, Cl. 211-183.000.
Cairnes Maltby Associates Limited: *See—*
Cairnes, Denis Alan; and Maltby, Derrick John, 4,094,417, Cl. 211-183.000.
California Institute of Technology: *See—*
Mueller, William A., 4,094,775, Cl. 210-22.000.
Callender, Robert E.: *See—*
Scanga, Theodore P.; and Callender, Robert E., 4,094,460, Cl. 229-43.000.
Cameron, Donald James: *See—*
Schulson, Erland Maxwell; and Cameron, Donald James, 4,094,706, Cl. 148-11.50F.
Camp 7: *See—*
Lamb, George D., 4,094,126, Cl. 53-35.000.
Camp, Vernon D.; and Bowman, Raymond D., to Cavalier Corporation. Composite vending circuit disposable in single- and multiple-priced configurations. 4,094,398, Cl. 194-10.000.
Campbell, John Edward; and Thompson, Gerhard Robert, to International Business Machines Corporation. First in-first out memory array containing special bits for replacement addressing. 4,095,283, Cl. 365-230.000.
Campbell, John Scott: *See—*
Kolker, Carl R.; Campbell, John Scott; La Fond, Robert L.; and Smith, JaMi, 4,095,248, Cl. 358-288.000.
Campbell Soup Company: *See—*
Hildebolt, William M.; and Hundt, Murray T., 4,095,001, Cl. 426-656.000.
Camphausen, Don L., to Xerox Corporation. Xerographic system employing waveguide addressing and modulating apparatus. 4,094,606, Cl. 355-3.00R.
Campioni, Armando, to Indesit Industria Elettrodomestici Italiana S.p.A. Differential gain error correction in color television systems. 4,095,256, Cl. 358-35.000.
Cannarozzo, Pedro Nicolas. Perpetual calendar. 4,094,082, Cl. 40-107.000.
Canon Kabushiki Kaisha: *See—*
Matsumoto, Seiichi, 4,095,241, Cl. 354-31.000.
Nakamura, Zenzo, 4,095,141, Cl. 315-241.00P.
Sato, Yasuhisa; Tsuji, Sadahiko; and Tanaka, Katsumi, 4,094,586, Cl. 350-184.000.
Tsunekawa, Tokuichi; Uchidoi, Masanori; Nakamura, Zenzo; Taguchi, Tetsuya; Aizawa, Hiroshi; and Uchiyama, Takashi, 4,095,242, Cl. 354-33.000.
Carl Zeiss-Stiftung: *See—*
Kutscherauer, Andreas; and Muller, Ortwin, 4,094,593, Cl. 351-38.000.
Carlile, Alfred E. Shoe fastener. 4,094,029, Cl. 12-113.000.
Carlson, Arthur W., to Velsicol Chemical Corporation. Process for the preparation of 2,5-dichlorophenol. 4,094,913, Cl. 568-778.000.
Carlson, Bayard L., to Amfac Foods, Inc. Method and apparatus for the alignment of elongated articles. 4,094,123, Cl. 53-24.000.
Carlsson, Gunilla A. Snap shackle. 4,094,047, Cl. 24-241.00R.
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., to Corning Glass Works. Glass pressing plunger cooling. 4,094,657, Cl. 65-83.000.
Carpenter, Jerry W. Fishing lure and hook. 4,094,087, Cl. 43-42.240.
Carr, Paul, to Flo-Tork, Inc. Rotary actuator and methods of fabrication. 4,094,231, Cl. 92-128.000.
Carrier Corporation: *See—*
Harvey, Samuel E.; Whitehead, James Stephen; and Goranson, Paul L., 4,094,424, Cl. 214-304.000.
Carrock, Frederick Elias; Perron, Peter James; and Zukowski, Edward August, to Dart Industries, Inc. Process for the polymerization of α-olefins. 4,095,016, Cl. 526-137.000.
Carroll, Mathew Ralph. Skate board braking and steering system. 4,094,524, Cl. 280-11.200.
Carter, Larry D., to True Temper Corporation. Base station antenna. 4,095,231, Cl. 343-846.000.
Carubia, Giovanni; Papa, Roberto; and Pratelli, Cesare, to Societa Italiana Telecomunicazioni Siemens S.p.A. Data-processing system with a set of peripheral units repetitively scanned by a common control unit. 4,095,266, Cl. 364-200.000.
Caruso, Peter M. Systems for drying particulate material. 4,094,075, Cl. 34-72.000.
Casey, Donald James: *See—*
Huffman, Kenneth Robert; Casey, Donald James; and Thomas, Walter Moreland, 4,094,847, Cl. 260-29.40R.
Castaigne, Francois; Boulet, Marcel; Riel, Rene R.; and Liber, Eric, to Universite Laval. Apparatus for the production of textured products. 4,094,235, Cl. 99-450.100.
Castcraft Industries, Inc.: *See—*
Frazier, Clifford John, 4,094,680, Cl. 96-41.000.
Catalucci, Enrico, to Lonza, Ltd. Process for the production of 2-amino-4-hydroxy-6-methylpteridine. 4,094,874, Cl. 544-258.000.
Catenaccio, Frank. Laundry bag. 4,094,351, Cl. 150-7.000.
Caterpillar Tractor Co.: *See—*
Chamberlain, Richard W., 4,095,071, Cl. 200-157.000.
Habiger, Cyril W., 4,094,145, Cl. 60-447.000.
Schexnayder, Lawrence F., 4,094,228, Cl. 91-411.00B.
Van Rossem, Richard; and Hyde, Michael B., 4,094,209, Cl. 74-543.000.
Cauley, John F. Cargo container. 4,094,430, Cl. 220-1.500.
Cavalier Corporation: *See—*
Camp, Vernon D.; and Bowman, Raymond D., 4,094,398, Cl. 194-10.000.
Cavigelli, George A.: *See—*
McEachern, Robert A.; and Cavigelli, George A., 4,094,310, Cl. 128-2.06G.
Cedro, Vito, III; Kinosz, Donald L.; and Lamberti, Thomas G., II, to Aluminum Company of America. Regeneration of activated carbon having materials adsorbed thereon. 4,094,815, Cl. 252-415.000.
Celanese Corporation: *See—*
DeMartino, Ronald N.; and Conciatori, Anthony B., 4,094,795, Cl. 252-8.55R.
Cellini, Alfonso J. Cleaning apparatus for selected small areas of a swimming pool. 4,094,031, Cl. 15-1.700.
Cessna Aircraft Company, The: *See—*
Vesel, Andrew M., 4,095,186, Cl. 328-133.000.
CGR Medical Corporation: *See—*
Bunch, Laverne R., 4,095,110, Cl. 250-445.00T.
Cha, Charles L., to Mead Corporation, The. Apparatus for producing multiple uniform fluid filaments and drops. 4,095,232, Cl. 346-75.000.
Chamberlain, Richard W., to Caterpillar Tractor Co. Switch mounted in a lever handle. 4,095,071, Cl. 200-157.000.
Champion International Corporation: *See—*
Navarre, Anatole Joseph, Jr., 4,094,187, Cl. 73-1.00G.
Raccaforte, Harry I., 4,094,456, Cl. 229-17.0SC.
Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. 6(6-Substituted-2,5,7,8-tetramethyl-2-chromanyl)-3-methyl-4-hexenoic acid derivatives. 4,094,885, Cl. 260-345.500.
Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Process for preparing optically active esters. 4,094,892, Cl. 260-410.90R.
Chandalia, Kiran B.; and Preston, Frank J., to Olin Corporation. Azo di-ester polyols for graft copolymerization. 4,094,868, Cl. 260-192.000.
Chang, Eugene Yue Chieh, to American Cyanamid Company. Process for the preparation of copolymers of thiodiethanol using a phosphorous acid-metal sulfate catalyst. 4,094,859, Cl. 260-47.00R.
Chang, Zung S.: *See—*
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., 4,094,657, Cl. 65-83.000.
Chas. O. Larson Co.: *See—*
Larson, Charles O., 4,094,415, Cl. 211-57.100.
Charles Stark Draper Laboratory, Inc., The: *See—*
Watson, Paul C.; and Drake, Samuel H., 4,094,192, Cl. 73-133.00R.
Charlesworth, John Philip: *See—*
Madsen, Peter Emil; Charlesworth, John Philip; and Armstrong, Derek, 4,094,060, Cl. 29-599.000.
Charlton, Thomas L.; and Redden, Robert F., to Cominco Ltd. Recovery of gallium from gallium compounds. 4,094,753, Cl. 204-105.00R.
Chedid, Louis A.; and Audibert, Francoise Marguerite, to Agence Nationale de Valorisation de la Recherche. Immunological adjuvant agents active in aqueous solution. 4,094,971, Cl. 424-92.000.
Chem-E-Watt Corporation: *See—*
Kober, Frederick P., 4,094,298, Cl. 126-263.000.
Chemineer, Inc.: *See—*
Kime, Donald L.; and Stogdill, Ronald G., 4,094,513, Cl. 277-41.000.
Chemische Werke Huels Aktiengesellschaft: *See—*
Knepper, Wilhelm; and Mueller, Dieter Juergen, 4,094,898, Cl. 260-513.00B.
Kuepper, Friedrich-Wilhelm, 4,095,033, Cl. 526-90.000.
Chetelat, Fernand; and Hersberger, Pierre, to Ebauches S.A. Electronic chronograph. 4,094,138, Cl. 58-39.500.
Chevron Research Company: *See—*
Bose, Phillip R., 4,094,770, Cl. 208-251.00R.
Straus, Alan E., 4,094,888, Cl. 260-346.750.
Tanquary, A. Charles, 4,094,945, Cl. 264-184.000.
Chicago Rawhide Manufacturing Company: *See—*
Heyn, William O.; and Peisker, Glenn W., 4,094,519, Cl. 277-134.000.
Johnson, Donald L., 4,094,514, Cl. 277-92.000.
Morley, James P.; and Woods, William J., 4,094,516, Cl. 277-92.000.
Ching, Yau-Chau; and Messerschmitt, David Gavin, to Bell Telephone Laboratories, Incorporated. Digital speech interpolation trunk priority rotator. 4,095,052, Cl. 179-15.0AS.
Chistyakov, Jury Vsevolodovich: *See—*
Borisov, Vladimir Alexeevich; Akhmedzhanov, Ravil Abdrakhmanovich; and Chistyakov, Jury Vsevolodovich, 4,095,156, Cl. 318-571.000.
Chiyoda Chemical Engineering & Construction Co., Ltd.: *See—*
Kobayashi, Hiroshi; and Kuwabara, Nobuyoshi, 4,094,380, Cl. 181-285.000.

Chokai, Shoichi: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Chokai, Shoichi; Machara, Mitsuhiro; Saito, Katsuhide; and Ozaki, Takayuki, 4,094,991, Cl. 424-309.000.
Chombard, Pierre Andre, to Societe Francaise d'Equipements pour la Navigation Aerienne S.F.E.N.A. Method and equipment for making roll and pitch data inputs into a piloting instrument. 4,094,200, Cl. 74-5.00R.
Chou, Eddie C. J.: *See—*
Symens, Raymond D.; Queneau, Paul B.; Chou, Eddie C. J.; and Clark, Franklin F., 4,094,754, Cl. 204-108.000.
Christiansen, David Wayne, to Babcock & Wilcox Company, The. Locking nut assembly with deformable locking sleeve. 4,094,558, Cl. 308-3.00R.
Chubb, Walston, to Westinghouse Electric Corp. Nuclear fuel pellet design to minimize dimensional changes. 4,094,738, Cl. 176-67.000.
Chumney, Richard Douglas, Jr.: *See—*
Frazier, Thomas Cecil; Ashworth, John Thomas; Chumney, Richard Douglas, Jr.; and Meyre, Rene Wilhelm, 4,094,323, Cl. 131-8.00R.
Chvala, William James: *See—*
Clarke, Richard Allen; Chvala, William James; and DeWitte, Raymond Edward, 4,094,526, Cl. 280-47.350.
Ciba Geigy AG: *See—*
Becker, Carl; Wegmann, Jacques; and Schaub, Andres, 4,094,634, Cl. 8-1.00W.
Ciba-Geigy Corporation: *See—*
Hubele, Adolf, 4,094,990, Cl. 424-285.000.
Karrer, Friedrich, 4,094,989, Cl. 424-282.000.
Karrer, Friedrich; and Farooq, Saleem, 4,094,993, Cl. 424-337.000.
Miller, Ralph, 4,094,958, Cl. 423-238.000.
Nachbur, Hermann; and Rohringer, Peter, 4,094,929, Cl. 260-968.000.
Riegler, Albert; Saar, Werner; and Wiese, Volkhard, 4,094,839, Cl. 260-23.00R.
Spivack, John D., 4,094,855, Cl. 260-45.8NT.
Citizen Watch Company Limited: *See—*
Morokawa, Shigeru, 4,094,137, Cl. 58-23.00A.
Nomura, Yasushi; and Morokawa, Shigeru, 4,094,135, Cl. 58-23.00R.
Nomura, Yasushi; and Nishikubo, Yasuhiko, 4,094,139, Cl. 58-50.00R.
Tanai, Kunio; Nakayama, Yasuaki; Hirai, Yoshiro; Aoyama, Shigeru; and Kashima, Yoshinobu, 4,095,129, Cl. 310-49.00R.
Clark, Franklin F.: *See—*
Symens, Raymond D.; Queneau, Paul B.; Chou, Eddie C. J.; and Clark, Franklin F., 4,094,754, Cl. 204-108.000.
Clark, George L., to TRW Inc. Broadband gas laser. 4,095,193, Cl. 331-94.50G.
Clark, Robert Tilden: *See—*
Oldham, Frederick, 4,094,950, Cl. 264-259.000.
Clarke, Richard Allen; Chvala, William James; and DeWitte, Raymond Edward, to PepsiCo, Inc. Portable display vehicle. 4,094,526, Cl. 280-47.350.
Clarke, William J., to American Cyanamid Company. Composition of matter useful for earthen formation treatment. 4,094,150, Cl. 61-36.00C.
Clayson N.V.: *See—*
Decoene, Frans J. G. C.; Muijs, Cornelis G. M.; Van Eecke, Roger H.; and Vansteelant, Marc G., 4,094,132, Cl. 56-14.400.
Clayton, Richard William: *See—*
Hayden, Percy; and Clayton, Richard William, 4,094,889, Cl. 260-348.340.
Clelland, David Watson, to United Kingdom Atomic Energy Authority. Method for the storage of material. 4,094,762, Cl. 204-192.0EC.
Cline, James C.: *See—*
Keyser, Naaman H.; and Cline, James C., 4,094,731, Cl. 156-616.00R.
Cloud, Don L., to I.I.C., Inc. Method and apparatus for producing composite film images for identification. 4,094,597, Cl. 353-35.000.
Cluzel, John Michael. Ski structure. 4,094,528, Cl. 280-610.000.
Coats & Clark, Inc.: *See—*
Einhorn, Ruediger, 4,094,490, Cl. 248-489.000.
Cocuzza, Gioacchino; and Musso, Giuseppe, to Societa' Italiana Resine S.I.R. S.p.A. Process for producing hydrogen and sulfur from hydrogen sulfide. 4,094,962, Cl. 423-573.00R.
Cohen, Jerome B.; and James, Michael R., to Northwestern University. Apparatus and method for determination of residual stress in crystalline substances. 4,095,103, Cl. 250-277.0CH.
Cohen, Murray S.; and O'Connell, Donald E., to Borg-Warner Corporation. Antioxidant for foods. 4,094,999, Cl. 426-547.000.
Coiner, William A. Disposable container for heatable food products. 4,094,434, Cl. 220-90.600.
Coker, J. O. Tensioning device for tightening and securing a holding strap. 4,094,044, Cl. 24-68.0CD.
Colchagoff, Robert D.; Fortner, Paul W.; Kirkman, Richard T.; Naughton, Thomas J.; and Zimmerman, George, to Owens-Illinois, Inc. Method for forming glass containers. 4,094,656, Cl. 65-81.000.
Cole, Judson C.; and Morain, Eldon W., to Continental Industries, Inc. Meter riser. 4,094,536, Cl. 285-21.000.
Collin, Per Harald; and Widell, Bjorn, to Stora Kopparbergs Bergslags AB. Method for simultaneous combined production of electrical energy and crude iron. 4,094,665, Cl. 75-11.000.
Collins, Joseph Martin, to Burroughs Corporation. Sheet splicer. 4,094,727, Cl. 156-505.000.
Combustion Engineering, Inc.: *See—*
Turner, James Franklin, 4,094,630, Cl. 432-134.000.
Cominco Ltd.: *See—*
Charlton, Thomas L.; and Redden, Robert F., 4,094,753, Cl. 204-105.00R.
Commissariat a l'Energie Atomique: *See—*
Alleau, Thierry; and Moracchioli, Robert, 4,094,147, Cl. 60-641.000.
Blanc, Raymond; and Jacquelin, Roland, 4,094,369, Cl. 177-147.000.
Boucher, Bernard; Luzet, Daniel; and Sella, Claude, 4,094,764, Cl. 204-298.000.
Commonwealth of Australia, c/o The Department of Health, The: *See—*
Kossoff, George, 4,094,306, Cl. 128-2.00V.
Communication Mfg. Company: *See—*
O'Dea, Orrin Bernard, 4,095,058, Cl. 179-175.20D.
Compagnie Industrielle des Telecommunications Cit-Alcatel S.A.: *See—*
Le Coz, Gerard; and Marchalot, Jean-Noel, 4,095,197, Cl. 333-28.00R.
Conciatori, Anthony B.: *See—*
DeMartino, Ronald N.; and Conciatori, Anthony B., 4,094,795, Cl. 252-8.55R.
Connelly, Gerald Aloysius: *See—*
Anderson, Elvin Lowell; and Connelly, Gerald Aloysius, 4,094,900, Cl. 260-520.00E.
Conrad Scholtz AG: *See—*
Heeke, Hugo, 4,094,402, Cl. 198-847.000.
Conrad, Ulrich, to Daimler-Benz Aktiengesellschaft. Lubricating oil filter with an upright filter pot. 4,094,791, Cl. 210-316.000.
Consolidated Packaging Corporation: *See—*
Spillson, George A., 4,094,457, Cl. 229-21.000.
Conte, Ronald L.: *See—*
Protano, Dominic R.; and Conte, Ronald L., 4,094,022, Cl. 4-172.170.
Continental Group, Inc., The: *See—*
Nelson, Bennie Charles, Jr., 4,094,458, Cl. 229-39.00R.
Continental Industries, Inc.: *See—*
Cole, Judson C.; and Morain, Eldon W., 4,094,536, Cl. 285-21.000.
Continental Oil Company: *See—*
Gorin, Everett, 4,094,766, Cl. 208-10.000.
Control Concepts Corporation: *See—*
Montague, Herbert R., 4,095,163, Cl. 323-8.000.
Cook, Arthur W. Skipping exercise device. 4,094,502, Cl. 272-74.000.
Cook, Charles Edward, to Deere & Company. Combined belt and hydrostatic vehicle drive. 4,094,205, Cl. 74-242.1FP.
Cook, John Stone; and Sandahl, Carl Ragnar, to Bell Telephone Laboratories, Incorporated. Hermaphrodite optical fiber connector. 4,094,580, Cl. 350-96.210.
Cook, Lloyd A.; Reynolds, Kim A.; and Mark, Werner J., to Alforge Metals Corporation, Limited. Method for pressure welding metal workpieces. 4,094,453, Cl. 228-265.000.
Cook, Martin Christopher: *See—*
Bradshaw, Janice; Cook, Martin Christopher; and Gregory, Gordon Ian, 4,095,021, Cl. 544-22.000.
Cook, Toby M.; Tucker, Gerald L.; and Brown, Marion L., to Mississippi Chemical Corporation. Ammonium nitrate neutralizer. 4,094,643, Cl. 23-285.000.
Cookson, Alan H., to Westinghouse Electric Corp. Gas insulated transmission line having low inductance intercalated sheath. 4,095,040, Cl. 174-28.000.
Coons, Everett A., to Olinkraft, Inc. Container with easy tuck-under flap for overlapping closure and method. 4,094,459, Cl. 229-41.00B.
Cope, Louis T., to H & T Enterprises, Inc. Method and apparatus for reducing the temperature of a fluid. 4,094,164, Cl. 62-74.000.
Cope, Raymond. Dental instrument retraction device. 4,094,069, Cl. 32-22.000.
Cormier Cardiac Systems, Inc.: *See—*
Cormier, Denny Charles, 4,094,308, Cl. 128-2.05R.
Cormier, Denny Charles, to Cormier Cardiac Systems, Inc. Method and system for rapid non-invasive determination of the systolic time intervals. 4,094,308, Cl. 128-2.05R.
Cornell Research Foundation: *See—*
Williams, Gregory J., 4,094,703, Cl. 136-89.0TF.
Cornell Research Foundation, Inc.: *See—*
Alexander, Martin; and Odeyemi, Oluwasuyi, 4,094,097, Cl. 47-57.600.
Saxena, Brij B., 4,094,963, Cl. 424-1.000.
Cornils, Boy: *See—*
Rottig, Walter; Tummes, Hans; Cornils, Boy; and Weber, Jurgen, 4,094,914, Cl. 568-862.000.
Corning Glass Works: *See—*
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., 4,094,657, Cl. 65-83.000.
Cory Food Services, Inc.: *See—*
Schlegel, Norman H.; and Karlen, Harvey R., 4,094,449, Cl. 222-475.000.
Courtaulds Limited: *See—*
Robinson, Frank, 4,094,171, Cl. 66-176.000.
Courtlandt Boot Jack Co., Ltd.: *See—*
Parlante, Frank; and Parlante, Henry, 4,094,450, Cl. 224-2.00B.
Covington, Dennis: *See—*
Beachem, Ronald; and Covington, Dennis, 4,095,050, Cl. 179-2.00A.

Cox, Jack Jebson, to Flavell Proprietary Limited. Shaft seal. 4,094,518, Cl. 277-95.000.
Crane Packing Limited: *See—*
Back, Anthony Charles, 4,094,512, Cl. 277-27.000.
Creegan, Patrick J. Structural steel building frame having resilient connectors. 4,094,111, Cl. 52-167.000.
Creusot-Loire: *See—*
Malbrunot, Pierre, 4,095,285, Cl. 366-23.000.
Crounse, Nathan N.; and Schmidt, Paul J., to Sterling Drug Inc. Tri- or tetrasubstituted diphenylphthalides. 4,094,877, Cl. 260-293.580.
Crouse, William George, to International Business Machines Corporation. Hybrid pulse width-pulse rate digital-to-analog converter method and apparatus. 4,095,218, Cl. 340-347.0DA.
Crow, Arthur F., Jr. Method and apparatus for converting an agriculture machine to a tractor. 4,094,373, Cl. 180-1.00F.
Crucible Inc.: *See—*
Fleck, James N.; Palmer, Richard C.; and Ruffner, Charles L., 4,094,672, Cl. 75-226.000.
Crue, Charles R., to Bell Telephone Laboratories, Incorporated. Demultiplexer circuit. 4,095,051, Cl. 179-15.0BS.
CSELT - Centro Studi e Laboratori Telecomunicazioni S.P.A.: *See—*
DiVita, Pietro; and Vannucci, Riccardo, 4,094,578, Cl. 350-96.150.
CTS Corporation: *See—*
Wiswell, H. Eugene; and Hardwick, Danny R., 4,095,209, Cl. 338-174.000.
Cutler-Hammer, Inc.: *See—*
Piber, Earl T., 4,095,072, Cl. 200-157.000.
Cybernet Electronic Corporation: *See—*
Kakigi, Takao, 4,095,182, Cl. 325-17.000.
Kakigi, Takao, 4,095,183, Cl. 325-17.000.
Cyclops Corporation: *See—*
Scott, Harley D., 4,094,108, Cl. 52-1.000.
Czerwin, Edward Peter, to Du Pont de Nemours, E. I., and Company. Process of preparing corrugated paper board with a particular polyvinyl alcohol modified starch-based corrugating adhesive. 4,094,718, Cl. 156-210.000.
Dahm, Manfred: *See—*
Behrenz, Wolfgang; Schapel, Dietmar; and Dahm, Manfred, 4,094,970, Cl. 424-78.000.
Dai Nippon Insatsu Kabushiki Kaisha: *See—*
Sumimoto, Mitsuhiro; and Kohama, Haruo, 4,094,642, Cl. 23-254.00R.
Daikin Kogyo Co., Ltd.: *See—*
Tatemoto, Masayoshi; and Tamaru, Sinji, 4,094,826, Cl. 260-2.20R.
Daimler-Benz Aktiengesellschaft: *See—*
Conrad, Ulrich, 4,094,791, Cl. 210-316.000.
Damen, Theodoar Charlouis; Gornik, Erich; Nguyen, Van-Tran; and Patel, Chandra Kumar Naranbhai, to Bell Telephone Laboratories, Incorporated. Tunable infrared and far-infrared source by four-photon mixing. 4,095,122, Cl. 307-88.300.
DaMert, Fred Allen. Curved prism ornament. 4,094,084, Cl. 40-613.000.
Danemar, Ake; Johansson, Arne; and Nerf, Owe, to Asea AB. Capacitor bank. 4,095,264, Cl. 361-274.000.
Daniel, Donald S., Jr. Surgical razor blade with integral guard. 4,094,066, Cl. 30-346.580.
Danielsson, Nils Allan; and Lindblom, Karl-Peter Christian, to Applied Research Laboratories S.A. Coil for producing a homogeneous magnetic field in a cylindrical space. 4,095,202, Cl. 335-213.000.
Danneberg, Peter: *See—*
Weber, Karl-Heinz; Bauer, Adolf; Danneberg, Peter; and Kuhn, Franz Josef, 4,094,984, Cl. 424-269.000.
Dar-Mar, Inc.: *See—*
Berndt, Robert Charles; and Eady, George B., 4,094,472, Cl. 242-54.00R.
Darrel, Bernard, to General Electric Company. Method and system for corona source location by acoustic signal detection. 4,095,173, Cl. 324-52.000.
Dart Industries, Inc.: *See—*
Carrock, Frederick Elias; Perron, Peter James; and Zukowski, Edward August, 4,095,016, Cl. 526-137.000.
Daubenbuschel, Werner; Thomas, Alfred; Hess, Dieter; and Augst, Hans-Rudiger, to Kautex Maschinenbau GmbH. Apparatus for the manufacture of hollow bodies of a thermoplastic by blow-moulding. 4,094,620, Cl. 425-140.000.
Davidson, John J.: *See—*
Smith, David A.; and Davidson, John J., 4,094,760, Cl. 204-181.00R.
Davis, Cecil E., to Unarco Industries, Inc. Roller skate toe stop converter. 4,094,525, Cl. 280-11.200.
Davis, John, Jr. Distress signal device. 4,094,267, Cl. 116-124.00B.
Davis, William E. Carburetor for engines using diesel fuel. 4,094,288, Cl. 123-127.000.
Day, Robert L.: *See—*
Smith, Edward A.; and Day, Robert L., 4,094,112, Cl. 52-211.000.
Dayco Corporation: *See—*
Wagner, William T., 4,094,341, Cl. 139-159.000.
de Barros, Ruy F. M., to Societe Anonyme belge d'exploitation de la navigation aerienne (SABENA). Electrical connector. 4,094,570, Cl. 339-75.00M.
De Blauwe, Francis: *See—*
Horsma, David August; and De Blauwe, Francis, 4,095,044, Cl. 174-138.00F.
Decoene, Frans J. G. C.; Muijs, Cornelis G. M.; Van Eecke, Roger H.; and Vansteelant, Marc G., to Clayson N.V. Mower-conditioner. 4,094,132, Cl. 56-14.400.
Deere & Company: *See—*
Cook, Charles Edward, 4,094,205, Cl. 74-242.1FP.
DeJovine, James M.: *See—*
De Vries, Donald L.; and DeJovine, James M., 4,094,799, Cl. 252-29.000.
DeLapp, Darwin Fiske, to Formica Corporation. Low pressure melamine resins containing elastomers. 4,094,846, Cl. 260-29.40R.
Delcroix, Catherine: *See—*
Moinard, Michel; Leturcq, Michel; and Delcroix, Catherine, 4,094,161, Cl. 61-95.000.
De Long, Charles F., to United States Trading International, Inc. Method of reducing loss of water by transpiration and composition therefor. 4,094,845, Cl. 260-29.4UA.
Delphi Instruments, Inc.: *See—*
Robinson, Alfred D., 4,094,337, Cl. 137-505.420.
DeMartino, Ronald N.; and Conciatori, Anthony B., to Celanese Corporation. Polygalactomannan ether compositions. 4,094,795, Cl. 252-8.55R.
Denaro, James J. Adjustable template for tapered airfoil rib profiles. 4,094,071, Cl. 33-174.00B.
Denes, George, to RCA Corporation. Random access-erasable read only memory cell. 4,095,281, Cl. 365-156.000.
Dennard, Robert H.; and Spampinato, Dominic P., to International Business Machines Corporation. Field effect transistors and fabrication of integrated circuits containing the transistors. 4,095,251, Cl. 357-23.000.
Denny, Arthur Francis; Gioffre, Anthony Joseph; and Sherman, John Delano, to Union Carbide Corporation. Sequestering of CA^{++} and MG^{++} in aqueous media using zeolite mixtures. 4,094,778, Cl. 210-38.00A.
Derbyshire, George Cecil, to Jacobs Manufacturing Company, Limited, The. Drill chucks. 4,094,523, Cl. 279-62.000.
DeRomano, Oscar. Irrigation apparatus. 4,094,466, Cl. 239-145.000.
Deutsch, Marshall E.; and Mead, Louis W., to Thyroid Diagnostics, Inc. Test device. 4,094,647, Cl. 23-253.0TP.
Deutsche Benkert GmbH & Co., K.G.: *See—*
Bolsinger, Otto; and Seckelmann, Ingolf, 4,094,324, Cl. 131-10.00A.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Brandt, Bernd; Nauroth, Peter; Peters, Albert; and Reinhardt, Helmut, 4,094,771, Cl. 209-4.000.
Knorre, Helmut; Langer, Manfred; and Leidl, Peter, 4,094,693, Cl. 106-111.000.
De Vries, Donald L.; and DeJovine, James M., to Atlantic Richfield Company. Solid particles-containing lubricating oil composition and method for using same. 4,094,799, Cl. 252-29.000.
DeWalt, Michael P., to Sperry Rand Corporation. Fail passive dual servo with continuous motor speed and acceleration and monitoring. 4,094,481, Cl. 244-194.000.
DeWitte, Raymond Edward: *See—*
Clarke, Richard Allen; Chvala, William James; and DeWitte, Raymond Edward, 4,094,526, Cl. 280-47.350.
Deziel, Marcel. Dispensing machine to prepare cups with a dry content. 4,094,345, Cl. 141-174.000.
Diamond, Julius, to William H. Rorer, Inc. Ethynylbenzene compounds and derivatives thereof to treat pain, fever and inflammation. 4,094,995, Cl. 424-353.000.
Dickens, Luther I.; and Nanny, William C., to Radva Plastics Corporation. Building system and method. 4,094,110, Cl. 52-80.000.
Dielectric Systems International, Inc.: *See—*
Kalt, Charles G., 4,094,590, Cl. 350-269.000.
Diesel Kiki Co., Ltd.: *See—*
Shibuya, Tsunenori, 4,094,617, Cl. 417-295.000.
Dieterich, Dieter: *See—*
Wenzel, Wolfgang; and Dieterich, Dieter, 4,094,842, Cl. 260-29.2TN.
Dietz, Ernest W., to Pacific Electricord Company. Safety cap slide. 4,094,569, Cl. 339-40.000.
DiMarco, Bernard, to Gould Inc. Visible blade switch. 4,095,075, Cl. 200-308.000.
Dines, Martin B., to Exxon Research & Engineering Co. Isonitrile intercalation complexes. 4,094,893, Cl. 260-429.00R.
Dishon, Giora: *See—*
Schieber, Michael M.; Beinglass, Israel; and Dishon, Giora, 4,094,268, Cl. 118-49.100.
Dismuke, William Odell, to Pace, Courtney C.; Linton, Ulle C.; and Pace, Casey C., part interest to each. Fuel atomizer. 4,094,290, Cl. 123-141.000.
Ditzig, Albert F., to Molex Incorporated. Sequencing switch assembly. 4,095,089, Cl. 219-441.000.
DiVita, Pietro; and Vannucci, Riccardo, to CSELT - Centro Studi e Laboratori Telecomunicazioni S.P.A. Optical equalizer for signal-transmission system using multimode light guides. 4,094,578, Cl. 350-96.150.
Dixon, Rolland E., to Phillips Petroleum Company. Alkylation process utilizing decreasing amounts of olefin in riser-reactor. 4,094,923, Cl. 260-683.480.
Dobson Park Industries Limited: *See—*
Thompson, Arthur David, 4,094,422, Cl. 214-145.00R.
Dockery, Denzel J. Aquarium gravel cleaner. 4,094,788, Cl. 210-169.000.
Dola, Frank Peter; and Rossler, Frederick William, Jr., to AMP Incorporated. Connector having wire locating means. 4,094,566, Cl. 339-14.00R.
Domoto, Masahiro: *See—*
Oyamada, Takeo; Satoh, Kazuhisa; Tsuru, Shinobu; Domoto, Masahiro; and Narisawa, Shizuo, 4,094,849, Cl. 260-29.6MQ.

Donath, Ernest E. Process for pseudohydrostatic feeding of solids into a reactor. 4,094,651, Cl. 48-210.000.
Doncque, Pierre M., to Agence Nationale de Valorisation de la Recherche (ANVAR). Rigid connection device and its application to motor cycles. 4,094,375, Cl. 180-33.00A.
Dorsett Educational Systems, Inc.: *See—*
Dorsett, Loyd G., 4,094,079, Cl. 35-8.00A.
Dorsett, Loyd G., to Dorsett Educational Systems, Inc. Single medium audio-visual teaching machine. 4,094,079, Cl. 35-8.00A.
Dounce, Eric A.; and Morris, Guy V., to Motorola, Inc. Digital phase correction for coherent-on-receive pulsed radar system. 4,095,224, Cl. 343-17.10R.
Dow Chemical Company, The: *See—*
Alfrey, Turner, Jr.; and Schrenk, Walter J., 4,094,947, Cl. 264-171.000.
Bieler, Barrie H., 4,094,956, Cl. 423-179.000.
Goralski, Christian T.; and Burk, George A., 4,094,880, Cl. 260-302.0SD.
Greenawalt, Eddie Lee, 4,094,629, Cl. 432-98.000.
Kroposki, Lorraine M.; Yoshimine, Masao; and Freedman, Harold H., 4,094,873, Cl. 544-243.000.
Mani, Inder, 4,094,841, Cl. 260-29.60H.
Smith, Hubert Stacy, Jr., 4,094,622, Cl. 425-224.000.
Trepanier, Donald L.; and Britton, Thomas C., 4,094,871, Cl. 260-239.30B.
Drake, Samuel H.: *See—*
Watson, Paul C.; and Drake, Samuel H., 4,094,192, Cl. 73-133.00R.
Dravo Corporation: *See—*
Jaquay, Louis H., 4,094,667, Cl. 75-92.000.
Dremierre, Jean G.: *See—*
Bellouin, Francois C.; and Dremierre, Jean G., 4,094,188, Cl. 73-81.000.
Drohomirecky, Walter. Tell it to the judge game. 4,094,510, Cl. 273-251.000.
Dubois, Robert, to Plastiroute S.A. Road-surface additive for preventing ice and melting snow. 4,094,686, Cl. 106-13.000.
Ducournau, Jean Paul: *See—*
Anizan, Pierre; Ducournau, Jean Paul; Gilberton, Paul; and Mevel, Yves, 4,095,054, Cl. 179-18.0ES.
Dulken, Hartmut: *See—*
Beschoner, Hans-Hermann; Guder, Gottfried; Dulken, Hartmut; and Kassel, Karl-Heinz, 4,094,675, Cl. 96-1.500.
Dullinger, Karl: *See—*
Kronseder, Hermann; Dullinger, Karl; and Matzinger, Kurt, 4,094,411, Cl. 209-97.000.
Dumont, Fritz, to Baugesellschaft Klammt KG. Method and apparatus for driving sheet piles into the ground. 4,094,156, Cl. 61-53.500.
Duncan, Farris N.: *See—*
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,094,455, Cl. 229-15.000.
Dunlop Limited: *See—*
Ford, Peter, 4,094,353, Cl. 152-310.000.
Du Pont de Nemours, E. I., and Company: *See—*
Anolick, Colin; Robinson, Vivian Marie; and Stewart, Charles Winfield, Sr., 4,095,009, Cl. 428-310.000.
Blackwell, Julian Theron, 4,094,894, Cl. 260-453.0SP.
Blickenstaff, Robert Alan, 4,094,948, Cl. 264-206.000.
Czerwin, Edward Peter, 4,094,718, Cl. 156-210.000.
Fitzgerald, Patrick Henry, 4,094,699, Cl. 106-288.00Q.
Guschl, Randolph Joseph, 4,094,856, Cl. 260-45.9NP.
Vladuchick, Susan Anne, 4,094,985, Cl. 424-270.000.
Wolfe, James Richard, Jr., 4,094,857, Cl. 260-45.9QB.
Durfee, William K.: *See—*
Symonds, Alan P.; and Durfee, William K., 4,095,139, Cl. 315-153.000.
Duteurtre, Philippe: *See—*
Soula, Gerard; and Duteurtre, Philippe, 4,094,802, Cl. 252-51.50A.
Duttweiler, Donald Lars; and Hofmann, Allan Michael, to Bell Telephone Laboratories, Incorporated. Quasi-pulse stuffing synchronization. 4,095,053, Cl. 179-15.0AF.
Dybas, Richard A.; Graham, Donald W.; and Brown, Jeannette E., to Merck & Co., Inc. Anticoccidial cyclicamino ethanols and esters thereof. 4,094,976, Cl. 424-228.000.
Dyckerhoff Zementwerke Aktiengesellschaft: *See—*
Rauschenfels, Eberhard, 4,094,692, Cl. 106-104.000.
Dykes, Willis G., to Lasco, Inc. Method and apparatus for using electrical current to destroy weeds in and around crop rows. 4,094,095, Cl. 47-1.300.
Dymo Industries, Inc.: *See—*
Edwards, Richard A.; and Olson, Cecil G., 4,094,244, Cl. 101-66.000.
Dynamit Nobel Aktiengesellschaft: *See—*
Sturm, Karl Gunter; and Bruning, Klaus, 4,094,721, Cl. 156-309.000.
E. R. Squibb & Sons, Inc.: *See—*
Varma, Ravi K., 4,094,840, Cl. 260-239.55R.
Eady, George B.: *See—*
Berndt, Robert Charles; and Eady, George B., 4,094,472, Cl. 242-54.00R.
Eastman Kodak Company: *See—*
Maskasky, Joe E., 4,094,684, Cl. 96-108.000.
Sanders, Robert R., 4,094,695, Cl. 106-179.000.
Eaton Corporation: *See—*
Neuman, Richard F., 4,094,390, Cl. 188-196.00D.
Ebauches S.A.: *See—*
Chetelat, Fernand; and Hersberger, Pierre, 4,094,138, Cl. 58-39.500.
Ebelt, Gunter, to Maschinenfabrik Gluckauf Beukenberg G.m.b.H. Workpiece-holding fixture for honing machine. 4,094,103, Cl. 51-34.00F.
Ebersberger, Hans: *See—*
Aichinger, Horst; and Ebersberger, Hans, 4,095,109, Cl. 250-374.000.
Eckelt, Michael: *See—*
Heyden, Rudi; Asbeck, Adolf; Eckelt, Michael; Petzold, Manfred; and Uphues, Gunter, 4,094,812, Cl. 252-321.000.
Ed. Rohr AG: *See—*
Rohr, Eduard, 4,094,302, Cl. 126-400.000.
Edmunds, George W.: *See—*
Hoppmann, Kurt H.; and Edmunds, George W., 4,094,412, Cl. 209-106.000.
Edmunds, Raymond S., Jr. Apparatus for handling extrudable substances. 4,094,122, Cl. 53-23.000.
Edo-Aire Mitchell: *See—*
Nixon, John M., 4,094,480, Cl. 244-180.000.
Edwards, Richard A.; and Olson, Cecil G., to Dymo Industries, Inc. Hand-held bar code label marking device. 4,094,244, Cl. 101-66.000.
Edwards, William J.: *See—*
Ketterer, Stanley J.; and Edwards, William J., 4,094,261, Cl. 112-228.000.
Ehara, Mitsuo: *See—*
Takagi, Tadao; Yagi, Toru; Ehara, Mitsuo; and Yamada, Tatsumi, 4,094,292, Cl. 123-179.00G.
Eheim, Franz, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 4,094,201, Cl. 74-56.000.
Ehrenhaft, Franz F., to Anamorphic Ltd. Additive color system with compensation of repeatability errors of variable-density electrooptical filter units. 4,095,099, Cl. 250-205.000.
Ehrenskjold, Nils Oluf: *See—*
Munk, Torben; and Ehrenskjold, Nils Oluf, 4,094,614, Cl. 416-140.000.
Eichbaum, Barlane R.: *See—*
Bauer, Donald J.; Eisele, Judith A.; and Eichbaum, Barlane R., 4,094,955, Cl. 423-123.000.
Einhorn, Ruediger, to Coats & Clark, Inc. Hard wall fastener. 4,094,490, Cl. 248-489.000.
Eisele, Judith A.: *See—*
Bauer, Donald J.; Eisele, Judith A.; and Eichbaum, Barlane R., 4,094,955, Cl. 423-123.000.
Ekato-Werk: *See—*
Todtenhaupt, Erich; Muller, Wolfgang; Schupper, Hans; and Geng, Walter, 4,094,638, Cl. 21-61.000.
Electric Power Research Institute: *See—*
Netzel, Philip C.; and Ponder, Jonathan Z., 4,095,041, Cl. 174-28.000.
Electric Power Research Institute, Inc.: *See—*
Glenn, Robert G., 4,094,615, Cl. 416-215.000.
Sisk, Francis J., 4,094,165, Cl. 62-115.000.
Electro-Thermal Corporation: *See—*
Jerles, James B., 4,094,166, Cl. 62-158.000.
Electroacustic GmbH: *See—*
Richter, Erhard; and Borsum, Dietrich, 4,094,511, Cl. 274-39.00A.
Elfab Corporation: *See—*
Langham, Arvin L., 4,094,573, Cl. 339-176.0MP.
Ellendt, Gunther: *See—*
Knofel, Hartmut; and Ellendt, Gunther, 4,094,907, Cl. 260-570.00D.
Elliott, James O., to General Motors Corporation. Triband vehicle antenna. 4,095,229, Cl. 343-715.000.
Elliott-Lewis Corporation: *See—*
Bevan, James, 4,094,445, Cl. 222-1.000.
Ellis, Jerry. Agitator for paint spray cans. 4,095,286, Cl. 366-293.000.
Ells, John William; Parker, Ian David; and Walker, David Baird Langley, to British Petroleum Company Limited, The. Offshore structure and method. 4,094,163, Cl. 61-111.000.
Elscint Ltd.: *See—*
Inbar, Dan; and Klein, Yitzhak, 4,095,108, Cl. 250-369.000.
Eltra Corporation: *See—*
Gesell, William Fred, 4,094,284, Cl. 123-119.00A.
Emmons, Donald Earl: *See—*
Waterman, Peter G.; and Emmons, Donald Earl, 4,094,039, Cl. 15-250.320.
Engelhard Minerals & Chemicals Corp.: *See—*
Pfefferle, William C., 4,094,142, Cl. 60-39.030.
Engle, Edward Jacob, to Polak's Frutal Works, Inc. Perfumed copolymers of ethylene and polar monomer. 4,095,031, Cl. 526-1.000.
English Clays Lovering Pochin & Company Limited: *See—*
Malden, Peter James, 4,094,736, Cl. 162-175.000.
Enomoto, Hiroshi: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Chokai, Shoichi; Machara, Mitsuhiro; Saito, Katsuhide; and Ozaki, Takayuki, 4,094,991, Cl. 424-309.000.
Erb, C J. Golf club fixture. 4,094,072, Cl. 33-174.00F.
Erickson, Arnold Roderick; and Panzera, Carlino, to Brunswick Corporation. Abradable seal material and composition thereof. 4,094,673, Cl. 75-246.000.
Erikmats, Erik Osten, to Telefonaktiebolaget L M Ericsson. Range side lobe suppression method for a phase modulated radar pulse. 4,095,225, Cl. 343-17.2PC.
Eroyan, Gary. Artificial hand and forearm. 4,094,016, Cl. 3-1.100.
Erwien, Helmut: *See—*
Karsten, Werner; and Erwien, Helmut, 4,094,157, Cl. 61-63.000.
Escher Wyss GmbH: *See—*
Kahmann, Albrecht, 4,094,794, Cl. 210-512.00R.

ESPE Fabrik Pharmazeutischer Praparate GmbH: *See—*
Schmitt, Werner; Purrmann, Robert; and Jochum, Peter, 4,095,018, Cl. 526-211.000.

Espenschied, Helmut, to Robert Bosch GmbH. Hydraulic system for an automatic transmission of an automotive vehicle. 4,094,211, Cl. 74-868.000.

Esseltepac Aktiebolag: *See—*
Ganholt, Bo Olov, 4,094,121, Cl. 53-22.00R.

Evans, Grover C. Apparatus for washing and sanitizing containers. 4,094,329, Cl. 134-56.00R.

Evans, John W. Engine preoiler and lubricant reservoir. 4,094,293, Cl. 123-196.00S.

Evers, Ben Fowler. Flat field, roll film transport. 4,094,603, Cl. 355-64.000.

Evers, William J.; Heinsohn, Howard H., Jr.; Shuster, Edward J.; and Schmitt, Frederick Louis, to International Flavors & Fragrances Inc. α-Oxy(oxo) sulfides in perfume. 4,094,824, Cl. 252-522.000.

Ewen, Joel J., to Tele-Path Industries, Inc. Toll restrictor access circuit. 4,095,056, Cl. 179-18.0DA.

Exline, Roger Edsel, to Borg-Warner Corporation. Safety slitter for thermoplastic sheet. 4,094,217, Cl. 83-6.000.

Exo Elettronica Industriale S.r.l.: *See—*
Tirelli, Paolo, 4,095,159, Cl. 318-605.000.

Exxon Production Research Company: *See—*
Thompson, Gene D.; and Jahns, Hans O., 4,094,149, Cl. 61-1.00R.

Exxon Research & Engineering Co.: *See—*
Bearden, Roby, Jr.; and Aldridge, Clyde L., 4,094,765, Cl. 208-8.000.
Dines, Martin B., 4,094,893, Cl. 260-429.00R.
Fuller, Everett J., 4,094,768, Cl. 208-11.0LE.
Koh, Kwang K.; Nahas, Nicholas C.; Pennington, Robert E.; and Vernon, Lonnie W., 4,094,650, Cl. 48-197.00R.
Langer, Arthur W., Jr., 4,094,818, Cl. 252-429.00C.
Langer, Arthur W., Jr.; and Whitney, Thomas A., 4,094,876, Cl. 260-270.0PD.
McVicker, Gary B.; and Garten, Robert L., 4,094,821, Cl. 252-466.0PT.
Sartori, Guido; and Savage, David W., 4,094,957, Cl. 423-223.000.
Siskin, Michael; and Mayer, Ivan, 4,094,924, Cl. 260-683.510.

F. L. Smith & Co.: *See—*
Rasmussen, Poul; and Kartman, Helge C. C., 4,094,628, Cl. 432-80.000.

Fabian, Wolfgang; Plumer, Werner; Sevenich, Theodor; and Zehnter, Heribert, to Hoesch Werke Aktiengesellschaft. Shearing arrangement. 4,094,219, Cl. 83-345.000.

Fabrique Nationale Herstal S.A. en abrege FN: *See—*
Gevers, Georges A., 4,094,086, Cl. 42-1.00R.

Faccenda, Valerio: *See—*
Bruno, Roberto; and Faccenda, Valerio, 4,094,670, Cl. 75-124.000.

Facom: *See—*
Moulinoux, Andre, 4,094,198, Cl. 73-460.000.

Faisandier, Jacques. Hydraulic control apparatus with feedback. 4,094,226, Cl. 91-39.000.

Falk, Edward J., to Wagner Electric Corporation. Automatic brake adjusting means. 4,094,388, Cl. 188-71.900.

Fancher, Llewellyn W., to Stauffer Chemical Company. Isoxazole phosphates and phosphonates. 4,094,974, Cl. 424-200.000.

Farinon Electric: *See—*
Bradley, Marion W., 4,094,213, Cl. 81-9.50R.
Bradley, Marion W., 4,094,214, Cl. 81-9.50R.

Farley, Roy: *See—*
Flain, Robert James; and Farley, Roy, 4,094,551, Cl. 302-26.000.

Farooq, Saleem: *See—*
Karrer, Friedrich; and Farooq, Saleem, 4,094,993, Cl. 424-337.000.

Faxon Communications Corporation: *See—*
Kolker, Carl R.; Campbell, John Scott; La Fond, Robert L.; and Smith, JaMi (said Kolker, Campbell and LaFond assors. to), 4,095,248, Cl. 358-288.000.

Feaster, Gene R.: *See—*
Simms, Robert A.; and Feaster, Gene R., 4,094,563, Cl. 316-19.000.

Febonio, Richard J., to Torque Systems, Inc. Brush holder for motor or generator. 4,095,131, Cl. 310-239.000.

Fedders Corporation: *See—*
Vogel, Charles A., 4,094,426, Cl. 214-338.000.

Federation of Fly Fishermen: *See—*
Whitlock, David W., 4,094,270, Cl. 119-3.000.

Feess, Erich; Gronen, Willy; and Hertel, Hasso, to Hoechst Aktiengesellschaft. Process for the printing with developing dyes. 4,094,637, Cl. 8-71.000.

Fegley, Charles R.; Morrow, Richard H.; and Naylor, Arthur G., to Western Electric Co., Inc. Methods of and apparatus for conveying, testing and sorting articles and straightening their leads. 4,094,410, Cl. 209-73.000.

Feinstein, Allen I.; Kane, Shantaram G.; and Fields, Ellis K., to Standard Oil Company (Indiana). Process for converting aromatic aldehydes to phenolic compounds. 4,094,912, Cl. 568-802.000.

Fekete, Douglas D., to Oxy Metal Industries Corporation. Method for cleaning tin surfaces. 4,094,701, Cl. 134-2.000.

Felkel, Gerfried; Maier, Gerhard; Guenzel, Wolfgang; and Waitl, Guenther, to Siemens Aktiengesellschaft. Electro-optical coupling element. 4,095,116, Cl. 250-551.000.

Felser, Hans-Josef; and Kley, Kurt Paul, to Bonaval-Werke GmbH. Emptying apparatus for pasty materials. 4,095,287, Cl. 366-194.000.

Fernandez-Baujin, J. M., to Lummus Company, The. Packed bed gas-liquid contactor. 4,094,936, Cl. 261-96.000.

Ferrell, Herbert W. Digital display for weighing scales. 4,094,371, Cl. 177-210.00R.

Ferrell, Wesley; and Shichman, Daniel, to Uniroyal, Inc. Breaker reinforcing tape for belted pneumatic tires, and tires made therefrom. 4,094,354, Cl. 152-361.00R.

Festo-Maschinenfabrik Gottlieb Stoll, Firma: *See—*
Heilmann, Roland, 4,094,384, Cl. 184-55.00A.

Fiberglas Canada Limited: *See—*
Kelly, Norman; Fletcher, William T.; Holden, Derek J.; and Welsh, James J., 4,094,130, Cl. 53-124.00D.

Fields, Ellis K., to Standard Oil Company (Indiana). 2-Hydroxy-3-alkylsulfoxypropyl-1 esters of arene polycarboxylic acids. 4,095,029, Cl. 560-87.000.

Fields, Ellis K.: *See—*
Feinstein, Allen I.; Kane, Shantaram G.; and Fields, Ellis K., 4,094,912, Cl. 568-802.000.

Filimonov, Viktor Dmitrievich: *See—*
Sirotkina, Ekaterina Egorovna; Lopatinsky, Vadim Petrovich; Filimonov, Viktor Dmitrievich; Kogan, Rita Moiseevna; Pirogov, Vyacheslav Dmitrievich; Kudinova, Sofya Ivanovna; Sizova, Ljubov Sergeevna; Reznikova, Svetlana Stepanovna; Ivanov, Georgy Nikolaevich; Tsekhanovskaya, Nina Alexandrovna; Sidaravichus, Jonas-Donatos Bronyaus; Randina, Larisa Vasilievna; Bocharova, Svetlana Leonidovna; Gulyaeva, Galina Petrovna; Bondarenko, Raisa Ivanovna; Rybalko, Galina Ivanovna; and Adomanite, Yanina Antono, 4,095,032, Cl. 526-11.100.

Finkensiep, Friedhelm; Meye, Reinhold Walter; and Thor, Gunter, to Henkel Kommanditgesellschaft auf Aktien. Striped soap, its production and apparatus for its production. 4,094,946, Cl. 264-171.000.

Finn, Lawrence J.: *See—*
Friswell, David R.; and Finn, Lawrence J., 4,094,195, Cl. 73-422.0GC.

Finney, James L.: *See—*
LeVere, Richard W.; Vocaturo, Joseph M.; and Finney, James L., 4,094,158, Cl. 61-63.000.

Firestone Tire & Rubber Company, The: *See—*
Valaitis, Joseph Kestutis; and Harwood, Harold James, 4,094,860, Cl. 260-47.00R.

Fischer, Artur. Method of securing an object to a low-strength support structure. 4,094,054, Cl. 29-460.000.

Fischer, Artur. Drive arrangement particularly for a toy model. 4,094,207, Cl. 74-425.000.

Fischer, Artur. Mounting device for use in masonry and the like. 4,094,223, Cl. 35-77.000.

Fischer & Porter Company: *See—*
Herzl, Peter J., 4,094,194, Cl. 73-194.0VS.
Hyams, Irving; Koch, Harold S.; and Aafjes, Herman, 4,094,212, Cl. 81-3.800.

Fisher, Ian Stuart: *See—*
Sheard, Dennis Richard; and Fisher, Ian Stuart, 4,094,926, Cl. 260-860.000.

Fitzgerald, Patrick Henry, to Du Pont de Nemours, E. I., and Company. Process for converting premilled quinacridone to pigmentary form. 4,094,699, Cl. 106-288.00Q.

Flachenecker, Gerhard: *See—*
Meinke, Hans Heinrich; Lindenmeier, Heinz; Landstorfer, Friedrich; Flachenecker, Gerhard; and Hopf, Jochen, 4,095,228, Cl. 343-704.000.

Flaig, Ulrich: *See—*
Bremer, Wolfgang; Heintz, Frieder; Flaig, Ulrich; Kiencke, Uwe; and Glauert, Wolfram, 4,095,179, Cl. 324-207.000.

Flain, Robert James; and Farley, Roy, to National Research Development Corporation. Material conveying systems. 4,094,551, Cl. 302-26.000.

Flanigan, Richard J.; and Hooton, Robert Duane, to Houdaille Industries, Inc. Hydraulic system for tensioning band saw blades. 4,094,218, Cl. 83-62.100.

Flavell Proprietary Limited: *See—*
Cox, Jack Jebson, 4,094,518, Cl. 277-95.000.

Fleck, James N.; Palmer, Richard C.; and Ruffner, Charles L., to Crucible Inc. Method and container for hot isostatic compacting. 4,094,672, Cl. 75-226.000.

Fleckenstein, Paul P., to Bindicator Company. Paddle for use in a rotating-paddle bin level indicator. 4,095,064, Cl. 200-61.210.

Fleischer, Helmut: *See—*
Scheyhing, Hans; Fleischer, Helmut; and Abend, Karl-Ludwig, 4,094,378, Cl. 180-105.00E.

Fleming, Ian George Cameron; and Jones, Raymond Vincent Heavon, to Imperial Chemical Industries Limited. Process for the manufacture of 1-aryl-3-carboxypyrazolid-5-ones. 4,095,024, Cl. 548-367.000.

Fletcher, Roy W.; Volkmann, Robert W.; and Forte, Anthony D., to Union Special Corporation. Button orientating lifting mechanism. 4,094,259, Cl. 112-110.000.

Fletcher, William T.: *See—*
Kelly, Norman; Fletcher, William T.; Holden, Derek J.; and Welsh, James J., 4,094,130, Cl. 53-124.00D.

Flo-Tork, Inc.: *See—*
Carr, Paul, 4,094,231, Cl. 92-128.000.

Floyd, Roger M.: *See—*
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,094,455, Cl. 229-15.000.

Fluet, Francis A., to Westinghouse Electric Corp. Pulse width modulated sine cosine generator. 4,095,275, Cl. 364-721.000.

FMN Schuster & Co.: *See—*
Tschentscher, Alfred, 4,094,471, Cl. 242-18.0PW.

Fobbe, Waldemar: *See—*
Liebscher, Johannes; Schulein, Rolf G.; and Fobbe, Waldemar, 4,094,032, Cl. 15-41.00R.

Fontanes, Sylvain, to Thomson-CSF. Arrangement for coding with compression the absolute value of an analog signal. 4,095,219, Cl. 340-347.0NT.

Food Processes, Inc.: *See—*
Peterson, Don G.; and Harper, Judson M., 4,094,633, Cl. 432-118.000.

Ford Aerospace & Communications Corporation: *See—*
Ramnarace, Jawaharlal, 4,094,711, Cl. 149-4.000.

Ford, John B. Containers for pills and the like. 4,094,408, Cl. 206-534.000.

Ford Motor Company: *See—*
Auiler, James E.; Hamburg, Douglas R.; Hyland, James E.; and Moyer, David F., 4,094,275, Cl. 123-34.00A.
Hamburg, Douglas R., 4,094,291, Cl. 123-141.000.

Ford, Peter, to Dunlop Limited. Tires having a solid polyurethane core. 4,094,353, Cl. 152-310.000.

Formica Corporation: *See—*
DeLapp, Darwin Fiske, 4,094,846, Cl. 260-29.40R.
Huffman, Kenneth Robert; Casey, Donald James; and Thomas, Walter Moreland, 4,094,847, Cl. 260-29.40R.

Forsberg, John Wesley, to Lubrizol Corporation, The. Magnesium-containing complexes, method for their preparation, and compositions containing the same. 4,094,801, Cl. 252-33.000.

Forte, Anthony D.: *See—*
Fletcher, Roy W.; Volkmann, Robert W.; and Forte, Anthony D., 4,094,259, Cl. 112-110.000.

Fortner, Paul W.: *See—*
Colchagoff, Robert D.; Fortner, Paul W.; Kirkman, Richard T.; Naughton, Thomas J.; and Zimmerman, George, 4,094,656, Cl. 65-81.000.

Fourcadier, Chantal S.: *See—*
Bugaut, Andree; and Fourcadier, Chantal S., 4,094,635, Cl. 8-11.000.

Fraas, Lewis M.; and Bleha, William P., Jr., to Hughes Aircraft Company. Process for low temperature stoichiometric recrystallization of compound semiconductor films. 4,095,004, Cl. 427-74.000.

Fraioli, Anthony V., to Galileo Electro-Optics Corp. Electron multiplier. 4,095,132, Cl. 313-103.0CM.

Frank, Alan I. W., to Alan I. W. Frank Corporation. Method of molding polymeric material. 4,094,952, Cl. 264-328.000.

Frank, James P., to General Electric Company. Switch and terminal assembly having strip terminal and mounting member adapted to ground dynamoelectric machine casing on similar conductive surface. 4,095,073, Cl. 200-293.000.

Frank Plasser Bahnbaummaschinen-Industriegesellschaft m.b.H.: *See—*
Theurer, Josef, 4,094,251, Cl. 104-12.000.

Franke, Walter. Two-stroke combustion engines. 4,094,278, Cl. 123-59.0EC.

Franklin, Howard. Urine specimen collector. 4,094,020, Cl. 128-294.000.

Franz Berrenberg: *See—*
Broder, Gerhard, 4,094,048, Cl. 29-6.000.

Franz, James H., Jr.: *See—*
Matty, Thomas C.; and Franz, James H., Jr., 4,095,153, Cl. 318-376.000.

Franz, John E.: *See—*
Alt, Gerhard H.; and Franz, John E., 4,094,661, Cl. 71-88.000.

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See—*
Theurer, Josef; and Brunninger, Manfred, 4,094,249, Cl. 104-6.000.
Theurer, Josef, 4,094,250, Cl. 104-12.000.

Fratini, Sabatino A. Snow shovel. 4,094,543, Cl. 294-54.000.

Frazier, Clifford John, to Castcraft Industries, Inc. Method and apparatus of changing characters on a font and preparing a font duplicate. 4,094,680, Cl. 96-41.000.

Frazier, Thomas Cecil; Ashworth, John Thomas; Chumney, Richard Douglas, Jr.; and Meyre, Rene Wilhelm, to American Brands, Inc. Smoking article and method. 4,094,323, Cl. 131-8.00R.

Freedman, Harold H.: *See—*
Kroposki, Lorraine M.; Yoshimine, Masao; and Freedman, Harold H., 4,094,873, Cl. 544-243.000.

Frenken, Klaus: *See—*
Schrewe, Hans; and Frenken, Klaus, 4,094,707, Cl. 148-12.00R.

Frey, Gerald J. Flexible magazine slide projector with movable lens. 4,094,599, Cl. 353-96.000.

Fricker, Paul: *See—*
Ullmann, Werner; Fricker, Paul; and Guenin, Maurice, 4,095,079, Cl. 219-69.00E.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Gerlach, Manfred, 4,094,193, Cl. 73-170.00A.
Sedlmayer, Franz; and Muller, Peter, 4,095,160, Cl. 318-675.000.

Friedman, Maurice W.: *See—*
Vulcano, Vincent N.; and Friedman, Maurice W., 4,094,128, Cl. 53-52.000.

Friedrich Kocks GmbH: *See—*
Bindernagel, Ali, 4,094,049, Cl. 29-33.00C.

Friswell, David R.; and Finn, Lawrence J., to Waters Associates, Inc. Novel seal and apparatus including same. 4,094,195, Cl. 73-422.0GC.

Friswell, David R., to Waters Associates, Inc. Sample injection with automatic cleaning of sampling conduit. 4,094,196, Cl. 73-422.0GC.

Friswell, David R., to Waters Associates, Inc. Low loss sample bottle assembly. 4,094,641, Cl. 23-230.00R.

Fritz Eichenauer, Firma: *See—*
Ohnmacht, Helmut; and Brechner, Ernst, 4,095,086, Cl. 219-283.000.

Frolke, Wilhelm: *See—*
Renth, Ernst-Otto; Mentrup, Anton; Schromm, Kurt; and Frolke, Wilhelm, 4,094,980, Cl. 424-250.000.

Frutiger, Peter; and Gemperle, Bruno, to Anstalt Europaische Handelsgesellschaft. Electronic enciphering- and deciphering apparatus in the form of a pocket calculator. 4,095,046, Cl. 178-22.000.

Fuchs, Francis Joseph, Jr., to Western Electric Co., Inc. Methods for continuous extrusion. 4,094,178, Cl. 72-41.000.

Fuji Photo Film Co., Ltd.: *See—*
Naito, Kenji, 4,094,848, Cl. 260-29.60E.
Tsujino, Nobuyuki; Ogawa, Akira; Shishido, Tadao; and Adachi, Keiichi, 4,094,683, Cl. 96-95.000.
Washizawa, Yasuo; and Ikeda, Tomoaki, 4,094,679, Cl. 96-36.300.

Fuji Photo Optical Co., Ltd.: *See—*
Numata, Saburo; and Fujino, Shin-ichiro, 4,095,243, Cl. 354-60.00L.
Yokoyama, Tsuneo; Yajima, Toshiyuki; Tsuchiya, Kazumichi; and Takemae, Hisao, 4,095,244, Cl. 354-82.000.

Fujii, Yoshio; Shimada, Mitsuo; and Ohnuma, Sadabumi, to Hitachi, Ltd. High sensitivity absorptiometer. 4,094,609, Cl. 356-201.000.

Fujino, Shin-ichiro: *See—*
Numata, Saburo; and Fujino, Shin-ichiro, 4,095,243, Cl. 354-60.00L.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Tanaka, Kunihiko; Kurita, Masaru; and Nishiwaki, Osamu, 4,094,872, Cl. 544-26.000.
Ueda, Ikuo; and Matsuo, Masaaki, 4,094,870, Cl. 260-239.0BD.

Fujita, Hiroshi; Kubota, Munetaka; Makita, Takashi; and Takahashi, Yukishige, to Kajima Kensetsu Kabushiki Kaisha. Anti-freezing method and apparatus for ground surrounding liquified gas storing underground tank. 4,094,151, Cl. 61-36.00A.

Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kawasaki, Mikio; and Kaneko, Yutaka, to Konishiroku Photo Industry Co., Ltd. Method for processing light-sensitive silver halide photographic material. 4,094,682, Cl. 96-55.000.

Fujiyama, Hikaru; Kasama, Tsuneo; and Higuchi, Shigenobu, to Nippon Oil and Fats Co., Ltd.; and Kokuku Chemical Industry Co. Ltd. Automatic inflating lifesaving buoy. 4,094,028, Cl. 9-321.000.

Fukumoto, Ryoichi; and Igarashi, Toshiro, to Aisin Seiki Kabushiki Kaisha. Free movement preventing device for window glasses of automobiles. 4,094,100, Cl. 49-348.000.

Fuller Company: *See—*
Boyhont, Donald S.; and Warshawsky, Jay, 4,094,626, Cl. 432-58.000.

Fuller, Everett J., to Exxon Research & Engineering Co. Separation of bitumen from tar sands using sulfur and water. 4,094,768, Cl. 208-11.0LE.

Fund, Harry, to Modular Products. Vehicle placarding apparatus. 4,094,083, Cl. 40-536.000.

Furrer, Edwin, to Rieter Machine Works Limited. Method and apparatus for controlling an open-end spinning machine. 4,094,133, Cl. 57-34.00R.

Furuno Electric Co., Ltd.: *See—*
Tanigaki, Hidetoshi, 4,095,128, Cl. 307-254.000.

G & W Electric Specialty Company: *See—*
Akers, Donald J., 4,095,065, Cl. 200-63.00R.

Gabbrielli, Franco. Device and a method for handling material. 4,094,425, Cl. 214-310.000.

Gaertner, Van Russell, to Monsanto Company. Carbonylaldiminomethanephosphonates. 4,094,928, Cl. 260-944.000.

GAF Corporation: *See—*
Biranowski, Jerome B.; and Lorenz, Donald H., 4,094,869, Cl. 260-2.5AW.
Miller, Paul D.; and Porcelli, V. Lorenzo, 4,094,404, Cl. 206-45.150.

Gage, Paul E., to Polymer Corporation, The. Railway truck floating pedestal wear liner. 4,094,253, Cl. 105-225.000.

Galerne, Andre, to International Underwater Contractors, Inc. Diving bell with transparent panoramic viewing. 4,094,160, Cl. 61-69.00R.

Galileo Electro-Optics Corp.: *See—*
Fraioli, Anthony V., 4,095,132, Cl. 313-103.0CM.

Galione, Edward Richard David, to W. Vinten Limited. Balanced portable pedestals. 4,094,484, Cl. 248-162.000.

Gallagher, Robert C., to Westinghouse Electric Corp. Method of neutralizing local defects in charge couple device structures. 4,094,733, Cl. 156-648.000.

Gallatin, Paul M., to Allis-Chalmers Corporation. Contactor having reduced contact bounce and shorter arc time. 4,095,200, Cl. 335-193.000.

Ganholt, Bo Olov, to Esseltepac Aktiebolag. Method and apparatus for packing products in substantially oxygen free atmosphere. 4,094,121, Cl. 53-22.00R.

Garlinghouse, Leslie H. Variable agitator mixer. 4,095,288, Cl. 366-219.000.

Garrison, Charles G.: *See—*
Goddard, Terrence P.; Thatcher, Donald N.; and Garrison, Charles G., 4,094,712, Cl. 149-10.000.

Garten, Robert L.: *See—*
McVicker, Gary B.; and Garten, Robert L., 4,094,821, Cl. 252-466.0PT.

Gast, Lyle E.: *See—*
Schneider, Wilma J.; and Gast, Lyle E., 4,094,838, Cl. 260-22.0TN.

Gearhart-Owen Industries, Inc.: *See—*
King, David W., 4,094,359, Cl. 166-65.00R.

Sumitomo Chemical Company, Limited. Polyolefin composition. 4,094,854, Cl. 260-42.460.

Harand, Elmar: *See—*
Greischel, Christoph; Harand, Elmar; Maritsch, Franz; and Michel, Eberhard, 4,094,737, Cl. 176-65.000.

Hardouin, Michel Jean Charles: *See—*
Tilly, Guy; Hardouin, Michel Jean Charles; and Lautrou, Jean, 4,094,966, Cl. 424-5.000.

Hardwick, Danny R.: *See—*
Wiswell, H. Eugene; and Hardwick, Danny R., 4,095,209, Cl. 338-174.000.

Harmon, Russel J.: *See—*
Johnson, William A.; Pausmer, Philip W.; and Harmon, Russel J., 4,094,532, Cl. 280-695.000.

Harper, John A.; and Williams, Terence V., to Austin Hoy and Company, Ltd. Securing means for machine parts. 4,094,611, Cl. 403-14.000.

Harper, Judson M.: *See—*
Peterson, Don G.; and Harper, Judson M., 4,094,633, Cl. 432-118.000.

Harrell, Robert C. Mobile insect collecting and destroying apparatus. 4,094,088, Cl. 43-144.000.

Harris Corporation: *See—*
Kratzer, Dale L., 4,095,226, Cl. 343-105.00R.

Harris, Geoffrey John, to Square D Company. Transducer. 4,095,177, Cl. 324-164.000.

Harris, Rano J., Jr.: *See—*
Harris, Rano J., Sr.; Harris, Rano J., Jr.; and Averette, Julius P., Jr., 4,094,197, Cl. 73-423.00A.

Harris, Rano J., Sr.; Harris, Rano J., Jr.; and Averette, Julius P., Jr. Semi-automatic and automatic fluid injectors. 4,094,197, Cl. 73-423.00A.

Harris, Richard Hunter, to International Business Machines Corporation. Hinged flyplate actuator. 4,095,066, Cl. 200-67.00A.

Harris, Thomas D., to Southern Saw Service, Inc. Honing device. 4,094,106, Cl. 51-214.000.

Harris, Walter Jefferson; and Neufeld, Ronald Murray, to Boeing Company, The. Rotating pot shaped eddy current probe in which only a small fraction of the lip forming the outer core portion is retained. 4,095,181, Cl. 324-238.000.

Harrold, Maurice, to Lucas Industries Limited. Intermittently operable electrical switch assembly. 4,095,208, Cl. 337-125.000.

Harrop, William H.; Witiak, David; and LaBar, Russell A., to Rohm and Haas Company. Process for improving the processability of polyolefins, improved polyolefin compositions, and modifier compositions. 4,094,927, Cl. 260-897.00B.

Hartdegen, Frank Joseph; and Swann, Wayne Elliott, to W. R. Grace & Co. Water-dispersible protein/polyurethane reaction product. 4,094,744, Cl. 195-63.000.

Harter Corporation: *See—*
Good, Wayne W., 4,094,113, Cl. 52-222.000.
Wolff, Douglas F.; Minick, Harold N.; and Reinhart, Jay J., 4,094,561, Cl. 312-223.000.

Hartl, Johannes: *See—*
Botta, Artur; von Konig, Anita; Moll, Franz; Rasp, Christian; and Hartl, Johannes, 4,094,811, Cl. 252-313.00R.

Hartung, Kuhn & Co.: *See—*
Riecker, Johann G., 4,094,420, Cl. 214-35.00R.

Harvey, Samuel E.; Whitehead, James Stephen; and Goranson, Paul L., to Carrier Corporation. Refuse container discharge station. 4,094,424, Cl. 214-304.000.

Harwood, Harold James: *See—*
Valaitis, Joseph Kestutis; and Harwood, Harold James, 4,094,860, Cl. 260-47.00R.

Harwood, Leopold Albert: *See—*
Groeneweg, Willem Hendrik; Tuma, Alois Vaclav; and Harwood, Leopold Albert, 4,095,255, Cl. 358-17.000.

Hasegawa, Katsuji, to Meinan Machinery Works, Inc. Apparatus for mending surface irregularities of wooden plates. 4,094,344, Cl. 141-125.000.

Haseler, Helmut; and von der Kall, Gunter, to Agfa-Gevaert Aktiengesellschaft. Dosing device for pulverulent material. 4,094,448, Cl. 222-342.000.

Hasspacher, Klaus; and Strasser, Michael, to Sandoz Ltd. 2-(3-m-Hydroxy-phenyl-1-substituted-3-pyrrolidinyl)-ethanols. 4,094,987, Cl. 424-274.000.

Hatanaka, Shiro; Tamesui, Tsuyoshi; and Matsuura, Tsuneharu, to Toyoda-Koki Kabushiki-Kaisha; and Toyota Jidosha Kogyo Kabushiki Kaisha. Cam grinding machine with workpiece speed control. 4,094,105, Cl. 51-101.00R.

Hattori, Tadashi; and Nakase, Takamichi, to Nippon Soken, Inc. Air-fuel ratio adjusting system. 4,094,273, Cl. 123-32.0EE.

Haugen, John H.: *See—*
Jones, Herman L.; and Haugen, John H., 4,094,719, Cl. 156-250.000.

Hauni-Werke Korber & Co. KG: *See—*
Stoffers, Helmut; and George, Rudolf, 4,094,325, Cl. 131-21.00R.

Hauser, Raimund: *See—*
Besenmatter, Walter; and Muszumanski, Trude, 4,094,587, Cl. 350-184.000.

Hawrylo, Frank Zygmunt; and Kressel, Henry, to RCA Corporation. Electroluminescent semiconductor device with passivation layer. 4,095,011, Cl. 428-469.000.

Hay, Warren H.; Kimball, Stephen F.; and Martin, Roy C., to GTE Sylvania Incorporated. Thermal fuse. 4,095,207, Cl. 337-20.000.

Hayashi, Kazuya: *See—*
Yasui, Seimei; Hino, Minoru; and Hayashi, Kazuya, 4,094,836, Cl. 260-22.0CB.

Hayashi, Masao: *See—*
Noguchi, Kosaku; Yoshimura, Kiyoharu; Tanaka, Honami; and Hayashi, Masao, 4,094,776, Cl. 210-27.000.

Hayashi, Osamu. Gold color copper alloy for restorative dentistry. 4,094,671, Cl. 75-157.500.

Hayashi, Yoshimasa: *See—*
Kuroda, Hiroshi; Nakajima, Yasuo; Hayashi, Yoshimasa; and Nagumo, Shin-ichi, 4,094,286, Cl. 123-119.00A.

Hayashida, Yoshihiro, to Tokico Ltd. Cap assembly and method for producing thereof. 4,094,437, Cl. 220-374.000.

Hayden, Percy; and Clayton, Richard William, to Imperial Chemical Industries Limited. Restoring selectivity of alkali metal promoted silver catalysts and production of olefine oxides. 4,094,889, Cl. 260-348.340.

Hayden, Rodney, to TRW Inc. Mechanically actuable control relay. 4,095,213, Cl. 340-252.00R.

Haynes, Richard T.; and Young, Harry L., to Monsanto Company. Method of preparation of clear concentrate compositions. 4,094,851, Cl. 260-33.6UA.

Hazar, Mitchell M. Method for producing artificial denture. 4,094,067, Cl. 32-2.000.

Heard, Robert Arthur Henderson. Securing device. 4,094,487, Cl. 248-231.000.

Heeke, Hugo, to Conrad Scholtz AG. Inlay fabric. 4,094,402, Cl. 198-847.000.

Hehl, Karl. Die closing unit with oversize injection molding die. 4,094,621, Cl. 425-190.000.

Heiling, Gerald Michael, to International Business Machines Corporation. Straight-line optical scanner using rotating holograms. 4,094,576, Cl. 350-3.710.

Heilmann, Roland, to Festo-Maschinenfabrik Gottlieb Stoll, Firma. Bayonet connecting system for collector bowl attachment to connecting housing of compressed air conditioning device. 4,094,384, Cl. 184-55.00A.

Heine, Gunter; and Schaffer, Claus, to Gerhard Berger GmbH & Co. Fabrik Elektrischer Messgerate. Variable stepping-angle synchronous motor. 4,095,161, Cl. 318-696.000.

Heinsohn, Howard H., Jr.: *See—*
Evers, William J.; Heinsohn, Howard H., Jr.; Shuster, Edward J.; and Schmitt, Frederick Louis, 4,094,824, Cl. 252-522.000.

Heintz, Frieder: *See—*
Bremer, Wolfgang; Heintz, Frieder; Flaig, Ulrich; Kiencke, Uwe; and Glauert, Wolfram, 4,095,179, Cl. 324-207.000.

Heinzl, Joachim: *See—*
Kattner, Erich; Guntersdorfer, Max; and Heinzl, Joachim, 4,095,238, Cl. 346-140.00R.

Hemby, Franklin Delano: *See—*
Toal, Desmond J.; McKenzie, John Matthew; and Hemby, Franklin Delano, 4,094,550, Cl. 301-37.00R.

Henderson, George L., to Henderson Industrial Corporation. Evaporator and treatment of viscous brines. 4,094,734, Cl. 159-13.00A.

Henderson Industrial Corporation: *See—*
Henderson, George L., 4,094,734, Cl. 159-13.00A.

Henderson, Stewart; and Hielema, Ralph, to Henderwood Industries, Ltd. Method and apparatus for applying foam insulation to pipe. 4,094,715, Cl. 156-78.000.

Henderwood Industries, Ltd.: *See—*
Henderson, Stewart; and Hielema, Ralph, 4,094,715, Cl. 156-78.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Finkensiep, Friedhelm; Meye, Reinhold Walter; and Thor, Gunter, 4,094,946, Cl. 264-171.000.
Heyden, Rudi; Asbeck, Adolf; Eckelt, Michael; Petzold, Manfred; and Uphues, Gunter, 4,094,812, Cl. 252-321.000.

Hersberger, Pierre: *See—*
Chetelat, Fernand; and Hersberger, Pierre, 4,094,138, Cl. 58-39.500.

Hertel, Hasso: *See—*
Feess, Erich; Gronen, Willy; and Hertel, Hasso, 4,094,637, Cl. 8-71.000.

Herzhoff, Peter; Gref, Hans; and Schweicher, Wolfgang, to Agfa-Gevaert Aktiengesellschaft. Detection device for paper or film in web form. 4,095,063, Cl. 200-61.130.

Herzl, Peter J., to Fischer & Porter Company. Sensing system for vortex-type flowmeters. 4,094,194, Cl. 73-194.0VS.

Hess, Dieter: *See—*
Daubenbuschel, Werner; Thomas, Alfred; Hess, Dieter; and Augst, Hans-Rudiger, 4,094,620, Cl. 425-140.000.

Hess, Hans-Jurgen E., to Pfizer Inc. Oxaprostaglandins. 4,094,899, Cl. 260-514.00D.

Hess, Robert L.: *See—*
Meyer, Jeffry R.; and Hess, Robert L., 4,095,068, Cl. 200-144.0AP.

Hesston Corporation: *See—*
White, Bruce Lynn; Kiner, Mark Winfield; and Wiens, Arlen Jacob, 4,094,427, Cl. 214-505.000.
White, Bruce Lynn; Kiner, Mark Winfield; and Wiens, Arlen Jacob, 4,094,428, Cl. 214-505.000.

Hetal-Werke Franz Hettich KG.: *See—*
Schmid, Gunter; and Schaber, Christian, 4,094,040, Cl. 16-191.000.

Hettinger, Frederic L., to Perry Oceanographics, Inc. Submersible chamber. 4,094,159, Cl. 61-69.00R.

Heurtey Effutherm: *See—*
Wang, Robert; and Brun, Didier, 4,094,625, Cl. 431-9.000.

Heyden, Rudi; Asbeck, Adolf; Eckelt, Michael; Petzold, Manfred; and Uphues, Gunter, to Henkel Kommanditgesellschaft auf Aktien. Anti-

foam composition and process with α-hydroxyamine derivatives. 4,094,812, Cl. 252-321.000.

Heyn, William O.; and Peisker, Glenn W., to Chicago Rawhide Manufacturing Company. Shaft seal with helical pumping element. 4,094,519, Cl. 277-134.000.

Hiai, Atsuhiko: *See—*
Iwai, Yasuto; Okabe, Masayoshi; Seki, Naotoshi; Hiai, Atsuhiko; and Iguchi, Seiya, 4,094,780, Cl. 210-38.00B.

Hicks, Alan A.: *See—*
Morrison, Howard J.; and Hicks, Alan A., 4,094,506, Cl. 273-85.00R.

Hiddink, Joseph Herman Arnold Peter. Capacity changer. 4,095,162, Cl. 320-1.000.

Hielema, Ralph: *See—*
Henderson, Stewart; and Hielema, Ralph, 4,094,715, Cl. 156-78.000.

Hiestand, Karl, to SMW-Spanneinrichtungen Schneider & Weisshaupt, Firma. Chuck having radially reciprocating jaws. 4,094,522, Cl. 279-4.000.

Higuchi, Shigenobu: *See—*
Fujiyama, Hikaru; Kasama, Tsuneo; and Higuchi, Shigenobu, 4,094,028, Cl. 9-321.000.

Hild, Melvin O. Apparatus for fine grading compacted earth. 4,094,362, Cl. 172-120.000.

Hildebolt, William M.; and Hundt, Murray T., to Campbell Soup Company. Protein texturization. 4,095,001, Cl. 426-656.000.

Hill, James C.; and Knox, Walter R., to Monsanto Company. Polyester of a cyclic diacid anhydride with an epoxide. 4,094,865, Cl. 260-78.410.

Hillekamp, Klaus; and Kindler, Hubert, to Krauss-Maffei Aktiengesellschaft. Method of and apparatus for sorting light refuse fractions. 4,094,772, Cl. 209-12.000.

Hillmann, Reinhart: *See—*
Koder, Walter; and Hillmann, Reinhart, 4,094,394, Cl. 192-98.000.

Hilti Aktiengesellschaft: *See—*
Lang, Gusztav; and Kuhlmann, Wolf, 4,094,222, Cl. 85-63.000.

Hino, Minoru: *See—*
Yasui, Seimei; Hino, Minoru; and Hayashi, Kazuya, 4,094,836, Cl. 260-22.0CB.

Hirai, Yoshiro: *See—*
Tanai, Kunio; Nakayama, Yasuaki; Hirai, Yoshiro; Aoyama, Shigeru; and Kashima, Yoshinobu, 4,095,129, Cl. 310-49.00R.

Hirano, Itsuro, to B F Kogyo Kaisha, Ltd. (Bi Efy Kogyo Kabushiki Kaisha). Apparatus and method for filtering dehydrating and drying material. 4,094,784, Cl. 210-68.000.

Hishiki, Hideo, to Victor Company of Japan, Limited. Encapsulated transformer assembly. 4,095,206, Cl. 336-96.000.

Hitachi Chemical Company, Ltd.: *See—*
Omori, Eiji; Aimono, Yuuji; Mukoyama, Yoshiyuki; and Sugitani, Hatuo, 4,094,835, Cl. 260-22.0CB.

Hitachi, Ltd.: *See—*
Fujii, Yoshio; Shimada, Mitsuo; and Ohnuma, Sadabumi, 4,094,609, Cl. 356-201.000.
Karino, Kimiji, 4,094,931, Cl. 261-23.00B.
Kawabe, Shun; and Omoda, Kouichiro, 4,095,269, Cl. 364-200.000.
Kihara, Toshimasa, 4,095,278, Cl. 364-900.000.
Kobayashi, Yoshiki; Bandoh, Tadaaki; Maejima, Hideo; and Yasuda, Hajime, 4,095,268, Cl. 364-200.000.
Maeda, Yasuyuki; Mitsui, Nobuo; Kameyama, Tadao; and Komuro, Katsu, 4,094,385, Cl. 187-29.00R.
Murayama, Seiichi; Yamamoto, Manabu; Ito, Masaru; Yasuda, Makoto; Watanabe, Makoto; and Kayama, Kunifusa, 4,095,142, Cl. 315-248.000.
Narita, Hiroshi, 4,095,152, Cl. 318-376.000.
Oyama, Yoshishige; Teranishi, Takao; and Yamauchi, Teruo, 4,094,285, Cl. 123-119.00A.
Suzuki, Hirofumi, 4,095,260, Cl. 358-248.000.
Suzuki, Kazuo; and Kataoka, Hiroyuki, 4,094,386, Cl. 187-29.00R.
Yoshimura, Masayoshi; Otsuki, Keizo; Shoji, Senji; Yamada, Tomio; Shimizu, Ichio; and Arai, Yuji, 4,095,253, Cl. 357-81.000.

Hlavka, Lloyd F., to Varian Associates, Inc. RF pick-up coil circuit for a wide tuning range nuclear magnetic resonance probe. 4,095,168, Cl. 324-0.5AH.

Hlinsky, Emil J., to MacLean-Fogg Lock Nut Co. Fasteners having toothed bearing surfaces. 4,094,352, Cl. 151-37.000.

Hochberger, Gerald J.: *See—*
Jones, William F.; and Hochberger, Gerald J., 4,094,367, Cl. 177-1.000.

Hochstein, Peter A.; and Shih, Kelvin. Radio transceiver power booster. 4,095,184, Cl. 325-22.000.

Hodges, Dewey W. Micro display with magnifier. 4,094,598, Cl. 353-76.000.

Hodson, Harold Francis; and Batchelor, John Frederick, to Burroughs Wellcome Co. Treatment for allergy and method of composition thereof. 4,094,968, Cl. 424-46.000.

Hoeberechts, Arthur Marie Eugene, to U.S. Philips Corporation. Field emission device. 4,095,133, Cl. 313-336.000.

Hoechst Aktiengesellschaft: *See—*
Feess, Erich; Gronen, Willy; and Hertel, Hasso, 4,094,637, Cl. 8-71.000.
Katsimbas, Themistoklis, 4,095,002, Cl. 427-27.000.
Schaum, Helmut; Schenk, Friedrich; Voigt, Hartmut; and Sartorius, Rudolf, 4,094,901, Cl. 260-530.00R.
Seeger, Karl; and Bauer, Fritz, 4,094,977, Cl. 424-240.000.
von der Eltz, Hans-Ulrich, 4,094,636, Cl. 8-46.000.

Hoehn, Wolfgang; and Sauer, Wolfgang, to ITT Industries, Incorporated. Monolithic integrated circuit for an RC oscillator. 4,095,194, Cl. 331-108.00D.

Hoelscher, Charles H.: *See—*
Stewart, Dorothy A.; Ricketts, Bobby D.; and Hoelscher, Charles H., 4,094,808, Cl. 252-186.000.

Hoesch Werke Aktiengesellschaft: *See—*
Fabian, Wolfgang; Plumer, Werner; Sevenich, Theodor; and Zehnter, Heribert, 4,094,219, Cl. 83-345.000.

Hoffman, Charles Reeves; and Nunnery, William Burrell, to International Business Machines Corporation. Bi-polar amplifier with sharply defined amplitude limits. 4,095,126, Cl. 307-237.000.

Hoffmann-La Roche Inc.: *See—*
Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, 4,095,038, Cl. 560-255.000.
Chan, Ka-Kong; and Saucy, Gabriel, 4,094,885, Cl. 260-345.500.
Chan, Ka-Kong; and Saucy, Gabriel, 4,094,892, Cl. 260-410.90R.
Jarrott, Bevyn; and Spector, Sidney, 4,094,964, Cl. 424-1.000.
Thomas, Gareth John, 4,094,664, Cl. 71-115.000.

Hofmann, Allan Michael: *See—*
Duttweiler, Donald Lars; and Hofmann, Allan Michael, 4,095,053, Cl. 179-15.0AF.

Hold, Peter, to USM Corporation. Injection molding machine controls. 4,094,940, Cl. 264-40.600.

Holden, Derek J.: *See—*
Kelly, Norman; Fletcher, William T.; Holden, Derek J.; and Welsh, James J., 4,094,130, Cl. 53-124.00D.

Holdren, Frederick V.; Hugli, Hans W.; Kubler, John M.; Larson, Martin E.; and Van Schoiack, Michael M., to Sundstrand Data Control, Inc. Accelerometer. 4,094,199, Cl. 73-517.00B.

Holgersson, Sigbjorn P. H. E., to Kopparfors AB. Method of pulping with sulfite liquor containing formic acid esters. 4,094,735, Cl. 162-76.000.

Holliday, Robert George, to Xerox Corporation. Reproduction of paged material from microform cards. 4,094,601, Cl. 355-26.000.

Holliday, Robert George, to Xerox Corporation. Microform card alignment device. 4,094,602, Cl. 355-40.000.

Holmes, Gordon W.; and Nelham, Roy W., to R. Nelham & Associates Incorporated. Ice-cream sandwich forming apparatus. 4,094,236, Cl. 99-450.400.

Holper, Manfred; Schertel, Gunter; and Kosters, Egon, to VOKO Franz Vogt & Co. Work table having lines embodied therein. 4,094,256, Cl. 108-50.000.

Homeyer, Bernhard: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Sirrenberg, Wilhelm; Hammann, Ingeborg; Homeyer, Bernhard; and Thomas, Herbert, 4,094,975, Cl. 424-216.000.

Homko, Joseph C., to United States of America, Army. Thread protector and seal. 4,094,224, Cl. 86-31.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Nakamura, Akihisa; Umemoto, Takashi; and Arai, Sakuji, 4,094,276, Cl. 123-52.00M.
Nakano, Teruyuki; and Otaka, Syoichi, 4,094,282, Cl. 123-117.00A.
Takagi, Tadao; Yagi, Toru; Ehara, Mitsuo; and Yamada, Tatsumi, 4,094,292, Cl. 123-179.00G.

Honeywell Inc.: *See—*
Milewski, Sylvester, 4,094,463, Cl. 236-82.000.
Quarton, William T.; and Lowe, Peter R., 4,095,235, Cl. 346-110.00R.
Shroff, Bansi K.; and Shu, Stephen K., 4,094,478, Cl. 242-192.000.

Hooton, Robert Duane: *See—*
Flanigan, Richard J.; and Hooton, Robert Duane, 4,094,218, Cl. 83-62.100.

Hoover Company, The: *See—*
Minton, Keith G., 4,094,535, Cl. 285-7.000.

Hopf, Jochen: *See—*
Meinke, Hans Heinrich; Lindenmeier, Heinz; Landstorfer, Friedrich; Flachenecker, Gerhard; and Hopf, Jochen, 4,095,228, Cl. 343-704.000.

Hoppmann Corporation: *See—*
Hoppmann, Kurt H.; and Edmunds, George W., 4,094,412, Cl. 209-106.000.

Hoppmann, Kurt H.; and Edmunds, George W., to Hoppmann Corporation. Rolling method of sorting particulate articles. 4,094,412, Cl. 209-106.000.

Horiike, Yasuhiro: *See—*
Yamamoto, Shinichi; Sumitomo, Yasusuke; Horiike, Yasuhiro; and Shibagaki, Masahiro, 4,094,722, Cl. 156-345.000.

Horsma, David August; and De Blauwe, Francis, to Raychem Corporation. Multiple cable adapter and splice case including the same. 4,095,044, Cl. 174-138.00F.

Hosaka, Hideo: *See—*
Nishikawa, Mitsuo; Hosaka, Hideo; and Maemori, Jun, 4,094,342, Cl. 140-93.200.

Houdaille Industries, Inc.: *See—*
Flanigan, Richard J.; and Hooton, Robert Duane, 4,094,218, Cl. 83-62.100.

House Food Industrial Company Limited: *See—*
Sakakibara, Sakuichi; Sugisawa, Ko; Kimura, Takashi; and Yasuda, Atsushi, 4,094,996, Cl. 426-115.000.

Howard, Dean D., to United States of America, Navy. Four-dimensional isometric radar target image display. 4,095,223, Cl. 343-7.900.

Howard, Frank N. Neck roll for helmet. 4,094,015, Cl. 2-415.000.

Kaelin, Bette M., to Marvin Glass & Associates. Doll having self-supporting sitting and standing positions. 4,094,093, Cl. 46-160.000.
Kahmann, Albrecht, to Escher Wyss GmbH. Hydrocyclone. 4,094,794, Cl. 210-512.00R.
Kaiser Resources Ltd.: *See—*
Shoji, Kouichi; and Grimley, Arthur W. T. (said Arthur Grimley assors. to), 4,094,549, Cl. 299-17.000.
Kajima Kensetsu Kabushiki Kaisha: *See—*
Fujita, Hiroshi; Kubota, Munetaka; Makita, Takashi; and Takahashi, Yukishige, 4,094,151, Cl. 61-36.00A.
Kakigi, Takao, to Cybernet Electronic Corporation. Display device for transceiver and like. 4,095,182, Cl. 325-17.000.
Kakigi, Takao, to Cybernet Electronic Corporation. Tuning circuit. 4,095,183, Cl. 325-17.000.
Kakui, Kuniaki; Shigeta, Toshihiko; and Koike, Koso, to Toyo Kogyo Co., Ltd. Rotary piston engines. 4,094,618, Cl. 418-178.000.
Kaloi, Cyril M., to United States of America, Navy. Asymmetrically fed magnetic microstrip dipole antenna. 4,095,227, Cl. 343-700.0MS.
Kalt, Charles G., to Dielectric Systems International, Inc. Electrostatic device for gating electromagnetic radiation. 4,094,590, Cl. 350-269.000.
Kameyama, Tadao: *See—*
Maeda, Yasuyuki; Mitsui, Nobuo; Kameyama, Tadao; and Komuro, Katsu, 4,094,385, Cl. 187-29.00R.
Kamlet, Mortimer J.: *See—*
Boyars, Carl; and Kamlet, Mortimer J., 4,094,710, Cl. 149-3.000.
Kane, Shantaram G.: *See—*
Feinstein, Allen I.; Kane, Shantaram G.; and Fields, Ellis K., 4,094,912, Cl. 568-802.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
Yamada, Hideaki; Takahashi, Satomi; and Yoneda, Koji, 4,094,741, Cl. 195-29.000.
Kaneko, Tomoyoshi: *See—*
Kusada, Shohei; and Kaneko, Tomoyoshi, 4,094,182, Cl. 72-344.000.
Kaneko, Yutaka: *See—*
Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kawasaki, Mikio; and Kaneko, Yutaka, 4,094,682, Cl. 96-55.000.
Kanemaru, Toyonosuke: *See—*
Ishikawa, Toshikatsu; Kanemaru, Toyonosuke; Teranishi, Haruo; and Onishi, Kazumasa, 4,094,951, Cl. 264-325.000.
Kantor, Frederick W. Rotary thermodynamic apparatus. 4,094,170, Cl. 62-499.000.
Kaplan, Jean-Pierre; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, to Synthelabo. Benzylidene derivatives. 4,094,992, Cl. 424-324.000.
Karcher, Thomas D.; and Hammond, Harry H., to Hansen Manufacturing Company, The. Combination quick connect-disconnect pneumatic/electrical coupling. 4,094,567, Cl. 339-15.000.
Karino, Kimiji, to Hitachi, Ltd. Carburetor assembly. 4,094,931, Cl. 261-23.00B.
Karlen, Harvey R.: *See—*
Schlegel, Norman H.; and Karlen, Harvey R., 4,094,449, Cl. 222-475.000.
Karpp, Heinrich. Floor cleaning device. 4,094,036, Cl. 15-244.00R.
Karpp, Heinrich. Wiping device. 4,094,037, Cl. 15-245.000.
Karrer, Friedrich, to Ciba-Geigy Corporation. Methylenedioxy substituted benzene derivatives. 4,094,989, Cl. 424-282.000.
Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Ethers. 4,094,993, Cl. 424-337.000.
Karsten, Werner; and Erwien, Helmut, to Gewerkschaft Eisenhutte Westfalia. Anchoring apparatus for anchoring a mining installation. 4,094,157, Cl. 61-63.000.
Kartman, Helge C. C.: *See—*
Rasmussen, Poul; and Kartman, Helge C. C., 4,094,628, Cl. 432-80.000.
Kartridg Pak Co., The: *See—*
Rousseau, Roy Settle, 4,094,042, Cl. 17-46.000.
Kasama, Tsuneo: *See—*
Fujiyama, Hikaru; Kasama, Tsuneo; and Higuchi, Shigenobu, 4,094,028, Cl. 9-321.000.
Kashima, Yoshinobu: *See—*
Tanai, Kunio; Nakayama, Yasuaki; Hirai, Yoshiro; Aoyama, Shigeru; and Kashima, Yoshinobu, 4,095,129, Cl. 310-49.00R.
Kashimura, Toshisada: *See—*
Tomita, Makoto; Yokota, Hisaaki; Koga, Syozi; and Kashimura, Toshisada, 4,095,085, Cl. 219-123.000.
Kassel, Karl-Heinz: *See—*
Beschoner, Hans-Hermann; Guder, Gottfried; Dulken, Hartmut; and Kassel, Karl-Heinz, 4,094,675, Cl. 96-1.500.
Kataoka, Hiroyuki: *See—*
Suzuki, Kazuo; and Kataoka, Hiroyuki, 4,094,386, Cl. 187-29.00R.
Kataoka, Mitsuru: *See—*
Morisawa, Yasuhiro; Kataoka, Mitsuru; Kitano, Noritoshi; and Mastuzawa, Toshiaki, 4,094,982, Cl. 424-263.000.
Katayama, Masatoshi: *See—*
Ohue, Hideki; and Katayama, Masatoshi, 4,094,140, Cl. 58-152.00R.
Katayama, Tsuyoshi: *See—*
Gotoh, Kazuhiko; Kawashima, Hiroshi; and Katayama, Tsuyoshi, 4,095,055, Cl. 179-18.0GF.
Kater, John A. R. Bio-event electrode material. 4,094,822, Cl. 252-512.000.
Kato, Kumiko: *See—*
Mizuno, Kinichi; Saito, Masao; Onda, Yuzi; Aoyama, Tetsuo; and Kato, Kumiko, 4,094,905, Cl. 260-561.00R.
Kato, Masumi: *See—*
Yamamoto, Akinori; and Kato, Masumi, 4,094,204, Cl. 74-230.17E.
Kato, Nobuharu: *See—*
Takeda, Shinji; Mitsui, Noriyoshi; and Kato, Nobuharu, 4,094,725, Cl. 156-497.000.
Katsimbas, Themistoklis, to Hoechst Aktiengesellschaft. Heat-curable pulverulent coating agent of a mixture of copolymers containing glycidyl groups and an adduct of aliphatic dicarboxylic acid and 2,4,6-tris(N',N'',N'''-dimethylaminomethyl)-phenol. 4,095,002, Cl. 427-27.000.
Kattner, Erich; Guntersdorfer, Max; and Heinzl, Joachim, to Siemens Aktiengesellschaft. Piezoelectric drive element for the printer heads used in ink-operated mosaic printer units. 4,095,238, Cl. 346-140.00R.
Katz, Seymour; and Brown, Victor R., to AGFA-GEVAERT. Light density scale imaging apparatus and method for using same. 4,095,111, Cl. 250-476.000.
Kaufer, Herbert: *See—*
Matthews, Larry Stanford; Kaufer, Herbert; and Sonstegard, David Ansel, 4,094,017, Cl. 3-1.911.
Kauffmann, Russell E. Channeled pivoting ball game with selective hole closure. 4,094,507, Cl. 273-110.000.
Kaufmann, Helmut: *See—*
Leisner, Ernst; Ulbricht, Wolfgang; and Kaufmann, Helmut, 4,094,339, Cl. 137-604.000.
Kaugars, Girts, to Upjohn Company, The. Alkanoyl chloride phenylhydrazones. 4,094,906, Cl. 260-566.00B.
Kautex Maschinenbau GmbH: *See—*
Daubenbuschel, Werner; Thomas, Alfred; Hess, Dieter; and Augst, Hans-Rudiger, 4,094,620, Cl. 425-140.000.
Kawabe, Shun; and Omoda, Kouichiro, to Hitachi, Ltd. Data processing system having a high speed buffer memory. 4,095,269, Cl. 364-200.000.
Kawamura, Koichi; and Kawamura, Yoshiko. Three dimensional display device using water fountain. 4,094,464, Cl. 239-17.000.
Kawamura, Yoshiko: *See—*
Kawamura, Koichi; and Kawamura, Yoshiko, 4,094,464, Cl. 239-17.000.
Kawasaki, Mikio: *See—*
Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kawasaki, Mikio; and Kaneko, Yutaka, 4,094,682, Cl. 96-55.000.
Kawashima, Hiroshi: *See—*
Gotoh, Kazuhiko; Kawashima, Hiroshi; and Katayama, Tsuyoshi, 4,095,055, Cl. 179-18.0GF.
Kayama, Kunifusa: *See—*
Murayama, Seiichi; Yamamoto, Manabu; Ito, Masaru; Yasuda, Makoto; Watanabe, Makoto; and Kayama, Kunifusa, 4,095,142, Cl. 315-248.000.
Kazami, Koichi: *See—*
Imazeki, Kazuyoshi; and Kazami, Koichi, 4,095,190, Cl. 331-2.000.
Kazuo, Nakanishi, to Murata of America Inc. Thread end cutting apparatus in spinning machine. 4,094,134, Cl. 57-56.000.
Keiper KG: *See—*
Wirtz, Egon; and Berghaus, Klaus, 4,094,210, Cl. 74-553.000.
Kelley, Joseph T.: *See—*
Glassmeyer, John J.; and Kelley, Joseph T., 4,094,546, Cl. 296-28.00M.
Kellie, Truman F., to Minnesota Mining and Manufacturing Company. Holographic article and process for making same. 4,094,575, Cl. 350-3.670.
Kellner, Ferdinand. Bellows setting equipment. 4,095,246, Cl. 354-187.000.
Kellogg, Robert Melroy; and Mulzet, Alfred Paul, to International Business Machines Corporation. Centrifuge collecting chamber. 4,094,461, Cl. 233-40.000.
Kelly, Norman; Fletcher, William T.; Holden, Derek J.; and Welsh, James J., to Fiberglas Canada Limited. Apparatus for compressing and packaging articles. 4,094,130, Cl. 53-124.00D.
Kelly, Robert C., to Upjohn Company, The. 4,5-Didehydro-6-hydroxy-1β-arylmethoxymethyl-3α-tetrahydropyranacetic acid ϵ-lactones. 4,094,882, Cl. 260-343.000.
Kelly, Robert C., to Upjohn Company, The. 5-Iodo-6-oxo-3-(2'-arylmethoxy-1'-hydroxyethyl)-4-hydroxy-hexanoic acid, γ-lactone dialkyl acetals. 4,094,883, Cl. 260-343.600.
Kelly, Robert C., to Upjohn Company, The. 4α-Hydroxy-6-oxo-2β-arylmethoxy-methyl-3α-tetrahydropyranacetic acid γ-lactones. 4,094,884, Cl. 260-343.600.
Kelsey-Hayes Company: *See—*
Rozmus, Walter J., 4,094,709, Cl. 148-126.000.
Kemper, Ronald J. Sulfur gas removing and solid particle filter for well water. 4,094,789, Cl. 210-188.000.
Kemper, Yves Jean, to Vadetec Corporation. Piston stroke varying mechanism for expansible chamber energy conversion machines. 4,094,202, Cl. 74-60.000.
Kendall Company, The: *See—*
Marshall, Preston F., 4,095,007, Cl. 428-113.000.
Kennedy, Clyde. Pull tab beverage can opener. 4,094,435, Cl. 220-269.000.
Kennedy, Thomas W., Jr., to Sperry Rand Corporation. Side slip angle command SCAS for aircraft. 4,094,479, Cl. 244-179.000.
Kenrich Petrochemicals, Inc.: *See—*
Monte, Salvatore J.; and Sugerman, Gerald, 4,094,853, Cl. 260-40.00R.
Keogh, Raymond J.: *See—*
Burr, Robert Page; Morino, Ronald; and Keogh, Raymond J., 4,094,572, Cl. 339-97.00P.
Keprda, Jaroslav, to Siemens Aktiengesellschaft. Slide switch assembly having terminals for mounting switch housing sidewall parallel to a printed circuit board. 4,095,060, Cl. 200-16.00D.
Kerr-McGee Corporation: *See—*
Thomas, David C., 4,094,810, Cl. 252-313.00R.
Kervizic, Jacques; and Hurt, Bernard, to C.G.R. MeV. Device for the magnetic correction of the trajectories of a beam of accelerated particles emerging from a cyclotron. 4,095,201, Cl. 335-210.000.
Kessler, Manfred, to Max Planck Gesellschaft. Method and an arrangement for continuously measuring the partial pressure of a gas in a sample. 4,094,305, Cl. 128-2.00E.
Ketterer, Stanley J.; and Edwards, William J., to Singer Company, The. Adjustable needle guard. 4,094,261, Cl. 112-228.000.
Keutzer, Larry L.: *See—*
Orr, F. D., Jr.; Templeton, L. F.; and Keutzer, Larry L., 4,095,115, Cl. 250-538.000.
Keyser, Naaman H.; and Cline, James C., to Interlake, Inc. Method of purifying silicon. 4,094,731, Cl. 156-616.00R.
Kiefer, Hans-Friedrich: *See—*
Mayer, Hermann; and Kiefer, Hans-Friedrich, 4,094,594, Cl. 352-91.00C.
Kiencke, Uwe: *See—*
Bremer, Wolfgang; Heintz, Frieder; Flaig, Ulrich; Kiencke, Uwe; and Glauert, Wolfram, 4,095,179, Cl. 324-207.000.
Kihara, Toshimasa, to Hitachi, Ltd. Instruction altering system. 4,095,278, Cl. 364-900.000.
Kikkoman Shoyu Co., Ltd.: *See—*
Aishima, Tetsuo; and Nobuhara, Akio, 4,094,997, Cl. 426-533.000.
Kilik, Ondrej: *See—*
Italy, Pavel; Kilik, Ondrej; Barancok, Jozef; and Miski, Anton, 4,094,144, Cl. 60-445.000.
Kimball, Stephen F.: *See—*
Hay, Warren H.; Kimball, Stephen F.; and Martin, Roy C., 4,095,207, Cl. 337-20.000.
Kime, Donald L.; and Stogdill, Ronald G., to Chemineer, Inc. Fully cartridge agitator seal for use with glass lined mixer tanks. 4,094,513, Cl. 277-41.000.
Kimura, Takashi: *See—*
Sakakibara, Sakuichi; Sugisawa, Ko; Kimura, Takashi; and Yasuda, Atsushi, 4,094,996, Cl. 426-115.000.
Kindler, Hubert: *See—*
Hillekamp, Klaus; and Kindler, Hubert, 4,094,772, Cl. 209-12.000.
Kiner, Mark Winfield: *See—*
White, Bruce Lynn; Kiner, Mark Winfield; and Wiens, Arlen Jacob, 4,094,427, Cl. 214-505.000.
White, Bruce Lynn; Kiner, Mark Winfield; and Wiens, Arlen Jacob, 4,094,428, Cl. 214-505.000.
King, David W., to Gearhart-Owen Industries, Inc.; and Petro-Data C. A. Apparatus and methods for testing earth formations. 4,094,359, Cl. 166-65.00R.
King, Samuel A. Fluid motor. 4,094,227, Cl. 91-180.000.
Kinosz, Donald L.: *See—*
Cedro, Vito, III; Kinosz, Donald L.; and Lamberti, Thomas G., II, 4,094,815, Cl. 252-415.000.
Kinpara, Shinji: *See—*
Mito, Sanai; Kinpara, Shinji; Sumitomo, Yuji; and Kobayashi, Toshio, 4,095,234, Cl. 346-75.000.
Kirby, Thomas J., to GTE Sylvania Incorporated. Impedance-matching network. 4,095,198, Cl. 333-32.000.
Kirkhuff, Ellison H.; and Morris, James C., to GTE Sylvania Incorporated. Trigger circuit for flash lamp directly coupled to AC source. 4,095,140, Cl. 315-199.000.
Kirkman, Richard T.: *See—*
Colchagoff, Robert D.; Fortner, Paul W.; Kirkman, Richard T.; Naughton, Thomas J.; and Zimmerman, George, 4,094,656, Cl. 65-81.000.
Kirsch, Daniel D. Combination pipe and game device. 4,094,508, Cl. 273-118.00R.
Kishida, Katsuhiro; and Oyamada, Akira, to Nissan Motor Company, Ltd. Method of producing low wear coating reinforced with brazing solder for use as rubbing seal. 4,095,005, Cl. 427-376.00B.
Kiso, Shigemitsu: *See—*
Yasutake, Akira; and Kiso, Shigemitsu, 4,094,058, Cl. 29-592.00R.
Kitano, Noritoshi: *See—*
Morisawa, Yasuhiro; Kataoka, Mitsuru; Kitano, Noritoshi; and Mastuzawa, Toshiaki, 4,094,982, Cl. 424-263.000.
Kittler, Milton J. Resilient throttle stop means. 4,094,281, Cl. 123-98.000.
Klauser, John G., to Boston Digital Corporation. Digital servomechanism control system. 4,095,157, Cl. 318-603.000.
Klein, Howard P., to Texaco Development Corporation. Rigid polyurethane foams. 4,094,828, Cl. 260-2.5AM.
Klein, Yitzhak: *See—*
Inbar, Dan; and Klein, Yitzhak, 4,095,108, Cl. 250-369.000.
Kleinschmidt, Johann Otto; and Niem, Wolfgang, to Union Special G.m.b.H. Method and apparatus for automatic sewing. 4,094,260, Cl. 112-121.150.
Kley, Kurt Paul: *See—*
Felser, Hans-Josef; and Kley, Kurt Paul, 4,095,287, Cl. 366-194.000.
Klinge Pharma GmbH: *See—*
Schonenberger, Helmut; Kranzfelder, Gerhard; and Schmitt-Wallenborn, Helga, 4,094,994, Cl. 424-341.000.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Kramer, Peter, 4,094,545, Cl. 296-28.00C.
Welke, Helmut; and Tullius, Karl, 4,094,534, Cl. 280-760.000.
Knapp, Jutta: *See—*
Hadi, Ali Sameh Abdel; Reinhardt, Johann; and Knapp, Jutta, 4,094,953, Cl. 423-2.000.
Knauft, Guenter: *See—*
Blum, Arnold; von der Heyden, Horst; Irro, Fritz; Knauft, Guenter; Richter, Stephan; and Schulze-Schoelling, Hermann, 4,095,270, Cl. 364-200.000.
Knepper, Wilhelm; and Mueller, Dieter Juergen, to Chemische Werke Huels Aktiengesellschaft. Process for the preparation of sodium methallyl sulfonate. 4,094,898, Cl. 260-513.00B.
Knofel, Hartmut; and Ellendt, Gunther, to Bayer Aktiengesellschaft. Process for the preparation of polyamines. 4,094,907, Cl. 260-570.00D.
Knogo Corporation: *See—*
Minasy, Arthur J., 4,095,214, Cl. 340-258.00C.
Knorre, Helmut; Langer, Manfred; and Leidl, Peter, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. D,L Tartaric acid as retardant for gypsum plaster. 4,094,693, Cl. 106-111.000.
Knox, Kenneth L., Sr. Carburetor checking and adjusting apparatus. 4,094,932, Cl. 261-41.00D.
Knox, Walter R.: *See—*
Hill, James C.; and Knox, Walter R., 4,094,865, Cl. 260-78.410.
Koa Oil Co., Ltd.: *See—*
Noguchi, Kosaku; Yoshimura, Kiyoharu; Tanaka, Honami; and Hayashi, Masao, 4,094,776, Cl. 210-27.000.
Kobayashi, Hiroshi; and Kuwabara, Nobuyoshi, to Chiyoda Chemical Engineering & Construction Co., Ltd. Multi layer sound-proofing structure. 4,094,380, Cl. 181-285.000.
Kobayashi, Shoji: *See—*
Takeda, Shinji; Kobayashi, Shoji; and Watanabe, Yutaka, 4,094,056, Cl. 29-527.200.
Kobayashi, Toshio: *See—*
Mito, Sanai; Kinpara, Shinji; Sumitomo, Yuji; and Kobayashi, Toshio, 4,095,234, Cl. 346-75.000.
Kobayashi, Yoshiki; Bandoh, Tadaaki; Maejima, Hideo; and Yasuda, Hajime, to Hitachi, Ltd. System for stopping and restarting the operation of a data processor. 4,095,268, Cl. 364-200.000.
Kobe Steel, Limited: *See—*
Tomita, Makoto; Yokota, Hisaaki; Koga, Syozi; and Kashimura, Toshisada, 4,095,085, Cl. 219-123.000.
Kober, Frederick P., to Chem-E-Watt Corporation. Separator in electrochemical heating element. 4,094,298, Cl. 126-263.000.
Koch, Harold S.: *See—*
Hyams, Irving; Koch, Harold S.; and Aafjes, Herman, 4,094,212, Cl. 81-3.800.
Koder, Walter; and Hillmann, Reinhart, to SKF Kugellagerfabriken GmbH. Clutch throw-out device. 4,094,394, Cl. 192-98.000.
Koenig, Karl-Heinz: *See—*
Mangold, Dietrich; Koenig, Karl-Heinz; and Reitel, Christian, 4,095,034, Cl. 560-134.000.
Koga, Syozi: *See—*
Tomita, Makoto; Yokota, Hisaaki; Koga, Syozi; and Kashimura, Toshisada, 4,095,085, Cl. 219-123.000.
Kogan, Rita Moiseevna: *See—*
Sirotkina, Ekaterina Egorovna; Lopatinsky, Vadim Petrovich; Filimonov, Viktor Dmitrievich; Kogan, Rita Moiseevna; Pirogov, Vyacheslav Dmitrievich; Kudinova, Sofya Ivanovna; Sizova, Ljubov Sergeevna; Reznikova, Svetlana Stepanovna; Ivanov, Georgy Nikolaevich; Tsekhanovskaya, Nina Alexandrovna; Sidaravichus, Jonas-Donatos Bronyaus; Randina, Larisa Vasilievna; Bocharova, Svetlana Leonidovna; Gulyaeva, Galina Petrovna; Bondarenko, Raisa Ivanovna; Rybalko, Galina Ivanovna; and Adomanite, Yanina Antono, 4,095,032, Cl. 526-11.100.
Koh, Kwang K.; Nahas, Nicholas C.; Pennington, Robert E.; and Vernon, Lonnie W., to Exxon Research & Engineering Co. Integrated catalytic gasification process. 4,094,650, Cl. 48-197.00R.
Kohama, Haruo: *See—*
Sumimoto, Mitsuhiro; and Kohama, Haruo, 4,094,642, Cl. 23-254.00R.
Koike, Koso: *See—*
Kakui, Kuniaki; Shigeta, Toshihiko; and Koike, Koso, 4,094,618, Cl. 418-178.000.
Kokuku Chemical Industry Co. Ltd.: *See—*
Fujiyama, Hikaru; Kasama, Tsuneo; and Higuchi, Shigenobu, 4,094,028, Cl. 9-321.000.
Kolker, Carl R.; Campbell, John Scott; La Fond, Robert L.; and Smith, JaMi, to Faxon Communications Corporation, by said Kolker, Campbell and LaFond. Redundancy reduction system for facsimile transceivers. 4,095,248, Cl. 358-288.000.
Kollmorgen Technologies, Inc.: *See—*
Burr, Robert Page; Morino, Ronald; and Keogh, Raymond J., 4,094,572, Cl. 339-97.00P.
Kolpakov, Serafim Vasilievich; Gurkov, Zinovy Lvovich; Bondarenko, Oleg Leonidovich; Valtsov, Vladimir Viktorovich; Pozhivanov, Alexandr Mikhailovich; Gugnin, Eduard Dmitrievich; Radilov, Stanislav Vyacheslavovich; and Bogdanov, Alexandr Andreevich. Method and apparatus for lining ladles. 4,094,938, Cl. 264-30.000.
Komamura, Takeo; Okamoto, Tadao; and Ishihama, Atsumi. Intra-uterine device and tool for insertion of same. 4,094,313, Cl. 128-130.000.
Komuro, Katsu: *See—*
Maeda, Yasuyuki; Mitsui, Nobuo; Kameyama, Tadao; and Komuro, Katsu, 4,094,385, Cl. 187-29.00R.
Kondo, Kiyosi; and Tunemoto, Daiei, to (Zaidanhojin) Sagami Chemi-

cal Research Center. Process for producing allyl alcohol derivatives useful in prostaglandin synthesis. 4,094,886, Cl. 260-345.90P.
Kondo, Yojiro; and Ohta, Yoshinori, to Nippon Electric Co., Ltd. Acoustooptic device. 4,094,583, Cl. 350-358.000.
Konishiroku Photo Industry Co., Ltd.: *See—*
Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kawasaki, Mikio; and Kaneko, Yutaka, 4,094,682, Cl. 96-55.000.
Kopparfors AB: *See—*
Holgersson, Sigbjorn P. H. E., 4,094,735, Cl. 162-76.000.
Koranda, Clarence J. Lock for railway hopper car gate railway car gate lock. 4,094,254, Cl. 105-282.00P.
Kores Holding Zug AG: *See—*
Koreska, Peter, 4,094,343, Cl. 141-86.000.
Koreska, Peter, to Kores Holding Zug AG. Sliding cover for duplicating fluid receptacles. 4,094,343, Cl. 141-86.000.
Korzeniewski, Eugene C.: *See—*
Moran, Kevin E.; and Korzeniewski, Eugene C., 4,095,120, Cl. 290-44.000.
Kossler, Edgar. Perforated doctor roll. 4,094,241, Cl. 101-120.000.
Kossoff, George, to Commonwealth of Australia, c/o The Department of Health, The. Apparatus for ultrasonic examination. 4,094,306, Cl. 128-2.00V.
Kosters, Egon: *See—*
Holper, Manfred; Schertel, Gunter; and Kosters, Egon, 4,094,256, Cl. 108-50.000.
Koyo Seiko Company Limited: *See—*
Okuda, Hiroji; and Narikiyo, Hiroyoshi, 4,094,174, Cl. 72-238.000.
Okuda, Hiroji, 4,094,179, Cl. 72-238.000.
Kramer, Peter, to Klockner-Humboldt-Deutz Aktiengesellschaft. Vehicle cab structure, especially for the tractors of the agricultural or construction type. 4,094,545, Cl. 296-28.00C.
Kranzfelder, Gerhard: *See—*
Schonenberger, Helmut; Kranzfelder, Gerhard; and Schmitt-Wallenborn, Helga, 4,094,994, Cl. 424-341.000.
Kratzer, Dale L., to Harris Corporation. System for communication. 4,095,226, Cl. 343-105.00R.
Krauss-Maffei Aktiengesellschaft: *See—*
Hillekamp, Klaus; and Kindler, Hubert, 4,094,772, Cl. 209-12.000.
Kressel, Henry: *See—*
Hawrylo, Frank Zygmunt; and Kressel, Henry, 4,095,011, Cl. 428-469.000.
Krieg, Adrian H., to Widder Corporation. Tool mounting apparatus. 4,094,612, Cl. 408-92.000.
Krieger, Heinrich. Arrangement for cooling fluids. 4,094,655, Cl. 62-40.000.
Kronseder, Hermann; Dullinger, Karl; and Matzinger, Kurt, to Kronseder, Hermann. Apparatus for conveying upright standing containers and rejecting abnormal containers. 4,094,411, Cl. 209-97.000.
Kroposki, Lorraine M.; Yoshimine, Masao; and Freedman, Harold H., to Dow Chemical Company, The. Process for preparing phosphorothioates and phenylphosphonothioates. 4,094,873, Cl. 544-243.000.
Krueger, Friedrich; and Michel, Walter, to Joh. A. Benckiser. N-acyl-1-amino alkane-1,1-diphosphonic acid compounds and compositions for and method of using same. 4,094,782, Cl. 210-58.000.
Kruger, Rolf, to O and K Orenstein & Koppel Aktiengesellschaft. Handling plant for dumping and discharging bulk materials. 4,094,419, Cl. 214-10.000.
Krupp-Koppers GmbH: *See—*
Waldhofer, Reinhard, 4,094,470, Cl. 241-46.00R.
Kubichan, Robert E.: *See—*
Gillery, Frank H.; Pressau, Jean P.; and Kubichan, Robert E., 4,094,763, Cl. 204-192.00P.
Kubler, John M.: *See—*
Holdren, Frederick V.; Hugli, Hans W.; Kubler, John M.; Larson, Martin E.; and Van Schoiack, Michael M., 4,094,199, Cl. 73-517.00B.
Kubota, Munetaka: *See—*
Fujita, Hiroshi; Kubota, Munetaka; Makita, Takashi; and Takahashi, Yukishige, 4,094,151, Cl. 61-36.00A.
Kudinova, Sofya Ivanovna: *See—*
Sirotkina, Ekaterina Egorovna; Lopatinsky, Vadim Petrovich; Filimonov, Viktor Dmitrievich; Kogan, Rita Moiseevna; Pirogov, Vyacheslav Dmitrievich; Kudinova, Sofya Ivanovna; Sizova, Ljubov Sergeevna; Reznikova, Svetlana Stepanovna; Ivanov, Georgy Nikolaevich; Tsekhanovskaya, Nina Alexandrovna; Sidaravichus, Jonas-Donatos Bronyaus; Randina, Larisa Vasilievna; Bocharova, Svetlana Leonidovna; Gulyaeva, Galina Petrovna; Bondarenko, Raisa Ivanovna; Rybalko, Galina Ivanovna; and Adomanite, Yanina Antono, 4,095,032, Cl. 526-11.100.
Kueny, Kenneth E., to Johnson Products Div. of Sealed Power Corporation. Ductile iron roller tappet body and method for making same. 4,094,279, Cl. 123-90.510.
Kuepper, Friedrich-Wilhelm, to Chemische Werke Huels Aktiengesellschaft. Process for the polymerization of cycloolefins. 4,095,033, Cl. 526-90.000.
Kuhlmann, Wolf: *See—*
Lang, Gusztav; and Kuhlmann, Wolf, 4,094,222, Cl. 85-63.000.
Kuhn, Franz Josef: *See—*
Weber, Karl-Heinz; Bauer, Adolf; Danneberg, Peter; and Kuhn, Franz Josef, 4,094,984, Cl. 424-269.000.
Kunzmann, Otto, to Bielomatik Leuze & Co. Apparatus for the folding of paper webs or similar materials. 4,094,500, Cl. 270-79.000.
Kupperman, Dennis: *See—*
Kupperman, Sam; and Kupperman, Dennis, 4,094,091, Cl. 46-53.000.
Kupperman, Sam; and Kupperman, Dennis, to R B Toy Development Co. Integrally formed plastic spinner toy unit with means for attaching same to a support. 4,094,091, Cl. 46-53.000.
Kuraishi, Kaoru, to Toshiba Photo Products Co., Ltd. Adapter for electronic flash apparatus. 4,095,245, Cl. 354-141.000.
Kurita, Masaru: *See—*
Tanaka, Kunihiko; Kurita, Masaru; and Nishiwaki, Osamu, 4,094,872, Cl. 544-26.000.
Kurnit, Norman A.: *See—*
Begley, Richard F.; and Kurnit, Norman A., 4,095,121, Cl. 307-88.300.
Kuroda, Hiroshi; Nakajima, Yasuo; Hayashi, Yoshimasa; and Nagumo, Shin-ichi, to Nissan Motor Company, Ltd. Internal combustion engine and method of reducing toxic compounds in the exhaust gases therefrom. 4,094,286, Cl. 123-119.00A.
Kusada, Shohei; and Kaneko, Tomoyoshi, to Kabushiki Kaisha Komatsu Seisakusho. Die apparatus for press machine. 4,094,182, Cl. 72-344.000.
Kutscher, Horst; and Zahs, Gernot, to Vacmetal Gesellschaft fur Vakuum'-Metallurgie mbH. Method and apparatus for the production of quality steels. 4,094,495, Cl. 266-143.000.
Kutscheraver, Andreas; and Muller, Ortwin, to Carl Zeiss-Stiftung. Instrument base for ophthalmological instruments. 4,094,593, Cl. 351-38.000.
Kuwabara, Nobuyoshi: *See—*
Kobayashi, Hiroshi; and Kuwabara, Nobuyoshi, 4,094,380, Cl. 181-285.000.
La Coulaz: *See—*
Ljungcrantz, Billy, 4,094,124, Cl. 53-29.000.
LaBar, Russell A.: *See—*
Harrop, William H.; Witiak, David; and LaBar, Russell A., 4,094,927, Cl. 260-897.00B.
Laboratoires Andre Guerbet: *See—*
Tilly, Guy; Hardouin, Michel Jean Charles; and Lautrou, Jean, 4,094,966, Cl. 424-5.000.
La Fond, Robert L.: *See—*
Kolker, Carl R.; Campbell, John Scott; La Fond, Robert L.; and Smith, JaMi, 4,095,248, Cl. 358-288.000.
Lafont, Raymond, to B.S.G. International Limited. Electric device controlling the movement of the mirror in an external rearview mirror unit. 4,094,591, Cl. 350-289.000.
Lajack, Joseph J.: *See—*
Lajack, William C.; and Lajack, Joseph J., 4,094,349, Cl. 145-31.00B.
Lajack, William C.; and Lajack, Joseph J. Hand sabre saw. 4,094,349, Cl. 145-31.00B.
Lake, Ivan James Samuel; and Sampson, Roy John, to Imperial Chemical Industries Limited. Hydrocarbon conversion processes and catalysts. 4,094,919, Cl. 260-668.00A.
Lamb, George D., to Camp 7. Method for filling down garments. 4,094,126, Cl. 53-35.000.
Lamberti, Thomas G., II: *See—*
Cedro, Vito, III; Kinosz, Donald L.; and Lamberti, Thomas G., II, 4,094,815, Cl. 252-415.000.
Lamberti, Vincent; and Willis, Chester R., to Lever Brothers Company. Aligomeric polyacrylates. 4,095,035, Cl. 560-180.000.
Lampkin, Curtis Magill: *See—*
Jordan, John Francis; and Lampkin, Curtis Magill, 4,095,006, Cl. 427-427.000.
Landez, Jean Pierre: *See—*
Athenes, Claude; and Landez, Jean Pierre, 4,095,048, Cl. 178-69.100.
Landstorfer, Friedrich: *See—*
Meinke, Hans Heinrich; Lindenmeier, Heinz; Landstorfer, Friedrich; Flachenecker, Gerhard; and Hopf, Jochen, 4,095,228, Cl. 343-704.000.
Lang, Gusztav; and Kuhlmann, Wolf, to Hilti Aktiengesellschaft. Adhesively secured anchor bolt. 4,094,222, Cl. 85-63.000.
Lang, John L. Preparation of liquid fuel and nutrients from solid municipal waste. 4,094,740, Cl. 195-27.000.
Langer, Arthur W., Jr., to Exxon Research & Engineering Co. Ziegler type catalyst system. 4,094,818, Cl. 252-429.00C.
Langer, Arthur W., Jr.; and Whitney, Thomas A., to Exxon Research & Engineering Co. Chelated lithium aluminum compounds. 4,094,876, Cl. 260-270.0PD.
Langer, Manfred: *See—*
Knorre, Helmut; Langer, Manfred; and Leidl, Peter, 4,094,693, Cl. 106-111.000.
Langham, Arvin L., to Elfab Corporation. Circuit board edge connector. 4,094,573, Cl. 339-176.0MP.
Larson, Charles O., to Chas. O. Larson Co. Display rack device. 4,094,415, Cl. 211-57.100.
Larson, Martin E.: *See—*
Holdren, Frederick V.; Hugli, Hans W.; Kubler, John M.; Larson, Martin E.; and Van Schoiack, Michael M., 4,094,199, Cl. 73-517.00B.
Larson, Wesley H. Pen lock apparatus. 4,094,610, Cl. 401-195.000.
Lasco, Inc.: *See—*
Dykes, Willis G., 4,094,095, Cl. 47-1.300.
LaScola, Anthony Rosario, to Ark-Les Switch Corporation. Appliance switch. 4,095,067, Cl. 200-67.0AA.
Laupman, Robert Ronald, to Novanex Automation N.V. Cascaded amplifier with frequency sensitive coupling. 4,095,188, Cl. 330-84.000.
Lautrou, Jean: *See—*
Tilly, Guy; Hardouin, Michel Jean Charles; and Lautrou, Jean, 4,094,966, Cl. 424-5.000.
Lauze, Robert Lavern, deceased; and by Brown, Vicki Suzanne, administrator. Oscillating cut-off saw. 4,094,102, Cl. 51-33.00R.
la Villa, Florentino: *See—*
Sugier, Andre; and la Villa, Florentino, 4,094,777, Cl. 210-32.000.
Lawton, William R. Heat-sensitive recording composition. 4,094,687, Cl. 106-21.000.
Layne, Warren W.; and Saklad, Eugene L., to New England Nuclear Corporation. Diagnostic agents containing albumin and method for making same. 4,094,965, Cl. 424-1.500.
Lazet, Frank J., to PQ Corporation. Forming a falling curtain of molten glass. 4,094,658, Cl. 65-90.000.
Le Cornec, Jacques, to Gilles Atlan. Pressure regulator for breathing apparatus. 4,094,314, Cl. 128-142.200.
Le Coz, Gerard; and Marchalot, Jean-Noel, to Compagnie Industrielle des Telecommunications Cit-Alcatel S.A. Propagation time equalizer for circular wave guides. 4,095,197, Cl. 333-28.00R.
Lee, Arthur, to Trail Manufacturing Ltd. Lubricant feed system. 4,094,382, Cl. 184-15.00R.
Lee C. Moore Corporation: *See—*
Woolslayer, Homer J.; Jenkins, Cecil; and Woods, Robert D., 4,094,051, Cl. 29-159.00R.
Lee, Laurence Saul; and Roback, Joseph Philip, to General Electric Company. Electrical crossover and test connectors. 4,094,568, Cl. 339-17.0LM.
LeFevre, Robert J.: *See—*
Burke, George K.; LeFevre, Robert J.; and Thomas, Robert E., 4,094,318, Cl. 128-214.00E.
Leiber, Heinz, to Robert Bosch GmbH. Hydraulic brake booster for a vehicular brake system. 4,094,554, Cl. 303-52.000.
Leidl, Peter: *See—*
Knorre, Helmut; Langer, Manfred; and Leidl, Peter, 4,094,693, Cl. 106-111.000.
Leifheit International Gunter Leifheit GmbH: *See—*
Liebscher, Johannes; Schulein, Rolf G.; and Fobbe, Waldemar, 4,094,032, Cl. 15-41.00R.
Leight, Charles. Ear plug. 4,094,315, Cl. 128-152.000.
Leisner, Ernst; Ulbricht, Wolfgang; and Kaufmann, Helmut, to Robert Bosch GmbH. High temperature combustion shock deburring system. 4,094,339, Cl. 137-604.000.
Lemberger, Earl S.; Olson, Robert K.; and Smith, Lester F., to UOP Inc. Regeneration method for gravity-flowing deactivated catalyst particles. 4,094,814, Cl. 252-415.000.
Lemelson, Jerome H. Light conductor having electrical conductors extending longitudinally of surface. 4,095,101, Cl. 250-227.000.
Leonard, Willie B. Fluidic repeater. 4,094,229, Cl. 91-506.000.
Le Pierres, Gildas: *See—*
Pelat, Roger Patrice; and Le Pierres, Gildas, 4,094,387, Cl. 188-1.00B.
LePoole, Jan Bart; and van der Mast, Karel Diederick, to U.S. Philips Corporation. Electron microscope. 4,095,104, Cl. 250-311.000.
Lesche, Wolfgang, to Siemens Aktiengesellschaft. Arrangement for obtaining an electrical signal proportional to a distance. 4,095,203, Cl. 336-20.000.
Lesk, Adolf; and Hageleit, Wolfgang, to Ingenieur-Boero. Particle feeding and treating system. 4,094,078, Cl. 34-181.000.
Lester Construction Company: *See—*
Yago, Jeffry R., 4,094,361, Cl. 169-48.000.
Lester, David; and Alexander, Robert R., to Polymerics, Inc. Expandable polymeric coating compositions. 4,094,685, Cl. 260-2.50B.
Leturcq, Michel: *See—*
Moinard, Michel; Leturcq, Michel; and Delcroix, Catherine, 4,094,161, Cl. 61-95.000.
Leuba, Jean-Louis, to Societe d'Assistance Technique pour Produits Nestle S.A. Enzymes immobilized on chitosan. 4,094,743, Cl. 195-63.000.
Leuenberger, Hans Georg Wilhelm: *See—*
Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, 4,095,038, Cl. 560-255.000.
Lever Brothers Company: *See—*
Humphreys, Peter Franklin; and Willis, Edwin, 4,094,807, Cl. 252-131.000.
Lamberti, Vincent; and Willis, Chester R., 4,095,035, Cl. 560-180.000.
LeVere, Richard W.; Vocaturo, Joseph M.; and Finney, James L., to United States of America, Interior. Loading gate for mine roof bolter apparatus. 4,094,158, Cl. 61-63.000.
Levesque, Paul N.: *See—*
Moore, Vincent; and Levesque, Paul N., 4,094,019, Cl. 4-312.000.
Levis, William Walter, Jr.: *See—*
Austin, Arthur Lawrence; and Levis, William Walter, Jr., 4,094,910, Cl. 260-613.00B.
Lew, Hyok Sang. Steam-heater-pump. 4,094,616, Cl. 417-121.000.
Liber, Eric: *See—*
Castaigne, Francois; Boulet, Marcel; Riel, Rene R.; and Liber, Eric, 4,094,235, Cl. 99-450.100.
Liberda, Heinz; Spes, Hellmuth; and Trommet, Alfred, to Wacker-Chemie GmbH. Process for the manufacture of phosphoric acid-tris-(dimethylamide). 4,094,902, Cl. 260-551.00P.
LICENTIA Patent-Verwaltungs-G.m.b.H.: *See—*
Beschoner, Hans-Hermann; Guder, Gottfried; Dulken, Hartmut; and Kassel, Karl-Heinz, 4,094,675, Cl. 96-1.500.
Liebscher, Johannes; Schulein, Rolf G.; and Fobbe, Waldemar, to Leifheit International Gunter Leifheit GmbH. Cleaning device. 4,094,032, Cl. 15-41.00R.
Lieckfeldt, Hans, to Robert Bosch GmbH. Control mechanism for the pull-down pawl of a film projector. 4,094,595, Cl. 352-180.000.
Lindblom, Karl-Peter Christian: *See—*
Danielsson, Nils Allan; and Lindblom, Karl-Peter Christian, 4,095,202, Cl. 335-213.000.
Lindenmeier, Heinz: *See—*
Meinke, Hans Heinrich; Lindenmeier, Heinz; Landstorfer, Friedrich; Flachenecker, Gerhard; and Hopf, Jochen, 4,095,228, Cl. 343-704.000.
Lindstrom, Dag Torsten: *See—*
Johansson, Haldor Ingemar; Lindstrom, Dag Torsten; and Soderberg, John Lennart, 4,094,833, Cl. 260-17.4GC.
Lingl Corporation: *See—*
Lingl, Hans, Sr., 4,094,118, Cl. 52-747.000.
Lingl, Hans, Sr., to Lingl Corporation. Method and apparatus for feeding of rows of blocks. 4,094,118, Cl. 52-747.000.
Lins, Stanley James, to Sperry Rand Corporation. Orthogonal potential well matrix and amplitude modulated bias field for bubble domain propagation. 4,095,279, Cl. 365-29.000.
Linton, Ulle C.: *See—*
Dismuke, William Odell, 4,094,290, Cl. 123-141.000.
Lippuner, Christian: *See—*
Rennes, Harri; and Lippuner, Christian, 4,094,700, Cl. 127-24.000.
List, Hans. Counting and filling apparatus for tablets, dragees or similar elements. 4,094,129, Cl. 53-54.000.
List, Hans. Article apportioning apparatus having a rotatable drum. 4,094,439, Cl. 221-9.000.
Ljungcrantz, Billy, to La Coulaz. Process and apparatus for the manufacture of filled, closed containers. 4,094,124, Cl. 53-29.000.
Lobeck, Walter G., Jr.: *See—*
Wu, Yao Hua; and Lobeck, Walter G., Jr., 4,094,981, Cl. 424-257.000.
Lock Technology, Inc.: *See—*
Iaccino, George V., 4,094,052, Cl. 29-263.000.
Lockard, Joseph LaRue, to AMP Incorporated. Switch for card edge. 4,095,074, Cl. 200-295.000.
Loebl, Harald: *See—*
Behn, Reinhard; Loebl, Harald; and Preissinger, Karl-Heinz, 4,095,199, Cl. 333-70.00R.
Login, Robert Bernard: *See—*
Newkirk, David Dudley; Login, Robert Bernard; and Thir, Basil, 4,094,797, Cl. 252-8.900.
Lohr & Bromkamp GmbH: *See—*
Aucktor, Erich, 4,094,517, Cl. 277-94.000.
Welschof, Hans-Heinrich, 4,094,376, Cl. 180-43.00R.
Long, Raymond H.: *See—*
Snell, George J.; and Long, Raymond H., 4,094,781, Cl. 210-54.000.
Long, William J., to United States Gypsum Company. Water-resistant gypsum composition and products, and process of making same. 4,094,694, Cl. 106-111.000.
Lonza, Ltd.: *See—*
Catalucci, Enrico, 4,094,874, Cl. 544-258.000.
Looper, Norman G. Ratiometric transparency meter. 4,095,098, Cl. 250-205.000.
Lopatinsky, Vadim Petrovich: *See—*
Sirotkina, Ekaterina Egorovna; Lopatinsky, Vadim Petrovich; Filimonov, Viktor Dmitrievich; Kogan, Rita Moiseevna; Pirogov, Vyacheslav Dmitrievich; Kudinova, Sofya Ivanovna; Sizova, Ljubov Sergeevna; Reznikova, Svetlana Stepanovna; Ivanov, Georgy Nikolaevich; Tsekhanovskaya, Nina Alexandrovna; Sidaravichus, Jonas-Donatos Bronyaus; Randina, Larisa Vasilievna; Bocharova, Svetlana Leonidovna; Gulyaeva, Galina Petrovna; Bondarenko, Raisa Ivanovna; Rybalko, Galina Ivanovna; and Adomanite, Yanina Antono, 4,095,032, Cl. 526-11.100.
Lopez, Eduardo Valdez, to Iberica de Calcomanias, S.A. Method of and apparatus for decorating articles with decalcomanias. 4,094,716, Cl. 156-87.000.
L'Oreal: *See—*
Bugaut, Andree; and Fourcadier, Chantal S., 4,094,635, Cl. 8-11.000.
Goncalves, Antonin, 4,094,120, Cl. 53-21.0FW.
Lorenz, Donald H.: *See—*
Biranowski, Jerome B.; and Lorenz, Donald H., 4,094,869, Cl. 260-2.5AW.
Lotspeich, Joseph A., to Gross-Given Manufacturing Company. Safety door mechanism. 4,094,440, Cl. 221-12.000.
Louis, Anthony. Aquarium backstrip. 4,094,271, Cl. 119-5.000.
Lowe, Peter R.: *See—*
Quarton, William T.; and Lowe, Peter R., 4,095,235, Cl. 346-110.00R.
Lowther, Frank Eugene, to W. R. Grace & Co. Electrodesorption system for regenerating a dielectric adsorbent bed. 4,094,652, Cl. 55-33.000.
Lubrizol Corporation, The: *See—*
Forsberg, John Wesley, 4,094,801, Cl. 252-33.000.
Schroeck, Calvin William, 4,094,739, Cl. 195-7.000.
Luca, David J.: *See—*
Prest, William M., Jr.; and Luca, David J., 4,095,020, Cl. 528-494.000.

Neufeld, Ronald Murray: *See—*
Harris, Walter Jefferson; and Neufeld, Ronald Murray, 4,095,181, Cl. 324-238.000.
Neuman, Richard F., to Eaton Corporation. Bidirectional clearance sensing brake adjuster. 4,094,390, Cl. 188-196.00D.
Neveux, Rene, to Societe Anonyme Francaise du Ferodo. Liquid cooling apparatus. 4,094,358, Cl. 165-154.000.
New England Nuclear Corporation: *See—*
Layne, Warren W.; and Saklad, Eugene L., 4,094,965, Cl. 424-1.500.
Newberry, Robert Anthony, to John Wyeth & Brother Limited. 1,3-Diaryl-pyrazol-4-acrylic acid and derivatives. 4,095,025, Cl. 548-378.000.
Newkirk, David Dudley; Login, Robert Bernard; and Thir, Basil, to BASF Wyandotte Corporation. Oxidation stable fiber lubricant. 4,094,797, Cl. 252-8.900.
Newman, Robert. Fire proof cigarette box. 4,094,326, Cl. 131-234.000.
Newmont Exploration Limited: *See—*
Yannopoulos, John C.; and Borham, Borham M., 4,094,668, Cl. 75-99.000.
Newton, David W.; and Alford, Frank A., to Valleylab, Inc. Electrosurgical safety circuit and method of using same. 4,094,320, Cl. 128-303.140.
Ng, Wahling H.; and Zaycer, Andrew, to United States of America, Army. Self centering flange gasket assembly. 4,094,520, Cl. 277-166.000.
Nguyen-Tan Tai, Paul. Electronic power amplifier for delivering a constant power into a load impedance. 4,095,189, Cl. 330-265.000.
Nguyen, Van-Tran: *See—*
Damen, Theodoar Charlouis; Gornik, Erich; Nguyen, Van-Tran; and Patel, Chandra Kumar Naranbhai, 4,095,122, Cl. 307-88.300.
Nickerson, Richard W.; and Nickerson, Thomas R. Quick-release, sure-set anti-fouling anchor. 4,094,264, Cl. 114-304.000.
Nickerson, Thomas R.: *See—*
Nickerson, Richard W.; and Nickerson, Thomas R., 4,094,264, Cl. 114-304.000.
Niem, Wolfgang: *See—*
Kleinschmidt, Johann Otto; and Niem, Wolfgang, 4,094,260, Cl. 112-121.150.
Niklas, Wilfrid F., to Varian Associates, Inc. Image tube employing a microchannel electron multiplier. 4,095,136, Cl. 315-11.000.
Nilsson, Olle: *See—*
Siwersson, Olle Lennart; Wall, Arne Evert; and Nilsson, Olle, 4,095,015, Cl. 429-15.000.
Ninomiya, Masakazu: *See—*
Harada, Susumu; and Ninomiya, Masakazu, 4,094,274, Cl. 123-32.0EL.
Nippon Carbon Co., Ltd.: *See—*
Ishikawa, Toshikatsu; Kanemaru, Toyonosuke; Teranishi, Haruo; and Onishi, Kazumasa, 4,094,951, Cl. 264-325.000.
Nippon Electric Co., Ltd.: *See—*
Kondo, Yojiro; and Ohta, Yoshinori, 4,094,583, Cl. 350-358.000.
Yoshida, Yasuharu, 4,095,187, Cl. 329-50.000.
Nippon Oil and Fats Co., Ltd.: *See—*
Fujiyama, Hikaru; Kasama, Tsuneo; and Higuchi, Shigenobu, 4,094,028, Cl. 9-321.000.
Nippon Shinyaku Co., Ltd.: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Chokai, Shoichi; Machara, Mitsuhiro; Saito, Katsuhide; and Ozaki, Takayuki, 4,094,991, Cl. 424-309.000.
Nippon Soken, Inc.: *See—*
Hattori, Tadashi; and Nakase, Takamichi, 4,094,273, Cl. 123-32.0EE.
Nippon Telegraph and Telephone Public Corporation: *See—*
Gotoh, Kazuhiko; Kawashima, Hiroshi; and Katayama, Tsuyoshi, 4,095,055, Cl. 179-18.0GF.
Nippondenso Co., Ltd.: *See—*
Harada, Susumu; and Ninomiya, Masakazu, 4,094,274, Cl. 123-32.0EL.
Nakano, Yoshiaki, 4,095,091, Cl. 235-462.000.
Yamamoto, Akinori; and Kato, Masumi, 4,094,204, Cl. 74-230.17E.
Nippondenso Kabushiki Kaisha: *See—*
Okamoto, Atutoshi; Taniguchi, Koichi; Nakano, Yoshiaki; and Toyama, Koichi, 4,094,556, Cl. 303-109.000.
Nishikawa, Hideichi; and Sakamoto, Masaharu, to Matsuzaka Iron Works, Inc. Shearing tool for synthetic resin tubes. 4,094,064, Cl. 30-92.000.
Nishikawa, Mitsuo; Hosaka, Hideo; and Maemori, Jun, to Max Co., Ltd. Automatic binder. 4,094,342, Cl. 140-93.200.
Nishikubo, Yasuhiko: *See—*
Nomura, Yasushi; and Nishikubo, Yasuhiko, 4,094,139, Cl. 58-50.00R.
Nishioka, Matsuo; and Oka, Shunzo, to Matsushita Electric Industrial Co., Ltd. Interlocked push-lock push-button switch assembly having conductive muting spring. 4,095,059, Cl. 200-5.00B.
Nishiwaki, Osamu: *See—*
Tanaka, Kunihiko; Kurita, Masaru; and Nishiwaki, Osamu, 4,094,872, Cl. 544-26.000.
Nissan Motor Company, Ltd.: *See—*
Kishida, Katsuhiro; and Oyamada, Akira, 4,095,005, Cl. 427-376.00B.
Kuroda, Hiroshi; Nakajima, Yasuo; Hayashi, Yoshimasa; and Nagumo, Shin-ichi, 4,094,286, Cl. 123-119.00A.
Nitta, Tohei: *See—*
Miyamoto, Teruo; Ishii, Toshiji; Miura, Yoshikazu; and Nitta, Tohei, 4,095,204, Cl. 336-57.000.
Nixon, John M., to Edo-Aire Mitchell. Aircraft altitude hold system. 4,094,480, Cl. 244-180.000.
Nixon, Phillip Sydney; and Woods, Harold, to Triplex Safety Glass Company Limited. Processing of glass sheets. 4,094,659, Cl. 65-104.000.
Nobuhara, Akio: *See—*
Aishima, Tetsuo; and Nobuhara, Akio, 4,094,997, Cl. 426-533.000.
Noguchi, Kosaku; Yoshimura, Kiyoharu; Tanaka, Honami; and Hayashi, Masao, to Koa Oil Co., Ltd. Method for treatment of oil-containing waste water by using an oil adsorbent. 4,094,776, Cl. 210-27.000.
Nohira, Hidetaka, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation system. 4,094,287, Cl. 123-119.00A.
Nolan, Ronald M., Jr. Picture frame apparatus. 4,094,085, Cl. 40-152.100.
Nomura, Yasushi; and Morokawa, Shigeru, to Citizen Watch Company Limited. Switch control unit for electronic timepiece. 4,094,135, Cl. 58-23.00R.
Nomura, Yasushi; and Nishikubo, Yasuhiko, to Citizen Watch Company Limited. Display control circuit for electronic timepiece. 4,094,139, Cl. 58-50.00R.
Nordin, Bengt Anders. Device for unloading of timber. 4,094,421, Cl. 214-82.000.
North American Philips Corporation: *See—*
Ragan, Randall C., 4,095,210, Cl. 338-180.000.
Northrop Corporation: *See—*
Mackey, Jack D., 4,094,750, Cl. 204-56.00R.
Northwestern University: *See—*
Cohen, Jerome B.; and James, Michael R., 4,095,103, Cl. 250-277.0CH.
Notter, Michael A. Motorized skateboard with uni-directional rear mounting. 4,094,372, Cl. 180-1.00G.
Novanex Automation N.V.: *See—*
Laupman, Robert Ronald, 4,095,188, Cl. 330-84.000.
Nozik, Arthur J., to Allied Chemical Corporation. Photochemical diodes. 4,094,751, Cl. 204-80.000.
Numata, Saburo; and Fujino, Shin-ichiro, to Fuji Photo Optical Co., Ltd. Warning device for a camera. 4,095,243, Cl. 354-60.00L.
Numbers, Jody L., to Thermo-Seal, Inc. Drinking receptacle valve means. 4,094,433, Cl. 220-90.400.
Nunnery, William Burrell: *See—*
Hoffman, Charles Reeves; and Nunnery, William Burrell, 4,095,126, Cl. 307-237.000.
Nystad, Jan. Water mattress. 4,094,025, Cl. 5-365.000.
O and K Orenstein & Koppel Aktiengesellschaft: *See—*
Kruger, Rolf, 4,094,419, Cl. 214-10.000.
O'Callaghan, James S., to Tram/Diamond Corporation. Radio mounting bracket. 4,094,485, Cl. 248-221.300.
Ochi, Hiroshi: *See—*
Nakai, Setsuo; and Ochi, Hiroshi, 4,094,942, Cl. 264-102.000.
Ochi, Sam S., to National Semiconductor Corporation. Composite JFET-bipolar transistor structure. 4,095,252, Cl. 357-43.000.
O'Connell, Donald E.: *See—*
Cohen, Murray S.; and O'Connell, Donald E., 4,094,999, Cl. 426-547.000.
O'Dea, Orrin Bernard, to Communication Mfg. Company. Telephone switching system test set. 4,095,058, Cl. 179-175.20D.
Odeyemi, Oluwasuyi: *See—*
Alexander, Martin; and Odeyemi, Oluwasuyi, 4,094,097, Cl. 47-57.600.
Oehler, Harry G., to Westinghouse Electric Corp. Memory including varactor circuit to boost address signals. 4,095,282, Cl. 365-204.000.
Oellig, Rudi: *See—*
Jellinek, Karl; and Oellig, Rudi, 4,094,925, Cl. 260-836.000.
O'Farrell, John J., Jr. Transformer/switch device. 4,095,124, Cl. 307-141.400.
Ogawa, Akira: *See—*
Tsujino, Nobuyuki; Ogawa, Akira; Shishido, Tadao; and Adachi, Keiichi, 4,094,683, Cl. 96-95.000.
Ohata, Katsuya: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Chokai, Shoichi; Machara, Mitsuhiro; Saito, Katsuhide; and Ozaki, Takayuki, 4,094,991, Cl. 424-309.000.
Ohnmacht, Helmut; and Brechner, Ernst, to Fritz Eichenauer, Firma. Vaporizing and warming device for beverage-preparing machines. 4,095,086, Cl. 219-283.000.
Ohnuma, Sadabumi: *See—*
Fujii, Yoshio; Shimada, Mitsuo; and Ohnuma, Sadabumi, 4,094,609, Cl. 356-201.000.
Ohta, Yoshinori: *See—*
Kondo, Yojiro; and Ohta, Yoshinori, 4,094,583, Cl. 350-358.000.
Ohue, Hideki; and Katayama, Masatoshi. Timepiece-gas lighter assembly. 4,094,140, Cl. 58-152.00R.
Oka, Shunzo: *See—*
Nishioka, Matsuo; and Oka, Shunzo, 4,095,059, Cl. 200-5.00B.
Okabe, Masayoshi: *See—*
Iwai, Yasuto; Okabe, Masayoshi; Seki, Naotoshi; Hiai, Atsuhiko; and Iguchi, Seiya, 4,094,780, Cl. 210-38.00B.
Okamoto, Atutoshi; Taniguchi, Koichi; Nakano, Yoshiaki; and Toyama, Koichi, to Nippondenso Kabushiki Kaisha. Anti-skid system for a vehicle. 4,094,556, Cl. 303-109.000.
Okamoto, Tadao: *See—*
Komamura, Takeo; Okamoto, Tadao; and Ishihama, Atsumi, 4,094,313, Cl. 128-130.000.
Okita, Taisuke: *See—*
Harada, Taro; Okita, Taisuke; Hara, Takahisa; and Ikezawa, Yuji, 4,094,854, Cl. 260-42.460.

Okuda, Hiroji; and Narikiyo, Hiroyoshi, to Koyo Seiko Company Limited. Drive mechanism for vertical rolling mills. 4,094,174, Cl. 72-238.000.
Okuda, Hiroji, to Koyo Seiko Company Limited. Driving device for high speed rolling mills and the like. 4,094,179, Cl. 72-238.000.
Okumura, Koji, to Xerox Corporation. Electrical information storage system using a layer of particulate photosensitive material. 4,095,280, Cl. 365-112.000.
Oldham, Frederick, to Clark, Robert Tilden. Method and apparatus for forming a sole on an upper by dip-coating. 4,094,950, Cl. 264-259.000.
Olin Corporation: *See—*
Chandalia, Kiran B.; and Preston, Frank J., 4,094,868, Cl. 260-192.000.
Olinkraft, Inc.: *See—*
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,094,455, Cl. 229-15.000.
Coons, Everett A., 4,094,459, Cl. 229-41.00B.
Olney, Wallace E.; and Wright, Robert G., to Brown Company. Filter paper cup for a percolator and process for making the same. 4,094,234, Cl. 99-310.000.
Olson, Cecil G.: *See—*
Edwards, Richard A.; and Olson, Cecil G., 4,094,244, Cl. 101-66.000.
Olson, Robert K.; and Smith, Lester F., to UOP Inc. Regeneration method for gravity-flowing deactivated catalyst particles. 4,094,817, Cl. 252-415.000.
Olson, Robert K.: *See—*
Lemberger, Earl S.; Olson, Robert K.; and Smith, Lester F., 4,094,814, Cl. 252-415.000.
Olympus Optical Co., Ltd.: *See—*
Nakagawa, Jihei, 4,094,588, Cl. 350-215.000.
Takahashi, Naoyuki, 4,095,123, Cl. 307-115.000.
Omoda, Kouichiro: *See—*
Kawabe, Shun; and Omoda, Kouichiro, 4,095,269, Cl. 364-200.000.
Omori, Eiji; Aimono, Yuuji; Mukoyama, Yoshiyuki; and Sugitani, Hatuo, to Hitachi Chemical Company, Ltd. Unsaturated polyester resinous composition. 4,094,835, Cl. 260-22.0CB.
Omron Tateisi Electronics Co.: *See—*
Yasutake, Akira; and Kiso, Shigemitsu, 4,094,058, Cl. 29-592.00R.
Onda, Yuzi: *See—*
Mizuno, Kinichi; Saito, Masao; Onda, Yuzi; Aoyama, Tetsuo; and Kato, Kumiko, 4,094,905, Cl. 260-561.00R.
Onder, Besir K., to Upjohn Company, The. Preparation of polyamideimide from diisocyanate with alkali metal lactamate catalyst. 4,094,864, Cl. 260-78.0TF.
Onder, Besir K., to Upjohn Company, The. Preparation of polyamide from diisocyanate with alkali metal lactamate catalyst. 4,094,866, Cl. 260-78.00R.
Onishi, Kazumasa: *See—*
Ishikawa, Toshikatsu; Kanemaru, Toyonosuke; Teranishi, Haruo; and Onishi, Kazumasa, 4,094,951, Cl. 264-325.000.
Ono, Tasuku, to Stiron Chemical Industry Co. Ltd. Sound making movable toy. 4,094,094, Cl. 46-232.000.
Opcon Associates of Canada, Ltd.: *See—*
Betensky, Ellis I., 4,094,585, Cl. 350-175.00E.
Orr, F. D., Jr.; Templeton, L. F.; and Keutzer, Larry L., to Accelerators, Inc. Ozone generation apparatus and method. 4,095,115, Cl. 250-538.000.
Osaka Denki Co., Ltd.: *See—*
Ueyama, Fumio; and Yoshimitsu, Takao, 4,095,080, Cl. 219-74.000.
Oshima, Kenji; Matsumoto, Tomohisa; Yamazaki, Hiroshi; and Yoshioka, Tamotsu, to Kabushiki Kaisha Seikosha. Synchronous motor. 4,095,130, Cl. 310-162.000.
Osterried, Gordon A. Briquette igniting device with foraminous metal cone. 4,094,649, Cl. 44-35.000.
Oswald, Alexis A.: *See—*
Zapp, Robert L.; and Oswald, Alexis A., 4,094,757, Cl. 204-159.180.
Oswald, Robert Clement, to Sperry Rand Corporation. Digital convergence system for a multi-gun CRT. 4,095,137, Cl. 315-13.00C.
Otaka, Syoichi: *See—*
Nakano, Teruyuki; and Otaka, Syoichi, 4,094,282, Cl. 123-117.00A.
Ototani, Tohei, to Metal Research Corporation. Method for refining molten iron and steels. 4,094,666, Cl. 75-58.000.
Otsuki, Keizo: *See—*
Yoshimura, Masayoshi; Otsuki, Keizo; Shoji, Senji; Yamada, Tomio; Shimizu, Ichio; and Arai, Yuji, 4,095,253, Cl. 357-81.000.
Owens-Corning Fiberglas Corporation: *See—*
Paetz, Frederic Harold, 4,094,944, Cl. 264-137.000.
Zellar, Wade V.; and Strauss, Carl R., 4,095,010, Cl. 428-375.000.
Owens-Illinois, Inc.: *See—*
Colchagoff, Robert D.; Fortner, Paul W.; Kirkman, Richard T.; Naughton, Thomas J.; and Zimmerman, George, 4,094,656, Cl. 65-81.000.
Taylor, Lynn J., 4,094,756, Cl. 204-159.180.
Oxy Metal Industries Corporation: *See—*
Fekete, Douglas D., 4,094,701, Cl. 134-2.000.
Oy Vehna AB: *See—*
Rennes, Harri; and Lippuner, Christian, 4,094,700, Cl. 127-24.000.
Oyama, Yoshishige; Teranishi, Takao; and Yamauchi, Teruo, to Hitachi, Ltd. Gas mixture feed system for internal combustion engine. 4,094,285, Cl. 123-119.00A.
Oyamada, Akira: *See—*
Kishida, Katsuhiro; and Oyamada, Akira, 4,095,005, Cl. 427-376.00B.
Oyamada, Takeo; Satoh, Kazuhisa; Tsuru, Shinobu; Domoto, Masahiro; and Narisawa, Shizuo, to Sumitomo Chemical Company, Limited. Process for producing aqueous dispersion of ethylene-vinyl acetate copolymer containing no formalin. 4,094,849, Cl. 260-29.6MQ.
Ozaki, Takayuki: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Chokai, Shoichi; Machara, Mitsuhiro; Saito, Katsuhide; and Ozaki, Takayuki, 4,094,991, Cl. 424-309.000.
Pace, Casey C.: *See—*
Dismuke, William Odell, 4,094,290, Cl. 123-141.000.
Pace, Courtney C.: *See—*
Dismuke, William Odell, 4,094,290, Cl. 123-141.000.
Pacific Electricord Company: *See—*
Dietz, Ernest W., 4,094,569, Cl. 339-40.000.
Paetz, Frederic Harold, to Owens-Corning Fiberglas Corporation. Machine for and continuous process of making molded tile. 4,094,944, Cl. 264-137.000.
Paget, Fredrick W., to GTE Sylvania Incorporated. Arc discharge lamp ballast tester. 4,095,175, Cl. 324-57.00R.
Palac, Kazimir, to Zenith Radio Corporation. Method of making curved color cathode ray tube shadow masks having interregistrable electron beam-passing aperture patterns. 4,094,678, Cl. 96-36.100.
Palmer, Richard C.: *See—*
Fleck, James N.; Palmer, Richard C.; and Ruffner, Charles L., 4,094,672, Cl. 75-226.000.
Palosi, Eva: *See—*
Toth, Edit; Torley, Jozsef; Szeberenyi, Szabolcs; Palosi, Eva; Szporny, Laszlo; Gorog, Sandor; and Meszaros, Csilla, 4,094,908, Cl. 260-570.00R.
Pang, Sing-Chin: *See—*
Genna, Sebastian; and Pang, Sing-Chin, 4,095,107, Cl. 250-363.00S.
Panzera, Carlino: *See—*
Erickson, Arnold Roderick; and Panzera, Carlino, 4,094,673, Cl. 75-246.000.
Papa, Roberto: *See—*
Carubia, Giovanni; Papa, Roberto; and Pratelli, Cesare, 4,095,266, Cl. 364-200.000.
Papanikolaou, Sotirios. Illuminated razor. 4,094,062, Cl. 30-34.00R.
Parker, Ian David: *See—*
Ells, John William; Parker, Ian David; and Walker, David Baird Langley, 4,094,163, Cl. 61-111.000.
Parker, Louis W. Direct current motors. 4,095,148, Cl. 318-138.000.
Parlante, Frank; and Parlante, Henry, to Courtlandt Boot Jack Co., Ltd. Open-top holster for revolver. 4,094,450, Cl. 224-2.00B.
Parlante, Henry: *See—*
Parlante, Frank; and Parlante, Henry, 4,094,450, Cl. 224-2.00B.
Parra, Gilbert T., to United States of America, National Aeronautics and Space Administration. Angle detector. 4,094,073, Cl. 33-366.000.
Parrier, Andre; Parrier, Jean; and Parrier, Henri. Safety electric connector. 4,094,565, Cl. 339-14.00P.
Parrier, Henri: *See—*
Parrier, Andre; Parrier, Jean; and Parrier, Henri, 4,094,565, Cl. 339-14.00P.
Parrier, Jean: *See—*
Parrier, Andre; Parrier, Jean; and Parrier, Henri, 4,094,565, Cl. 339-14.00P.
Partenheimer, Walter, to Standard Oil Company. Method for stabilizing a phosphorus-vanadium-oxygen complex catalyst. 4,094,816, Cl. 252-415.000.
Patel, Chandra Kumar Naranbhai: *See—*
Damen, Theodoar Charlouis; Gornik, Erich; Nguyen, Van-Tran; and Patel, Chandra Kumar Naranbhai, 4,095,122, Cl. 307-88.300.
Pater, Hendrik; Torgersen, G. Earl; and Brunner, Fritz R., to Pater, Hendrik. Self-controlled on-grade monorail track switch and method. 4,094,252, Cl. 104-130.000.
Patzig, Dieter, to Ludwig Taprogge Reinigungsanlagen fur Rohren-Warmeaustauscher. Filter apparatus, especially for a liquid to be fed to a power-plant condenser. 4,094,793, Cl. 210-323.00R.
Pausmer, Philip W.: *See—*
Johnson, William A.; Pausmer, Philip W.; and Harmon, Russel J., 4,094,532, Cl. 280-695.000.
Payrhammer, Bernd; and Treiber, Helmut, to Agfa-Gevaert Aktiengesellschaft. Apparatus for determining the light transmissivity of film frames or the like. 4,094,604, Cl. 355-68.000.
PCB Controls Ltd.: *See—*
Byrne, Peter Cyril; and Moore, Desmond F., 4,094,555, Cl. 303-100.000.
Pechner, Julius. Internal tumbler lock key change system. 4,094,175, Cl. 70-364.00A.
Peisker, Glenn W.: *See—*
Heyn, William O.; and Peisker, Glenn W., 4,094,519, Cl. 277-134.000.
Pelat, Roger Patrice; and Le Pierres, Gildas, to International Vibration Engineering. Inertia dependent device for preventing and permitting relative rotation between two members. 4,094,387, Cl. 188-1.00B.
Pennington, Robert E.: *See—*
Koh, Kwang K.; Nahas, Nicholas C.; Pennington, Robert E.; and Vernon, Lonnie W., 4,094,650, Cl. 48-197.00R.
Pennsylvania Engineering Corporation: *See—*
Readal, John P., 4,094,496, Cl. 266-142.000.
PepsiCo, Inc.: *See—*
Clarke, Richard Allen; Chvala, William James; and DeWitte, Raymond Edward, 4,094,526, Cl. 280-47.350.
Perron, Peter James: *See—*
Carrock, Frederick Elias; Perron, Peter James; and Zukowski, Edward August, 4,095,016, Cl. 526-137.000.
Perry Oceanographics, Inc.: *See—*
Hettinger, Frederic L., 4,094,159, Cl. 61-69.00R.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 13TH DAY OF JUNE, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AMP Incorporated: *See—*
Reynolds, Charles Edward; and Swartz, John Clinton, Re. 29,666, Cl. 339-15.000.
Eastman Kodak Company: *See—*
Spaulding, Richard A., Re. 29,670, Cl. 358-4.000.
Gusmer Corporation: *See—*
Gusmer, Frederick E.; Sundberg, Carl W., Jr.; and Hayes, Joseph E., Jr., Re. 29,665, Cl. 239-112.000.
Gusmer, Frederick E.; Sundberg, Carl W., Jr.; and Hayes, Joseph E., Jr., to Gusmer Corporation. Apparatus for ejecting a mixture of a plurality of liquids. Re. 29,665, Cl. 239-112.000.
Harner, Kermit I., to United Technologies Corporation. Compressor surge sensor. Re. 29,667, Cl. 415-28.000.
Hayes, Joseph E., Jr.: *See—*
Gusmer, Frederick E.; Sundberg, Carl W., Jr.; and Hayes, Joseph E., Jr., Re. 29,665, Cl. 239-112.000.
Kansas Jack, Inc.: *See—*
Kuhn, Charles Joseph, Re. 29,664, Cl. 72-444.000.
Kuhn, Charles Joseph, to Kansas Jack, Inc. Hydraulic pulley apparatus. Re. 29,664, Cl. 72-444.000.
Lombardino, Joseph G., to Pfizer Inc. Glycineamides. Re. 29,668, Cl. 260-306.80R.
Lombardino, Joseph G., to Pfizer, Inc. Production of 4-hydroxy-1,2-benzothiazine-3-carboxamides. Re. 29,669, Cl. 544-49.000.
Pfizer Inc.: *See—*
Lombardino, Joseph G., Re. 29,668, Cl. 260-306.80R.
Lombardino, Joseph G., Re. 29,669, Cl. 544-49.000.
Reynolds, Charles Edward; and Swartz, John Clinton, to AMP Incorporated. Electrical contact terminal having improved wire-receiving slot. Re. 29,666, Cl. 339-15.000.
Spaulding, Richard A., to Eastman Kodak Company. Multi-color acoustooptic modulator. Re. 29,670, Cl. 358-4.000.
Sundberg, Carl W., Jr.: *See—*
Gusmer, Frederick E.; Sundberg, Carl W., Jr.; and Hayes, Joseph E., Jr., Re. 29,665, Cl. 239-112.000.
Swartz, John Clinton: *See—*
Reynolds, Charles Edward; and Swartz, John Clinton, Re. 29,666, Cl. 339-15.000.
United Technologies Corporation: *See—*
Harner, Kermit I., Re. 29,667, Cl. 415-28.000.

LIST OF PLANT PATENTEES

Kinney, Charles Lyle. Pear tree. 4,263, 6-13-78, Cl. 36.000.
Mikkelsen, James C., to Mikkelsens Inc. Impatiens plant. 4,262, 6-13-78, Cl. 68.000.
Mikkelsens Inc.: *See—*
Mikkelsen, James C., 4,262, Cl. 68.000.
Saville, F. Harmon: *See—*
Schwartz, Ernest, 4,264, Cl. 9.000.
Schwartz, Ernest, 4,265, Cl. 8.000.
Schwartz, Ernest, to Saville, F. Harmon. Rose plant. 4,264, 6-13-78, Cl. 9.000.
Schwartz, Ernest, to Saville, F. Harmon. Rose plant. 4,265, 6-13-78, Cl. 8.000.

LIST OF DESIGN PATENTEES

Acrylic Designs, Inc.: *See—*
Comfort, Barbara; and von Roth, Frederik George Richard, 248,140, Cl. D6-181.000.
American Locker Security Systems, Inc.: *See—*
Stackhouse, Wells F.; and Barth, Douglas A., 248,138, Cl. D6-170.000.
Anderson, Victor F., to Shell Oil Company. Shoe. 248,126, 6-13-78, Cl. D2-292.000.
Appelblom, Harold R., deceased: *See—*
Yoshida, Saburo; Appelblom, Harold R., deceased; and Appelblom, Mae H., administratrix, 248,153, Cl. D11-152.000.
Appelblom, Mae H., administratrix: *See—*
Yoshida, Saburo; Appelblom, Harold R., deceased; and Appelblom, Mae H., administratrix, 248,153, Cl. D11-152.000.
Aulbert, Harold V., to Vaughan Furniture Company, Incorporated. Dresser or similar article. 248,136, 6-13-78, Cl. D6-154.000.
Bamis Manufacturing Company: *See—*
Kelly, Gordon, 248,168, Cl. D24-54.000.
Barth, Douglas A.: *See—*
Stackhouse, Wells F.; and Barth, Douglas A., 248,138, Cl. D6-170.000.
Batra, Vijay. Outer sole for footwear. 248,127, 6-13-78, Cl. D2-320.000.
Bell, Mace Hudson; and Haas, David Lee. Sphygmomanometer. 248,164, 6-13-78, Cl. D24-21.000.
Berkline Corporation, The: *See—*
Long, Stapleton, 248,129, Cl. D6-37.000.
Long, Stapleton, 248,131, Cl. D6-63.000.
Long, Stapleton, 248,132, Cl. D6-71.000.
Burd, Inc., Howell Division: *See—*
Petersen, Warren D., 248,130, Cl. D6-56.000.
Petersen, Warren D., 248,137, Cl. D6-146.000.
Petersen, Warren D., 248,139, Cl. D6-177.000.
Cannon, Thomas G.; and Mackay, Spencer L., to Teledyne Industries. Serving spoon. 248,143, 6-13-78, Cl. D7-140.000.
Carolina Enterprises, Inc.: *See—*
Hastings, Hank, 248,152, Cl. D10-120.000.
Carrier, Raymond E. Golf putter head. 248,180, 6-13-78, Cl. D34-5.0GH.
Cavanaugh, Genevieve S., to Cavanaugh, Genevieve S. Fire lighter. 248,162, 6-13-78, Cl. D23-166.000.
Cervantes, Walter I. Golf putter head. 248,181, 6-13-78, Cl. D34-5.0GH.
Chamberlin, Davis W., to Minnesota Mining and Manufacturing Company. Developer powder container. 248,148, 6-13-78, Cl. D9-224.000.
Comfort, Barbara; and von Roth, Frederik George Richard, to Acrylic Designs, Inc. Accessory holder for food processors. 248,140, 6-13-78, Cl. D6-181.000.
Corning Glass Works: *See—*
Greger, Richard W., 248,142, Cl. D7-87.000.
Dalzell, Charles J. Combined solid fuel unit and igniter. 248,161, 6-13-78, Cl. D23-166.000.
Designs for Vision, Inc.: *See—*
Feinbloom, Richard E.; and Endrodi, Laszlo, 248,160, Cl. D16-38.000.
Drag, Gerard, to General Binding Corporation. Book support bracket. 248,146, 6-13-78, Cl. D8-363.000.
Duris, Rudolph M., to General Signal Corporation. Electric buzzer. 248,151, 6-13-78, Cl. D10-116.000.
Endrodi, Laszlo: *See—*
Feinbloom, Richard E.; and Endrodi, Laszlo, 248,160, Cl. D16-38.000.
Eshelman, Cheston Lee. Electric car. 248,155, 6-13-78, Cl. D12-92.000.
Feather Kogyo Kabushiki Kaisha: *See—*
Kanai, Ryoji, 248,166, Cl. D24-29.000.
Kanai, Ryoji, 248,167, Cl. D24-29.000.
Feinbloom, Richard E.; and Endrodi, Laszlo, to Designs for Vision, Inc. Photo adapter microscope accessory. 248,160, 6-13-78, Cl. D16-38.000.
Forsland, Audre C. Pillow. 248,141, 6-13-78, Cl. D6-201.000.

Fujita, Teizo; and Ohashi, Toshiro, to Izumi Denki Company Limited. Motor timer. 248,149, 6-13-78, Cl. D10-40.000.
Ganzi, Gary C.; O'Donoghue, Kenneth; and Jha, Anil D., to Ionics, Inc. Electrode frame for use in an electrolytic filter press cell apparatus or the like. 248,157, 6-13-78, Cl. D13-40.000.
Garcia, John Anthony Mason. Candle holder. 248,182, 6-13-78, Cl. D48-2.000.
Garcia, John Anthony Mason. Candle holder. 248,183, 6-13-78, Cl. D48-2.000.
General Binding Corporation: *See—*
Drag, Gerard, 248,146, Cl. D8-363.000.
General Signal Corporation: *See—*
Duris, Rudolph M., 248,151, Cl. D10-116.000.
Greger, Richard W., to Corning Glass Works. Browning griddle or the like for microwave ovens. 248,142, 6-13-78, Cl. D7-87.000.
Haas, David Lee: *See—*
Bell, Mace Hudson; and Haas, David Lee, 248,164, Cl. D24-21.000.
Hastings, Hank, to Carolina Enterprises, Inc. Siren. 248,152, 6-13-78, Cl. D10-120.000.
Hazerjian, Kevork P.: *See—*
Hazerjian, Minas P.; and Hazerjian, Kevork P., 248,186, Cl. D48-38.000.
Hazerjian, Minas P.; and Hazerjian, Kevork P. Cover for yard light. 248,186, 6-13-78, Cl. D48-38.000.
Interlego A.G.: *See—*
Tapdrup, Erik Peter, 248,172, Cl. D34-2.00R.
Tapdrup, Erik Peter, 248,173, Cl. D34-4.00R.
Tapdrup, Erik Peter, 248,174, Cl. D34-4.00R.
Tapdrup, Erik Peter, 248,175, Cl. D34-4.00R.
Tapdrup, Erik Peter, 248,176, Cl. D34-4.00R.
Tapdrup, Erik Peter, 248,177, Cl. D34-4.00R.
Tapdrup, Erik Peter, 248,178, Cl. D34-4.00R.
Ionics, Inc.: *See—*
Ganzi, Gary C.; O'Donoghue, Kenneth; and Jha, Anil D., 248,157, Cl. D13-40.000.
Izumi Denki Company Limited: *See—*
Fujita, Teizo; and Ohashi, Toshiro, 248,149, Cl. D10-40.000.
Jha, Anil D.: *See—*
Ganzi, Gary C.; O'Donoghue, Kenneth; and Jha, Anil D., 248,157, Cl. D13-40.000.
Kanai, Ryoji, to Feather Kogyo Kabushiki Kaisha. Blade for surgical knife. 248,166, 6-13-78, Cl. D24-29.000.
Kanai, Ryoji, to Feather Kogyo Kabushiki Kaisha. Blade for surgical knife. 248,167, 6-13-78, Cl. D24-29.000.
Kelly, Gordon, to Bamis Manufacturing Company. Male urinal. 248,168, 6-13-78, Cl. D24-54.000.
Keyawa, Stanley J. Detachable multi-purpose light platform. 248,185, 6-13-78, Cl. D48-4.00A.
Koch, Samuel J. Combined moisture and light meter for plants. 248,150, 6-13-78, Cl. D10-56.000.
Kreitz, Lloyd D. Multi-purpose jig for use with table saws. 248,144, 6-13-78, Cl. D8-14.000.
Long, Stapleton, to Berkline Corporation, The. Lounge chair. 248,129, 6-13-78, Cl. D6-37.000.
Long, Stapleton, to Berkline Corporation, The. Seat. 248,131, 6-13-78, Cl. D6-63.000.
Long, Stapleton, to Berkline Corporation, The. Lounge chair. 248,132, 6-13-78, Cl. D6-71.000.
Loomis, Judith J. Utility bag. 248,189, 6-13-78, Cl. D87-3.00C.
Mackay, Spencer L.: *See—*
Cannon, Thomas G.; and Mackay, Spencer L., 248,143, Cl. D7-140.000.
Maejima, Husazo, to Sachie Andov. Coffee mill. 248,159, 6-13-78, Cl. D15-100.000.
Matsushita Electric Works, Ltd.: *See—*
Yamamoto, Shinji, 248,169, Cl. D28-13.000.
Mineo, Joseph Scott. Combined razor blade carrier and dispenser. 248,128, 6-13-78, Cl. D2-400.000.
Minnesota Mining and Manufacturing Company: *See—*
Chamberlin, Davis W., 248,148, Cl. D9-224.000.
Moore Company, Inc., The: *See—*
Moore, Junius T., Jr., 248,145, Cl. D8-344.000.
Moore, Junius T., Jr., to Moore Company, Inc., The. Locking plate. 248,145, 6-13-78, Cl. D8-344.000.
Motzer, Alfred E., to W. E. Bassett Company, The. Key retainer. 248,190, 6-13-78, Cl. D87-8.000.
Northern Telecom Limited: *See—*
Read, Clifford D., 248,158, Cl. D14-94.000.
O'Donoghue, Kenneth: *See—*
Ganzi, Gary C.; O'Donoghue, Kenneth; and Jha, Anil D., 248,157, Cl. D13-40.000.
Ohashi, Toshiro: *See—*
Fujita, Teizo; and Ohashi, Toshiro, 248,149, Cl. D10-40.000.
Petersen, Warren D., to Burd, Inc., Howell Division. Chair. 248,130, 6-13-78, Cl. D6-56.000.
Petersen, Warren D., to Burd, Inc., Howell Division. Table or similar article. 248,137, 6-13-78, Cl. D6-146.000.
Petersen, Warren D., to Burd, Inc., Howell Division. Table or similar article. 248,139, 6-13-78, Cl. D6-177.000.
Pinseeker Corporation, The: *See—*
Riley, Edward J., 248,179, Cl. D34-5.0GC.
Procter & Gamble Company, The: *See—*
Torongo, Albert H., Jr., 248,135, Cl. D6-87.000.
Rauch, Joseph A.; and Wales, Arthur P., to SCM Corporation. Ribbon cartridge caddy. 248,147, 6-13-78, Cl. D9-189.000.
Read, Clifford D., to Northern Telecom Limited. Headset-hardhat adapter. 248,158, 6-13-78, Cl. D14-94.000.
Regie Nationale des Usines Renault: *See—*
Tixier, Michel, 248,156, Cl. D12-169.000.
Riley, Edward J., to Pinseeker Corporation, The. Golf club. 248,179, 6-13-78, Cl. D34-5.0GC.
Roberts, Thomas Peter. Lamp for illuminating door locks and the like. 248,184, 6-13-78, Cl. D48-4.00B.
Roberts, Wallace A. Skin care equipment and stand apparatus. 248,163, 6-13-78, Cl. D24-1.100.
Roe, George J. Bagpipe practice chanter. 248,187, 6-13-78, Cl. D56-1.00C.
Sachie Andov: *See—*
Maejima, Husazo, 248,159, Cl. D15-100.000.
Samsonite Corporation: *See—*
Tweedie, Thomas D., 248,188, Cl. D87-5.00G.
SCM Corporation: *See—*
Rauch, Joseph A.; and Wales, Arthur P., 248,147, Cl. D9-189.000.
Shames, Harold: *See—*
Shames, Sidney J.; and Shames, Harold, 248,133, Cl. D6-86.000.
Shames, Sidney J.; and Shames, Harold, 248,134, Cl. D6-86.000.
Shames, Sidney J.; and Shames, Harold. Sink stopper. 248,133, 6-13-78, Cl. D6-86.000.
Shames, Sidney J.; and Shames, Harold. Tub stopper. 248,134, 6-13-78, Cl. D6-86.000.
Shell Oil Company: *See—*
Anderson, Victor F., 248,126, Cl. D2-292.000.
Sierra, Everardo P. Flag. 248,154, 6-13-78, Cl. D11-167.000.
Stackhouse, Wells F.; and Barth, Douglas A., to American Locker Security Systems, Inc. Locker. 248,138, 6-13-78, Cl. D6-170.000.
Steigerwald, Allan M. Manual control valve for anesthetic gases. 248,170, 6-13-78, Cl. D29-7.000.
Sugarman, Sanford A., to Superior Funeral Supply Corporation. Cremation urn. 248,171, 6-13-78, Cl. D31-5.000.
Sunnyside Nurseries, Inc.: *See—*
Yoshida, Saburo; Appelblom, Harold R., deceased; and Appelblom, Mae H., administratrix, 248,153, Cl. D11-152.000.
Superior Funeral Supply Corporation: *See—*
Sugarman, Sanford A., 248,171, Cl. D31-5.000.
Tapdrup, Erik Peter, to Interlego A.G. Toy figure. 248,172, 6-13-78, Cl. D34-2.00R.
Tapdrup, Erik Peter, to Interlego A.G. Toy figure. 248,173, 6-13-78, Cl. D34-4.00R.
Tapdrup, Erik Peter, to Interlego A.G. Toy figure. 248,174, 6-13-78, Cl. D34-4.00R.
Tapdrup, Erik Peter, to Interlego A.G. Toy figure. 248,175, 6-13-78, Cl. D34-4.00R.
Tapdrup, Erik Peter, to Interlego A.G. Toy figure. 248,176, 6-13-78, Cl. D34-4.00R.
Tapdrup, Erik Peter, to Interlego A.G. Toy figure. 248,177, 6-13-78, Cl. D34-4.00R.
Tapdrup, Erik Peter, to Interlego A.G. Toy figure. 248,178, 6-13-78, Cl. D34-4.00R.
Teledyne Industries: *See—*
Cannon, Thomas G.; and Mackay, Spencer L., 248,143, Cl. D7-140.000.
Tixier, Michel, to Regie Nationale des Usines Renault. Car front bumper. 248,156, 6-13-78, Cl. D12-169.000.
Torongo, Albert H., Jr., to Procter & Gamble Company, The. Hanger for collapsible tubes. 248,135, 6-13-78, Cl. D6-87.000.
Tweedie, Thomas D., to Samsonite Corporation. Luggage case. 248,188, 6-13-78, Cl. D87-5.00G.
Vaughan Furniture Company, Incorporated: *See—*
Aulbert, Harold V., 248,136, Cl. D6-154.000.
von Roth, Frederik George Richard: *See—*
Comfort, Barbara; and von Roth, Frederik George Richard, 248,140, Cl. D6-181.000.
W. E. Bassett Company, The: *See—*
Motzer, Alfred E., 248,190, Cl. D87-8.000.
Wales, Arthur P.: *See—*
Rauch, Joseph A.; and Wales, Arthur P., 248,147, Cl. D9-189.000.
Wilson, Charles A. Inframammary dissector instrument. 248,165, 6-13-78, Cl. D24-28.000.
Yamamoto, Shinji, to Matsushita Electric Works, Ltd. Hair dryer. 248,169, 6-13-78, Cl. D28-13.000.
Yoshida, Saburo; Appelblom, Harold R., deceased; and by Appelblom, Mae H., administratrix, to Sunnyside Nurseries, Inc. Plant pot. 248,153, 6-13-78, Cl. D11-152.000.

CLASSIFICATION OF PATENTS

ISSUED JUNE 13, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

161 R	4,094,014
415	4,094,015

CLASS 3

1.1	4,094,016
1.911	4,094,017

CLASS 4

7	4,094,018
172.12	4,094,021
172.17	4,094,022
213	4,094,023
312	4,094,019

CLASS 5

66	4,094,024
365	4,094,025

CLASS 6

1	4,094,026

CLASS 8

1 W	4,094,634
11	4,094,635
46	4,094,636
71	4,094,637

CLASS 9

6 P	4,094,027
321	4,094,028

CLASS 12

113	4,094,029
116.8	4,094,030

CLASS 15

1.7	4,094,031
41 R	4,094,032
	4,094,033
49 R	4,094,034
160	4,094,035
244 R	4,094,036
245	4,094,037
250.32	4,094,038
	4,094,039

CLASS 16

191	4,094,040

CLASS 17

44.2	4,094,041
46	4,094,042

CLASS 19

53	4,094,043

CLASS 21

61	4,094,638
74 R	4,094,639

CLASS 23

230 PC	4,094,640
230 R	4,094,641
	4,094,646
253 TP	4,094,647
254 R	4,094,642
259	4,094,648
285	4,094,643
288 F	4,094,644
288 FC	4,094,645

CLASS 24

68 CD	4,094,044
131 C	4,094,045
230 AK	4,094,046
241 R	4,094,047

CLASS 29

6	4,094,048
33 C	4,094,049
129.5	4,094,050
159 R	4,094,051
263	4,094,052
420	4,094,053
460	4,094,054
527.2	4,094,056
527.6	4,094,055
571	4,094,057
592 R	4,094,058
599	4,094,059
	4,094,060
612	4,094,061

CLASS 30

34 R	4,094,062
47	4,094,063
92	4,094,064
210	4,094,065
346.58	4,094,066

CLASS 32

2	4,094,067
14 A	4,094,068
22	4,094,069

CLASS 33

166	4,094,070
174 B	4,094,071
174 F	4,094,072
366	4,094,073

CLASS 34

33	4,094,074
72	4,094,075
90	4,094,076
155	4,094,077
181	4,094,078

CLASS 35

8 A	4,094,079
77	4,094,223

CLASS 36

2.6	4,094,080
116	4,094,081

CLASS 40

107	4,094,082
152.1	4,094,085
536	4,094,083
613	4,094,084

CLASS 42

1 R	4,094,086
90	4,094,098

CLASS 43

42.24	4,094,087
144	4,094,088

CLASS 44

35	4,094,649

CLASS 46

1 K	4,094,089
19	4,094,090
53	4,094,091
126	4,094,092
160	4,094,093
232	4,094,094

CLASS 47

1.3	4,094,095
41.13	4,094,096
57.6	4,094,097

CLASS 48

197 R	4,094,650
210	4,094,651

CLASS 49

163	4,094,099
348	4,094,100

CLASS 51

5 D	4,094,101
33 R	4,094,102
34 F	4,094,103
76 R	4,094,104
101 R	4,094,105
214	4,094,106
215 CP	4,094,107

CLASS 52

1	4,094,108
2	4,094,109
80	4,094,110
167	4,094,111
211	4,094,112
222	4,094,113
489	4,094,114
521	4,094,115
693	4,094,116
698	4,094,117
747	4,094,118

CLASS 53

4	4,094,119
21 FW	4,094,120
22 R	4,094,121
23	4,094,122
24	4,094,123
29	4,094,124
	4,094,125
35	4,094,126
51	4,094,127
52	4,094,128
54	4,094,129
124 D	4,094,130

CLASS 54

24	4,094,131

CLASS 55

33	4,094,652
138	4,094,653
290	4,094,654

CLASS 56

14.4	4,094,132

CLASS 57

34 R	4,094,133
56	4,094,134

CLASS 58

23 A	4,094,137
23 R	4,094,135
	4,094,136
39.5	4,094,138
50 R	4,094,139
152 R	4,094,140

CLASS 59

93	4,094,141

CLASS 60

39.03	4,094,142
352	4,094,143
445	4,094,144
447	4,094,145
641	4,094,146
	4,094,147
652	4,094,148

CLASS 61

1 R	4,094,149
36 A	4,094,151
36 C	4,094,150
41 A	4,094,152
45 D	4,094,153
	4,094,154
	4,094,155
53.5	4,094,156
63	4,094,157
	4,094,158
69 R	4,094,159
	4,094,160
95	4,094,161
96	4,094,162
111	4,094,163

CLASS 62

40	4,094,655
74	4,094,164
115	4,094,165
158	4,094,166
238	4,094,167
347	4,094,168
498	4,094,169
499	4,094,170

CLASS 65

81	4,094,656
83	4,094,657
90	4,094,658
104	4,094,659
325	4,094,660

CLASS 66

176	4,094,171

CLASS 68

58	4,094,172

CLASS 70

237	4,094,173
364 A	4,094,175
394	4,094,176
423	4,094,177

CLASS 71

88	4,094,661
92	4,094,662
	4,094,663
115	4,094,664

CLASS 72

41	4,094,178
238	4,094,174
	4,094,179
280	4,094,180
325	4,094,181
344	4,094,182
356	4,094,183
392	4,094,184
444	Re.29,664
477	4,094,185

CLASS 73

1 G	4,094,186
	4,094,187
81	4,094,188
88 E	4,094,189
115	4,094,190
118	4,094,191
133 R	4,094,192
170 A	4,094,193
194 VS	4,094,194
422 GC	4,094,195
	4,094,196
423 A	4,094,197
460	4,094,198
517 B	4,094,199

CLASS 74

5 R	4,094,200
56	4,094,201
60	4,094,202
230.17 E	4,094,204
230.17 F	4,094,203
242.1 FP	4,094,205
360	4,094,206
425	4,094,207
520	4,094,208
543	4,094,209
553	4,094,210
868	4,094,211

CLASS 75

11	4,094,665
58	4,094,666
92	4,094,667
99	4,094,668
108	4,094,669
124	4,094,670
157.5	4,094,671
226	4,094,672
246	4,094,673

CLASS 81

3.8	4,094,212
9.5 R	4,094,213
	4,094,214
127	4,094,215
156	4,094,216

CLASS 83

6	4,094,217
62.1	4,094,218
345	4,094,219
712	4,094,220
762	4,094,221

CLASS 85

63	4,094,222

CLASS 86

31	4,094,224

CLASS 89

41 L	4,094,225

CLASS 91

39	4,094,226
180	4,094,227
411 B	4,094,228
506	4,094,229

CLASS 92

51	4,094,230
128	4,094,231

CLASS 96

1 SD	4,094,674
1.5	4,094,675
36	4,094,677
36.1	4,094,678
36.3	4,094,679
41	4,094,680
49	4,094,681
55	4,094,682
90 R	4,094,676
95	4,094,683
108	4,094,684

CLASS 98

36	4,094,232

CLASS 99

305	4,094,233
310	4,094,234
450.1	4,094,235
450.4	4,094,236
451	4,094,237
643	4,094,238

CLASS 100

5	4,094,239
97	4,094,240

CLASS 101

66	4,094,244
120	4,094,241
123	4,094,242
349	4,094,243

CLASS 102

35	4,094,245
66	4,094,246
100	4,094,248
228	4,094,247

CLASS 104

6	4,094,249
12	4,094,250
	4,094,251
130	4,094,252

CLASS 105

225	4,094,253
282 P	4,094,254

CLASS 106

13	4,094,686
21	4,094,687
38.2	4,094,688
50	4,094,689
73.4	4,094,690
95	4,094,691
104	4,094,692
111	4,094,693
	4,094,694
179	4,094,695
277	4,094,696
280	4,094,697
288 B	4,094,698
288 Q	4,094,699

CLASS 108

25	4,094,255
50	4,094,256
115	4,094,257

CLASS 112

20	4,094,258
110	4,094,259
121.15	4,094,260
228	4,094,261

CLASS 114

43	4,094,262
91	4,094,263
304	4,094,264
307	4,094,265

CLASS 116

64	4,094,266
124 B	4,094,267

CLASS 118

49.1	4,094,268
	4,094,269

CLASS 119

3	4,094,270
5	4,094,271

CLASS 123

30 D	4,094,272
32 EE	4,094,273
32 EL	4,094,274
34 A	4,094,275
52 M	4,094,276
52 MF	4,094,277
59 EC	4,094,278
90.3	4,094,280
90.51	4,094,279
98	4,094,281
117 A	4,094,282
119 A	4,094,283
	4,094,284
	4,094,285
	4,094,286
	4,094,287
127	4,094,288
141	4,094,289
	4,094,290
	4,094,291
179 G	4,094,292
196 S	4,094,293

CLASS 124

56	4,094,294

CLASS 126

25 R	4,094,295
30	4,094,296
39 J	4,094,297
263	4,094,298
270	4,094,299
271	4,094,300
	4,094,301
400	4,094,302

CLASS 127

24	4,094,700

CLASS 128

1 R	4,094,303
2 E	4,094,305
2 V	4,094,304
	4,094,306
2.05 R	4,094,308
2.06 E	4,094,309
2.06 G	4,094,310
2.1 B	4,094,307
66	4,094,311
83.5	4,094,312
130	4,094,313
142.2	4,094,314
152	4,094,315
156	4,094,316
194	4,094,317
214 E	4,094,318
284	4,094,319
294	4,094,020
303.14	4,094,320
419 N	4,094,322
419 P	4,094,321

CLASS 131

8 R	4,094,323
10 A	4,094,324
21 R	4,094,325
234	4,094,326

CLASS 132

91	4,094,328

CLASS 134

2	4,094,701
10	4,094,702
56 R	4,094,329

CLASS 135

67	4,094,330
	4,094,331

CLASS 136

89 TF	4,094,703
	4,094,704

CLASS 137

46	4,094,332
100	4,094,333
219	4,094,334
317	4,094,335
403	4,094,327
505.42	4,094,337
512.1	4,094,336
578	4,094,338
604	4,094,339
625.66	4,094,340

CLASS 139
159 4,094,341

CLASS 140
93.2 4,094,342

CLASS 141
86 4,094,343
125 4,094,344
174 4,094,345
286 4,094,346
313 4,094,347

CLASS 144
34 F 4,094,348

CLASS 145
31 B 4,094,349
50 D 4,094,350

CLASS 148
2 4,094,705
11.5 F 4,094,706
12 R 4,094,707
32.5 4,094,708
126 4,094,709

CLASS 149
3 4,094,710
4 4,094,711
10 4,094,712
36 4,094,713
88 4,094,714

CLASS 150
7 4,094,351

CLASS 151
37 4,094,352

CLASS 152
310 4,094,353
361 R 4,094,354

CLASS 156
78 4,094,715
87 4,094,716
197 4,094,717
210 4,094,718
250 4,094,719
304 4,094,720
309 4,094,721
345 4,094,722
353 4,094,723
384 4,094,724
497 4,094,725
502 4,094,726
505 4,094,727
514 4,094,728
515 4,094,729
606 4,094,730
616 R 4,094,731
643 4,094,732
648 4,094,733

CLASS 159
13 A 4,094,734

CLASS 162
76 4,094,735
175 4,094,736

CLASS 165
1 4,094,355
39 4,094,356
105 4,094,357
154 4,094,358

CLASS 166
65 R 4,094,359
243 4,094,360

CLASS 169
48 4,094,361

CLASS 172
120 4,094,362
349 4,094,363

CLASS 173
80 4,094,364
117 4,094,365
138 4,094,366

CLASS 174
23 C 4,095,039
28 4,095,040
4,095,041
36 4,095,042
65 R 4,095,043
138 F 4,095,044

CLASS 176
65 4,094,737
67 4,094,738

CLASS 177
1 4,094,367
128 4,094,368
147 4,094,369
168 4,094,370
210 R 4,094,371

CLASS 178
2 R 4,095,045
22 4,095,046
69.1 4,095,047
4,095,048

CLASS 179
1 GQ 4,095,049
2 A 4,095,050
15 AF 4,095,053
15 AS 4,095,052
15 BS 4,095,051
18 DA 4,095,056
18 ES 4,095,054
18 GF 4,095,055
175.1 A 4,095,057
175.2 D 4,095,058

CLASS 180
1 F 4,094,373
1 G 4,094,372
31 4,094,374
33 A 4,094,375
43 R 4,094,376
65 C 4,094,377
105 E 4,094,378

CLASS 181
284 4,094,379
285 4,094,380

CLASS 182
67 4,094,381

CLASS 184
15 R 4,094,382
55 A 4,094,383
4,094,384

CLASS 187
29 R 4,094,385
4,094,386

CLASS 188
1 B 4,094,387
71.9 4,094,388
73.3 4,094,389
196 D 4,094,390

CLASS 190
18 A 4,094,391
41 R 4,094,392

CLASS 192
82 T 4,094,393
98 4,094,394
106.2 4,094,395

CLASS 194
1 M 4,094,396
10 4,094,398

CLASS 195
7 4,094,739
27 4,094,740
29 4,094,741
33 4,094,742
63 4,094,743
4,094,744
103.5 M 4,094,745

CLASS 198
535 4,094,399
607 4,094,400
827 4,094,401
847 4,094,402

CLASS 200
5 B 4,095,059
16 D 4,095,060
48 KB 4,095,061
61.13 4,095,062
4,095,063
61.21 4,095,064
63 R 4,095,065
67 A 4,095,066
67 AA 4,095,067
144 AP 4,095,068
148 B 4,095,069
153 J 4,095,070
157 4,095,071
4,095,072
293 4,095,073
295 4,095,074
308 4,095,075

CLASS 201
5 4,094,746

CLASS 202
173 4,094,747

CLASS 203
88 4,094,748

CLASS 204
25 4,094,749
56 R 4,094,750
80 4,094,751
105 R 4,094,753
108 4,094,754
129.95 4,094,752
149 4,094,755
159.18 4,094,756
4,094,757
164 4,094,758
180 G 4,094,759
181 R 4,094,760
192 EC 4,094,762
192 M 4,094,761
192 P 4,094,763
298 4,094,764

CLASS 206
45.13 4,094,403
45.15 4,094,404
423 4,094,405
432 4,094,406
524.3 4,094,407
534 4,094,408
566 4,094,409
586 P 4,094,909

CLASS 208
8 4,094,765
10 4,094,766
11 LE 4,094,768
11 R 4,094,767
4,094,769
251 R 4,094,770

CLASS 209
4 4,094,771
12 4,094,772
73 4,094,410
97 4,094,411
106 4,094,412
121 4,094,413

CLASS 210
5 4,094,773
12 4,094,774
22 4,094,775
27 4,094,776
32 4,094,777
38 A 4,094,778
38 B 4,094,780
40 4,094,779
54 4,094,781
58 4,094,782
63 R 4,094,783
68 4,094,784
70 4,094,785
101 4,094,786
103 4,094,787
169 4,094,788
188 4,094,789
289 4,094,790
316 4,094,791
321 B 4,094,792
323 R 4,094,793
512 R 4,094,794

CLASS 211
1.3 4,094,414
57.1 4,094,415
71 4,094,416
183 4,094,417

CLASS 214
1 BC 4,094,418
10 4,094,419
35 R 4,094,420
82 4,094,421
145 R 4,094,422
147 G 4,094,423
304 4,094,424
310 4,094,425
338 4,094,426
505 4,094,427
4,094,428

CLASS 215
305 4,094,429

CLASS 219
10.49 R 4,095,076
61 4,095,077
68 4,095,078
69 E 4,095,079
74 4,095,080
76.16 4,095,081
78.15 4,095,082
121 EB 4,095,083
121 LM 4,095,084
123 4,095,085
283 4,095,086
298 4,095,087
345 4,095,088
441 4,095,089
4,095,090

CLASS 220
1.5 4,094,430
23.4 4,094,431
63 R 4,094,432
90.4 4,094,433
90.6 4,094,434
269 4,094,435
315 4,094,436
374 4,094,437

CLASS 221
1 4,094,438
9 4,094,439
12 4,094,440
18 4,094,441
59 4,094,442
63 4,094,443
266 4,094,444

CLASS 222
1 4,094,445
146 HE 4,094,446
4,094,447
342 4,094,448
475 4,094,449

CLASS 224
2 B 4,094,450

CLASS 225
96 4,094,451

CLASS 226
34 4,094,452

CLASS 228
265 4,094,453

CLASS 229
15 4,094,454
4,094,455
17 SC 4,094,456
21 4,094,457
39 R 4,094,458
41 B 4,094,459
43 4,094,460

CLASS 233
40 4,094,461

CLASS 235
92 GT 4,095,093
92 PK 4,095,092
304.1 4,095,094
419 4,094,462
4,095,095
462 4,095,091
463 4,095,096

CLASS 236
82 4,094,463

CLASS 239
17 4,094,464
112 Re.29,665
132.3 4,094,465
145 4,094,466
230 4,094,467
394 4,094,468
405 4,094,469

CLASS 241
46 R 4,094,470

CLASS 242
18 PW 4,094,471
54 R 4,094,472
55 4,094,473
56.2 4,094,474
107.4 A 4,094,475
125.2 4,094,476
152.1 4,094,477
192 4,094,478

CLASS 244
179 4,094,479
180 4,094,480
194 4,094,481

CLASS 248
4 4,094,482
73 4,094,483
162 4,094,484
221.3 4,094,485
225.4 4,094,486
231 4,094,487
359 4,094,488
429 4,094,489
489 4,094,490

CLASS 249
83 4,094,491

CLASS 250
199 4,095,097
205 4,095,098
4,095,099
206 4,095,100
227 4,095,101
265 4,095,102
277 CH 4,095,103
311 4,095,104
338 4,095,105
358 R 4,095,106
363 S 4,095,107
369 4,095,108
374 4,095,109
445 T 4,095,110
476 4,095,111
492 A 4,095,112
494 4,095,113
510 4,095,114
538 4,095,115
551 4,095,116
564 4,095,117

CLASS 251
212 4,094,492

CLASS 252
8.55 D 4,094,798
8.55 R 4,094,795
8.8 4,094,796
8.9 4,094,797
29 4,094,799
32.7 E 4,094,800
33 4,094,801
51.5 A 4,094,802
62.1 P 4,094,803
62.52 4,094,804
70 4,094,805
102 4,094,806
131 4,094,807
186 4,094,808
301.1 W 4,094,809
313 R 4,094,810
4,094,811
321 4,094,812
373 4,094,813
415 4,094,814
4,094,815
4,094,816
4,094,817
429 C 4,094,818
435 4,094,819
465 4,094,820
466 PT 4,094,821
512 4,094,822
522 4,094,823
4,094,824

CLASS 254
144 4,094,493

CLASS 260
2 S 4,094,825
2.2 R 4,094,826
2.5 AC 4,094,827
2.5 AK 4,094,829
2.5 AM 4,094,828
2.5 AW 4,094,869
2.5 B 4,094,685
4 R 4,094,830
5 4,094,831
17.4 GC 4,094,832
4,094,833
19 UA 4,094,834
22 A 4,094,837
22 CB 4,094,835
4,094,836
22 TN 4,094,838
23 R 4,094,839
29.2 N 4,094,843
29.2 TN 4,094,842
29.3 4,094,844
29.4 R 4,094,846
4,094,847
29.4 UA 4,094,845
29.6 E 4,094,848
29.6 H 4,094,841
29.6 MQ 4,094,849
31.8 PQ 4,094,850
33.6 UA 4,094,851
37 N 4,094,852
40 R 4,094,853
42.46 4,094,854
45.75 B 4,094,858
45.8 NT 4,094,855
45.9 NP 4,094,856
45.9 QB 4,094,857
47 P 4,094,861
47 R 4,094,859
4,094,860
65 4,094,862
77.5 B 4,094,863
78 R 4,094,866
78 TF 4,094,864
78.41 4,094,865
79.3 M 4,094,867
192 4,094,868
239 BD 4,094,870
239.3 B 4,094,871
239.55 R 4,094,840
270 PD 4,094,876
270 PY 4,094,875
293.58 4,094,877
297 Z 4,094,878
299 4,094,879
302 SD 4,094,880
306.8 R Re.29,668
308 A 4,094,881
343 4,094,882
343.6 4,094,883
4,094,884
345.5 4,094,885
345.9 P 4,094,886
346.11 4,094,887
346.75 4,094,888
348.34 4,094,889
397.2 4,094,890
410.9 R 4,094,892
413 4,094,891
429 R 4,094,893
453 SP 4,094,894
455 A 4,094,895
456 A 4,094,896
513 B 4,094,898
514 D 4,094,899
520 E 4,094,900
530 R 4,094,901
551 P 4,094,902
555 A 4,094,903
558 A 4,094,904
561 R 4,094,905
566 B 4,094,906
570 D 4,094,907
570 R 4,094,908
613 B 4,094,910
615 A 4,094,911
656 R 4,094,915
666 A 4,094,916
4,094,917
668 A 4,094,919
668 R 4,094,918
4,094,920
671 C 4,094,921
4,094,922
683.48 4,094,923
683.51 4,094,924
836 4,094,925
860 4,094,926
897 B 4,094,927
944 4,094,928
968 4,094,929

CLASS 261
18 A 4,094,930
23 B 4,094,931
41 D 4,094,932
50 A 4,094,933
64 R 4,094,934
80 4,094,935
96 4,094,936
111 4,094,937

CLASS 264
30 4,094,938
35 4,094,939
40.6 4,094,940
71 4,094,941
102 4,094,942
105 4,094,897
130 4,094,943
137 4,094,944
171 4,094,946
4,094,947
184 4,094,945
206 4,094,948
234 4,094,949
259 4,094,950
325 4,094,951
328 4,094,952

CLASS 266
44 4,094,494
142 4,094,496
143 4,094,495

CLASS 269
71 4,094,497

CLASS 270
52.5 4,094,498
60 4,094,499
79 4,094,500

CLASS 272
8 M 4,094,501
74 4,094,502
85 4,094,503

CLASS 273
29 A 4,094,504
73 C 4,094,505
85 R 4,094,506
110 4,094,507
118 R 4,094,508
247 4,094,509
251 4,094,510

CLASS 274
39 A 4,094,511

CLASS 277
27 4,094,512
41 4,094,513
92 4,094,514
4,094,515
4,094,516
94 4,094,517
95 4,094,518
134 4,094,519
166 4,094,520

CLASS 279
4 4,094,521
4,094,522
62 4,094,523

CLASS 280
11.2 4,094,524
4,094,525
47.35 4,094,526
414 R 4,094,527
610 4,094,528
614 4,094,529
625 4,094,530
649 4,094,531
695 4,094,532
745 4,094,533
760 4,094,534

CLASS 285
7 4,094,535
21 4,094,536
47 4,094,537
150 4,094,538
309 4,094,539

CLASS 290
2 4,095,118
40 R 4,095,119
44 4,095,120

CLASS 292
214 4,094,540
231 4,094,541
256.5 4,094,542

CLASS 294
54 4,094,543
82 R 4,094,544

CLASS 296
28 C 4,094,545
28 M 4,094,546

CLASS 297
182 4,094,547

CLASS 299
9 4,094,548
17 4,094,549

CLASS 301
37 R 4,094,550

CLASS 302
26 4,094,551
29 4,094,552

CLASS 303
3 4,094,553
52 4,094,554
100 4,094,555
109 4,094,556

CLASS 305
54 4,094,557

CLASS 307
88.3 4,095,121
4,095,122
115 4,095,123
141.4 4,095,124
234 4,095,125
237 4,095,126
253 4,095,127
254 4,095,128

CLASS 308
3 R 4,094,558
194 4,094,559
206 4,094,560

CLASS 310
49 R 4,095,129
162 4,095,130
239 4,095,131

CLASS 312
223 4,094,561
290 4,094,562

CLASS 313
103 CM 4,095,132
336 4,095,133
470 4,095,134
493 4,095,135

CLASS 315
11 4,095,136
13 C 4,095,137
16 4,095,138
153 4,095,139
199 4,095,140
241 P 4,095,141
248 4,095,142
370 4,095,143
375 4,095,144
383 4,095,145

CLASS 316
19 4,094,563

CLASS 318
7 4,095,146
52 4,095,147
138 4,095,148
220 A 4,095,149
227 4,095,150
266 4,095,151
376 4,095,152
4,095,153
4,095,154
541 4,095,155
571 4,095,156
603 4,095,157
4,095,158
605 4,095,159
675 4,095,160
696 4,095,161

CLASS 320
1 4,095,162

CLASS 323
8 4,095,163
4,095,164
17 4,095,165
4,095,166

CLASS 324
0.5 AH 4,095,168
3 4,095,167
8 4,095,169
16 T 4,095,170
33 4,095,171
51 4,095,172
52 4,095,173
4,095,174
57 R 4,095,175
65 CR 4,095,176
164 4,095,177
169 4,095,178
207 4,095,179
233 4,095,180
238 4,095,181

CLASS 325
17 4,095,182
4,095,183
22 4,095,184

CLASS 328
55 4,095,185
133 4,095,186

CLASS 329
50 4,095,187

CLASS 330
84 4,095,188
265 4,095,189

CLASS 331
2 4,095,190
4 4,095,191
78 4,095,192
94.5 G 4,095,193
108 D 4,095,194
116 R 4,095,195

CLASS 332
16 T 4,095,196

CLASS 333
28 R 4,095,197
32 4,095,198
70 R 4,095,199

CLASS 335
193 4,095,200
210 4,095,201
213 4,095,202

CLASS 336
20 4,095,203
57 4,095,204
92 4,095,205
96 4,095,206

CLASS 337
20 4,095,207
125 4,095,208

CLASS 338
174 4,095,209
180 4,095,210

CLASS 339
14 L 4,094,564
14 P 4,094,565
14 R 4,094,566
15 Re.29,666
4,094,567
17 LM 4,094,568
40 4,094,569
75 M 4,094,570
91 R 4,094,571
97 P 4,094,572
176 MP 4,094,573
177 E 4,094,574

CLASS 340
147 MD 4,095,239
224 4,095,211
4,095,212
252 R 4,095,213
258 C 4,095,214
311 4,095,215
324 AD 4,095,216
324 R 4,095,217
347 DA 4,095,218
347 NT 4,095,219
409 4,095,220
421 4,095,221

CLASS 343
7 A 4,095,222
7.9 4,095,223
17.1 R 4,095,224
17.2 PC 4,095,225
105 R 4,095,226
700 MS 4,095,227
704 4,095,228
715 4,095,229
729 4,095,230
846 4,095,231

CLASS 346
75 4,095,232
4,095,233
4,095,234
110 R 4,095,235
139 C 4,095,236
140 R 4,095,237
4,095,238
163 4,095,240

CLASS 350
3.67 4,094,575
3.71 4,094,576
3.72 4,094,577
96.15 4,094,578
96.17 4,094,579
96.21 4,094,580
150 4,094,581
162 SF 4,094,584
175 E 4,094,585
184 4,094,586
4,094,587
215 4,094,588
241 4,094,589
269 4,094,590
289 4,094,591
333 4,094,582
358 4,094,583

CLASS 351
30 4,094,592
38 4,094,593

CLASS 352
91 C 4,094,594
180 4,094,595

CLASS 353
27 R 4,094,596
35 4,094,597
76 4,094,598
96 4,094,599
120 4,094,600

CLASS 354
31 4,095,241
33 4,095,242
60 L 4,095,243
82 4,095,244
141 4,095,245
187 4,095,246
286 4,095,247
288 4,095,249
293 4,095,250

CLASS 355
3 R 4,094,606
26 4,094,601
40 4,094,602
64 4,094,603
68 4,094,604
95 4,094,605

CLASS 356
85 4,094,607
97 4,094,608
201 4,094,609

CLASS 357
23 4,095,251
43 4,095,252
81 4,095,253

CLASS 358
4 Re.29,670
11 4,095,254
17 4,095,255
35 4,095,256
113 4,095,257
120 4,095,258
141 4,095,259
248 4,095,260
288 4,095,248

CLASS 360
13 4,095,261

CLASS 361
1 4,095,262
274 4,095,264
292 4,095,263

CLASS 364
200 4,095,265
4,095,266
4,095,267
4,095,268
4,095,269
4,095,270
434 4,095,271
497 4,095,272
705 4,095,273
715 4,095,274
721 4,095,275
724 4,095,276
900 4,095,277
4,095,278

CLASS 365
29 4,095,279
112 4,095,280
156 4,095,281
204 4,095,282
230 4,095,283

CLASS 366
7 4,095,284
23 4,095,285
194 4,095,287
219 4,095,288
293 4,095,286

CLASS 400
161.4 4,094,397

CLASS 401
195 4,094,610

CLASS 403
14 4,094,611

CLASS 408
92 4,094,612

CLASS 415
17 4,094,613
28 Re.29,667

CLASS 416
140 4,094,614
215 4,094,615

CLASS 417
121 4,094,616
295 4,094,617

CLASS 418
178 4,094,618

CLASS 423
2 4,094,953
69 4,094,954
123 4,094,955
179 4,094,956
223 4,094,957
238 4,094,958
359 4,094,959
456 4,094,960
564 4,094,961
573 R 4,094,962

CLASS 424
1 4,094,963
4,094,964
1.5 4,094,965
5 4,094,966
28 4,094,967
46 4,094,968
78 4,094,969
4,094,970
92 4,094,971
105 4,094,972
177 4,094,973
200 4,094,974
216 4,094,975
228 4,094,976
240 4,094,977
246 4,094,978
4,094,979
250 4,094,980
257 4,094,981
263 4,094,982
266 4,094,983
269 4,094,984
270 4,094,985
4,094,986
274 4,094,987
277 4,094,988
282 4,094,989
285 4,094,990
309 4,094,991
324 4,094,992
337 4,094,993
341 4,094,994
353 4,094,995

CLASS 425
135 4,094,619
140 4,094,620
190 4,094,621
224 4,094,622
227 4,094,623
434 4,094,624

CLASS 426
115 4,094,996
533 4,094,997
535 4,094,998
547 4,094,999
656 4,095,000
4,095,001

CLASS 427
27 4,095,002
34 4,095,003
74 4,095,004
376 B 4,095,005
427 4,095,006

CLASS 428
113 4,095,007
215 4,095,008
310 4,095,009
375 4,095,010
469 4,095,011
474 4,095,012
522 4,095,013
658 4,095,014

CLASS 429
15 4,095,015

CLASS 431
9 4,094,625
202 4,094,632

CLASS 432
58 4,094,626
59 4,094,627
80 4,094,628
98 4,094,629
118 4,094,633
134 4,094,630
176 4,094,631

CLASS 526
1 4,095,031
11.1 4,095,032
90 4,095,033
137 4,095,016
188 4,095,017
211 4,095,018
215 4,095,019

CLASS 528
494 4,095,020

CLASS 542
422 4,095,023

CLASS 544
22 4,095,021
26 4,094,872
49 Re.29,669
87 4,095,022
243 4,094,873
258 4,094,874

CLASS 548
367 4,095,024
378 4,095,025
379 4,095,026

CLASS 560
18 4,095,027
44 4,095,028
87 4,095,029
100 4,095,030
121 4,095,036
134 4,095,034
180 4,095,035
246 4,095,037
255 4,095,038

CLASS 568
778 4,094,913
802 4,094,912
862 4,094,914

CLASSIFICATION OF DESIGNS

D2—	292	248,126		154	248,136		224	248,148	D15—	100	248,159	D29—	7	248,170			248,181
	320	248,127		170	248,138	D10—	40	248,149	D16—	38	248,160	D31—	5	248,171	D48—	2	248,182
	400	248,128		177	248,139		56	248,150	D23—	166	248,161	D34—	2 R	248,172			248,183
D6—	37	248,129		181	248,140		116	248,151			248,162		4 R	248,173		4 A	248,185
	56	248,130		201	248,141		120	248,152	D24—	1.1	248,163			248,174		4 B	248,184
	63	248,131	D7—	87	248,142	D11—	152	248,153		21	248,164			248,175		38	248,186
	71	248,132		140	248,143		167	248,154		28	248,165			248,176	D56—	1 C	248,187
	86	248,133	D8—	14	248,144	D12—	92	248,155		29	248,166			248,177	D87—	3 C	248,189
		248,134		344	248,145		169	248,156			248,167			248,178		5 G	248,188
	87	248,135		363	248,146	D13—	40	248,157		54	248,168		5 GC	248,179		8	248,190
	146	248,137	D9—	189	248,147	D14—	94	248,158	D28—	13	248,169		5 GH	248,180			

CLASSIFICATION OF PLANTS

P.—		4,265		9	4,264		36	4,263		68	4,262						

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,094,069		4,094,337		4,095,210		4,094,718		4,094,373		4,095,089
	4,094,168		4,094,371		4,095,217		4,094,857		4,094,393		4,095,090
	4,094,300		4,094,372		4,095,227		4,094,894		4,094,395		4,095,103
	4,094,945		4,094,374		4,095,230		4,094,985		4,094,403		4,095,138
4 :	4,094,045		4,094,429		4,095,239		4,095,009		4,094,415		4,095,147
	4,094,067		4,094,435		4,095,248		4,095,019		4,094,426		4,095,170
	4,094,281		4,094,478		4,095,250		4,095,031		4,094,431		4,095,178
	4,094,336		4,094,483		4,095,252	11 :	4,094,845		4,094,442	18 :	4,094,216
	4,094,433		4,094,492		4,095,274	12 :	4,094,159		4,094,449		4,094,348
	4,094,479		4,094,498		4,095,288		4,094,166		4,094,456		4,094,981
	4,094,481		4,094,524	8 :	4,094,020		4,094,227		4,094,458		4,095,003
	4,094,508		4,094,532		4,094,126		4,094,288		4,094,463		4,095,209
	4,094,610		4,094,537		4,094,149		4,094,303		4,094,473	19 :	4,094,042
	4,094,761		4,094,539		4,094,311		4,094,308		4,094,501		4,094,497
	4,094,939		4,094,541		4,094,320		4,094,319		4,094,506		4,094,557
	4,095,124		4,094,562		4,094,335		4,094,377		4,094,507		4,094,574
5 :	4,094,041		4,094,569		4,094,392		4,094,414		4,094,514	20 :	4,094,427
	4,094,096		4,094,573		4,094,491		4,094,423		4,094,516		4,094,428
	4,094,329		4,094,599		4,094,616		4,094,434		4,094,519		4,094,983
	4,094,482		4,094,603		4,094,633		4,094,472		4,094,542	21 :	4,094,397
	4,094,488		4,094,608		4,094,749		4,094,503		4,094,544	22 :	4,094,197
	4,095,185		4,094,662		4,094,754		4,094,560		4,094,546		4,094,295
6 :	Re.29,664		4,094,663		4,094,767		4,094,566		4,094,613		4,094,340
	4,094,014		4,094,697		4,094,769		4,094,639		4,094,631		4,094,416
	4,094,021		4,094,711		4,094,935		4,094,673		4,094,644		4,094,455
	4,094,026		4,094,712		4,095,097		4,094,856		4,094,645		4,094,459
	4,094,027		4,094,713		4,095,235		4,094,967		4,094,648		4,094,765
	4,094,043		4,094,750	9 :	Re.29,667		4,095,077		4,094,674	24 :	4,094,230
	4,094,073		4,094,758		Re.29,668		4,095,148		4,094,678		4,094,304
	4,094,084		4,094,766		Re.29,669		4,095,221		4,094,680		4,094,505
	4,094,085		4,094,770		4,094,024		4,095,275		4,094,694		4,094,581
	4,094,102		4,094,775		4,094,180	13 :	4,094,106		4,094,731		4,094,627
	4,094,112		4,094,792		4,094,191		4,094,164		4,094,779		4,094,646
	4,094,114		4,094,820		4,094,293		4,094,550		4,094,787		4,094,710
	4,094,116		4,094,822		4,094,354	15 :	4,094,317		4,094,790		4,094,717
	4,094,173		4,094,825		4,094,526	16 :	4,094,941		4,094,799		4,094,733
	4,094,175		4,094,873		4,094,559	17 :	4,094,023		4,094,800		4,094,744
	4,094,176		4,094,888		4,094,589		4,094,075		4,094,814		4,094,954
	4,094,189		4,094,895		4,094,596		4,094,083		4,094,816		4,094,973
	4,094,213		4,094,956		4,094,600		4,094,091		4,094,817		4,095,105
	4,094,214		4,094,961		4,094,668		4,094,093		4,094,838		4,095,110
	4,094,225		4,094,974		4,094,846		4,094,104		4,094,850		4,095,222
	4,094,238		4,095,004		4,094,847		4,094,145		4,094,858		4,095,223
	4,094,244		4,095,044		4,094,864		4,094,205		4,094,912		4,095,282
	4,094,263		4,095,058		4,094,866		4,094,209		4,094,913	25 :	4,094,022
	4,094,264		4,095,084		4,094,868		4,094,228		4,094,969		4,094,053
	4,094,271		4,095,098		4,094,899		4,094,233		4,094,998		4,094,063
	4,094,297		4,095,114		4,094,940		4,094,254		4,095,014		4,094,071
	4,094,301		4,095,127		4,095,008		4,094,259		4,095,029		4,094,148
	4,094,315		4,095,136		4,095,045		4,094,309		4,095,061		4,094,192
	4,094,327		4,095,149		4,095,146		4,094,338		4,095,065		4,094,195
	4,094,330		4,095,168		4,095,211		4,094,352		4,095,071		4,094,196
	4,094,332		4,095,193	10 :	4,094,143		4,094,367		4,095,073		4,094,215

4,094,310
4,094,321
4,094,443
4,094,529
4,094,579
4,094,584
4,094,590
4,094,641
4,094,647
4,094,685
4,094,943
4,094,965
4,095,007
4,095,040
4,095,051
4,095,067
4,095,070
4,095,107
4,095,131
4,095,139
4,095,140
4,095,145
4,095,157
4,095,167
4,095,175
4,095,207
26 : 4,094,016
4,094,017
4,094,072
4,094,099
4,094,113
4,094,115
4,094,125
4,094,202
4,094,234
4,094,266
4,094,275
4,094,279
4,094,291
4,094,307
4,094,349
4,094,383
4,094,390
4,094,457
4,094,521
4,094,561
4,094,601
4,094,602
4,094,622
4,094,650
4,094,669
4,094,701
4,094,709
4,094,740
4,094,788
4,094,797
4,094,841
4,094,871
4,094,880
4,094,882
4,094,883
4,094,884
4,094,890
4,094,891
4,094,906
4,094,910
4,094,934
4,094,947
4,094,972
4,095,028
4,095,036
4,095,064
4,095,180
4,095,184
4,095,286
27 : 4,094,440

4,094,575
4,094,576
4,094,911
4,095,013
4,095,050
4,095,137
4,095,279
28 : 4,094,095
4,094,643
29 : 4,094,239
4,094,388
4,094,597
4,094,661
4,094,705
4,094,851
4,094,865
4,094,928
31 : 4,094,362
32 : 4,094,356
4,094,696
4,094,932
4,094,955
4,095,284
33 : 4,094,451
4,094,485
4,095,198
4,095,215
34 : Re.29,665
4,094,062
4,094,081
4,094,142
4,094,150
4,094,158
4,094,169
4,094,178
4,094,224
4,094,245
4,094,247
4,094,248
4,094,255
4,094,257
4,094,261
4,094,346
4,094,368
4,094,432
4,094,477
4,094,504
4,094,520
4,094,528
4,094,571
4,094,580
4,094,582
4,094,698
4,094,699
4,094,751
4,094,757
4,094,768
4,094,781
4,094,795
4,094,818
4,094,821
4,094,823
4,094,824
4,094,840
4,094,859
4,094,876
4,094,878
4,094,892
4,094,893
4,094,900
4,094,915
4,094,921
4,094,924
4,094,936
4,094,957
4,094,963

4,094,964
4,094,976
4,094,999
4,095,001
4,095,011
4,095,035
4,095,039
4,095,043
4,095,052
4,095,053
4,095,100
4,095,101
4,095,120
4,095,122
4,095,132
4,095,155
4,095,164
4,095,186
4,095,196
4,095,226
4,095,258
4,095,263
4,095,281
35 : 4,095,121
36 : Re.29,670
4,094,031
4,094,052
4,094,092
4,094,097
4,094,128
4,094,160
4,094,170
4,094,177
4,094,258
4,094,298
4,094,299
4,094,316
4,094,326
4,094,351
4,094,357
4,094,396
4,094,404
4,094,409
4,094,450
4,094,461
4,094,490
4,094,509
4,094,527
4,094,547
4,094,553
4,094,563
4,094,568
4,094,572
4,094,606
4,094,612
4,094,652
4,094,657
4,094,684
4,094,687
4,094,703
4,094,727
4,094,729
4,094,742
4,094,755
4,094,774
4,094,778
4,094,803
4,094,834
4,094,853
4,094,855
4,094,869
4,094,896
4,094,903
4,094,958
4,095,016
4,095,020

4,095,023
4,095,092
4,095,099
4,095,111
4,095,143
4,095,144
4,095,163
4,095,165
4,095,173
4,095,214
4,095,233
4,095,251
4,095,257
4,095,261
4,095,262
4,095,273
4,095,280
4,095,283
37 : 4,094,328
4,094,413
4,095,027
4,095,066
4,095,125
4,095,126
4,095,218
39 : 4,094,146
4,094,231
4,094,280
4,094,284
4,094,341
4,094,379
4,094,408
4,094,438
4,094,462
4,094,493
4,094,502
4,094,513
4,094,535
4,094,564
4,094,567
4,094,656
4,094,730
4,094,739
4,094,756
4,094,789
4,094,801
4,094,806
4,094,831
4,094,843
4,094,860
4,094,877
4,094,922
4,094,944
4,095,010
4,095,075
4,095,094
4,095,229
4,095,232
40 : 4,094,051
4,094,079
4,094,080
4,094,270
4,094,334
4,094,381
4,094,525
4,094,536
4,094,598
4,094,632
4,094,783
4,094,810
4,094,819
4,094,918
4,094,920
4,094,923
4,094,959

4,094,960
4,095,017
4,095,030
4,095,037
4,095,272
41 : 4,094,123
4,094,785
42 : Re.29,666
4,094,019
4,094,029
4,094,061
4,094,076
4,094,108
4,094,165
4,094,194
4,094,212
4,094,221
4,094,246
4,094,253
4,094,318
4,094,399
4,094,410
4,094,445
4,094,454
4,094,460
4,094,496
4,094,510
4,094,543
4,094,615
4,094,619
4,094,626
4,094,658
4,094,667
4,094,672
4,094,704
4,094,738
4,094,746
4,094,760
4,094,763
4,094,808
4,094,815
4,094,837
4,094,875
4,094,881
4,094,916
4,094,917
4,094,927
4,094,937
4,094,952
4,094,979
4,094,988
4,094,995
4,095,041
4,095,068
4,095,069
4,095,074
4,095,119
4,095,153
4,095,154
4,095,171
4,095,224
44 : 4,094,681
45 : 4,094,119
4,094,486
4,094,623
4,095,012
4,095,042
4,095,062
4,095,231
47 : 4,094,088
4,094,098
4,094,218
4,094,290
4,094,398
4,094,424

4,094,630
4,094,695
4,095,106
48 : 4,094,015
4,094,044
4,094,087
4,094,122
4,094,162
4,094,187
4,094,220
4,094,229
4,094,355
4,094,359
4,094,360
4,094,407
4,094,441
4,094,480
4,094,629
4,094,677
4,094,732
4,094,798
4,094,827
4,094,828
4,094,844
4,094,930
4,095,006
4,095,022
4,095,093
4,095,102
4,095,115
4,095,118
4,095,212
4,095,220
4,095,265
4,095,277
49 : 4,094,252
4,094,296
4,094,805
50 : 4,094,057
51 : 4,094,066
4,094,090
4,094,110
4,094,131
4,094,294
4,094,323
4,094,391
4,094,412
4,094,720
4,094,862
4,094,948
4,095,056
4,095,192
4,095,205
52 : 4,094,651
53 : 4,094,030
4,094,199
4,094,267
4,094,467
4,094,558
4,094,719
4,094,723
4,094,734
4,094,809
4,095,181
4,095,271
54 : 4,094,217
4,094,361
4,094,453
4,094,852
4,094,861
55 : 4,094,190
4,094,796
4,095,072
4,095,200
56 : 4,094,446

DESIGN PATENTS

4 : 248,154
6 : 248,128
248,150
248,153
248,179
248,180
248,181
248,182
248,183

248,185
248,188
8 : 248,143
248,162
9 : 248,151
248,164
248,190
12 : 248,155

248,165
17 : 248,130
248,137
248,139
248,146
25 : 248,127
248,157
248,163

248,186
27 : 248,141
248,144
248,148
34 : 248,126
36 : 248,133
248,134
248,138

248,142
248,160
37 : 248,136
248,152
39 : 248,171
41 : 248,187
42 : 248,135
47 : 248,129

248,131
248,132
48 : 248,189
50 : 248,140
53 : 248,161
248,170
54 : 248,145
55 : 248,168

PLANT PATENTS

24 : 4,264

4,265

39 : 4,262

41 : 4,263

U. S. GOVERNMENT PRINTING OFFICE : O - 1978

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

June 20, 1978 Volume 971 Number 3

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $300.00 per annum for first-class mailing, also available as fourth-class mail at $200.00; foreign first-class mailing rates will be furnished upon request; single copies each, $4.00 domestic, $5.00 foreign.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

GENERAL INFORMATION concerning TRADEMARKS, price $1.50 each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

LUTRELLE F. PARKER,
May 2, 1978. *Acting Commissioner of Patents and Trademarks.*

Notice of Recordation of Trade Name

(T.D. 78-127)
AURORA STEEL PRODUCTS

DEPARTMENT OF THE TREASURY
OFFICE OF THE COMMISSIONER OF CUSTOMS
Washington, D.C.

On March 10, 1978, there was published in the Federal Register (43 F.R. 9911), a notice of application for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name AURORA STEEL PRODUCTS used by Aurora Steel Products, division of Hupp, Inc. and a wholly owned subsidiary of White Consolidated Industries, Inc. The notice advised that prior to final action on the application, filed pursuant to section 133.12, Customs Regulations (19 CFR 133.12), consideration would be given to relevant data, views, or arguments submitted in opposition to the recordation and received not later than 30 days from the date of publication of the notice. No responses were received in opposition to the application.

The name "AURORA STEEL PRODUCTS" is hereby recorded as the trade name of Aurora Steel Products, division of Hupp, Inc., a corporation organized under the laws of the State of Delaware, located at 580 S. Lake Street, Aurora, Illinois 60507, when applied to desks, chairs, bookcases, tables, shelving, and storage equipment, namely, lockers, library shelving, storage cabinets and shelf storage cabinets and shelf filing systems, manufactured in the United States. No foreign person, partnership, subsidiary, related company or patent company is authorized to use the trade name.

LEONARD LEHMAN,
Apr. 26, 1978. *Assistant Commissioner, Regulations and Rulings.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,965,040, J. Eisenber, GEAR PUMPS, **filed** June 6, 1973, D.C.N.J. (Newark), Doc. 787-73, *ECO Pump Corporation* v. *Picut Mfg. Co., Inc.* Order of dismissal of action without costs.

3,063,599, F. J. Kestel, SEED-DROP MECHANISM FOR PLANTER, **filed** Dec. 12, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c4586, *Frederick J. Kestel* v. *Deere & Company.* Motion to dismiss for improper venue, Jan. 1, 1978.

3,074,301, L. M. Carpenter, WIRE STRIPPER, **filed** July 12, 1977, D.C.N.J. (Newark), Doc. 77-1401, *Carpenter Manufacturing Co., Inc.* v. *William Leonhardt.*

3,105,324, M. Friedman, TOY NURSING BOTTLE, **filed** Feb. 16, 1978, D.C., S.D.N.Y., Doc. 78-C-0695 (KTD), *Miner Industries Inc.* v. *H-G Toys Inc.*

3,167,491, Harrison and Herrmann, POLYFLUORINATED ETHYLENE POLYMER-METAL ARTICLE AND METHOD, **filed** Jan. 23, 1976, D.C., S.D.N.Y., Doc., 76-C-394 VLB, *Polyflon Corporation* v. *Plated TFE Components, Inc.*

3,169,142, Knaggs and Nussbaum, METHOD FOR SULFONATION AND SULFATION OF ORGANIC COMPOUNDS, **filed** Dec. 21, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c4732 *Stephan Chemical Company* v. *Onyx Chemical Company.*

3,228,741, W. E. Becker, CORNEAL CONTACT LENS FABRICATED FROM TRANSPARENT SILICONE RUBBER, **filed** Jan. 16, 1978, D.C. Colo. (Denver), Doc. 78-M-0041, *Syntex Ophthalmics, Inc.* v. *Bausch & Lomb Incorporated.* Stipulation of dismissal filed Feb. 15, 1978.

3,247,692, P. K. Davis, PIPE MAKING MACHINE AND METHOD, **filed** Feb. 21, 1978, D.C., N.D. Calif. (San Francisco), Doc. C78-383 SAW, *Pacific Roller Die Co., Inc.* v. *Boyken, Mohler and Wood.*

3,332,620, D. P. Streed, RELATIVE HUMIDITY CONTROL FOR BUILDING, **filed** Feb. 10, 1978, D.C. E.D. Mo. (St. Louis), Doc. 78-182C(B), *Donovan P. Streed* v. *White-Rodgers Co.*

3,427,720, Berman and Pastan, HAND DRILLING APPARATUS, **filed** June 16, 1977, D.C. Mass. (Boston), Doc. 77-1749-F. *Herbert Berman* v. *Excellon Industries, doing business as Excellon Automation.*

3,610,799, G. A. Watson, MULTIPLEXING SYSTEM FOR SELECTION OF NOTES AND VOICES IN AN ELECTRONIC MUSICAL INSTRUMENT, **filed** Feb. 14, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c541, *Allen Organ Company* v. *Conn Organ Corporation.*

3,635,297, R. F. Salava, POSTAGE CALCULATOR, **filed** Mar. 13, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c940, *Roger F. Salava* v. *FME Corporation.*

3,650,149, P. A. Howes, ENGINE IGNITION AND POWER ANALYZER, **filed** Jan. 3, 1978, D.C., E.D. Wis. (Milwaukee), Doc. 78-1, *Clayton Manufacturing Co., Inc.* v. *Applied Power, Inc.*

3,665,583, J. F. Helderman, SUSPENSION CLIP STRUCTURE AND APPARATUS AND METHOD FOR SECURING SAME TO A WORK SURFACE; **3,805,472,** same, **filed** Sept. 19, 1975, D.C., E.D. Pa. (Philadelphia), Doc. 75-2652, *Ladd Tool Company, Inc.* v. *Hilti Fastening Systems and Abersthaw Construction Co., Inc.* All claims by plaintiff, defendants and Hilti encompassed by Civil Action No. 75-2652 are dismissed with prejudice, Dec. 19, 1977.

3,690,836, Buissiere, Colobert, Montagnon, DEVICE FOR USE IN THE STUDY OF CHEMICAL AND BIOLOGICAL REACTIONS AND METHOD OF MAKING SAME, **filed** May 27, 1977, D.C., S.D.N.Y., Doc. 77-C-2636, *American Home Products Corp.* v. *Inolex Corporation.*

3,733,309, Wyeth, Newman, Gay, BIAZIALLY ORIENTED ARTICLE INCLUDING A METHOD AND APPARATUS FOR FORMING IT, **filed** Jan. 10, 1978, D.C., E.D. Pa. (Philadelphia), Doc. 78-99, *E. I. du Pont de Nemours and Company* v. *Pepsi-Cola Metropolitan Bottling Company, Inc.*

3,746,255, B. Surloff, VARIABLE FEED VAPORIZING DIFFUSER, **filed** Jan. 4, 1978, D.C., S.D. Fla. (West Palm Beach), Doc. 78-19-C-CF, *Surco Products, Inc.* v. *Marco Chemical Division, Inc.*

3,769,919, P. P. Thomas, EXTENSIBLE TABLE, **filed** Feb. 3, 1978, D.C., N.C. (Greensboro), Doc. C-78-460G, *Winzeler Stamping Co.* v. *Allmark, Inc. and Custom Processing and Manufacturing Co., Inc.*

3,789,210, Weber, Shroyer, Baker, RECESSER LIGHTED ASSIST BAR, **filed** Mar. 8, 1977, D.C., N.D. Ind. (South Bend), Doc. S77-0034, *Progressive Dynamics, Inc.* v. *ILC Products Company, Inc.* Patent-in-suit is invalid under 35 USC § 103. Accordingly judgment entered for the defendant and against the plaintiff.

3,793,750, W. J. Bowerman, ATHLETIC SHOE FOR ARTIFICIAL TURF, **filed** Mar. 6, 1978, D.C., E.D. Pa. (Philadelphia), Doc. 78-734, *Brooks Shoe Manufacturing Co., Inc.* v. *BRS, Inc.*

3,762,648, Delnes, Trenary, Smith, Hickman, SPRAY NOZZLE; **3,801,019,** J. M. Trenary, same, **filed** Mar. 10, 1977, D.C., W.D. Okla. (Oklahoma City), Doc. 77-0233-E, *Teledyne Industries, Inc., doing business as Teledyne Water Pik* v. *Dillard Department Stores, Inc.* Plaintiff's patent is valid and defendant has infringed on said patent. Defendant is to return to the manufacturer all shower magic spray nozzles now on hand to inform plaintiff if they intend to resume sale of said nozzles.

3,801,019. (See 3,762,648.)

3,814,139, Loyd and Mills, INSULATING CONNECTOR; **3,906,267,** same, METHOD OF APPLYING AN INSULATING CONNECTOR, **filed** Sept. 1, 1977, D.C., W.D. N.C. (Statesville), Doc. ST-C-77-34, *Stone Industrial Division of J. L. Clark Mfg. Co.* v. *Niemand Industrial, Inc.* Dismissal by stipulation filed Jan. 19, 1978.

3,814,562, H. J. Diamond, VACUUM FORMING APPARATUS, **filed** Dec. 23, 1977, D.C., N.D. Tex. (Dallas), Doc. CA3-77-1648-G, *Plasti-Vac, Inc.* v. *AAA Plastics Equipment Company.*

3,818,837, Jacoby and Lindquvist, VEHICLE AND TRACK SYSTEM, **filed** Feb. 3, 1976, D.C., N.D. Ill. (Rockford), Doc. 76c20004, *SI Handling System, Inc.* v. *Rockford Automation, Inc.* Pursuant to stipulation this case is dismissed with prejudice, Feb. 15, 1978.

3,835,292, Walter, Kronheim, Levine, STEAM CURLING IRON, **filed** June 20, 1977, D.C. Del. (Wilmington), Doc. 77-230, *Clairol* v. *Conair.* Consent judgment, Feb. 21, 1978.

3,836,767, M. L. Lasker, LIGHTING FIXTURES, **filed** Dec. 22, 1976, D.C.N.J. (Newark), Doc. 76-2437, *Marvin Electric Manufacturing Company* v. *Wylain, Inc.* Order of dismissal of action, Feb. 16, 1978.

3,899,791, M. Kerr, PHOTOGRAPHIC POSITIONING AND ALIGNING GRID, **filed** Feb. 14, 1978, D.C.N.J. (Newark), Doc. C-78-274, *Slidemagic System, Inc.* v. *Oxberry, Division of Richmark Camera Service.*

3,905,349, Nielsen and Church, SPHERICAL MEMBERS, **filed** May 13, 1977, D.C.N.J. (Newark), Doc. 77-0938, *Prince Manufacturing Inc.* v. *Lob-ster Inc.* Action dismissed.

3,906,658, S. Gross, MAGNETIC TOY HAVING SCULPTURABLE PARTICLES, **filed** Feb. 24, 1978, D.C., C.D. Calif. (Los Angeles), Doc. CV78-748-RMT(px), *Sam Gross* v. *Loncraine Broxton and Partners, Limited.*

3,908,267. (See 3,814,139.)

3,928,933, T. Iwamoto, HOLDING TOY, **filed** Dec. 22, 1976, D.C., M.D. Pa. (Scranton), Doc. C-76-1542, *ITI Hawaii, Inc.* v. *Avlon, Inc.* Consent judgment against defendants, Feb. 27, 1978.

3,935,947, W. T. Barrett, MAGNETIC REFUSE SEPARATOR, **filed** Dec. 30, 1977, D.C., W.D. Wash. (Tacoma), Doc. C77-296T, *Wehr Corp.* v. *Eriez Manufacturing Co.*

3,943,571, M. C. Boatman, PROTECTIVE HELMET, **filed** Oct. 25, 1977, D.C., E.D. La. Doc. 77-3195, *Marvin C. Boatman* v. *Safety Sea Systems, Inc.*

3,948,294, Magarian and Thompson, IMPACT-PROTECTIVE COATING FOR PLASTIC PIPE, **filed** Feb. 21, 1978, D.C.N.J. (Newark), Doc. 78-329, *The Thompson Tool Co., Inc.* v. *Colonial Tool Company, Inc.*

3,948,441, Perkins, Nurmberg, Goodhouse, TIME VARIABLE THERMOSTAT, **filed** Feb. 15, 1978, D.C., E.D. Mich. (Detroit), Doc. 78-70344, *Robertshaw Controls Company* v. *Honeywell, Inc.*

3,958,090, R. L. Garcia, MINIATURE SWITCH ASSEMBLY, **filed** May 19, 1976, D.C.N.J. (Newark), Doc. 76-936, *Grayhill, Inc.* v. *AMF, Inc.* Judgment declaring patent invalid in favor of defendants, Feb. 16, 1978.

3,958,294, D. E. Thompson, ROTARY SCRAPPER, **filed** Jan. 11, 1978, D.C. Conn. (Bridgeport), Doc. B-78-14, *Thompson Tool Company, Inc.* v. *John Sturges House, Inc.*

3,958,378, G. Omeechevarria, BURIAL CRYPT, **filed** Feb. 23, 1978, D.C. Puerto Rico, (San Juan), Doc. C-78-262, *Gerardo Omeechevarria* v. *Luis A. Torres and Municipio de San Juan.*

3,963,895, J. M. Hennion, DEVICE FOR EFFECTING THE GUIDING AND OSCILLATION MOVEMENTS OF A WELDING HEAD EQUIPPED WITH AN ELECTRODE-CARRIER NOZZLE, **filed** June 15, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2205, *National Presto/Industries, Inc.* v. *Scoville Manufacturing Company and Hyland Electrical Supply Co.* Enter order, cause is settled by agreement of the parties, the complaint herein is dismissed without prejudice, Mar. 1, 1977.

3,964,373, Christen, Jr. and Latal, PAPER LOG ROLLER, **filed** Mar. 2, 1978, D.C., E.D. Wis. (Milwaukee), Doc. 77-128, *Christen, Inc.* v. *Amron Corporation.*

3,986,505, R. A. Power EMERGENCY BURN TREATMENT

3,998,383, Romanauskas and Weyant, GRADIENT SEPARATION APPARATUS, **4,015,775,** V. C. Rohde, METHOD OF GRADIENT SEPARATION, **filed** Mar. 1, 1978, D.C., E.D. Pa. (Philadelphia), Doc. 78-679, *E. I. du Pont de Nemours and Company* v. *Beckman Instruments, Inc.*

4,006,770, T. A. Ferguson, WINDOW SHADE ASSEMBLY, **filed** Jan. 31, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c329, *Newell Companies, Inc.* v. *Clopay Corporation.*

4,012,494, C. Ling, DIRECT RADIOIMMUNOASSAY FOR ANTIGENS AND THEIR ANTIBODIES, **filed** Mar. 3, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c799, *Abbott Laboratories* v. *Travenol Laboratories, Inc.*

4,015,775. (See 3,998,383.)

4,020,848, T. J. Dicicco, EAR LOBE PIERCING APPARATUS, **filed** Feb. 27, 1978, D.C.N.J. (Newark), Doc. 78-388, *Roman Research, Inc.* v. *Inverness Corp.*

4,021,055, M. C. Okland, VEHICLE RUNNING BOARD, **filed** Oct. 31, 1977, D.C. Iowa (Des Moines), Doc. C-2-77-476, *Tafco Equipment Co.* v. *Putco, Inc.* Judgment entered Dec. 20, 1977, action dismissed on plaintiff's voluntary dismissal pursuant to Rule 41.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,952,687, Re. S.N. 899,878, Filed Apr. 24, 1978, Cl. 115/41 R, MARINE DRIVE, Alan Brownlie, et al., Owner of Record: *American Challenger Corporation, Fulton, N.Y.,* Attorney or Agent: Richard E. Kurtz, Ex. Gp.: 315

3,959,957, Re. S.N. 898,745, Filed Apr. 21, 1978, Cl. 56/208, CROP HARVESTING MACHINE HEADER SUSPENSION SYSTEM, Lawrence M. Halls, Owner of Record: *Sperry Rand Corporation, New Holland, Pa.,* Attorney or Agent: Frank A. Seemar, Ex. Gp.: 333

4,015,691, Re. S.N. 897,300, Filed Apr. 17, 1978, Cl. 188/59, DISC BRAKE FOR RAILWAY VEHICLES, Hans Pollinger, et al., Owner of Record: *Inventor,* Attorney or Agent: Edmund M. Jaskiewicz, Ex. Gp.: 315

4,017,659, Re. S.N. 898,260, Filed Apr. 20, 1978, Cl. 428/397, TEAM LATTICE FIBERS, George C. Brumlik, Owner of Record: *Ingrip Fasteners Inc., Montclair, N.J.,* Attorney or Agent: Arnold Sprung, et al., Ex. Gp.: 164

4,045,229, Re. S.N. 896,123, Filed Apr. 14, 1978, Cl. 96/84 UV, NOVEL (UV ABSORBING COMPOUNDS AND) PHOTOGRAPHIC ELEMENTS CONTAINING UV ABSORBING COMPOUNDS, Wayne W. Weber, II, et al., Owner of Record: *Eastman Kodak Company, Rochester, N.Y.,* Attorney or Agent: Joshua G. Levitt, et al., Ex. Gp.: 166

4,047,355, Re. S.N. 897,660, Filed Apr. 17, 1978, Cl. 52/738, SHAFTWALL, William L. Knorr, Owner of Record: *Studco, Inc., Salem, Oreg.,* Attorney or Agent: Kenneth S. Klarquist, et al., Ex. Gp.: 354

4,048,932, Re. S.N. 895,845, Filed Apr. 13, 1978, Cl. 112/158 E, BIGHT STOP MECHANISM FOR SEWING MACHINES, Charles R. Odermann, et al., Owner of Record: *The Singer Company, New York, N.Y.,* Attorney or Agent: Robert E. Smith, Ex. Gp.: 353

4,056,820, Re. S.N. 897,925, Filed Apr. 18, 1978, Cl. 340/347, REVERSIBLE ANALOG TO DIGITAL CONVERTER, Ernst Höfer, Owner of Record: *Inventor,* Attor-

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

LUTRELLE F. PARKER,
May 2, 1978. *Acting Commissioner of Patents and Trademarks.*

Notice of Recordation of Trade Name

(T.D. 78–127)
AURORA STEEL PRODUCTS

DEPARTMENT OF THE TREASURY
OFFICE OF THE COMMISSIONER OF CUSTOMS
Washington, D.C.

On March 10, 1978, there was published in the Federal Register (43 F.R. 9911), a notice of application for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name AURORA STEEL PRODUCTS used by Aurora Steel Products, division of Hupp, Inc. and a wholly owned subsidiary of White Consolidated Industries, Inc. The notice advised that prior to final action on the application, filed pursuant to section 133.12, Customs Regulations (19 CFR 133.12), consideration would be given to relevant data, views, or arguments submitted in opposition to the recordation and received not later than 30 days from the date of publication of the notice. No responses were received in opposition to the application.

The name "AURORA STEEL PRODUCTS" is hereby recorded as the trade name of Aurora Steel Products, division of Hupp, Inc., a corporation organized under the laws of the State of Delaware, located at 580 S. Lake Street, Aurora, Illinois 60507, when applied to desks, chairs, bookcases, tables, shelving, and storage equipment, namely, lockers, library shelving, storage cabinets and shelf storage cabinets and shelf filing systems, manufactured in the United States. No foreign person, partnership, subsidiary, related company or patent company is authorized to use the trade name.

LEONARD LEHMAN,
Apr. 26, 1978. *Assistant Commissioner, Regulations and Rulings.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,965,040, J. Eisenber, GEAR PUMPS, **filed** June 6, 1973, D.C.N.J. (Newark), Doc. 787–73, *ECO Pump Corporation* v. *Picut Mfg. Co., Inc.* Order of dismissal of action without costs.

3,063,599, F. J. Kestel, SEED-DROP MECHANISM FOR PLANTER, **filed** Dec. 12, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c4586, *Frederick J. Kestel* v. *Deere & Company.* Motion to dismiss for improper venue, Jan. 1, 1978.

3,074,301, L. M. Carpenter, WIRE STRIPPER, **filed** July 12, 1977, D.C.N.J. (Newark), Doc. 77–1401, *Carpenter Manufacturing Co., Inc.* v. *William Leonhardt.*

3,105,324, M. Friedman, TOY NURSING BOTTLE, **filed** Feb. 16, 1978, D.C., S.D.N.Y., Doc. 78–C–0695 (KTD), *Miner Industries Inc.* v. *H-G Toys Inc.*

3,167,491, Harrison and Herrmann, POLYFLUORINATED ETHYLENE POLYMER-METAL ARTICLE AND METHOD, **filed** Jan. 23, 1976, D.C., S.D.N.Y., Doc., 76–C–394 VLB, *Polyflon Corporation* v. *Plated TFE Components, Inc.*

3,169,142, Knaggs and Nussbaum, METHOD FOR SULFONATION AND SULFATION OF ORGANIC COMPOUNDS, **filed** Dec. 21, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c4732 *Stephan Chemical Company* v. *Onyx Chemical Company.*

3,228,741, W. E. Becker, CORNEAL CONTACT LENS FABRICATED FROM TRANSPARENT SILICONE RUBBER, **filed** Jan. 16, 1978, D.C. Colo. (Denver), Doc. 78–M–0041, *Dow Corning Corporation* v. *Danker & Wohik, Inc.*

3,247,692, P. K. Davis, PIPE MAKING MACHINE AND METHOD, **filed** Feb. 21, 1978, D.C., N.D. Calif. (San Francisco), Doc. C78–383 SAW, *Pacific Roller Die Co., Inc.* v. *Boyken, Mohler and Wood.*

3,332,620, D. P. Streed, RELATIVE HUMIDITY CONTROL FOR BUILDING, **filed** Feb. 10, 1978, D.C. E.D. Mo. (St. Louis), Doc. 78–182C(B), *Donovan P. Streed* v. *White-Rodgers Co.*

3,427,720, Berman and Pastan, HAND DRILLING APPARATUS, **filed** June 16, 1977, D.C. Mass. (Boston), Doc. 77–1749–F. *Herbert Berman* v. *Excellon Industries, doing business as Excellon Automation.*

3,610,799, G. A. Watson, MULTIPLEXING SYSTEM FOR SELECTION OF NOTES AND VOICES IN AN ELECTRONIC MUSICAL INSTRUMENT, **filed** Feb. 14, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c541, *Allen Organ Company* v. *Conn Organ Corporation.*

3,635,297, R. F. Salava, POSTAGE CALCULATOR, **filed** Mar. 13, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c940, *Roger F. Salava* v. *FME Corporation.*

3,650,149, P. A. Howes, ENGINE IGNITION AND POWER ANALYZER, **filed** Jan. 3, 1978, D.C., E.D. Wis. (Milwaukee), Doc. 78–1, *Clayton Manufacturing Co., Inc.* v. *Applied Power, Inc.*

3,665,583, J. F. Helderman, SUSPENSION CLIP STRUCTURE AND APPARATUS AND METHOD FOR SECURING SAME TO A WORK SURFACE; **3,805,472,** same, **filed** Sept. 19, 1975, D.C., E.D. Pa. (Philadelphia), Doc. 75–2652, *Ladd Tool Company, Inc.* v. *Hilti Fastening Systems and Aberthaw Construction Co., Inc.* All claims by plaintiff, defendants and Hilti encompassed by Civil Action No. 75–2652 are dismissed with prejudice, Dec. 19, 1977.

3,690,836, Buisslere, Colobert, Montagnon, DEVICE FOR USE IN THE STUDY OF CHEMICAL AND BIOLOGICAL REACTIONS AND METHOD OF MAKING SAME, **filed** May 27, 1977, D.C., S.D.N.Y., Doc. 77–C–2636, *American Home Products Corp.* v. *Inolex Corporation.*

3,733,309, Wyeth, Newman, Gay, BIAZIALLY ORIENTED ARTICLE INCLUDING A METHOD AND APPARATUS FOR FORMING IT, **filed** Jan. 10, 1978, D.C., E.D. Pa. (Philadelphia), Doc. 78–99, *E. I. du Pont de Nemours and Company* v. *Pepsi-Cola Metropolitan Bottling Company, Inc.*

3,746,255, B. Surloff, VARIABLE FEED VAPORIZING DIFFUSER, **filed** Jan. 4, 1978, D.C., S.D. Fla. (West Palm Beach), Doc. 78–19–C–CF, *Surco Products, Inc.* v. *Marco Chemical Division, Inc.*

3,769,919, P. P. Thomas, EXTENSIBLE TABLE, **filed** Feb. 3, 1978, D.C., N.C. (Greensboro), Doc. C–78–460G, *Winzeler Stamping Co.* v. *Allmark, Inc. and Custom Processing and Manufacturing Co., Inc.*

3,789,210, Weber, Shroyer, Baker, RECESSER LIGHTED ASSIST BAR, **filed** Mar. 8, 1977, D.C., N.D. Ind. (South Bend), Doc. S77–0034, *Progressive Dynamics, Inc.* v. *ILC Products Company, Inc.* Patent-in-suit is invalid under 35 USC § 103. Accordingly judgment entered for the defendant and against the plaintiff.

3,793,750, W. J. Bowerman, ATHLETIC SHOE FOR ARTIFICIAL TURF, **filed** Mar. 6, 1978, D.C., E.D. Pa. (Philadelphia), Doc. 78–734, *Brooks Shoe Manufacturing Co., Inc.* v. *BRS, Inc.*

3,762,648, Deines, Trenary, Smith, Hickman, SPRAY NOZZLE; **3,801,019,** J. M. Trenary, same, **filed** Mar. 10, 1977, D.C., W.D. Okla. (Oklahoma City), Doc. 77–0233–E, *Teledyne Industries, Inc., doing business as Teledyne Water Pik* v. *Dillard Department Stores, Inc.* Plaintiff's patent is valid and defendant has infringed on said patent. Defendant is to return to the manufacturer all shower magic spray nozzles now on hand to inform plaintiff if they intend to resume sale of said nozzles.

3,801,019. (See 3,762,648.)

3,805,472. (See 3,665,583.)

3,814,139, Loyd and Mills, INSULATING CONNECTOR; **3,908,267,** same, METHOD OF APPLYING AN INSULATING CONNECTOR, **filed** Sept. 1, 1977, D.C., W.D. N.C. (Statesville), Doc. ST–C–77–34, *Stone Industrial Division of J. L. Clark Mfg. Co.* v. *Niemand Industrial, Inc.* Dismissal by stipulation filed Jan. 19, 1978.

3,814,562, H. J. Diamond, VACUUM FORMING APPARATUS, **filed** Dec. 23, 1977, D.C., N.D. Tex. (Dallas), Doc. CA3–77–1648–G, *Plasti-Vac, Inc.* v. *AAA Plastics Equipment Company.*

3,818,837, Jacoby and Lindquvist, VEHICLE AND TRACK SYSTEM, **filed** Feb. 3, 1976, D.C., N.D. Ill. (Rockford), Doc. 76c20004, *SI Handling System, Inc.* v. *Rockford Automation, Inc.* Pursuant to stipulation this case is dismissed with prejudice, Feb. 15, 1978.

3,835,292, Walter, Kronheim, Levine, STEAM CURLING IRON, **filed** June 20, 1977, D.C. Del. (Wilmington), Doc. 77–230, *Clairol* v. *Conair.* Consent judgment, Feb. 21, 1978.

3,836,767, M. L. Lasker, LIGHTING FIXTURES, **filed** Dec. 22, 1976, D.C.N.J. (Newark), Doc. 76–2437, *Marvin Electric Manufacturing Company* v. *Wylain, Inc.* Order of dismissal of action, Feb. 16, 1978.

3,899,791, M. Kerr, PHOTOGRAPHIC POSITIONING AND ALIGNING GRID, **filed** Feb. 14, 1978, D.C.N.J. (Newark), Doc. C–78–274, *Slidemagic System, Inc.* v. *Oxberry, Division of Richmark Camera Service.*

3,905,349, Nielsen and Church, SPHERICAL MEMBERS, **filed** May 13, 1977, D.C.N.J. (Newark), Doc. 77–0938, *Prince Manufacturing Inc.* v. *Lob-ster Inc.* Action dismissed.

3,906,658, S. Gross, MAGNETIC TOY HAVING SCULPTURABLE PARTICLES, **filed** Feb. 24, 1978, D.C., C.D. Calif. (Los Angeles), Doc. CV78–748–RMT(px), *Sam Gross* v. *Loncraine Broxton and Partners, Limited.*

3,908,267. (See 3,814,139.)

3,928,933, T. Iwamoto, HOLDING TOY, **filed** Dec. 22, 1976, D.C., M.D. Pa. (Scranton), Doc. C–76–1542, *ITI Hawaii, Inc.* v. *Avlon, Inc.* Consent judgment against defendants, Feb. 27, 1978.

3,935,947, W. T. Barrett, MAGNETIC REFUSE SEPARATOR, **filed** Dec. 30, 1977, D.C., W.D. Wash. (Tacoma), Doc. C77–296T, *Wehr Corp.* v. *Eriez Manufacturing Co.*

3,943,571, M. C. Boatman, PROTECTIVE HELMET, **filed** Oct. 25, 1977, D.C., E.D. La. Doc. 77–3195, *Marvin C. Boatman* v. *Safety Sea Systems, Inc.*

3,948,294, Magarian and Thompson, IMPACT-PROTECTIVE COATING FOR PLASTIC PIPE, **filed** Feb. 21, 1978, D.C.N.J. (Newark), Doc. 78–329, *The Thompson Tool Co., Inc.* v. *Colonial Tool Company, Inc.*

3,948,441, Perkins, Nurmberg, Goodhouse, TIME VARIABLE THERMOSTAT, **filed** Feb. 15, 1978, D.C., E.D. Mich. (Detroit), Doc. 78–70344, *Robertshaw Controls Company* v. *Honeywell, Inc.*

3,958,090, R. L. Garcia, MINIATURE SWITCH ASSEMBLY, **filed** May 19, 1976, D.C.N.J. (Newark), Doc. 76–936, *Grayhill, Inc.* v. *AMF, Inc.* Judgment declaring patent invalid in favor of defendants, Feb. 16, 1978.

3,958,294, D. E. Thompson, ROTARY SCRAPPER, **filed** Jan. 11, 1978, D.C. Conn. (Bridgeport), Doc. B–78–14, *Thompson Tool Company, Inc.* v. *John Sturges House, Inc.*

3,958,378, G. Omeechevarria, BURIAL CRYPT, **filed** Feb. 23, 1978, D.C. Puerto Rico, (San Juan), Doc. C–78–262, *Gerardo Omeechevarria* v. *Luis A. Torres and Municipio de San Juan.*

3,963,895, J. M. Hennion, DEVICE FOR EFFECTING THE GUIDING AND OSCILLATION MOVEMENTS OF A WELDING HEAD EQUIPPED WITH AN ELECTRODE-CARRIER NOZZLE, **filed** June 15, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2205, *National Presto/Industries, Inc.* v. *Scoville Manufacturing Company and Hyland Electrical Supply Co.* Enter order, cause is settled by agreement of the parties, the complaint herein is dismissed without prejudice, Mar. 1, 1977.

3,964,373, Christen, Jr. and Latal, PAPER LOG ROLLER, **filed** Mar. 2, 1978, D.C., E.D. Wis. (Milwaukee), Doc. 77–128, *Christen, Inc.* v. *Amron Corporation.*

3,986,505, R. A. Power EMERGENCY BURN TREATMENT PACK, **filed** Feb. 27, 1978, D.C., C.D. Calif. (Los Angeles), Doc. CV78–765–WPG, *Ronald Power* v. *Oliver E. Burns.*

3,998,383, Romanauskas and Weyant, GRADIENT SEPARATION APPARATUS, **4,015,775,** V. C. Rohde, METHOD OF GRADIENT SEPARATION, **filed** Mar. 1, 1978, D.C., E.D. Pa. (Philadelphia), Doc. 78–679, *E. I. du Pont de Nemours and Company* v. *Beckman Instruments, Inc.*

4,006,770, T. A. Ferguson, WINDOW SHADE ASSEMBLY, **filed** Jan. 31, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c329, *Newell Companies, Inc.* v. *Clopay Corporation.*

4,012,494, C. Ling, DIRECT RADIOIMMUNOASSAY FOR ANTIGENS AND THEIR ANTIBODIES, **filed** Mar. 3, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c799, *Abbott Laboratories* v. *Travenol Laboratories, Inc.*

4,015,775. (See 3,998,383.)

4,020,848, T. J. Dicicco, EAR LOBE PIERCING APPARATUS, **filed** Feb. 27, 1978, D.C.N.J. (Newark), Doc. 78–388, *Roman Research, Inc.* v. *Inverness Corp.*

4,021,055, M. C. Okland, VEHICLE RUNNING BOARD, **filed** Oct. 31, 1977, D.C. Iowa (Des Moines), Doc. C–2–77–476, *Tafco Equipment Co.* v. *Putco, Inc.* Judgment entered Dec. 20, 1977, action dismissed on plaintiff's voluntary dismissal pursuant to Rule 41.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,952,687, Re. S.N. 899,878, Filed Apr. 24, 1978, Cl. 115/41 R, MARINE DRIVE, Alan Brownlie, et al., Owner of Record: *American Challenger Corporation, Fulton, N.Y.,* Attorney or Agent: Richard E. Kurtz, Ex. Gp.: 315

3,959,957, Re. S.N. 898,745, Filed Apr. 21, 1978, Cl. 56/208, CROP HARVESTING MACHINE HEADER SUSPENSION SYSTEM, Lawrence M. Halls, Owner of Record: *Sperry Rand Corporation, New Holland, Pa.,* Attorney or Agent: Frank A. Seemar, Ex. Gp.: 333

4,015,691, Re. S.N. 897,300, Filed Apr. 17, 1978, Cl. 188/59, DISC BRAKE FOR RAILWAY VEHICLES, Hans Pollinger, et al., Owner of Record: *Inventor,* Attorney or Agent: Edmund M. Jaskiewicz, Ex. Gp.: 315

4,017,659, Re. S.N. 898,260, Filed Apr. 20, 1978, Cl. 428/397, TEAM LATTICE FIBERS, George C. Brumlik, Owner of Record: *Ingrip Fasteners Inc., Montclair, N.J.,* Attorney or Agent: Arnold Sprung, et al., Ex. Gp.: 164

4,045,229, Re. S.N. 896,123, Filed Apr. 14, 1978, Cl. 96/84 UV, NOVEL (UV ABSORBING COMPOUNDS AND) PHOTOGRAPHIC ELEMENTS CONTAINING UV ABSORBING COMPOUNDS, Wayne W. Weber, II, et al., Owner of Record: *Eastman Kodak Company, Rochester, N.Y.,* Attorney or Agent: Joshua G. Levitt, et al., Ex. Gp.: 166

4,047,355, Re. S.N. 897,660, Filed Apr. 17, 1978, Cl. 52/738, SHAFTWALL, William L. Knorr, Owner of Record: *Studco, Inc., Salem, Oreg.,* Attorney or Agent: Kenneth S. Klarquist, et al., Ex. Gp.: 354

4,048,932, Re. S.N. 895,845, Filed Apr. 13, 1978, Cl. 112/158 E, BIGHT STOP MECHANISM FOR SEWING MACHINES, Charles R. Odermann, et al., Owner of Record: *The Singer Company, New York, N.Y.,* Attorney or Agent: Robert E. Smith, Ex. Gp.: 353

4,056,820, Re. S.N. 897,925, Filed Apr. 18, 1978, Cl. 340/347, REVERSIBLE ANALOG TO DIGITAL CONVERTER, Ernst Höfer, Owner of Record: *Inventor,* Attorney or Agent: William E. Schuyler, et al., Ex. Gp.: 234

4,062,711, Re. S.N. 891,582, Filed Mar. 30, 1978, Cl. 156/244, METHOD FOR FORMING FIBERGLASS RESIN LAMINATE WITH PERMANENT INDICIA PATTERN, R. Elbert Davis, Owner of Record: *Inventor,* Attorney or Agent: Robert Berliner, Ex. Gp.: 161

4,073,011, Re. S.N. 899,241, Filed Apr. 24, 1978, Cl. 364/900, ELECTROCARDIOGRAPHIC COMPUTER, Isaac Raymond Cherry, et al., Owner of Record: *Del Mar Avionics, Irvine, Calif.,* Attorney or Agent: George F. Smyth, et al., Ex. Gp.: 237

PATENT NOTICES

Certificates of Correction for the Week of June 20, 1978

Re.29,202.	4,053,313	4,069,036	4,073,868
Re.29,444	4,053,799	4,069,174	4,073,956
D.238,084	4,054,122	4,069,257	4,073,996
3,690,846	4,054,450	4,069,367	4,074,234
3,727,838	4,054,794	4,069,517	4,074,314
3,839,426	4,054,893	4,069,521	4,074,546
3,919,235	4,055,010	4,069,598	4,074,608
3,934,124	4,055,294	4,069,613	4,074,821
3,944,984	4,055,338	4,069,908	4,074,869
3,974,144	4,055,506	4,070,158	4,074,996
3,985,758	4,056,537	4,070,232	4,075,082
3,993,645	4,057,632	4,070,245	4,075,121
3,997,351	4,057,743	4,070,303	4,075,126
3,998,146	4,058,563	4,070,396	4,075,144
4,009,044	4,058,633	4,070,464	4,075,196
4,018,060	4,058,775	4,070,663	4,075,307
4,018,913	4,058,830	4,070,680	4,075,320
4,022,223	4,058,964	4,070,770	4,075,369
4,023,552	4,059,463	4,070,994	4,075,437
4,023,933	4,060,356	4,071,091	4,075,484
4,024,442	4,060,824	4,071,221	4,075,518
4,025,760	4,060,998	4,071,233	4,075,538
4,029,010	4,061,707	4,071,350	4,075,625
4,029,672	4,061,781	4,071,352	4,075,719
4,030,925	4,062,640	4,071,390	4,075,754
4,031,240	4,062,999	4,071,461	4,075,844
4,035,004	4,063,817	4,071,527	4,075,973
4,035,220	4,063,822	4,071,545	4,076,066
4,036,942	4,064,076	4,071,672	4,076,094
4,038,086	4,064,163	4,071,674	4,076,254
4,038,102	4,064,267	4,072,132	4,076,294
4,040,574	4,064,272	4,072,238	4,076,299
4,042,606	4,065,629	4,072,258	4,076,327
4,042,910	4,065,633	4,072,319	4,076,356
4,044,131	4,065,953	4,072,332	4,076,451
4,045,350	4,066,184	4,072,527	4,076,485
4,045,840	4,066,622	4,072,535	4,076,823
4,047,832	4,066,821	4,072,597	4,076,828
4,047,856	4,067,789	4,072,709	4,076,844
4,047,980	4,067,834	4,072,902	4,076,924
4,048,886	4,067,877	4,072,955	4,076,990
4,049,417	4,068,379	4,073,121	4,077,063
4,049,426	4,068,490	4,073,330	4,077,895
4,050,005	4,068,513	4,073,450	4,077,896
4,050,406	4,068,517	4,073,567	4,077,900
4,050,981	4,068,670	4,073,630	4,077,916
4,051,223	4,068,685	4,073,666	4,077,976
4,052,418	4,068,843	4,073,671	4,077,992
4,052,440	4,068,864	4,073,856	4,078,107
4,052,733	4,069,012	4,073,857	

Patents Available for Licensing or Sale

3,986,694. SLIDING PAINT PAIL SUPPORT USED WHEN PAINTING OFF A LADDER. William J. Nowak, R.D. #3, New Berlin, N.Y. 13411.

4,071,004. ELECTRO-STATIC FUEL MIXTURE SYSTEM. Neil Ostergaard, 3830 S. 43rd St., Apt. 10, Milwaukee, Wis. 53220.

The following three patents are offered by Carol L. Hunderlach, M. S., Consulting Nutritionist/c-N Publications, 2509 Fiftieth Ave., Hyattsville, Md. 20781.

3,157,905. CLOSURE ASSEMBLY WITH MOVABLE FLUID APPLICATOR.

3,282,230. PORTABLE SURFACE.

3,318,631. AUTOMOTIVE SIGNAL DEVICE.

The General Electric Company is prepared to grant nonexclusive licenses under the following 1 patent upon reasonable terms to domestic manufacturers

Applications for licenses should be addressed to: Division Patent Counsel, Space Division, General Electric Company, P.O. Box 8555, Philadelphia, Pa. 19101.

4,010,378. INTEGRATED ELECTRIC GENERATING AND SPACE CONDITIONING SYSTEM.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 20, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-22-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-16-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-11-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	6-1-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-5-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	2-2-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	12-17-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	3-9-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-3-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-7-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-26-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-10-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GRAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	5-3-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	6-20-77

Expiration of patents: The patents within the range of numbers indicated below expire during May 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,981,954 to 2,986,736, inclusive
Plant Patents..... Numbers 2,055 to 2,066, inclusive

REISSUES

JUNE 20, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,671

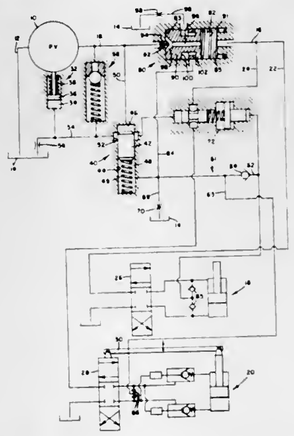
DEMAND COMPENSATED HYDRAULIC SYSTEM WITH FLOW SENSITIVE DEVICE

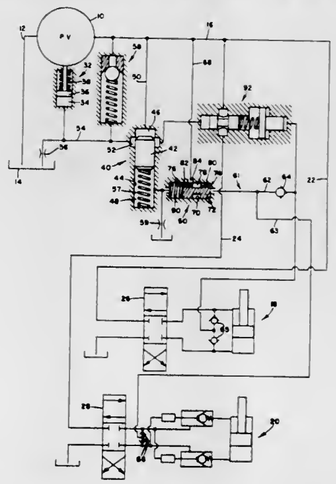
Harlan Welbert Van Gerpen, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Original No. 4,004,418, dated Jan. 25, 1977, Ser. No. 644,884, Dec. 29, 1975. Application for reissue Jun. 24, 1977, Ser. No. 809,562

Int. Cl.[2] **F16H** *39/46;* **F15B** *11/16*

U.S. Cl. 60—445 **6 Claims**





1. An improved hydraulic system of the type having a variable displacement pump with output control means biased to increase pump output fluid flow and responsive to an input of pressurized fluid to decrease pump output fluid flow, a fluid motor, an output line connected between the pump and the motor, a motor control valve interposed in the output line and having servo feedback from the motor for selectively opening and closing the output line, a control line connected between the pump and the output control means, demand valve means interposed in the control line for selectively opening and closing the control line to allow and block the input of pressurized fluid to the output control means in response to pressurized fluid in a pilot line connected to the demand valve means, said pilot line [further connected to the output line between] *operatively associated with* the motor control valve and *pressurized by the pressurized fluid to* the motor *when the motor control valve is moved from a neutral position,* wherein the improvement comprises: means operatively associated with the output line, the pilot line, and a fluid reservoir responsive to [descreasing] *decreasing* flow through the output line to connect the pilot line to the reservoir and responsive to increasing fluid flow in the output line to block the pilot line from the reservoir.

Re. 29,672

DEMAND COMPENSATED HYDRAULIC SYSTEM WITH PRESSURE AMPLIFIER

Harlan Welbert Van Gerpen, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Original No. 3,990,237, dated Nov. 9, 1976, Ser. No. 644,882, Dec. 29, 1975. Application for reissue Jun. 24, 1977, Ser. No. 809,563

Int. Cl.[2] **F16H** *39/46;* **F15B** *11/16*

U.S. Cl. 60—445 **4 Claims**

1. An improved hydraulic system of the type having a variable displacement pump with an output control means biased to increase pump output and responsive to an input of pressurized fluid to decrease pump output, a fluid motor, a pressurized output line connected between the pump and the motor, a motor control valve interposed in the output line for selectively opening and closing the output line, a control line connected between the pump and the output control means, demand valve means interposed in the control line for selectively opening and closing the control line to allow and block the input of pressurized fluid to the output control mens in response to pressurized fluid in a pilot line connected to the demand valve means, said pilot line [further connected to the output line between] *operatively associated with* the motor control valve and *pressurized by the pressurized fluid to the* motor *when the motor control valve is moved from a neutral position*, wherein the improvement comprises: pressure amplifier means connected to the output line and interposed between the pilot line and the demand valve means and responsive to pressurized fluid in the pilot line to connect the output line to the demand valve means.

Re. 29,673

DEMAND COMPENSATED HYDRAULIC SYSTEM WITH PILOT LINE DITHER

Harlan Welbert Van Gerpen, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

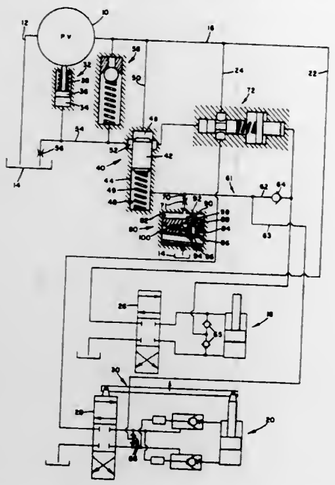
Original No. 3,973,399, dated Aug. 10, 1976, Ser. No. 644,883, Dec. 29, 1975. Application for reissue Jun. 24, 1977, Ser. No. 809,564

Int. Cl.[2] **F16H** *39/46*

U.S. Cl. 60—445 **6 Claims**

1. An improved hydraulic system of the type having a variable displacement pump with output control means biased to increase pump output and responsive to an input of pressurized fluid to decrease pump output, a fluid motor, an output line connected between the pump and the motor, a motor control valve interposed in the output line and having servo feedback from the motor for selectively opening and closing the output line, a control line connected between the pump and the output control means, demand valve means interposed in the control line for selectively opening and closing the control line to allow and block the input of pressurized fluid to the output control means in response to pressurized fluid in a pilot line

connected to the demand valve means, said pilot line [further connected to the output line between] *operatively associated with* the motor control valve and *pressurized by the pressurized fluid to* the motor *when the motor control valve is moved from a*



neutral position, wherein the improvement comprises: means operatively associated with the pilot line responsive to pressurized fluid therein to cause fluctuations in the pressure of the pressurized fluid.

Re. 29,674

PREPARING CIGARETTE FILTERS

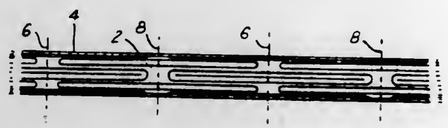
Francis Auguste Maurice Labbe, Neuilly-sur-Seine, France, and Michael Bruce Mitchell, London, England, assignors to Molins Limited, London, England

Original No. 3,773,883, dated Nov. 20, 1973, Ser. No. 162,513, Jul. 14, 1971. Application for reissue Nov. 20, 1975, Ser. No. 633,872

Claims priority, application United Kingdom, Jul. 17, 1970, 34754/70

Int. Cl.[2] A24C *5/50*

U.S. Cl. 264—151 **10 Claims**



1. A method for making cigarette filters comprising
(a) forming filter material into a continuous rod,
(b) feeding said continuous rod of filter material along a predetermined path,
(c) shaping the continuous rod by at least one moving die which provides said rod with a plurality of circumferentially-spaced longitudinally-extending rows of grooves separated by a plurality of longitudinally extending ribs adapted for flow of cigarette smoke therethrough in a direction transverse to the axis of the rod, each row comprising a plurality of individual elongated grooves arranged successively in spaced end-to-end relationship in a longitudinal direction with filter material occupying the space between the ends of adjacent grooves in each row and each groove of each row overlapping longitudinally with at least two successive grooves of each adjacent row of grooves, each rib extending continuously between adjacent rows of grooves, and
(d) cutting the formed continuous rod at the space between the ends of successive grooves in at least one row into filter lengths such that none of the grooves in said filter lengths fully extend between opposite ends thereof.

Re. 29,675

O-(HALOPHENYLCARBAMYL)-N-(HALOPHENYL) GLYCOLAMIDES

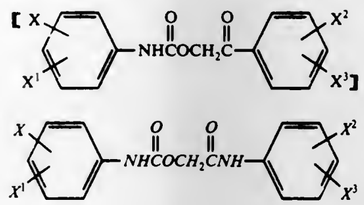
Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Original No. 3,859,332, dated Jan. 7, 1975, Ser. No. 348,448, Apr. 5, 1973. Application for reissue Jul. 18, 1977, Ser. No. 816,226

Int. Cl.[2] C07C *125/06*

U.S. Cl. 560—31 **7 Claims**

1. [The] *A* compound having the formula



wherein X is chlorine or bromine; X^1 is hydrogen, chlorine or bromine; X^2 is chlorine or bromine; and X^3 is hydrogen, chlorine or bromine.

Re. 29,676

MATRIX RESISTORS FOR INTEGRATED CIRCUIT

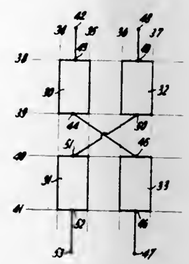
Kyuichi Hareyama, and Shuzi Nakazawa, both of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Original No. 3,906,430, dated Sep. 16, 1975, Ser. No. 501,791, Aug. 29, 1974. Application for reissue Oct. 4, 1976, Ser. No. 729,287

Claims priority, application Japan, Sep. 3, 1973, 48-99100

Int. Cl.[2] H01C *1/01, 1/16*

U.S. Cl. 338—320 **6 Claims**



1. An integrated circuit device comprising a plurality of substantially rectangular resistance elements each having first and second electrodes, said resistance elements being substantially equal both in width and in length to each other, said resistance elements being arranged in an n-row by n-column matrix (where n stands for an integer larger than 1), said first and second electrodes of each of said resistance elements being respectively provided at the same positions in each of said resistance elements, the upper sides of all of said resistance elements belonging to the same row of said matrix being colinear with a straight line, the lower sides of all of said resistance elements of the same row being colinear with a straight line, the right sides of all of said resistance elements belonging to the same column being colinear with a straight line, and the left sides of all of said resistance elements of the same column being colinear with a straight line, n numbers of first terminals respectively electrically connected with the first electrodes of the resistance elements of the first row, n numbers of second terminals respectively electrically connected with the second electrodes of the resistance elements of the n-th row, and means [for] respectively connecting the second electrodes of each of said resistance elements belonging to each row to the first electrodes of each of said resistance elements belonging to an adjacent row but belonging to a different column, thereby to form a series connection of n resistance elements belonging to different columns between each of said first terminals and each of said second terminals.

Re. 29,677

SINGLE-WALL DOMAIN ARRANGEMENT

Peter Istvan Bonyhard, Edison, and Paul Charles Michaelis, Watchung, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Original No. 3,713,116, dated Jan. 23, 1973, Ser. No. 196,902, Nov. 9, 1971. Application for reissue Dec. 20, 1974, Ser. No. 534,849

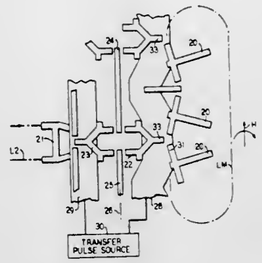
Int. Cl.[2] G11C *19/08*

U.S. Cl. 365—15 **14 Claims**

13. A rapid access cylindrical magnetic domain memory comprising

a plurality of main storage loops and an auxiliary loop, each loop being formed of a plurality of bars of highly permeable material in close proximity to a thin magnetic cylindrical domain sustaining platelet,

a magnetic domain sustaining structure including means for producing a bias magnetic field applied transverse to a surface of the platelet for stable cylindrical domains and means producing a rotating magnetic field within the plane of the thin platelet to drive the cylindrical domains from bar to bar, said auxiliary loop having at least partially separate infeed and outfeed transfer tracks with one of said infeed and one of said outfeed transfer tracks being coupled to each of the main storage cylindrical domain circulating loops,



said auxiliary loop having a number of bit positions selected to accommodate a predetermined whole multiple of the number of bits transferred from each main storage loop, and further having a number of bit positions selected to provide domain position synchronization between the auxiliary loop and each main storage loop, and

a cylindrical domain detector arranged to detect domains in the auxiliary loop.

PLANT PATENTS

GRANTED JUNE 20, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,266

AFRICAN VIOLET PLANT

Reinhold Holtkamp, Wertherstrasse 112, 4294 Isselburg, Germany

Filed Nov. 30, 1976, Ser. No. 746,216
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African violet plant known by the cultivar name Colorado and characterized as to novelty by the combined characteristics of purplish-red flower color, frilled petal edges, vigorous and compact growth, upright and strong flower stems, profuse blooming and long blooming period.

4,267

AFRICAN VIOLET PLANT

Reinhold Holtkamp, Wertherstrasse 112, 4294 Isselburg, Germany

Filed Mar. 3, 1977, Ser. No. 774,226
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African violet known by the cultivar name Georgia and particularly characterized as to uniqueness by the combined characteristics of vigorous growth, upright and strong flower stems each carrying 6–10 medium pink size flowers which are non-dropping; strong upright peduncle; long blooming period; dark green shiny leaves, and by the characteristic of being an attractive, saleable plant with the first flash of flowers.

4,268

AFRICAN VIOLET PLANT

Reinhold Holtkamp, Wertherstrasse 112, 4294 Isselburg, Germany

Filed Mar. 3, 1977, Ser. No. 774,227
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African violet plant known by the cultivar name Virginia and particularly characterized as to uniqueness by the combined characteristics of large pink non-dropping flowers with frilled edges; strong upright flower stems with short peduncles; up to ten flowers on each stem; vigorous and uniform growth; saleability with the first flash of flowers, and its full flowerhead on second flowering.

4,269

CHRYSANTHEMUM

Nicolaas Middelburg, 's Gravenzande, Netherlands, assignor to Middelburg B.V., 's Gravenzande, Netherlands

Filed Jun. 3, 1977, Ser. No. 792,486
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of chrysanthemum, substantially as described and pictured herein, characterized by its satiny golden blooms, vigorous growth, 12 week response and permanence.

4,270

CHRYSANTHEMUM

Nicolaas Middelburg, 's Gravenzande, Netherlands, assignor to Middleburg, B.V., 's Gravenzande, Netherlands

Filed Aug. 22, 1977, Ser. No. 820,920
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of chrysanthemum, substantially as described and pictured herein, characterized by its satiny pure white blooms, vigorous growth, nine week response and permanence.

PATENTS

GRANTED JUN. 20, 1978

ERRATA

For CLASS	See PATENT NO.
074–084 S	4,095,460
272–071	4,095,657
400–150	4,095,686
220–090.2	4,095,710
220–094 R	4,095,711
220–254	4,095,712
220–270	4,095,713
214–151	4,095,752
356–102	4,095,775
366–163	4,095,776
272–140	4,095,789
305–035 R	4,095,849
350–096.14	4,095,869
353–122	4,095,882
425–564	4,095,931
425–575	4,095,932
544–237	4,096,143
544–284	4,096,144
568–866	4,096,192
568–881	4,096,193
568–899	4,096,194
426–250	4,096,258
424–308	4,096,337
235–144 HC	4,096,377
235–466	4,096,378
362–235	4,096,379

PATENTS

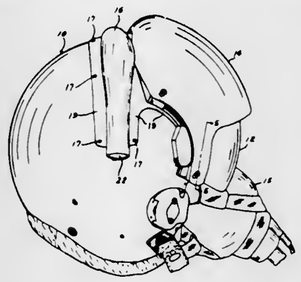
GRANTED JUNE 20, 1978

GENERAL AND MECHANICAL

4,095,289
AIR VENTILATION APPARATUS FOR FLIGHT HELMET

Abbott T. Kissen, Centerville; Willi J. Buehring, Montgomery County; Warren G. Miller, Greene County; Milton Alexander, Montgomery County; James S. Ater, Montgomery County, and Donald H. Lowe, Montgomery County, all of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 31, 1976, Ser. No. 719,315
Int. Cl.[2] A42B *3/00;* **A42C** *5/04*
U.S. Cl. 2—6 **1 Claim**

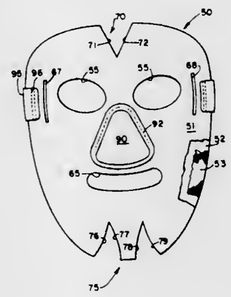


1. In combination with a flight helmet having a visor assembly including a visor and a face mask attached thereto; an apparatus for providing an air flow between the visor and the face of the user of the helmet comprising: a shell member attached to said helmet and forming together with said helmet an air plenum chamber; said shell member having its forward portion adapted to fit between said visor assembly and said helmet; means, between said helmet and said visor assembly, for fitting said visor assembly to the helmet when the shell member is attached; the forward portion of said shell member being spaced from the forward portion of said helmet to form an air exit nozzle between the visor and face of the user of the helmet; said shell member including an air supply inlet for the plenum chamber; said means for fitting said visor assembly to the helmet, when the shell member is attached, includes a pair of blocks for spacing the visor assembly from the helmet.

4,095,290
COLD WEATHER MASK

Robert G. O'Brien, Northbrook, Ill., assignor to Thermo Industries, Inc., Glenview, Ill.

Filed Dec. 6, 1976, Ser. No. 747,648
Int. Cl.[2] A41D *13/00*
U.S. Cl. 2—9 **9 Claims**

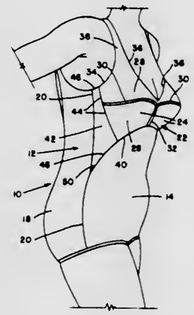


1. A cold weather face mask comprising a flexible, thermally insulating facepiece adapted to cover and closely engage the face of the wearer of said face mask, said facepiece having a visual port, a nose port and a mouth port therein, only a single V-shaped notch forming a forehead pocket to assure close fitting of the top of said mask to the forehead of the wearer, only two spaced apart V-shaped notches with a rectangular insert therebetween forming a chin pocket to assure close fitting of said mask to the chin of said wearer, a nose flap connected to the outer surface of said ski mask overlying said nose port to cover the nose of the wearer, said facepiece and said nose flap constructed of a three-part laminate having a moisture absorbent innerlayer laminated to a thermal barrier having a metalized outer layer.

4,095,291
LADIES' SWIMSUITS

Flavia Di Tullio, New York, N.Y., assignor to Hanes Corporation, Winston-Salem, N.C.

Filed Mar. 17, 1977, Ser. No. 761,370
Int. Cl.[2] A41D *5/00*
U.S. Cl. 2—67 **10 Claims**



1. A woman's garment comprising; an outer fabric body including a front section, a rear section, the junctures of said front section with said rear section being secured together by side seams, a bust support positioned inside said front section and having upper portions selectively secured directly to said front section, said bust support having marginal outer side edges terminating in spaced relation to said side seams, and tension balancing panel means interconnecting said marginal outer side edges of said bust support and said side seams for eliminating excessive strain and balancing tensions applied by said bust support along said side seams of said outer body and for eliminating direct tensions across the rib cage, when worn.

4,095,292
SPORT GLOVE

Michael Klein, New York, N.Y., assignor to Van R Apparel Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 724,395, Sep. 17, 1976, abandoned. This application Jun. 16, 1977, Ser. No. 807,045
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—161 A **13 Claims**

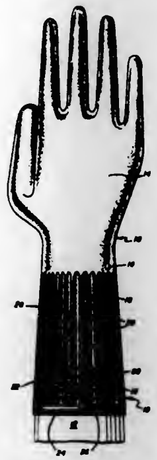
1. A sport glove or the like, comprising
(a) an elastic, contractile inner glove shell for enveloping substantially the entire hand, including the fingers and thumb,
(b) said inner glove shell being of knitted construction and being of such materials and of such construction as to accommodate substantial elastic stretch upon insertion of the hand and to fit snugly about the hand, to provide a secure fit for the sport glove,

(c) said inner glove shell having relatively limited and inadequate gripping characteristics for typical sport glove use,
(d) an outer glove shell surrounding and interfitting with said inner glove shell,
(e) said outer glove shell being of a material and construction to provide gripping characteristics suitable for use in sporting activities,
(f) the elastic properties of the outer glove shell being of secondary significance in relation to the gripping characteristics thereof and in relation to the contractile elastic characteristics of the inner glove shell,

(g) means loosely secured said inner and outer glove shells together at limited areas enabling donning and doffing of the assembled glove shells as a single glove while simultaneously accommodating substantial elastic expansion and contraction of the inner glove shell relative to the outer shell,
(h) said securing means including means for securing the respective glove shells at the tips and quirks of the thumb and finger stalls and in the cuff area,
(i) whereby the inner glove shell and outer glove shell each provide characteristics significant for use in sporting activities in a unitary structure.

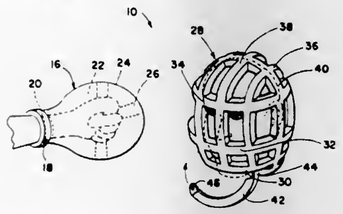
4,095,293
MOLDED GLOVE AND FORM THEREFOR HAVING TEXTURED WRIST PORTION FOR THE ELIMINATION OF CUFF ROLL-DOWN
Paul W. Heavner, Kettering, and William E. Le May, Waynesville, both of Ohio, assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.
Continuation of Ser. No. 723,347, Sep. 15, 1976. This application Oct. 25, 1977, Ser. No. 845,193
Int. Cl.² A41D *19/00*
U.S. Cl. 2—168 **5 Claims**

1. In a molded glove defining a hand and wrist portion, said wrist portion defining, in as-molded configuration, longitudinal channels positioned about its circumference and extending from a position adjacent to the end of said glove remote from the hand portion to the wrist portion thereof; a plurality of first circumferential channels, defined on said wrist portion at an end remote from said hand portion, said circumferential channels crossing said longitudinal channels, the thickness of the material said glove along the longitudinal and circumferential channels being increased over the thickness of the material said glove in areas adjacent to said channels, whereby the glove



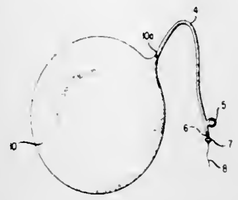
exhibits improved resistance to rolling-down of the cuff while being worn.

4,095,294
SOFT PUNCH
Harold E. Winterbottom, 1702 Lansing Rd., Glen Burnie, Md. 21061
Filed Mar. 21, 1977, Ser. No. 755,005
Int. Cl.² A41D *13/10*; A63B *71/10*
U.S. Cl. 2—424 **1 Claim**



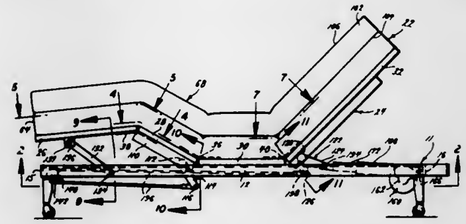
1. A punch softening system for boxing comprising:
a proportionally and structurally matched set consisting of:
a pair of inflatable boxing gloves and inflatable headgear having rib structure including a series of interconnected arcuate members defining vents therein, each inflatable boxing glove when inflated being larger than said vents and all said inflatable boxing gloves and inflatable headgear being of elastic material such as rubber causing elastic widening of all said inflatable boxing gloves and ribs on impact therebetween for preventing passage of a portion of an inflatable boxing glove through a vent during boxing, each inflatable boxing glove having a full double wall throughout including an inflatable cuff, each inflatable cuff having an inflation valve therein and each inflatable boxing glove having an internal thumb pocket therein; the inflatable headgear having means for tightening including inflation means at the rear thereof, and a foam cushion chin strap.

4,095,295
ADJUSTABLE, FLUID-FILLED BREAST IMPLANT
Douglas Lake, 21 Elsway Rd., Short Hills, N.J. 07078
Filed Mar. 28, 1977, Ser. No. 781,734
Int. Cl.² A61F *1/24*; A41C *3/10*
U.S. Cl. 3—36 **14 Claims**



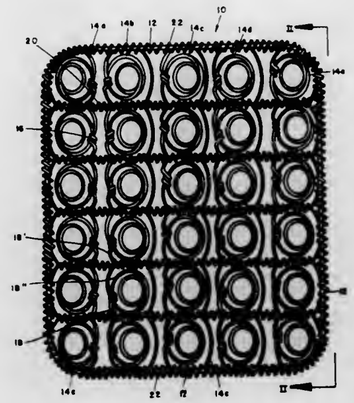
1. A mammary prosthetic implant comprising in combination:
a liquid inflatable valveless bag of liquid impervious flexible material,
a filler tube of flexible liquid impervious material integral with an opening in the periphery of said bag and extending outward therefrom,
means for suturing said filler tube to tissue comprising a loop formed integrally with said tube near its external end.

4,095,296
ADJUSTABLE BED
Arthur Charles Ferro, St. Louis, Mo., assignor to Contour Chair-Lounge Company, Inc., St. Louis, Mo.
Filed Apr. 27, 1976, Ser. No. 680,758
Int. Cl.² A61G *7/06*
U.S. Cl. 5—69 **15 Claims**



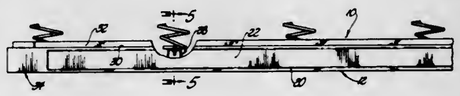
1. An adjustable bed comprising a support and an articulated base; the base including a first section having a back edge and a foot edge, said first section being secured to the support so as to be immovable thereon; a second back section pivoted to the back edge of the first section so as to vary its angle relatively to the first section, a third section having a foot end and back edge, said third section back edge being pivoted to the foot edge of the first section so as to vary its angle relatively to the first section; and actuating means connected to the second and third sections to pivot the second section and third section up relatively to the first section simultaneously by a movement thereof comprising a first lever attached to the second section, a second lever attached to the third section, means to cause movement of the first lever to move the second lever including a linkage cable connected to the first lever and extending in a first direction from the first lever toward the foot end past the second lever to sliding engagement with the support and thence extending in a second direction substantially opposite to the said first direction to the second lever and connected to the second lever.

4,095,297
COIL SPRING ASSEMBLY
Herbert J. Thomas, Jr., Holland, Mich., assignor to Holland Wire Products, Inc., Holland, Mich.
Filed May 11, 1977, Ser. No. 796,001
Int. Cl.² A47C *23/04*
U.S. Cl. 5—256 **3 Claims**



1. A coil spring assembly comprising:
a pair of peripheral supports lying in a pair of parallel planes;
a plurality of individual wire coil springs between said planes arranged in parallel rows across said assembly, the springs in alternate rows having right-hand and left-hand helical coils; the ends of each coil spring being knotted on the respective adjacent turns of the spring; the last turn on each end of each coil spring having a pair of opposite parallel linear portions oriented normal to the row containing that coil spring; said linear portions of successive adjacent coil springs in each row being in abutment; a plurality of cross helicals on parallel axes extending across said rows to interconnect the files, each cross helical enveloping the series of abutting linear portions in successive rows to interconnect adjacent coils in each row and to interconnect adjacent rows together.

4,095,298
BED ASSEMBLY
William L. Pringle, Grosse Pointe Shores, Mich., assignor to United States Steel Corporation, Pittsburgh, Pa.
Continuation-in-part of Ser. No. 610,699, Sep. 5, 1975, Pat. No. 4,020,512. This application Feb. 7, 1977, Ser. No. 765,990
Int. Cl.² A47C *23/04*
U.S. Cl. 5—263 **21 Claims**



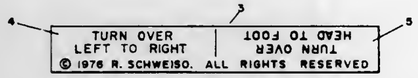
1. A bed assembly comprising; metal frame means of generally rectangular configuration including a pair of opposed side rails and a pair of opposed end rails, at least one of said rails including first and second metal members defining a hollow cross section along the length thereof, each of said first and second members being U-shaped in cross section with said second U-shaped member having shorter legs than said first U-shaped member, said legs of said first and second U-shaped members being in engagement with one another and secured together with the base portions of said U-shaped members being spaced apart to define said hollow cross section thereof.

4,095,299

LABEL AND METHOD FOR DETERMINING MATTRESS ROTATION

Robert J. Schweiso, 1028 Edmonds Ct., Sunnyvale, Calif. 94087

Filed Jun. 24, 1976, Ser. No. 699,390
Int. Cl.[2] A63F *9/00*; A63H *33/16*
U.S. Cl. 5—317 R 6 Claims



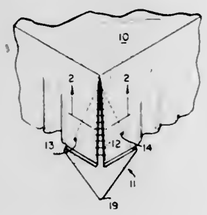
1. A label or a pair of labels for a mattress which, when located on a predetermined part of the mattress, comprises a first instruction which is readable when the mattress is in a first position for directing the reader thereof to move the mattress from the first position to a second position and which is readable when the mattress in in a third position for directing the reader thereof to move the mattress from the third position to a fourth position; and a second instruction which is readable when the mattress is in the second position for directing the reader thereof to move the mattress from the second position to the third position and which is readable when the mattress is in the fourth position for directing the reader thereof to move the mattress from the fourth position to the first position whereby the mattress can be rotated in a predetermined sequence by one or more persons without any one of the persons having to have knowledge of or recall the nature of the immediate past movement of the mattress.

4,095,300

CONSTRUCTION OF A FITTED CORNER FOR A BEDCOVER

Sol Ruben, Brooklyn, N.Y., assignor to Richard G. Rattner, Woodmere, N.Y., a part interest

Filed Jan. 31, 1977, Ser. No. 764,140
Int. Cl.[2] A47G *9/00*
U.S. Cl. 5—334 R 4 Claims



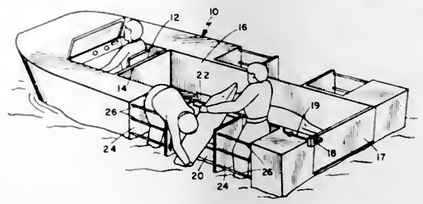
1. A construction of a fitted corner for a bedcover having two mutually perpendicular edges comprising a first stitched connection joining said fabric together along two lines, one extending from and substantially normal to each of said two edges, to a point adjacent to the junction of said lines to define an area of said bedcover bounded by said edges and said two lines, and second and third stitched connections extending one from each said edge to a point adjacent the junction of said lines, said second and said third stitched connection respectively joining said area of said bedcover to the remainder of said bedcover symmetrically one on each side of said first stitched connection.

4,095,301

PORPOISE EVACUATION BOAT

Rafael Guillen, 2258 Flintridge Dr., San Diego, Calif. 92139

Filed Dec. 23, 1976, Ser. No. 753,739
Int. Cl.[2] B63B *35/14*
U.S. Cl. 9—6 R 8 Claims



1. A porpoise evacuation skiff deployable from a larger fishing vessel to permit direct removal of porpoises from within net, said skiff comprising:

(a) a boat body having a central bay for temporarily confining porpoises;

(b) a ramp descending at least to the waterline of said boat body to permit the hauling of porpoises up said ramp and ascending to the top of said bay to permit easy depositing of the porpoises in said bay without opening said bay to the sea permiting escapé of collected porpoises;

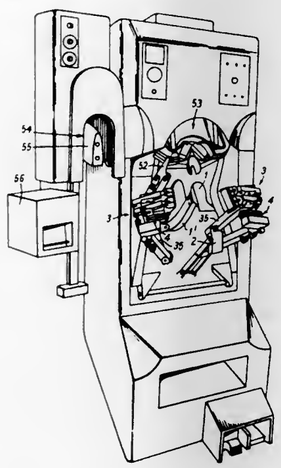
(c) an operator stabilizing station adjacent said ramp to secure an operator for hauling porpoises up said ramp, said station having a support upon which said operator can stand and means securing said operator from falling from the skiff.

4,095,302

MANUFACTURE OF SHOES

Harold Albert Boddy, Bristol, England, assignor to C. & J. Clark Ltd., Somerset, England

Filed Sep. 17, 1976, Ser. No. 724,745
Claims priority, application United Kingdom, Sep. 18, 1975, 38444/75
Int. Cl.[2] A43D *21/12*
U.S. Cl. 12—8.1 18 Claims



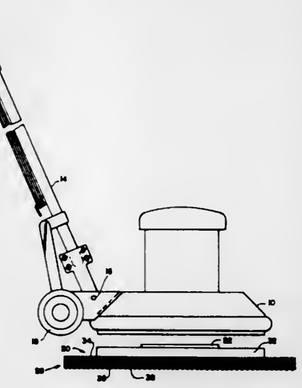
1. Apparatus for lasting the waist region of a shoe comprising a post supporting a last, two lasting assemblies mounted for movement widthwise of the last and adapted for engaging respective sides of the waist region of an upper when arranged on the last, each assembly including a single resilient band extending under tension heightwise of the last and supported only at its upper and lower edges, means for moving each assembly towards the last so as to cause the band progressively to conform such upper to the last both in the direction of the top line and feather line of the shoe to be lasted and lengthwise of the last, means for preventing further movement of each assembly towards the last, and means for moving an edge of the band relative to the assembly both widthwise and heightwise of the last so that the part of the band adjacent the feather line is rolled over onto the last bottom whereby to turn over the lasting margin of such upper and press it onto an insole supported on the last.

4,095,303

DRY CLEANING CARPETING

John L. Armstrong, 4482 Holly Dr., Palm Beach Gardens, Fla. 33410, and Edward G. Tarkinson, 125 SE. 31st Ave., Boynton Beach, Fla. 33435

Filed Jan. 27, 1977, Ser. No. 763,004
Int. Cl.[2] A47L *11/162*
U.S. Cl. 15—1.5 R 24 Claims



1. Apparatus for dry cleaning a carpet which comprises a machine having a grounded frame, motor means on said frame comprising a vertical output shaft, pad driving means connected to the lower end of said shaft, a cleaning pad connected to said driving means at its underside and movable in rubbing relation over the carpet to be cleaned and of a material selected to generate a static electrical charge as a result of frictional contact with the carpet material, accumulator means comprising a plurality of condensers electrically connected to said driving means and pad, and static charge bleed-off means connected between said accumulator means and said frame.

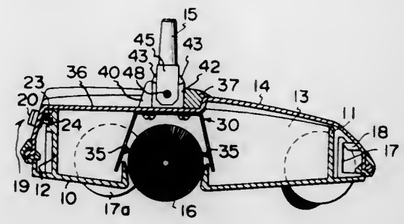
4,095,304

HAND SWEEPER

Mamoru Shinozaki, No. 1-35, Sakuradai, Nerima-ku, Tokyo; Yuichi Takahama, No. 332-90, Ohaza sunashinden, Kawagoe-shi, Saitama-ken; Hachiro Tubaki, No. 813-1440, Ohaza fujima, Kawagoe-shi, Saitama-ken; Kazuo Nagasawa, c/o Atorasuso No. 16-33, 2-chome, Nukui, Nerima-ku, Tokyo, and Yasao Mikami, c/o Ohkawa No. 28-2, 2-chome, Narimasu, Nerima-ku, Tokyo, all of Japan

Filed Feb. 7, 1977, Ser. No. 766,566
Claims priority, application Japan, Feb. 10, 1976, 51-14957[U]; Feb. 14, 1976, 51-16191[U]; Feb. 27, 1976, 51-22763[U]
Int. Cl.[2] A47L *11/33*
U.S. Cl. 15—48 7 Claims

1. A hand sweeper comprising a base in the form of a dust box having front and rear walls and side walls, a rotary brush rotatably supported on the side walls and extending transversely of the dust box, driving wheels for transmitting their rotation to said rotary brush to sweep dust into said dust box, a cover body for covering said base, a handle pivotably attached to said cover body, and connecting means for removably connecting said cover body to said base, said connecting means including hooks extending upwardly from said base adjacent to its front edge, corresponding projections on the inner surface of said cover body for engaging said hooks, a



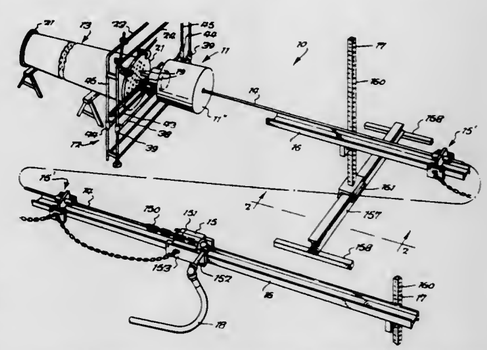
hook-like slot formed in said rear wall of said base, and a spring urged latch slidably mounted in said cover body so as to be capable of moving between a position in which it is engaged by said hook-like slot to connect said cover to said base and a position in which said latch is disengaged from said hook-like slot to allow removal of said cover from said base.

4,095,305

CLEANING APPARATUS FOR TUBES AND TUBE BUNDLES

Robert J. Goodwin, Hendersonville, N.C., assignor to C. H. Heist Corporation, Clearwater, Fla.

Continuation-in-part of Ser. No. 627,556, Oct. 31, 1975, abandoned. This application Jul. 12, 1976, Ser. No. 704,474
Int. Cl.[2] F28G *3/10*
U.S. Cl. 15—104.1 R 30 Claims



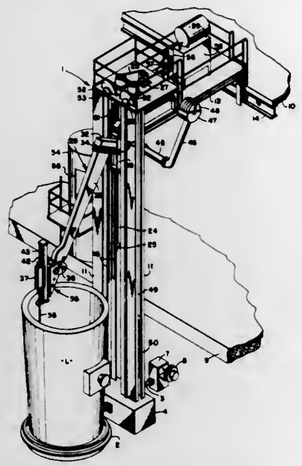
1. A lance reciprocating and rotating construction comprising frame means, means for securing said frame means relative to a tube to be cleaned, lance advancing and rotating means including motor means for advancing and rotating a lance, first mounting means for mounting said motor means on said frame means, carriage means for attachment to the end of said lance remote from said tube, swivel means on said carriage means for permitting rotation of said lance, carriage-supporting means for supporting said carriage means for movement toward and away from said tube, and second mounting means for mounting said carriage-supporting means, said motor means being located between said carriage means and said tube.

4,095,306

REACTION LADLE CLEANING MACHINE

Ned Gilbert Norton, Myrtle Creek, Oreg., assignor to The Hanna Mining Company, Cleveland, Ohio

Filed Jun. 27, 1977, Ser. No. 810,012
Int. Cl.[2] B08B *1/00*
U.S. Cl. 15—104.07 **15 Claims**



1. A machine for breaking away slag accumulation from the interior or a reaction ladle comprising a columnar structure having an upper portion extending beyond the upper end of the ladle; and slag breaker means including a carriage vertically adjustable along said upper portion, a downwardly extending boom having its upper end swingably adjustably connected to said carriage, and a slag breaking tool assembly swingably adjustably connected to the lower end of said boom and having a power actuated tool for engagement with slag on the interior of the ladle.

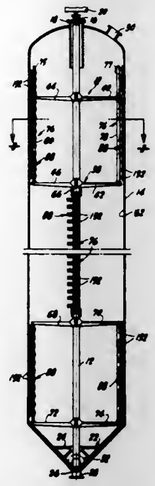
4,095,307

SCRAPER FOR A VESSEL INTERIOR SURFACE

Dale A. Brubaker, Delphi, Ind., assignor to Lox Equipment Company, Livermore, Calif.

Filed Jun. 28, 1976, Ser. No. 700,730
Int. Cl.[2] B08B *9/08*; F28Q *3/10*
U.S. Cl. 15—246.5 **13 Claims**

1. Scraper for the interior surface of a vessel comprising:
a. an inner shaft positioned within the vessel,
b. a plurality of arms radially disposed with respect to said inner shaft said plurality of arms having at least a first pair of substantially parallel arms and a second pair of substantially parallel arms, one of said arms of said first pair of arms oppositely radially disposed along said inner shaft with respect to one arm of said second pair of arms and another of said arms of said first pair of arms oppositely radially disposed along said shaft with respect to another arm of said second pair of arms,
c. a plurality of peripheral shafts spanning the end portions of at least said first and second pairs of substantially parallel arms,
d. scraping means for scraping the interior surface of the vessel mounted on said plurality of peripheral shafts, said scraping means comprising a plurality of scraping units, each of said units including a lever having a first pivotal arm and a second pivotal arm pivotal about a fulcrum and having a blade contacting the inner surface of the vessel, said blade mounted on said first pivotal arm of said lever, said second pivotal arm of said lever connected to spring means for urging contact between said blade and the inner surface of the vessel through a predetermined range of



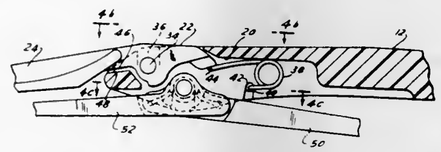
distances between the fulcrum of said lever and the inner surface of the vessel.

4,095,308

LOW PROFILE WINDSHIELD WIPER ASSEMBLY

William Blaiklock, Dundas; George McDonald, Mississauga, and Edward Kimber, Cayuga, all of Canada, assignors to Tridon Limited, Burlington, Canada

Filed Dec. 16, 1976, Ser. No. 751,178
Int. Cl.[2] B60S *1/04*
U.S. Cl. 15—250.42 **21 Claims**



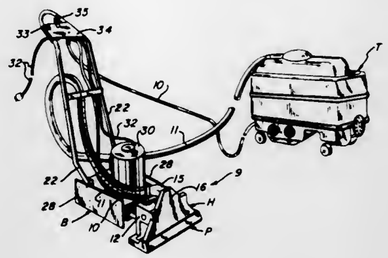
1. A windshield wiper superstructure comprising a primary superstructure element adapted to be connected to a windshield wiper arm; a plurality of claw carrying superstructure elements pivotally mounted on said primary superstructure element and spring means operatively associated with said primary superstructure element and with said claw carrying elements for independently biasing said claw carrying elements about their pivotal connection to the primary superstructure element to urge the claws thereon towards the windshield on which the superstructure is used; said primary superstructure element including a pair of opposed ends and said plurality of claw carrying superstructure elements including two pairs of lever elements respectively located at said opposed ends of said superstructure element with each lever in each pair being pivotally mounted on the adjacent end of the superstructure element at one of its ends fOr substantially independent pivotal movement of each lever element when the superstructure is in use.

4,095,309

APPARATUS FOR CLEANING A CARPET

John J. Sundheim, Englewood, Colo., assignor to John J. Sundheim Family Estate, Englewood, Colo.

Filed Sep. 25, 1975, Ser. No. 616,547
Int. Cl.[2] A47L *7/00*
U.S. Cl. 15—320 **13 Claims**



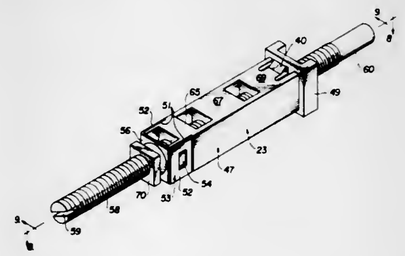
1. A carpet cleaning apparatus constructed for movement across a carpet in a predetermined direction, said apparatus comprising:
(a) means for engaging the fibers of the pile of a carpet and directing a cleaning fluid to a portion of the carpet, said means being connectible in use with a source of cleaning liquid, said means extending laterally of said predetermined direction,
(b) a suction manifold, said suction manifold being connectible when in use with a source of suction,
(c) a laterally extending nozzle disposed in fluid communication with said suction manifold for applying suction to said carpet, said nozzle being spaced from said means for engaging the fibers of the carpet in a direction generally parallel to said predetermined direction,
(d) a body member,
(e) a head member carrying at least one suction manifold and said laterally extending nozzle, said head member being mounted for movement toward and away from said body member,
(f) means supporting said head member from said body member, and
(g) means mounted on said body member for reciprocating said head member and support means for the head member relative to said body member.

4,095,310

GUIDE AND PIVOT PIN CARTRIDGE ASSEMBLIES FOR FOLDING DOORS

Bernard C. Governale, Duluth, Ga., assignor to Peachtree Doors, Inc., Atlanta, Ga.

Filed Jul. 21, 1977, Ser. No. 817,844
Int. Cl.[2] E05D *13/02*
U.S. Cl. 16—87 R **5 Claims**



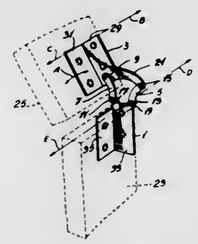
1. In a folding door structure including a pair of door sections hingedly connected on a vertical hinge axis and disposed between overhead and bottom guide tracks for horizontal movement between folded and unfolded positions, each folding door section having upper and lower braces and each brace including a pair of vertically spaced horizontal walls, the improvement comprising a prefabricated and preassembled unitized guide pin cartridge assembly for installation on the job site where the folding door structure is being installed on said upper and lower braces of one door section and on the upper brace of the other door section of said pair, and a coacting prefabricated and preassembled unitized and adjustable pivot pin cartridge for installation on said job site on the lower brace of said other door section, all of said guide and pivot pin cartridge assemblies including rectangular cross section pin housings having enlarged heads at one end and cooperating yielding locking tangs projecting from one side thereof near said head, whereby said housings may enter rectangular openings in said vertically spaced horizontal walls of said upper and lower braces with the heads of the housings abutting the outer faces of corresponding walls and said locking tangs lockingly engaged with the opposite faces of said walls of the braces, upper and lower guide track follower elements on the pins of sid guide pin cartridge assemblies, and a pivot extension on the pin of said adjustable pivot pin cartridge assembly, and said rectangular cross section pin housings serving to enclose major portions of the lengths of the guide and pivot pins of said cartridge assemblies along at least two opposite sides thereof.

4,095,311

HINGES

Hans Janosch, Chateauguay, Calif., assignor to Phil Menard Limitee, Montreal, Canada

Filed Oct. 4, 1976, Ser. No. 728,908
Int. Cl.[2] E05D *3/06*
U.S. Cl. 16—163 **8 Claims**



1. A hinge arrangement comprising, in combination:
a base member having a first end;
a swivelling member having a first end;
the first end of the base member being disposed contiguous to the first end of the swivelling member; and
first and second elongated connecting members pivotally connecting said base member with said swivelling member at the first ends thereof;
said first connecting member being pivotally connected, at one end thereof, to one side of the one end of said base member and, at the other end thereof, to the corresponding side of the one end of said swivelling member;
said second connecting member being pivotally connected, at one end thereof, to the other side of the one end of said base member and, at the other end thereof, to the other side of the one end of said swivelling member; and
further comprising an extension member extending outwardly and in the direction of said base member from one side of the one end of said swivelling member;
said first and second connecting members being connected, at the other ends thereof, to the base and tip respectively of said extension member.

4,095,312

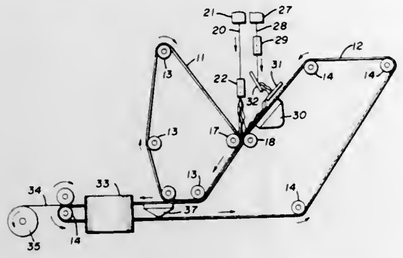
APPARATUS FOR MAKING A NONWOVEN FABRIC

David J. Haley, Durham, N.C., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 636,267, Nov. 28, 1975. This application Nov. 10, 1976, Ser. No. 740,575

Int. Cl.[2] D01G *25/00;* **D04H** *3/05*

U.S. Cl. 19—308 **5 Claims**



1. An apparatus for forming a nonwoven fabric having uniform stretch in two directions, comprising:

a. a pair of moving collecting surfaces positioned to form a nip;

b. a first air nozzle positioned to direct a first group of filaments in a longitudinal direction into said nip so that said filaments fold into and are captured and held by said nip with spans of said filaments lying in the plane of said nip, thereby causing said filaments to lie in positions predominately transverse to said fabric;

c. an element having an impact surface positioned adjacent to one of the collecting surfaces at a location spaced from said nip;

d. a second air nozzle positioned to direct a second group of filaments in a longitudinal direction onto said impact surface; and

e. said impact surface being positioned in such a manner that said second group of filaments can be pulled off said impact surface by said one collecting surface thereby causing said second group of filaments to extend longitudinally along said fabric.

4,095,313

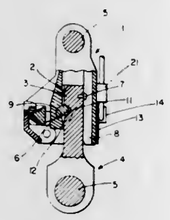
GAS OPERATED AUTOMATIC CANOPY RELEASE

Robert E. Piljay, Corona, and Kenneth K. Craig, Riverside County, both of Calif., assignors to H. Koch & Sons, Anaheim, Calif.

Filed Dec. 17, 1976, Ser. No. 751,884

Int. Cl.[2] A44B *11/25*

U.S. Cl. 24—230 A **2 Claims**



1. In a releasable strap connector having a female member having a pair of spaced pockets therein and a male member having a pair of prongs fitting into said pockets, each prong having a recess therein, a rockable roll bar journalled in said female member intersecting said pockets, means to position said prongs so that said recesses face said roll bar at the intersection thereof, a portion of said roll bar at the intersection being cutaway so as to leave said pockets and said recesses unobstructed in one position of said roll bar thereby to permit insertion and withdrawal of said prongs from said pockets and in another position to project into said recesses thereby to interlock with said prongs, and manipulatable means for turning said roll bar from interlocking position to unobstructing position at will,

the improvement of pressure medium operated means for turning said roll bar from interlocking position to unobstructing position, comprising

a pair of tracks adjacent the respective pockets in the female member,

a pair of abutments on said roll bar,

a cylinder aligned with each track, and a piston in each cylinder,

releasable restraining means in the path of each piston,

one of said abutments on each roll bar projecting into each track,

the piston in each cylinder being engagable with the adjacent abutment in the interlocking position of said roll bar for turning said roll bar into unobstructing position,

and means to convey a pressure medium simultaneously into both cylinders for forcing said pistons to release said restraining means and roll said roll bar from interlocking to unobstructing position.

4,095,314

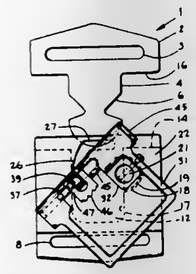
SHOCKLOAD RESISTANT CANOPY RELEASE

John A. Gaylord, San Diego, Calif., assignor to H. Koch & Sons, Anaheim, Calif.

Filed Mar. 10, 1977, Ser. No. 776,300

Int. Cl.[2] A44B *11/25*

U.S. Cl. 24—230 A **6 Claims**



1. In a webbing connector,

a male connector member,

a female connector member having a pocket therein,

a part of said male connector member being insertable into said pocket and having a keeper recess therein,

a lock in said female connector projectable into said recess for locking said connector members together,

a manipulating member on said female member for moving said lock into and out of said recess at will,

and locking means to lock said manipulating member in the locking position of said lock,

means to rotatably hold said manipulating member on said female member,

means to translate the rotating motion of said manipulating member into moving said lock into and out of said keeper recess at will,

said locking means including a guide element on said female body adjacent said manipulating member,

a guide on said manipulating member coacting with said guide element,

said guide element having a middle portion substantially concentric with the center of rotation of said manipulating member, and having an end portion at each end of said middle portion extending at an angle to the middle portion to block said guide from movement about said center,

and manipulatable means to shift said guide out of the respective end portions and to said middle portion thereby to free said manipulating member for rotating manipulation.

4,095,315

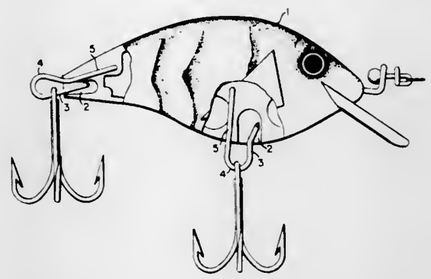
LOOP RETAINER

Welbourne D. McGahee, Melbourne, Fla., assignor to Loop-A-Line, Inc., Melbourne, Fla.

Filed Jan. 21, 1977, Ser. No. 760,920

Int. Cl.[2] A44B *13/00;* **A43C** *11/08*

U.S. Cl. 24—231 **41 Claims**



1. A connector to be incorporated into a body, comprising:

a first bore penetrating the surface of said body; a second bore penetrating said body; and an elongated retainer fabricated from a material having spring properties, said retainer including a secured end held rigidly within said body by the side walls of said second bore and a free end positioned adjacent to the wall of said first bore so that said elongated retainer descends into and crosses a majority of the diameter of said first bore.

4,095,316

CARABINER

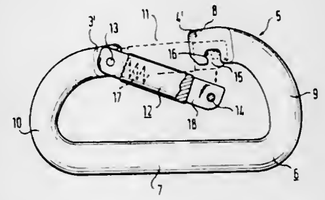
Günther Gabriel, Gauting near Munich, Germany, assignor to Salewa Sportperatefabrik mit beschrankter Haftung, Munich, Germany

Continuation of Ser. No. 762,760, Jan. 26, 1977. This application Aug. 29, 1977, Ser. No. 828,860

Claims priority, application Germany, Feb. 26, 1976, 2607886

Int. Cl.[2] A44B *13/02*

U.S. Cl. 24—234 **8 Claims**



1. A carabiner comprising:

(a) an elongated body member of tubular metallic material,

(1) said body member being approximately C-shaped, having two bight portions connected by an approximately straight portion, and two longitudinally terminal portions respectively extending from said bight portions toward one another and defining a gap therebetween,

(2) the wall thickness of said metallic material in said terminal portions being greater than in said bight and straight portions;

(b) an elongated closure member having first and second longitudinal end portions, one of said end portions being pivotally secured to one of said terminal portions for arcuate movement of the other end portion toward and away from the other terminal portion; and

(c) cooperating abutment means on said other end portion and said other terminal portion engageable for limiting said arcuate movement in a position of said closure member in which said closure member closes said gap,

(1) the wall thickness of said metallic material in said one terminal portion being greater than the corresponding thickness in said other terminal portion.

4,095,317

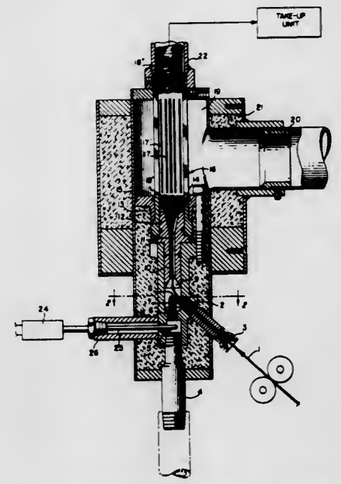
PROCESS FOR PRODUCING TEXTURED YARN

Brewster B. Eskridge; Roger H. Fink; William D. Porter, all of Asheville, and Elbert K. Warren, Candler, all of N.C., assignors to Akzona Incorporated, Asheville, N.C.

Division of Ser. No. 517,802, Oct. 24, 1974, Pat. No. 3,983,610. This application Apr. 28, 1976, Ser. No. 681,252

Int. Cl.[2] D02G *1/12, 1/16*

U.S. Cl. 28—221 **13 Claims**



1. A process for texturizing yarn which comprises:

passing a synthetic polymeric multifilament yarn together with a stream of heated gas into a diverging conical diffuser zone to cause the gas stream to rapidly expand and to cause the filaments of the yarn to splay outwardly from the center of the expanding gas stream;

creating an eddy-effect at the end of the diffuser zone to cause yarn filaments splayed outwardly in said diffuser zone to contact a smooth imperforate continuous wall portion of such length as to insure the formation of a compacted yarn mass therein and said smooth wall portion defining an upstream end of a bulking chamber;

forming the yarn filaments into a compacted yarn mass within said smooth wall portion at said upstream end of the bulking chamber;

pushing the compacted yarn mass into and through an air permeable wall portion of the bulking chamber while the gas initially passes through the compacted yarn mass at said upstream end of the chamber; and subsequently discharges laterally from the yarn mass within the air permeable wall portion of the bulking chamber; and

withdrawing a yarn bundle from the compacted yarn mass.

13. In a continuous process for the texturizing of yarn in a gas jet bulking process wherein the yarn is aspirated along with a heated gas into a yarn bulking chamber, the improvement comprising:

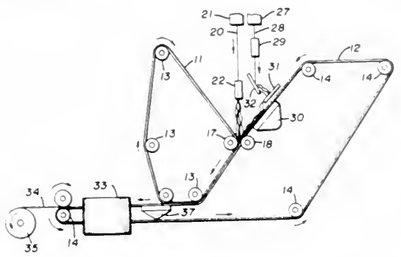
passing the yarn together with the stream of heated gas into a diverging conical diffuser zone to cause the gas stream to expand rapidly and to cause the filaments of the yarn to splay open;

4,095,312

APPARATUS FOR MAKING A NONWOVEN FABRIC

David J. Haley, Durham, N.C., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 636,267, Nov. 28, 1975. This application Nov. 10, 1976, Ser. No. 740,575
Int. Cl.[2] D01G *25/00;* D04H *3/05*
U.S. Cl. 19—308 5 Claims



1. An apparatus for forming a nonwoven fabric having uniform stretch in two directions, comprising:

a. a pair of moving collecting surfaces positioned to form a nip;

b. a first air nozzle positioned to direct a first group of filaments in a longitudinal direction into said nip so that said filaments fold into and are captured and held by said nip with spans of said filaments lying in the plane of said nip, thereby causing said filaments to lie in positions predominately transverse to said fabric;

c. an element having an impact surface positioned adjacent to one of the collecting surfaces at a location spaced from said nip;

d. a second air nozzle positioned to direct a second group of filaments in a longitudinal direction onto said impact surface; and

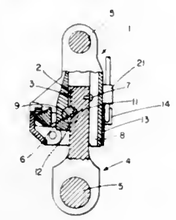
e. said impact surface being positioned in such a manner that said second group of filaments can be pulled off said impact surface by said one collecting surface thereby causing said second group of filaments to extend longitudinally along said fabric.

4,095,313

GAS OPERATED AUTOMATIC CANOPY RELEASE

Robert E. Piljay, Corona, and Kenneth K. Craig, Riverside County, both of Calif., assignors to H. Koch & Sons, Anaheim, Calif.

Filed Dec. 17, 1976, Ser. No. 751,884
Int. Cl.[2] A44B *11/25*
U.S. Cl. 24—230 A 2 Claims



1. In a releasable strap connector having a female member having a pair of spaced pockets therein and a male member having a pair of prongs fitting into said pockets, each prong having a recess therein, a rockable roll bar journalled in said female member intersecting said pockets, means to position said prongs so that said recesses face said roll bar at the intersection thereof, a portion of said roll bar at the intersection being cutaway so as to leave said pockets and said recesses unobstructed in one position of said roll bar thereby to permit insertion and withdrawal of said prongs from said pockets and in another position to project into said recesses thereby to interlock with said prongs, and manipulatable means for turning said roll bar from interlocking position to unobstructing position at will,

the improvement of pressure medium operated means for turning said roll bar from interlocking position to unobstructing position, comprising

a pair of tracks adjacent the respective pockets in the female member,

a pair of abutments on said roll bar,

a cylinder aligned with each track, and a piston in each cylinder,

releasable restraining means in the path of each piston,

one of said abutments on each roll bar projecting into each track,

the piston in each cylinder being engagable with the adjacent abutment in the interlocking position of said roll bar for turning said roll bar into unobstructing position,

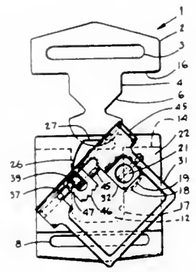
and means to convey a pressure medium simultaneously into both cylinders for forcing said pistons to release said restraining means and roll said roll bar from interlocking to unobstructing position.

4,095,314

SHOCKLOAD RESISTANT CANOPY RELEASE

John A. Gaylord, San Diego, Calif., assignor to H. Koch & Sons, Anaheim, Calif.

Filed Mar. 10, 1977, Ser. No. 776,300
Int. Cl.[2] A44B *11/25*
U.S. Cl. 24—230 A 6 Claims



1. In a webbing connector,

a male connector member,

a female connector member having a pocket therein,

a part of said male connector member being insertable into said pocket and having a keeper recess therein,

a lock in said female connector projectable into said recess for locking said connector members together,

a manipulating member on said female member for moving said lock into and out of said recess at will,

and locking means to lock said manipulating member in the locking position of said lock,

means to rotatably hold said manipulating member on said female member,

means to translate the rotating motion of said manipulating member into moving said lock into and out of said keeper recess at will,

said locking means including a guide element on said female body adjacent said manipulating member,

a guide on said manipulating member coacting with said guide element,

said guide element having a middle portion substantially concentric with the center of rotation of said manipulating member, and having an end portion at each end of said middle portion extending at an angle to the middle portion to block said guide from movement about said center,

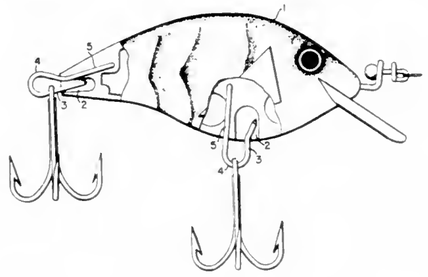
and manipulatable means to shift said guide out of the respective end portions and to said middle portion thereby to free said manipulating member for rotating manipulation.

4,095,315

LOOP RETAINER

Welbourne D. McGahee, Melbourne, Fla., assignor to Loop-A-Line, Inc., Melbourne, Fla.

Filed Jan. 21, 1977, Ser. No. 760,920
Int. Cl.[2] A44B *13/00;* A43C *11/08*
U.S. Cl. 24—231 41 Claims



1. A connector to be incorporated into a body, comprising:

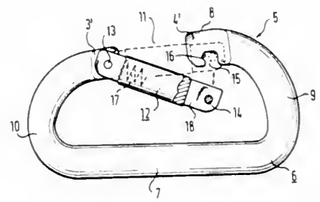
a first bore penetrating the surface of said body; a second bore penetrating said body; and an elongated retainer fabricated from a material having spring properties, said retainer including a secured end held rigidly within said body by the side walls of said second bore and a free end positioned adjacent to the wall of said first bore so that said elongated retainer descends into and crosses a majority of the diameter of said first bore.

4,095,316

CARABINER

Günther Gabriel, Gauting near Munich, Germany, assignor to Salewa Sportperatefabrik mit beschrankter Haftung, Munich, Germany

Continuation of Ser. No. 762,760, Jan. 26, 1977. This application Aug. 29, 1977, Ser. No. 828,860
Claims priority, application Germany, Feb. 26, 1976, 2607886
Int. Cl.[2] A44B *13/02*
U.S. Cl. 24—234 8 Claims



1. A carabiner comprising:

(a) an elongated body member of tubular metallic material,

(1) said body member being approximately C-shaped, having two bight portions connected by an approximately straight portion, and two longitudinally terminal portions respectively extending from said bight portions toward one another and defining a gap therebetween,

(2) the wall thickness of said metallic material in said terminal portions being greater than in said bight and straight portions;

(b) an elongated closure member having first and second longitudinal end portions, one of said end portions being pivotally secured to one of said terminal portions for arcuate movement of the other end portion toward and away from the other terminal portion; and

(c) cooperating abutment means on said other end portion and said other terminal portion engageable for limiting said arcuate movement in a position of said closure member in which said closure member closes said gap,

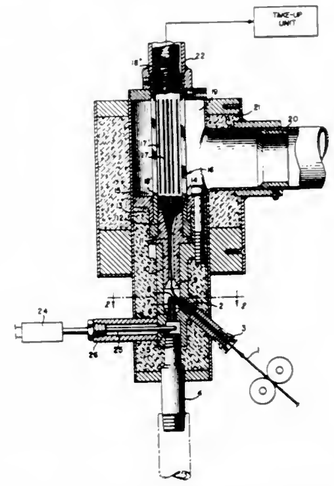
(1) the wall thickness of said metallic material in said one terminal portion being greater than the corresponding thickness in said other terminal portion.

4,095,317

PROCESS FOR PRODUCING TEXTURED YARN

Brewster B. Eskridge; Roger H. Fink; William D. Porter, all of Asheville, and Elbert K. Warren, Candler, all of N.C., assignors to Akzona Incorporated, Asheville, N.C.

Division of Ser. No. 517,802, Oct. 24, 1974, Pat. No. 3,983,610. This application Apr. 28, 1976, Ser. No. 681,252
Int. Cl.[2] D02G *1/12, 1/16*
U.S. Cl. 28—221 13 Claims



1. A process for texturizing yarn which comprises:

passing a synthetic polymeric multifilament yarn together with a stream of heated gas into a diverging conical diffuser zone to cause the gas stream to rapidly expand and to cause the filaments of the yarn to splay outwardly from the center of the expanding gas stream;

creating an eddy-effect at the end of the diffuser zone to cause yarn filaments splayed outwardly in said diffuser zone to contact a smooth imperforate continuous wall portion of such length as to insure the formation of a compacted yarn mass therein and said smooth wall portion defining an upstream end of a bulking chamber;

forming the yarn filaments into a compacted yarn mass within said smooth wall portion at said upstream end of the bulking chamber;

pushing the compacted yarn mass into and through an air permeable wall portion of the bulking chamber while the gas initially passes through the compacted yarn mass at said upstream end of the chamber; and subsequently discharges laterally from the yarn mass within the air permeable wall portion of the bulking chamber; and

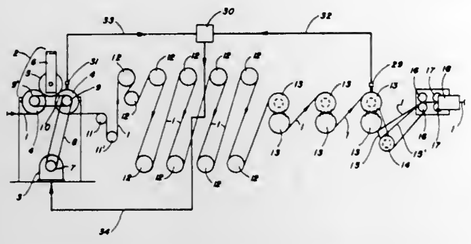
withdrawing a yarn bundle from the compacted yarn mass.

13. In a continuous process for the texturizing of yarn in a gas jet bulking process wherein the yarn is aspirated along with a heated gas into a yarn bulking chamber, the improvement comprising:

passing the yarn together with the stream of heated gas into a diverging conical diffuser zone to cause the gas stream to expand rapidly and to cause the filaments of the yarn to splay open;

creating an eddy-effect at the end of the diffuser zone to cause yarn filaments splayed open to contact a first tubular smooth imperforate wall zone of the bulking chamber of such a length to insure the formation of a compacted yarn plug therein;
forming a compacted yarn plug from an initial length of yarn filaments within said first tubular smooth imperforate wall zone, the upstream face of the plug being concave toward the downstream end of the plug;
impinging successive yarn filaments in a controlled random oscillatory manner on the formed plug surface while passing the heated gas axially through at least the initially formed portion of the plug within said smooth wall zone;
pushing the yarn plug into and through a second perforate wall portion of the bulking chamber; and
withdrawing a yarn bundle from the yarn plug.

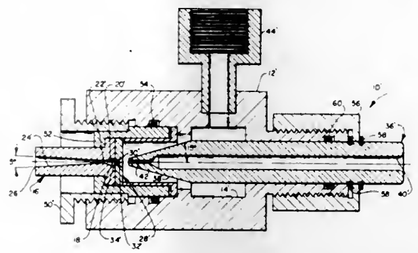
4,095,318
CONTROLLED TOW STRETCHER
James Gardner Abbott; Jerry Wayne Berley; Allen Edens Ward, Jr., and Brandi, Sr. Adolph John, all of Columbia, S.C., assignors to Allied Chemical Corporation, Morris Township, N.J.
Filed Jul. 15, 1975, Ser. No. 596,042
Int. Cl.[2] D02J *1/22*
U.S. Cl. 28—241 **2 Claims**



1. An apparatus for stretching a tow of filaments comprising said tow traveling serially through, in combination,
a nip roll stand, said stand having rolls, drag rolls, and driven rolls, with means to drive said driven rolls,
means to mount said rolls,
means to sense variation in a set ratio of speed between said nip rolls and said driven rolls, and
a speed control device, communicating with said means to sense, said device continuously controlling at least one roll in said nip roll stand proportional to said sensed variation in the ratio of speed,
said tow being stretched by the tension on said tow caused by the driven rolls dragging said tow across said drag rolls.

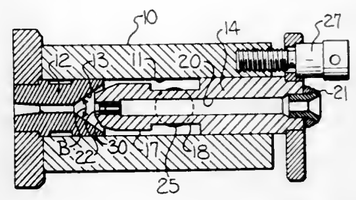
2. An apparatus for stretching a tow of filaments comprising said tow traveling serially through, in combination,
a nip roll stand, said stand having rolls, drag rolls, and at least three sets of driven rolls, with electric motor means to drive said driven rolls,
means to mount said rolls,
means to selectively lock said drag rolls to prevent rotation and at least one of said drag rolls being locked to prevent rotation,
means to sense variation in a set ratio of speed between said nip rolls and driven rolls,
an eddy current brake, communicating with said means to sense, said brake continuously controlling at least one roll in said nip roll stand, proportional to said sensed variation in the ratio of speed, and
said means to sense variation in said set ratio of speed being sensed on a roll on said nip roll stand and on the last of said three sets of driven rolls, and said eddy current brake being applied to two rolls on said nip roll stand, said tow being stretched by the tension on said tow caused by the driven rolls dragging said tow across said drag rolls.

4,095,319
YARN FRACTURING AND ENTANGLING JET
Jackson Lee Nelson, Johnson City, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jan. 26, 1977, Ser. No. 762,614
Int. Cl.[2] D02G *1/16*
U.S. Cl. 28—273 **4 Claims**



1. In a gaseous fluid jet for fracturing yarn, the jet including an elongated housing having a central bore therethrough defining a plenum chamber;
a venturi supported in the central bore and in the exit end of the housing, the venturi defining a passageway therethrough and the inner end of the venturi defining a central entry opening followed by a converging wall portion terminating in a constant diametered throat having a length approximately that of its diameter, the throat in turn being followed by a diverging wall portion leading to a central exit opening extending through the exit end of the venturi;
an orifice plate supported in the central bore of the housing and abutting against the inner end of the venturi, the orifice plate defining a central entry opening therethrough concentric with the central opening of the venturi, the wall of the entry opening having an inwardly tapering bevel terminating in an exit opening of constant diameter;
a yarn guiding needle positioned in the central bore of the housing and having an inner end portion adjustably spaced closely adjacent the entry opening of the orifice plate, the needle defining an axial yarn guiding passageway extending therethrough and terminating in an exit opening for directing yarn through the needle and toward the entry opening of the orifice plate, the outer wall of the inner end portion of the needle adjacent its exit opening being inwardly tapered toward the orifice plate entry opening; and
means for directing a flow of pressurized gaseous fluid into the central bore of the housing and the plenum chamber and along the inner end portion of the needle whereby the gaseous fluid passes through the entry opening of the orifice plate and the entry opening of the venturi and outwardly through the exit opening of the venturi to partially fracture the yarn and entangle the filaments of the yarn as the yarn passes through the venturi from the axial yarn guiding passageway of the needle and the openings of the orifice plate; the improvement comprising:
providing the inward taper of the outer wall of the inner end portion of the needle with a half angle relative to the axis of the yarn guiding passageway of about 15°;
providing the wall of the orifice plate entry opening with an inwardly tapering bevel of about 30° relative to the axis of the central entry opening; and
providing the diverging wall portion of the exit opening of the venturi with an angle of about 2.5° relative to the axis of the exit opening whereby the gaseous fluid jet is capable of using pressures of about 500 p.s.i.g. of gaseous fluid at a rate of about 6.5 SCFM to treat yarn.

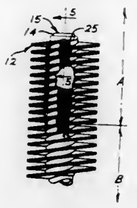
4,095,320
YARN TEXTURING AIR JET
Richard J. Polney, New Castle, Del., assignor to Enterprise Machine and Development Corporation, New Castle, Del.
Filed Mar. 9, 1977, Ser. No. 775,692
Int. Cl.[2] D02G *1/16*
U.S. Cl. 28—273 **7 Claims**



1. In a multifilament yarn texturing air jet of the type comprising an elongate housing including a central bore therethrough, venturi means supported in said central bore and at the exit end of said housing and including an inwardly tapered conical inner end wall defining the exit end of a turbulence chamber, a yarn guiding needle concentrically supported in said central bore and including an inner end defining the entrance end of said turbulence chamber, said yarn guiding needle including an inwardly tapered inner end portion extending at least partially into and centered within said inner end wall of said venturi to define a restricted airflow passageway completely surrounding said inner end of said needle, the included angle of said inwardly tapered conical inner end wall of said venturi means being greater than the included angle of said inwardly tapered inner end portion of said needle, a yarn passageway extending through said needle and providing an exit opening in said inner end of said needle, and means for directing pressurized air into said central bore and rearwardly of the inner end of said needle so that the air passes completely around and in a uniform manner along said needle and enters said turbulence chamber through said restricted airflow passageway completely surrounding the inner end of said needle to impart crimps, curls and loops to the filaments of the yarn as the yarn passes through said turbulence chamber, the combination therewith of means for enhancing the crimps, curls and loops imparted to the yarn and for permitting increased operational speed of said jet, said means comprising a cut-away portion on one side only of the inner end of said needle for increasing the volume of air in an arcuate segment on one side only of said restricted airflow passageway so that the air enters said turbulence chamber completely around the inner end of said needle but in an unbalanced condition with the greater volume of air entering said turbulence chamber through said arcuate segment of said restricted airflow passageway, said cut-away portion comprising a beveled face extending across a minor portion of said inner end of said needle, and wherein the remaining portion of said inner end of said needle extends at right angles to the yarn passageway extending through said needle.

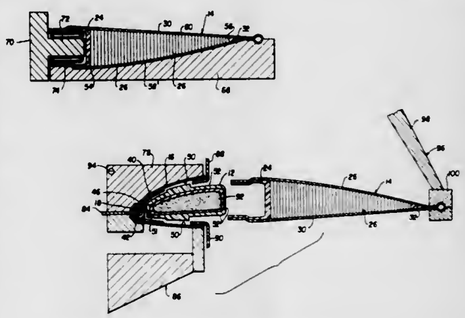
4,095,321
APPARATUS FOR MANUFACTURING A HELICALLY FINNED HEAT EXCHANGER
Robert E. Hicks, Crestwood, Ky., assignor to General Electric Company, Louisville, Ky.
Division of Ser. No. 737,833, Nov. 1, 1976, Pat. No. 4,051,586, which is a continuation-in-part of Ser. No. 579,889, May 22, 1975, abandoned, which is a continuation-in-part of Ser. No. 529,445, Dec. 4, 1974, Pat. No. 3,909,898. This application May 11, 1977, Ser. No. 795,972
Int. Cl.[2] B23P *15/26;* B21D *39/03*
U.S. Cl. 29—33 G **1 Claim**

1. An apparatus for manufacturing a continuous spine fin heat exchanger tube including a helically wound spine fin material supported on a base tube member which comprises:
means advancing said base tube member at a preselected rate of speed;
means helically winding said spine fin material in intimate contact with adjacent wraps and the outer wall of said advancing tube to form said spine fin heat exchanger;
means for moving spine fin from adjacent wraps of said spine fin material into interlocking engagement for securing a preselected portion of said spine fin material at spaced



intervals along the advancing spine fin heat exchanger so as to prevent movement thereof relative to said base tube member; and
means severing said advancing heat exchanger in said preselected portion to form predetermined lengths of said heat exchanger with said preselected portion forming end portions effectively held against movement relative to said base tube member so that the other portion of said helically wound spine fin material intermediate said preselected portion is maintained in its initial helically wound position.

4,095,322
METHOD OF FABRICATING A COMPOSITE AERODYNAMIC ROTOR BLADE ASSEMBLY
Thomas S. Scarpati, Mt. Laurel, N.J., and Robert J. Ford, Bromall, Pa., assignors to The Boeing Company, Seattle, Wash.
Filed Aug. 30, 1976, Ser. No. 718,796
Int. Cl.[2] B23P *15/00, 9/00;* B32B *1/10, 3/12*
U.S. Cl. 29—156.8 P **66 Claims**



1. A method of fabricating a composite areodynamic rotor blade assembly utilizing a single method die mold, the assembly including: a cap member having an outer surface which defines a leading edge of the blade and an inner surface with a nose block engaging portion, a spar engaging portion and an aft fairing skin member engaging portion; a nose block having a spar engaging surface; a spar heel; a spar having a root end and an outer surface with a spar heel engaging portion; an aft fairing structure which defines a trailing edge of the blade and comprises a lightweight core having front, rear, top and bottom surfaces, with the top and bottom surfaces being contoured to a desired portion of an airfoil shape, and a skin member secured to each one of the top and bottom surfaces; and a

tip cover having a surface which engages the cap member and the skin members, the method comprising the steps of:

a. forming the aft fairing structure in a bonding assembly jig by:
   (i) attaching with an adhesive, a skin member to each of the top and bottom surfaces of the core;
   (ii) attaching with an adhesive, the spar heel to the front surface of the core and to each skin member; and
   (iii) securing the attached surfaces to each other by the application of heat and pressure to the bonding assembly jig;
b. placing the spar, the cap member, the nose block, the aft fairing structure and the tip cover into the single matched die mold with:
   (i) the nose block engaging portion, the spar engaging portion and the aft fairing skin member engaging portion of the inner surface of the cap member in engagement with the nose block, the spar and the aft fairing skin members, respectively;
   (ii) the spar engaging surface of the nose block engaging the spar;
   (iii) the spar heel engaging portion of the outer surface of the spar engaging the spar heel;
   (iv) the tip cover surface engaging the cap member and the skin members; and with
   (v) the engaged surfaces in (i) - (iv) being attached with an adhesive; and
c. securing the attached surfaces to each other in the single matched die mold through the application of heat and pressure to thereby form the composite aerodynamic rotor blade assembly.

4,095,323

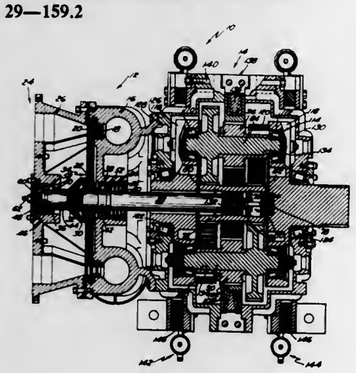
GEAR TOOTH ALIGNMENT BY STRAIN

Giovanni Silvestri, 4 Meadowbrook Dr., Barrington, R.I. 02806

Filed May 18, 1977, Ser. No. 798,061

Int. Cl.² B23P *15/14, 19/00*

U.S. Cl. 29—159.2 **3 Claims**



1. A method of gear tooth alignment of a planet gear cluster of more than one stage in a multi-cluster gear train assembly, including a plurality of planet gear clusters and a ring gear, comprising the steps of:

assembling the first stage gear and the second stage pinion of the planet gear cluster with a transition fit in a common area;

welding the common area;

assembling the planet gear cluster in a multi-cluster gear train assembly;

locking the output shaft of the multi-cluster gear train assembly; and

torsionally loading the input shaft of the multi-cluster gear train assembly beyond the yield point of the welded area to cause a permanent repositioning of all gears.

4,095,324

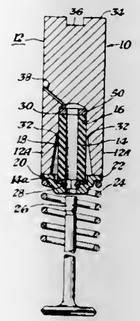
HANDHELD VALVE REPLACEMENT TOOL

William Lawson, 1341 SW. 21st Ter., Fort Lauderdale, Fla. 33311

Continuation-in-part of Ser. No. 584,365, Jun. 6, 1975, abandoned. This application May 28, 1976, Ser. No. 690,914

Int. Cl.² B23P *19/04*

U.S. Cl. 29—249 **2 Claims**



1. An impact tool for the removal and replacement of valve stem keepers for a valve spring retainer on a valve stem as utilized in a conventional internal combustion engine comprising:

a relatively rigid, elongated body, said body having a striker surface and having in one end a first chamber and a second chamber, said first chamber having a conically tapered internal wall and said second chamber having a smaller relative diameter than said first chamber disposed within the end of said first chamber; and

a resilient, valve stem keeper restraining sleeve removeably connectable within said second chamber, said resilient sleeve protruding into said first chamber, said sleeve having an annular recess disposed at the distal end sized to receive said valve stem keepers.

4,095,325

METHOD FOR TIGHTENING BOLTS

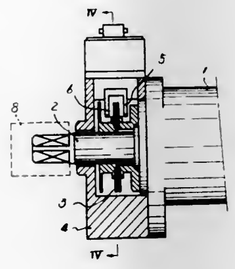
Hiroshi Hashimoto, and Kinya Mori, both of Aichi, Japan, assignors to Sanyo Machine Works, Ltd., Japan

Filed Dec. 22, 1975, Ser. No. 642,706

Claims priority, application Japan, Dec. 24, 1974, 50-3163; Oct. 13, 1975, 50-123449; Oct. 13, 1975, 50-123450; Oct. 13, 1975, 50-123451; Oct. 14, 1975, 50-124025; Oct. 14, 1975, 50-124026

Int. Cl.² B23Q *17/00*

U.S. Cl. 29—407 **9 Claims**



1. A method for tightening a bolt to a member to be clamped comprising applying rotatable bolt head engaging means to the head of the bolt, rotating the bolt head engaging means at a high speed for a period of time sufficient for the bolt head to reach a particular point in relation to the bearing surface of the member to be clamped that is not beyond the snug point of the bolt head to the bearing surface, reducing the speed of rotation of the bolt head engaging means when said particular point has been reached to a low speed, continuing the rate of rotation of the bolt head engaging means at a low rate of speed from said particular point until said bolt is tightened beyond the yield point thereon and thereafter rotating said bolt head engaging means in a reverse direction at said low rate of speed through a fixed angle to obtain the proper tightening force.

4,095,326

METHOD AND APPARATUS FOR INSERTING POST-STRESSING TENDONS IN CONCRETE STRUCTURES

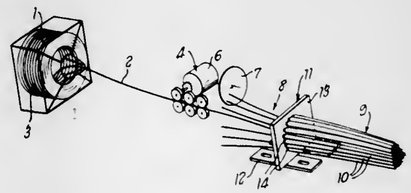
John Terence Crawford Harvey, Beaconsfield, England, assignor to Societe Technique Pour L'Utilisation De La Precontrainte, Boulogne, France

Filed May 4, 1976, Ser. No. 683,063

Claims priority, application United Kingdom, May 6, 1975, 19027/75

Int. Cl.² B23P *17/00*

U.S. Cl. 29—417 **11 Claims**



1. In the post-stressing of concrete structures, a method of inserting a post-stressing tendon into a duct in the structure which comprises providing at least two elongate parking ducts externally of the duct in the concrete structure, inserting at least one tendon strand into one of the elongate parking ducts to house the strand along at least a substantial portion of its length, inserting at least one further strand into anOther of the parking ducts to house the strand along at least a substantial portion of its length, and drawing all of said strands as a group simultaneously from the respective parking ducts into the duct in the structure.

4. Apparatus for inserting a post stressing tendon into a duct in a concrete structure comprising a sheaf of open ended, elongate parking tubes, each tube having a length sufficient to receive at least a substantial portion of one tendon strand, means for feeding successive lengths of strand from a supply coil to each of said parking tubes, means for severing successive lengths of strand from the supply coil, and means for drawing all of said strands as a group simultaneously from said parking tubes and into a common duct in a concrete structure to form a tendon therein.

4,095,327

METHOD OF SECURING A NUT TO A SUPPORT PLATE

Erich Hartmann, Hillsdale, N.J., assignor to Stauff Corporation, Waldick, N.J.

Filed Jul. 30, 1976, Ser. No. 710,224

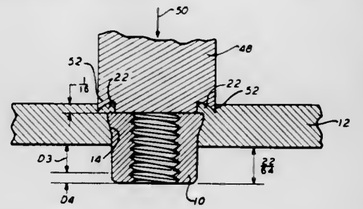
Int. Cl.² B21D *39/00;* **B23P** *11/00*

U.S. Cl. 29—509 **1 Claim**

1. Method of securing a metal nut to a metal support plate, the nut having (i) an upper portion provided with an external surface tapering generally inwardly from the top of the nut to generally inwardly from the top of the nut to generally the middle of the nut, and (ii) a lower portion provided with an external surface of generally right cylindrical configuration extending from generally the middle of the nut to the bottom of the nut, comprising the steps of:

forming an aperture in the support plate, the aperture defined by a wall having (i) an upper portion of generally tapered configuration complementary to the generally tapered external surface of the nut and tapering generally inwardly from the top of the surface to approximately four fifth of the depth of the aperture, and (ii) a lower portion of generally right cylindrical configuration complementary to the generally right cylindrical external surface of the nut and extending from the tapered portion of the wall to the bottom of the aperture;

inserting the nut downwardly into the aperture with the generally tapered external surface of the nut in loose engagement with the generally tapered portion of the wall defining the aperture and with the lower portion of the nut



of generally right cylindrical configuration extending through the generally right cylindrical portion of the wall; and

forcing the nut downwardly a predetermined distance into the aperture to force the generally tapered external surface of the nut, and thereby the upper portion of the nut, into tight frictional engagement with the generally tapered upper portion of the wall and concurrently swaging predetermined peripheral portions of the support plate surrounding the top of the aperture into engagement with and over predetermined peripheral portions of the top of the nut to lock the nut downwardly in the aperture and to prevent the nut from being forced upwardly out of the aperture thereby securing the nut to the support plate.

4,095,328

METHOD OF CLAMPING SHEATHED ROD, STRAND, OR ROPE

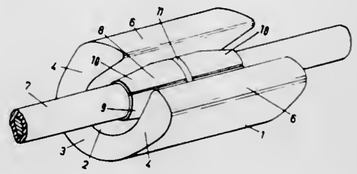
Stephen Cawthorne, Wadworth, near Doncaster, England, assignor to Bridon Limited, England

Division of Ser. No. 637,240, Dec. 3, 1975, Pat. No. 4,065,225. This application Feb. 25, 1977, Ser. No. 772,016

Claims priority, application United Kingdom, Dec. 3, 1974, 52211/74

Int. Cl.² B21D *39/00;* **B23P** *11/00*

U.S. Cl. 29—515 **3 Claims**



1. A method of applying to a plastics-sheathed line a clamp comprising a hard tubular element divided longitudinally into at least two separable parts, retaining means for holding the parts of the tubular element together, and a ductile metallic elongate clamp body longer than the tubular element and having a longitudinal channel which receives the tubular element, the method comprising the sequential steps of:

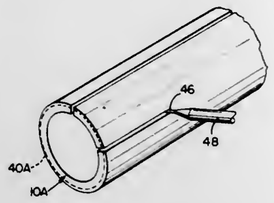
(i) removing the sheathing over a length greater than that of the tubular element but less than that of the clamp body,
(ii) positioning the parts of the tubular member about the unsheathed length of the line,
(iii) applying the retaining means to the tubular element,
(iv) inserting the tubular element into the longitudinal channel of the clamp body, the unsheathed length lying wholly within the channel, and
(v) connecting the ductile clamp body so as to close the mouth of the channel, to form the interior of the body to the external shape of the tubular element and the parts of the line lying on either side of the tubular element, and to force the tubular element into gripping engagement with the unsheathed length of line.

4,095,329

MANUFACTURE OF SEMICONDUCTOR RIBBON AND SOLAR CELLS

Kramadhati Venkata Ravi, Sudbury, Mass., assignor to Mobil Tyco Solar Energy Corporation, Waltham, Mass.

Filed Dec. 5, 1975, Ser. No. 638,186
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—572 **12 Claims**



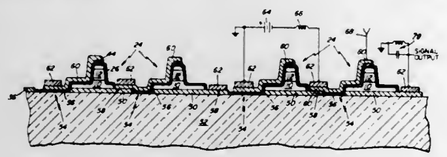
1. A method of producing ribbon-like substantially monocrystalline bodies for use in fabricating solar cells comprising the steps of:
(a) providing a tubular substantially monocrystalline body of a semiconductor material;
(b) forming a photovoltaic junction in the tubular body; and then
(c) dividing said tubular body lengthwise into a plurality of ribbon-like bodies.

4,095,330

COMPOSITE SEMICONDUCTOR INTEGRATED CIRCUIT AND METHOD OF MANUFACTURE

Chung K. Kim, Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.

Division of Ser. No. 718,484, Aug. 30, 1976, abandoned, which is a continuation of Ser. No. 465,213, Apr. 29, 1974, abandoned. This application Jun. 27, 1977, Ser. No. 810,143
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—580 **6 Claims**



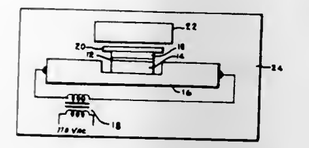
1. The method of fabricating a composite of semiconductor elements on a supporting substrate comprising:
forming a wafer of semiconductor material;
at least partially forming semiconductor elements upon one surface of said wafer as at least one epitaxial layer of semiconductor material;
forming pedestals by etching partially through said at least one epitaxial layer to form regions projecting from said wafer;
forming grooves in said epitaxial layer extending into said wafer between said elements beyond the active regions of said semiconductor elements, said grooves being formed in regions of said wafer which are offset from said pedestals;
bonding a layer of material having a higher plasticity than said semiconductor material over said pedestals and said surfaces;
removing semiconductor material from the side of said wafer opposite to said surface to expose said material in said grooves and separte said semiconductor elements from each other.
bonding a substrate to said elements; and
removing said layer of material having a higher plasticity than said semiconductor material.

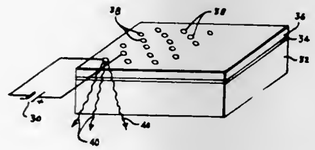
4,095,331

FABRICATION OF AN EPITAXIAL LAYER DIODE IN ALUMINUM NITRIDE ON SAPPHIRE

Richard Frederick Rutz, Cold Spring, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 4, 1976, Ser. No. 738,916
Int. Cl.[2] B01J *17/00;* **H01L** *21/203, 21/205*
U.S. Cl. 29—589 **6 Claims**





1. A method of making a light emitting diode array comprising the steps of:
sputtering aluminum nitride onto a sapphire substrate,
placing said sapphire substrate in contact with a source material of aluminum nitride in a gaseous environment of a predetermined ratio,
heating said sapphire substrate and said source material to a predetermined temperature,
depositing said source material onto said sapphire substrate to a predetermined thickness to form a layered surface, and
alloying a plurality of conductive dots onto the surface of said layered surface in a predetermined configuration.

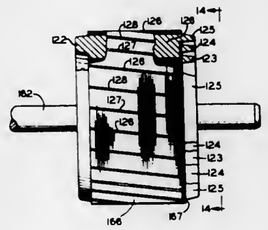
4,095,332

METHOD OF MAKING HIGH EFFICIENCY INDUCTION MOTOR WITH MULTI-CAGE CIRCUIT ROTOR

Clovis E. Linkous, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 471,743, May 20, 1974, Pat. No. 3,987,324. This application Oct. 4, 1976, Ser. No. 729,429
Int. Cl.[2] H02K *15/12*
U.S. Cl. 29—598 **5 Claims**

1. A method of making an induction motor having a magnetic stator core assembly with winding turns that establish a predetermined number N of instantaneous fundamental magnetic poles during operation and a rotor constructed so that a selected space harmonic of a given number does not couple therewith during operation, the method comprising: stacking together in predetermined aligned relation of plurality of laminations each having conductor accommodating openings therein, including aligning the laminations so that slots therein are aligned and thereby establishing predetermined slot patterns and defining axially extending cage slot sets with adjacent ones of the axially extending slots of each such set spaced apart a fraction of a fundamental pole pitch with the fraction being equal to two divided by the given number of the space harmonic to be decoupled; casting conductors in the axially



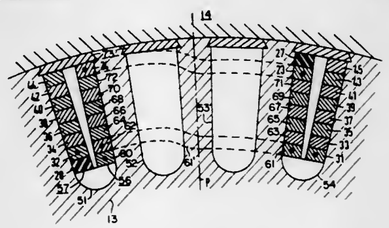
extending cage slots and establishing a plurality of cage sets of conductors with adjacent conductors of each such cage set spaced apart a fraction of a fundamental pole pitch with the fraction being equal to two divided by the given number of the space harmonic to be decoupled and thus forming a cast rotor assembly of laminations and the plurality of cage sets of conductors, and processing at least part of the cast assembly to ensure sufficient resistance between the laminations and cage conductors to substantially prevent subsequent rotor coupling with the selected space harmonic; and thereafter assembling the cast rotor assembly with the magnetic stator core assembly having windings thereon for establishing the predetermined number N of fundamental magnetic poles.

4,095,333

METHOD OF INTRODUCING THE COILS OF A SUPERCONDUCTIVE EXCITER WINDING INTO THE SLOTS OF A TURBOGENERATOR ROTOR

Heinrich Küter, Wattenscheid, and Erich Weghaupt, Mülheim, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim (Ruhr), Germany

Filed Feb. 9, 1977, Ser. No. 766,962
Claims priority, application Germany, Feb. 12, 1976, 2605640
Int. Cl.[2] H02K *15/09*
U.S. Cl. 29—598 **4 Claims**



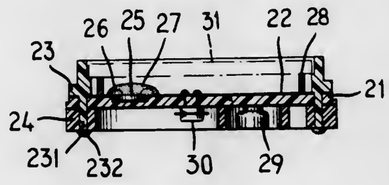
1. Method of introducing the coils of a superconductive exciter winding into slots formed in a winding support member of a turbogenerator rotor, the slots having a radially extending cross section with the base thereof disposed at the radially inward end thereof, which comprises winding first an inner coil and then an outer coil of a pair of concentric coils forming respective parts of a double coil into two of the slots spaced from one another in accordance with the respective width of the coil, the inner and the outer coils in the respective slots being continuously wound beginning at the slot base and in respective opposite rotary sense so that a non-interrupted transition from the inner coil to the outer coil occurs at the slot base.

4,095,334

PROCESS OF ASSEMBLING COMPONENTS OF ELECTRONIC WATCH

Masataka Uchida, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jan. 28, 1977, Ser. No. 763,597
Claims priority, application Japan, Jan. 29, 1976, 51-8658
Int. Cl.[2] G04C *3/00;* **H05K** *5/00*
U.S. Cl. 29—627 **4 Claims**



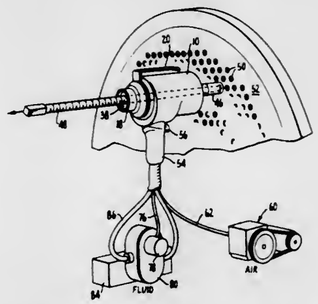
1. In a process of making an electronic watch, the combination of steps comprising:
providing a substrate of insulating material with at least one through hole,
providing a conductive circuit on at least one face of said substrate to form a circuit board,
mounting an integrated circuit chip on one face of said circuit board,
electrically connecting the integrated circuit of said chip with the circuit of said circuit board,
covering said chip and its connection to said circuit board with an insulating potting material,
separately forming two plates of synthetic resin material,
sandwiching said circuit board between said plates and connecting said plates and circuit board through said through hole to form a unitary assembly.

4,095,335

AUTOMATIC TUBE PULLER

Yves Albert Robert Lassarat, Sainte Adresse, France, assignor to Trouvay & Cauvin, Le Havre, France

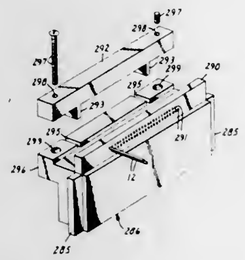
Filed Jan. 12, 1977, Ser. No. 758,804
Int. Cl.[2] B23P *15/26*
U.S. Cl. 29—726 **6 Claims**



1. Apparatus comprising a cylinder, a pair of pistons mounted for axial movement within said cylinder, means defining an axial passageway extending through said cylinder and said pistons for the accommodation of an elongate member to which an axial force is to be applied, jaw means carried by said cylinder adapted to close and grip said member and open and release said member, means to move said pistons apart, means responsive to the movement of one of said pistons away from

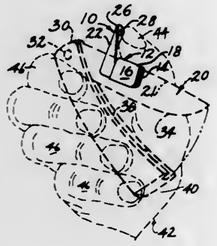
the other to close said jaw means into gripping engagement with said member, a fixed reaction member, and means responsive to the movement of the other of said pistons away from said one piston to thrust against said reaction member and thereby apply an axial force to said elongate member through the medium of said jaw means.

4,095,336
COMB MEANS FOR CONNECTING STATION
James D. Throne, Maple Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Sep. 6, 1977, Ser. No. 830,852
Int. Cl.[2] H01R *43/04*
U.S. Cl. 29—749 **1 Claim**



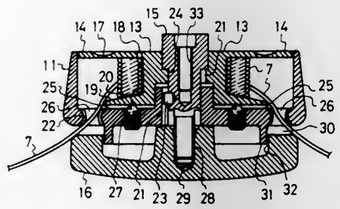
1. In an apparatus for attachment of connectors to multiple wire pairs comprising:
a base having a longitudinal axis,
a connector receiving station on said base having a supply side and a product side and comprising a receptacle for a connector,
means in said base for elevating said connector receiving station with respect to said base and
arm means rotatable about the said axis of said base from a horizontal position to a position immediately above said connector receiving station, said arm means comprising anvil means positioned to contact a connector in said receptacle of said connector receiving station when said connector is covered and said connector receiving station is elevated, the improvement consisting of comb means mounted on the supply side of said connector receiving station
said comb means having a body with tongues for engagement with grooves in said connector receiving station, a wire guide with two rows of staggered holes of a size for allowing the wires of said multiple wire pairs to readily pass through, and an extension on said body bearing wire gathering means.

4,095,337
FINGER ACTUATOR FOR FOLDED KNIFE BLADE
Cecil O. Pharr, 2272 La Vista Woods Dr., Atlanta, Ga. 30084
Filed Dec. 17, 1976, Ser. No. 751,796
Int. Cl.[2] B26B *1/02*
U.S. Cl. 30—158 **2 Claims**



1. In a knife actuator for a folding knife having a handle and a blade folded thereon for movement from a folded position to an extended position, said blade having a cutting and a non-cutting edge, said knife actuator comprising:
a pair of resilient, spring attaching plates attached along a common line which is positioned substantially co-extensively with and for attachment to the non-cutting edge of the blade, actuating means on said attaching plates comprising a first member extending upwardly on one side of said knife blade and said first member then bending outwardly substantially perpendicular to th knife blade providing a flat finger plate for operating said blade by pushing said plate with the thumb while holding said knife in the same hand as the thumb, said attaching plates being mounted by being manually urged apart against spring action in order to position same over said knife blade whereupon after release said plates spring tightly into place thereby holding said plates firmly in place on said blade, and said plates being manually slidable on said blade to adjust same.

4,095,338
LAWN TRIMMER EQUIPPED WITH FLEXIBLE LINE CUTTING EDGES
Hobara Naohiko; Hori Katsumi, and Sugimoto Sadanobu, all of Okayama, Japan, assignors to Kaaz Machinery Co., Ltd., Okayama, Japan
Filed Jun. 27, 1977, Ser. No. 810,185
Claims priority, application Japan, Jun. 26, 1976, 51-84347[U]
Int. Cl.[2] A01D *55/18;* B26B *27/00*
U.S. Cl. 30—276 **8 Claims**

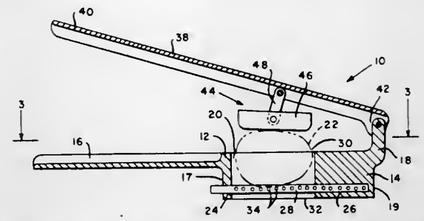


1. A lawn trimmer provided with flexible line cutting edges comprising:
a dish-shaped bobbin housing having an open top end;
a rotary shaft provided in said housing;
a bobbin rotatably provided on said shaft and having a bottom flange and having a top flange closing said open top end of said housing;
a flexible line wound on said bobbin;
at least one finger grip provided in said top flange such that said bobbin may be rotated manually independently of said housing;
at least one flexible line extension hole provided in a bottom of said housing; and
a guide plate coupled to said housing.

4,095,339
EGG SLICER
Rose Turner, 470 W. 24th St., London Ter. Apts., New York, N.Y. 10011
Filed Feb. 17, 1977, Ser. No. 769,665
Int. Cl.[2] B26B *3/00*
U.S. Cl. 30—279 R **7 Claims**

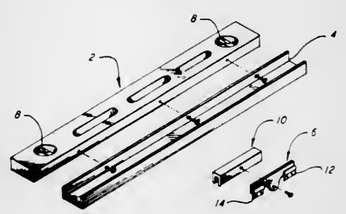
1. An improved egg slicer comprising a lower member, an upper member pivotally connected to the lower member and a cutter means slideably removably mounted in the lower member, said cutter means including a plurality of elongated blades disposed in spaced apart parallel relationship pivotably secured

to at least a pair of elongated bars disposed in spaced apart relationship, one of said pair of said bars being linearly shiftable



relative to the other said pair of bars when said cutting means is disposed mounted in said lower member.

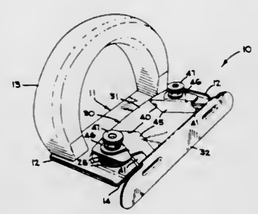
4,095,340
APPARATUS FOR TRIMMING OVERLAPPING EDGES
Ronald Kingsley, Fyler Rd., Chittenango, N.Y. 13037
Filed Jan. 7, 1977, Ser. No. 757,770
Int. Cl.[2] B26B *27/00;* B25F *1/04*
U.S. Cl. 30—287 **3 Claims**

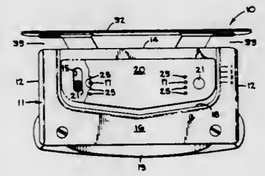


1. A wall paper trimmer comprising
(a) a rectangular base having flat top and bottom and parallel sides,
(b) a spirit level mounted on said base,
(c) a track secured to one of the long sides of said base, said track being of trough shaped configuration of rectangular cross section having a bottom and upwardly extending sides,
(d) a slide member in sliding engagement with said track,
(e) a knife holder pivotally mounted on said slide member by a centrally located pivot shaft,
(f) a pair of oppositely positioned linerally aligned cutting blades mounted on said knife holder.

4,095,341
CARPET TRIMMER
Millard Crain, Pleasanton, Calif., assignor to Crain Cutter Company, Inc., Santa Clara, Calif.
Filed Oct. 25, 1977, Ser. No. 844,644
Int. Cl.[2] B26B *29/00*
U.S. Cl. 30—287 **9 Claims**

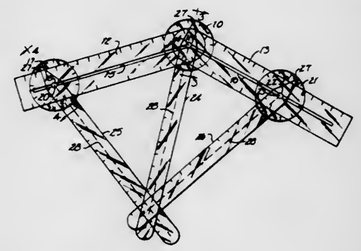
1. A carpet trimmer comprising:
(a) a base plate, said base plate being relatively flat and comprising a wall means for travelling over a carpet to be trimmed said wall means being formed with a working edge and at least one slot directed at right angles to said working edge;
(b) a handle mounted on said base plate for moving said base plate along a path extending in the direction of said working edge;
(c) a relatively flat member underlying said base plate and movable relative to said base plate;
(d) at least one upstanding post fixed to said member and projecting through said slot formed in said base plate;
(e) a blade holder comprising a base and a wall guide depending from said base, said base of said blade holder overlying said base plate and being formed with an opening to receive said upstanding post, said depending wall guide of said blade holder being spaced from said working edge of said base plate to define a carpet entry space for receiving an edge of a carpet to be trimmed, the movement of said member relative to said base plate moves said upstanding post therewith within said slot for said upstanding post to urge said blade holder to move therewith relative to said base plate for adjusting the space between





said working edge of said base plate and said wall guide of said blade holder to accommodate the width of a carpet disposed in said carpet entry space to be trimmmed;
(f) at least one blade mounted on said base of said blade holder and projecting into said carpet entry space for trimming a carpet; and
(g) means on said posts to releasably lock said blade holder and said member in an adjusted position relative to said base plate.

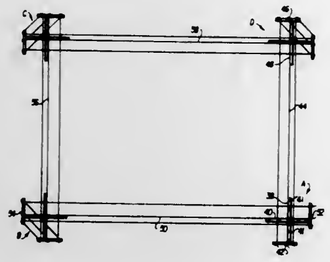
4,095,342
RADIO NAVIGATION AID
Donald E. Oertli, Rte. 2, Box 2146, Hamilton, Mont. 59840
Filed Jan. 10, 1977, Ser. No. 757,976
Int. Cl.[2] G01C *21/20;* G06G *1/00*
U.S. Cl. 33—1 SD **3 Claims**



1. In a radio navigation aid:
first and secondary primary elongate arms movably connected to one another about a first axis for independent pivotal motion of the respective arms, each primary elongate arm having a longitudinal axis radiating outward from said first axis;
a first compass rose rotatably mounted to said first and second primary elongate arms about said first axis;
a second compass rose rotatably mounted to said first primary elongate arm about a second axis that is parallel to

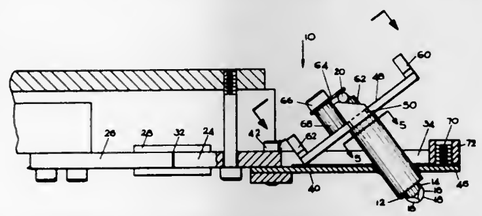
and spaced from said first axis and which is located along the longitudinal axis of said first primary elongate arm;
a third compass rose rotatably mounted to said second primary elongate arm about a third axis that is parallel to and spaced from said first axis and which is located along the longitudinal axis of the second primary elongate arm;
means for permitting relative longitudinal movement between the first compass rose and the second compass rose along the longitudinal axis of the first primary elongate arm;
means for permitting relative longitudinal movement between the first compass rose and the third compass rose along the longitudinal axis of the second primary elongate arm;
a first secondary elongate arm pivotally mounted about said first axis for motion independent of said first compass rose and said primary elongate arms;
a second secondary elongate arm pivotally mounted about said second axis for motion independent of said second compass rose and said first primary elongate arm;
and a third secondary elongate arm pivotally mounted about said third axis for motion independent of said third compass rose and said second primary elongate arm;
each secondary arm having a pointer thereon overlapping the compass rose centered on the axis about which it is mounted and capable of visually indicating a heading on the compass rose;
said secondary elongate arms each extending to a common side of the first and second primary elongate arms, and said first compass rose being intermediate the second and third compass roses;
and means for selectively fixing the positions of said first, second and third compass roses and said first and second primary elongate arms relative to one another while permitting pivotal movement of the secondary elongate arms about the respective axes about which they are mounted.

4,095,343
BUILDING LAYOUT TEMPLATES
J. C. McPhail, 8530 W. Pinetta Dr., Richmond, Va. 23235
Filed Apr. 20, 1977, Ser. No. 789,313
Int. Cl.² E04G *21/18*
U.S. Cl. 33—1 LE **10 Claims**



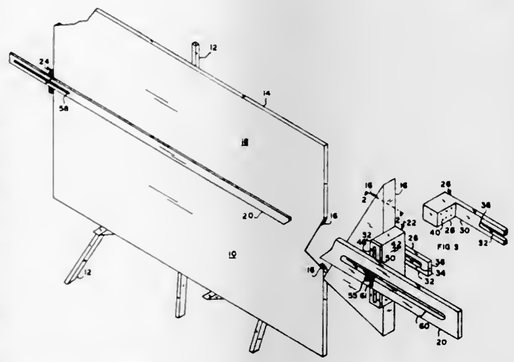
1. A building layout template for securing corner locations and laying wall and footing lines, the template comprising:
first strip means defining a straight edge of sufficient length to enable visual alignment of a first line parallel to said first strip means with reasonable accuracy;
second strip means defining a straight edge of sufficient length to enable visual alignment of a second line parallel to said second strip means with reasonable accuracy;
said first strip means being affixed to said second strip means at a predetermined angle of intersection so as to define a corner location;
third strip means attached to said first strip means at a point spaced from said corner location by a distance at least as great as the distance desired between said footing lines and having a plurality of end footing line locating means which lie in a line perpendicular to said first strip means;
said third strips means including an end wall line locating means situated at the intersection of said first and third strip means;
fourth strip means attached to said second strip means at a point spaced from said corner location by a distance at least as great as the desired distance between said footing lines and having a plurality of end footing line locating means which lie in a line perpendicular to said second strip means;
said fourth strip means including an end wall line locating means situated at the intersection of said second and fourth strip means and;
said first, second, third and fourth strip means being in the same plane.

4,095,344
SCRIBE TOOL AND MOUNT THEREFOR
James W. Loomis, 2125 Palmer Dr., St. Helena, Calif. 94574
Filed Aug. 24, 1976, Ser. No. 717,410
Int. Cl.² B43L *13/00*
U.S. Cl. 33—18 R **22 Claims**



1. A mount for a scribing tool of the type having a shank provided at one end with a cylindrical cross bar and at the opposite end with a diamond head having a scribe edge comprising: an arm adapted to be movable in a predetermined scribing direction relative to an article to be scribed; and a tool holder on the arm for movement therewith relative to said article, said tool holder having means for positioning the shank of the tool and inclined surface means for engaging the cross bar of the tool and orienting the same and thereby the scribe edge of the diamond head relative to said scribe direction.

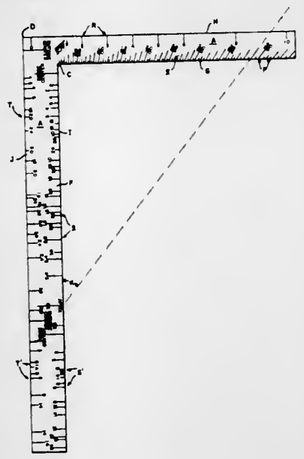
4,095,345
STRAIGHT EDGE ASSEMBLY
Harris L. Smith, 6109 Stratford Ct., Huntsville, Ala. 35806
Filed Dec. 27, 1977, Ser. No. 864,454
Int. Cl.² B43L *13/02*
U.S. Cl. 33—80 **3 Claims**



1. A straight edge assembly for an artist's stretched canvas, a rectangular frame having rectangularly cross sectioned frame

members supporting the back side of a sheet of canvas wherein each frame member has a discrete front-to-back thickness, and said assembly comprising:
an elongated flat surfaced rod having a straight edge and longitudinally extending openings in end regions of the rod normal to said straight edge;
first and second L-shaped blocks, each having perpendicular meeting inside surfaces which engage inside and back sides of a portion of said rectangularly cross sectioned frame, and having an end region which extends outwardly beyond the side of said frame; and
first and second clamping blocks having a pair of planar opposite surfaces separated by a thickness dimension which is greater than said discrete front-to-back thickness of said frame member, and each including:
a slot in one of said surfaces of said clamping block and a connector held by an interior region of said clamping block and extending outwardly through and movable along said slot,
position locking means for coupling said connector through said elongated opening in said rod and locking said clamping block to said rod, and
means for adjustably clamping a said end region of said L-shaped block to said clamping blocks with said portion of frame member clamped between an L-shaped block and a said clamping block,
whereby said rod is locked at a spaced distance in front of said stretched canvas and at selected positions which are adjustably movable by said position locking means.

4,095,346
PIPEFITTING SQUARE
Huey Cox, 3145 William Tell St., Slidell, La. 70458
Filed Dec. 13, 1976, Ser. No. 750,016
Int. Cl.² B43L *7/00*
U.S. Cl. 33—113 **13 Claims**



13. A square for use in fitting pipe of conventional size, said square comprising a tongue and a body extending perpendicular to said tongue, said tongue and body each having inside and outside edges intersecting each other at inside and outside heels respectively, and each having a face surface and a back surface, wherein one of said square tongue face edges has markings with numerical degree indicia associated therewith, each of said markings comprising a line disposed at a numerically indicated angle α with respect to an edge of said body face, all said lines intersecting said body face edge at a common, "APEX", point, each of said lines being located a distance DP from a square heel wherein DP = DA × tan ×, DA being the distance the common "APEX" point is spaced along said body edge from the same square heel from where the distance DP is measured, said square further comprising
a plurality of markings disposed on each of the other edges of the square, each of said markings having numeral indicia associated therewith corresponding to an actual conventional pipe size,
said tongue back inside edge and said body back inside edge having markings disposed thereon spaced from said inside heel a distance equal to the actual outside radius for the indicated conventional particular pipe numeral,
said tongue face outside edge having a line with the indicia "Outside Center" disposed thereon and a plurality of markings being provided spaced along said tongue face outside edge a distance equal to the actual outside radius for the indicated conventional particular pipe numeral from said "Outside Center" line,
said tongue back outside edge and said body back outside edge each having markings disposed therealong spaced a distance 1.5 PS from said outside heel wherein PS is the pipe size numeral indicia corresponding to each marking,
said tongue face outside edge having a reference line with indicia "O" disposed thereon and having markings disposed therealong spaced a distance 1.5 PS from said "O" indicia,
said body face inside edge having markings spaced a distance from a reference therealong according to the formula IRP × sin β, wherein IRP is the actual inside radius for a pipe size numeral corresponding to the marking, and wherein β is the angle formed by division of a circumference into a number of divisions q, so that $\beta = 360°/q$, and
said body face outside edge having at least one reference line thereon with indicia "Outside Center", and having markings spaced a distance from said reference line therealong according to the formula ORP × sin β, wherein ORP is the actual outside radius for a pipe size numeral corresponding to the marking.

4,095,347
SIGHTING IN APPARATUS FOR RIFLE MOUNTED TELESCOPE GUNSIGHTS
Walter J. Steffan, 17838 SE. Lincoln St., Portland, Oreg. 97233
Continuation-in-part of Ser. No. 613,891, Sep. 16, 1975, abandoned. This application May 5, 1977, Ser. No. 794,221
Int. Cl.² F41G *1/38*; G01C *15/08*
U.S. Cl. 33—234 **5 Claims**

1. Sighting in apparatus for rifle mounted telescope gunsights comprising
(a) a sighting gauge having top and front edges,
(b) rod-like support means having one end portion secured to said sighting gauge and arranged at its other end to be rotatably received in the muzzle end of a rifle barrel,
(c) said gauge being counterweighted at its lower portion to form a pendulus support for the gauge on the support means and hold it vertical when the support means is supported in the muzzle end of a rifle,
(d) a sighting target mounted on the front edge of said gauge having intersecting vertical and horizontal reference lines to be used in sighting in the telescope gunsight,
(e) lens means arranged to focus the gunsight to the sighting target when the latter is supported on the muzzle end of the barrel,
(f) a holder having a bore extending from front to rear thereof,
(g) an insert at the front of said holder supporting said lens means in said holder,

(h) a plurality of chuck-type jaws on said holder having radial movement for engaging a gunsight and holding said holder on gunsight to sight in a rifle by means of said sighting gauge,

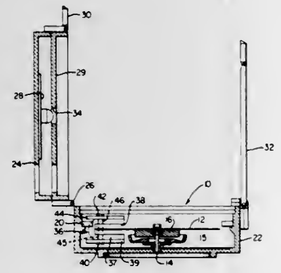
(i) and a manually operated rotatable drive member having a spiral groove in which said teeth are engaged and arranged when rotated to move said jaws radially in symmetrical movement for mounting said holder precisely on a gunsight from one time to the next.

4,095,348

DIGITAL COMPASS

Melvin G. Kramer, Riverton, Wyo., assignor to The Brunton Company, Riverton, Wyo.

Filed Nov. 10, 1976, Ser. No. 740,389
Int. Cl.² G01C *17/26*
U.S. Cl. 33—363 K **16 Claims**



1. In a digital compass, encoding means for converting compass readings into a numerical display corresponding to the directional displacement of said compass, comprising:

a rotatable disc including means orienting a radius of said disc in alignment with the earth's magnetic field, said disc having a reference position index and a digit code strip divided into equally spaced increments representing degrees of angular displacement away from said reference position index,

a sensing unit operative to generate a combination of signals and including a reference position sensor operative to generate a signal in response to alignment of said reference position sensor with respect to said reference position index so as to define a reference position, said combination of signals representing the direction and number of increments of movement of said code strip away from said reference position,

decoding means including counting means operative in response to the combination of signals generated by said sensor unit to count up or down in accordance with the direction and number of increments of movement of said digit code strip, and

reference position control means responsive to receipt of a reference position signal to clear said counting means.

4,095,349

HEAT EXCHANGER FOR CLOTHES DRYER

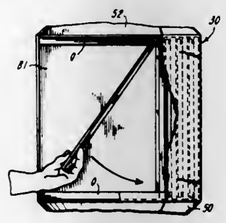
Charles L. Parker, 5499 Elmcrest Ln., Cincinnati, Ohio 45242

Filed Oct. 8, 1976, Ser. No. 730,843
Int. Cl.² F26B *19/00*
U.S. Cl. 34—86 **20 Claims**

1. A heat exchanger which utilizes lint and moisture laden hot exhaust gaseous media from a clothes dryer to preheat a portion of the ambient air introduced into a dryer in advance of the heating unit of a dryer, the heat exchanger comprising:

a housing having a first set of inlet and outlet ports for hot exhaust gaseous media and a second set of inlet and outlet ports for the ambient air, wherein the ports of the first set are disposed at substantial right angles with respect to the ports of the second set;

a plurality of flat, rectangular plates within the housing disposed in facially opposed spaced relationship, each plate having spacer means on a pair of opposite side edges thereof, said spacer means covering essentially the entire extent of said opposite side edges, said spacer means each having an abutting means thereon engaging the surface of an adjacent plate for essentially the entire extent of that adjacent plate to define a plurality of first flow channels between said spacer means, spacer means on said adjacent plate abutting a further adjacent plate to form a plurality of second flow channels, said adjacent plates being oriented with regard to each other so that said each plate spacer means are at essentially right angles with said



adjacent plate spacer means and said second flow channels are oriented at essentially right angles with regard to said first flow channels, said first flow channels being in fluid communication with the first set of inlet and outlet ports, said second flow channels being in fluid communication with the said second set of inlet and outlet ports,

hot exhaust gaseous media passing through the first passageways being completely isolated from air passing through the second passageways;

plate mounting means on said housing for releasably receiving each of said plates; and

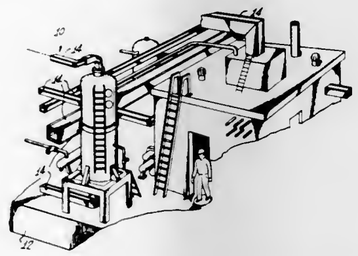
an access means on said housing for inserting and removing individual plates into and from said housing.

4,095,350

DUCTING CONSTRUCTION FOR ENGINEERING DESIGN MODELS

Herbert A. Wanderman, Pasadena, Calif., assignor to Engineering Model Associates, Inc., Monterey Park, Calif.

Filed May 31, 1977, Ser. No. 801,856
Int. Cl.² G09B *25/04*
U.S. Cl. 35—16 **9 Claims**



1. A method of fabricating a detailed, three-dimensional engineering design model of a large and complex installation such as a chemical processing plant or a power generating station, including arranging a plurality of rectangular tables adjacent each other to provide a supporting base for the model; positioning three-dimensional plastic representations of ducting, beams, piping, valves, fittings, vessels, and associated equipment on said base in a manner consistent with the positions of corresponding components of the installation; connecting said plastic representations to each other by solvent welding; and cutting said model vertically into rectangular sections

suitable for shipping, each section being supported by a different table, wherein the improvement comprises:

providing an assortment of ducting fabrication segments, each of said segments being a flat, solid member of rectangular outline having longitudinal, step-shaped, nesting configurations extending along its two longest parallel edges, said assortment including segments of various colors and dimensions; and

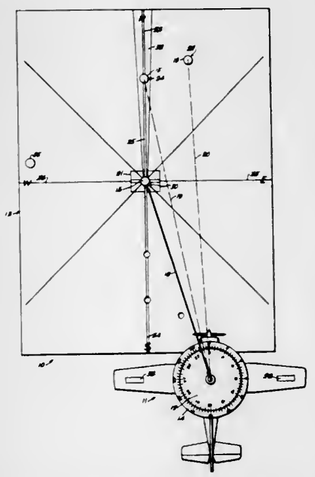
connecting segments selected from said assortment by solvent welding in groups of four so that said nesting configurations interlock to form representations of said ducting, all members of each of said groups being the same color.

4,095,351

NAVIGATIONAL SIMULATOR AND TEACHING DEVICE

Adrian S. Eisele, R.R. I, Germantown, Ill. 62245

Filed Oct. 26, 1976, Ser. No. 735,629
Int. Cl.² G09B *9/08*
U.S. Cl. 35—10.2 **10 Claims**



1. A navigation simulator and training aid for visually illustrating a navigational instrument reading as an angular relation between a vessel and a navigational aid utilized suitable for self-instruction by a student, comprising in combination

a horizontal map including simulated navigational aids

a rigid vertical navigational peg having an upper and lower end

lower end of said peg having means to attach to said map

an extensible member

means at the upper end of said peg for securing one end of said extensible member

a simulated vessel attached to the other end of said extensible member

a means for indicating the angle between the directional axis of said simulated vessel and said extensible member, whereby upon moving the vessel with relation to the navigational aid the radial relationship and vector to the navigational aid move in simulated relationship to each other.

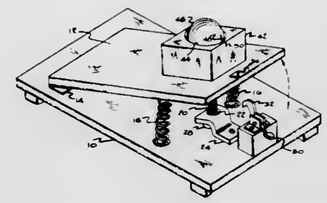
4,095,352

CHIROPRACTIC TRAINING DEVICE

Michael U. Kale, Rte. 6, Spartanburg, S.C. 29303

Filed Aug. 27, 1976, Ser. No. 718,187
Int. Cl.² G09B *23/28*
U.S. Cl. 35—17 **3 Claims**

1. An improved device for teaching proper application of force to the human body in chiropractic manipulation of the joints comprising a base member, a moveable member operatively connected to said base member for movement toward and away from said member along a predetermined path of travel, force-imparting means operatively associated with said members for continuously urging said moveable member away from said base member during its movement along said path of travel, means operatively associated with said members and defining opposite ends of said path of travel of said moveable member toward and away from base member, releasable locking means for engaging said moveable member at a position along said path of travel which is closely adjacent the end of said path of travel toward said base member to prevent its



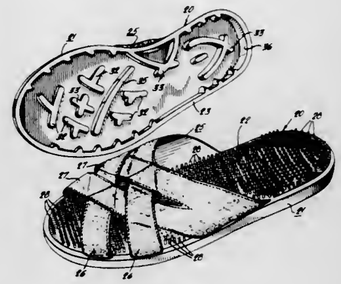
movement away from said base member, and a fracturable or deformable object supportably received on said moveable member for engagement by the hand for application of force thereto to move said moveable member, said object having a force of fracture or deformation under low velocity which is less than the force of said force-imparting means and having a force of fracture or deformation under high velocity which is greater than the force of said force-imparting means, whereby application of force to said object under high velocity is transmitted therethrough to said moveable member to move said member toward said base member and into engagement with said locking means deformation or fracture of said object.

4,095,353

MASSAGE SANDAL

Peter Andrew Foldes, Conyngham, Pa., assignor to Oggs Manufacturing Corp., Hazleton, Pa.

Filed May 5, 1977, Ser. No. 794,220
Int. Cl.² A43B *3/12, 13/38*
U.S. Cl. 36—11.5 **2 Claims**



1. A sandal for human wear comprising:

a. a sole portion of flexible material;

b. an inner sole portion integral with the sole portion, wherein the inner sole is formed of a plurality of flexible points cone-shaped having a uniform height in the range of 0.20 inches, a base diameter in the range of 0.09 inches, and a pointed apex, said points extending upwardly from the sole portion and having a density of 36 points per square inch; and

c. a top retaining strap portion integral with the sole portion; wherein the foot of a user when inserted into the sandal beneath the strap portion and into contact with the points of the inner sole, is constantly massaged during foot activity by the

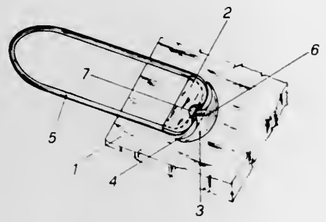
user through the action of the flexing of the points of the inner sole.

4,095,354

CONNECTOR FOR A REMOVABLE SKI BOOT FASTENING LOOP

Giuseppe Annovi, Montebelluna, Italy, assignor to Calzaturificio Giuseppe Garbuio S.A.S., Montebelluna, Italy

Filed Dec. 22, 1976, Ser. No. 753,373
Claims priority, application Italy, Dec. 29, 1975, 62072/75[U]
Int. Cl.[2] A43B *11/00*; A44B *21/00*
U.S. Cl. 36—50 **4 Claims**



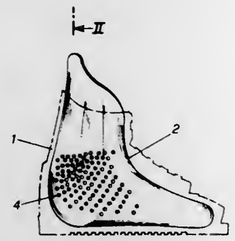
1. In a ski boot, a vamp section, a connector for a boot fastening loop molded integrally with the vamp section and rising from the exterior face of the vamp section, said connector provided in its outer face with an arcuate groove extending from side-to-side of the connector, and said groove having a restricted entrance slot through which a boot fastening loop may be engaged in the arcuate groove by being snapped through the restricted entrance slot, the entrance slot opening through the outer face of said connector.

4,095,355

SKI BOOT WITH AERATED PADDING OF DIFFERING DEGREES OF SOFTNESS

Giuseppe Annovi, Montebelluna, Italy, assignor to Calzaturificio Giuseppe Garbuio S.A.S., Montebelluna, Italy

Filed Dec. 22, 1976, Ser. No. 753,374
Claims priority, application Italy, Dec. 29, 1975, 62068/75[U]
Int. Cl.[2] A43B *5/04, 19/00*
U.S. Cl. 36—118 **6 Claims**



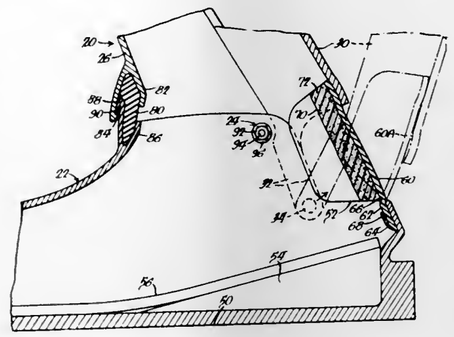
1. A ventilating ski boot with padding having differing degrees of softness at different areas of the foot of the wearer of the boot comprising an outer substantially rigid boot upper, and a soft inshoe housed within the upper and adapted to receive a wearer's foot, a plurality of spaced projections on at least one surface of the soft inshoe between which air may circulate, said projections adapted to have their tips contact an opposing surface within the ski boot, said projections varying in their distribution over the surface of the inshoe to thereby provide differing degrees of softness of the inshoe at certain areas thereof, said projections being most densely distributed adjacent to the malleoli, and said projections having a gradually less dense distribution toward the toe of the boot.

4,095,356

BOOT WITH PIVOTED UPPER

David T. Robran, and Charles S. French, both of Ketchum, Id., assignors to Scott USA, Inc., Sun Valley, Id.

Filed Oct. 15, 1976, Ser. No. 732,906
Int. Cl.[2] A43B *5/04, 21/00*
U.S. Cl. 36—121 **23 Claims**



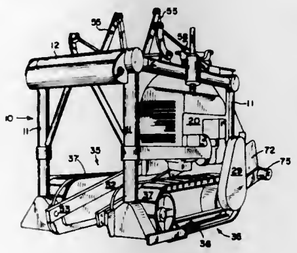
1. A boot comprising:
a lower vamp shell having a foot receiving opening defined by an outer wall which includes a lower pocket,
an upper shell having an outer wall which includes an upper pocket facing the lower pocket and forming therewith an interior cavity enclosed at least by overlapping outer walls of the upper and lower pockets,
pivot means for pivotally interconnecting the upper shell to the lower shell to allow forward and rearward motion of the shells and resulting sliding movement between the overlapped outer walls of the upper and lower pockets; and
a resilient body mounted within the interior cavity and compressed during sliding motion between the overlapped pockets to control the flex characteristics between the upper and lower shells.

4,095,357

TREE DIGGER

Wendell E. Daniel, Topeka, Kans., assignor to International Harvester Company, Chicago, Ill.

Continuation of Ser. No. 652,006, Jan. 26, 1976, abandoned, which is a continuation of Ser. No. 313,215, Dec. 8, 1975, abandoned, which is a continuation of Ser. No. 94,890, Dec. 3, 1970, abandoned. This application Apr. 28, 1977, Ser. No. 791,670
Int. Cl.[2] A01B *13/00*; A01G *23/00*
U.S. Cl. 37—2 R **1 Claim**



1. A plant digging machine having forward and rearward ends comprising:
a frame including an elevated portion and downward extending supports;
a pair of laterally spaced track assemblies connected to said supports;

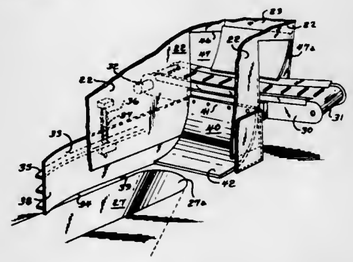
a pair of engines, each engine affixed to said frame and positioned above one of said pair of track assemblies;
an independent, variable speed drive train extending between each engine and its underlying track assembly;
each drive train including:
hydrostatic transmission having a variable volume pump driven by the engine and a hydraulic motor driven by the pump;
a drive sprocket driven by the motor;
a driven sprocket drivingly connected to one of said track assemblies; and
a driven chain extending between and drivingly connecting said drive and driven sprockets;
said supports, said engines, said driven trains and said track assemblies defining an open space therebetween to permit the plants to be straddled thereby as the machine is driven forward;
bell crank means rotatably supported on said elevated portion of the frame;
a pair of lift arms pivotally connected to said bell crank means and extending downward on each side of said open space;
a blade connected to the lift arms and positioned between said track assemblies and centrally of their length;
brace means extending between said blade and frame;
hydraulic ram means connected to said bell crank means for vertically adjusting said blade; and
an operator's station including a seat located on said frame above said elevated portion and toward the rear of the machine to permit ready observation of said blade and plants to be dug thereby within said open space.

4,095,358

APPARATUS FOR HIGH-SPEED TRENCH DIGGING BESIDE HIGHWAYS

Thomas G. Courson, Mansfield; William L. Schlueter, Rantoul, and Thomas T. Kelly, Champaign, all of Ill., assignors to Central Illinois Tile Co., Champaign, Ill.

Filed Feb. 4, 1977, Ser. No. 765,808
Int. Cl.[2] E02F *5/06*
U.S. Cl. 37—90 **2 Claims**



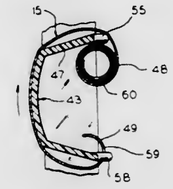
1. In a high-speed digging chain trencher, apparatus for trenching beside paved highway slab while leaving a clean trench for reception of drainage tubing overlaid with compacted sand fill free of loose soil, comprising:
a boom on the trencher having means carrying a drive chain with cutters for high speed cutting and opening of an earthen trench, said chain cutters piercing the soil and propelling loosened soil upwardly,
sheet metal shrouds having side walls and an end wall joining the side walls enclosing said boom and chain portion above ground level when said boom and chain is in its dug trench, said side and end walls providing an enlarged enclosed space upwardly and forwardly of the cutting portion of the chain to catch propelled earth from the cutting chain,
a lateral conveyor mounted in said shrouds at the lower end of said end wall above ground level and forward of the chain cutters relative to advancing direction and having a driven belt extending laterally to the side of said boom outside said shroud, said shroud side walls each terminating above the conveyor providing an opening above the belt to pass soil thereon out of the shroud, said end wall having an auxiliary soil deflecting plate connecting the end wall to the upper portion of the conveyor to deflect falling soil onto the conveyor,
a pair of ground engaging upright plates, one carried by the shroud side plates on either side of the boom and trench and extending from the conveyor rearwardly beside the drive chain cutters, each plate having an inner surface positioned beside the chain cutter boom for deflection of trencher dug soil back into the trench as the trencher advances,
a rubberized fabric flexible flap having an upper end secured to the upper portion of the lateral conveyor and a trailing body extending downwardly for dragging upon the ground with a rear edge closely adjacent said chain cutters, said flap having lateral edges movably engaging said upright plates to enclose the space immediately above and in advance of the chain cutters up to said lateral conveyor,
whereby the trench is provided with a temporary extension above ground level by building up earth upon said flap between said upright plates permitting removed earth to be elevated to the conveyor for lateral movement away from the trench.

4,095,359

TAPE HOLDING MECHANISM FOR DISPLAY DEVICE

Charles Edward Trame, Mequon, Wis., assignor to Everbrite Electric Signs, Inc., South Milwaukee, Wis.

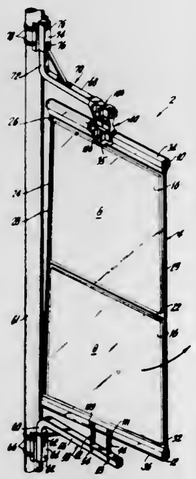
Filed Dec. 30, 1976, Ser. No. 755,713
Int. Cl.[2] G09F *11/24*
U.S. Cl. 40—446 **4 Claims**



1. In a display device:
a tape bearing indicia and having front and rear sides, said tape having the property of tending to form coils at opposite ends when unrestrained, said tape having aperture means near its opposite ends,
a member having a rigid front wall providing a surface of predetermined length for supporting said tape in a region intermediate its ends and to present the front of said tape for observation of said indicia and for enabling said tape to be pressed against said rigid surface and slid to translate said tape.
first and second pin means spaced from each other on opposite ends of said rigid front surface length, said pin means projecting generally rearwardly away from said rigid front surface and having tips, a portion of said tape beyond each end of the length of said rigid surface being disposed for sliding over said tips such that the end portions of said tape may form coils, respectively, in the space between said first and second pin means, each of said first and second pin means comprising a pair of pins which are spaced apart from each other in the crosswise direction of said tape and said respective aperture means are a pair of apertures which are spaced apart correspondingly with said pair of pins,
translation of said tape in one direction until one of its end portions is substantially uncoiled resulting in said aperture means near said one end slipping onto said pin means to

prohibit positively further translation of the tape in said one direction and translation of said tape oppositely of said one direction resulting in said aperture means slipping off of said pin means to enable said one end portion to recoil.

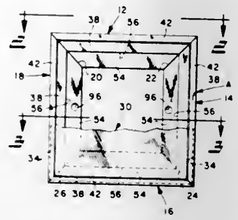
4,095,360
DISPLAY DEVICE
James M. Dinan, Irvington; Conrad Hade, Rye, both of N.Y., and Frank De Nigris, Parsippany, N.J., assignors to Dinaco, Inc., New York, N.Y.
Filed Apr. 27, 1976, Ser. No. 680,895
Int. Cl.[2] G09F *7/22*
U.S. Cl. 40—603 **6 Claims**



1. A display device comprising a rectangular transparent plastic envelope extending generally vertically between an upper horizontal tublar arm and a lower horizontal tubular arm, said envelope being formed by two overlying sheets of transparent flexible plastic, said sheets being sealed together along their top, bottom and one side margins, reversible closure means for the other side margin, said sheets also defining horizontal enclosed sleeves at the top and at the bottom of said envelope, in which said upper and said lower tubular arms respectively are positioned, a necked out portion in the central portion of said upper sleeve to accommodate a flexing coupling, said flexing coupling having a lower portion slidingly engaging said upper horizontal tubular arm in the longitudinal central portion thereof, and an upper portion of said flexing coupling slidingly engaging a horizontal tubular mounting frame, said upper and lower portions of said flexing coupling being connected by a central portion thereof which is flexible, means for securing said flexing coupling on said upper horizontal tubular arm and said horizontal tubular mounting frame against movement thereon, and a pair of laterally spaced apart tension means extending between said lower horizontal tubular arm and a lower horizontal tubular mounting frame to normally hold said envelope in a vertical plane parallel to said upper horizontal tubular arm, but permitting said lower horizontal tubular arm to turn 90° with respect to said upper horizontal tubular arm.

4,095,361
DISPLAY FRAME
Robert Louis Ledenican, 710 Hemlock Dr., Euclid, Ohio 44132
Filed Mar. 24, 1977, Ser. No. 780,794
Int. Cl.[2] G09F *1/12*
U.S. Cl. 40—152 **18 Claims**

1. A display holder for cards, pictures, posters and the like comprising: a substantially rectangular frame formed by a plurality of frame members connected together at corner joints, said frame having front, back and outer peripheral surfaces, one of said frame members defining a separable frame portion and the other of said frame members defining a holding frame portion, said holding frame portion having a slideway for slidably receiving the edge portions of a flat member and having a slideway entrance normally closed by said frame portion; said separable frame portion being separably connected to said holding frame portion by separable joints at least

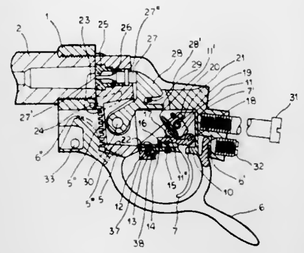


one of which includes a releasable locking member releasably locking said separable frame portion to said holding frame portion and being movable between locking and released positions, said releasable locking member being located completely beneath said surfaces and normally being biased to said locking position in a direction generally inwardly of said frame relative to said outer peripheral surface; and, a limited access opening in said peripheral surface for providing access to said releasable locking member with a special tool to move same to said released position.

4,095,362
POST CARD DISPLAYER FASTENING ON BULLETIN BOARD
Glenn J. Potter, 1332 S. Hope St., Los Angeles, Calif. 90015
Filed Sep. 8, 1975, Ser. No. 611,359
Int. Cl.[2] B42F *13/00;* **A44B** *21/00*
U.S. Cl. 40—617 **2 Claims**

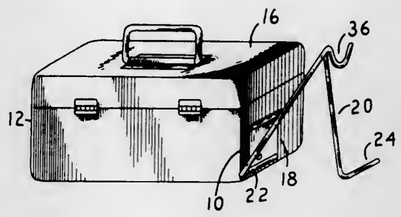
1. In a card and bulletin displaying device comprising a small spring-loaded, finger and thumb operated clip having opposing levers for nondestructively, non-intrusively, and releasably holding a card by the middle of its upper margin, a suspending length of chain fastened closely above by a fixation means to a supporting structure having a broad perpendicular surface and fastened below by a coupling means to one of the finger levers of said clip, said coupling means spacing the terminus of said chain off said finger lever to a position midway between said finger levers, so that said card, suspended, is held closely against said perpendicular surface with either front or back displayed, and so it can be easily variously held in the hand and turned over for viewing and reading.

4,095,363
FALLING BREECH BLOCK ACTION FOR A SINGLE SHOT ACTION
James Loren Riedl, 15124 Weststate, Westminster, Calif. 92683
Filed Jul. 26, 1976, Ser. No. 701,543
Int. Cl.[2] F41C *11/04*
U.S. Cl. 42—23 **2 Claims**



1. An improvement in a falling block single shot action for a firearm comprising a receiver, a rack toothed breech block in the receiver vertically movable by a pinion toothed finger lever pivotable on a pin, the breech block containing firing pin and self-cocking hammer parts removable from the receiver as an assembly; the finger lever being held closed by a ball plunger positioned to provide maximum closed holding power; a trigger housing assembly comprising a trigger, safety, and sear contained in a trigger housing; the safety and trigger being fully adjustable; and the complete trigger housing assembly being removably mounted in the receiver by a screw threaded into a threaded hole; the threaded hole being longitudinally split with half of the hole in the receiver and half of the hole in the trigger housing.

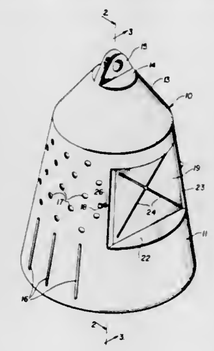
4,095,364
FISHING ROD HOLDER FOR A FISHING TACKLE BOX
Verle Orval Prine, 33 Nightingale, Billings, Mont. 59101
Filed Jan. 28, 1977, Ser. No. 763,369
Int. Cl.[2] A01K *97/10*
U.S. Cl. 43—21.2 **8 Claims**



1. A fishing rod holder comprising:
(a) a base attached to a side of a fishing tackle box; and
(b) an elongated tubular member, the one end of which is hingedly attached to the base, the middle portion of which forms a yoke which is capable of supporting a fishing rod, and the remaining end of which is detachably attached to the base.

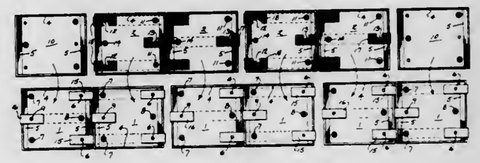
4,095,365
BAIT BUCKET
Otis Eugene Ray, 6850-66th St., North, Pinellas Park, Fla. 33565
Filed Jan. 19, 1977, Ser. No. 760,710
Int. Cl.[2] A01K *97/04*
U.S. Cl. 43—55 **1 Claim**

1. A container for live bait formed as a unit by blow molding, said container having a conically tapered body which is apertured in its side wall and which includes a comparatively wide flat end wall and a towing eye at its end remote from said end wall, a side wall closure for said container in the form of a substantially flat panel which is integrally hinged to the container side wall on a hinge axis substantially transverse to the longitudinal axis of the container and with the free end of the panel away from the integral hinge and disposed nearest said end wall, a pair of spaced projections on the container side wall on opposite sides of said closure panel, said container side wall having a pair of apertures on opposite sides of said closure panel and between the closure panel and said projections, and



an elastic band looped over said projections and anchored thereby and extending through said pair of apertures and across the interior side of the closure panel chordwise of said side wall and being taut to resist inward swinging of the closure panel about the axis of the integral hinge and yielding to permit such inward swinging when bait is introduced into the container and then returning the closure panel automatically to a closed position, said closure panel when closed lying within an opening of said side wall which is inset from the peripheral surface of the side wall to thereby extend chordwise of said side wall.

4,095,366
BLOCK PUZZLE TOY
John Kenneth Buck, and Linda Lee Buck, both of Rte. 3, Box 75, Baraboo, Wis. 53913
Filed Oct. 8, 1976, Ser. No. 730,794
Int. Cl.[2] A63H *33/08;* **A63J** *21/00*
U.S. Cl. 46—1 R **1 Claim**



1. A block puzzle toy which comprises a first set of a plurality of half blocks and a second set of a plurality of half blocks, the first set of half blocks consisting of at least three pairs of half blocks, the second set of half blocks consisting of at least two central pairs of half blocks and end half blocks, a snap fit securing the half blocks of the first set to the half blocks of the second set to provide each assembled block with a hollow cavity on the inside, hinge means joining the blocks together so that the blocks may be articulated to accomplish various puzzle tricks consisting of single bands of material extending generally centrally between and over and under the surface of the blocks with the ends of the bands disposed inside the hollow cavity of a respective block and a pair of horizontally spaced bands of material located outside the single bands and extend-

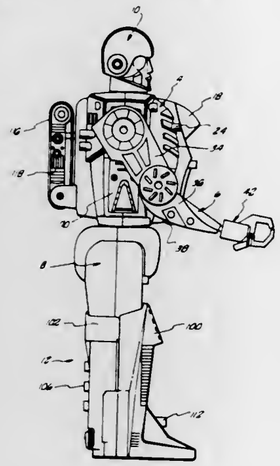
ing between the blocks and the ends of the latter bands disposed inside the hollow cavity of a respective block, and complementary pegs and serrated sockets disposed within the cavities of assembled half blocks and the ends of each respective band having a hole therein to fit over a peg in a respective cavity and be held between the peg and serrated socket when the peg is forced home in the socket as the half blocks are snap fitted together to thereby conceal within the cavities in the blocks the holding means for the bands.

4,095,367

ARTICULATED ROBOT ASSEMBLY

Iwakichi Ogawa, Kashiwa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1976, Ser. No. 694,161
Int. Cl.[2] A63H *13/02, 11/00*
U.S. Cl. 46—105 **21 Claims**



1. A detachable robot toy assembly comprising;
a hollow trunk member;
motor means mounted in the trunk member;
a plurality of output power coupling means operatively connected to the motor means and mounted in positions about the trunk member;
a detachable lower torso member capable of being removably attached to one of the power coupling means and including a transmission means for receiving power from the power coupling means and translating it into a locomotive power output; and
at least one support appendage removably attached to the lower torso member in one aligned position to provide a stationary support of the robot toy assembly regardless of the activation of the lower torso transmission means, the support appendage further having means which, when connected in another aligned position with the lower torso member power output, will provide locomotion to the toy assembly whereby the hollow trunk member can be removed from the lower torso member and operated independently to provide power to accessory items appended to its output power coupling means and further can be combined with the lower torso member and support appendage in a stationary mode of operation or with the lower torso member and said appendage means in a locomotion mode of operation.

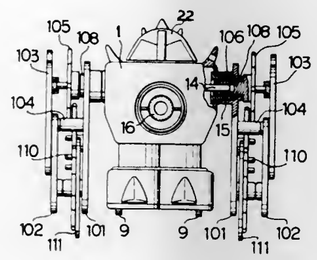
17. In an articulated doll figure such as a robot toy having a simulated head, arm and leg appendages, the improvement comprising:
a simulated body trunk member having the configuration of a chest and back and appropriately capable of supporting the head, arm and leg appendages;
motor means for providing power operatively connected to the body trunk member including an output power coupling means on the back of the body trunk member;
pivotal mounting means on the back of the body trunk member, and
an endless track drive assembly connected at one end to the pivotal mounting means and the output power coupling means to drive the track of the drive assembly, the endless track drive assembly being rotatable about the pivotal mounting means to assume various drive configurations relative to the body trunk member.

4,095,368

TOY PRIME MOVER AND ACCESSORIES THEREFOR

Shigeru Saito, No. 6-4, 2-chome, Kuramae, Taito-ku, Tokyo, Japan

Continuation-in-part of Ser. No. 608,539, Aug. 28, 1975, Pat. No. 3,961,440. This application May 25, 1976, Ser. No. 691,557
Int. Cl.[2] A63H *11/00, 33/26*
U.S. Cl. 46—104 **15 Claims**



1. A toy prime mover comprising a hollow housing having opposite sides, a front, a back, and a bottom; means including a spring windup mechanism mounted in said housing having rotary output members at said sides, said front, and said bottom and a rotatable input member for storing up energy applied to said input member and releasing such energy to said output members; a pair of ground-engaging drive wheels at said bottom connected to the respective output member; means secured to said mover, accessible from the exterior of said housing, whereby accessories can be attached to the mover and driven by the respective output member, said means including a shoulder mount at the upper region of each of said sides surrounding the respective output member and a chest mount at the upper region of said front at the respective output member.

4,095,369

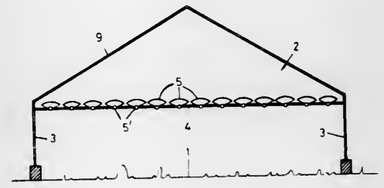
INSTALLATION FOR CULTIVATING PLANT CULTURES

Mario Posnansky, Pappelweg 4, 3072 Ostermundigen (Canton of Berne), and Bernardo Raimann, Hegibergstrasse 78, 4632 Trimbach (Canton of Soleure), both of Switzerland

Filed Mar. 21, 1977, Ser. No. 779,628
Claims priority, application Switzerland, Mar. 24, 1976, 3661/76
Int. Cl.[2] A01G *13/00*
U.S. Cl. 47—26 **9 Claims**

1. An installation for cultivating plants and the like comprising:
a cover device for protecting the ground at which the plants are grown from damaging radiation of the sun;
a support device for supporting the cover device;
said cover device comprising a number of pivotable, substantially cylindrical parabolic reflectors each having a focal line;
a respective conduit provided along the focal line of each parabolic reflector for conveying a heat carrier;

an adjustment mechanism for pivoting the reflectors about their lengthwise axis;
a circulation system for circulating the heat carrier;
said circulation system encompassing a feed pump and said conduits;
a control device for actuating said adjustment mechanism;
said control device being constucted such that when the sun is shining the reflectors are automatically positionally



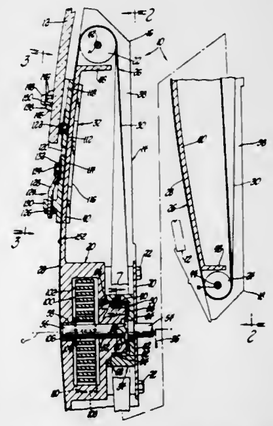
adjusted in accordance with the position of the sun and simultaneously throw shade upon the ground and the solar energy taken-up by the reflectors is removed;
a heat storage for the storage of the removed heat;
said control device having means controlling said circulation system in the absence of the sun's radiation such that said reflectors are aligned with respect to the ground such that heat is radiated from the heat storage to the ground.

4,095,370

BAND-TYPE WINDOW REGULATOR FOR VEHICLES

Anthony A. Muehling, 14583 Maddelein, Detroit, Mich. 48205

Filed Jan. 24, 1977, Ser. No. 761,915
Int. Cl.[2] E05F *11/48*
U.S. Cl. 49—352 **15 Claims**



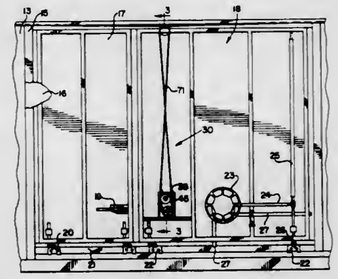
1. A vehicle window regulator for moving a vehicle window between open and closed positions, the regulator comprising: upper and lower idler rollers mounted for rotation about respective axes that extend horizontally parallel to the window and to each other; a rotatable drive roller mounted vertically intermediate the upper and lower idler rollers about an axis perpendicular to a plane through the idler roller axes so as to be adaptable to be driven by a hand crank from within the vehicle on which the regulator is used; a band trained over the idler rollers and having a cross section with a greater lateral extent than its thickness; said band including inboard and outboard reaches extending between the idler rollers and forming a closed drive loop; said inboard reach of the band including a half twist such that the total lateral extent of the band engages the idler and drive rollers without stressing the band; and means for connecting the outboard reach of the band to the window to be controlled by the regulator such that manually driven rotation of the drive roller drives the band and thereby moves the window between the open and closed positions.

4,095,371

OPERATING MECHANISM FOR BOX CAR SLIDING DOORS

Willis H. Knippel, Palos Park, Ill., assignor to Pullman Incorporated, Chicago, Ill.

Filed Aug. 17, 1977, Ser. No. 825,346
Int. Cl.[2] E05F *11/00*
U.S. Cl. 49—352 **10 Claims**



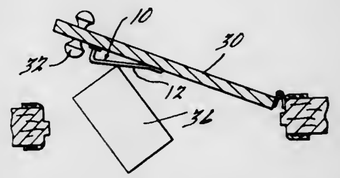
1. For a railway car having a side door opening and a sliding door laterally movable from said opening to one side thereof, said door and car including releasable inter-engaging locking mechanisms, the improvement of a cable drive mechanism for opening and closing said door comprising;
a first drive pulley rotatably connected to said door,
a second guide pulley rotatably connected to said door adjacent to said first pulley,
a third idler pulley arrangement connected to said door for rotation above said first and second pulleys,
said third pulley arrangement including a pair of circumferentially extending first grooves,
a cable including means on one end for fixedly connecting the same to said car on one side of said door,
said cable extending around one of said first grooves to said first and second pulleys and around the other of said first grooves of said third pulley arrangement,
said cable including a second end extending from said third pulley arrangement and including second means fixedly connecting the same to said car on the other side of said door.

4,095,372

PROTECTOR BAR

Ronald C. Rittner, 941 Hemlock St., Rochester, Mich. 48063

Filed Jan. 3, 1977, Ser. No. 756,127
Int. Cl.[2] E05B *1/00*
U.S. Cl. 49—460 **8 Claims**



1. A protector bar for a door of a building hinged along one vertical edge having a handle or other piece of hardware protruding from the planar surface of the door comprising:
a first part fastened to said planar surface of said door at a point intermediate said hinged edge and said handle or

other piece of hardware and extending therefrom at an acute angle relative to said planar surface, and

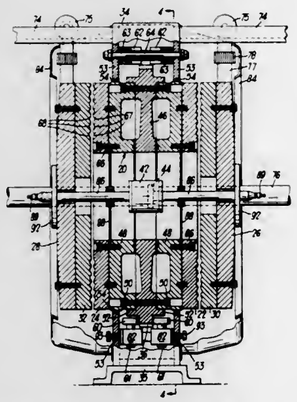
a second part fastened to said planar surface of said door adjacent said handle or other piece of hardware and extending to said first part substantially normal to said planar surface a distance at least as great as the distance said handle or other piece of hardware protrudes from said door, so that objects striking said bar or said planar surface of said door at a point intermediate said bar and said hinged edge are deflected away from said handle or other piece of hardware.

4,095,373

MACHINE FOR PRODUCING SPHERICAL OBJECTS

Eivind Christian Thobroe, Stroud, England, assignor to National Research Development Corporation, London, England

Filed Jan. 29, 1976, Ser. No. 653,543
Int. Cl.[2] B24B *11/06*
U.S. Cl. 51—130 **24 Claims**



1. A vertical plate machine for machining spherical objects between opposed generally vertical faces of at least one pair of opposed relatively rotatable working plates, having

a. at least one non-rotary plate carrier adapted to carry a first working plate,

b. a rotary plate carrier rotatable about an axis of rotation and having an end face adapted to carry a second working plate opposed to said first working plate, and having a radially outward periphery, located radially outwardly from said axis of rotation,

c. means for driving said rotary plate carrier in rotation, said means including a rotatable driven member in engagement with said periphery of said rotary plate carrier to transmit drive to the rotary plate carrier,

d. bearing means for providing vertical support for the rotary plate carrier, and cooperating with said periphery of said rotary plate carrier to support said rotary plate carrier for rotation about said axis of rotation,

e. means for preventing access of ground-off particles to said bearing means and said rotatable driven member, said means including a stationary housing substantially enclosing said bearing means and said rotatable drive member and substantially sealed to said periphery, and

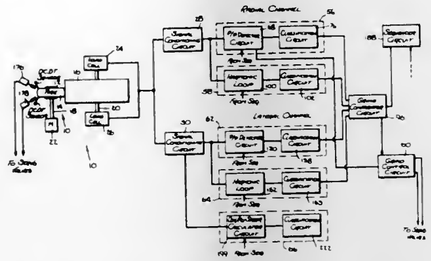
f. pressure-applying means for causing said plates to apply pressure to objects being machined between the plates.

4,095,374

METHOD AND APPARATUS FOR IMPROVED TIRE UNIFORMITY GRINDING AND MEASURING

John W. Ugo, Warren, Mich., assignor to Uniroyal, Inc., New York, N.Y.

Filed Jun. 29, 1977, Ser. No. 811,120
Int. Cl.[2] B24B *49/16*
U.S. Cl. 51—165 R **8 Claims**



1. A method of optimizing the uniformity of a tire comprising the steps of:

(a) revolving said tire in contact with a load wheel in a first direction;

(b) determining the radial composite force value and the lateral force value between said tire and said load wheel;

(c) determining a harmonic of said radial composite force value and said lateral composite force value;

(d) determining a lateral thrust force reaction between said tire and said load wheel;

(e) grinding said tire until said radial composite force value lies within predetermined limits;

(f) updating the values of said radial composite, radial harmonic, lateral composite, lateral harmonic and lateral thrust force values to provide post-grinding values;

(g) classifying said tire in accordance with said updated post-grinding values of the radial composite, radial harmonic, lateral composite and lateral harmonic forces;

(h) storing the value of the updated lateral thrust force value;

(i) revolving said tire in a second direction in contact with said load wheel;

(j) determining the radial composite, radial harmonic, lateral composite, lateral harmonic and lateral thrust force values as said tire rotates in said second direction;

(k) combining said lateral thrust force value determined and stored as said tire revolved in said first direction after grinding with said lateral thrust force value determined as said tire revolved in said second direction to calculate the conicity of said tire; and

(l) classifying said tire in accordance with said conicity value and said radial composite, radial harmonic, lateral composite and lateral harmonic force values determined as said tire revolved in said second direction.

4,095,375

SUPPORT ASSEMBLY FOR A PORTABLE SURFACE-TREATING MACHINE

Elmer C. Klebe, Easley, and Edward N. Greene, Pickens, both of S.C., assignors to The Singer Company, New York, N.Y.

Filed Mar. 16, 1977, Ser. No. 777,998
Int. Cl.[2] B24B *23/04*
U.S. Cl. 51—170 MT **4 Claims**

1. A resilient support system for a portable sander having an electric motor journaled in a housing comprising:

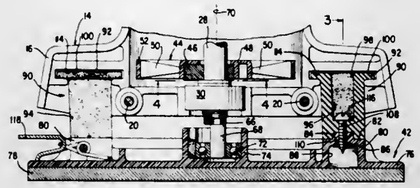
(a) a platen having a rigid back plate,

(b) a plurality of bosses having raised top surfaces, hollow interiors and open bottoms formed on the back plate,

(c) an aperture formed on each of the top surfaces in communication with the hollow interiors,

(d) a solid pad formed of non-rigid material cemented to the bottom of the back plate and enclosing the open bottoms of each of the bosses,

(e) a plurality of resilient posts having hollow interiors, extending between open tops and enclosed bottoms with central apertures therein to sit upon the top surface of the boss,



(f) a plurality of screws, one inserted into each of the posts to pass through the aperture and be threadedly received into the aligned aperture of the boss whereby the screw extends into the hollow interior without contacting the pad,

(g) the posts connected to the housing at the upper end thereof to resiliently support the platen, and

(h) the platen connected to be driven by the electric motor.

4,095,376

CLAMPING DEVICE FOR USE IN SHARPENING SHEARS AND THE LIKE

John H. Lotane, Morse Dr., Shelburne, Vt. 05432

Filed Oct. 29, 1976, Ser. No. 737,010
Int. Cl.[2] B24B *3/52*
U.S. Cl. 51—218 R **5 Claims**

1. An improved freely movable and manipulable clamping device for use in sharpening shear blades and the like with a grinding wheel, which device comprises:

(a) a base member;

(b) a support member pivotally carried by the base member for free and unbiased pivotal movement with respect thereto, wherein the pivot point of the support member is disposed rearwardly of the center of gravity thereof to thereby provide a forward portion that is counterbalanced in a downward direction;

(c) a clamping means carried by the forward portion of the support member, which clamping means includes:

(i) a flange having a longitudinal wall section,

(ii) a detachable plate having a substantially trapezoidal configuration, wherein the shorter parallel side of the plate is disposed adjacent and parallel to the longitudinal wall of the flange and the longer parallel side overlaps the blade when the latter is in a clamped positon; and

(iii) a camming means for applying pressure to the upper portion of the detachable plate to clamp the blade to the forward portion of the support member, which camming means includes:

1. a camming member having at least two opposed cam surfaces, and

2. means for rotating the camming member for selectively engaging either cam surface;

(d) means for adjustably limiting the degree of free and unbiased pivotal movement of the support member with respect to the base member to control the desired grinding angle between the blade edge and the grinding wheel, and

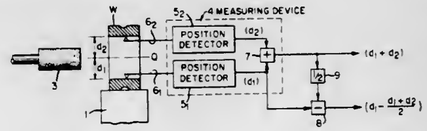
(e) resilient means carried by the support member and detachable plate for frictionally securing the clamped blade against movement with respect to the clamping device during sharpening.

4,095,377

METHOD TO COMPENSATE INFEED FOR THE ERROR CAUSED BY THE OUTER DIAMETER ERROR OF A WORKPIECE IN A CENTERLESS INTERNAL GRINDER

Terumitsu Sugita, Narashino, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Japan

Filed Jan. 31, 1977, Ser. No. 764,075
Int. Cl.[2] B24B *49/04*
U.S. Cl. 51—290 **4 Claims**



1. A method of operating a centerless internal grinder during internal grinding of annular workpieces to compensate for variations in workpiece outer diameter from workpiece to workpiece, the internal grinder including at least two diametrically opposed position detectors each with a respective feeler, a grinding wheel, an infeed table, and a workhead mounted on said infeed table for supporing an annular workpiece on the outer peripheral surface thereof during internal grinding; the method comprising:

positioning said detectors with said feelers extending into said annular workpiece contacting an inner surface thereof during internal grinding of the annular workpiece for developing respective signals each representative of a distance between a referaxis and a point of contact between the internal surface of the annular workpiece and respective one of said feelers; developing a signal representative of center position error of the annular workpiece being internally ground caused by variation in workpiece outer diameter from workpiece to workpiece which causes center position error of the workpiece center relative to the reference axis from workpiece to workpiece; and controlling the internal grinding of the annular workpiece with the signal representative of center position error to compensate for the center position error.

4,095,378

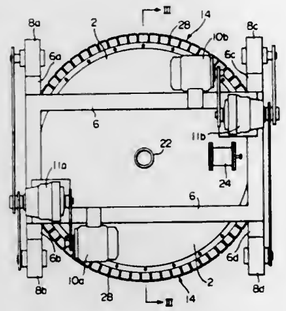
DEVICE CAPABLE OF SUCTION-ADHERING TO A WALL SURFACE AND MOVING THEREALONG

Fukashi Urakami, Tategaoka-danchi 3-8-410, No. 1097, Tatemachi, Hachioji-shi, Tokyo, Japan

Filed Dec. 14, 1976, Ser. No. 750,416
Claims priority, application Japan, Dec. 18, 1975, 50/152362; Jan. 19, 1976, 51/5497[U]; Feb. 26, 1976, 51/23577[U]; Jan. 22, 1976, 51/6256[U]
Int. Cl.[2] B24C *3/06, 9/00;* B63B *59/00;* F04H *3/20*
U.S. Cl. 51—425 **37 Claims**

1. A device capable of adhering by suction to a wall surface by the pressure of an ambient fluid and movable along the wall surface, which device comprises: a pressure receiver housing made of a rigid or semi-rigid material having one side open toward the wall surface and the remainder closed; a plurality of wheels or endless tracks secured to the housing for contact with the wall surface; a partition connected to the pressure receiver housing and extending outwardly therefrom in a

direction away from the central axis of the housing which is perpendicular to the wall, said partition having a free end adapted to make contact with the wall surface, at least said free end of said partition being made of a relatively flexible material, the partition contacting the wall surface for forming a substantially fluid-tight low pressure seal together with the wall surface; and a means connected to said device for discharging fluid from the space within said partition and said housing; at least the free end of said partition being displaceable toward and away from the wall surface with respect to the



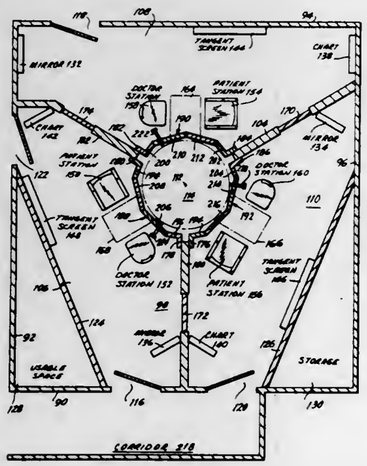
pressure receiver housing by a relatively small force; whereby the free end of the partition is caused to contact the wall surface in substantially fluid-tight engagement by the pressure of the fluid which acts on the surface of the partition facing away from the wall due to the difference in fluid pressure between the inside and outside of the low pressure space, and the fluid pressure acting on the outside of the pressure receiver housing due to the difference in fluid pressure between the inside and outside of the low pressure space is transmitted to the wheels or endless tracks for urging them against the wall surface.

4,095,379

MULTI-EXAMINING SPACE ARRANGEMENT FOR A ROTATABLE OPHTHALMIC TABLE OR THE LIKE

Joel Weintraub, 40 Arrandale Rd., Rockville Centre, N.Y. 11570

Filed Jul. 19, 1976, Ser. No. 706,163
Int. Cl.[2] E04H *3/08*; E04B *7/16*; A61C *19/02*
U.S. Cl. 52—29 **14 Claims**



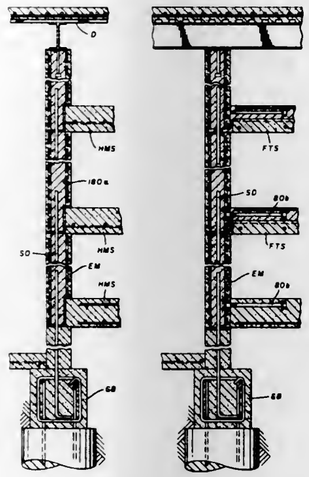
1. In combination: at least one wall having an opening, at least two rooms separated by said wall, a rotatable ophthalmic table in said opening, a housing adapted for completely surrounding and protecting said ophthalmic table; said ophthalmic table comprising a pedestal, a pedestal means reciprocable relative to said pedestal between a raised position and a lowered position, a turntable rotatably supported on said pedestal means and a plurality of partitions on said turntable forming a plurality of compartments for the accommodation of a plurality of ophthalmic instruments therein; said housing comprising a first portion and a second portion, each of said portions comprising a plurality of links connectible together, two of said plurality of links of each of said first and second portions being pivotally connected to each other and one of said two links having one end pivotally connected to another of said plurality of links such that said two links serve as a door for allowing access to the ophthalmic instruments mounted on said turntable support within said housing, first means on each of said plurality of links for abutting against sides of said wall adjacent said opening, and second means for holding said first means on said wall, so that said housing accommodates said rotatable ophthalmic table and allows ready access thereto from said rooms.

4,095,380

BUILDING AND ELEVATOR MODULE FOR USE THEREIN

Thomas J. Dillon, Akron, Ohio, assignor to Forest City Dillon, Inc., Cleveland, Ohio

Division of Ser. No. 302,678, Nov. 1, 1972, Pat. No. 3,818,660, and a continuation of Ser. No. 482,320, Jun. 24, 1974, abandoned. This application Jan. 22, 1976, Ser. No. 651,460
The portion of the term of this patent subsequent to Jun. 25, 1991, has been disclaimed.
Int. Cl.[2] E04H *1/12*
U.S. Cl. 52—79.13 **1 Claim**



1. In combination with a multi-story building which includes vertical load-bearing walls having vertical voids extending from top to bottom thereof and full and partial thickness floor slabs adapted to rest on and span the distance between said walls and site-poured concrete simultaneously received on said partial thickness floor slabs and within said voids of said walls, the improvement comprising precast elevator modules arranged vertically with respect to each other, each comprising;
(A) opposed front and rear walls;
(B) opposed end walls integrally joined to and interconnecting said front and rear walls, thereby forming an elevator-receiving compartment;
(C) said front wall having at least one door opening therein;
(D) said walls having top and bottom edges with said bottom edges being supported in slightly spaced relationship with said top edges of the next preceding module;

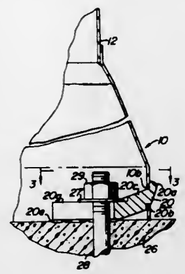
(E) each of said walls having at least one through vertical void therein extending from the top edge to the bottom edge thereof for reception of said site-poured concrete that is received on said partial thickness floor slabs;
(F) said end walls having transversely extending locating notches in the bottom edges thereof for engagement with and support on the full thickness floor slabs;
(G) said full thickness floor slabs being received on the top edge of the end walls of the next preceeding module;
(H) said partial thickness floor slabs disposed adjacent the top edges of the side walls of the next preceeding module;
(I) said site-poured concrete covering said partial thickness floor slabs and filling the space between vertically adjacent modules and said voids; and
(J) said end walls having three dimensional leveling pockets disposed on their lower edges and embedded brackets adjacent their upper edges with said embedded brackets and said levelling pockets of vertically adjacent modules cooperating for leveling and attachment purposes.

4,095,381

POLE BASE MOUNT ASSEMBLY

John S. Garchinsky, Aldan, Pa., assignor to Gar Design Research, Inc., Media, Pa.

Filed Aug. 4, 1976, Ser. No. 711,559
Int. Cl.[2] E02D *27/00*; E04B *1/00*
U.S. Cl. 52—295 **15 Claims**



1. A pole-base mount for affixation to a substantially horizontal planar base having a plurality of fastening means extending upward therefrom, comprising:
(a) a pole assembly having a lower terminal portion having generally vertical sides in a plurality of apertures are formed, and
(b) a plurality of clamps associated respectively with said plurality of apertures, each clamp having means to enable it to be releasably engaged by one of said upwardly projecting fastening members, each clamp also having a first end portion dimensioned to pass through its associated aperture, said end portion including means for preventing substantial normal lateral movement of said terminal portion when said end portion is passed through its associated aperture.

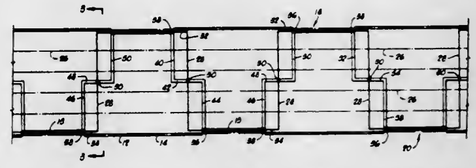
4,095,382

AIRCRAFT HANGAR CONSTRUCTION

Otis A. Clark, Rte. 2, Box 193-E, Tecumseh, Okla. 74873

Filed Apr. 21, 1977, Ser. No. 789,512
Int. Cl.[2] E04H *1/00*
U.S. Cl. 52—234 **20 Claims**

1. An aircraft hangar comprising:
at least four substantially horizontal, transversely extending primary roof frame members;
substantially horizontal, longitudinally extending primary roof frame members located in horizontally spaced, substantially parallel relation and each connected to an end of at least two of said transversely extending primary roof frame members and providing the sole support of said transversely extending primary roof frame members at said ends;
a vertical supporting member supporting the central portion of each of said transversely extending primary roof frame members;
at least two additional vertical supporting members supporting each of said longitudinally extending primary roof frame members at locations spaced from opposite ends thereof and at locations spaced from said ends of said transversely extending primary roof frame members;



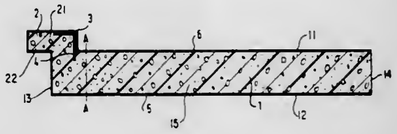
secondary roof frame members extending longitudinally of the hangar and supported upon said transversely extending primary roof frame members;
roof panelling means over and supported on said secondary roof frame members; and
a partition assembly including a plurality of vertical partition walls defining at least two complementary, internesting T-shaped hangar spaces opening at opposite sides of the hangar.

4,095,383

ROOF-SHEETING ELEMENT WITH INTEGRAL LATH STRUCTURE

Horst Strobl, Grunwald, Germany, assignor to Neumann & Co. AG, Buchs, Switzerland

Filed Jul. 23, 1976, Ser. No. 708,019
Claims priority, application Germany, Jul. 23, 1975, 2532853
Int. Cl.[2] E04C *1/12*
U.S. Cl. 52—309.7 **6 Claims**



1. An elongate roof-sheeting element with an integral lath structure for supporting roof tiles on an inclined roof structure comprising:
a board-like member having an upper surface to be positioned adjacent the lower surface of roof tiles to be supported thereby and having a lower surface to be supported by an inclined roof structure;
a lath-like member integral with said board-like member and extending along the entire length of one only of the longitudinal sides of said board member, said lath-like member having a first portion extending upwardly from the upper surface of said board-like member along its entire length and having a second portion projecting outwardly from said first portion beyond said one longitudinal side only of said board-like member along its entire length, said lath-like member being constructed and arranged such that when two of said elongate roof-sheeting elements are located with said one longitudinal side of a first roof-sheeting element adjacent the longitudinal side of a second roof sheeting element remote from said one longitudinal side of said second roof sheeting element, said second portion of said lath-like member extends over the upper surface of said second roof sheeting element adjacent said remote side thereof thereby covering a joint formed between the

adjacent longitudinal sides of said first and second roof sheeting elements;

said board-like member and said lath-like member being integral and having a light core composite structure comprising an expanded plastic core and a layer of a covering material bonded to said expanded plastic core; and

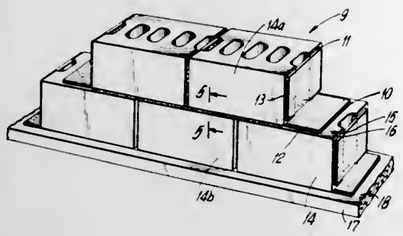
an elongate reinforcing element embedded in said expanded plastic core and disposed lengthwise in said lath-like member along the entire length thereof, said reinforcing element being angled and perforated and having a longitudinal marginal portion extending into the expanded plastic core of said board-like member along the entire length thereof.

4,095,384

BUILDING BLOCK WALL FABRICATING DEVICE

Daniel A. Zarriello, 422 N. Main St., Lodi, N.J. 07644

Filed Sep. 17, 1976, Ser. No. 724,382
Int. Cl.² E04B *2/00*
U.S. Cl. 52—408 **4 Claims**



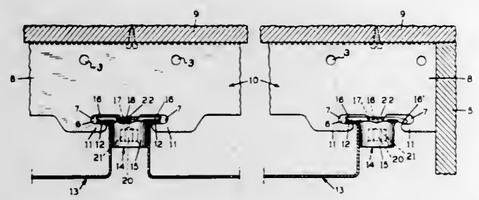
1. A method of fabricating a building block wall comprising in combination: lineally serially aligning end to end a series of building blocks; placing between serially consecutive block ends and between consecutive tiers, an elongated sheet structure means of a first predetermined thickness having each of opposite lateral side faces extending longitudinally along the sheet structure means in substantially parallel alignment with one another and each of the parallel lateral side faces defining aperture structure forming a series of laterally-facing apertures, the sheet structure means being of a second predetermined width such that the predetermined width is less than a building block with which the sheet structure means is to be employed, and the sheet structure means including on each of upper and lower faces thereof a binder composition coated along upper and lower faces of the sheet structure means.

4,095,385

DEVICE FOR SECURING PANELS IN A SUSPENDED CEILING OR WALL CONSTRUCTION

Johannes Antonius Hendrikus Brugman, Rotterdam, Netherlands, assignor to Hunter Douglas International N.V., Willemstad, Netherlands Antilles

Filed Jul. 25, 1977, Ser. No. 818,718
Claims priority, application Germany, Aug. 3, 1976, 2634774
Int. Cl.² E04B *5/52*
U.S. Cl. 52—489 **16 Claims**



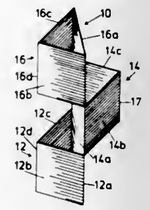
1. A suspension system for mounting panels to a generally planar surface of a building comprising a plurality of elongated, generally parallel panel supports; each of said panel supports being supported by said surface; and elongated panel; said panel having along each longitudinal side thereof an in-turned flange facing the in-turned flange of the opposite side; the material of said panel being sufficiently resilient to permit said flanges to be sprung apart; said panel being arranged with its length substantially transverse to the length of the panel supports; said panel supports having hooks; the flanges of said panel being engaged over said hooks; a locking member having a body portion with two ends; said locking member being positioned adjacent a longitudinal side of a panel with one end bearing against a panel support; said one end having a laterally extending arm; said locking member being rotatable to move said arm between unlocked and locked positions; said arm, when in locked position, extending over and bearing firmly against an in-turned flange of a panel to press said flange securely against its associated hook.

4,095,386

PRISMATIC INTERLOCKING STRUCTURAL MODULE

Joseph Daniel Johnson, 1101 E. Capitol St., Washington, D.C. 20003

Filed Aug. 19, 1977, Ser. No. 826,112
Int. Cl.² E04C *1/08*
U.S. Cl. 52—575 **9 Claims**



1. A structural module comprising at least three triangular prismatic elements, each of said elements comprising at least a base and a pair of side walls, said bases of said triangular elements being in rectilinear alignment and forming a common quadrangular wall of the module with the common edge of the side walls of the elements alternating on opposite sides of the common quadrangular wall.

4,095,387

UNPLANKING DEVICE FOR UPRIGHTS OR TOWERS OF SUPPORTING SCAFFOLDINGS

Henri Loewe, Paris, France, assignor to Societe Francaise des Echafaudages Self-Lock, Aulnay-sous-Bois, France

Filed Sep. 10, 1976, Ser. No. 722,170
Claims priority, application France, Sep. 11, 1975, 75 27923; Apr. 13, 1976, 76 10865
Int. Cl.² E04H *12/18*
U.S. Cl. 52—645 **5 Claims**

1. A device for unplanking a scaffolding comprising:

a first upright element having a base;

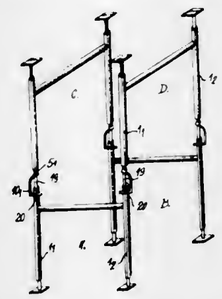
a second upright element having a longitudinal axis and being provided with at least one hole extending perpendicularly to said longitudinal axis, said first upright element being adapted to receive and guide said second upright element;

two symmetrical cams placed one on each side of the second upright element, each of said cams having one aperture to register with said hole of the second upright element, said base of the first upright element bearing on said cams;

a pin passing through both said apertures and said hole, said cams being rotatable around said pin;

a lever rigidly connected to said cams; and

a locking element adapted to engage said lever and maintain said cams in a position in which said first upright element bearing on said cams biases said cams in a direction of rotation against which said locking element has an increased action, said two cams being connected by a stirrup shaped part provided with arms and forming said lever, whereby said cams cannot escape from the element bearing thereupon.

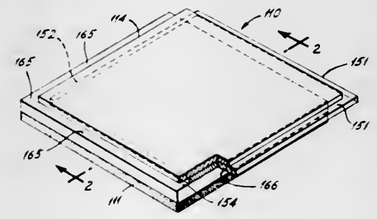


4,095,388

STRENGTHENING INTER-TILE ADHESION

Homer Breault, Pine Glen, Pa., assignor to PermaGrain Products, Inc., Media, Pa.

Filed Jun. 13, 1977, Ser. No. 805,777
Int. Cl.² E04B *5/00*
U.S. Cl. 52—747 **1 Claim**



1. A method of applying floor tiles to a subflooring for an area which includes the steps of:

preparing a set of smaller rectangular floor tiles having a predetermined length and a predetermined width, each tile having overhanging-underfitting relationship of straight line boundary portions which in the unadhered conditions permit two adjacent tiles to be slideably adjustable with respect to each other;

preparing a set of larger rectangular floor tiles having a predetermined length substantially twice the length of said smaller tile and having a predetermined width substantially twice the width of said smaller tile, each tile having overhanging-underfitting relationship of straight line boundary portions which in the unadhered condition permits two adjacent tiles to be slideably adjustable with respect to each other;

applying floor tiles to a central portion of a subflooring, said tiles being adhered to each other only at the overhanging-underfitting zones, while retaining vent paths for the diffusion of moisture to permit the moisture content of the subflooring and the moisture content of the atmosphere to equilibriate readily in such central area because of not using conventional adhesive relationship of the floor tiles and subflooring throughout such central area, a gas permeation zone being maintained between the vertical walls of adjacent tiles, there being no adhesion between said vertical walls;

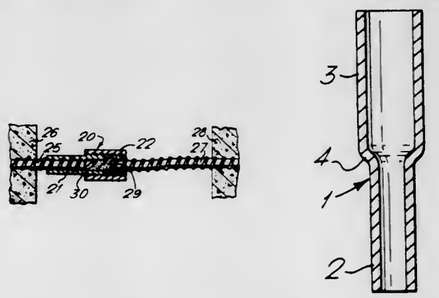
staggering the distribution of a substantially equal number of said smaller tiles and said larger tiles in said central area whereby any path of adhesion across the central portion in either of two rectangular directions has numerous offsets and staggers involving no continuous line longer than about one and one-half lengths of a larger tile, each larger tile on each of its four sides having the adhesive overhanging-underfitting bonding with a portion of at least one other larger tile and with at least a portion of a smaller tile, said staggering of the adhesion to the subflooring imparting greater resistance to buckling, separation of adjacent tiles and related long term malfunction stimulated by fluctuations of humidity and temperature than attained for the similar adhesion of the overlapping-underlying boundary portions of rectangular tiles of substantially uniform size when laid without adhesion to the subflooring.

4,095,389

JOINED CONCRETE BODIES AND METHOD OF JOINING SAME

Christopher David Outram, London, and Hugh Jeremy Willis Edwards, Menston, both of England, assignors to CCL Systems Limited, England

Filed Apr. 18, 1977, Ser. No. 788,203
Claims priority, application United Kingdom, Apr. 20, 1976, 15826/76
Int. Cl.² E04C *1/10, 1/30*
U.S. Cl. 52—583 **10 Claims**



1. A method of joining together two bodies of concrete, each body having therein a concrete-reinforcing bar, which method comprises compressing on to an end of the first of the bars a gripping portion of a metal sleeve so as to cause the gripping portion tightly to grip the bar, said metal sleeve also having an unpressed portion which, when the gripping portion of the metal sleeve grips the bar, extends beyond the end of the bar, said unpressed portion also having an internal diameter larger than the maximum cross-sectional dimension of the second of the bars, and securing an end of the second of the bars within the unpressed portion of the sleeve by means of a self-setting composition.

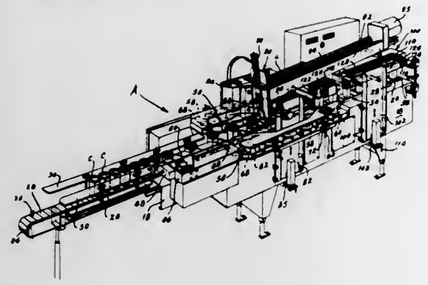
10. Two bodies of concrete, each body having therein concrete-reinforcing bar, joined together by means of a metal sleeve having a gripping portion and an unpressed portion, the gripping portion being compressed on to the end of one of the bars so as to grip the bar tightly, the unpressed portion extending beyond the end of the bar and having an internal diameter larger than the maximum cross-sectional dimension of the other of the bars, the end of the other bar being secured within the unpressed portion of the sleeve by means of a set self-setting composition.

4,095,390

MACHINE AND PROCESS FOR CAPPING AND SEALING CONTAINERS

David S. Knudsen, St. Louis, Mo., assignor to McKenna Equipment Company, Inc., Pacific, Mo.

Filed Apr. 1, 1976, Ser. No. 672,719
Int. Cl.[2] B65B *51/16, 51/18, 51/22, 51/32*
U.S. Cl. 53—39 **33 Claims**



1. A machine for attaching a seal member to a rim surrounding the open top of a container, the seal member being formed at least in part from metal and being adapted to bond to the rim of the container when heated above a prescribed temperature, said machine comprising: conveyor means for supporting the containers and moving them along a conveying path with the seal members being on the container rims, but initially not bonded to those rims; an induction coil located adjacent to the path and creating a magnetic field in a heating zone through which the seal members and container rims pass as they move along the path, the magnetic field being of sufficient intensity to heat the metal of the seal members above the prescribed temperature; and a succession of closely spaced rollers arranged in a single row extended through the heating zone with their axes extending transversely of the path, the diameter of each roller being substantially less than the length of the seal member measured in the direction of advance for the seal member along the conveying path, each roller being formed from a nonmetallic material and being positioned such that it exerts a downwardly directed force on the seal member of a container passing through the heating zone, the spacing between the rollers being such that a plurality of rollers will concurrently and continuously exert forces on a single seal member as that seal member passes through the heating zone, whereby as the seal member moves through the heating zone and is heated by the induction coil, the succession of rollers causes a ripple-like force to be applied to the seal member and to the rim over which the seal member is disposed to effect a good bond between the seal member and the rim.

4,095,391

APPARATUS FOR BUNCHING BROCCOLI

Benjamin E. Anguiano, Aptos, Calif., assignor to Veg-A-Mix, Castroville, Calif.

Filed May 23, 1977, Ser. No. 799,507
Int. Cl.[2] B65B *27/10, 67/00;* **B26D** *7/28*
U.S. Cl. 53—123 **18 Claims**

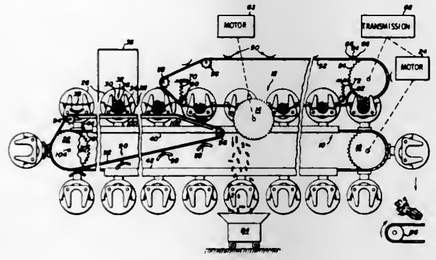
1. Apparatus for bunching, trimming and banding vegetables having a head and a stalk, comprising:

first means forming a first loop extending between a first position and a second position;

vegetable carrying means affixed to said first means at equal intervals so as to be carried around said first loop thereby, said carrying means including a vegetable head-holding portion and vegetable stalk-holding portion, said stalk-holding portion including a pair of upstanding arms forming a stalk receiving slot and adapted to carry banding means stretched thereacross;

second means forming a second loop extending between said second position and a third position intermediate said first and second positions and disposed above said first means, said second means having a plurality of clamping elements affixed thereto at intervals corresponding to the spacing between adjacent one of said carrying means, said second means being positioned relative to said first means such that some of said clamping elements mate with said vegetable carrying means at a point proximate said third position and remain in such mating relationship until the mated carrying means reaches said second position;

first drive means for driving said first and second means in synchronism; and



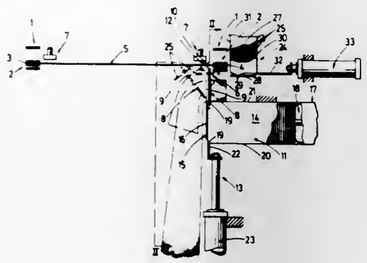
trimming means disposed at a fourth position proximate said third position and between said third position and said second position so as to trim the ends of stalks carried by said carrying means and extending beyond said stalk-holding portion, said fourth position being separated from said second position by a distance long enough to enable the banding means to be removed from said upstanding members and placed about the trimmed ends of the stalks.

4,095,392

DEVICE FOR STACKING AND RETAINING IN A STACK FLAT GOODS, PARTICULARLY PLASTIC BAGS

Edouard Louis van de Gent, Meise, Belgium, assignor to Printex, Brussels, Belgium

Filed Jun. 29, 1977, Ser. No. 811,320
Claims priority, application Belgium, Jun. 29, 1976, 843546
Int. Cl.[2] B65B *35/50*
U.S. Cl. 53—159 **10 Claims**



1. Device for stacking and retaining in a stack flat goods, particularly perforated plastic bags, comprising transfer means with retaining members in parallel relationship cooperating with two opposite edges on the bags, allowing to bring said bags from the manufacturing machine to the stacking location and means for releasing said bags from the transfer means in said location to form a bag stack, which device comprises fixed means to feed forks one by one to the stacking location along a path at right angle to the transfer means movement direction between the parallel members and adjacent that edge provided with said perforations of those bags retained by said members, said forks of U-shape being free relative to one another, with legs directed at right angle to the transfer means movement direction and the leg free ends being directed towards the

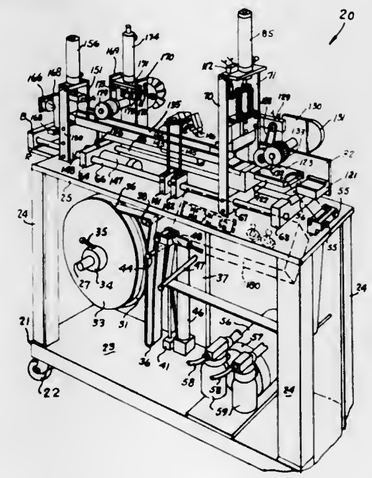
means allowing to release the bags from the transfer means in such a way that the fork legs enter the bag perforations, and means for moving the fork brought to the stacking location and on which will be stacked the bags to form a stack, along a direction in parallel relationship with the legs thereof to let said fork lie in two positions, the one position in which the fork is stationary to allow stacking the bags during said stacking operation and the second position in which the fork is free and can leave by gravity the device with the bags stacked thereon.

4,095,393

BAG FORMING AND FILLING MACHINE

Craig R. Nelson, 711 Shunpike Rd., Green Village, N.J. 07935; Roy A. Nelson, deceased, late of Green Village, N.J., by Elizabeth D. Nelson, administratrix, 711 Shunpike Rd., Green Village, N.J. 07935

Filed Feb. 18, 1977, Ser. No. 770,194
Int. Cl.[2] B65B *5/02, 9/10, 43/30*
U.S. Cl. 53—183 **6 Claims**



1. A bag forming and filling apparatus comprising a frame, a roll of heat sealable plastic tubing supported in said frame, means on said frame for moving said tubing in one direction with respect to said frame, means engageable with said tubing for simultaneously cutting said tubing into bag lengths and heat sealing one end of said bag length, means on said frame for opening one end of said bag length, a stationary mandrel on said frame, and means for moving said opened end of said bag length substantially horizontally in said direction onto said mandrel to permit elongate merchandise to be inserted through said mandrel into said bag length, means on said frame engageable with said filled bag length to move said bag length in the opposite direction off of said mandrel and out of said frame.

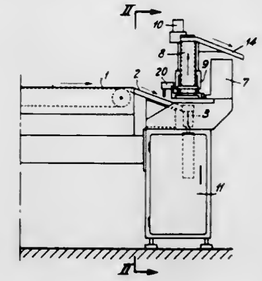
4,095,394

APPARATUS FOR AUTOMATICALLY APPLYING FLEXIBLE STRIPS

Jacques Edmond Maurice Evrard, 64 rue des Rondeaux, Paris, France

Filed Oct. 29, 1976, Ser. No. 737,009
Int. Cl.[2] B65B *13/02*
U.S. Cl. 53—198 R **3 Claims**

1. Apparatus for automatically placing strips around objects comprising a vertical object guide having an open end, the cross section of said guide being substantially equal to the section of the object, means for feeding a flexible strip across the open end of said guide in synchronism with the arrival of an object, a piston to push the object upwardly into said open end so that the flexible strip is folded over one face and the sides of said object by the walls of said guide, and means cooperating with said guide for folding down the ends of the strip on the other face of the object, the upper position of said piston being substantially at the level of said folding down means and the lower position thereof being below the open end at a level



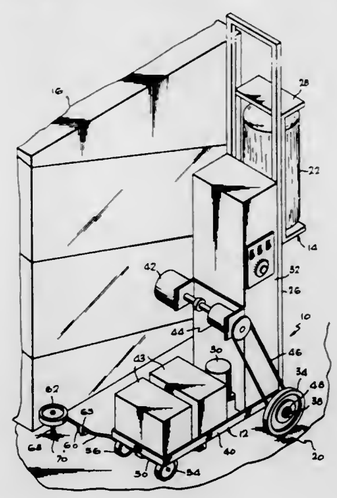
lower at least than the height of an object, said piston having an upper surface of a shape complimentary to that of said other face of the object and having grooves centering the strip in the course of its introduction into the guide.

4,095,395

SELF-GUIDING STRETCH-WRAP MACHINE

Joseph Goldstein, 9838 Chicopee Ave., Northridge, Calif. 91325

Continuation-in-part of Ser. No. 752,444, Dec. 20, 1976. This application May 19, 1977, Ser. No. 798,450
Int. Cl.[2] B65B *13/10*
U.S. Cl. 53—198 R **12 Claims**



1. A stretch-wrap machine comprising:

a vehicle including, as components of the vehicle, means for supporting the vehicle for free movement along a floor, means for driving the vehicle along the floor around material to be wrapped, said driving means including means for continually biasing the vehicle to move in a direction toward said material without external guidance, and feeler means projecting in said direction for engaging a surface associated with said material in response to said biasing and thereby limiting the movement of the vehicle toward said material; and

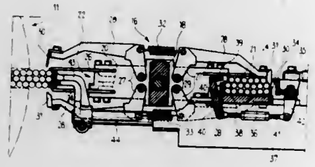
a stretch-wrap unit mounted on the vehicle for movement therewith along the floor and including means for wrapping stretch-wrap film around the material to be wrapped as the vehicle travels on the floor around said material.

4,095,396

DEVICE FOR GUIDING AND HOLDING CIGARETTE BATCHES IN AN APPARATUS FOR TRANSFERRING SAID BATCHES FROM A CONVEYOR TO A PACKING MACHINE

Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Bologna, Italy

Filed Mar. 22, 1977, Ser. No. 780,102
Int. Cl.² B65B *11/28*
U.S. Cl. 53—234 **4 Claims**



1. In a device for guiding and holding cigarette batches in an apparatus for transferring said batches from a conveyor to a machine for packaging cigarettes into hinged-lid-type packs said packaging machine having a rotating head comprising a plurality of equispaced radially disposed compartments, each compartment being formed by two pairs of stationary plates, the plates of each pair being spaced apart in the direction of the rotating axis of the head of a distance substantially equal to the length of the cigarettes, and the same plates of each pair being spaced apart of a distance equal to the thickness of said cigarette batch, and by two pairs of plier-shaped movable elements in which the elements of each pair of plier-shaped movable elements are coplanar and oppositely positioned relative to the stationary plates of the corresponding pair; and a first, a second, and a third wall lying - during a dwell of said rotating head - between the pair of stationary plates of one of said radial compartments forming the guiding and holding surfaces for the cigarette batches, the first wall being tangential and radially movable relative to the compartment, the second wall being radially positioned inside the compartment and facing said first movable plate, and the third wall being coplanar with one of the stationary plates of the corresponding pair, the improvement wherein said second wall comprises a stationary part and a movable part, said movable part being secured to one end of a lever oscillatable about a shaft parallel to the rotating axis of said head, and passing through an intermediate point of said oscillatable lever; a linking element is pivoted with one end to a projection of the first movable wall, and with the other end to the other end of said lever, for imparting an approaching and removal motion to said movable part and to the upper end of the first movable wall and of said movable part projecting inwardly of said compartment.

4,095,397

BLISTER SEALING MACHINE PLATE MEANS

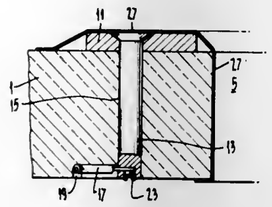
Hank John Schilte, 9 Burton Ct., Bayswater, Victoria, Australia

Filed Mar. 4, 1977, Ser. No. 774,484
Claims priority, application Australia, Mar. 17, 1976, PC5241
Int. Cl.² B65B *7/28, 51/10*
U.S. Cl. 53—329 **5 Claims**

1. A blister sealing machine plate means which enables heat sealing of packaging components, said plate means comprising:

a. an electric heater element of sheet material arranged to extend in a path around an opening in said plate means, said opening having sides adapted to receive said blister when said plate means is in use, and

b. heat permeable covering material having contact adhesive on the faces thereof extending over said heater element and secured to said plate means on both sides of said path of said heater element, said adhesive being heat destructable substantially adjacent said heater element to enable said heater element to expand and move underneath said material and be held by said material substantially co-



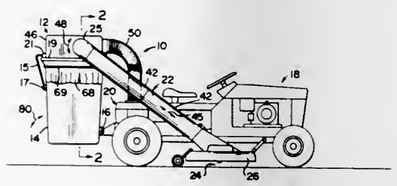
planer with said plate means, and said covering material extending down and secured to said sides of said opening to facilitate insertion and removal of said blisters from said opening.

4,095,398

GRASS BAGGER

Richard F. Aumann, 252 Dolphin Point, and Robert J. Aumann, 223 Dolphin Point, both of Clearwater, Fla. 33515

Continuation of Ser. No. 508,277, Sep. 23, 1974, abandoned. This application May 26, 1976, Ser. No. 690,163
Int. Cl.² A01D *35/22*
U.S. Cl. 56—202 **10 Claims**



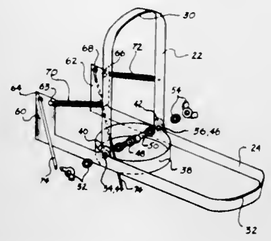
1. A cutting machine with a cutting means and a collecting assembly for the cut debris, said assembly comprising: a positive source of fluid flow contiguous to the cutting means and in fluid communication therewith, debris storage means, a first conduit means interconnected between the cutting means and said debris storage means to establish fluid communication therebetween, said positive source of fluid flow comprising impeller means rotatably mounted in the cutting means of the cutting machine, whereby debris is entrained in the established fluid flow and directed through said first conduit, a negative pressure source means independent of said positive source of fluid flow and disposed in fluid communication with said debris storage means and said cutting means said first conduit means, said negative pressure source means comprising a second conduit means interconnecting in fluid communication said storage means and said negative pressure source means, whereby enhanced fluid flow is established from said cutting area through said storage means, said debris storage means comprising container means connected to said cutting machine and being disposed in fluid communication with both said positive source of fluid flow and said negative fluid pressure, and said container means adapted to receive a disposable container element in which debris is removable from said container means as a desired quantity is collected.

4,095,399

FRUIT PICKER

Richard J. Faulconer, P.O. Box 164, Barstow, Calif. 92311

Filed Mar. 3, 1977, Ser. No. 756,178
Int. Cl.² A01D *46/24*
U.S. Cl. 56—336 **16 Claims**



1. A fruit picker comprising

an elongated tubular member defining a bore therethrough, and having an inlet and an outlet at opposite ends thereof;

a first handle and a secnd handle spaced from each other, affixed to the exterior of said tubular member;

cutting means secured to said tubular member adjacent said inlet, comprising a first knife fixedly mounted on said tubular member, and a second knife pivotally connected to said tubular member and said first knife, and movable between a first position angularly spaced from said first knife, and a second position juxtaposed therewith;

means for moving said second knife between said first and said second position, said means comprising a first lever mounted on said first handle and spaced therefrom a distance such that said handle and said lever may be gripped in one hand and the lever squeezed toward said handle, force transmitting means connecting said first lever and said second knife, and spring means disposed between said first knife and said second knife;

said fruit picker further comprising a cover member pivotally mounted on said tubular member adjacent said outlet and movable between a first position closing said outlet, and a second position opening said outlet for the discharge of fruit therethrough, means for moving said cover between said first and said second position, said means comprising a second lever mounted on said second handle and spaced therefrom a distance such that said handle and said lever may be gripped in one hand and the lever squeezed toward said handle, force transmitting means connecting said second lever and said cover, and spring means operatively engaging said force transmitting means intermediate said second lever and said cover.

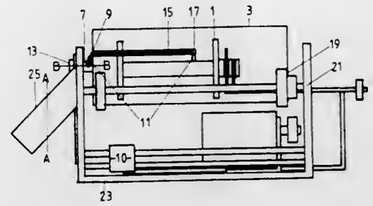
4,095,400

SPINNING MACHINE

Arthur Robert Glen Pownall, Masterton, New Zealand, assignor to Development Finance Corporation of New Zealand, Wellington, New Zealand

Filed Jun. 6, 1977, Ser. No. 803,944
Int. Cl.² D01H *1/00, 1/28, 7/50*
U.S. Cl. 57—37 **11 Claims**

1. A spinning machine including a reel adapted to receive yarn after spinning, a hollow cylinder surrounding and approximately co-axial with said reel, a base including rotatable means on which said cylinder rests, a first guide fixed axially to and projecting from the end of said cylinder and adapted to guide the yarn after spinning, a second guide held without rotation by said base in line with said first guide and adapted to guide the yarn, sliver or partly spun sliver towards the first guide, means for rotating the cylinder and the first guide relative to the second guide, means for rotating the reel relative to the cylinder and including a carding comb held by said base with one end of said comb adjacent to the second guide



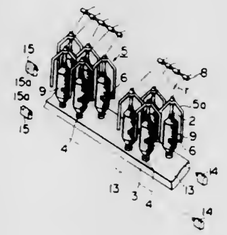
whereby the fibres to be spun are carded while being fed to the second guide.

4,095,401

METHOD AND APPARATUS FOR STOPPING A FLYER FRAME

Mitsuo Mori, Toyota; Katsumi Nakane, Okazaki, and Hideo Hirano, Aichi, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan

Filed Jun. 2, 1976, Ser. No. 692,227
Int. Cl.² D01H *13/16*
U.S. Cl. 57—81 **6 Claims**



2. An apparatus for stopping the movement of a flyer frame provided with a plurality of twisting and winding flyer mechanisms at the time a roving breakage occurs in an outer layer of any roving package during the spinning operation thereof, said flyer frame being provided with a driving means therefor, comprising:

a detector including a photoelectric detecting device for detecting floating flies in a space between said flyer mechanisms;

a control circuit connected to said detecting device for generating a monitoring signal having a magnitude corresponding to the frequency of detection of floating flies by said device; switching means connected to said control circuit for disabling said driving means when the magnitude of said monitoring signal exceeds a predetermined threshold value;

said photoelectric detecting device comprising a light emitter disposed at a position adjacent to and outside one end of the arrangement of said flyer mechanisms and a light receiver comprising a photoelectric light receiving element disposed adjacent to, outside, and at the other end of said arrangement of said flyer mechanisms so that a light beam projected from said light emitter toward said light receiver is passed through a space between said flyer mechanisms parallel to the lengthwise direction of said flyer frame, said light receiver being capable of generating an output signal when said light beam is interrupted;

said control circuit comprising a capacitor and a discharging and charging circuit which discharges or charges said capacitor with a predetermined time constant whenever said output signal is present, and a switching circuit for

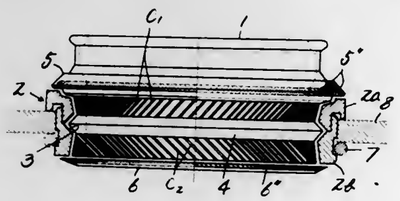
actuating said switching means to disable said driving means when the voltage across said capacitor exceeds a predetermined value, said predetermined values being such that said driving means is not disabled by periodic interruption of said light beam by the normal amount of floating flies present in the absence of any roving breakage.

4,095,402

ROTARY RING FOR SPINNING

Hiroshi Yamaguchi, 12-go, 3-ban, 4-chome, Minamisakurazuka, Toyonaka-shi, Osaka-fu, Japan

Filed Oct. 27, 1976, Ser. No. 736,225
Claims priority, application Japan, Oct. 28, 1975, 50-130030
Int. Cl.² D01H *7/56*
U.S. Cl. 57—124 **2 Claims**



1. A rotary spinning ring construction comprising a rotary ring body having an upper tapered portion and a lower tapered portion, each of said upper and lower tapered portions tapering outwardly gradually from a central portion of said rotary ring body to respective upper and lower end portions of said ring body, inclined grooves positioned in said upper and lower tapered portions of said ring body, a holder for receiving said ring body in rotatable relationship therein, said holder having an annular triangular groove in the central portion of the inner surface thereof, a triangular annular sliding flange mounted around the central portion of said ring body and positioned in said triangular groove on the inner surface of said holder to thereby rotatably support said ring body in said holder with a small amount of play therebetween, and an elastic dust cover fitted around each of the upper and lower end portions respectively of the rotary ring body to cover respectively the openings of the upper and lower areas of play between the ring body and the holder, each of said dust covers having a large number of inclined grooves on the inner surface thereof.

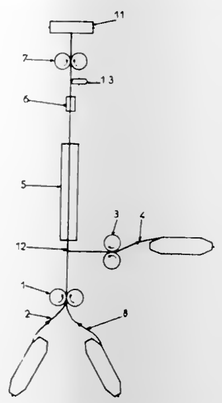
4,095,403

METHOD OF MAKING FANCY YARN AND FANCY YARN

Claudius Beraud, Tassin; Robert Guigal, Lyons; Robert Lehmann, L'Arbresle, and André Lyonnet, Lyons, all of France, assignors to Institut Textile de France, Boulogne sur Seine and Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, both of France

Filed Apr. 19, 1977, Ser. No. 788,914
Claims priority, application France, Apr. 20, 1976, 76 11646
Int. Cl.² D02G *3/38, 3/40*
U.S. Cl. 57—144 **19 Claims**

1. A method of making a fancy yarn in which at least two yarns, of which one forms a core and one an effect yarn, are fed to a junction point and then fed together through a heat-treatment zone and assembled into the fancy yarn in a false twisting step, and wherein the core yarn is provided with a thermoplastic binder upstream of the junction point, the heat treatment in



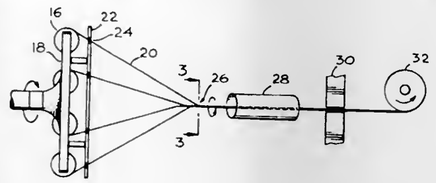
the zone being such as to develop the hot-melt adhesive properties of the thermoplastic binder.

4,095,404

METHOD OF MANUFACTURING A HIGH-STRENGTH, POLYURETHANE-IMPREGNATED POLYAMIDE CABLE

Eduard P. Babayan, Huntington Beach, Calif., assignor to Hitco, Irvine, Calif.

Division of Ser. No. 621,005, Oct. 9, 1975, Pat. No. 4,034,138, which is a division of Ser. No. 429,220, Dec. 28, 1973, abandoned. This application Apr. 25, 1977, Ser. No. 790,546
Int. Cl.² D02G *3/40*
U.S. Cl. 57—164 **9 Claims**

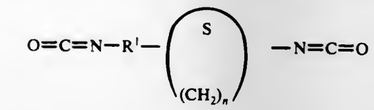


1. A method of manufacturing a high-strength, lightweight cable comprising the steps of:

impregnating high modulus, multifilament, aromatic polyamide yarns with a solution of thermoplastic resin to a level of 15 to 40% by weight of resin, said resin being a hydrolytically stable, solvent soluble polyurethane comprising the stoichiometric reaction product of:

a liquid polytetramethylene glycol having a molecular weight from 500 to 3,000;

an aliphatic-cycloaliphatic diisocyanate of the formula:



where R^1 is alkylene of 1-10 carbon atoms and n is an integer from 4 to 10;

a cycloaliphatic diamine coupling-curing agent;

drying said impregnated yarns to form a resin coating thereon;

twisting a plurality of individual dried yarns into a continuous helix assembly;

heating the twisted yarn assembly to a temperature above the softening point of the resin to fuse the coatings of adjacent yarns; and

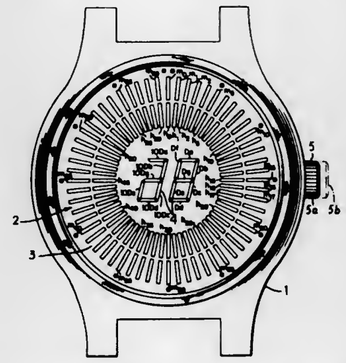
cooling the heated assembly to form a set twisted helix of said yarns.

4,095,405

ELECTRONIC WATCH

Kojiro Tanaka, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sep. 23, 1976, Ser. No. 725,713
Claims priority, application Japan, Sep. 23, 1975, 50-115209
Int. Cl.² G04B *19/24, 19/34, 27/08;* G04C *3/00*
U.S. Cl. 58—4 A **5 Claims**



1. An electronic timepiece comprising a case, an electronic analog time display unit for displaying hours and minutes, said analog time display unit comprising a base plate and a circular series of display segments arranged radially on a peripheral portion of said base plate, a digital date display unit in a center portion of said base plate for displaying the date, a minute counter providing output signals to said analog display unit to activate said display segments sequentially to indicate minutes, said minute counter comprising an up-down counter, an hour counter providing output signals to said analog display unit to activate selected ones of said display segments sequentially to indicate hours, said hour counter comprising an up-down counter, a day counter providing output signals to said digital display unit to indicate date, said day counter comprising an up-down counter, a crown on said case having two operational positions and rotatable in opposite direc. modification switch means controlled by said crown, said switch means comprising means for supplying high feed rate pulses selectively to said minute counter and to said day counter and means for selectively switching said counters to an up-counting mode and to a down counting mode so that said high feed rate pulses amend said time display and said date display selectively in a forward direction or in a backward direction.

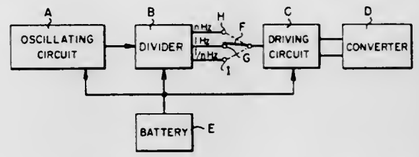
4,095,406

SECOND ADJUSTMENT SYSTEM IN AN ELECTRONIC WATCH

Tadahiro Kikuchi, Tokyo; Yukio Ikehata, Matsudo; Masataka Ikenishi, Soka, and Shozo Kushida, Narashino, all of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Aug. 29, 1975, Ser. No. 609,065
Claims priority, application Japan, Sep. 6, 1974, 49-102613
Int. Cl.² G04B *27/00;* G04C *3/00*
U.S. Cl. 58—23 R **5 Claims**

1. In an electronic timepiece of the type comprising an oscillator circuit for developing an oscillatory output signal which defines a time base; a divider circuit connected to receive the oscillatory time base signal developed by said oscillator circuit for developing in response thereto an oscillatory time signal having a frequency determinative of the rate of advance of seconds which are indicated by the timepiece; a converter for converting the time signal into a seconds indication; and a driving circuit connected to receive the oscillatory time signal developed by said divider circuit for driving said converter with the oscillatory time signal; the improvement which comprises: a system for adjusting the seconds indication of the timepiece; said system comprising said divider circuit wherein said divider circuit includes means for developing a plurality of time signals including a first oscillatory time signal having a frequency for determining the standard once per second rate of advance of the seconds indicated by the timepiece, a second oscillatory time signal having a frequency higher than the frequency of the first oscillatory time signal for determining a rate of advance of the seconds indicated by the timepiece which is higher than the standard rate, and a third



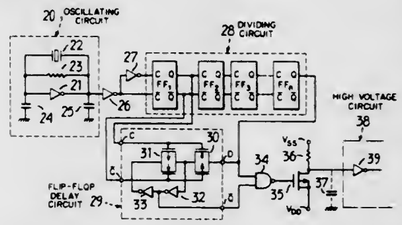
oscillatory time signal having a frequency lower than the frequency of the first oscillatory time signal for determining a rate of advance of the seconds indicated by the timepiece which is lower than the standard rate; and further comprising a time signal selection switch, connected between said divider circuit and said driving circuit, normally set to apply the first oscillatory time signal to said driving circuit for operating the timepiece in a mode with seconds indication advancing at the standard rate and operable for selectably applying the second or third time signals to said driving circuit for operating the timepiece in a mode with the seconds indication advancing at a rate respectively higher than or less than the standard rate to correct the seconds indication of the timepiece when it is respectively slow or fast without stopping operation of the timepiece.

4,095,407

OSCILLATING AND DIVIDING CIRCUIT HAVING LEVEL SHIFTER FOR ELECTRONIC TIMEPIECE

Kazuhiro Asano, Chiba, and Kojiro Tanaka, Yachiyo, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jul. 6, 1976, Ser. No. 702,603
Claims priority, application Japan, Jul. 9, 1975, 50-84666
Int. Cl.² G04C *3/00;* H03K *17/60*
U.S. Cl. 58—23 R **7 Claims**



1. An oscillating and dividing circuit having a voltage level-shifter for an electronic timepiece comprising in combination: an oscillating circuit for generating an oscillating signal, a multistaged dividing circuit for dividing said oscillating signal to standard time signal, means comprising a first inverter connecting the output of said oscillating circuit with a first input of the first stage of said dividing circuit, means comprising a second inverter connecting the output of said first inverter with a second input of said first stage of the dividing circuit, a delay circuit for delaying a divided output of said dividing circuit, means transmitting the output of a stage of said dividing circuit to said delay circuit as a control signal, a level-

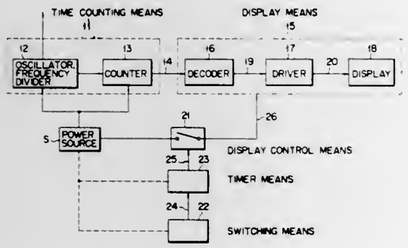
shifter circuit including gate means and means connecting the outputs of said dividing circuit and said delay circuit to said gate means of said level-shifter circuit.

4,095,408

WATCH DEVICE

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 487,461, Jul. 11, 1974, abandoned. This application Feb. 24, 1977, Ser. No. 771,742
Claims priority, application Japan, Jul. 24, 1973, 48-83300
Int. Cl.² G04C *3/00*; G04B *19/24*
U.S. Cl. 58—23 R **3 Claims**



1. A wrist watch device comprising:

a source of power;

an electronic time counting means including an oscillator, said time counting means generating time counting signals;

a liquid crystal display means having a display surface, said display means being coupled to said time counting means for receiving time counting signals from said time counting means;

a switch means coupled to said source of power and including only inclination responsive means for generating an electrical signal only when said wrist watch device is brought to a given position at which the angle between its display surface and a horizontal plane is within a predetermined range;

circuit means coupled to said switch means and to said source of power to produce first and second control signals when supplied with said electrical signal from said switch means;

counter means coupled to said time counting means, to said circuit means and to said source of power for commencing to count clock pulses supplied from said time counting means when reset by said first control signal and for producing a third control signal when a predetermined number of said clock pulses is counted;

a holding circuit coupled to said counter means, to said circuit means and to said source of power to be set by said second control signal for producing a hold signal and adapted to be reset by said third control signal for stopping said hold signal; and

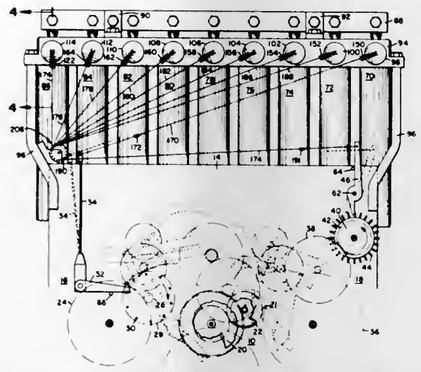
display control means coupled to said holding circuit and to said source of power and being responsive to said hold signal to apply a display driving signal to said liquid crystal display means for causing said liquid crystal display means to be driven for the duration of said hold signal which corresponds to the time duration of a given number of said time counting signals supplied from said time counting means whereby said liquid crystal display means may be driven substantially continuously during wearing of the wrist watch and is extinguished during non-use thereof regardless of the inclination of the wrist watch during said non-use.

4,095,409

CHIMING MECHANISM

Barry L. Palum, Rochester, N.Y., assignor to Marine Midland Bank of Rochester, Rochester, N.Y.

Continuation of Ser. No. 369,672, Jun. 13, 1973, abandoned. This application Aug. 1, 1974, Ser. No. 493,582
Int. Cl.² G04B *121/06*
U.S. Cl. 58—13 **6 Claims**



1. A chiming mechanism adapted for use in a clock of the grandfather type and the like having clock works and the multiplicity of tube chimes in side-by-side relationship adjacent to the clock works such that said chimes and clock works can be contained within the confines of said clock, said mechanism comprising:

(a) a rotatable member providing a source of driving power for striking said chimes,

(b) a chime music barrel having its axis parallel to the axis of said rotatable member and coupled thereto in direct driving relationship therewith such that said chime music barrel is sequentially rotationally movable under control of said clock works, said chime music barrel having an axial length much smaller than the lateral distance across said multiplicity of chimes, and

(c) apparatus for translating the rotational movements of said chime music barrel into percussion against the chimes, said apparatus comprising:

(i) cords,

(ii) a plurality of pulleys defining separate paths for said cord between said chime music barrel and said chimes, said paths each having a plurality of linear portions and each being defined by a plurality of said pulleys, said paths each also extending in a plurality of directions between said chime barrel and said chimes,

(iii) means connected to said cords at one end thereof and operated by said chime music barrel for actuating said cords in response to the rotational movements of said chime music barrel, said actuating means and said pulleys defining one of said plurality of linear portions,

(iv) means connected to said cords at the opposite ends thereof for striking said chimes, said striking means and said pulleys defining another one of said plurality of linear portions, said another of said linear portions being perpendicular to the axis of said chimes such that the driving power is delivered directly to said chimes by said striking means; and

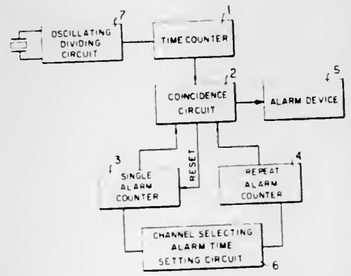
(d) said chimes being disposed with their longitudinal axes in a plane perpendicular to the axis of said chime music barrel and wherein in each of said paths, a first of said plurality of pulleys has its axis parallel to said chime barrel axis and the second of said plurality of pulleys has its axis in a plane parallel to the plane in which said chimes are disposed, said one path portion being disposed between said actuating means and said first of said plurality of pulleys, said another one of said plurality of path portions being disposed between said second of said plurality of pulleys and said striking means, and a third of said path portions being disposed between said first and second pulleys.

4,095,410

ALARM ELECTRONIC TIMEPIECE

Noboru Kaneko, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Oct. 13, 1976, Ser. No. 732,030
Claims priority, application Japan, Oct. 13, 1975, 50-123008
Int. Cl.² G04C *21/00*
U.S. Cl. 58—38 R **4 Claims**



1. An alarm electronic timepiece, comprising in combination:

means for generating a high frequency time standard signal;

divider means receptive of the time standard signal for dividing the same and for developing a low frequency output signal having a frequency defining a rate of advance of time;

counting means receptive of and responsive to the divider means output signal for developing a progressively increasing count representative of time;

single alarm counter means for storing thereing a count representative of a time and responsive to a reset signal for clearing the count stored therein;

repeat alarm counter means for storing therein a count representative of a time;

coincidence detecting means for comparing the respective counts stored in said single and said repeat alarm counter means with the count developed by said counting means and for developing an output signal when the compared counts coincide;

an alarm enabled by the coincidence detecting means output signal for indicating when the time represented by the count developed by said counting means coincides with a time representated by a count stored in a respective one of said alarm counter means; and

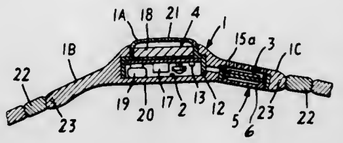
gate means for alternately applying the respective counts stored in said alarm counter means to said coincidence detecting means to alternately compare the count developed by said counting means with the respective counts stored in said alarm counter means for applying the coincidence detecting means output signal as a reset signal to reset said single alarm counter means when the count developed by said counting means coincides with the count stored in said single alarm counter means.

4,095,411

ELECTRONIC WRISTWATCH HAVING AN ALARM DEVICE

Kenichi Kondo, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jul. 21, 1976, Ser. No. 707,118
Claims priority, application Japan, Jul. 22, 1975, 50-101651[U]
Int. Cl.² G04B *23/12*; G04C *21/34*
U.S. Cl. 58—57.5 **6 Claims**



1. A wristwatch comprising an elongated watch case having a central portion with a central cavity therein and two integral side wing portions extending laterally from opposite sides of said central portion and having at their laterally outermost extremities means for connection of said side wing portions with watch band means for holding said wristwatch on the arm of a wearer, a side cavity in one of said integral side wing portions of said case, a watch movement in said central cavity, an audio alarm device in said side cavity and leads electrically connecting said audio alarm device with said watch movement, said central cavity and side cavity being isolated from one another by an intervening integral portion of said watch case.

4,095,412

FLEXIBLE CABLE FOR DIGITAL WATCH

Roger A. Burke, Laguna Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Jun. 16, 1975, Ser. No. 587,487
Int. Cl.² G04C *3/00*; G04B *29/00, 37/00*; H05K *1/00*
U.S. Cl. 58—50 R **7 Claims**

1. A digital watch comprising an oscillator for producing a time signal, electronic components for controlling a plurality of electro-optical display devices which display the time, a plurality of pushbuttons for activating said display devices, a plurality of batteries for energizing said electronic components and said display devices, wherein the improvement comprises a flexible cable consisting of:

a flexible base;

at least one battery contact affixed to said flexible base;

at least one pushbutton contact;

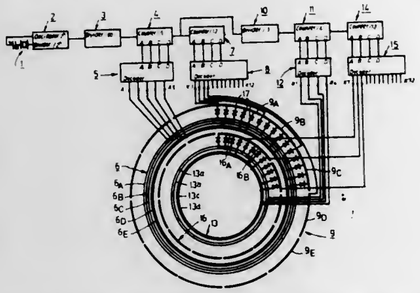
interconnection circuitry for electrically connecting the batteries through said battery contacts to the electronic components and display devices and for electrically connecting the push buttons through said pushbutton contacts to the electronic components and display devices.

4,095,413

ELECTRONIC TIMEPIECE

Joachim Reich, Am Holzweg 21, D 8036 Herrsching (Ammersee), Germany

Filed Apr. 19, 1976, Ser. No. 678,187
Claims priority, application Germany, Nov. 17, 1975, 2551541
Int. Cl.[2] G04C *3/00, 17/00, 19/00*
U.S. Cl. 58—50 R **12 Claims**



1. An electronic timepiece comprising a display, and having an oscillator with output signals employed as a time base, a frequency divider coupled to said oscillator to divide the frequency of the oscillator output signals to the desired clock frequency to provide clock pulses, counting means coupled to said frequency divider for counting the clock pulses, and decoding circuits coupled to said counting means for applying clock pulses to said display such that time marks corresponding to the clock pulse frequency are displayed, said display comprising time marks and an insulating carrier on which there is disposed sets of electrodes coupled to said decoding circuits, said electrodes connected together in a matrix-like arrangement including lines and columns, in which one set of electrodes for said time marks are applied to the lines of said matrix-like arrangement and the other set of electrodes for said time marks are applied to the columns of the matrix-like arrangement and the product of the number of lines and the number of columns is equal to the number of said time marks employed and on driving the lines and the columns of this matrix-like arrangement only one respective time mark responds, wherein the lines of the matrix-like arrangement are constructed as concentric rings and the columns of the matrix-like arrangement are constructed as ring sections concentric to said rings and said time marks are selectively coupled between said rings and said ring sections to be actuated thereby and provide a time display.

4,095,414

ELECTRONIC TIMEPIECE

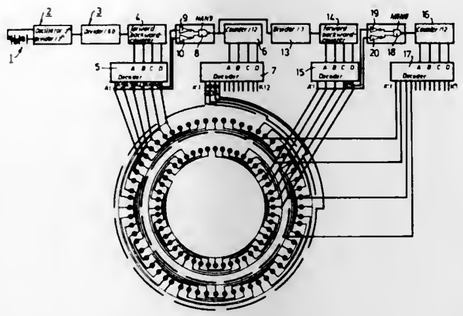
Joachim Reich, am Holzweg 21, D 8036 Herrsching (Ammersee), Germany

Filed Apr. 19, 1976, Ser. No. 678,190
Claims priority, application Germany, Nov. 17, 1975, 2551542
Int. Cl.[2] G04C *3/00;* **G04B** *19/30, 19/06*
U.S. Cl. 58—50 R **14 Claims**

1. An electronic timepiece with a display device, employing an oscillator as a time base, a frequency divider for dividing the frequency of the oscillator to the desired clock frequency, counting means for counting the clock pulses and decoding circuits, which apply the clock pulses to the display device such that time marks are switched on for displaying the time, the improvement comprising:

said counting means including a forward-backward counter having an input coupled to said frequency divider and an output coupled to the input of a simple counter, which on a complete operational cycle runs through the number of time marks completely; and wherein a first decoding circuit is coupled to the simple counter and to first electrodes of one respective group of time marks of the display;

a second decoding circuit coupled to the forward-backward counter and to other electrodes of other time marks of the display, and means coupling remaining time marks of the display to said one and other time marks such that the time marks following the time marks connected with the last



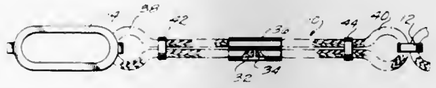
output of said second decoding circuit are respectively coupled with the outputs of said first decoding circuit in a reversed sequence such that sequential actuation of all time marks is completed.

4,095,415

EXPANDABLE METAL BELT

Richard R. Bower, 3708 Crownridge Dr., Sherman Oaks, Calif. 91403

Filed Dec. 15, 1976, Ser. No. 750,604
Int. Cl.[2] F16G *13/24*
U.S. Cl. 59—35 R **9 Claims**



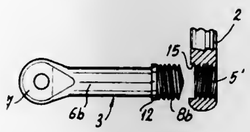
1. The method of constructing an expandable belt or the like comprising the steps of: weaving a tubular-shaped mesh section from metal wire, passing tension spring through the center of the tubular mesh section, securing the ends of spring to respective ends of the tubular mesh section with the mesh longitudinally fully compressed, bringing the opposite ends of the mesh section together in abutting relationship, clamping the abutting ends together and in side-by-side relationship to the center of the section of tubular mesh to provide a pair of closed loops in the form of a figure-8.

4,095,416

SHACKLING DEVICE

Gerard Issard, Thiers, France, assignor to Societe Wichard, Thiers, France

Filed Jun. 22, 1976, Ser. No. 698,776
Claims priority, application France, Jul. 8, 1975, 75 22024
Int. Cl.[2] F16G *15/04*
U.S. Cl. 59—86 **1 Claim**



1. A shackling device according to claim 1, wherein said pin is provided between its smooth portion of given diameter and its threaded portion with a further smooth portion whose diameter is larger than said given diameter and corresponds to

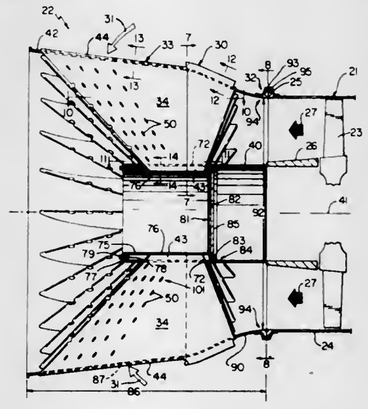
that of said threaded portion of said pin, and a bore is provided beside said second aperture and in axial alignment therewith, the diameter of said bore corresponding to said diameter of said further smooth portion.

4,095,417

APPARATUS FOR AND METHOD OF SUPPRESSING INFRARED RADIATION EMITTED FROM GAS TURBINE ENGINE

Clifford R. Banthin, Easton, Conn., assignor to Avco Corporation, Wilmington, Mass.

Filed Aug. 23, 1976, Ser. No. 716,396
Int. Cl.[2] F02C *7/18*
U.S. Cl. 60—39.5 **25 Claims**



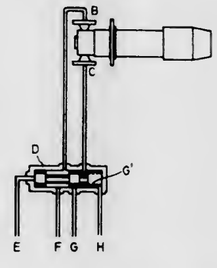
1. An apparatus for suppressing infrared radiation emitted from hot metal parts at the aft end of a gas turbine engine and from the exhaust gas plume thereof during engine operation comprising a multiple purpose ejector vane assembly for introducing cooling ambient air into the hot engine exhaust gases and hiding said hot metal parts and means attaching said vane assembly to said engine, said vane assembly comprising, a duct structure for receiving and confining said engine exhaust gases, and a plurality of radial ejector vanes supported by said duct structure for hiding said hot metal parts and introducing cooling ambient air into hot engine exhaust gases during engine operation by ejector action while simultaneously imparting a spiral swirl to both said cooling ambient air and said exhaust gases, said swirl promoting mixing of ambient air within said duct structure and causing additional entrainment of ambient air downstream of said duct structure, said duct structure comprising an inner tubular support having a central longitudinal axis and an outer tubular support disposed concentrically about said inner support and having an axis common with said central axis, said inner tubular support having means sealing the center thereof from engine exhaust gases and cooling ambient air, each of said plurality of radial vanes being supported by said tubular supports and comprising cooperating curved wall means which provide said hiding of hot metal parts and impart said spiral swirl, each of said plurality of radial vanes having independent cooling ambient air inlet means disposed outwardly of said outer tubular support and communicating directly with ambient air, said plurality of inlet means introducing said cooling ambient air into said radial vanes by said ejector action, said curved wall means of each vane having single-thickness aft wall portions in the direction of exhaust gas flow which cooperate to define a passage disposed transverse said axis for receiving said cooling ambient air therethrough from an associated cooling ambient air inlet means, each of said aft wall portions having a plurality of apertures therein with each aft wall portion and its aperatures upon being subjected to engine exhaust gases being the sole means providing withdrawal of cooling ambient air from within its passage by said ejector action for mixing thereof with said exhaust gases, each of said aperatures in a single-thickness aft wall portion serving to produce a low pressure area in the vicinity thereof which introduces a jet-like stream of cooling ambient air into said exhaust gases, said aperatures defining a plurality of jet-like streams associated with a particular aft wall means of a particular vane which cooperate to define a radially extending blanket of cooling ambient air, each of said blankets due to said sealing means being initially disposed between said inner tubular support and said outer tubular support.

4,095,418

FUEL FLUSHING FROM INJECTOR FOR COMBUSTION CHAMBER

Martin Mansson, and Ragnar Torstenfelt, both of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Finspong, Sweden

Filed Oct. 20, 1976, Ser. No. 733,986
Claims priority, application Sweden, Oct. 28, 1975, 7512016
Int. Cl.[2] F02C *7/22;* **F02G** *3/00;* **F23D** *11/30*
U.S. Cl. 60—39.09 F **3 Claims**



1. Apparatus for the injection of fuel into a gas turbine combustion chamber comprising:

an injector defining separate first and second parallel fuel flow paths from separate fuel inlet connections toward a plurality of atomizing apertures defined in said injector,

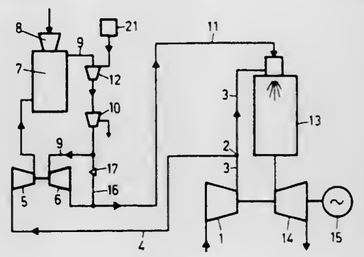
means for simultaneously supplying the fuel from a fuel source to both said inlet connections during normal operation of said turbine, and for connecting one said inlet connection to a source of compressed air while concurrently said other inlet connection is connected to a fuel sump, during shut-down for purposes of cleaning said injector.

4,095,419

THERMAL POWER PLANT

Hans Pfenninger, Baden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Mar. 12, 1976, Ser. No. 666,327
Claims priority, application Switzerland, Apr. 8, 1975, 4426/75
Int. Cl.[2] F02B *43/08*
U.S. Cl. 60—39.12 **4 Claims**



1. In a thermal power plant comprising at least one thermal

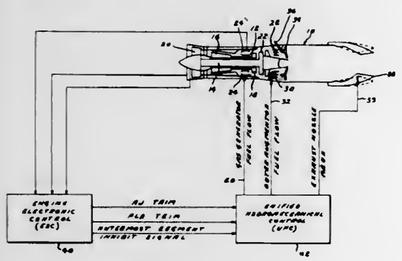
prime mover, a supercharged gas generator for generating hot pressurized producer gas from a sulphur-containing coal, said producer gas after separation of fly ash and sulphur being utilized as the fuel for the power plant and which further includes coupled air compressor and gas turbine units, said compressor unit serving to compress air and deliver it to said gas generator, and said gas turbine unit being driven by the hot pressurized and unburned producer gas from the outlet of said gas generator, the improvement which comprises means provided directly in the flow path of the hot pressurized producer gas at the outlet of said gas generator for injecting a reagent into the hot gas which chemically binds the sulphur, a first separator of the centrifugal type located in the path of the hot pressurized producer gas following said reagent injection means and ahead of said gas turbine for separating out fly ash and sulphur bound reagent and a second centrifugal separator structurally integrated with said gas turbine and which is comprised of a spiral entry section at the intake side of said turbine ahead of and a multiplicity of slots in the turbine casing after the first row of blading on the turbine rotor which provides a further centrifuging affect upon and removal of any remaining fly ash and sulphur bound reagent in the gas.

4,095,420

AUGMENTOR OUTER SEGMENT LOCKOUT AND FAN UPMATCH

Robert B. Abernethy; Edmond Preti, and John P. Rembold, all of North Palm Beach, Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 26, 1977, Ser. No. 791,077
Int. Cl.[2] F02K *3/10*
U.S. Cl. 60—204 **4 Claims**



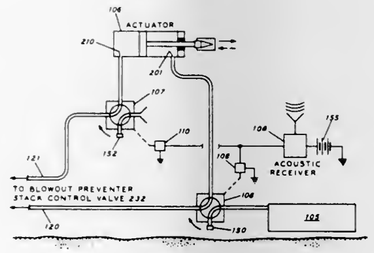
4. A method for controlling instability at high altitude, low Mach number conditions in thrust augmented twin spool turbofan engine having compressor driven by a first turbine connected to one spool and a fan, adjacent an engine inlet, driven by a second turbine connected to a second spool, a plurality of burners for supplying energy to drive the first and second turbines, a variable area nozzle for expanding the gases passing through the turbines and thrust augmentor; a unified control system, including an engine electronic control and a unified hydromechanical control for controlling the engine during its various operating modes with the unified control including means for controlling fuel flow to said burners, means for sequencing the fuel flow to separate segments in the augmentor and means for controlling the area of the variable nozzle, comprising: the steps of blocking fuel flow to the outermost augmentor during a portion of the aircraft operating envelope when the engine inlet total temperature is less than 25° F and when the engine burner pressure is less than 120 psia; increasing the fan pressure ratio by increasing the fuel flow to the engine burners a predetermined amount and decreasing the variable nozzle area a predetermined percent during the time that the fuel flow to the outermost augmentor segment is blocked.

4,095,421

SUBSEA ENERGY POWER SUPPLY

William H. Silcox, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jan. 26, 1976, Ser. No. 652,447
Int. Cl.[2] E21B *29/00;* **F01K** *27/00*
U.S. Cl. 60—398 **23 Claims**



1. A system for operating equipment submerged in a body of water, said submerged equipment having intake and discharge sides and said equipment being actuatable by a pressure difference between said intake side and said discharge side, comprising:

submerged means for containing an internal pressure less than the ambient fluid pressure exerted on said submerged equipment;

conduit means connecting said discharge side of said submerged equipment with said submerged means for flowing fluid from said submerged equipment to said submerged means;

normally closed valve means closing said intake side and said discharge side of said submerged equipment, said valve means upon being opened placing said intake side directly in communication with the ambient fluid pressure exerted on said submerged equipment by exposing said intake side to the water at the depth of the location of the equipment while simultaneously placing said discharge side in communication with said submerged means through said conduit means so that the resulting pressure difference between said intake side and said discharge side actuates said submerged equipment.

4,095,422

VERTICAL-AXIS COMPOSITE SWINGING-BLADE WATER WHEEL

Yoshio Kurakake, Ohbu, Japan, assignor to Aquatech Co., Ltd., Ohbu, Japan

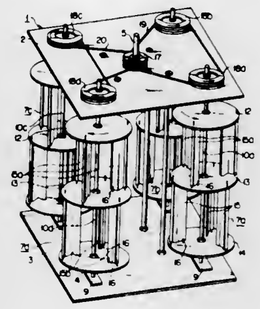
Filed Apr. 12, 1977, Ser. No. 786,961
Claims priority, application Japan, May 28, 1976, 51-62023
Int. Cl.[2] F16D *31/00;* **F03B** *13/00*
U.S. Cl. 60—398 **5 Claims**

1. An apparatus to convert a kinetic energy of a substantially horizontal stream into a torque, comprising:

(a) two parallel horizontal retaining plates, said plates being fixed at a predetermined vertical distance from one another by means of a plurality of spacer bolts, thereby forming a frame;

(b) a vertical output shaft at the center of said frame;

(c) at least a pair of vertical-axis swinging-blade water wheels disposed symmetrically with respect to the axis of the output shaft, each of said water wheels further comprising a vertical water wheel shaft mounted between said retaining plates, shroud discs attached to said water wheel shaft coaxially therewith at a predetermined vertical distance from one another and capable of rotating in a body with said water wheel shaft, a plurality of vertical swinging blades pivotably attached to and between said shroud discs at points equiangularly spaced along the circumference of circles of the shroud discs with the axis of said



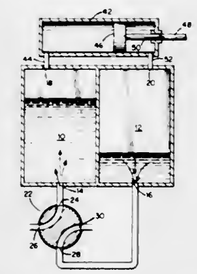
water wheel shaft as the center, and vertical stop pins arranged on each shroud disc at positions away from said pivotal points over a distance a little shorter than the width of the blade along the radii extending between said respective pivotal points and the axis of the water wheel shaft; and (d) means for converting the rotations of the respective water wheel shafts into a rotation in one direction and transmitting the resultant torque to said output shaft.

4,095,423

APPARATUS FOR HARNESSING TIDAL POWER

Alexander Moiseevich Gorlov, 234 Main St., Medford, Mass. 02155

Filed May 5, 1977, Ser. No. 794,239
Int. Cl.[2] F15B *1/02;* **E02B** *9/00*
U.S. Cl. 60—398 **7 Claims**



1. An apparatus for extracting usable power from a tidal water flow, comprising:

means for creating a low water pressure differential between a first, tidal body of water and a second, non-tidal body of water;

first and second chambers each having a first port in the upper portion thereof and a second port in the second portion thereof;

a cylinder having a piston and piston rod disposed therein, the piston rod extending through a wall of the cylinder in a fluid-sealed aperture;

the cylinder having a first port at a first end thereof and a second port at a second port thereof;

the first port of the first chamber being connected to the first port of the cylinder and the first port of the second chamber being connected to the second port of the cylinder;

a multi-state valve for connecting, in a first state, a first port thereof to a second port thereof and a third port thereof to a fourth port thereof and, in the second state, connecting the first port to the fourth port thereof and the second port to the third port thereof;

one of either the first or third ports of the valve being connected to the second port of the first chamber and the other of such ports of the valve being connected to the second port of the second chamber;

the valve being in the first state while the piston is moving toward the second end of the cylinder;

means for switching the valve to the second state thereof when the piston nears the second end of the cylinder;

the valve being in the second state while the piston is moving toward the first end of the cylinder;

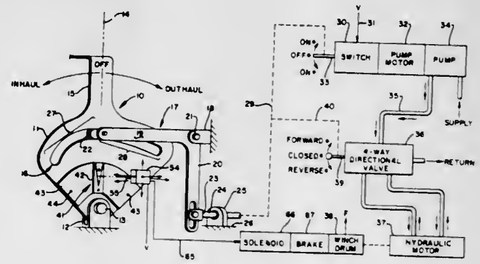
means for switching the valve to the first state when the piston nears the first end of the cylinder.

4,095,424

VARIABLE HYDRAULIC PUMP NONLINEAR CONTROL WITH CAM-ACTUATED, ADJUSTABLY-SEQUENCED SECONDARY CONTROL

Tibor Laky, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Mar. 28, 1977, Ser. No. 781,623
Int. Cl.[2] F15B *15/18*
U.S. Cl. 60—436 **10 Claims**



1. A control system comprising means for generating a primarly control output defined by first and second primary control functions each contiguous with a primary control neutral position; means for generating a secondary control output bearing a selectable, sequential relationship with said primary control output, said secondary control output defining first and second operational-definitive outputs; means for selectively, differentially adjusting said secondary control first and second operational and definitive outputs over the range of said primary control outputs; and means for selectively, asymmetrically offsetting one of said secondary control outputs with respect to said primary control neutral position.

4,095,425

CONTROL SYSTEM FOR ROTARY AIR MODULATOR

Graydon L. Brown, and Larry L. Newlin, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

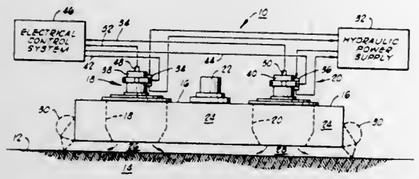
Filed Mar. 3, 1977, Ser. No. 773,926
Int. Cl.[2] F15B *11/20*
U.S. Cl. 60—484 **23 Claims**

1. Circuit apparatus for controlling angular velocity and position of a motor driven rotary element which includes a servo amplifier controlling said motor, comprising:

means generating a reference frequency signal, and producing a first output which is an equivalent voltage thereof and a second output which is an integral sub-multiple frequency signal thereof;

means responsive to said motor driven rotary element for producing a first feedback signal at said reference frequency and a second feedback signal at said integral submultiple frequency;

means converting said first feedback signal to an equivalent second voltage;



phase detector means receiving input of said second output and second feedback signal to produce a phase difference voltage; and

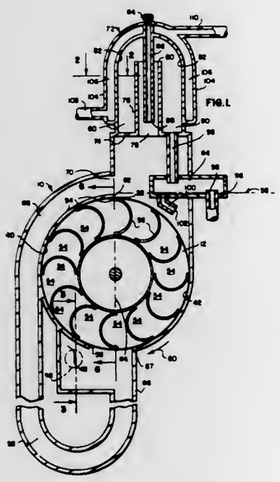
summing means receiving said first output, said second voltage and said phase difference voltage to produce an algebraically summed voltage which is applied to energize said servo amplifier in control of said motor.

4,095,426

TURBINE AND METHOD OF USING SAME

William A. Rhodes, 4421 N. 13th Pl., Phoenix, Ariz. 85016

Filed Aug. 27, 1976, Ser. No. 718,393
Int. Cl.² F03G 7/00
U.S. Cl. 60—496 **5 Claims**



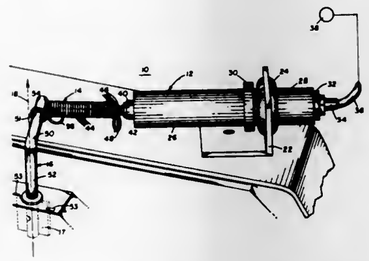
1. A fluid operated turbine having: a housing; liquid in said housing; a rotor rotatably mounted on a horizontal axis and emersed in said liquid in said housing; said rotor provided with a peripheral portion having gas receiving pockets therein; liquid level control means in said housing above said rotor tending to maintain a liquid level above said rotor and adapted to drain overflow liquid from a position above said liquid level whereby said rotor is normally emersed in liquid in said housing; gas inlet means disposed in said housing for introducing a gas phase of said liquid into said housing at the lower periphery of said rotor and at a location horizontally offset from said generally horizontal axis whereby gas is bouyantly introduced into said pockets; said housing provided with arcuate seal and gas passage structure disposed in close tolerance clearance relative to said peripheral portion and pockets of said rotor in an area above said inlet means; said arcuate seal structure having a gas outlet at an upper portion of said rotor above said inlet means; said housing having a liquid downflow conducting arcuate seal structure disposed in close tolerance clearance relative to said peripheral portion and said pockets of said rotor; a liquid outlet disposed in horizontally offset position relative to said axis and communicating with the periphery and pockets of said rotor at a lower portion thereof; said liquid outlet being disposed adjacent said gas inlet in said housing; liquid return conduit means communicating with said liquid outlet and the interior of said housing above said rotor; gas receiving condenser means disposed to receive gas above said liquid level established by said liquid level control means; and baffle and conduit means disposed in intercommunicating relation with said condenser and said housing above said rotor for conducting gas upwardly into said condenser and for shielding said condenser from splashing liquid above said liquid level which may result from gas emanating upwardly through said liquid at said liquid level.

4,095,427

LINEAR ACTUATOR LINKAGE

Edward J. Stropkay, Chesterland, Ohio, assignor to Design & Manufacturing Corporation, Willoughby, Ohio

Filed Aug. 2, 1976, Ser. No. 710,598
Int. Cl.² F16J 1/10; F01B 9/00
U.S. Cl. 60—530 **19 Claims**



1. An actuator system for rotating a controlled load about a pivot axis comprising:

linear actuator means for producing a force in a linear direction through a predetermined distance by generally linear movement of a piston rod in response to an actuation signal;

a control arm, said control arm having a longitudinal axis and being connected to the controlled load, the longitudinal axis of said control arm forming said pivot axis, and a thrust lever connected to said control arm to provide a lever arm by which said control arm may be rotated; and

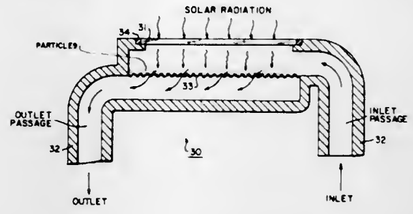
actuator linkage means for coupling said piston rod to said thrust lever, said linkage means comprising means for transforming the linearly directed force of said piston rod into rotary motion about the pivot axis of said control arm by an elastic flexure of said linkage means, and including an integral tubular body formed of flexible coils aligned longitudinally with said piston rod and having sufficient rigidity to apply to said thrust lever a pushing force produced by said piston rod upon actuation thereof, said tubular body also being longitudinally flexible to produce a bending of elastic flexure out of said alignment when said piston rod is actuated to continue applying such pushing force to said thrust lever rotating the same about said pivot axis.

4,095,428

SOLAR ELECTRIC POWER PLANT AND AN IMPROVED THERMAL COLLECTOR OF SOLAR ENERGY

Roger W. Warren, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 25, 1975, Ser. No. 552,834
Int. Cl.² F03G 7/02; F24J 3/02
U.S. Cl. 60—641 **27 Claims**



1. A thermal collector of solar energy that is adapted to delivery collected energy to a heat using apparatus, comprising,

first means for transmitting solar radiation,

second means for supporting a finely divided semiconductor material in relation to said first means to expose the semiconductor material to the transmitted radiation, whereby the semiconductor material absorbs at least a portion of the energy of the transmitted radiation and is heated by the absorbed energy, and

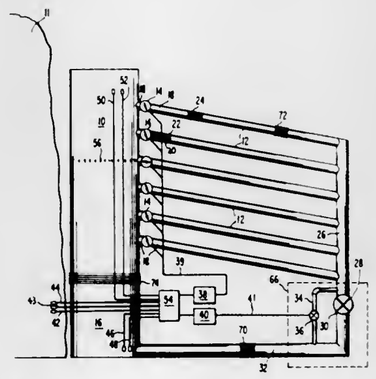
third means for transferring heat from the semiconductor material to the heat using apparatus.

4,095,429

SOLAR GRAVITY ENGINE

Robert E. Morey, 18 Cumberland Rd., Hamilton Square, N.J. 08690

Filed May 5, 1977, Ser. No. 794,292
Int. Cl.² F03G 7/02
U.S. Cl. 60—675 **21 Claims**



1. A solar gravity engine comprising:

(a) a substantially vertical conduit means including an evaporating area in a lower region thereof;

(b) a plurality of liquid return conduit means each being attached at different vertical locations to said vertical conduit for selective condensation and fluid flow therewith, each of said liquid return conduit means defining a condensing area therein in the region adjacent said vertical conduit means;

(c) a plurality of first valve means each one positioned in the fluid flow path between said vertical conduit means and one of said return conduit means to selectively control fluid flow from said vertical conduit means to the associated return conduit means;

(d) an accumulating chamber means being in fluid flow communication with the output of said return conduit means to receive and accumulate condensed fluid therefrom;

(e) a return chamber means connected for fluid flow communication between said accumulating chamber means and said evaporating area to allow liquid to return from said accumulating chamber means to said vertical conduit means;

(f) power generating means positioned adjacent the fluid flow path from said accumulating chamber means to said return chamber means and adapted to be activated by liquid movement therealong to produce usable energy;

(g) a by-pass line connected between said accumulating chamber means and said return chamber to allow a controlled amount of condensed liquid to flow from said accumulating chamber means to said return chamber means without passing adjacent said power generating means;

(h) a second valve means positioned within said by-pass line to modulate flow therethrough;

(i) first control means to modulate fluid flow through each of said first valve means; and

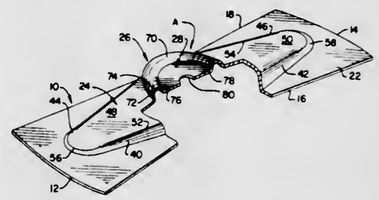
(j) second control means to modulate flow through said second valve means.

4,095,430

LOAD SUPPORTING BEARING PLATE

John I. Hannan, Shadyside, Ohio, assignor to Phillips Stamping Co., Inc., Bellaire, Ohio

Continuation of Ser. No. 685,695, May 12, 1976, Pat. No. 4,037,418. This application Jun. 20, 1977, Ser. No. 808,185
The portion of the term of this patent subsequent to Jul. 26, 1994, has been disclaimed.
Int. Cl.² E21D 21/00
U.S. Cl. 61—45 B **12 Claims**



1. A low profile bearing plate of the type adapted to provide support for a generally planar surface, said plate comprising:

a generally flat body having a length greater than the width with a longitudinal axis extending between the body ends and a transverse axis extending between the body sides with said axes intersecting at substantially the midpoint of said body, one face of said flat body defining a generally planar plate bearing surface adapted to be closely received against a generally planar surface; an elongated major embossed area extending outwardly from the other face of said body; said major embossed area having a length as measured along said major embossed area greater than the width as measured along said transverse axis; the height of said major embossed area being such that said plate defines a relatively low profile; a recessed area extending inwardly from the outer surface of said major embossed area back toward said plate bearing surface and being coaxially disposed relative to the intersection of said body axes, said recessed area having a bottom wall disposed generally parallel to and spaced from said plate bearing surface; and, an opening in said bottom wall coaxially disposed with the intersection of said body axes adapted to receive headed fastener means for affixing said support plate to a generally planar surface; the depth of said recessed area being such that when said fastener means is

received in said opening, at least a portion of the head of said fastener means is concealed within said recessed area.

4,095,431

LOAD SUPPORTING BEARING PLATE

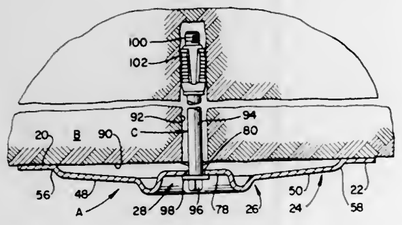
John I. Hannan, Shadyside, Ohio, assignor to Phillips Stamping Co., Inc., Bellaire, Ohio

Continuation of Ser. No. 808,185, Jun. 20, 1977, which is a continuation of Ser. No. 685,695, May 12, 1976, Pat. No. 4,037,418. This application Nov. 10, 1977, Ser. No. 850,480

The portion of the term of this patent subsequent to Jul. 26, 1994, has been disclaimed.

Int. Cl.[2] E21D *21/00*

U.S. Cl. 61—45 B **12 Claims**



1. A low profile bearing plate of the type adapted to provide support for a generally planar surface, said plate comprising:

a generally flat body having a length greater than the width with a longitudinal axis extending between the body ends and a transverse axis extending between the body sides with said axes intersecting at substantially the midpoint of said body, one face of said flat body defining a generally planar plate bearing surface adapted to be closely received against a generally planar surface; an elongated major embossed area extending outwardly from the other face of said body; said major embossed area having a length as measured along said major embossed area greater than the width as measured transversely thereof; the height of said major embossed area being such that said plate defines a relatively low profile; a recessed area extending inwardly from the outer surface of said major embossed area back toward said plate bearing surface and being coaxially disposed relative to the intersection of said body axes, said recessed area having a bottom wall disposed generally parallel to and spaced from said plate bearing surface; and, an opening in said bottom wall coaxially disposed with the intersection of said body axes adapted to receive headed fastener means for affixing said support plate to a generally planar surface; the depth of said recessed area being such that when said fastener means is received in said opening, at least a portion of the head of said fastener means is concealed within said recessed area.

4,095,432

MINE ROOF SUPPORTS

Arthur Scarfe, Wakefield, England, assignor to Fletcher Sutcliffe Wild Limited, Wakefield, England

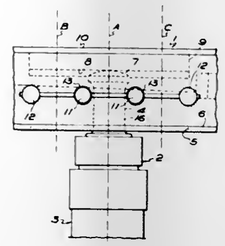
Filed May 21, 1976, Ser. No. 688,940

Claims priority, application United Kingdom, May 22, 1975, 22144/75

Int. Cl.[2] E21D *15/44*

U.S. Cl. 61—45 D **21 Claims**

1. A mine roof support comprising a hydraulically extensible chock leg, an elongated roof bar supported by the upper end of said leg, means for attaching said upper end to said bar including a projection on said upper end of said leg, and abutment means defining a plurality of apertures along the underside of the roof bar, said projection to be adjustably located in an articulated manner in any one of said plurality of apertures,



said abutment means being positioned to define said apertures and retain said projection.

4,095,433

TUNNEL SUPPORT STRUCTURE USING BUILT-UP PIPE SUPPORT SET, AND UNIT PIPE SUPPORT MEMBER THEREFOR

Minoru Yamamoto, Machida; Juntaro Honda, Kobe; Katsumi Nagasaki, Sakai, and Yoshito Seto, Yamato-Koriyama, all of Japan, assignors to Kubota, Ltd., Osaka, Japan, a part interest

Filed Oct. 7, 1976, Ser. No. 730,343

Claims priority, application Japan, Oct. 9, 1975, 50-122212

Int. Cl.[2] E21D *7/00*

U.S. Cl. 61—45 C **8 Claims**

1. A unit pipe support member for use in a structure for supporting the earth wall of a tunnel or the like by built-up pipe support sets each including a plurality of unit pipe support members, wherein:

said unit pipe support member is a casting of ductile cast iron or cast steel having substantially the same shape and same length as the other of said plurality of unit pipe members;

at least one of the inner and outer surfaces of said unit pipe support member has reinforcing rib means cast integral therewith, said reinforcing rib means comprising continuous annular ribs spaced apart from each other longitudinally of said unit pipe support member;

and connector flanges integrally formed on and reinforcing the opposite ends of said unit pipe support member.

4,095,434

MINE EQUIPMENT

Rodney James Anthony Hunter, Etwall, and Derek Plummer, Burton upon Trent, both of England, assignors to Coal Industry (Patents) Limited, London, England

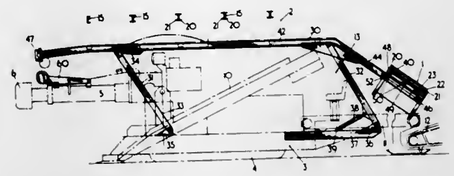
Filed Oct. 20, 1975, Ser. No. 624,234

Claims priority, application United Kingdom, Nov. 19, 1974, 50041/74

Int. Cl.[2] E21D *13/04*

U.S. Cl. 61—63 **26 Claims**

1. Apparatus for conveying a roadway roof support section along a portion of an underground roadway adjacent to a mining machine, comprising an elongated movable frame, a plurality of legs pivotally connected to the frame and to the mining machine and hydraulic ram means connected between the mining machine and the legs whereby the elongated frame is moved about the pivotal connections by the hydraulic rams with respect to the mining machine such that in use the frame



extends along the portion of the roadway adjacent to the mining machine, a carriage adapted to carry the support section and advanceable along the elongated frame, and means for urging the support section from the advanced carriage toward a roof supporting position.

4,095,435

METHOD OF ADVANCING A PLURALITY OF LONGITUDINALLY ARRANGED MOVABLE CONSTRUCTIONAL UNITS FORWARDLY SUCCESSIVELY IN A SELF-RUNNING MANNER AND APPARATUS FOR PERFORMING SAME

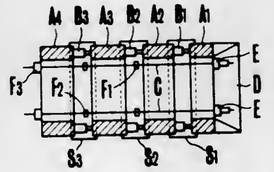
Koichi Uemura, 1-13-11, Sakura-machi, Koganei-shi, Tokyo, Japan

Filed Apr. 2, 1976, Ser. No. 673,052

Claims priority, application Japan, Apr. 8, 1975, 50-41793; Apr. 8, 1975, 50-41794; Oct. 4, 1975, 50-119375; Aug. 6, 1975, 50-95014; Oct. 9, 1975, 50-121237; Apr. 12, 1975, 50-43893; Oct. 16, 1975, 50-123783; Apr. 10, 1975, 50-42779; Jul. 4, 1975, 50-81942; Aug. 14, 1975, 50-98053; Aug. 14, 1975, 50-98054; Aug. 25, 1975, 50-102094; Sep. 6, 1975, 50-107575; Sep. 13, 1975, 50-110498

Int. Cl.[2] E01G *3/00*

U.S. Cl. 61—84 **30 Claims**



1. A method of advancing a plurality of longitudinally aligned movable constructional units successively in a self-running manner, wherein said constructional units constituting an underground structure of a form adapted for a special purpose such as tunnel excavation, heavy load transportation, underwater tunnel construction or muddy water dredging excavation are arranged along a common longitudinal line adjacent to each other and are provided with a self-run forward advancement impelling mechanism, said mechanism comprising propulsion means each positioned between adjacent said constructional units, a linking member extending over the entire length of said constructional unit group, traction means positioned in front of the forwardmost constructional unit for forward advancement thereof and connected to said linking member, and anchorage members arranged for selective contact with the respective intermediate and tailing ones of said constructional units and mounted on and selectively engageable with said linking member, said method comprising actuating the first one of said propulsion means positioned between the forwardmost and next ones of said constructional units while releasing said traction means and all the said anchorage members from engagement with said linking member to advance said forwardmost constructional unit relative to said next constructional unit and to the ground, releasing said first propulsion means, bracing said linking member to said next constructional unit through the one of said anchorage members arranged for selective engagement therewith, actuating said traction means and the second one of said propulsion means positioned between the second and third ones of said constructional units counting from the front to advance said next constructional unit relative to the ground, advancing the other ones of said intermediate constructional units individually subsequently in a manner similar to that described above relative to the ground, bracing said linking member to said tailing constructional unit through the one of said anchorage members arranged for selective contact therewith, actuating said traction means to advance said tailing constructional unit relative to the ground through said linking member, and repeating the procedure consisting of the above-described steps a necessary number of times.

4,095,436

METHOD OF, AND APPARATUS FOR, CONTROLLING THE ADVANCE OF A TUNNEL DRIVE SHIELD

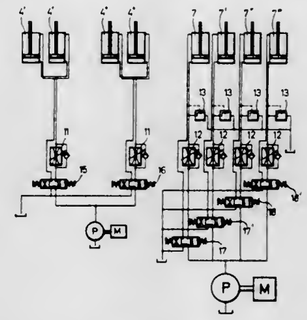
Herbert Heitkamp, Werne, and Rolf Stoltz, Bottrop, both of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Germany

Filed Mar. 21, 1977, Ser. No. 779,851

Claims priority, application Germany, Mar. 23, 1976, 2612169

Int. Cl.[2] E01G *3/00*

U.S. Cl. 61—85 **22 Claims**



1. A method of controlling the advance of a tunnel drive shield of the type having a plurality of elongate implements each of which is supported and guided on a frame, the elongate implements being movable relative to the frame by means of hydraulic rams, the method comprising the step of advancing the frame by applying hydraulic fluid to hydraulic ram means acting between the frame and a fixed tunnel lining positioned behind the drive shield, and by simultaneously applying hydraulic fluid to at least one of said hydraulic rams whereby the direction of advance of the frame is controllable by varying the ratio of the pressures of the hydraulic fluid applied to said hydraulic ram means and to said at least one hydraulic ram, wherein a first control unit is operated to vary the pressure of hydraulic fluid applied to said hydraulic ram means, and wherein a second control unit is operated to control the pressure of hydraulic fluid applied to each of said at least one hydraulic ram.

4,095,437

SUBMERSIBLE PIPE INSTALLATION SYSTEMS

John W. Cox, Oklahoma City, Okla., assignor to Transworld Drilling Company, Oklahoma City, Okla.

Filed Oct. 18, 1976, Ser. No. 733,377

Int. Cl.[2] F16L *1/00*; E02D *29/10*

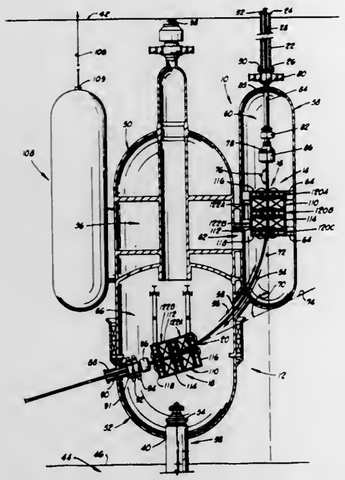
U.S. Cl. 61—109 **95 Claims**

1. An apparatus for use in forming a pipe, comprising:

a support structure;

means connectable to the support structure, having portions engageable with the pipe and providing a pipe passageway, the pipe being passable through the pipe passageway and said means engaging and forming portions of the pipe, comprising:

a first forming assembly connectable to the support structure having portions engageable with the pipe and providing a pipe passageway, the pipe being passable through the pipe passageway of the first forming assembly and the first forming assembly engaging and forming the portions of the pipe passing through the pipe passageway of the first forming assembly in a predetermined radius; and



a riser connectable to the support structure, having a first end, a second end and a pipe passageway, the second end of the riser being disposed near the pipe passageway of the means engaging and forming portions of the pipe, the pipe being passable through the pipe passageway in the riser and through the pipe passageway of the means engaging and forming portions of the pipe.

4,095,438

REFRIGERATION SYSTEM WITH HOT GAS DEFROST

Daniel E. Kramer, 2009 Woodland Dr., Yardley, Pa. 19067

Filed Mar. 4, 1977, Ser. No. 774,480

Int. Cl.[2] F25B *47/00*

U.S. Cl. 62—278 **6 Claims**

1. An improved refrigeration system having refrigerating and defrosting periods, said system comprising:

a. compressor;

b. condenser;

c. a discharge conduit connecting the compressor to the condenser, the compressor and condenser constituting a refrigeration highside;

d. evaporator, including suction conduit means for conveying refrigerant from the evaporator to the compressor;

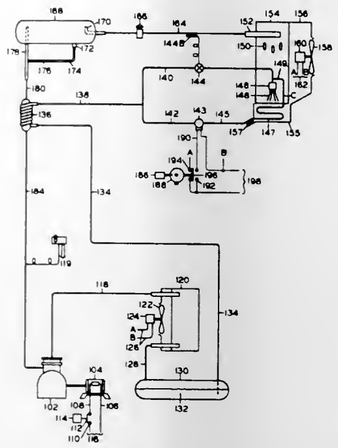
e. expansion means positioned substantially adjacent the evaporator, for restrictedly feeding liquid refrigerant to the evaporator during refrigerating periods;

f. liquid conduit means for connecting the condenser to the expansion device,

wherein the improvement comprises:

1. hot gas conduit means connecting a point in said liquid conduit means substantially adjacent the inlet of the expansion device to the evaporator for defrosting the evaporator by hot gas which has traversed the condenser and the liquid conduit means; and

2. means in the suction conduit means for limiting the rate of refrigerant circulation through said liquid conduit means during defrost;



whereby both the refrigerating and the hot gas defrosting functions are achieved with only two conduits joining the highside.

4,095,439

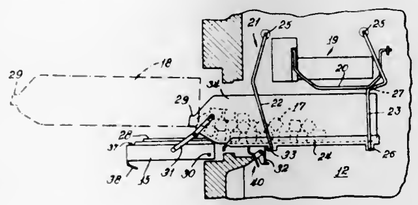
MOVABLE ICE RECEPTACLE

William John Linstromberg, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 10, 1976, Ser. No. 749,536

Int. Cl.[2] F25C *5/18*

U.S. Cl. 62—344 **21 Claims**



1. In a refrigeration apparatus having a cabinet defining a refrigeration space provided with an opening, and a receptacle for storing ice within said space, improved means for providing access to said ice comprising:

mounting means for removably carrying said receptacle for swinging movement about a horizontal pivot axis between a rearward upper ice storage position within said space and a forward lower ice access position adjacent said opening;

a closure movable between a first position wherein said closure closes said opening with said receptacle being retained in said rearward position, and a second position wherein said opening is exposed, said receptacle being repositioned fowardly from said storage position to said access position as an incident of movement of said closure from said first to said second position to permit access to ice in said receptacle; and

stop means for effecting rapid deceleration of the forward movement of said receptacle at said access position when the closure is moved to said second position thereby to urge ice in said receptacle forwardly therein.

4,095,440

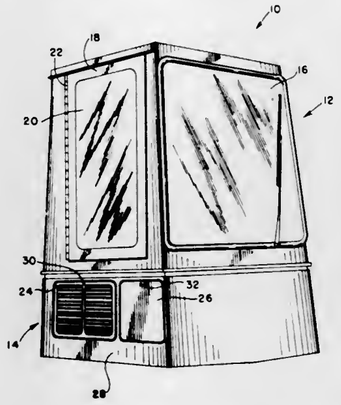
AIR BLOWER MOUNTING ASSEMBLY

William J. Brown, Naperville, and William F. Legler, Sugar Grove, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 622,912, Oct. 16, 1975, abandoned. This application Mar. 7, 1977, Ser. No. 775,333

Int. Cl.[2] F25D *19/00*

U.S. Cl. 62—450 **3 Claims**



1. A machinery enclosure and mounting arrangement comprising:

housing means defining an enclosed machinery compartment;

said compartment including means for mounting machinery within said compartment;

an access opening formed in said housing for providing access to machinery in said compartment;

access door means pivotally secured to said housing for closing said access opening;

said access door means being readily detachable from said housing for removal thereof from said housing;

fan means mounted on said access door means for pivoting with said door means for providing access to said fan means and to said compartment behind said door means, removal of the door means providing removal of the fan means;

the access door means being pivotally secured at its lower edge to said housing.

4,095,441

KNITTING METHOD

Frank Robinson, and Nigel Stephen Whatmough, both of Breatson, England, assignors to Courtaulds Limited, London, England

Filed Jul. 21, 1977, Ser. No. 817,704

Claims priority, application United Kingdom, Aug. 10, 1976, 33208/76

Int. Cl.[2] A41B *9/06*

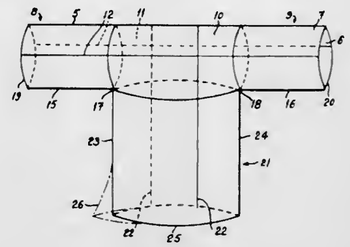
U.S. Cl. 66—176 **6 Claims**

1. In a method of knitting a blank for a sleeved garment wherein the sleeves of the blank are formed integrally with the body of the blank in the knitting process, the improvement comprising performing the following steps in either order:

(a) knitting fabric to constitute the sleeves and the front and rear body shoulder regions of the garment by forming knitted courses each of which extends the full length of each sleeve and across one of said body shoulder regions,

(b) knitting body fabric for the blank by forming simultaneously front and rear body portions of the blank by knitting courses which extend across said body portions in the finished garment,

(c) said body fabric being integral with said sleeve and body shoulder region fabric and having knitted wales which are



continuous with knitted wales in said front and rear body shoulder regions.

4,095,442

WASHING MACHINE FOR A TEXTILE WEB

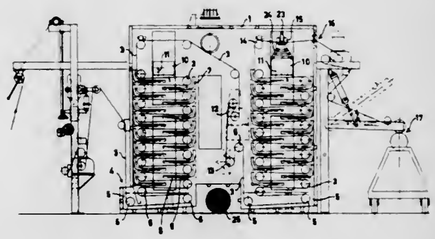
Hans Brugman, Ambt-Delden, Netherlands, assignor to Brugman Machinefabriek BV, Netherlands

Filed Jul. 8, 1976, Ser. No. 703,377

Claims priority, application Netherlands, Jul. 10, 1975, 7508277

Int. Cl.[2] D06B *1/06*

U.S. Cl. 68—18 C **5 Claims**



1. A washing machine for a textile web, or the like, comprising:

a treatment space;

a plurality of guide rollers in said space and said rollers all being oriented horizontally and all being parallel; said rollers being arranged in at least one group of two generally vertical rows of said rollers, with neighboring said rollers in a said row being adjacent to each other, wherein the textile web, or the like, is passed along a zig-zag path of generally horizontally traveling loops of textile web, with the web first wrapping around a said roller in one said row and then traveling generally horizontally to a said roller in the other said row and wrapping about that said roller in the other said row; and said rollers being so positioned along their respective said rows for enabling such travel of the web by means of said rollers in one said row being vertically staggered from the horizontally adjacent said rollers in the other said row;

a respective receptacle disposed under each said roller and the receptacle being away from the web such that the web does not contact the contents of the receptacle; each said receptacle having a width greater than the length of the said roller above that said receptacle; each said receptacle extending toward the other said row of rollers and of receptacles such that said receptacles of each said roller row overlap the said receptacles of the other said roller row, thereby blocking liquid drip down a row of said rollers and down said receptacles;

a controllable liquid outlet from each said receptacle;

cleaning liquid supply means above said group of rollers for

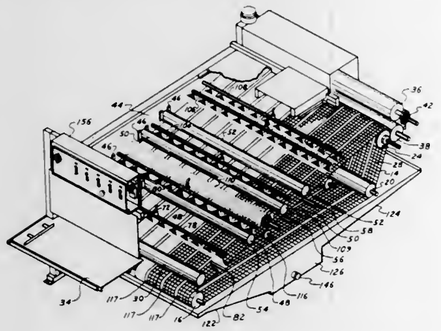
supplying liquid at each vertical level of each said vertical row of rollers.

4,095,443

APPARATUS FOR WASHING RUGS AND THE LIKE

Clifford L. Hasselschwert, Rock Hill, S.C., assignor to Schmidt Industries, Inc., Charlotte, N.C.

Filed Nov. 17, 1976, Ser. No. 742,672
Int. Cl.[2] D06B *3/18, 3/20*
U.S. Cl. 68—22 R **9 Claims**



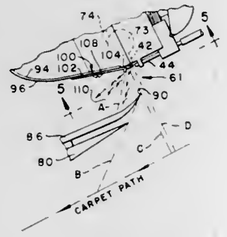
1. Apparatus for washing rugs and the like including:
a. means for supporting a rug with the nap thereof facing upwardly;
b. conveyor means for moving said rug upwardly along an inclined path;
c. compression means disposed transversely of said inclined path and arranged for compressing the nap of said rug as it passes therebeneath; and
d. means for directing a jet of water and detergent toward said rug nap as it is conveyed past said transversely disposed compression means to cause said water and detergent to collect as a pool at the dam created by said compression means, said jet of water and detergent being directed toward said rug at a point immediately ascentional of said compression means and at said water and detergent collected at said dam to agitate said collected water and detergent and cause cleaning of said rug.

4,095,444

APPARATUS FOR THE APPLICATION OF LIQUIDS TO MOVING MATERIALS

William Martin Pascoe, Sr., and David Bruce Wilson, both of Spartanburg, S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Jun. 15, 1977, Ser. No. 806,783
Int. Cl.[2] D06B *1/02*
U.S. Cl. 68—205 R **5 Claims**



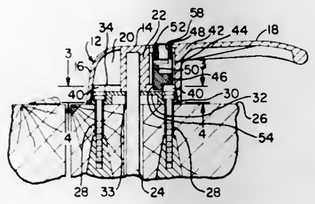
1. In an apparatus for applying liquids to moving material including means for conveying the material in a predetermined path of travel, liquid applicator means having a row of outlets positioned above the path of travel of the material for continuously discharging a corresponding row of generally parallel streams of liquid downwardly toward the path of travel of the material, air discharge means positioned on one side of said row of outlets so that discharge axes of said air discharge means intersect the discharge axes of the outlets for selectively deflecting the streams of liquid from said outlets away from the path of travel of the material, and a liquid collection chamber positioned on the other side of the discharge axes of the row of outlets from said deflecting means, said liquid collection chamber having an opening extending along the row of outlets for receiving the deflected liquid streams to prevent their contact with the moving material, an air foil means defining one surface of said collection chamber, said air foil means having a curbed surface extending from approximately tangent to the discharge axes of said gaseous fluid discharge orifices adjacent said opening and diverging progressively inwardly of said chamber from said opening and away from said axes of the gaseous fluid discharge orifices, a first liquid collector plate suportably positioned in said opening with an outer edge of the plate extending along the opening and positioned closely adjacent the liquid discharge axes of said outlets to intercept and direct deflected liquid into the collection chamber, and a second liquid collector plate positioned in spaced relation below said first collector plate and having an outer edge extending generally parallel to said first collector plate edge but positioned further from said discharge axes than said first collector plate edge for receiving liquid falling from the first plate and directing the liquid into the collection chamber, the improvement comprising air deflector means operably associated with said air foil means at a position above said first liquid collector plate and closely adjacent the liquid discharge axes of the outlets, said air deflector means extending downwardly toward said first collector plate into a portin of an expanded air zone created by the expansion of the air emitted from said air discharge means so that said air deflector means extending into said expanded air zone forms an acute angle with an imaginary plane passing through the end portion of said first collector plate closely adjacent said liquid discharge axes of said outlets, said imaginary plane being substantially parallel to said liquid discharge axes of said outlets.

4,095,445

OFF-CENTER LOCKING HANDLE

Llewellyn O. Storlie, Spring Grove, Minn., and James F. Beatty, Decorah, Iowa, assignors to Deco Products Company, Decorah, Iowa

Filed Jan. 24, 1977, Ser. No. 761,866
Int. Cl.[2] E05B *13/10*
U.S. Cl. 70—215 **5 Claims**



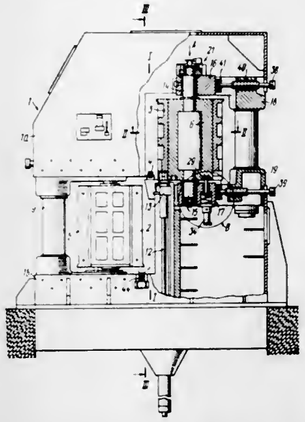
1. A locking handle for a door, said handle secured to a shaft disposed along the central axis of the handle and connected to a door latch, the handle rotatable about the central axis between door latched and door unlatched positions, comprising:
(a) a housing member having a lock cylinder chamber;
(b) a lock cylinder received within said lock cylinder chamber and disposed along an axis spaced apart from and parallel to the central axis at a first radial position from said central axis, said lock cylinder having an integral first projection and rotatable between a first locked position and a second unlocked position;
(c) an estucheon secured to the door and enclosed within said housing member, said estucheon having a second projection disposed at a second radial position from the central axis of the handle spaced apart from the first radial position of said lock cylinder axis, said second projection having an engagement surface disposed in a plane normal to the door and parallel to a plane containing the central and lock cylinder axes, said lock cylinder rotatable about its central axis so that said first projection directly engages said engagement surface in said first locked position and is disengaged from said engagement surface in said second unlocked position;
(d) means for retaining said lock cylinder within said housing member so that said lock cylinder cannot be externally removed from said lock cylinder chamber.

4,095,446

CROSS ROLLING MILL

Jury Grigorievich Zabava, ulitsa Romen Rollana, 17, kv. 61; Rem Naumovich Kogan, ulitsa Njutona, 27, kv. 21, both of Kharkov; Ivan Mikhailovich Barabash, 2 Begovoi proezd, 8, kv. 32; Tadeush Valentinovich Svidnitsky, Volzhsky bulvar, 34, kv. 92, both of Moscow; Dzhan Alievich Lurie, pereulok I. Dubovskogo, 2, kv. 3, Kharkov; Elvira Alexeevna Bratslavskaya, ulitsa 8 Marta, 5, kv. 1, Kharkov; Mark Abramovich Lomazov, ulitsa Vorobieva, 9, kv. 3, Kharkov; Ilya Grigorievich Rodnyansky, ulitsa Bibliotechnaya, 16, kv. 33, Khimki Moskovskoi oblasti; Viktor Fedorovich Skorikov, ulitsa Pushkina, 10-a, kv. 5, Yaroslavl, and Viktor Georgievich Surkov, ulitsa Tobolskaya, 50, kv. 31, Kharkov, all of U.S.S.R.

Filed Feb. 16, 1977, Ser. No. 769,292
Int. Cl.[2] B21H *1/18*
U.S. Cl. 72—88 **16 Claims**



1. A mill for cross rolling of workpieces in the form of solids of revolution, the workpieces moving in a direction perpendicular to an axis of rolling during the cross rolling comprising: a housing formed of two rigidly interconnected upper and lower members; two rotatable drums adjustably installed between the upper and lower members of said housing so that the axes of the drums are substantially vertical and perpendicular to the axis of rolling; guides positioned on the gener atrices of the side surfaces of each of said drums and spaced equidistantly over the periphery of said drums; first slides seated in said guides of one of said drums; first tool means having differently profiled wedge-shapes and carried by said first slides; second slides seated in the guides of the other of said drums; second tool means having wedge-shapes mating with said shapes of said first tool means and carried by said second slides, the rotation of said drums allowing setting-up of different mating pairs of said first and second tool means to bring same into proximity with the axis of rolling for cross rolling workpieces.

4,095,447

METHOD AND ROLLING MILL FOR CONTINUOUS TUBE ROLLING

Alexandr Andreevich Shevchenko, ploschad Oktyabrskaya, 5, kv. 13; Gennady Ivanovich Gulyaev, ulitsa Sevastopolskaya, 52; Igor Alexandrovich Chekmarev, prospekt Gagarina, 2, kv. 9; Petr Alexeevich Loskutov, prospekt K. Marxa, 82, kv. 71; Vitaly Nikolaevich Cherny, ulitsa Karuna, 47, kv. 4; Valentin Nikolaevich Danchenko, prospekt K. Marxa, 55, kv. 30, all of Dnepropetrovsk; Valery Georgievich Balakin, ulitsa Malakhitovaya, 14, kv. 18, Moscow; Evgeny Stepanovich Bondarenko, ulitsa Pervomaiskaya, 24, kv. 6; Vladimir Petrovich Bednyakov, prospekt Lenina, 28, kv. 109, both of Elektrostal Moskovskoi oblasti; Vladimir Mikhailovich Bokov, ulitsa Sovetskaya, 41, kv. 46, Noginsk Moskovskoi oblasti, and Fedor Terentievich Vinogradov, ulitsa Pushkina, 4a, kv. 13, Elektrostal Moskovskoi oblasti, all of U.S.S.R.

Filed Oct. 18, 1976, Ser. No. 733,370
Int. Cl.[2] B21B *17/04*
U.S. Cl. 72—208 **9 Claims**

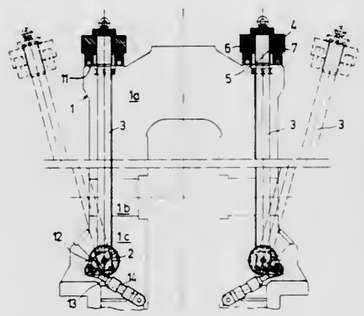
1. A method of continuous tube rolling comprising the steps of: deforming the wall thickness of a hollow blank in groups of grooves on a mandrel; reducing the diameter of said blank after said deformation; alternating at least twice said deformation of the wall thickness of the blank with said reduction of the diameter of the blank; installing said mandrel substantially in all groups of grooves, the diameter of said mandrel at the portions corresponding to the groups of grooves for reduction being smaller than the mandrel diameter at the preceding portions corresponding to the groups of grooves for deformation of the blank according to the wall thickness thereof.

4,095,448

ROLL HOUSING OF DIVIDED CONSTRUCTION WITH REMOVABLE HOUSING CAP

Theodor Gipperich, Dusseldorf, Germany, assignor to Schloeman-Siemag Aktiengesellschaft, Dusseldorf, Germany

Filed Feb. 9, 1977, Ser. No. 767,036
Claims priority, application Germany, Feb. 20, 1976, 2606842
Int. Cl.[2] B21B *31/08*
U.S. Cl. 72—238 **3 Claims**



1. A roll housing for a rolling mill, said housing comprising a base,
a separate top cross-member,
a plurality of tie bars pivotally mounted in the base and extending through vertical open-sided slots in the base and in the top cross-member, an hydraulic stressing nut at the top of each tie bar which nuts can be pressurized to pull

the base and top cross-member together to tension the tie bars and stress the housing, an hydraulic jack at the lower end of each tie bar which jacks can be pressurized to swing the tie bars into and out of engagement with the top cross-member when they are not tensioned,

an hydraulic circuit for selectively pressurizing said nuts and said jacks and switching means in said circuit for switching said circuit between a first state wherein the mill is operational and wherein the stressing nuts are constantly pressurized to maintain the tie bars in a stressed condition and a second state wherein the hydraulic jacks are pressurized to swing the tie bars out of or into engagement with the top cross-member.

4,095,449

COATED PUNCH

Frank George Roach, Rochester, and Paul Fred Woerner, Grosse Pointe, both of Mich., assignors to The Valeron Corporation, Detroit, Mich.

Continuation of Ser. No. 585,297, Jun. 9, 1975, abandoned. This application Dec. 30, 1976, Ser. No. 755,672

Int. Cl.² B21C *25/00*

U.S. Cl. 72—273 **7 Claims**

1. Extrusion tooling comprising an appropriately shaped tool body with a metallurgically bonded film coating of a nitride of a material selected from the group of titanium, tantalum, columbium, hafnium and silicon applied to the forming surface of the tool body, said film coating having a thickness in the order of 0.00015–0.0003 inches.

4,095,450

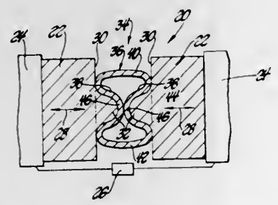
AXLE MAKING METHOD AND APPARATUS

Harry Opland, Madison Heights; Ralph S. Sharpe, Livonia, and Joseph H. Zawacki, Detroit, all of Mich., assignors to Lear Siegler, Inc., Detroit, Mich.

Filed Mar. 21, 1977, Ser. No. 779,444

Int. Cl.² B21K *1/12*

U.S. Cl. 72—318 **19 Claims**



1. A method for making an axle from a tubular axle blank of a unitary construction having an end including upper and lower walls and also having an intermediate portion including spaced side walls and upper and lower walls connecting the side walls, the method comprising: forming the upper and lower walls of the axle end to provide upper and lower projections spaced vertically from each other; and deforming the side walls inwardly toward each other at a location spaced from the axle end to form an I-beam section with a smaller combined height and width than the intermediate axle portion immediately adjacent the axle end.

4,095,451

GAS TURBINE BLADES

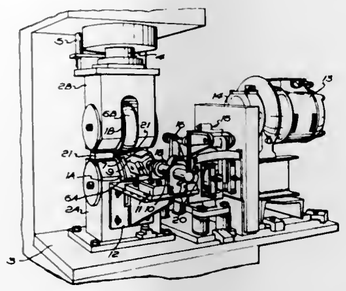
William Thomas Watton, Sheffield, England, assignor to Bramah Limited, Sheffield, England

Filed Apr. 25, 1977, Ser. No. 790,812

Claims priority, application United Kingdom, Apr. 26, 1977, 16842/77

Int. Cl.² B21K *3/04*

U.S. Cl. 72—340 **6 Claims**



1. A method of refurbishing a gas turbine blade comprising rolling under pressure a portion of the blade extending from the tip, the direction or rolling being towards the tip, to effect extension of the tip, and machining the extended tip to a predetermined overall length of the blade.

4,095,452

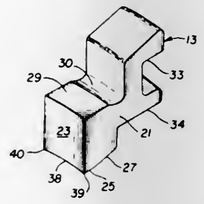
CAN BODY STRIPPER

Fred Cruz, Westminster, Colo., assignor to West Mark Denver, Inc., Denver, Colo.

Filed Dec. 7, 1976, Ser. No. 748,164

Int. Cl.² B21D *45/00*

U.S. Cl. 72—344 **3 Claims**



1. An improved stripper of the kind used in can body formers or like machines wherein a punch carries a cylindrical can body through a ring of stripper segments resiliently held in place and deflectable under forward motion of the punch, resilient means urging the segments to return to undeflected position, and wherein the punch moves rearwardly through the stripper segments with the segments contacting the surface of the punch and engaging an edge of the can body, holding the can body in place as the punch retracts from the can body, the improvement comprising:

(a) a stripper segment support ring forming an inner opening of larger diameter than a punch adapted to pass therethrough, the ring having a radially outward facing surface, a radially inward facing surface, a forward wall joining the inward facing surface to the outward facing surface, and a rear wall joining the inward facing surface to the outward facing surface at the axially opposite end of the ring from said forward wall;

(b) a plurality of stripper segments supported on said outward facing surface in spaced, mutually nonabutting relationship;

(c) a plurality of bosses integral with said ring and spaced at circumferentially aligned predetermined locations about the circumference of the ring, the bosses extending radially outwardly beyond said outward facing surface of the ring, each boss separating two of said segments, the bosses maintaining the segments in circumferentially fixed locations about the ring;

(d) said support ring having a void area located at and below the level of said outward facing surface circumferentially between said bosses for allowing reduction of the outer diameter of said ring at said outward facing surface without requiring reduction of the diameter of material circumferentially between said bosses, the void area being a recess at the junction of the rear wall and the outward facing wall;

(e) each of said stripper segments having a stripping edge and having an inwardly facing side contacting said outwardly facing side of the ring and pivotally supporting the segment against the ring, each segment having a portion of its inward facing side extending over said recess and being pivotable therein, the bosses extending radially outwardly from the recess and separating the portions of the segments extending over the recess, said stripping edge depending radially inwardly over said forward wall from the inwardly facing side of the segment, the stripping edges of each of the segments defining a stripper opening of smaller diameter than the inner diameter of the ring for stripping a can body from a punch moving rearwardly through the stripper opening.

4,095,453

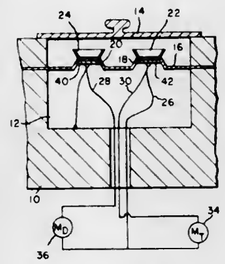
DIFFERENTIAL THERMAL ANALYSIS CELL

Lecon Woo, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 25, 1977, Ser. No. 772,134

Int. Cl.² G01K *17/00*

U.S. Cl. 73—15 B **1 Claim**



1. A cell for use in the differential thermal analysis of sample materials comprising:

a thermally conductive disc at least a portion of which is fabricated of a first metal, said metal portion of said conductive disc having two face area regions each adapted to receive one of said sample materials and a reference material, said conductive disc having an outer portion fabricated of a ceramic and an inner portion fabricated of said first metal;

a pair of second discs each disc having a face, being fabricated of a second metal capable of forming a thermocouple with said first metal, and affixed to at least a portion of a different one of said face area regions of said conductive disc in face-to-face relationship to form respective sandwich-like thermocouple regions for said sample and reference materials;

a first lead of said second metal affixed to one of said second discs;

a second lead of said second metal affixed to the other of said second discs; and

means for sensing the temperature of said sample material.

4,095,454

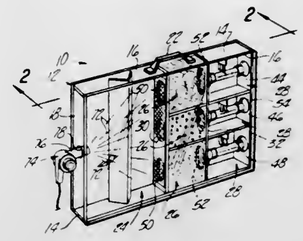
THERMAL INSULATION DEMONSTRATION DEVICE

Tom Fisher, 1695 E. Maple, Troy, Mich. 48084

Filed May 31, 1977, Ser. No. 801,614

Int. Cl.² G01N *25/18*; G09B *23/16*

U.S. Cl. 73—15 A **10 Claims**



1. A thermal insulation demonstration device comprising at least two insulation cells each constructed and arranged to receive a quantity of thermal insulation therein, a plenum communicating with said insulation cells and constructed and arranged to direct heated air under pressure into each of said insulation cells, a separate after chamber for each of said insulation cells, each after chamber having an inlet communicating with its associated insulation cell downstream of the communication of such insulation chamber with said plenum and constructed and arranged to receive heated air from its associated insulation chamber, a thermometer received in each after chamber, and each after chamber having a transparent portion constructed and arranged so that its associated thermometer can be visually observed and read from the exterior of the device, whereby when different types of thermal insulation are received in the insulation cells and heated air passes from said plenum through said insulation cells and into said after chambers the relative effectiveness of the different types of thermal insulation is demonstrated by the temperatures in the after chambers measured by the thermometers.

4,095,455

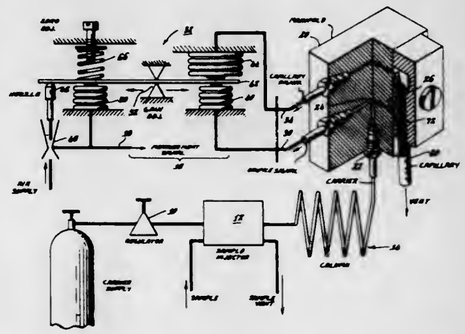
PNEUMATIC DETECTOR FOR CHROMATOGRAPHIC ANALYZER

Edwin L. Karas, Sharon, Mass.; Raymond Annino, Coldon, N.Y., and Richard W. Kalinoski, East Providence, R.I., assignors to The Foxboro Company, Foxboro, Mass.

Division of Ser. No. 549,929, Feb. 14, 1975, Pat. No. 4,033,171. This application Jun. 13, 1977, Ser. No. 805,922

Int. Cl.² G01N *31/08*

U.S. Cl. 73—23.1 **4 Claims**



1. In gas chromatographic apparatus of the type including a separation column through which a carrier gas conducts a sample gas mixture to be separated into its components as it passes through the column, the apparatus including component

concentration detector means in a conduit connected to the column output for producing an output signal responsive to a characteristic of the gas sample components which characteristic is in turn proportional to the concentration of such components;

that improvement in said concentration detector means comprising:

an orifice for producing a first pressure signal responsive to characteristics of the gas flowing therethrough;

a capillary connected in series with said orifice for producing a second pressure signal responsive to characteristics of the gas flowing therethrough;

means for combining said first and second pressure signals in opposed sense to develop the component concentration measurement signal;

said combining means including:

(A) a movable member;

(B) first pressure-responsive means coupled to said first pressure signal and arranged to apply a corresponding force in one direction to said movable member;

(C) second pressure-responsive means coupled to said second pressure signal to apply a corresponding force in an opposite direction to said movable member;

(D) pneumatic sensing means for producing a pneumatic pressure signal responsive to movement of said movable member and comprising nozzle and flapper elements one of which is secured to said member for movement therewith relative to the other element such that said sensing means produces at said nozzle a pneumatic back-pressure signal determined by the spacing between said two elements;

(E) rebalance means including third pressure-responsive means and means to direct to said third pressure-responsive means a pneumatic feedback signal corresponding to said nozzle back-pressure signal, said third pressure-responsive means being operable thereby to develop a force in a direction tending to move one of said elements in a direction relative to the other element so as to oppose the change in spacing between said two elements resulting from movement of said member due to changes in either of said first or second pressure signals, said rebalance means maintaining a close spacing between said nozzle and flapper elements within the operating range thereof and said pneumatic feedback signal having a magnitude corresponding to the combination of said first and second pressure signals from said orifice and capillary so as to serve as a concentration measurement signal for said detector means; and

means for predeterminedly setting the relative rates-of-change of said first and second pressure signals with respect to changes in gas flow rate through said orifice and said capillary to produce at least substantial cancellation of the effects of such changes in flow rate on said concentration measurement signal in response to changes in said gas sample characteristic.

4,095,456

APPARATUS FOR INDICATING RATE OF ICE ACCRETION

Geoffrey Edgington, Godalming, England, assignor to Lucas Industries Limited, Birmingham, England

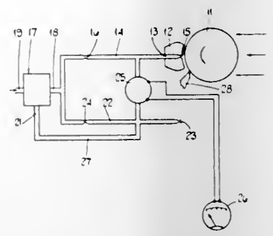
Filed May 27, 1976, Ser. No. 690,389

Claims priority, application United Kingdom, Jun. 4, 1975, 24068/75

Int. Cl.² G01B *13/04*

U.S. Cl. 73—37.6 **2 Claims**

1. Apparatus for indicating rate of ice accretion comprising test surface upon which ice forms in use, first and second gas conduits each communicating at one end with the outlet of a gas pressure regulator the inlet of which communicates with a gas supply, and the regulator having a control port whereby the regulator is supplied with a reference pressure, the regulator operating to maintain its outlet pressure at a predetermined amount in excess of the reference pressure, first and second restrictors in said first and second conduits respectively, said first and second conduits terminating at their ends remote from the regulator in first and second orifices respectively, said first orifice being adjacent, and presented to, the test surface, means sensing difference in the pressure in the first and second conduits intermediate their orifice and their restrictor respectively and supplying a signal dependent upon such pressure difference to an indicator to operate the indicator, a control conduit connecting the control port of the regulator to the second conduit at a point intermediate the second orifice and the second restrictor whereby the reference pressure for the regulator is the pressure existing in the second conduit intermediate the second restrictor and the second orifice and, means for



moving the test surface relative to the first orifice at a predetermined speed, the arrangement being such that when no ice is present on the test surface then the first orifice is unrestricted, and there is no pressure difference between the first and second conduits but when ice forms on the test surface the ice obstructs the first orifice to an extent dependent upon the thickness of the ice layer on the test surface thus resulting in an increase in pressure in the first conduit downstream of the first restrictor related to the thickness of the ice layer on the test surface, the difference in pressure between the first and second conduits being sensed by the sensor, and since the pressure difference is directly related to the thickness of the ice layer on the moving test surface the indicator thus indicating the rate of ice accretion.

4,095,457

APPARATUS FOR DETECTING CHANGES IN PARAMETERS OF LIQUID FLOWING IN A PIPE BASED ON SING-AROUND METHOD

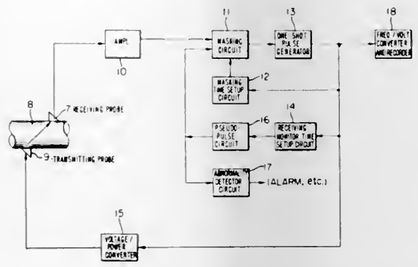
Kazuo Koda, and Masato Tsuchiya, both of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 21, 1977, Ser. No. 808,597

Claims priority, application Japan, Jul. 16, 1976, 51-83943

Int. Cl.² G01N *29/02*

U.S. Cl. 73—53 **6 Claims**



1. An apparatus for detecting a change in parameters of a liquid flowing in a pipe based on the sing-around method, which comprises:

a set of a transmitting probe and a receiving probe arranged opposite to each other on the outer surface of a pipe, said transmitting probe emitting an ultrasonic pulse through a liquid flowing in said pipe to said receiving probe, and said receiving probe converting said ultrasonic pulse from said transmitting probe into a voltage signal and transmitting said voltage signal;

an amplifier for amplifying said voltage signal from said receiving probe;

a masking circuit for transmitting a masking signal in response to said signal from said receiving probe as amplified by said amplifier, said masking circuit masking, during a preset masking time, noise signals other than normal ones from among signals from said receiving probe;

a one-shot pulse generator circuit for transmitting a pulse in response to said making signal from said masking circuit;

a masking time setup circuit for setting up said masking time, said masking time setup circuit beginning actuation immediately upon resetting of a timer thereof in response to said pulse from said one-shot pulse generator circuit, and releasing said masking by said masking circuit by transmitting a masking release signal to said masking circuit at the moment when said masking time has elapsed, and said masking time being set up at a desired value by said timer within a range of periods slightly smaller than the sing-around period corresponding to a liquid flowing in said pipe giving the highest sound velocity and sufficient to permit masking of said noise signals;

a receiving monitor-time setup circuit for setting up a receiving monitor time during which interruptions of pulses transmitted from said one-shot pulse generator circuit are monitored, said receiving monitor-time setup circuit beginning actuation immediately upon resetting of a timer thereof in response to said pulse from said one-shot pulse generator circuit, and transmitting a signal when said timer has not been reset again by the next pulse from said one-shot pulse generator circuit during said receiving monitor time, and said receiving monitor time being setup by said timer at a desired value slightly larger than the sing-around period corresponding to a liquid flowing in said pipe giving the lowest sound velocity;

a pseudo-pulse generator circuit for transmitting a pseudo-pulse to said masking circuit in response to said signal from said receiving monitor-time setup circuit, said pseudo-pulse, like said signal from said receiving probe, causing said masking circuit to transmit a masking signal in response to said pseudo-pulse;

a voltage/power converter circuit for converting said pulse from said one-shot pulse generator circuit into a power signal and transmitting said power signal to said transmitting probe, said transmitting probe transmitting the next ultrasonic pulse in response to said power signal, and thus the sing-around actuation being continued; and

an output section for taking out a pulse from said one-shot pulse generator circuit as an output, said output section comprising a frequency/voltage converter circuit and a recorder.

4,095,458

HYGROSTAT

Ernst Wild, Uerikon, Switzerland, assignor to Elektrowatt AG, Zurich, Switzerland

Filed Mar. 14, 1977, Ser. No. 777,409

Claims priority, application Switzerland, Mar. 25, 1976, 3723/76

Int. Cl.² G01N *19/10*; H01H *35/42*; A01G *25/02*

U.S. Cl. 73—73 **6 Claims**

1. A hygrostat comprising:

a hygroscopic body;

said hygroscopic body being formed of wood;

a pervious housing formed of hydrophobic material;

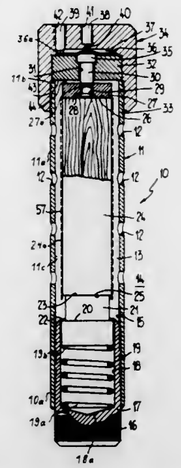
said hygroscopic body being arranged in said housing;

said hygroscopic body comprising a wooden rod having opposed ends;

means coupled with one end of said wooden rod;

a support element coupled with the housing for supporting the other end of said wooden rod;

stop means for limiting the stroke of said one end of said wooden rod;



a compensation spring operatively connected with said housing by means of said support element for coupling the other end of said wooden rod with said housing; and

said support means is provided with means for adjusting the position of said compensation spring.

4,095,459

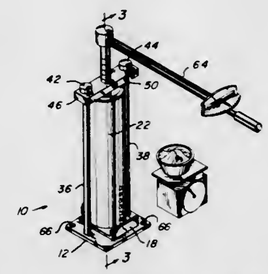
APPARATUS FOR DETERMINING MOISTURE CONTENT

Anthony L. Feldt, Park, Kans.

Filed Sep. 7, 1976, Ser. No. 721,314

Int. Cl.² G01N *5/04*

U.S. Cl. 73—76 **9 Claims**



1. Apparatus for subjecting a mass of moist fibrous material to a predetermined pressure comprising:

a base,

means forming a circular opening through the base, said opening having a center, a hollow cylinder, having a longitudinal axis, the diameter of the opening in the cylinder being substantially equal to the diameter of the circular opening through the base,

a bottom plate,

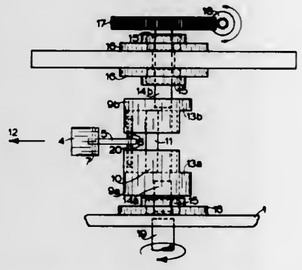
means forming a plurality of openings through said plate,

means for removably mounting said bottom plate on said base so that at least some of the openings through said bottom plate communicate with the opening in said base,

means for removably mounting said cylinder on the bottom plate so that the center of the opening in the base substantially lies on the axis of the cylinder,

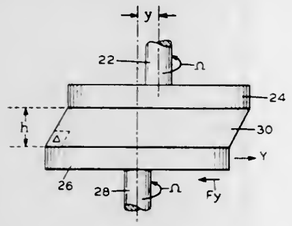
a piston adapted to move within said cylinder, and
means for applying a predetermined force to said piston.

4,095,460
DEVICE FOR CONVERTING ROTARY MOTION INTO UNIDIRECTIONAL MOTION
Calvin I. Cuff, 135 Ocean Ave., Brooklyn, N.Y. 11225
Filed Jul. 20, 1976, Ser. No. 707,017
Int. Cl.[2] F16H *27/04*
U.S. Cl. 74—84 S **3 Claims**



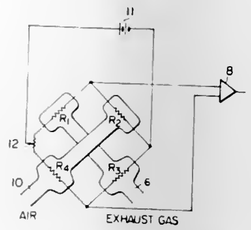
1. In a device that converts rotary motion into unidirectional motion by varying the radius of gyration of a plurality of gyrating masses that gyrate in a plane that is perpendicular to the axis of rotation of said plurality of gyrating masses, and in which said device includes means for supporting, rotating, and permitting sliding radial movement of said plurality of gyrating masses; an improved mechanism for varying the radius of gyration of said plurality of gyrating masses comprising:
an axis of rotation;
a pair of circular cams mounted coaxially with respect to each other, parallel with respect to said plane which contains said plurality of gyrating masses, and eccentrically with respect to said axis of rotation of said plurality of gyrating masses, said pair of circular cams being normally non-rotating with respect to said means for supporting, rotating, and permitting sliding radial movement of said plurality of gyrating masses;
a connecting rod attached to each gyrating mass of said plurality of gyrating masses;
a pair of cam followers rotatably mounted on the free end of and on opposite sides of each of said connecting rods and in such a manner that each cam follower of the said pair of cam followers engages one of the said pair of circular cams.

4,095,461
RHEOLOGICAL TEST METHOD AND APPARATUS
Joseph M. Starita, 13 Beverley Dr., Belle Mead, N.J. 08502
Filed Dec. 27, 1976, Ser. No. 754,753
Int. Cl.[2] G01N *3/24, 25/02*
U.S. Cl. 73—101 **4 Claims**



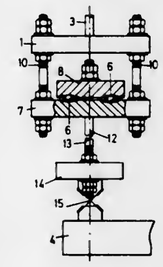
4. A method for automatically determining the elastic and viscous moduli of a material with an eccentric rotating disc rheological test apparatus comprising the steps of
placing a sample of the material between and in contact with the confronting circular faces of a pair of rotatable members,
rotatively drivng one of the members,
laterally displacing the axis of rotation of one of the members with respect to the other a first predetermined distance to impart a strain to the material,
producing a first pair of signals having values representative of the stress in one of the rotating members in the direction of lateral displacement and in the orthogonal direction,
laterally displacing the axes a second predetermined distance,
producing a second pair of signals having values representative of the stress in the rotating member in the lateral and orthogonal directions,
producing a signal having a value representative of the elastic modulus, which signal is a function of the difference of the values of the signals of the first and second pair representative of stress in the direction of lateral displacement and a signal having a value representative of the difference between the first and second predetermined distances, and
producing a signal having a value representative of the viscous modulus, which signal is a function of the difference of the values of the signals of the first and second pair representative of the stress in the direction orthogonal to the direction of lateral displacement and a signal having a value representative of the difference between the first and second predetermined distances.

4,095,462
DEVICE FOR DETECTING THE AIR-FUEL RATIO OF AN INTERNAL COMBUSTION ENGINE
Kenji Goto, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan
Filed Sep. 23, 1976, Ser. No. 725,840
Claims priority, application Japan, May 25, 1976, 51-59578
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—116 **3 Claims**



1. A device for detecting the air-fuel ratio of the mixture supplied to an internal combustion engine of the type including an exhaust gas recirculation system for recirculating a part of the exhaust gas into an intake passage, said device comprising:
a bridge electric circuit consisting of four hot-wire electric resistance elements, each having an equal resistance value under the same ambient condition, the first and second elements being connected at the first terminal, the second and third elements being connected at the second terminal, the third and fourth elements being connected at the third terminal and the fourth and said first elements being connected at the fourth terminal, said first and third elements are located in an exhaust gas recirculation passage of said exhaust gas recirculation system and said second and fourth elements are located in an air passage, the temperature of the air in said air passage being maintained the same as that of the exhaust gas flowing through said exhaust gas recirculation passage,
an electric power means connected to one pair of terminals, the first and third terminals or the second and fourth terminals, for supplying an electric current to said bridge electric circuit, and;
a detecting means connected to the other pair of terminals, for detecting the changes of the electric current flowing between said other pair of terminals.

4,095,463
DYNAMOMETER CELL
Josef Wöhrl, Pfedelbach, Germany, assignor to Eric Thomas Scriven, Wheathampstead, England, a part interest
Filed Nov. 17, 1975, Ser. No. 632,892
Int. Cl.[2] G01L *5/00*
U.S. Cl. 73—141 R **2 Claims**

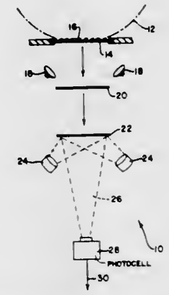


1. A dynamometer cell comprising a gyroscope having a gyroscope rotor and inner and outer gyroscope gimbals supporting the rotor, a motor for rotating the gyroscope rotor at a constant speed, lever means, reacting between the inner and outer gyroscope gimbals, to which a force to be measured is applied to induce a primary precessional motion of the gyroscope, a linkage between the lever means and the point of application of the force, and means arranged between the lever means and the linkage to prevent transmission of the primary precessional motion from the lever means to the linkage, which linkage comprises at least two parts with at least one bearing member between facing surfaces of the parts, said bearing member being able to move relative to both parts to permit relative movement between the parts in a plane normal to the direction in which the force is transmitted to the linkage between the respective facing surfaces irrespective of the position of said lever means.

4,095,464
METHOD AND APPARATUS FOR TIRE TREAD ANALYSIS
Frans Nico Breedijk, Hunsdorf, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jun. 21, 1976, Ser. No. 697,816
Int. Cl.[2] B60C *11/00*; G01M *17/02*
U.S. Cl. 73—146 **17 Claims**

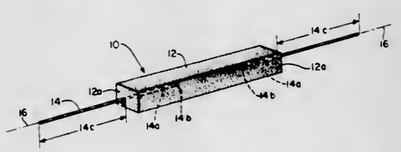
1. A method of analyzing surface contact areas created by tire tread patterns comprising the steps of:
A. providing a high contrast image as defined by the tire tread contact area selectively established on a transparent plate having a preselected colored fluid thereon to optimize the contrast between the tread in contact with the plate and tread not in contact with the plate;
B. illuminating the image;
C. photographing the tread contact image on a highspeed, high contrast black and white photosensitive medium having a spectral sensitivity for the colored fluid on the plate to provide a photographic image of the tread contact area;
D. illuminating the photographic image;
E. optoelectronically converting the illuminated photographic image to an electrical signal indicative of the tread contact area;
F. providing an electrical reference signal that is established as a control contact area; and
G. comparing the signal indicative of the tread contact area to the reference control signal to obtain a visual readout indicative of a percentage of the control reference.

17. Apparatus for analyzing tire tread patterns with respect to their surface contact area comprising:
means to generate a tread contact image as defined by the tire tread contact area comprising a transparent plate having a colored fluid thereon to provide a contrast between tread areas in contact with the plate and areas not in contact with the plate;



means to illuminate the tread contact image;
a shutter TV positioned to accept the tread contact image through the plate and convert the illuminated image to an electrical signal indicative of the tread contact area;
means to generate a reference electrical signal indicative of a control tread contact area; and
means to compare the signal indicative of the tread contact area to the reference signal to provide a readout indicative of the difference between the two.

4,095,465
TESTING ADHESION OF CORD OR WIRE IN RUBBER
Ronald L. Rongone, Cuyahoga Falls; David W. Nicholson, Kent, and Roger E. Payne, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Mar. 25, 1977, Ser. No. 781,245
Int. Cl.[2] G01L *5/04*
U.S. Cl. 73—159 **10 Claims**



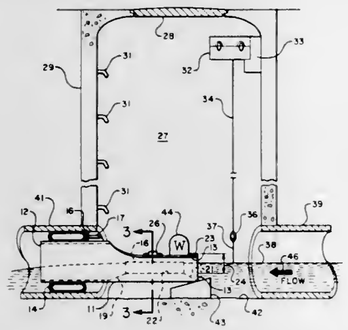
1. Method for testing interface adhesion of wire and rubber comprising the steps of:
(a) cutting a plurality of segments each of predetermined length of such wire;
(b) preparing said rubber in sheet form of predetermined thickness in its uncured state and cutting from such sheet a plurality of coupons of predetermined length and width;
(c) preforming said coupons each in preforming means to form a plurality of pairs of uncured preformed coupons;
(d) placing said wire segments in surface contact one pair respectively with a first coupon of each pair thereof such that each segment of said one pair thereof be located in a single straight line, such that a portion of each segment be seated on said first coupon and the remaining portion thereof be extended outward lengthwise of said coupon such that the proximate ends of each said segments of such pair be spaced apart a predetermined minimum distance along such line;

(e) disposing the other coupon of each pair thereof and a respectively associated first coupon in face-to-face contact with the respective pairs of wire segments each having a portion embedded therein so associated each pair of coupons to form an integral test specimen;
(f) molding and curing the specimens in mold means comprising associated parts of said preforming means;
(g) releasing said specimens from said mold means;
(h) gripping only the wire segments of a selected specimen and pulling said wire segments oppositely along said single line at a predetermined rate while measuring the force exerted to separate one of said wire segments from such specimen;
(i) said force so measured being useful to determine the interface adhesion of said wire and said rubber.

4,095,466
QUICK INSERT FLUME FOR USE IN METERING FLUID FLOW

James G. Schontzler, and Wendall C. Gates, both of Santa Cruz, Calif., assignors to Manning Environmental Corporation, Santa Cruz, Calif.

Filed Oct. 1, 1976, Ser. No. 728,850
Int. Cl.² G01F *1/52*
U.S. Cl. 73—215 **3 Claims**

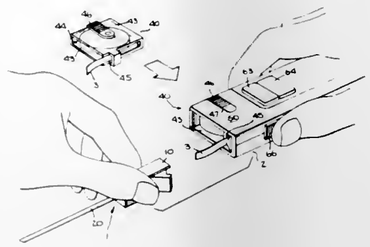


1. An arrangement for metering fluid flow comprising an apparatus providing a flow channle for installation in a sewer well having an inlet pipe and an exit pipe located near the bottom of the sewer well, a level measuring device for detecting the level of a fluid flowing between the inlet and exit pipes, said device being mechanically unconnected with said apparatus, said apparatus including a cylindrical exit section for placement in the exit pipe, an inlet section attached to said cylindrical exit section, a metering flume mounted in said inlet section for providing a predetermined flow cross section including a bottom surface in said inlet surface, an inflatable collar surrounding said cylindrical exit section, so that when said exit section is placed in the exit pipe and said inflatable collar is inflated, a seal is provided between the exit pipe and said cylindrical exit section, whereby all fluid flowing through said sewer well passes through said predetermined flow cross section, said apparatus further including means attached to said inlet section for providing a reference level, said reference level being located a predetermined height above said bottom surface and cooperating with said level measuring device whereby an inlet level for the flow channel may be determined while fluid is passing therethrough.

4,095,467
DISPOSABLE TAPE CORD THERMOMETER

John F. McGlynn, White Plains, N.Y., assignor to IPCO Hospital Supply Corporation, White Plains, N.Y.

Filed Jul. 9, 1975, Ser. No. 594,218
Int. Cl.² G01K *7/00*
U.S. Cl. 73—362 AR **24 Claims**

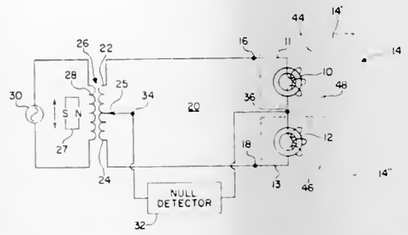


1. An electronic sensing assembly comprising: a probe unit adapted for connection and disconnection with one end of a disposable and severable electrically conductive tape; a cartridge for housing a supply of said tape; a reader unit comprising: means for housing said cartridge; means for electrically contacting a portion of said tape proximate the cartridge with powered electronic circuitry and indicating means; means for severing said tape at said cartridge and means permitting withdrawal of additional lengths of tape, whereby a fresh length of tape can be withdrawn for each use with a connectible probe after severing the former length which was subject to a prior use.

4,095,468
TWO CORE MAGNETIC TEMPERATURE SENSOR

Edward Frank Sidor, Lombard, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 625,784, Oct. 24, 1975, abandoned, which is a continuation of Ser. No. 533,364, Dec. 16, 1974, abandoned. This application Jan. 31, 1977, Ser. No. 763,955
The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.
Int. Cl.² G01K *7/38*
U.S. Cl. 73—362 R **9 Claims**

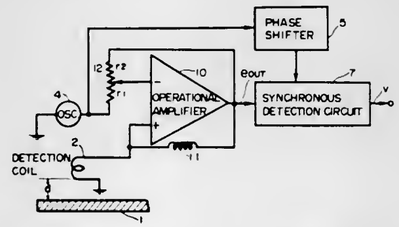


1. A temperature sensor comprising first and second separate inductively wound elongated, hollow, tube-shaped magnetic cores, each having an independent, self-contained magnetic flux path provided by a closed loop configuration of magnetically permeable material so that no substantial amount of magnetic flux is externally coupled from either of said cores, said cores having different inherent magnetic permeability vs. temperature characteristics which are controlled so that the inductance vs. temperature characteristics of the two cores intersect at the temperature which is to be sensed, within a predetermined temperature range, and so that neither of said cores undergoes either a first or a second order transition over said temperature range, an alternating current source of voltage coupled to said sensor and sensing means coupled to said sensor which indicates that at least one of said magnetic cores is affected by a temperature of a predetermined magnitude when the output signals derived from said magnetic cores are approximately equal.

4,095,469
TEMPERATURE MEASURING APPARATUS

Takeo Yamada, Yokohama; Katsujiro Watanabe, Tokyo; Seigo Ando, and Akira Kameyama, both of Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 11, 1977, Ser. No. 776,901
Claims priority, application Japan, Mar. 17, 1976, 51-28140
Int. Cl.² G01K *7/36;* G01R *33/12*
U.S. Cl. 73—362 R **5 Claims**



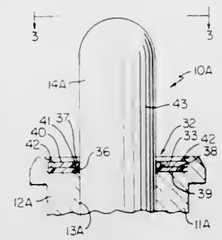
1. A temperature measuring apparatus for measuring temperature of a metallic body utilizing eddy current effect, comprising:
a differential amplification type operational amplifier having its one input terminal connected to a detecting coil and including a dummy coil to which positive feedback connection is made;
an oscillator connected to the other input terminal of said operational amplifier to supply thereto a signal having a constant amplitude and a predetermined oscillation frequency, the other input terminal of said operational amplifier being connected to provide a negative feedback circuit having an adjustable negative feedback factor;
a phase shifter connected to an output terminal of said oscillator for adjusting the phase angle of the signal from said oscillator to produce a synchronous detection reference signal; and
a detection circuit connected to said operational amplifier and said phase shifter for synchronously detecting the output of said operational amplifier with the reference signal applied from said phase shifter to produce a signal indicative of a measured temperature.

4,095,470
THERMAL ELEMENT AND PARTS THEREFOR AND METHODS OF MAKING THE SAME

Boyd P. Sliger, Concord, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Jun. 22, 1977, Ser. No. 808,874
Int. Cl.² G01K *5/00*
U.S. Cl. 73—368 **20 Claims**

1. In a thermal element having a cylinder member carrying a piston member that projects out of an opening of an end of said cylinder member to be extended and retracted relative thereto upon changes of sensed temperature, the improvement comprising a washer-like resilient seal member carried by said end of said cylinder member and having an opening therethrough and press-fittingly receiving said piston member therethrough in such a manner that an inner peripheral portion of said washer-like member is turned into substantially parallel sealing and wiping engagement with said piston member while being substantially transverse to the remainder of said washer-like member, said washer-like member containing abrasive

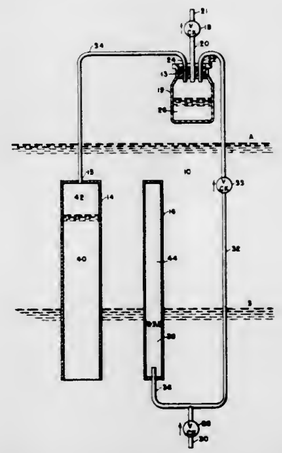


means therein to provide a scraping action of said inner peripheral portion thereof against said piston member to clean the same as said piston member is moved relative thereto.

4,095,471
TIDAL SAMPLER

David W. Hayes, Aiken, S.C., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 4, 1977, Ser. No. 784,403
Int. Cl.² G01N *1/14*
U.S. Cl. 73—421 B **6 Claims**



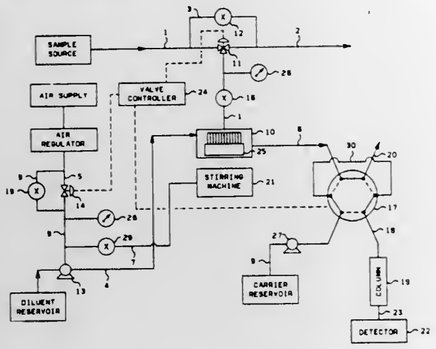
1. An apparatus for pumping a sample of liquid from an oscillating liquid source which comprises in combination:
a. an enclosed collection vessel including a plurality of inlets and a check valve having an outlet open to the atmosphere;
b. suction means submersibly disposed in said liquid source and connected to one of the inlets of said collection vessel;
c. booster means consisting essentially of an enclosed vessel including a check valve sample inlet and a delivery tube connected to another inlet of said collection vessel, said enclosed vessel being at least partially submerged in said liquid source when said source is at its lowest level; said suction means and said booster means being responsive to the oscillating level of said liquid source so as to pump a portion of said liquid into said collection vessel.

4,095,472

LIQUID SAMPLE DILUTION SYSTEM

Richard A. Mowery, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 15, 1977, Ser. No. 824,582
Int. Cl.² G01N *1/20*
U.S. Cl. 73—422 GC **12 Claims**



1. An apparatus for intermittently providing diluted samples from a sample source, said apparatus comprising,

(1) a mixing chamber wherein a stream of liquid diluent and a stream of sample liquid can combine to produce an effluent stream having a substantially constant concentration of said sample liquid,

(2) an outlet from said mixing chamber,

(3) a first conduit means providing a path for flow of sample liquid from a sample source into said mixing chamber,

(4) a three-way valve in said first conduit between said sample source and said mixing chamber,

(5) a second conduit means providing a path for flow from the second outlet of said three-way valve to a suitable discharge point,

(6) a third conduit means providing a path for flow of sample liquid around said three-way valve from a point in the first conduit means upstream of said three-way valve to a point in the second conduit means,

(7) a first restrictor in said third conduit means,

(8) a second restrictor in said first conduit means between said three-way valve and said mixing chamber, and

(9) a fourth conduit means providing a path for flow of liquid diluent from a liquid diluent source into said mixing chamber, and

(10) a flow rate control means for controlling the rate of flow of liquid diluent into the mixing chamber

---

4,095,473

PYCNOMETER

Robert L. Batchelor, Orange, and Thomas J. Lynch, Houston, both of Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed May 16, 1977, Ser. No. 797,648
Int. Cl.² G01N *9/02*
U.S. Cl. 73—433 **10 Claims**

1. Apparatus to measure the density of a particulate porous polymer sample consisting essentially of;

a. a sample cell of fixed volume including means for admitting and discharging gas therefrom,

b. a sample container of fixed weight adapted to fit within the sample cell,

c. a gas reservoir of fixed volume having a valve to admit gas thereto,

d. a valved line providing gas communication between the sample cell and the gas reservoir,

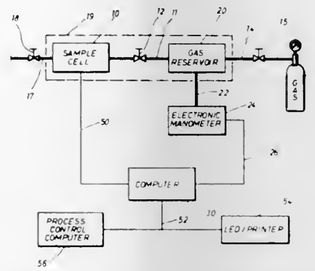
e. first instrument means associated with the sample cell to measure the weight of the sample container and generate a signal responsive thereto,

f. second instrument means associated with the gas reservoir to measure the gas pressure therein and generate a signal responsive thereto, and

g. computing means, including elements, to;

(1) receive signals from the first instrument means and calculate the weight of a sample in the sample container,

(2) receive signals from the second instrument means and calculate gas pressures therefrom,



(3) calculate the free gas volume in the gas reservoir and the sample cell from the gas pressure of the gas reservoir, when isolated from the sample cell, and the gas pressure of the gas reservoir when in gas communication with the sample cell,

(4) calculate the volume of a sample in the sample container from the free gas volume determined in g(3) and the known volumes of the gas reservoir and the sample cell,

(5) calculate the density of the sample from the sample weight determined in g(1) and the sample volume determined in g(4), and

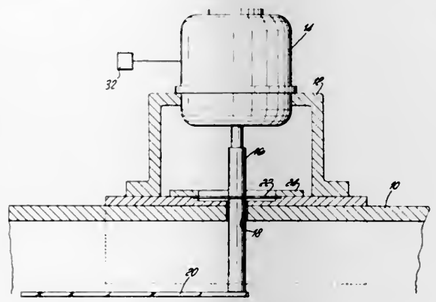
(6) generate a signal indicating the density of the sample.

4,095,474

MONITORING SYSTEMS AND INSTRUMENTS

Peter Hancock, and Terence Edward Clifton, both of Bedford, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Jul. 19, 1976, Ser. No. 706,553
Int. Cl.² G01M *7/00*; G01N *17/00*
U.S. Cl. 73—579 **6 Claims**



1. Monitoring apparatus utilizable with a wall delimiting at least in part an environment to be monitored, and comprising means for continuously monitoring a continuously changing environmental condition in the environment said means comprising:

an elongated vibratory element, said continuously monitoring means comprises means for detecting the amount of corrosion or surface deposition on the vibratory element,

vibration originating means located exterior of said environment,

coupling means affixed to said element for operatively coupling said vibratory element to said vibration originating means and for transmitting vibrations from said vibration originating means to said vibratory element,

means for resiliently supporting said coupling means relative to said wall so that said vibratory element is disposed within said environment, and

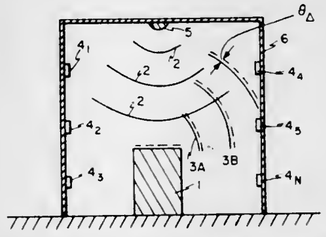
the resonant frequency of said vibratory element being different from the resonant frequency of said coupling means or said supporting means.

4,095,475

APPARATUS AND METHOD WHEREBY WAVE ENERGY IS CORRELATED WITH GEOMETRY OF A MANUFACTURED PART OR THE LIKE OR TO POSITIONAL RELATIONSHIPS IN A SYSTEM

Bruce Shawn Buckley, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 22, 1976, Ser. No. 679,262
Int. Cl.² G01N *29/00*
U.S. Cl. 73—628 **34 Claims**



1. A method of inspecting geometrical characteristics of a sample object of arbitrary shape, that comprises:

directing wave energy of a single frequency upon the object which reflects the same;

detecting the reflected wave energy at a multiplicity of locations to obtain an array of measurements;

comparing a characteristic of the reflected wave energy detected at each location of said multiplicity of locations with the same characteristic of the original wave energy directed upon the sample object to note any difference θ_A therebetween, and

comparing the difference θ_A for each said location with the difference θ_B of the same characteristic of a standard object located substantially at the same position as the sample object to check for any differential θ_Δ therebetween, and combining the differential θ_Δ thus obtained for each said location with an array of sensitivities to produce an array of deviations, each deviation of the array of deviations being produced by a plurality of differentials θ_Δ, the deviations thus obtained being used to determine if the sample object is within tolerance with regard to geometry.

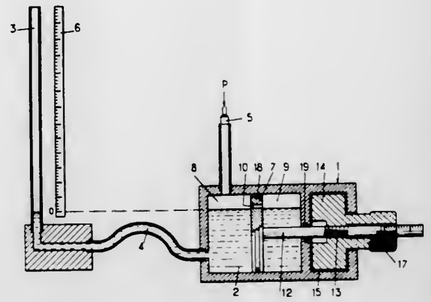
4,095,476

SINGLE SCALE U-TYPE MANOMETER

Gabriel Banon, Paris, France, assignor to Societe Industrielle d'Etudes et de Realisations Scientifiques S.I.E.R.S., Paris, France

Filed Feb. 23, 1977, Ser. No. 771,390
Int. Cl.² G01L *7/18*
U.S. Cl. 73—747 **3 Claims**

1. A U-type manometer, particularly for use in measuring the height of liquids of different densities held in containers, such as ballast-tanks or storage tanks, comprising a calibrated measuring tube, a graduated scale, a reservoir of manometric liquid communicating with said measuring tube, a connection between the enclosure containing the liquid whose height is to be measured and said reservoir, a piston sealingly mounted in said reservoir so as to define two chambers therein, communicating by an aperture in the piston disposed at a height substantially equal to the zero level of the manometric liquid, and



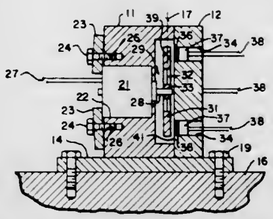
means for moving the piston horizontally within the reservoir for correcting the density of the liquid to be measured by varying the effective area of the manometric liquid.

4,095,477

TWO AXIS RATE GYRO

Harold D. Morris, Orinda, Calif., and Romeal F. Asmar, Bellevue, Wash., assignors to Systron-Donner Corporation, Concord, Calif.

Continuation of Ser. No. 659,266, Feb. 19, 1976, abandoned.
This application Jun. 6, 1977, Ser. No. 803,797
Int. Cl.² G01C *19/28*
U.S. Cl. 74—5.6 D **19 Claims**



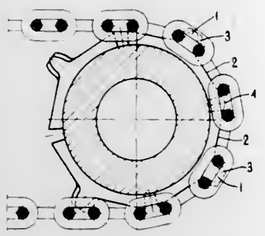
1. A multi-axis angular velocity sensor for sensing angular velocity about two intersecting axes, comprising a framework, a motor mounted on said framework, an output shaft on said motor for providing rotational motion, a rotor having a spin axis aligned with and coupled to said motor output shaft, said rotor having a continuous periphery and opposite rotor faces, means integral with said rotor deflecting in a bending mode for permitting restrained rotation of said rotor about any rotor diametral axis, so that when angular velocity inputs are applied about the two intersecting axes said continuous rotor periphery moves in restrained rotation about first and second diametral axes which are each substantially orthogonal to one of the two intersecting axes, said means for permitting restrained rotation having an angular spring rate for urging said continuous rotor periphery toward a neutral spin plane in the presence of torques about said first and second axes, and a plurality of pickoff means spaced from said rotor faces for producing an output signal related to the spacing therefrom.

4,095,478

SPROCKET-WHEEL, ESPECIALLY FOR MINING MACHINES

Jan Rynik, Gliwice, Poland, assignor to Politechnika Slaska im. Wincentego Pstrowskiego, Gliwice and Rybnicka Fabryka Maszyn "Ryfama", Rybnik, both of, Poland

Filed May 27, 1976, Ser. No. 690,775
Claims priority, application Poland, Jun. 4, 1975, 180960
Int. Cl.[2] F16H *55/30*
U.S. Cl. 74—229 **2 Claims**



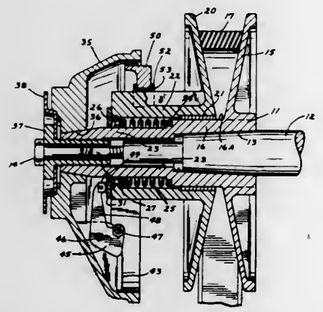
1. A combination chain and sprocket wheel, particularly for driving mining machines, said chain engaging said sprocket wheel having a first set of links lying in a plane perpendicular to the axis of said sprocket wheel and a second set of links lying in planes parallel to the axis of said sprocket wheel, said links of said first and second sets alternately interlocking forming said chain, said sprocket wheel having teeth around the periphery thereof, each tooth having nonparallel flat seats on both sides thereof along the periphery of the sprocket wheel, thus providing twice as many seats as teeth, whereby each seat has on one side along the periphery of the sprocket wheel a tooth and on the other side of each seat an adjacent seat, projections of each pair of adjacent seats intersecting in a line parallel to said axis, each tooth having two prongs, alternate links of said first set lying between said prongs, the remainder of said first set of links lying along the projected lines of intersection of adjacent seats, each link of said second set lying on a seat, wherein the wear of said teeth is relatively small compared to the wear of teeth on said wheel when the number of teeth are not smaller than the number of seats.

4,095,479

EXPANSIBLE PULLEY WITH TORQUE AND CENTRIFUGAL RESPONSE

John P. Lundberg, Pequot Lakes, Minn., assignor to Scorpion, Inc., Crosby, Minn.

Filed Jul. 19, 1976, Ser. No. 706,763
Int. Cl.[2] F16H *55/52, 55/56*
U.S. Cl. 74—230.17 E **9 Claims**



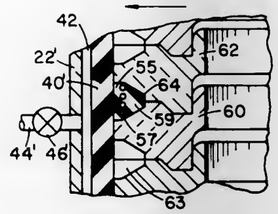
1. A pulley assembly for a V belt comprising first and second pulley sections, each of said sections comprising one side of the pulley assembly, said first section being adapted to be connected to a shaft, said second section being mounted for movement annularly and axially relative to said first section in direction toward and away from the first section to define a variable width V belt groove between the sections, at least one of said sections including a hub, rib means on the hub extending in generally radial direction to define a drive surface extending outwardly from the axis of the shaft and having a length extending in direction along the longitudinal axis of said shaft and part annularly around the hub, and a follower member drivably mounted on the other of the sections from the section having said hub, said follower member comprising a removable saddle straddling the rib and effecting a driving engagement therewith when the second section tends to be rotated relative to the first section, and means tending to urge said pulley sections toward each other when they are under rotation.

4,095,480

METHOD FOR MAKING POWER TRANSMISSION BELTING

Nile L. Schwabauer, Northglenn, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Sep. 29, 1975, Ser. No. 617,338
Int. Cl.[2] B29D *29/02*
U.S. Cl. 74—231 P **17 Claims**



1. A method for making power transmission belting from an uncured elastomeric belt body having at least one stable length tensile member embedded in the body, comprising the steps of:
concentrically assembling the belt body adjacent an inwardly disposed metal mandrel, said metal having a coefficient of thermal expansion of at least about 10×10^{-6} per ° F;
heating said mandrel and causing it to expand against the belt body and to maintain the stable length tensile member under tension;
subjecting said belt body to pressure in a direction toward said mandrel;
supplying heat units to the belt body beginning preferentially at that portion of the belt body adjacent the metal mandrel and then outwardly toward the remaining portions of the belt body away from the metal mandrel, to establish a heating gradient across the belt body to ensure maintenance of the tensile member under tension; and
while maintaining the tensile member in tension, curing said belt body.

4,095,481

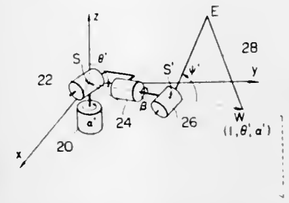
JOINT MECHANISM OF MANIPULATOR

Masuo Kasai; Kanji Kato, both of Kokubunji; Yasuhide Matsumura, Hachioji; Kiyoo Takeyasu, Tokorozawa, and Raiji Shimomura, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 1, 1976, Ser. No. 746,628
Claims priority, application Japan, Dec. 19, 1975, 50-150576
Int. Cl.[2] B25J *3/02*
U.S. Cl. 74—469 **14 Claims**

1. A joint mechanism of a manipulator comprising
a first joint having a rotating shaft in alignment with the Z-axis of an X-Y-Z Cartesian coordinate system,

a second joint connected to the rotating shaft of said first joint and having a rotating shaft positioned within the X-Y coordinate plane,
a third joint connected to the rotating shaft of said second joint and having a rotating shaft extending along a vector



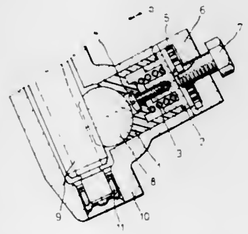
passing through the origin of the Cartesian coordinate system,
and an arm assembly connected to the rotating shaft of said third joint comprising linkage means which is driven so that a wrist connected to said arm assembly may be always moved on the line of said vector.

4,095,482

RACK AND PINION STEERING APPARATUS

Peter Kirschner, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany

Filed Nov. 22, 1976, Ser. No. 743,915
Claims priority, application Germany, Feb. 18, 1976, 2606365
Int. Cl.[2] B62D *3/12, 1/20*
U.S. Cl. 74—498 **3 Claims**



1. Steering appartus for a motor vehicle comprising a housing, a rack, displaceable along a longitudinal axis and engaged with a rotatable pinion in said housing, compression spring means in said housing urging said rack into engagement with said pinion and having an adjusted compression distance, and a self-adjusting mechanism arranged between said compression means and said housing, for eliminating play between said compression means and said housing.

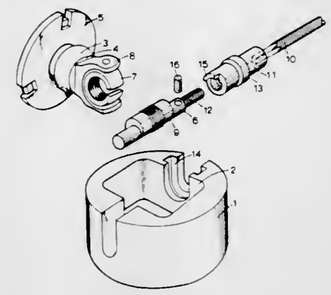
4,095,483

EXTERIOR REAR VIEW MIRROR FOR VEHICLES

Archibald Sargeant, Felpham, England, assignor to Wingard Limited, Sussex, England

Filed Jan. 19, 1976, Ser. No. 650,358
Claims priority, application United Kingdom, Jan. 19, 1975, 2242/75
Int. Cl.[2] F16C *1/10;* **A47G** *1/24;* **G02B** *5/08, 5/10*
U.S. Cl. 74—501 M **11 Claims**

1. A rear view mirror for a motor vehicle comprising a mirror head mounted for angular movement about a first axis and about a second axis at right angles to said first axis, a single rotatable control member for adjusting the angular positions of said mirror solely by rotation of said control member and without axial movement thereof, first mirror-tilting means comprising an eccentric element connected for rotation by the control member and operative on rotation to adjust the angular setting of said mirror head about said first axis, second mirror-tilting means comprising means operative to produce linear motion from rotation of said control member and to adjust the angular setting of said mirror head about said second axis, and a limited lost motion device between said control member and



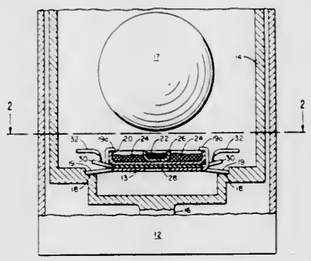
one of said first and second mirror-tilting means constructed and arranged that a degree of adjustment of said mirror head about one of said axes can be effected solely by a limited degree of rotation of said control member without upsetting the angular setting of said head with respect to the other of said axes.

4,095,484

BALANCING SYSTEM FOR ROTARY ELEMENT

John A. Gautraud, Lexington, Mass., assignor to Northrop Corporation, Norwood, Mass.

Filed Jan. 31, 1977, Ser. No. 764,395
Int. Cl.[2] G01C *19/02;* **G01M** *1/16;* **F16F** *15/22*
U.S. Cl. 74—573 R **10 Claims**



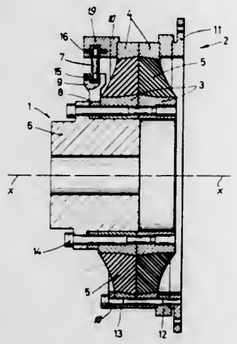
1. In an instrument having an element disposed for rotation about an axis, a system for changing the center of gravity of said element comprising a plurality of thermally responsive materials normally disposed in a solid state in a given fixed relationship to said element and influencing the center of gravity thereof, each of said materials having a different melting temperature, means for repetitively raising the temperature of said thermally responsive materials to render them molten and movable relative to said element, and means for selectively resolidifying said materials in an altered fixed relationship to said element whereby said center of gravity is changed.

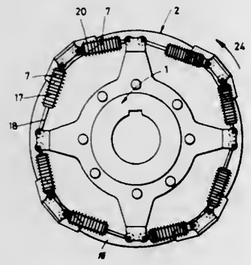
4,095,485

ELASTIC SHAFT COUPLING WITH ATTENUATION OF TORSIONAL OSCILLATIONS

Heinz Max Hiersig, Dusseldorf, Germany, assignor to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Jan. 7, 1976, Ser. No. 647,146
Claims priority, application Germany, Jan. 9, 1975, 2500901
Int. Cl.² F16D *13/26*
U.S. Cl. 74—574 **5 Claims**





1. In a highly elastic coupling having a first, inner annular coupling portion and a second, outer annular coupling portion connected to the first portion via radially extending elastic means for rotation about a common axis, the improvement comprising:

a plurality of radially extending arms connected to said first coupling portion;

a plurality of holders connected to said second coupling portion, extending axially therefrom and being symmetrically interspaced between said arms;

a plurality of shock absorbers regularly arranged about said axis and connected respectively to said arms and said holders so that each holder and each arm is connected to two of said shock absorbers, so that the shock absorbers act parallelly to the elastic means to obtain attenuation of rotational oscillations of the parts relative to each other.

4,095,486

DEVICE FOR CONTROLLING A LOCK-UP CLUTCH IN AN AUTOMATIC TRANSMISSION

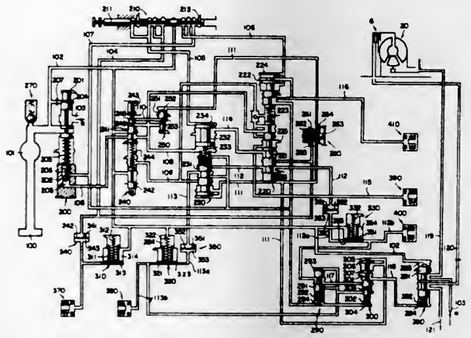
Kiyoshi Ohnuma, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jul. 9, 1976, Ser. No. 703,964
Claims priority, application Japan, Mar. 2, 1976, 51/022521
Int. Cl.² F16H *47/00*; F16D *37/00*
U.S. Cl. 74—645 **10 Claims**

1. A device for controlling a lock-up clutch in an automatic transmission including a torque converter equipped with a lock-up clutch, comprising:

first and second oil pressure passage means which supply first and second oil pressures to first and second oil pressure servo means, respectively;

a relay valve which is controlled by said second pressure and delivers said first pressure as an output pressure when said second pressure is below a first predetermined value and delivers said second pressure as an output pressure when said second pressure is above said first predetermined value; and



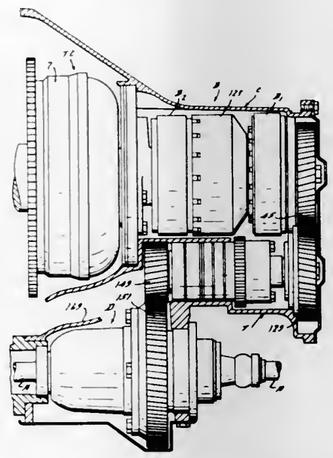
a lock-up shift valve which is shifted by a balance of said output pressure of said relay valve and line pressure and changes over the supply of oil pressure to engage said lock-up clutch when the difference between the output pressure and the line pressure is smaller than a second predetermined value and to disengage said lock-up clutch when said difference of pressure is larger than said second predetermined value.

4,095,487

POWER TRANSMISSION DRIVELINE UNIT

Bert W. Cartwright, Mt. Clemens; Dugald Cameron, Grosse Pointe Woods; James A. Hagaman, Madison Heights; Robert A. Hoetger, St. Clair Shores; Uno Kuusik, Royal Oak, and William Nortman, Grosse Pointe, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 11, 1976, Ser. No. 713,460
Int. Cl.² F16H *37/08, 57/10*
U.S. Cl. 74—695 **3 Claims**



1. In an engine driven vehicle having an engine extending transversely with respect to the vehicle at one end thereof, a pair of wheels at the same end of said vehicle, and automatic drive transmission means connecting said engine to said wheels, said automatic drive transmission means including a housing attached to said vehicle, said housing having a torque converter section, a speed change section adjacent said torque converter section, a differential having portions located in generally vertically planar alignment with said torque converter section, and a transfer section having portions in generally vertically planar alignment with said speed change section, said engine having a crankshaft, a torque converter in said torque converter section of said housing rotatable on the same axis as said crankshaft and adapted to be driven by said engine crankshaft, said torque converter having a torque converter output shaft extending into said speed change section, an annular spider connected to said shaft, first and second sets of clutch discs drivingly connected to said shaft, a speed change section output shaft mounted in said speed change section, a sleeve having first and second sun gears thereon rotatably mounted on said speed change section output shaft, first drum means connected to said sleeve, a third set of clutch discs connected to said drum means and adapted to frictionally engage said first set of clutch discs, a first planet pinion carrier connected to said speed change output shaft and having first pinions engaging said first sun gear, a first annulus gear engaging said first pinions, a fourth set of clutch discs connected to said first annulus gear and adapted to frictionally engage said second set of clutch discs, a second planetary pinion carrier having second pinions engaging said second sun gear, second drum means connected to said second pinion carrier, a second annulus gear connected to said speed change section output shaft and engaged with said second pinions, first and second brakes for respectively engaging said first drum means and said second drum means, an output gear connected to said speed change section ohutput shaft, said speed change section output shaft and said output gear rotating on said axis, a transfer shaft rotatably mounted in said transfer section on an axis parallel to said axis, a first transfer gear engaged with said output gear and attached to said transfer shaft, a governor valve body attached to said transfer shaft, a second transfer gear on the other end of said transfer shaft adjacent said torque converter section, said differential including a carrier, said carrier having an annular gear thereon driven by said second transfer gear and rotatable on an axis parallel with the axis of said transfer shaft, said differential including pinions rotatable with said carrier and side gears driven by said pinions, said side gears being connected to axle means for driving said wheels, a first speed drive being transmitted to said axle means when said second and fourth sets of clutch discs are engaged and said second brake is applied, a second speed drive being transmitted to said axle means when said second and fourth sets of clutch discs are engaged and said first brake is applied, and a third speed drive being transmitted to said axle means when said second and fourth sets of clutch discs and said first and third clutch discs are engaged.

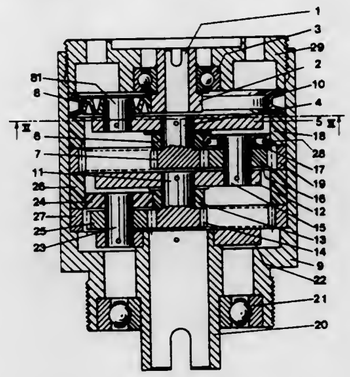
4,095,488

PLANETARY GEAR SYSTEM

Sven Walter Nilsson, Partille, Sweden, assignor to SKF Nova AB, Gothenburg, Sweden

Filed Apr. 7, 1976, Ser. No. 674,642
Claims priority, application Sweden, Jun. 4, 1975, 7506355
Int. Cl.² F16N *1/28*
U.S. Cl. 74—801 **8 Claims**

1. A planetary gear system comprising a housing, an input shaft at one end of said housing and an output shaft at the other end thereof, transmission means drivingly connecting said shafts including, a planet support having at least two planet wheel journals mounted thereon, at least one of said journals mounting a planet friction wheel adapted to contact a friction ring having at least an elastically deformable portion mounted in said housing, and means for adjusting the pressure applying



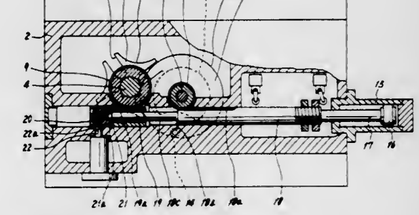
relation between said planet friction wheel and said elastically deformable portion of said friction ring.

4,095,489

INDEX APPARATUS FOR MACHINE TOOL

Toshifumi Hasegawa, Kariya, Japan, assignor to Toyoda-Koki Kabushiki-Kaisha, Japan

Filed Apr. 15, 1977, Ser. No. 788,085
Int. Cl.² B23B *29/32*
U.S. Cl. 74—820 **4 Claims**



1. An index apparatus for a machine tool comprising:

a base;

a vertical support shaft slidably and rotatably supported in said base;

a tool support carrying a plurality of tools and fixedly supported on the upper end of said support shaft;

a first gear coupling fixedly mounted on said base;

a second gear coupling provided at the underside of said tool support and engaged with said first gear coupling when said tool support is located at a lower position thereof;

a first gear member rotatably but non-slidably mounted on said support shaft and provided with a threaded portion threadedly engaged with said base;

means for indexing said tool support positioned at an upper position thereof;

an operating shaft slidably received in said base;

a sleeve member slidably received in said base and provided with a notch and connected to said operating shaft to be movable relative thereto a predetermined distance;

a first rack formed on said sleeve member and engaged with said first gear member;

means for moving said operating shaft a distance larger than said predetermined distance to move said support shaft and said tool support vertically, through said first rack and said first gear member, and to drive said indexing means;

a lock shaft mounted in said base to be slidable in a direction

perpendicular to the movement of said sleeve member and to be engaged with the notch of said sleeve member, to restrict axial movement of said sleeve member when said tool support is moved to the upper position thereof, so as to disengage said second gear coupling from said first gear coupling; and

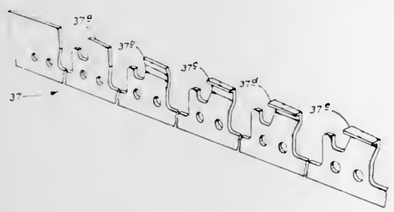
resilient means for urging said lock shaft toward said sleeve member.

4,095,490

METHOD OF MAKING CHISEL-TYPE CUTTER LINK

Renwick S. Atkinson, Portland, Oreg., assignor to Carlton Company, Milwaukie, Oreg.

Filed Aug. 19, 1976, Ser. No. 716,016
Int. Cl.[2] B23D *63/00*
U.S. Cl. 76—112 **5 Claims**



1. A method of forming from a blank a chisel-type saw-chain cutter link comprising

producing a first bend in the blank, with such having inside and outside corners and being located at a first position in the blank which is to one side of another position in the blank wherein a final bend is desired,

producing a subsequent bend in the blank, with such having inside and outside corners that are shifted from the corners of the first-mentioned bend, and with the second-mentioned bend being located toward said other position from said first position, and

during producing of said second-mentioned bend, flowing material in the blank from the region of the first-mentioned bend toward the region of the second-mentioned bend.

4,095,491

METHOD FOR MAKING POWER BORING BITS

William J. Hildebrandt, West Simsbury, Conn., assignor to The Stanley Works, New Britain, Conn.

Division of Ser. No. 666,783, Mar. 15, 1976, Pat. No. 4,050,841.
This application Apr. 25, 1977, Ser. No. 790,433
Int. Cl.[2] B21K *5/02*
U.S. Cl. 76—108 R **13 Claims**

1. In a method for making power boring bits, the steps comprising:

a. forming an elongated shaft member to provide a shank portion and a pointed tip portion at one end thereof, said tip portion being formed with cutting surfaces extending along a segment of the axial length of said tip portion from the point thereof and circumscribing a circle of rotation of maximum radius at a location along the length of said tip portion spaced from said point thereof, said tip portion being formed to provide a generally axially extending planar shoulder portion spaced from said point with the radial distance to said axial shoulder portion being less than said maximum radius, said shoulder portion having a length dimension extending axially of said shaft member and a width dimension extending perpendicularly to said length dimension;

b. forming a disc with a coaxial aperture and a channel extending from the circumference of said disc to said aperture, the portion of said disc along one edge of said channel being formed to extend at an angle from the plane of the body portion of the disc to provide a cutting lip portion with a root end adjacent said body portion of said disc and a free end spaced therefrom, said body portion being substantially planar;

c. seating said disc on said tip portion of said shaft member with said tip portion extending through said aperture of said disc and with said free end of said cutting lip portion projecting in the direction of said point and with the inner end of said cutting lip portion being disposed closely adjacent said axial shoulder portion intermediate the width dimension thereof and inwardly of said circle of rotation of maximum radius; and

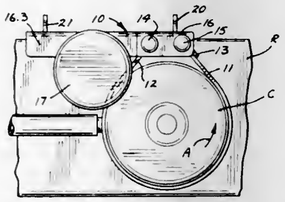
d. bonding said seated disc to said shaft member as seated.

4,095,492

RADIATOR CAP TURNING TOOL

Martin A. Makela, Waconia, Minn., assignor to J-Mark Quality Products, Inc., Minneapolis, Minn.

Filed Mar. 11, 1977, Ser. No. 776,608
Int. Cl.[2] B67B *7/00*
U.S. Cl. 81—3.43 **10 Claims**



1. A radiator cap gripping and turning tool comprising,

a stiff but flexible band formed in a loop to embrace the periphery of such a radiator cap, the band having opposite ends adjacent each other,

a rigid swingable link interposed between the ends of the band and having pivotal connections to both ends of the band, the link being swingable relative to the ends of the band to constrict the loop for gripping and turning the radiator cap, and

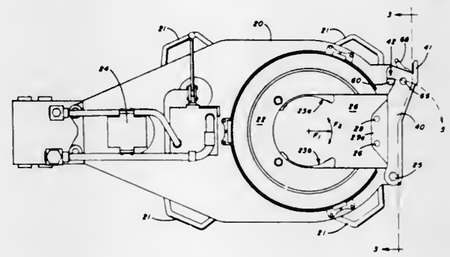
a rigid handle on the link and swingable therewith in opposite directions between a rest position wherein the band is distended to loosely embrace the radiator cap and a gripping position wherein the loop is constricted onto the cap, the handle having a pressure-applying portion located adjacent the center of the loop while in said gripping position for applying downward pressure on a central portion of the cap while the band grips the periphery of the cap and turns the cap.

4,095,493

TONG LOCKING MECHANISM

Charles W. Haynes, Spring, Tex., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Apr. 28, 1977, Ser. No. 791,752
Int. Cl.[2] B25B *17/00*
U.S. Cl. 81—57.15 **8 Claims**



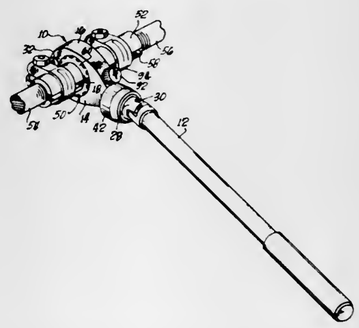
1. A rotary power tong for the make-up and break-out of drilling rods and pipes comprising: a bifurcated frame having first and second portions defining a central opening and an outwardly open passageway in communication with said central opening; rotatable gripping means mounted in said central opening for holding and rotating rod or pipe about the axis of said central opening; pivoting means attached to said first frame portion; a door attached to said pivoting means; at least one door contact means attached to said door for transmitting force to said door; at least one frame contact means attached to said second frame portion for transmitting forces to said second frame portion; at least one hook-like door member operably connected to said door to engage said frame contact means; and at least one hook-like frame member rotatably connected to second frame portion so as to engage and disengage said door contact means.

4,095,494

GEAR-OPERATED RATCHET WRENCH

John H. Castoe, 10234 McVine St., Sunland, Calif. 91040

Filed Apr. 13, 1977, Ser. No. 787,082
Int. Cl.[2] B25B *13/46*
U.S. Cl. 81—63.2 **27 Claims**



1. A gear-operated ratchet wrench comprising:

a body having an opening in it, the opening having an axis;

an elongated handle secured to the body for rotating the body about said axis;

a socket for being secured to an object to be rotated by the wrench;

hinge means for rotating the body between a closed position and an open position to expand the effective size of the opening in the body to allow the socket means to be inserted in the opening, the body having a fixed portion rigidly affixed to the handle means and a movable portion engaged with the hinge means to rotate relative to the fixed portion;

gear teeth spaced circumferentially around a portion of the socket;

means releasably securing the gear teeth portion of the socket in said opening, the releasable securing means including a movable locking sleeve having a locked position disposed around the fixed portion and the movable portion of the body to hold the body in the closed position, the locking sleeve being movable to a released position allowing the movable portion of the body to rotate relative to the fixed position;

a ratchet pawl extending into engagement with the gear teeth portion of the socket to allow relative rotation between the socket and the body in one direction of rotation and to prevent said rotation in an opposite direction; and

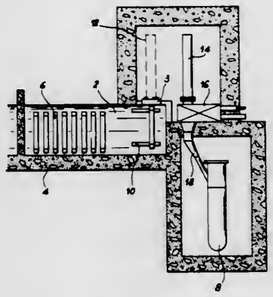
means for rotating the ratchet pawl to reverse the direction of relative rotation between the socket and the body.

4,095,495

METHOD AND DEVICE FOR CUTTING A BUNDLE OF IRRADIATED NUCLEAR FUEL TUBES

Gilbert Chaze, Bourg-la-Reine; Guy Cherel, Le Vesinet; Rene Guilloteau, Verrieres-le-Buisson, and Daniel Tucoulat, La Frette sur Seine, all of France, assignors to Commissariat a l'Energie Atomique, Paris and Saint-Gobain Techniques Nouvelles, Courbevoie, both of France

Filed Sep. 2, 1976, Ser. No. 720,060
Claims priority, application France, Sep. 11, 1975, 75 27896
Int. Cl.[2] B26D *7/08*
U.S. Cl. 83—15 **14 Claims**



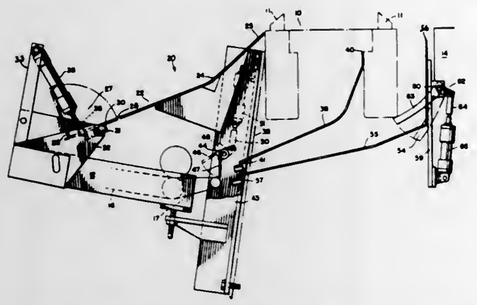
1. A method of cutting a bundle of nuclear fuel tubes comprising the steps of gripping by means of a manipulator a bundle of vertically oriented nuclear fuel tubes having a base spigot and a top spigot, said bundle being disposed in a storage pond, completely introduced said bundle and said manipulator into a store, contacting and positioning said bundle with and relative to a movable reference plate disposed adjacent to an end of said store adapted to come into contact with a cutter, the position of said plate being known relative to said store and said cutter, retracting said reference plate into a non-contacting position with said bundle, moving said store until said end is adjacent and in contact with said cutter moving said bundle out of said store in steps of predetermined distance, cutting said base spigot from said bundle, cutting said bundle less said top spigot into predetermined portions, said manipulating means within said store continuously gripping said bundle during said moving and cutting.

4,095,496

STRIP HANDLING APPARATUS

Walter J. Buhler, Pearl River, N.Y., assignor to National-Standard Company, Niles, Mich.

Filed Aug. 16, 1976, Ser. No. 714,516
Int. Cl.² B26D *7/06*
U.S. Cl. 83—104 **7 Claims**



1. A strip handling apparatus for use with a scroll shear assembly having a double set of cutting edges for producing strip material from which a single row of can ends is produced, a scroll shear piler having a stacking box therein, and an infeed device, including in combination:

first chute means mounted to the out-feed side of the scroll shear assembly to direct the over-the-die cut strips of material onto the scroll shear piler for stacking in the stacking box,

second chute means mounted to the scroll shear assembly between the double set of cutting edges to direct the through-the-die cut strips of material onto the scroll shear piler for stacking in the stacking box,

third chute means mounted to the infeed side of the scroll shear assembly to direct the butt-die cut strips of material onto the scroll shear piler for stacking in the stacking box, and

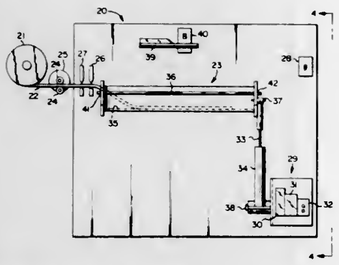
control means associated with at least two of the said first chute means, said second chute means and said third chute means to thereby predeterminely control the operation of the scroll shear assembly to permit stacking of the die cut strips of material in the stacker box.

4,095,497

ARTICLE HANDLING APPARATUS

Billy R. Radford, Princeton, and Thomas Linwood McLamb, Four Oaks, both of N.C., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Apr. 6, 1977, Ser. No. 785,226
Int. Cl.² B65H *29/24*
U.S. Cl. 83—157 **1 Claim**



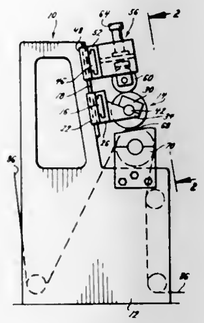
1. In an apparatus for automatically cutting flexible material to a pre-set length, said apparatus comprising: a supply of a said material; means for linearly removing said material from said supply and delivering said material to a work station; means for measuring said material to said pre-set length; and means at said work station including cutting means for cutting material to said pre-set length, the improvement comprising, traying means adjacent said work station for supporting said pre-set length of said material before, during and after cutting and operable to subsequently deliver said material, after cutting, to a remote location, said traying means being attached to said apparatus and comprising a one piece tray for supporting said material; pivoting means connected to said tray for pivoting said tray whereby cut material is delivered from said tray to said remote location, said tray being self-storing in said pivoted position when not in use; and delay means operatively connected to said pivoting means for delaying operation thereof until said material is cut and entirely supported by said tray.

4,095,498

DIECUTTER

Frank McKay Biggar, III, Angola, N.Y., assignor to Frank M. Biggar, Jr., Hamburg, N.Y.

Filed Jun. 14, 1976, Ser. No. 695,838
Int. Cl.² B26D *1/56*
U.S. Cl. 83—346 **13 Claims**



1. In a rotary diecutting device for diecutting traveling web having a frame, a rotating diecutting cylinder mounted in bearings in the frame for supporting a die, a rotating anvil cylinder mounted in bearings in the frame and means to receive a web between the cylinders, the improvement comprising adjustable means in the frame to apply force to urge the diecutting cylinder into contact with the anvil cylinder, the diecutting cylinder having a die accepting location thereon and means thereon spaced from the die accepting location cooperating with the means to apply force to the diecutting cylinder; independently selective means to receive individual anvil cylinders and individual diecutting cylinders of a plurality of diameters; means to selectively receive diecutting cylinders of a plurality of preselected lengths; and including means to adjust the relative distance between individual bearings in the frame.

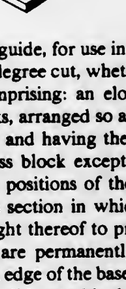
4,095,499

ELECTRICAL HOUSEHOLD APPLIANCE EQUIPPED WITH A REMOVABLE ACCESSORY SUCH AS A VEGETABLE CUTTER

Edouard Pierre Julien Ades, Paris, France, assignor to Moulinex, Societe Anonyme, Bagnolet, France

Filed Feb. 1, 1977, Ser. No. 764,688
Claims priority, application France, Feb. 12, 1976, 76 03848
Int. Cl.² B26D *4/28*
U.S. Cl. 83—471 **8 Claims**

1. An electrically operable household appliance comprising a base having a top arranged to constitute a seat for a detachable accessory, including a working bowl and a cover removably covering the bowl, said bowl containing working elements adapted to be coupled to the output shaft of an electric motor which is housed in the base and is controlled by at least one switch which is operable by a key situated in the top part of the base and is actuated by a push button mounted on the accessory for movement between an operative position, in which the key is brought into its working position, and an inoperative position, in which the key is in its position of rest,



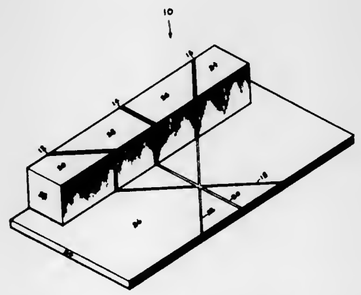
said accessory being fixed to the base by at least one fastener comprising a hook articulated on the cover and the hook portion of which is releasably engageable with the base, wherein the push-button is mounted on the hook and is slidable in a guide on said hook between said operative position and said inoperative position.

4,095,500

ANGLE CUTTING GUIDE

William W. Rouse, 22 Bedinger Ave., Walton, Ky. 41094

Filed Jan. 28, 1977, Ser. No. 763,330
Int. Cl.² B27G *5/02*
U.S. Cl. 83—762 **1 Claim**



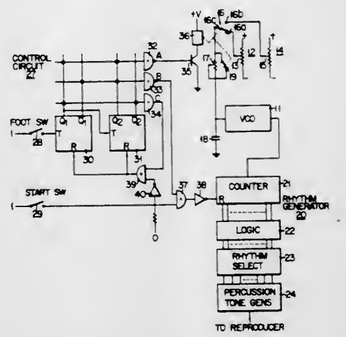
1. An angle cutting guide, for use in giving a saw a rigid and perfect guide for any degree cut, whether said cut be horizonal or perpendicular, comprising: an elongated base; four elongated solid mass blocks, arranged so as to leave slits as cutting guides between them, and having the appearance of an elongated single solid mass block except for the slits or cutting guides formed by the positions of the blocks said solid mass blocks having a cross section in which the width is substantially equal to the height thereof to provide sufficient guiding surfaces; said blocks are permanently attached to said base along one longitudinal edge of the base only with the longitudinal back side of said solid mass blocks running parallel to the longitudinal edge of said base; the other longitudinal edge of the base being clear a saw guide slot perpendicular to the longitudinal axis of said block and base extending downwards through and from said solid mass block, and partially through said base for 90° cuts; the plurality of diagonally extending saw guides slots extending vertically downwards through said solid mass block and partially through said base for angular cuts.

4,095,501

AUTOMATIC RHYTHM PERFORMING APPARATUS HAVING A VOLTAGE-CONTROLLED VARIABLE FREQUENCY OSCILLATOR

Eiichiro Aoki, 624, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Nov. 24, 1976, Ser. No. 744,770
Claims priority, application Japan, Nov. 29, 1975, 50-142547
Int. Cl.² G10H *1/00*
U.S. Cl. 84—1.03 **7 Claims**



1. An automatic rhythm performing apparatus having a presettable rhythm tempo, comprising:

a plurality of tempo determining voltage signal sources;

voltage-controlled variable frequency oscillator means having an input and an output and responsive to a tempo determining voltage signal at the input to generate at the output a clock signal having a frequency which is a function of the voltage value of the tempo determining voltage signal at the input;

selecting means coupled to said tempo determining voltage signal sources for selectively coupling one of the plurality of tempo determining voltage signal sources to the input of said voltage-controlled oscillator means to thereby preset the rhythm tempo; and

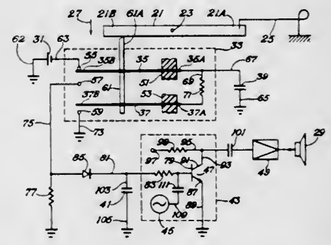
rhythm signal generating circuit means coupled to said voltage-controlled variable frequency oscillator means and responsive to the clock signal to generate a rhythm signal having a tempo corresponding to the frequency of the clock signal.

4,095,502

SOUND CONTROL SYSTEM IN AN ELECTRONIC MUSICAL INSTRUMENT

William T. Moore, Mansfield, Tex., and Tadayaki Adachi, Hamamatsu, Japan, assignors to Rhythm Band, Inc., Fort Worth, Tex.

Filed May 21, 1976, Ser. No. 688,824
Int. Cl.² G10H *3/00*
U.S. Cl. 84—1.13 **2 Claims**



1. In an electronic musical instrument having a plurality of

movable keys for controlling the sound produced by a speaker, a sound control system for each key, comprising:

signal generating means for generating a distinctive frequency signal,

gate means having an input coupled to said signal generating means and an output coupled to said speaker,

first and second movable contacts,

first and second stationary contacts to be engaged by said first movable contacts,

a third stationary contact to be engaged by said second movable contact,

said first movable contact being supported to engage said first stationary contact and to be out of engagement with said second stationary contact when said key is in its normal position,

said second movable contact being supported to be out of engagement with said third stationary contact when said key is in its normal position,

means adapted to be engaged by said key for moving said first and second movable contacts to engage said second and third stationary contacts respectively when said key is depressed,

said first movable contact being disengaged from said first stationary contact when said key is depressed,

said second and third stationary contacts being located such that said second movable contact engages said third stationary contact before said first movable contact engages said second stationary contact when said key is depressed,

first capacitor means electrically connected to said first and second movable contacts,

a source of voltage connected to said first stationary contact for charging said first capacitor means through said first movable contact when it engages said first stationary contact,

means for connecting said third stationary contact to ground to allow said first capacitor means to begin to discharge when said second movable contact engages said third stationary contact,

circuit means connecting said second stationary contact with said input of said gate means,

ground means connected to said circuit means and to ground to allow said first capacitor means to discharge through said ground means when said first movable contact engages said second stationary contact, and

second capacitor means connected to said circuit means between the connection of said ground means with said circuit means and said input of said gate means for receiving a quantity of charge from said first capacitor means dependent upon the time between engagement of said second movable contact means with said third stationary contact means and said first movable contact means with said second stationary contact means when said key is depressed,

said quantity of charge received by said second capacitor means being applied to said gate means for passing the output from said signal generating means to said speaker and for controlling the sound level of said speaker.

4,095,503

MUSICAL INSTRUMENT

Carl Haagenson, 13212 Magnolia, No. 134, Garden Grove, Calif. 92644

Filed Dec. 20, 1976, Ser. No. 752,142
Int. Cl.² G10D *1/02*
U.S. Cl. 84—173 **6 Claims**

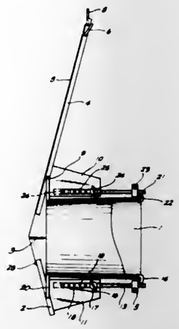
1. A stringed musical instrument, comprising:

a body member having a closed end and an oppositely directed open end; a bridge supported by said closed end;

a neck piece having connected thereto bearing means adapted to rest on said body member adjacent said closed end and stabilizer means releasably connected to said body member adjacent said open end;

a tailpiece having connected thereto second bearing means adapted to rest on said body member adjacent said closed end and second stabilizer means releasably connected to said body member adjacent said open end;

at least one tuning means mounted on said neck piece; and



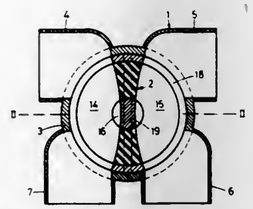
at least one string being fastened to said tailpiece, extending over said bridge and neck piece, and being fastened to said tuning means, the tension in said string maintaining both of said bearing means in contact with said body member.

4,095,504

ROTARY VALVE FOR BRASS WIND INSTRUMENTS

Peter Hirsbrunner, Dorfgasse, Sumiswald, Switzerland

Filed Mar. 28, 1977, Ser. No. 781,974
Claims priority, application Germany, Mar. 30, 1976, 2613554
Int. Cl.² G10D *9/04*
U.S. Cl. 84—390 **1 Claim**



1. In a rotary valve for a brass wind instrument of the type wherein a housing, having a cylindrical wall with four duct connecting pieces fixed thereto about the circumference thereof, accommodates a rotating member including a middle portion and two journals by means of which said member is rotatingly but undisplaceably mounted in said housing, one of said journals projecting from said housing for enabling operation of said rotating member, and said middle portion having a substantially cylindrical exterior surface forming a fluid-tight joint together with said wall of said housing and having two recesses situated on opposite sides of the longitudinal axis of said valve for causing said connecting pieces to communicate in pairs in both of two positions of rotation of said rotating member separated by 90°, the improvement comprising a said rotating member including:

a continuous metal shaft having end portions forming said journals,

a said middle portion having a core element made of a plastic material which does not swell in a wet environment and mounted upon said shaft, a metal jacket being snugly fitted upon said core element and forming said exterior surface,

one or more radial or diametral bores piercing said middle portion, and

one or more pins engaged in respective said bores for securing said jacket to said core element.

4,095,505

DRUM SNARE

Fred A. Hoey, San Antonio, Tex., and Robert A. Allmansberger, Bridgewater, N.J., assignors to National Musical String Company, New Brunswick, N.J.

Filed Feb. 4, 1977, Ser. No. 765,852
Int. Cl.² G10D *13/02*
U.S. Cl. 84—416 **9 Claims**

1. A drum snare comprising at least one cord consisting of a single piece of plastic material, said cord along its length having a plurality of enlarged diameter portions and a plurality of reduced diameter portions, said enlarged diameter portions alternating with said reduced diameter portions so as to space said enlarged diameter portions from one another along the length of said cord.

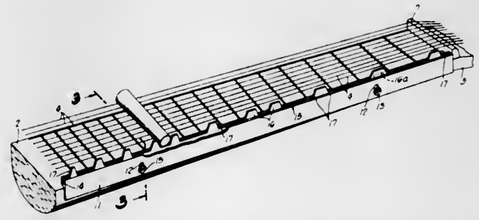
5. A drum snare comprising a set of cords arranged in spaced parallel relationship to one another in a common plane, each of said cords of said set consisting of a single piece of plastic material and each of said cords along its length having a plurality of enlarged diameter portions and a plurality of reduced diameter portions, said enlarged diameter portions alternating with said reduced diameter portions so as to space said enlarged diameter portions from one another along the length of said cord.

4,095,506

POSITION INDICATOR FOR GUITARS

Walter E. Smith, P.O. Box A, Payette, Id. 83661

Filed Jan. 10, 1977, Ser. No. 758,194
Int. Cl.² G09B *15/06*
U.S. Cl. 84—485 R **9 Claims**



8. Means utilizing a slide bar for aiding in the location of preselected positions on a stringed musical instrument, comprising:

supporting means disposed longitudinally with respect to the strings;

a set of projections carried by the supporting means normally extending above the strings and engageable by the slide bar to locate preselected positions on the strings;

said projections being deflectable to movement of the slide bar to permit such movement past a projection while maintaining contact between the slide bar and the strings.

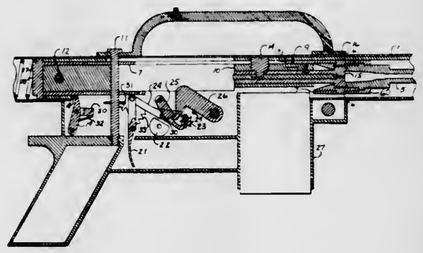
4,095,507

COMBAT FIREARM

Ross A. Close, 3831 Glenbrook Rd., Fairfax, Va. 22031

Filed Mar. 7, 1977, Ser. No. 775,394
Int. Cl.² F41D *11/10*
U.S. Cl. 89—129 B **1 Claim**

1. A firearm having a cylindrical actuating sleeve concentric to the barrel consisting of a floating power cylinder attached to the actuating sleeve, having a cylindrical frame concentric to the barrel and being attached to a control mechanism consisting of a ratchet wheel counter actuated by levers and paws, having a cylindrical receiver mounted concentrically within the cylindrical actuating sleeve, a barrel mounted in the cylindrical receiver, a cylindrical breech block mounted concentrically within the cylindrical receiver and movable coaxially along the axis of the bore of the barrel, the breech block being



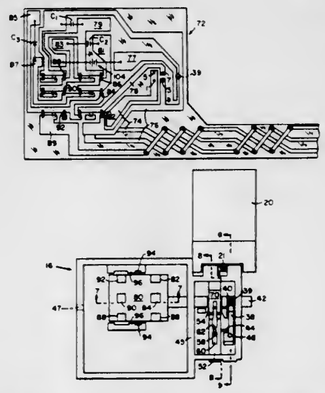
connected to the receiver by two or more locking lugs and connected to the actuating sleeve by a pin, the breech blocking having a cam pin connecting the bolt and actuating sleeve and acting at a retainer for the firing pin, the breech block having a lever type bolt catch mounted on the breech block for preventing the breech block from rotating during feeding of a loaded shell from the magazine to the barrel.

4,095,508

CAPACITIVE DISCHARGE FIRING MECHANISM

Jeffrey A. Lienau, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 4, 1977, Ser. No. 784,106
Int. Cl.² F41F *3/04*
U.S. Cl. 89—1.814 **10 Claims**



1. A discharge firing mechanism for a lightweight portable rocket launcher in which the discharge firing mechanism includes a power supply system on a printed circuit, said power supply system including battery means, capacitors, and appropriate connecting means connecting said battery means and said capacitors to leads of said printed circuit; and a firing

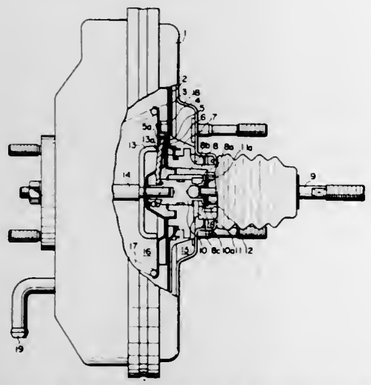
button with a plurality of switch contacts mounted in fixed relation thereon and with each of said plurality of said switch contacts in contact with certain of said leads of said printed circuit to supply power to a first output lead of said leads and to a second output lead of said leads of the printed circuit for connecting said power supply system for arming and firing a rocket motor when said switch contacts have been actuated in unison to predetermined positions relative to said leads.

4,095,509

VACUUM DEGREE AUGMENTATION DEVICE

Kiyoshi Tateoka, Fujisawa, and Tomizo Azuma, Yamato, both of Japan, assignors to Tokico Ltd., Kawasaki, Japan

Filed Nov. 15, 1976, Ser. No. 741,676
Claims priority, application Japan, Nov. 20, 1975, 50-157714
Int. Cl.² F15B *9/10*
U.S. Cl. 91—369 B **2 Claims**



1. A vacuum degree augmentation device of the type usable with push rod actuated vehicle brakes and having

a hollow body,

a plunger assembly shiftably mounted in said body and actuatable by said push rod for movement of said plunger assembly from a standby to an operated position thereof in response to actuation of said push rod,

an output rod shiftably mounted in said body to be moved with augmented force in response to movement of said plunger assembly to its operated position,

a shiftable diaphragm-piston mechanism mounted in said body between a pair of fluid chambers within the latter,

means for subjecting one of said chambers to a fluid pressure different from atmospheric pressure,

valve means operably associated with said plunger assembly for placing said chambers in communication with each other to maintain both of said chambers at substantially the same fluid pressure when said plunger assembly is in its standby position, and for isolating said chambers from fluid communication with each other and placing the other of said chambers in communication with the atmosphere for shifting said diaphragm-piston mechanism in response to the fluid pressure differential presented between said chambers when said plunger assembly is moved to its operated position,

a generally cup-shaped fulcrum plate mounted on said output rod for transmitting a force to the latter for moving the same and having an arcuate portion generally concentric with the axis of said output rod and bonded with a narrow edge facing in a direction generally toward said plunger assembly and said diaphragm-piston mechanism, and

a reaction lever extending generally radially with respect to the axis of said output rod, having a pair of oppositely facing side surfaces, and disposed with a radially inner portion of one of said surfaces engageable by said plunger assembly, a radially outer portion of said one surface engageable with said diaphragm-piston mechanism and a radially intermediate portion of the other of said surfaces engageable with said edge portion of said fulcrum plate,

the improvement of which is characterized by and comprises:

said intermediate portion of said other surface of said reaction lever is provided with a convexly curved surface contour having is longest dimension extending substantially radially for engaging said edge portion of said fulcrum plate in substantially one-point contact relationship,

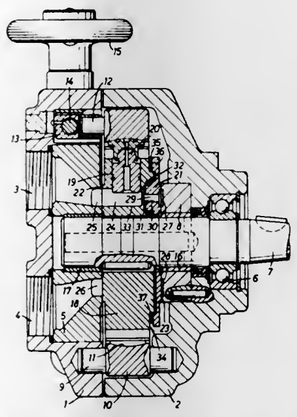
whereby the effects of normal working stresses and wear upon the interengaging portions of said reaction lever and said fulcrum plate leave the location of their point of contacting interengagement substantially fixed to prevent substantial changes in the augmentation ratio of the device as would otherwise result from said effects moving the location of the fulcrum for the reaction lever provided by its interengagement with said fulcrum plate.

4,095,510

RADIAL PISTON PUMP

Carl Verner Ohrberg, Poppelvej 1, Havnbjerg, Nordborg, Denmark (6430)

Filed Nov. 3, 1975, Ser. No. 628,045
Claims priority, application Germany, Nov. 2, 1974, 2452092
Int. Cl.² F01B *13/06*
U.S. Cl. 91—487 **1 Claim**



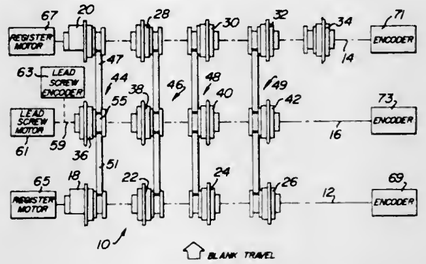
1. A radial piston pump assembly comprising a housing, a stationary valve plate fixedly mounted in said housing, an insert plate fixedly mounted in said housing in spaced relation to said valve plate, bearing means in said plates, a shaft journaled in said bearing means, a piston carrier member attached to said shaft between said plates, a track carrier surrounding said piston carrier member and having a cam track surface cooperably engaging said piston carrier member a slide plate member surrounding said shaft and being disposed between said piston carrier member and said insert plate, an annularly shaped corrugated spring between said piston carrier member and said slide plate member resiliently biasing said members in opposite directions away from each other, a fluid passage extending through said members, a cylindrically shaped recess in one of said members surrounding said passage, a circular plug on the other of said members extending partially into said recess, a sealing ring surrounding said plug so that pressurized fluid is trapped in said recess to exert separating forces on said members.

4,095,511

SET-UP CONTROL

Allan Brent Woolston, Wynnewood, Pa., assignor to Molins Machine Company, Inc., Cherry Hill, N.J.

Continuation of Ser. No. 696,670, Jun. 16, 1976, abandoned.
This application Jun. 21, 1977, Ser. No. 809,147
Int. Cl.² B31B *1/20*
U.S. Cl. 93—58.2 R **8 Claims**



1. Apparatus for processing a moving box blank including a rotatable shaft having a plurality of rotary elements mounted thereon at least one of which is mounted for lateral movement along the longitudinal axis of the shaft in response to rotation of a lead screw operatively associated with the element by a lead screw motor, comprising:

means for generating a digital set point signal indicative of a desired lateral position of a rotary element along a rotatable shaft;

means for tracking the actual lateral position of the rotary element on the shaft and for generating a digital signal indicative thereof;

means for comparing said actual position signal to said set point signal and generating an error signal indicative of the sense of the difference therebetween;

means for causing a lead screw motor to rotate a lead screw and move the movable rotary element along the longitudinal axis of the shaft in a first direction directly to said desired lateral position; and

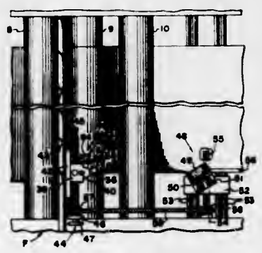
means for sequentially causing the lead screw motor to rotate the lead screw and move the movable rotary element along the longitudinal axis of the shaft in a second direction to and beyond said desired lateral position and to rotate the lead screw and move the movable rotary element along the longitudinal axis of the shaft in said first direction directly to said desired lateral position.

4,095,512

WINDING OF UNIFORM DIAMETER TUBES

Martin H. Stark, Saginaw, Mich., assignor to Arrow Paper Products Company, Saginaw, Mich.

Filed Apr. 8, 1976, Ser. No. 674,950
Int. Cl.² B31C *3/00*
U.S. Cl. 93—81 R **12 Claims**



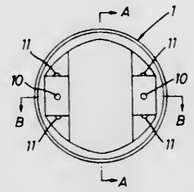
1. In a method of winding substantially uniform diameter tubes from a web of varying thickness sheet material which is cut transversely at successive intervals to form blanks of predetermined length and width, each of which blanks subsequently is wound upon itself from one side edge thereof toward its other side edge to form a tube, the improvement comprising varying the width of successive blanks inversely with changes in the thickness of said sheet material.

4,095,513

PISTON WITH GUDGEON PIN AND METHOD OF MAKING SAME

Albert Block, Glucksburg, Germany, assignor to Danfoss A/S, Nordborg, Denmark

Filed Nov. 4, 1976, Ser. No. 738,712
Claims priority, application Germany, Nov. 5, 1975, 2549550
Int. Cl.² F16J *1/18*
U.S. Cl. 92—187 **2 Claims**



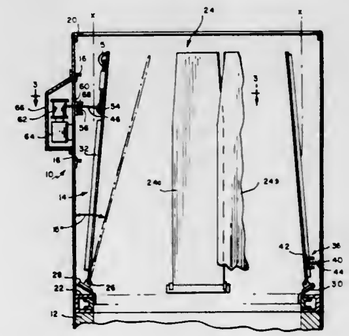
1. A piston assembly for compressors or the like comprising a one piece, molded imperforate piston body having a head portion and a skirt portion, said skirt portion having internal longitudinally extending and mutually facing recesses on opposite sides thereof, said recesses having parallel side walls and curved summits at the head end of said body, said recesses being open at the end opposite said head portion, a pin disposed in press fitting relation in said recesses and means welding said pin to said summits and said side walls, said pin being journaled in a connecting rod connected thereto.

4,095,514

AIR POLLUTION CONTROL DEVICE

John R. Roy; Stephen Roy; Mary L. Roy, all of Cohasset, and Daniel T. Mooney, Winchester, all of Mass., assignors to Airtek Corporation, Quincy, Mass.

Filed Nov. 8, 1976, Ser. No. 739,458
Int. Cl.² F23L *17/02*
U.S. Cl. 98—58 **20 Claims**



13. The combination with a smokestack of means at the top of the stack defining a truncated conical member adapted to be expanded and contracted to vary the size of the discharge opening, said means comprising a plurality of relatively long, narrow blades disposed in a circle about the axis of the stack for pivotal movement about their lower ends radially inwardly

and outwardly relative to the axis of the stack and wherein the blades are arranged in inner and outer circles in overlapping relation such that movement of the blades of the outer circle inwardly effect a corresponding inward movement of the inner blades and movement of the inner blades outwardly effect a corresponding movement of the outer blades outwardly, and means for effecting expansion and contraction of said blades to obtain control of the gas exit velocity, thereby effecting maximum plume rise from the top of the chimney.

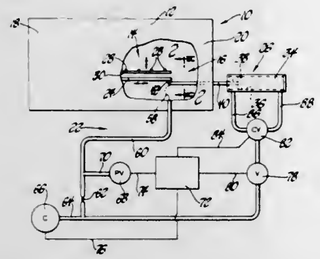
14. The combination with a smoke stack of means at the top of the stack defining a truncated conical chamber adapted to be expanded and contracted to vary the size of the discharge opening, said means comprising a plurality of relatively long, narrow blades disposed in a circle about the axis of the stack for pivotal movement about their lower ends radially inwardly and outwardly relative to the axis of the stack, said blades being arranged in inner and outer circles in overlapping relation such that movement of the blades of the outer circle inwardly effect a corresponding inward movement of the inner blades and movement of the inner blades outwardly effect a corresponding movement of the outer blades outwardly, spring means biasing the outer blades inwardly and means for effecting outward movement of the inner blades comprising cables connected at one end to the inner blades and to a winch at their outer ends and means for effecting rotation of the winch.

4,095,515

OVERLOAD INDICATOR

Ralph J. MacKay, Novi, Mich., assignor to Gladd Industries, Inc., Detroit, Mich.

Filed Oct. 1, 1976, Ser. No. 728,811
Int. Cl.[2] A23B *4/00*; A23L *3/02*; B65G *43/06*
U.S. Cl. 99—337 **3 Claims**



1. A meat processing system for processing meat products for the like, the system comprising;

a housing including a chamber in which the products are processed;

a conveyor including a reciprocating beam for conveying the products through the chamber and a drive cylinder for reciprocating the beam;

an overload indicator including a frangible member connecting the beam and drive cylinder of the conveyor so as to fracture upon being subjected to an overload condition therebetween; said frangible member having an internal gas chamber that is communicated with the environment upon fracture due to an overload condition; conduit means including a restricted orifice for supplying pressurized gas to the gas chamber from a gas compressor; and means for sensing a decrease in gas pressure within the conduit means downstream from the restricted orifice so as to thereby detect the occurrence of an overload condition; and

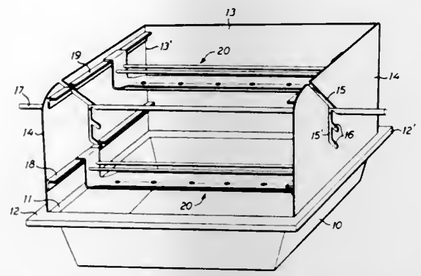
means for terminating operation of the drive cylinder when the overload condition is sensed by the indicator.

4,095,516

GRILLING APPARATUS

John Harry Orsing, Avangsgatan 2, S-253 71 Helsingborg, Sweden

Filed Jul. 28, 1976, Ser. No. 709,479
Int. Cl.[2] A47J *37/06*
U.S. Cl. 99—390 **9 Claims**



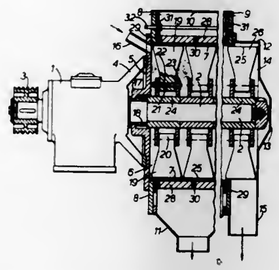
1. A grilling apparatus using particulate fuel comprising a housing for supporting foodstuff to be broiled; a drip pan forming the base of said housing; a plurality of individual elongated channel fuel-receiving means for receiving particulate fuel; a plurality of spaced supporting means on said housing, arranged to support the fuel receiving means at different levels beneath and on each side of the foodstuff; the fuel-receiving means resting and supported on said supporting means; said fuel-receiving means spanning the space between the supporting means; and being disposed at a plurality of locations selected from beneath and on one side; or beneath and on both sides of the foodstuff.

4,095,517

JUICE AND PULP EXTRACTOR

Viacheslav Jansen Janovtchik, London, England, assignor to IN. DA. TE. Aktiengesellschaft, Eschen, Liechtenstein

Filed Jan. 12, 1977, Ser. No. 758,882
Claims priority, application United Kingdom, Jan. 22, 1976, 2526/76
Int. Cl.[2] A23B *5/00*; A23N *1/00*
U.S. Cl. 99—495 **9 Claims**



1. An extractor, comprising:

(a) a foraminous wall defining a chamber of circular cross-section;

(b) end walls individually attached to said foraminous wall which close the ends of the chamber;

(c) an inlet connected to one of said end walls and communicating with said chamber for feeding a product to be treated into the chamber;

(d) an outlet communicating with the chamber adjacent the other one of said end walls for leading residue from the chamber;

(e) an envelope surrounding said foraminous wall and defining a collecting zone around the wall of extract pressed therethrough;

(f) an outlet connected to said envelope and communicating with said collecting zone for leading extract from the collecting zone;

(g) a rotatable shaft mounted in at least one of said end walls and extending centrally through the chamber;

(h) a plurality of pivots on the shaft whose axes are substantially parallel to the shaft; and

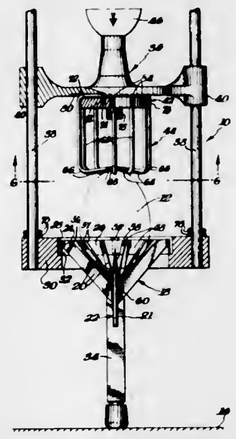
(i) a plurality of mobile beaters individually mounted on said shaft about said pivots, said beaters extending radially from the shaft when the shaft rotates and having sufficient length to locate the ends of the beaters adjacent said foraminous wall when the beaters extend radially from the shaft.

4,095,518

SECTIONING DEVICE FOR ROUNDED FOOD ARTICLE

Frank W. Jones, Marshallton, Del., assignor to Fasline Food Equipment Co., Wilmington, Del.

Filed Sep. 28, 1976, Ser. No. 727,456
Int. Cl.[2] A47J *17/00*
U.S. Cl. 99—538 **15 Claims**



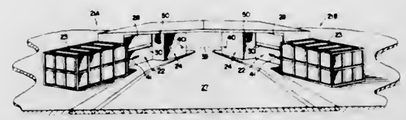
1. A device for sectioning a rounded food article comprising a base, a conical cup of internally sharp radial blades mounted in the base and having an apex disposed towards the base with substantially wedge-shaped spaces between the blades, a plunger, slide guide means connecting the plunger for reciprocating movement towards the base and return, the plunger including a annular array of fingers depending from it which freely engage within the wedge-shaped spaces between the radial blades when the plunger is moved towards the blades, the fingers each comprising a linear element having two ends, one end of each of the fingers being attached to the plunger and the other end being free, stop means on the base and plunger for terminating their engagement with each other, the fingers being long enough to substantially pass through the blades when the movement of the plunger into engagement with the base is terminated, a spike having a point and a stem centrally mounted at the central junction of the blades to form their apex disposed within the cup, the point of the spike extending upwardly adjacent the entrance to the cup for holding the article aligned for engagement by the plunger and for initiating the radial splitting of the article which is continued and completed by the blades, the stem of the spike freely terminating a short distance below the cup of blades, the fingers each comprising an elongated resilient rod having an inwardly bent foot, the inwardly bent feet terminating in a circular array leaving a circular space between their ends for receiving the spike, the inwardly bent feet also being upwardly inclined from their junctions with the rods to inwardly disposed ends whereby the rods are guided through the wedge-shaped spaces with their feet in smooth contact with the article they are pushing through the conical cup of blades.

4,095,519

METHOD FOR THE HANDLING OF SOLID WASTE

Hyman Budoff, 374 N. Pershing Ave., Akron, Ohio 44313

Division of Ser. No. 614,357, Sep. 18, 1975, Pat. No. 4,044,664.
This application Jun. 15, 1977, Ser. No. 806,902
Claims priority, application Canada, Dec. 29, 1976, 268834
Int. Cl.[2] B30B *13/00*
U.S. Cl. 100—35 **1 Claim**



1. A method of handling waste in a system having multiple and operatively interconnected stations, each said station having a closed hopper unit, a removable storage unit and a compactor unit having a reciprocally driven compactor means, comprising the steps of:

sensing the presence of a vehicle adjacent one of said hopper units at said operatively interconnected stations and opening said hopper unit for receiving such waste in response to the presence of an adjacent vehicle;

depositing such waste in said open hopper unit;

sensing the absence of a vehicle adjacent said open hopper unit and closing said hopper unit in response to the absence of an adjacent vehicle;

actuating said compactor means to transfer such waste from said hopper unit and compacting such waste in said storage unit;

detecting the density of such compacted waste in said storage unit;

comparing said detected density of compacted waste in said storage unit to predetermined value;

deactivating a station having said compacted waste with a detected density exceeding said predetermined value;

activating an interconnected station having an empty storage unit; and,

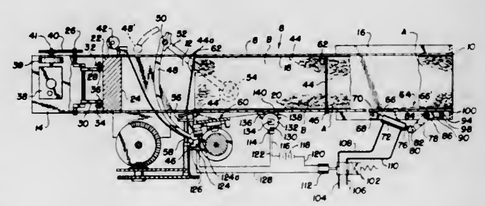
removing said storage unit from said deactivated station for emptying.

4,095,520

HORIZONTAL BALER

Charles E. Burford, 3131 Turtle Creek Blvd., Dallas, Tex. 75219

Filed Sep. 20, 1976, Ser. No. 724,275
Int. Cl.[2] B30B *15/26*; B65B *13/18*
U.S. Cl. 100—43 **10 Claims**



1. In a baling apparatus having a chamber and a discharge end of the chamber: a pressure member; means moveably securing said pressure member adjacent one side of the discharge end of the chamber; pressure actuated means to urge said pressure member into frictional engagement with the side of a bale adjacent said discharge end of the chamber; a sleeve;

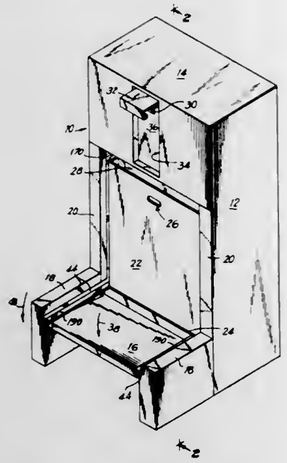
means pivotally securing the sleeve for rotation about an axis lying adjacent the pressure member; a crank arm rigidly secured to the sleeve; means securing the pressure actuated means to the crank arm; a lever arm; means securing the lever arm to the sleeve; roller means rotatably secured to the end of said lever arm and adapted to rollingly engage said pressure member, said roller means being arranged to urge the pressure member into frictional engagement with a bale in said chamber; a source of pressurized fluid; and valve means between said source of pressurized fluid and said pressure actuated means.

4,095,521

TRASH COMPACTION APPARATUS

Arthur Hauptman, 629 E. 82nd St., Brooklyn, N.Y. 11236

Filed Mar. 15, 1976, Ser. No. 666,777
Int. Cl.[2] B30B *1/04*
U.S. Cl. 100—219 **10 Claims**



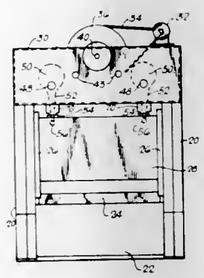
1. A trash compaction apparatus comprising a container for the storage of trash therein,
said container having an open mouth,
a housing,
an opening in said housing,
said opening permitting the passage of said container therethrough,
a ram head,
said ram head being disposed within said housing,
said open mouth being in substantial vertical alignment with said ram head,
a foot operated treadle,
said ram head being capable of displacement along a vertical line,
said ram head being disposed in an uppermost position,
ram head displacement means for applying an urging force for displacing said ram head from said uppermost position downwardly through said mouth and into said container in compressive touching engagement with said trash in a trash contacting position,
said urging force being derived from the application of downward manual forces applied to said foot operated treadle,
latching means for retaining said ram at selective locations intermediate said uppermost position and said trash contacting position,
ram head upward biasing means for urging said ram head into said uppermost position,
unlatching means for releasing said latching means,
guidance means for guiding said ram head along said vertical line,
said guidance means including a track and a guide rod,
said track being fixedly secured to the interior of said housing,
said guide rod being disposed within said housing and fixedly secured to said ram head,
said guide rod being disposed in sliding engagement with said track,
said ram head displacement means comprising a plurality of rack-like teeth,
said plurality of rack-like teeth being disposed in spaced apart relationship along a vertical surface of said guide rod,
a pawl,
said pawl being disposed in selective touching engagement with at least one of said plurality of racklike teeth,
pawl biasing means for biasing said pawl in said selective touching engagement,
an arm pivotably secured to said foot operated treadle,
said pawl fixedly secured to said arm, and
mechanical advantage means for applying a greater downward force upon said at least one of said plurality of racklike teeth by said pawl than said downward manual forces applied to said foot operated treadle.

4,095,522

SOUND ABATEMENT DEVICE FOR MECHANICAL PRESSES

Walter J. Drungil, Chicago, Ill., assignor to Verson Allsteel Press Company, Chicago, Ill.

Filed Jul. 1, 1977, Ser. No. 812,163
Int. Cl.[2] B30B *1/26*
U.S. Cl. 100—214 **8 Claims**



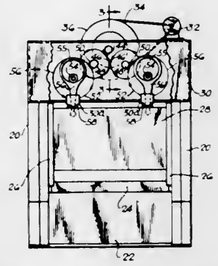
1. In a mechanical press having a bed for supporting a workpiece, a reciprocatable slide for performing work on the workpiece, an enclosed crown containing mechanical gear means and drive means associated therewith for reciprocating the slide with relation to the workpiece supported on the bed of the press, and a movable link member which extends through an opening in the base of the crown, said link member being joined at one end to the drive means in the crown and at its other end to the slide through a connection housing secured on the slide in spaced relation to the opening in the base of the crown, the improvement comprising: a sound abatement device positioned at the opening in the base of the crown for substantially reducing the amount of noise mechanically generated in the enclosed crown which normally would pass from the interior of the crown through the opening in the base thereof, said device including a rigid, open-ended body portion through which one end of the movable link member extends and which is movable in response to the movement of the slide, said body portion having side walls which are sealed with respect to the connection housing and which extend into the crown through the opening in the base thereof and which bridge the space between said opening in the crown and the connection housing secured on the slide thereby providing a sound barrier between the opening in the base of the crown and the connection housing, and flexible, sound-sealing guide means for the body portion, said guide means being maintained in constant slidable engagement with the side walls of the body portion as the body portion moves in response to the movement of the slide.

4,095,523

BRAKE ASSEMBLY FOR MECHANICAL PRESSES

Walter J. Drungil, Chicago, Ill., assignor to Verson Allsteel Press Company, Chicago, Ill.

Filed Jul. 1, 1977, Ser. No. 812,164
Int. Cl.[2] B30B *1/06*
U.S. Cl. 100—282 **5 Claims**



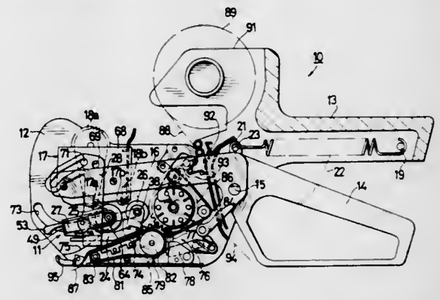
1. In a mechanical press of the type having a bed for supporting a workpiece, a reciprocating slide for performing work on the workpiece, a crown for supporting mechanical drive means and gear means including a drive shaft, movable link means connected between the drive means and the reciprocating slide for reciprocating the latter as the drive shaft is rotated, a clutch mechanism associated with the drive shaft for rotating the same when engaged whereby the slide is moved reciprocatably by the link means with relation to the workpiece supported on the bed of the press, and a brake mechanism associated with the drive shaft for braking the same when applied, said brake mechanism being released when the clutch mechanism is engaged and said clutch mechanism being disengaged when the brake mechanism is applied, the improvement wherein said brake mechanism comprises a brake assembly including a male member associated with the drive shaft of the drive means of the press and being rotatable with the drive shaft, said male member being non-circular and having curved lobes formed on the outer surface thereof, a female member movably mounted on the male member, said female member having a centrally located opening therethrough shaped to receive and engage the lobes of the non-circular male member and being rotatable by the drive shaft, and brake means for the female member, when applied, for stopping the female member and bringing the curved lobes of the non-circular male member into solid engagement with the female member whereby the rotational movement of the male member and the drive shaft is stopped when the clutch mechanism is disengaged, said curved lobes of the non-circular male member and the centrally located opening through the female member which is shaped to receive and engage the lobes of the non-circular male member cooperating to minimize vibration of the female member and consequent noise generated therefrom, when the brake mechanism is released and the clutch mechanism is engaged, due to stress and vibration transmitted to the drive shaft as work is performed on the work piece by the mechanical press.

4,095,524

INK SUPPLY MECHANISM FOR DICHROMIC PORTABLE LABELING MACHINE

Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed Feb. 28, 1977, Ser. No. 772,469
Claims priority, application Japan, Mar. 6, 1976, 51-23724
Int. Cl.[2] B41J *27/12, 27/14*; B41F *1/46*
U.S. Cl. 101—103 **19 Claims**



1. A portable label printing and applying machine, comprising:
a machine frame; an actuating lever movable with respect to said frame;
a printing head including at least a first and a second printing member with a respective first and second printing surface thereon and having type characters on said printing surface; said printing head being attached to and being movable with said actuating lever; means normally biasing said printing head to a standby position; said actuating lever being movable to move said printing head from said standby position to an inking position at which said printing surfaces are inked by inking rollers pressing against said printing surfaces with a predetermined pressure and being further movable by said actuating lever to a printing position at which said printing surfaces contact a label to imprint it;
an ink supply mechanism comprising:
holding means pivotally attached to said actuating lever for moving said holding means with respect to said frame as said actuating lever moves; at least a first and a second inking roller rotatably carried on said holding means so as to be rotatable with respect to said holding means and said first inking roller being rotatable over said first printing surface and said second inking roller being rotatable over said second printing surface;
a first guide in said frame for guiding motion of said first inking roller; a second guide in said frame for guiding motion of said second inking roller;
first and second guide engaging means located at said first and second rollers, respectively, and connected for movement therewith; said first and said second guide engaging means slidably engaging and being slidable along said first and said second guides, respectively;
said guides and said printing surfaces being so positioned and shaped that said inking rollers are spaced from said printing surfaces when said printing head is in said standby position, such that said each of first and second printing surfaces are engaged by the respective one of first and second inking rollers when said actuating lever has been manually actuated partially through its stroke and such that said inking rollers are moved out of the pathway of said printing head when said actuating lever is moved through its full stroke and said printing surfaces are moved to imprint a label and further wherein said guides are shaped to cause said second inking roller to move away from said printing surfaces after said second inking roller contacts said second printing surface, thereby to

prevent said second inking roller from contacting said first printing surface.

4,095,525

PROTECTIVE COATING MATERIAL FOR LITHOGRAPHIC PRINTING PLATE

Norishige Tsukada, Nishinomiya; Kazuo Hagihara, Tokyo; Kozo Tsuji, Takatsuki; Masanori Fujimoto, Ibaraki, and Tsuneyuki Nagase, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Inc., both of Japan

Filed Oct. 20, 1976, Ser. No. 734,356
Claims priority, application Japan, Oct. 31, 1975, 50-131692
Int. Cl.² B41N *3/08*
U.S. Cl. 101—465 **4 Claims**

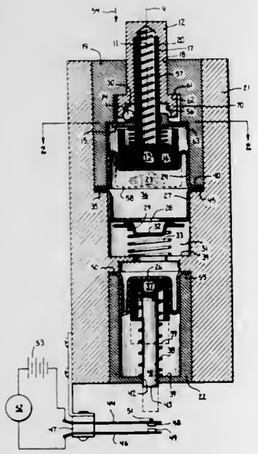
1. In a process for lithographic printing which comprises forming ink-receptive image areas and ink-repellent non-image areas on a metallic lithographic plate, coating the non-image areas of said plate with a film-forming material to enhance the hydrophilic character of the ink-repellent non-image areas of said plate and protect said plate from chemical or mechanical damage, applying a hydrophobic ink to said plate and then printing upon a substance with said plate; the improvement comprising coating said non-image areas with an aqueous solution of pullulan or a pullulan derivative having a viscosity in the range of 10 to 100 cp at a temperature of 20° C.

4,095,526

MECHANICAL HYDRAULIC COUNTING AND MEMORY DEVICE

Virgil H. Johnson, and David I. Parker, both of Champaign, Ill., assignors to The Magnavox Company, Fort Wayne, Ind.

Filed Aug. 26, 1965, Ser. No. 483,390
Int. Cl.² F42B *23/06, 23/26*
U.S. Cl. 102—8 **7 Claims**



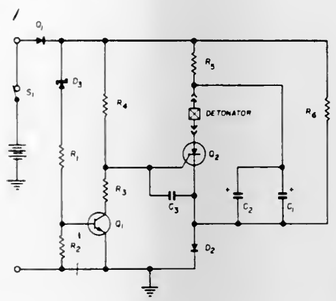
7. A memory device comprising:
a housing;
an input member and an output member in said housing;
a liquid confined in a space in said housing;
a first flexible seal connected to said input member and to said housing and defining a first movable wall of said space confining said liquid;
a second flexible seal connected to said output member and to said housing and defining a second movable wall of said space confining said liquid;
a partition in said space between said walls and dividing said space into a first chamber and a second chamber;
a normally closed valve operable when opened to facilitate liquid flow from said first chamber to said second chamber;
metering means permitting only a limited rate flow of liquid from said second chamber to said first chamber;
an input actuator having an initial rest position in said housing;
a clutch coupling said actuator to said input member when said actuator is moved toward said input member, thereby enabling said actuator to drive said input member toward said partition and reduce the volume of said first chamber, said clutch being automatically releasable upon movement of said actuator away from said input member;
and means maintaining a released condition of said clutch when said input actuator is in said initial rest position.

4,095,527

SPECIALIZED DETONATOR FIRING CIRCUIT

Morrison Bert Moore, III, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 15, 1964, Ser. No. 396,782
Int. Cl.² F42C *11/06, 9/00*
U.S. Cl. 102—19.2 **3 Claims**



1. A condition responsive electronic firing circuit responsive to a predetermined change in supply voltage comprising:
a first switch means normally biased for conduction,
a second switch means including a controlled rectifier normally biased for non-conduction, wherein the gate electrode is responsively connected to said first switch means whereby a change in the conductive state of said first switch effects a corresponding change in the conductive state of said second switch;
a detonator connected between one of the output electrodes of the controlled rectifier and a source of power whereby a detonating current passes therethrough when the rectifier becomes conductive;
a bypass capacitor connected between the gate and the other rectifier output electrode for preventing inadvertent actuation of the rectifier by spurious signals;
a zener diode interconnecting said first switch means and a source of power;
a storage means connected across the output electrodes of said controlled rectifier to provide a discharge pulse to said detonator upon the initiation of conduction in said controlled rectifier.

4,095,528

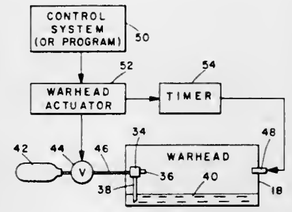
VEHICLE WITH COMBINED FUEL TANK/WARHEAD

Donald McChesney Post, San Diego, Calif., assignor to Teledyne Ryan Aeronautical Division of Teledyne Industries, Inc., San Diego, Calif.

Filed Jan. 28, 1977, Ser. No. 763,318
Int. Cl.² F42B *13/28*
U.S. Cl. 102—49.8 **2 Claims**

1. In a vehicle having combustible fuel powered propulsion means, the improvement comprising:

a fuel tank for containing the combustible fuel used for propulsion;
a fluid pressure actuated atomizer mounted in said fuel tank and having a nozzle directed into the tank;
a source of pressurized oxidizer connected to and driving said atomizer;



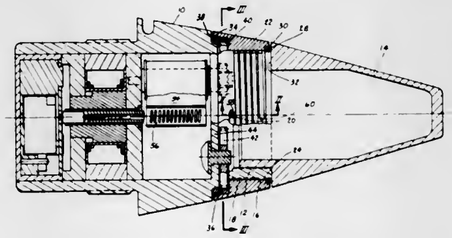
detonating means mounted in said fuel tank for detonating the atomized fuel and oxidizer mixture, whereby the fuel tank is an explosive warhead;
and timing means for actuating said detonating means at a predetermined time after operation of said atomizer.

4,095,529

SETTING RING STOP

Richard Thomas Ziemba, Burlington, Vt., assignor to General Electric Company, Burlington, Vt.

Filed Feb. 17, 1977, Ser. No. 769,760
Int. Cl.² F42C *17/00*
U.S. Cl. 102—200 **4 Claims**



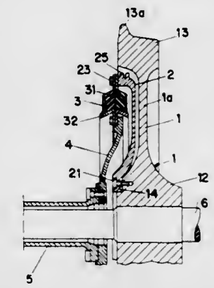
1. A multi-turn setting ring assembly comprising:
a body having a cylindrical outer surface portion;
a setting ring having a cylindrical inner surface portion journaled for rotation on said cylindrical outer surface portion of said body;
a ball;
a multi-turn helical raceway, having a longitudinal cross-section adapted to receive less than the total cross-section of said ball, formed into one of said surface portions, and having respective obturations of its cross-section at the clockwise and counter-clockwise ends thereof;
a longitudinally extending raceway, having a transverse cross-section adapted to receive less than the total cross-section of said ball, formed into the other of said surface portions;
said ball concurrently being disposed in part in each of said raceways; and
having a mode of operation such that said ring is free to rotate on said body in the clockwise direction until said ball abuts said clockwise obturation, and is free to rotate on said body in the counter-clockwise direction until said ball abuts said counter-clockwise obturation.

4,095,530

RESILIENT RAILWAY DRIVE CONNECTION

Joachim Korber, Weinheim; Wilhelm Koch, Heidelberg; Heinz Güthlein, Augsburg; Richard Wagner, Ingolstadt; Edmund Frantz, Munich, and Paul Kalinowski, Bad Tolz, all of Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Aug. 7, 1975, Ser. No. 602,906
Claims priority, application Germany, Aug. 8, 1974, 2438088
Int. Cl.² B60B *17/00, 19/10, 37/00;* B61C *9/44*
U.S. Cl. 105—131 **5 Claims**



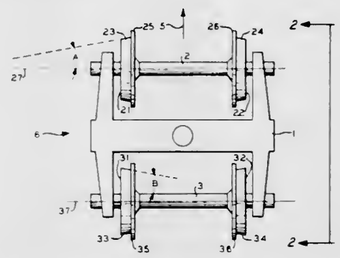
1. In an elastic drive coupling provided between a hollow drive shaft and a drive wheel of a railway track operated vehicle wherein said hollow drive shaft surrounds the axle of the drive wheel and the latter includes a hub and a wheel disc extending generally radially therefrom said wheel disc terminating in a flanged rim for a rolling engagement with the track, the improvement which comprises an annular coupling plate connected to said hub and extending generally radially outwardly therefrom and adjacent to but spaced axially from an inner side of said wheel disc to form a gap therebetween, an outer ring fixed to a radially outer peripheral portion of said coupling plate, an inner ring spaced radially inwardly from said outer ring, a rubber-containing elastic member secured to and between said rings, and said inner ring being connected to said hollow shaft to resiliently transmit traction forces.

4,095,531

RAILCAR RUNNING GEAR

Richard J. Bennett, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 8, 1976, Ser. No. 693,983
Int. Cl.² B61F *5/00*
U.S. Cl. 105—182 R **5 Claims**



1. A wheel unit for railcars comprising
a. a base element,
b. a first axle rotatably arranged in said base element,
c. a second axle arranged rotatably and essentially parallel to said first axle in said base element,
d. four wheels, with
e. a first set of two wheels, each being coaxially attached to

said first axle, each of these wheels having a tapered roll surface with only one taper; said taper is slightly converging away from the other wheel of said first set, and

f. a second set of two wheels, each being coaxially attached to said second axle, each of these wheels having a tapered roll surface with only one taper; said taper is slightly converging toward the other wheel of said second set of wheels,

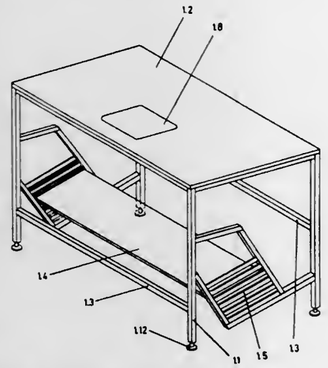
whereby the wheel unit is stabilized against oscillations caused by the tapered wheels.

4,095,532

WORKPLACE EQUIPMENT

Peter Redemann, Berlin, Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Mar. 15, 1976, Ser. No. 667,117
Int. Cl.² A47B *37/00*
U.S. Cl. 108—59 **2 Claims**



1. A worktable consisting essentially of:

two identical end sections, each of said end sections composed of two vertical legs of equal heights and a first tubular crossmember, attached to the tops of each of said legs and being perpendicular to each of said legs, said end sections being separated from each other along a line perpendicular to each of said first crossmembers such that said crossmembers are parallel to each other;

leg height adjustment means at the bottom of each of said legs;

a pair of equal length tubular crossmembers, each connecting the top of one leg of one of said end sections to the top of one leg of the other end section, said second crossmembers being disposed parallel to each other and perpendicular to said first tubular crossmembers;

a pair of third tubular crossmembers, each located under and parallel to one of said second crossmembers, one of said third crossmembers connecting the lower regions of the legs to which its overlying second crossmember is attached; and the other of said third crossmembers connecting the middle regions of the legs to which its overlying second crossmember is attached; each of said third crossmembers being of a length equal to that of said second tubular crossmembers and greater than the length of said first crossmembers;

a pair of first tubular rods each disposed parallel to and under one of said first crossmembers, each of said first tubular rods being attached at the same height to the lower region of one of said legs which are connected at their middle regions by one of said third crossmembers, each of said first tubular rods being of a length shorter than said first crossmembers, and each of said first tubular rods extending beyond the midpoint between the legs in each of said end sections;

a pair of second tubular rods disposed parallel to and under each of said first crossmembers, each of said second tubular rods being attached at the same height to the upper region of one of said legs which are connected at their lower regions by one of said third crossmembers, each of said second tubular rods terminating before the midpoint between the legs in each of said end sections;

a pair of third tubular rods, each connecting the non-leg engaging end of one of said second tubular rods to the top of said first tubular rod in the end section of said second tubular rod, the connection at the top of said first tubular rod being at a point between said midpoint and the leg to which said first tubular rod is connected;

a pair of fourth tubular rods, each connecting the non-leg engaging end of one of said first tubular rods to the inner side of a leg in the same end section as said first tubular rod, said leg being the one to which said first tubular rod is not attached, the connection at said leg being at a point below that at which said second tubular rod is attached and in the middle region of said leg, said third and fourth tubular rods in each end section being disposed parallel to each other;

a plurality of rungs in each end section disposed parallel to said first crossmembers and one above the other, each of said rungs being connected at one end to the third tubular rod in the end section and at its other end to the fourth tubular rod in the end section, said rungs being vertically spaced from each other to provide slots in each end section for insertion of one end of a footrest surface;

a rectangular footrest surface whose longer ends are substantially equal in length to the distance between said end sections and whose shorter ends are substantially equal in width to the distance between the third and fourth tubular crossmembers in each end section, each of said shorter ends of said footrest surface lying on one of said rungs in one of said end sections, the two supporting rungs being of equal height;

a work surface of length substantially equal to the distance between said end sections and of width substantially equal to the distance between the legs in each end section, said work surface loosely disposed on top of said end sections and said pair of second crossmembers;

four stop-blocks attached to the underside of said work surface, said stop-blocks being positioned on said work surface so that when said work surface is disposed on top of said end sections and second crossmembers, each of said four stop-blocks engages one of the four corners defined by the connections of said first crossmembers to said second crossmembers, thereby fixing the position of said work surface; and

a marked area on the top of said work surface, the center of said marked area being located centrally between said end sections, the marked area being composed of a quadrilateral figure, each of the four lines of said marked area being parallel to one of the edges of said work surface, one of said lines which is parallel to the longer edges of said work surface being located about 100mm from one longer edge, the other of said lines which is parallel to the longer edges of said work surface being located in the middle region of said work surface, and each of the remaining two lines joining one pair of edges of said two lines which are parallel to the longer edges of the work surface.

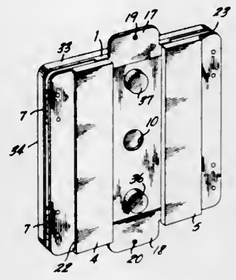
4,095,533

TRAYS COMBINABLE INTO AN ASSEMBLY

Jean Claude Leveille, No. I Tennis Court, Apt. 6G, Brooklyn, N.Y. 11226

Filed Apr. 15, 1977, Ser. No. 787,964
Int. Cl.² A47B *13/08;* A47F *3/14*
U.S. Cl. 108—90 **3 Claims**

1. Two separable and portable trays usable individually and jointly comprising, a first tray having a flat receptacle having a plurality of holes therein for receiving articles in said holes for transport and serving the articles therefrom, said first tray having legs hinged on the flat receptacle and positionable in a folded position against an underside surface and positionable in an extended depending position for converting said first tray to a stand, hinge means for hinging the legs individually on said first flat receptacle, and a second flat tray usable independently of said first tray and jointly therewith, said second flat tray having a flat receptacle free of holes and having raised edges



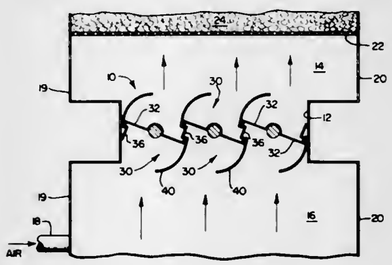
and locating projections on an underside thereof received in corresponding ones of said holes of said first tray for locating and releasably mounting the second tray on the first tray receptacle to convert said first tray into a flat tray free of holes for transporting articles thereon.

4,095,534

DAMPER WITH CURVED EXTENSION PLATES FOR WIDE RANGE FLOW CONTROL

Stephen John Goidich, Parsippany, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Feb. 16, 1977, Ser. No. 769,377
Int. Cl.² F23D *19/00*
U.S. Cl. 110—263 **6 Claims**



1. In combination with a heat exchanger having a fluidized bed of particulate material as a source of heat, including a particulate fuel material, a flow control damper to control the flow of air to the fluidized bed, said damper comprising:

a blade element pivotally disposed for movement between a closed and open positions, the free end of said blade element moving in a curved path;

an extension plate disposed relative to said curved path to define a flow opening between the free end of said blade element and the surface of said extension plate, said plate having a substantially straight portion and an arcuate portion connected tangentially at one end to said straight portion, said arcuate portion having a substantially constant radius of curvature; and a sealing element disposed on the free end of said blade element to provide a fluid seal with said blade element in the closed position,

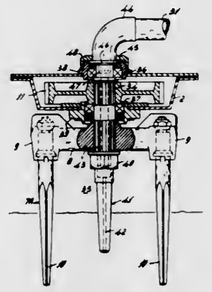
said extension plate cooperating with said blade element during said movement of the latter to define a substantially linear relationship between the open positions of said blade element and the air flow rate through the damper.

4,095,535

ROTARY HARROWS

Ary van der Lely, Maasland, and Cornelis Johannes Gerardus Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N.V., Maasland, Netherlands

Division of Ser. No. 590,520, Jun. 26, 1975, Pat. No. 4,018,170.
This application Feb. 14, 1977, Ser. No. 768,433
Claims priority, application Netherlands, Jun. 28, 1974, 7408749
Int. Cl.² A01C *23/02*
U.S. Cl. 111—6 **10 Claims**



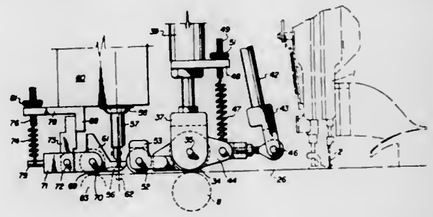
1. A soil cultivating implement or rotary harrow comprising a frame and a plurality of rotatable soil working members arranged in a transverse row, said members being supported and positioned on a portion of said frame to work overlapping strips of soil during operation, driving means engaging said soil working members and rotating same about corresponding upwardly extending shafts that define the axes of rotation of the soil working members, each soil working member comprising a substantially horizontal support and at least one downwardly extending tine depending from said support adjacent a lateral end thereof, said support mounting injector means that introduces fluid material into the soil being worked by said tine, said injector means comprising an elongated ejector that extends downwardly substantially parallel to said tine and said ejector being detachably connected to said support with fastening means located below the support, said ejector member having an internal conduit that communicates with a bore in the corresponding shaft and said bore extending throughout the length of said shaft.

4,095,536

DISCHARGE AND CUTTING APPARATUS FOR TANDEM SEWING MACHINE

Ladislav Hujik, Batawa, and Miroslav Baran, Trenton, both of Canada, assignors to Bata Shoe Company, Inc., Belcamp, Md.

Filed Oct. 13, 1976, Ser. No. 731,543
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.26 **8 Claims**



1. A discharge and cutting apparatus for attachment to a sewing machine having a base plate for sewing a tape onto footwear components comprising frame means; a work surface in the frame means for receiving the footwear components and

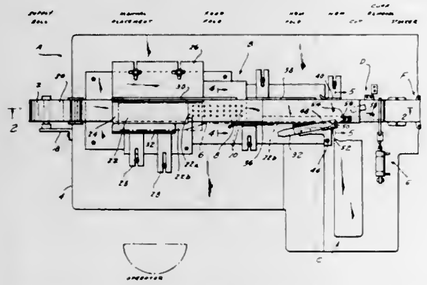
tape, said work surface being contiguous with the base plate of the sewing machine; first feed means in said frame means for gripping components and tape, and drawing the components and tape from the sewing machine under constant tension tension higher than that to which the tape and components are subjected in the sewing machine; cutting means in said frame means for cutting said tape at the leading and trailing edges of said components; second feed means in said frame means for receiving said components and tape following the cutting means in the path of travel of the components and tape, and discharging said components and tape from the apparatus; and drive means in said frame means driven by said sewing machine for operating said first and second feed means in synchronism with each other and with the sewing machine.

4,095,537

AUTOMATIC HEMMING APPARATUS

Seymour Silverman, and Kwan Hong Ng, both of New York, N.Y., assignors to Silverman Machines Company, New York, N.Y.

Filed May 2, 1977, Ser. No. 792,712
Int. Cl.[2] D05B *33/02, 35/02*
U.S. Cl. 112—121.29 **25 Claims**



1. Apparatus for folding the overlapping portion of a first piece of material over the edge of a second piece of material, said apparatus comprising first and second adjoining surfaces, means for positioning the pieces of material on said first surface in a face-to-face relationship with the second piece adjacent said first surface, the edge of the second piece aligned with the end of said first surface and a portion of the first piece overlapping the edge of said second piece, said second surface having an opening therein, air flow means operably connected to said opening and effective to create a flow of air into said opening, said air flow causing said overlapping portion of the first piece to move towards said opening, be folded around said end of said first surface and, therefore, around the edge of the second piece.

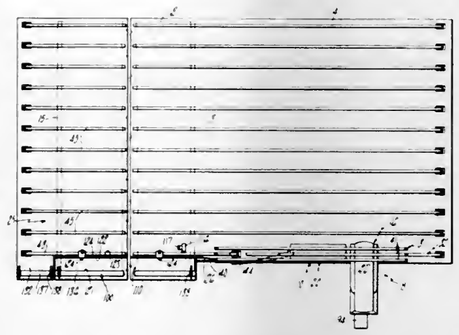
4,095,538

MATERIAL FOLDING DEVICE

John L. Rockerath, and Harold J. Schreck, both of Utica, N.Y., assignors to Jetsew, Inc., Barneveld, N.Y.

Filed Jan. 22, 1976, Ser. No. 651,449
Int. Cl.[2] D05B *35/04*
U.S. Cl. 112—147 **14 Claims**

1. In a sewing machine system having material conveyance means for individually conveying continuously without interruption material blanks longitudinally forwardly in succession along an elongated material path through successive material folding and sewing stations, and material folding and sewing apparatus at the material folding and sewing stations for respectively prefolding each material blank and sewing the prefolded material blank as it is conveyed longitudinally forwardly through said stations continuously without interruption, the improvement wherein the material folding apparatus comprises first and second successive material folding means at the folding station for sequentially folding a longitudinally extending portion of each material blank to a first intermediate longitudinally extending folded condition and then from its intermediate folded condition to a predetermined prefolded condition respectively as the material blank is conveyed by the material conveyance means therethrough continuously without interruption, the first material folding means being operable for folding the entire said longitudinally extending portion of the material blank to said intermediate folded condition substantially simultaneously and automatically in coordination with the conveyance of the material blank continuously without interruption along the material path through the folding station by the material conveyance means, the first material folding means comprising a retractable material support re-



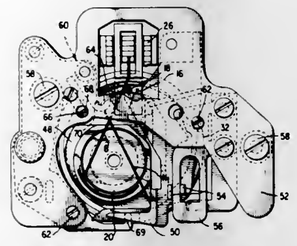
tractable from a first normal position for supporting a predetermined part of each material blank as it is being conveyoed along the generally longitudinally horizontally extending material path on the table to a retracted position freeing said material part to fold downwardly to provide said intermediate folded condition of the material blank, and retracting means for automatically retracting the retractable material support in coordination with the conveyance of each material blank continuously without interruption along the elongated material path by the material conveyance means and so that said material support is retracted when said material part overlies the retractable support.

4,095,539

NEEDLE THREAD WORK LIMB RETAINERS

Ralph E. Johnson, Convent Station, N.J., assignor to The Singer Company, New York, N.Y.

Filed Aug. 23, 1976, Ser. No. 717,053
Int. Cl.[2] D05B *57/14*
U.S. Cl. 112—184 **7 Claims**



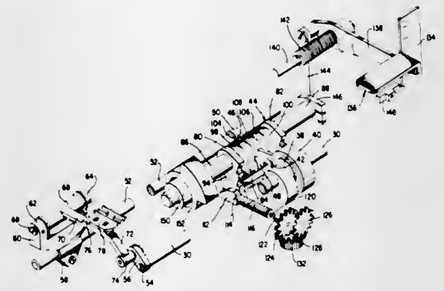
1. In a sewing machine having a reciprocating thread carrying needle, a work supporting plate carried by said sewing machine for supporting work during penetration thereof by said needle, a loop taker supported under said work supporting plate, a thread carrying bobbin, said loop taker being operative for seizing a loop of thread extending from said needle to said work and for carrying the loop of thread around said bobbin for concatenating the needle thread with the bobbin thread to form a lockstitch, and means carried apart from said loop taker and said bobbin for positively separating the work limb of the loop of needle thread seized by said loop taker from the needle limb at least during passage of the seized loop of needle thread around said bobbin.

4,095,540

SEWING MACHINE STITCH REGULATING MECHANISMS

Kenneth Francis Kaltenbach, Leonia, and Alfred John Zenger, Montville, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed Feb. 28, 1977, Ser. No. 773,106
Int. Cl.[2] D05B *27/00*
U.S. Cl. 112—210 **2 Claims**



1. A work feed mechanism for a sewing machine having a drive shaft rotatably mounted in the bed of the machine, a feed dog adapted to engage and feed the work, means including a rock shaft for oscillating said feed dog along the line of work feed, means connecting the drive shaft to the feed dog for oscillating said feed dog normal to the line of work feed, an eccentric on said drive shaft, a stitch length controlling device including a carrier frame, means for pivotably mounting said frame in the bed, said frame carrying linkage connecting said eccentric and said rock shaft for oscillating said rock shaft upon rotation of said drive shaft and for varying the oscillation of the rock shaft upon pivotable movement of said carrier frame, forward stitch adjusting means including an abutment cam member secured to said carrier frame and an abutment stop member threadedly received in the bed of the sewing machine and disposed to abut said cam member to pivotably move said carrier frame upon axial movement of said stop member, a gear train including a first gear, means for securing said stop member for rotation with and axially movable relative to said first gear, a second gear in driving engagement with said first gear, and an operator influenced member secured to said second gear and rotatably mounted on the bed, whereby rotation of the operator influenced member effects axial movement of the stop member to turn said carrier frame and thereby change the stitch length.

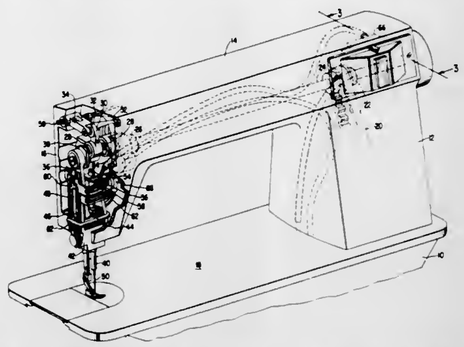
4,095,541

SEWING MACHINE LUBRICATION

Earl Francis Dunn, Edison, and Adolph Armer Gebhardt, Chatham, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed Apr. 14, 1977, Ser. No. 787,734
Int. Cl.[2] D05B *71/00*
U.S. Cl. 112—256 **6 Claims**

1. In a sewing machine having a frame including a bed, a standard upstanding from the bed, a bracket arm terminating in a head overlying said bed, said frame supporting operating mechanisms including a reciprocal needle bar and a take up mechanism in the head, an arm shaft rotatably journalled in said bracket arm for driving said needle bar and said take up mechanism, and means for rotating said shaft, said frame supporting said operating mechanism in such a way as to transmit normal operating vibratory forces thereto, the improvement comprising: a lubricate reservoir supported on the frame for receiving vibratory forces therefrom, said reservoir including a bottom surface and an upstanding wall, means for maintaining lubricate in said reservoir at an intermediate level on said wall, an elongated cord-like wick having the free end surface at one end disposed in abutting relation with said wall above said



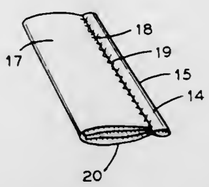
level of lubricant and the remainder of the wick extending through said reservoir without contacting the lubricate therein to lubrication distribution points in said operating mechainsm, whereby only the vibratory forces of the frame causes lubricate to wet said wall and through capillary action to wet the wick to distribute lubricate to the operating mechanism.

4,095,542

METHODS OF MAKING FEMININE HYGIENIC PADS

Shalom Z. Hirschman, 110-11 Queens Blvd., Forest Hills, N.Y. 11375

Filed Oct. 15, 1976, Ser. No. 732,941
Int. Cl.[2] A61F *13/18*
U.S. Cl. 112—262 **16 Claims**



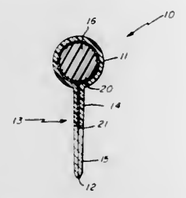
1. A method of making feminine hygienic pads from a material of predetermined width with opposed longitudinal edges and opposed faces by folding said material into longitudinal folds providing a folded form; the method including inwardly folding one longitudinal edge over one face of the material to provide a fold formed anterior leading edge with a first panel, inwardly folding the other longitudinal edge over said one face to provide a folded second edge with a second panel, inwardly folding the folded second edge with its panel over said one face across a major portion of the width of the material and over the inwardly folded first panel to a point short of the anterior leading edge, and stitching the inwardly folded second edge to the underlying mterial inward of the anterior leading edge to define a narrow anterior portion and a relatively wider posterior portion relative to the stitching.

4,095,543

DUAL EXTRUSION WELT

Manuel B. Gassman, Swampscott, Mass., assignor to Maynard Plastics, Inc., Salem, Mass.

Filed Feb. 28, 1977, Ser. No. 772,635
Int. Cl.[2] B32B *7/08*
U.S. Cl. 112—417 **5 Claims**



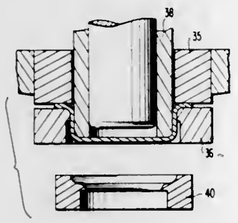
1. A decorative plastic welt comprising an elongated, decorative, arcuate bead portion formed of a first plastic material,
an integral elongated plastic flange extending from said bead to an outer flange edge and defining a first flange portion adjacent said bead and a second flange portion extending from said first portion to said flange edge,
said bead and flange being coextruded and said bead portion being opaque,
said section portion forming an elongated see-through plastic strip which permits sewing of aligned sheet material portions on either side thereof.

4,095,544

PRODUCTION OF CORROSION RESISTANT SEAM-FREE CAN BODIES FROM TINPLATE

Gordon L. Peters, Weirton, W. Va., and John R. Smith, Richmond, Ohio, assignors to National Steel Corporation, Pittsburgh, Pa.

Filed Oct. 26, 1976, Ser. No. 735,895
Int. Cl.[2] B21D *51/26*
U.S. Cl. 113—120 A **3 Claims**



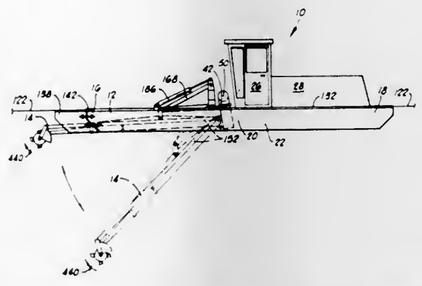
1. A method of producing a corrosion resistant seam-free can body comprising
providing as a starting stock a planar sheet of steel of a thickness between about 0.025 inch and 0.005 inch having a coating of at least ¼ lb. per BB of tin on each side and a layer of iron-tin alloy between the tin coating and the steel, the ATC value of at least one side of the tinplated steel being below 0.500 microamperes per cm^2,
subjecting the planar sheet of steel to a cold forming action, including a drawing step, to form a seamless cup having sidewalls, the steel of the sidewalls being subjected to plastic flow in the cold forming action, the said one side of the starting stock being on the inside of the cup, the ATC value of the inside of the sidewalls of the cup being above 0.500 microamperes per cm^2, and
subjecting the seamless cup with the tin coating exposed to an elevated temperature above about 400° F. at the lower end of a temperature range but not greater than the melting point of tin at the upper end of the temperature range for a period of time sufficient to lower the ATC value to a value below 0.100 microamperes per cm^2, the period of time varying between not less than about 10 minutes at the lower end of the temperature range and slightly less than the time necessary to create an objectionable form of tin-iron alloy at the upper end of the temperature range,
the temperature at the upper end of the temperature range being between about 448° and about 450° F. and the period of time and the upper end of the temperature range being not less than about 10 seconds.

4,095,545

SELF-PROPELLED DREDGING APPARATUS

Robert H. Vaughn; C. Eugene Maitlen; Glen H. Davis, and Randall E. Maitlen, all of Oklahoma City, Okla., assignors to VMI, Inc., Oklahoma City, Okla.

Filed Mar. 2, 1977, Ser. No. 773,501
Int. Cl.[2] E02F *3/06*
U.S. Cl. 114—26 **30 Claims**



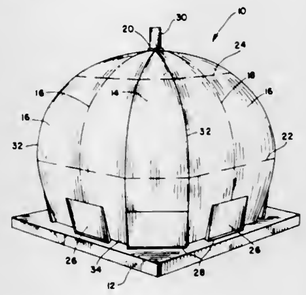
1. In an apparatus for dredging the bed of a body of water of the type which includes a buoyant hull structure having a forward end portion and an aft end portion; an engine having a power output shaft and mounted on said hull structure intermediate the forward and aft end portions thereof; a pump having an inlet port and an outlet port and mounted on said hull structure intermediate the forward and aft end portions thereof; means drivingly interconnecting said pump and the power output shaft of said engine for transmitting power to said pump from said engine to pump liquid through said pump from the inlet port to the outlet port thereof; and a rigid boom structure having a forward end portion and a rear end portion, said boom structure being pivotally secured at the rear end portion thereof to said hull structure along a substantially horizontal transverse axis of rotation with the forward end portion of said boom structure extending from the rear end portion thereof toward the forward end portion of said hull structure, the improvement comprising:
a dredging head assembly including:
a dredging head frame structure having a forward end portion and a rear end portion with means connected to the rear end portion thereof for rigidly securing the rear end portion thereof to the forward end portion of the rigid boom structure;
shaft means having first and second end portions and horizontally transversely journaled across the forward end portion of said dredging head frame structure, for rotating thereon;
a cylinder disposed about and fixedly secured to said shaft means in coaxial alignment therewith;
a plate fixedly secured to the forward end portion of said dredging head frame structure parallel to the axis of rotation of said shaft means and spaced a radial distance therefrom;
a plurality of radially outwardly extending cutter blades fixedly secured to the outer surface of said cylinder in spaced relation therealong;
means drivingly engaging said shaft means for rotating said shaft means about its axis of rotation;
a cutter bar fixedly secured to said plate along a line substantially parallel to the axis of rotation of said shaft means and extending from said plate toward the outer surface of said cylinder, said cutter bar including a plurality of notches formed therein and spaced therealong, each notch being constructed and arranged to receive a cutter blade therethrough as said shaft means is rotated about its axis of rotation;
an opening formed in said plate and extending therealong for at least a portion of the entire length of said cylinder; and
conduit means for interconnecting said opening and the inlet port of said pump.

4,095,546

SHIPBOARD LNG TANKS

John R. Kane, 314 67th St., Newport News, Va. 23607

Filed Jul. 14, 1977, Ser. No. 815,790
Int. Cl.[2] B63B *25/14*
U.S. Cl. 114—74 R **10 Claims**



1. A self supporting tank for containing low-pressure liquids aboard ships comprising:
eight sides curved in vertical planes and linear in all horizontal planes, four non-adjacent sides of which are dimensionally equal to each other and larger in horizontal dimensions than the other four sides, which are dimensionally equal to each other, each of said eight sides being attached to adjacent sides by conventional methods and all meeting at an apex at their highest points, forming a container with octagonal cross-sections in all horizontal planes; and
a horizontal octagonal flat plate attached to the eight sides thereby truncating the volume, forming a bottom of the tank and completing the enclosure.

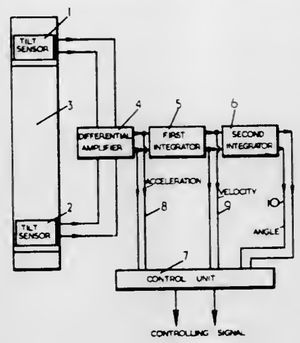
4,095,547

ACCELERATION MEASURING DEVICE

Charles Kenneth Benington, Edinburgh, Scotland, assignor to Brown Brothers & Company, Ltd., Edinburgh, Scotland

Filed Apr. 27, 1976, Ser. No. 680,929
Claims priority, application United Kingdom, May 1, 1975, 18186/75
Int. Cl.[2] B63B *39/00*; G01P *15/08*
U.S. Cl. 114—122 **2 Claims**

1. An angular accelerometer for detecting the angular acceleration of an object about a rotational axis thereof comprising first and second tilt sensors of the torque-balance type oriented in the same direction to be sensitive to accelerations occurring in the direction in which the object rotates, said first and second tilt sensors being spaced from each other in a direction transverse to the direction of rotation of the body and at different distances from the axis of rotation of the object, each of said tilt sensors being capable of providing an output signal containing a component representative of the angular acceleration of the body, a differential amplifier connected to said first and second tilt sensors to receive as inputs thereto the outputs of said tilt sensors and to derive a difference output signal therefrom, a first integrator connected to said differential amplifier so as to be operable to integrate the output signal therefrom to provide an output signal related to instantaneous velocity of the rotating object, and a second integrator connected to said first integrator to receive the output signal



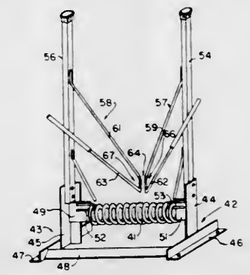
therefrom and to be operable to integrate the output signal from said first integrator to provide an output signal related to the angle of swing of the rotating object.

4,095,548

DOCKING AND MOORING DEVICE

Frank D. Bruner, 10012 Emmet St., Omaha, Nebr. 68134

Filed Oct. 12, 1976, Ser. No. 731,184
Int. Cl.[2] B63B *21/04*; F16G *11/00*
U.S. Cl. 114—230 **6 Claims**



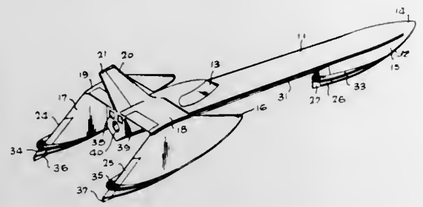
1. A docking and mooring device for use with a throwline having an enlarged end portion, said device comprising:
a semi-rigid catching means adapted to be affixed to a support, said catching means including an elongate horizontally disposed coil member having a first end and second end, said elongate member having a series of convolutions spaced apart, said elongate member being devoid of interior structure to permit the throwline to engage the coil member by falling freely between adjacent convolutions, said convolutions providing a continuous convoluted surface that once engaged by the throwline the enlarged end portion will continuously engage said surface as long as tension is maintained on the throwline, no matter what directional changes are made to the throwline relative to said surface.

4,095,549

HIGH PERFORMANCE WATER VEHICLE

Arthur L. Williams, 11301 Yolanda Ave., Northridge, Calif. 91326

Filed Mar. 14, 1977, Ser. No. 777,169
Int. Cl.² B63B *1/20*
U.S. Cl. 114—283 **17 Claims**



1. A high performance marine vehicle comprising the combination of:
- a central elongated body extending substantially the full length of said vehicle;
- said marine vehicle having a distributed mass so that the center of gravity is well forward of said vehicle's aerodynamic center of lift;
- a frontal float carried on said body at the bow of said marine body and a pair of side floats separated by the aft end of said marine vehicle;
- a wing-like structure cantilevered outwardly from an upper stern portion of said body in spatial relationship to the surface of said water and said side floats downwardly depending from the terminating ends of said wing-like structure;
- hydroski surfaces carried on the underside of each of said floats and being angularly disposed with respect to the surface of the water so that as vehicle speed increases, said marine vehicle will gradually climb upwardly;
- aft rearwardly tapering planing surfaces on each of said hydroski surfaces constituting a reduced wetted area for supporting said marine vehicle at maximum speed and said rearwardly tapered planing surfaces being well aft of the stern of said body;
- propulsion means operably carried in said body for powering said marine vehicle at high speed;
- aerodynamic and hydrodynamic directional control means operably carried on said body and floats respectively; and
- wherein said aerodynamic directional control means includes a vertical stabilizer upwardly projecting from the stern of said body and having a movable rudder thereon and further including said wing-like structures serving as horizontal stabilizers having movable control surfaces thereon.

4,095,550

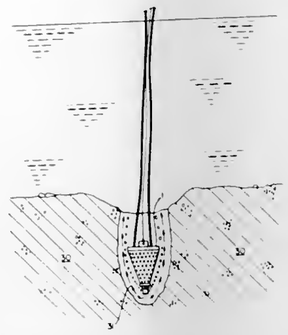
SELF-BURYING ANCHORING DEVICES

Neil Kerr, East Kilbride, Scotland, assignor to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Apr. 12, 1977, Ser. No. 786,935
Claims priority, application United Kingdom, Apr. 21, 1976, 16208/76
Int. Cl.² B63B *21/26*
U.S. Cl. 114—295 **8 Claims**

1. A self burying anchoring device for providing an anchorage in a bed of material, comprising an anchor plate, an anchor body dependent from the anchor plate and tapering to an apex thereof, a liquid supply means, at least one liquid discharge outlet to the exterior of the anchor body for said liquid supply means and situated at said apex, a gas supply means, and at least one gas discharge outlet to the exterior of the anchor body for said gas supply means and situated near to but above said liquid discharge outlet:

whereby in use thereof, a forced liquid flow through the liquid discharge outlet from the liquid supply means, and



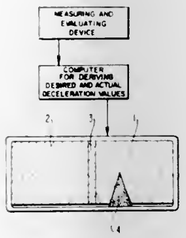
a flow of compressed gas through the gas discharge outlet from the gas supply means, causes bed material to travel upwardly along the exterior of the anchoring device to bury same.

4,095,551

INDICATING ARRANGEMENT FOR A DISTANCE WARNING INSTALLATION IN MOTOR VEHICLES

Jürgen Paul, and Walter Kostelezky, both of Stuttgart, Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Mar. 4, 1977, Ser. No. 774,543
Claims priority, application Germany, Mar. 5, 1976, 2609046
Int. Cl.² G01P *15/00*
U.S. Cl. 116—35 R **9 Claims**



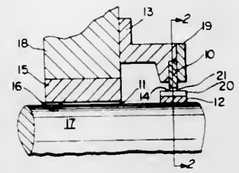
1. An indicating arrangement with an indicating means for a distance warning system in motor vehicles that includes measuring and evaluating means for determining the distance of the vehicle to an obstacle disposed in front thereof and for determining the approach velocity to this obstacle, and means for deriving from the determined values a desired value for the brake deceleration necessary for the avoidance of a collision and an actual value from the actual deceleration values attained during the braking operation, and means for utilizing the desired and actual value for the indication in the indicating arrangement, characterized in that said lastmentioned means includes further means operable to indicate on said indicating arrangement only one of the two values consisting of difference and ratio of desired value and actual value.

4,095,552

DUMMY BEARING FOR BEARING WEAR DETECTION

Hewitt Hsu Fu Lo, 6100 Massachusetts Ave., Washington, D.C. 20016

Filed May 25, 1977, Ser. No. 800,494
Int. Cl.² F16C *41/00*; G01N *3/56*
U.S. Cl. 116—114 Q **10 Claims**



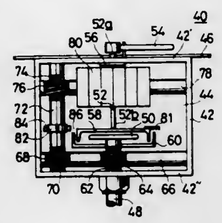
1. A dummy bearing for indicating the state of wear of a bearing journalling a shaft in a support comprising:
- a housing affixed to the bearing support;
- a readily observable annular member positionally secured to said housing and disposed about and proximate said shaft; said annular member being fixed relative to said shaft and proximate said bearing;
- abrading means on said shaft proximate said annular member,
- whereby upon excessive bearing wear, said shaft resultingly rotates in an irregular or eccentric pattern causing said abrading means to wear said annular member so that an indication of the wear of said bearing is provided by visual inspection and measurement of the amount of abrasion of the surface of said annular member.

4,095,553

SPEEDOMETER WITH AN EXCEEDING SPEED WARNING DEVICE

Katsutoshi Ono, No. 3-6-1, Gyotoku-ekimae, Ichikawa City, and Yasumasa Takagi, No. 766-9, Nishi-Motojuku, Higashi-Matsuyama City, both of Japan

Filed Oct. 22, 1976, Ser. No. 734,751
Claims priority, application Japan, Oct. 27, 1975, 50-128347
Int. Cl.² G01P *1/10*
U.S. Cl. 116—116 **11 Claims**



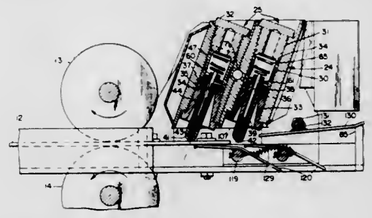
1. A speedometer for measuring rotational speed and for providing a visible warning by pointer vibration when excessive speed is reached comprising:
- a housing;
- a shaft, the speed of which is to be measured, extending through the bottom face of said housing and having a permanent magnet fixed for rotation therewith located within the housing;
- a spindle located essentially spacedly coaxially to said shaft extending through the top face of the housing, said spindle being rotatable against the bias of a spring in response to rotation of said shaft;
- a metal speed cap fixedly attached to said spindle located within the housing and adjacent to said magnet and magnetically connected therewith to produce said spindle rotation;
- a ring member parallelly mounted adjacent to said metal cap provided with a plurality of projections and rotatably driven by said shaft;
- means on said speed cap consecutively contactable with said projections for causing said metal cap to vibrate at a given degree of angular rotation mounted on said cap; and a speed pointer attached to said spindle at the portion extending above the upper face of the housing said vibrations correlated to the location of the speed pointer in response to rotation odf the spindle beyond the predetermined point.

4,095,554

SELF-WIPING, SELF CONTROLLED FLUID DISPENSER APPARATUS

Lenard E. Moen, 7914 Michigan, Whittier, Calif. 90602

Continuation of Ser. No. 584,907, Jun. 9, 1975, abandoned, which is a continuation-in-part of Ser. No. 366,629, Jun. 4, 1973, abandoned. This application Oct. 26, 1976, Ser. No. 735,274
Int. Cl.² B05C *5/02, 11/10*
U.S. Cl. 118—3 **23 Claims**



1. Apparatus for applying a fluid to successive box blanks or the like comprising:
- a framework having longitudinally spaced apart sets of means engagable with opposite sides of a box blank for feeding successive box blanks in a predetemined direction of travel in a predetermine plane;
- a fluid dispenser on said framework, said dispenser movably mounting a rigid nozzle barrel that is normally disposed to intercept said plane, said nozzle barrel being deflectable by the leading edge of a box blank to thereafter bear against one side of the box blank, said nozzle barrel being located longitudinally intermediate an adjacent pair of sets of said longitudinally spaced apart sets of feeding means;
- a support shoe mounted to bear against the opposite side of the box blank at a position longitudinally aligned a predetermined gap distance upstream from said nozzle barrel and against which the box blank reacts, during passage thereover, to hold said nozzle barrel in a deflected position against one side of the box blank,
- a normally closed valve means in said dispenser that is adapted to open upon deflection of said nozzle barrel to pass a fluid through an outlet orifice nozzle thereof to be deposited on one side of the box blank;
- means biasing said nozzle barrel to normal position that yields to permit deflection of said nozzle barrel and opening of said valve means upon engagement of said nozzle barrel by a leading edge of a box blank reacting against said support shoe, said biasing means effecting return of said nozzle barrel to a normal position and of said valve means to normally closed position concurrently with a trailing edge of the box blank leaving said support shoe, whereupon a trailing end portion of the box blank is deflected by said rigid nozzle barrel, whereby said closed nozzle barrel is wiped on the deflected trailing end portion of the box blank for a distance substantially equal to said predetermined distance; and

said dispenser and said support shoe being mounted on a

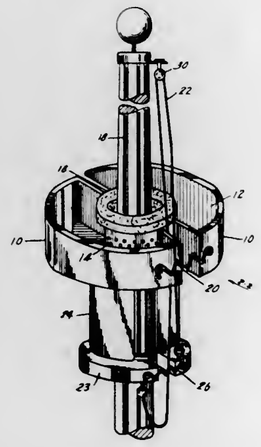
common bracket having means to adjust said predetermined gap distance between said nozzle barrel and said support shoe, whereby to vary the wiping distance of engagement of said nozzle barrel and the deflected trailing end portion of the box blank.

4,095,555

PAINTING DEVICE FOR FLAGPOLES

John Kmetz, 125 W. Third St., Clifton, N.J. 07011

Filed Aug. 25, 1976, Ser. No. 717,549
Int. Cl.² B05C *1/02*
U.S. Cl. 118—208 **2 Claims**



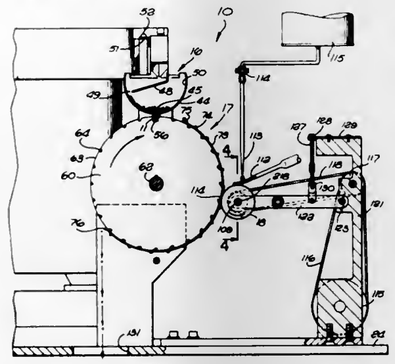
1. An apparatus for painting a pole, comprising:
(a) a sponge adapted to be circumferentially disposed about a flagpole to be painted for painting said pole;
(b) means for containing paint, said means circumferentially and abuttingly disposed about said sponge, said means comprising at least two segmental sections, said sections defining at least one space therebetween, each section including a multiplicity of holes in abuttment to said sponge through which paint may osmotically flow to said sponge;
(c) spring tension means adapted for maintaining an appropriate pressure on said sponge against said pole, said tension means being further adapted to maintain a constant pressure against the pole regardless of changes in diameter which occur at different heights of the pole;
(d) means for supporting and guiding said paint-containing means, said supporting and guiding means circumferentially and abuttingly disposed about said pole below said means for containing paint, said supporting and guiding means comprising at least two segmental sections, said sections defining at least one space therebetween, at least one space of said supporting and guiding means being in substantial alignment with at least one space of said paint containing means;
(e) second spring tension means adapted for maintaining an appropriate pressure of said supporting and guiding means against said pole, said second tension means being further adapted to maintain a constant pressure against the pole regardless of changes in diameter which occur at different heights of the pole and regardless of the texture or configuration of the surface of the pole; and
(f) lanyard means connected to one section of said supporting and guiding means, said lanyard means passing through one space of said supporting and guiding means and one space of said paint containing means, said lanyard means enabling the selectable elevation and de-elevation of the present apparatus regardless of the configuration or texture of the pole.

4,095,556

APPARATUS FOR PAINTING CODING MARKINGS ON ARTICLES

Wayne G. Dawson, 757 3rd St., McFarland, Calif. 93250; Robert A. Kozlowski, Garden Grove, and Paul W. Belber, McFarland, both of Calif., assignors to Wayne G. Dawson, McFarland, Calif.

Filed May 12, 1977, Ser. No. 796,195
Int. Cl.² B05C *1/02, 13/02*
U.S. Cl. 118—230 **11 Claims**



1. Apparatus for painting coding markings on a series of elongated articles, comprising.
a. transporting wheel structure mounted to turn about a predetermined axis and containing circularly spaced notches opening radially outwardly away from said axis and adapted to receive said articles in driving relation to advance them circularly as the structure turns;
means for feeding said articles successively into said notches at a predetermined pick-up location to be advanced circularly thereby to a painting location;
non-rotating retaining means relative to which said wheel structure turns and extending acruately about said axis and said wheel structure radially outwardly of and radially opposite said notches in a relation retaining said articles in said notches as the wheel structure turns relative to said retaining means:
said retaining means having two portions spaced axially apart at said painting location to engage one of said articles near opposite ends thereof while leaving an intermediate portion of the article exposed axially between said two portions of the retaining means; and
painting means located adjacent said transporting wheel structure at said painting location and operable to paint markings on said exposed intermediate portion of the article between said spaced portions of the retaining means.

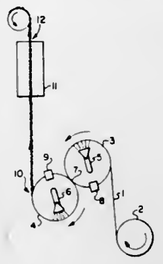
4,095,557

APPARATUS FOR MAKING ELECTRICAL COILS USING PATTERNED DRY RESIN COATED SHEET INSULATION

Edward J. Croop; Howard E. Saunders, both of Pittsburgh, and Dean C. Westervelt, Acme, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 527,458, Nov. 26, 1974, Pat. No. 3,974,302. This application May 4, 1976, Ser. No. 683,118
Int. Cl.² B05B *5/02, 15/04;* B05D *1/06*
U.S. Cl. 118—301 **14 Claims**

1. An apparatus for making a flexible, patterned, porous, adhesive coated substrate comprising:
(A) at least one rotatable perforated hollow cylindrical mask, containing patterned openings, each perforated opening having an area of up to about 1.75 sq. in., where the distance from any part in the perforated area to the nearest perforated area edge does not exceed 2 inches, the mask having electrostatic coating means therein, capable of dispersing dry, heat reactive adhesive resin powder through the patterned openings;
(B) means to pass a flexible substrate next to and in contact relationship with the mask, the substrate being capable of having the resin powder applied thereto through the



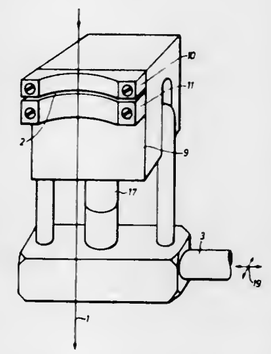
patterned openings in the mask, wherein the coating means is effective to provide between about 10 percent to 90 percent area coating coverage of the substrate with the resin powder, said substrate contacting between about 1/10 to 9/10 of the outside circumference of the mask and;
(C) means to heat the substrate after it has passed next to the mask.

4,095,558

COATING APPARATUS

Konrad Ellegast, Leichlingen; Fritz Feld, Leverkusen; Karlheinz Feltgen, Straberg; Horst Greiner, Cologne; Armin Köhler, Dormagen; Wolfgang Kühn, Leverkusen; Richard Menold, Leverkusen; Heinrich Nassenstein, Leverkusen, and Roland Weisbeck, Odenthal-Voiswinkel, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Continuation of Ser. No. 605,146, Aug. 15, 1975, abandoned, which is a division of Ser. No. 526,411, Nov. 22, 1974, abandoned. This application Aug. 8, 1977, Ser. No. 822,915
Claims priority, application Germany, Nov. 28, 1973, 2359276
Int. Cl.² B05C *3/12, 5/02*
U.S. Cl. 118—420 **2 Claims**



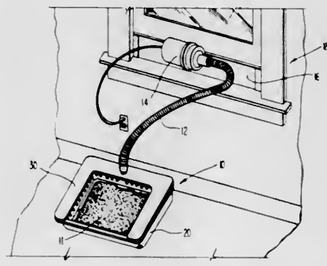
1. An apparatus for applying a liquid preparation to a freshly spun synthetic sliver which passes perpendicularly and in close relationship to a horizontal concave slot disposed in a vertically oriented dispensing surface from which is forced said liquid preparation, the apparatus comprising a liquid storage chamber which is connected to the said slot by an upwardly inclining passageway, the liquid being supplied to the storage chamber by a continuously operated, precisely controlled gear pump, said slot having a height of 0.1–0.3 mm., a depth of 10–40 mm, and a radius of curvature of 20–200 mm., said slot being formed by two parallel prism-shaped solid materials made from the group consisting of sintered ceramic, nitride, carbide, oxide, or abrasion-resistant steel, said storage chamber being fitted with a frit of perfluorinated polyalkylene through which gas is delivered under pressure to produce foaming in said liquid inside said storage chamber, and thereby produce a foamed liquid issuing from said slot for application to said sliver and a curved guide element disposed in parallel with the upper element forming the slot and operatively associated therewith to form a guide for said perpendicularly passing sliver.

4,095,559

VENTILATED LITTER BOX

Loren B. Griffith, 250 Washington Ave., Phoenixville, Pa. 19460

Filed Oct. 27, 1976, Ser. No. 736,038
Int. Cl.² A01K *29/00*
U.S. Cl. 119—1 **6 Claims**



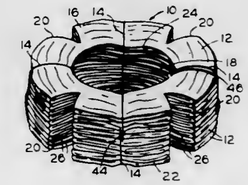
1. Ventilated litter box for pet animals, comprising in combination a traylike open-top portable container having an upwardly extending wall terminating in a top edge, a partial cover therefor adapted to fit onto part of the top edge and to extend part of the way over the container, a skirt extending from the cover downward a distance approaching the depth of the container and extending laterally to the container wall to form an enclosure therewith, the skirt having ventilating openings therein, and the enclosure having an exhaust vent therein for connection to means for exhausting air from the enclosure and thereby drawing air through the litter box and the litter therein.

4,095,560

BALED TIRE PROCESS

Albert F. Laurie, 7239 N. Chase, Portland, Oreg. 97217, and G. W. Bunch, 11775 SW. Warner, Tigard, Oreg. 97223

Division of Ser. No. 574,595, May 5, 1975. This application Mar. 3, 1976, Ser. No. 663,366
Int. Cl.² A01K *61/00;* E02B *3/04*
U.S. Cl. 119—3 **9 Claims**



1. The method of forming an artificial fish reef comprising:
compressing a stack of rubber tires endwise into a compact bale and securing said bale in its compressed condition with a series of ties at spaced intervals around the annular circumference thereof,
slitting said bale lengthwise between said ties with each slit

extending inwardly from the outer circumference of said bale and ending short of the inner circumference of said bale,

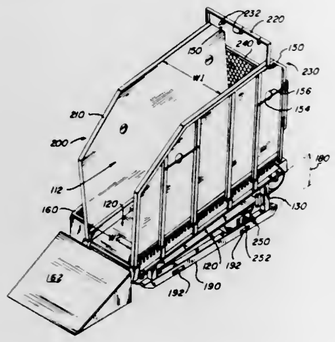
severing all except one of said ties to cause said compressed bale to fan open about said one tie and said tires to radiate from said one tie.

4,095,561

ANIMAL EXERCISING APPARATUS

Roger Ray Ruetenik, Vermilion, Ohio, assignor to Horsey, Inc., Vermilion, Ohio

Filed Mar. 14, 1977, Ser. No. 777,086
Int. Cl.² A01K *15/00*
U.S. Cl. 119—29 **2 Claims**



2. In an exercising apparatus for animals having a moveable exercising surface on the floor of said stall, the front of said surface being fixedly inclined at a predetermined elevation, said apparatus comprising:

a body having upwardly extending side walls, said side walls defining a stall of trapezoidal cross-section, each of said side walls further being angularly oriented to have the width between the upper portions of said stall greater than the width between the lower portions of said stall, said trapezoidal cross-section being greater than the trapezoidal cross-sectional width of said animal,

means operably connected to said exercising surface for imparting movement thereto after said animal is loaded into said stall, said imparting means being further capable of selectively imparting a plurality of speeds to said exercising surface,

a gate pivotally connected to the front end of one of said side walls, said gate conforming to said side wall trapezoidal cross-section being operably latched to said front end of the remaining side wall, said gate being capable of allowing air to circulate from outside of said treadmill into the area between said side walls,

means mounted above said side walls for selectively positioning the head of said animal when said animal is exercising, said positioning means being capable of orienting the head of said animal for a predetermined lead,

means cooperative with said exercising surface for removing material therefrom, and

means cooperative with said removing means for storing said material.

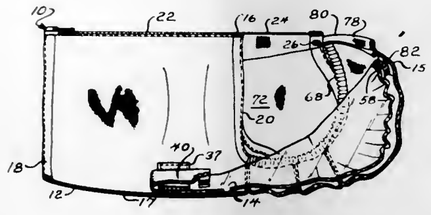
4,095,562

ANIMAL REFUSE CONTAINER

Tessie Graham, 5477 S. Drexel, Chicago, Ill. 60615

Filed Jul. 6, 1976, Ser. No. 702,718
Int. Cl.² A01K *23/00*
U.S. Cl. 119—95 **3 Claims**

1. An animal refuse container comprising: a substantially cylindrical jacket adapted to be positioned about a torso of an animal, said substantially cylindrical jacket having a jacket loop mounted interiorly of said cylindrical jacket along a bottom portion thereof; a flexible disposable receptacle composed of a clear plastic pyramid releasably connected to said jacket loop of the substantially cylindrical jacket, said flexible disposable receptacle having a plurality of walls, each of said walls having a free edge, said flexible disposable receptacle terminating at an apex opposite said free edges, said free edges being adapted for substantially complete contact with said torso of said animal along a perimeter surrounding a pair of termini of an alimentary canal and a urinary system of the animal respectively, said contact between said free edges of said flexible disposable receptacle and said torso of said animal preventing release of an animal waste from said flexible disposable receptacle, said apex being adapted to be moved away from said free edges when animal waste is present in said flexible disposable receptacle to prevent release of said animal waste; and a receptacle cover releasably connected to said cylindrical jacket at an upper rear portion of said cylindrical jacket, said receptacle cover also being connected to said bottom portion of said cylindrical jacket, said receptacle cover being releasably connected to said flexible disposable receptacle opposite said jacket loop to hold said edges of said flexible disposable receptacle in tension against said animal, said receptacle cover being positioned exterior to and contiguous with a portion of the flexible disposable receptacle, said receptacle cover substantially covering said flexible disposable receptacle.

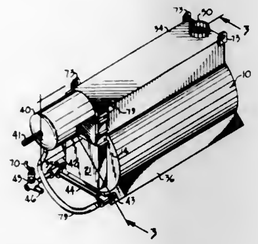


4,095,563

LOW PRESSURE STEAM GENERATOR

John F. Finger, Beresford, S. Dak., assignor to Sioux Steam Cleaner Corporation, Beresford, S. Dak.

Filed Dec. 3, 1976, Ser. No. 747,356
Int. Cl.² F22B *21/30*
U.S. Cl. 122—235 R **11 Claims**



1. In combination:

a coil of tubing closed at both ends and helical about an axis;

a first header outside of and adjacent to said coil and extending parallel to said axis;

first taps connecting said first header to successive turns of said coil;

a pair of further headers outside of and adjacent to said coil and extending parallel to said axis at locations angularly spaced oppositely about said axis from the radius of the helix passing passing through the location of said first header;

and second taps extending from successive turns of said coil to alternate ones of said pair of headers at sites spaced oppositely about said axis by predetermined obtuse angles from the radius of the helix passing through the location of said first header,

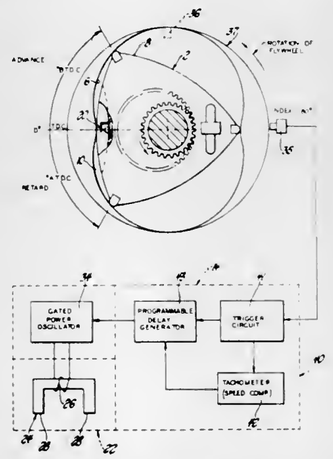
so that each turn of said coil has a connection to said first header, and a connection to only one of said pair of headers, spaced by less than 180° around said axis.

4,095,564

METHOD AND APPARATUS FOR IGNITING AIR-FUEL MIXTURE IN AN ENGINE

Peter A. Hochstein, 14020 Fifteen Mile Rd., Sterling Heights, Mich. 48077

Filed Nov. 5, 1975, Ser. No. 628,950
Int. Cl.² F02B *53/12*
U.S. Cl. 123—211 **20 Claims**



1. An ignition assembly in combination with a rotary piston engine having a triangular piston which has three corners and which rotates within a housing whose internal cross section is epitrochoid in shape, a combustion chamber being formed by first and second corners of the triangular piston and a predetermined portion of the housing, both first and second corners being adjacent the predetermined portion of the housing, said ignition assembly comprising: generating means attached to the housing for generating a magnetic flux, and ignition means attached to the triangular piston and responsive to said generating means when magnetically coupled thereto through said magnetic flux during a predetermined portion of the rotary movement between the triangular piston and the housing while the combustion chamber is formed for providing a spark within the combustion chamber.

4,095,565

METHOD OF OPERATING AN INTERNAL COMBUSTION ENGINE

Masaaki Noguchi, Nagoya; Masaharu Sumiyoshi, Toyota; Yukiyasu Tanaka, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

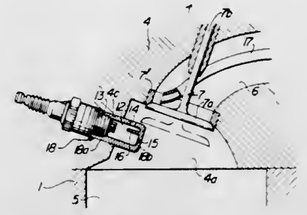
Division of Ser. No. 434,216, Jan. 17, 1974, Pat. No. 3,974,818.
This application Jan. 22, 1976, Ser. No. 651,584
Claims priority, application Japan, Jan. 22, 1973, 48-9748; Feb. 27, 1973, 48-23919; Mar. 8, 1973, 48-27277; Apr. 3, 1973, 48-38467; Oct. 31, 1973, 48-123227
Int. Cl.² F02B *3/00*
U.S. Cl. 123—/32 SP **16 Claims**

1. A method of operating a torch ignition type internal combustion engine having a main combustion chamber, an intake port connected to said main combustion chamber, a trap chamber provided with first and second apertures through which said chamber is communicated with said main combustion chamber, and a spark plug having a set of electrodes exposed to said trap chamber, said method including the steps of:

a. supplying an air-fuel mixture into said main combustion chamber through said intake port during a suction stroke of said engine;

b. introducing a portion of said air-fuel mixture through said first aperture into said trap chamber during said suction stroke of said engine;

c. substituting in said trap chamber said portion of said air-fuel mixture for residual gases produced in said trap



chamber during the preceding combustion stroke of said engine to discharge said residual gases through said second aperture to thereby scavenge said trap chamber;

d. preventing a forced scavenging flow of said portion of said air-fuel mixture within the area of said trap chamber remote from said first and second apertures during the compression stroke of said engine;

e. igniting said air-fuel mixture in said trap chamber to produce a combustion flame therein;

f. spurting said combustion flame in the form of torch jets from said trap chamber into said main combustion chamber through said first and second apertures; and

g. burning, by said torch jets, said air-fuel mixture supplied to said main combustion chamber to produce power therein.

4,095,566

VACUUM TIMING SYSTEM

Clarence D. Fox, Decatur, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed May 27, 1977, Ser. No. 801,175
Int. Cl.² H01H *35/34*
U.S. Cl. 123—41.49 **3 Claims**

1. A vacuum operated timing system for use with an electrical accessory circuit of an internal combustion engine having a variable vacuum source, said system including:

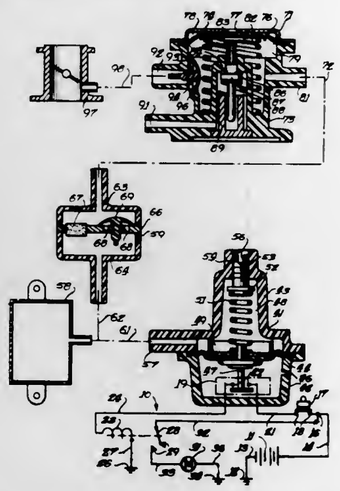
an electrical switch connected in said accessory circuit;

vacuum motor means connected to said switch rendering said switch closed below a first selected level of subatmospheric depression in said motor means;

a flow restrictor communicating with said vacuum motor means;

wherein the improvement comprises a vacuum regulator communicable with ambient atmosphere, with said variable vacuum source and with said vacuum motor means, said regulator including means limiting evacuation of said motor means to a second selected level of subatmospheric depression lower than said first selected level of depression while said engine is operative regardless of variation in the level of said vacuum source, said vacuum regulator further including means arranged for permitting air bleed-

ing of said vacuum motor means through said flow restrictor when said engine is rendered inoperative;



whereby said switch is retained in closed condition for a selected time interval after said engine is rendered inoperative.

4,095,567

CARBURATION DEVICES WITH IDLE ADJUSTMENT

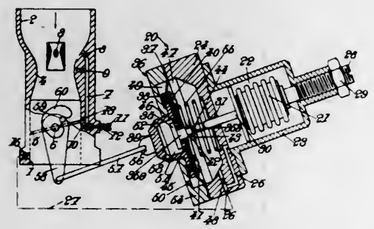
Jacques L. Chenet, Sevres, France, assignor to Societe Industrielle de Brevets et d'Etudes S.I.B.E., France

Filed Jun. 4, 1976, Ser. No. 693,124

Claims priority, application France, Jun. 26, 1975, 75 20163

Int. Cl.[2] F02D *9/08*

U.S. Cl. 123—103 R **9 Claims**



1. A carburation device for internal combustion engine, comprising:

an intake pipe,

an operator operable main throttle member in said intake pipe,

stop means for preventing said throttle member from closing beyond a predetermined minimum opening position by which an air flow cross-section is defined by the throttle member in the intake pipe,

an idling circuit constructed to receive fuel and air and terminating into a part of said intake pipe downstream of said throttle member,

and idling regulator means which includes:

a first pneumatic element having movable wall means,

means for connecting said element to said part of the intake pipe so that the position of the movable wall means is determined by the degree of underpressure in said part of the intake pipe,

a second pneumatic element having force applying wall means drivably connected to said main throttle member via a one-way connection to move said throttle member in the direction of opening,

and valve means carried by the force applying drive wall means arranged to be engaged and actuated by the wall means of said first pneumatic element upon movement of said wall means of said first pneumatic element toward said force applying wall means responsive to increase of said degree of underpressure, said valve means upon actuation thereof modifying the underpressure applied to said force applying wall means whereby the latter is moved in the direction corresponding to a decrease in the minimum degree of opening of said throttle.

4,095,568

ALTITUDE COMPENSATING APPARATUS FOR USE WITH AN INTERNAL COMBUSTION ENGINE

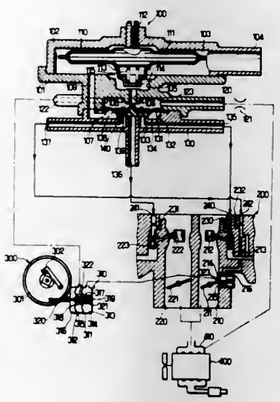
Akira Furukawa, Kariya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Jun. 23, 1976, Ser. No. 699,164

Claims priority, application Japan, Jun. 24, 1975, 50-87356; Jul. 24, 1975, 50-102579

Int. Cl.[2] F02P *5/04, 5/14*

U.S. Cl. 123—117 A **5 Claims**



1. An altitude compensating apparatus for use with an internal combustion engine comprising:

a housing having a first and a second air passage formed therein;

a cover secured to said housing for forming with said housing an atmosphere chamber to be supplied with the atmosphere;

a block secured to said housing;

a deflectable diaphragm interposed between said housing and said block for forming a pressure chamber with said housing and a sub-atmosphere chamber with said housing and a sub-atmosphere chamber with said block;

said pressure chamber and said sub-atmosphere chamber communicating with said atmosphere chamber through said first air passage and said second air passage respectively;

a pressure inlet and a pressure outlet both formed on said housing and communicating with said pressure chamber;

said pressure inlet and outlet being adapted for connection to an intake manifold and a vacuum advancer of a distributor of an engine, respectively;

at least one air outlet formed on said block and communicating with said sub-atmosphere chamber;

said air outlet being disposed for connection to an air bleed of a carburetor of the engine;

said diaphragm having a valve portion normally closing said air outlet;

said valve portion being disposed to open said air outlet with the deflection of said diaphragm when the negative pressure is transmitted in said pressure chamber and acts on said diaphragm;

at least one bellows disposed in said atmosphere chamber for forming therein a chamber to be confined with the air or gas at a predetermined pressure;

said bellows being of the type that expands as the atmospheric pressure decreases; and

a valve connected to said bellows for normally opening said first air passage;

said valve being disposed to close said first air passage by the expansion of said bellows.

4,095,569

INTERNAL COMBUSTION ENGINE WITH AN EXHAUST GAS RECIRCULATING DEVICE

Nobuaki Wakita, and Kiyoshi Yuuki, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 29, 1976, Ser. No. 745,550

Claims priority, application Japan, Oct. 15, 1976, 51-122954

Int. Cl.[2] F02M *25/00*

U.S. Cl. 123—119 A **11 Claims**

1. An internal combustion engine having an intake system, an exhaust system and an exhaust gas recirculating device having an exhaust gas control valve for changing the amount of the exhaust gas recirculated from the exhaust system into the intake system in accordance with the operating condition of the engine, said engine comprising:

a combustion chamber;

a cylinder head positioned over one end of said chamber and having therein a bore which has an inner wall defining an intake port;

an intake valve mounted in said cylinder head for reciprocal movement therein and having a valve head, said valve head having a front surface facing said combustion chamber and a rear surface located opposite said front surface;

obstructing means movable in said intake port for obstructing a part of a mixture stream flowing through the valve opening of said intake valve to create the swirl motion of the mixture containing the recirculated exhaust gas therein in said combustion chamber when the amount of the recirculated exhaust gas is larger than a predetermined level, and;

actuating means responsive to changes in the amount of the recirculated exhaust gas and operatively connected to said obstructing means for actuating said obstructing means to move between an operative position located near said rear surface of the valve head of the intake valve and an inoperative position where said obstructing means does not obstruct the mixture stream flowing in said intake port.

4,095,570

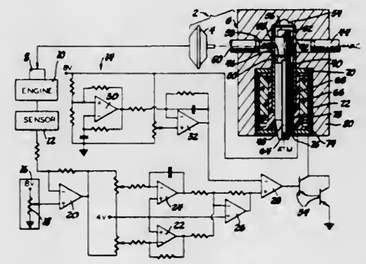
ELECTRONIC ENGINE CONTROL SYSTEM AND METHOD OF OPERATION

Timothy K. Sheffer, Rochester, and Donald D. Stoltman, Henrietta, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 24, 1976, Ser. No. 717,283

Int. Cl.[2] F02B *3/00*; F02M *7/00*; F02B *33/00*

U.S. Cl. 123—119 EC **8 Claims**



1. A system for positioning an engine control element comprising

an actuator including a fluid motor responsive to a regulated pressure for moving said element toward a retracted position upon a decrease in said regulated pressure and toward a projected position upon an increase in said regulated pressure,

said actuator also including a pressure regulator having a port adapted to sense low pressure, a bleed adapted to sense higher pressure, an outlet connected to said motor and combining said pressures to form said regulated pressure, a floating valve member regulating said port and said bleed, said valve member having one end exposed to said higher pressure and an opposite end exposed to a biasing pressure which varies between said low pressure and said regulated pressure and being biased by the difference between said higher pressure and said biasing pressure to close said port and open said bleed, and a coil surrounding said valve member for magnetically biasing said valve member to open said port and close said bleed,

and an electronic control including means for increasing current through said coil to cause said valve member to open said port and close said bleed and thus reduce said regulated pressure when said element must be moved toward said retracted position, for decreasing current through said coil to cause said valve member to close said port and open said bleed and thus increase said regulated pressure when said element must be moved toward said projected position, and for maintaining sufficient current through said coil to balance the magnetic bias on said valve member with the pressure bias on said valve member and cause said valve member to close both said port and said bleed when said element must remain stationary.

4,095,571

FILTERING AND MIXING APPARATUS

Willard Eugene Fleetwood, Seymour, and Ronald Dean Boyd, North Vernon, both of Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Aug. 16, 1976, Ser. No. 714,945

Int. Cl.[2] F02M *59/00*; F02B *3/00*

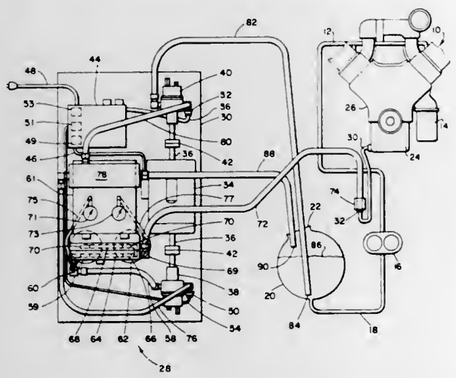
U.S. Cl. 123—136 **8 Claims**

1. Apparatus for addition of liquid lubricating oil to liquid fuel oil used by an internal combustion engine, said apparatus comprising:

first conduit means having one end extendable to a supply of lubricating oil;

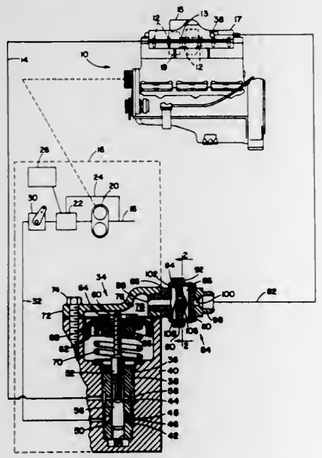
first pump means for pumping lubricating oil through conduit means,

filter means interposed in said first conduit means for filtering contaminates from said lubricating oil;
second pump means for pumping fuel oil;
means defining a mixing chamber having inlets connected to receive the output of said first and second pump means for mixing said lubricating oil with said fuel oil, said mixing chamber means having means defining orifices in said inlets for producing a substantial pressure differential



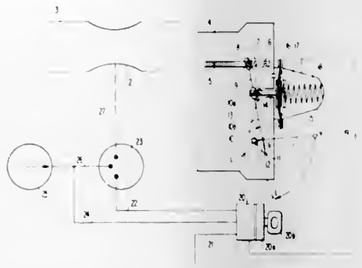
between the output of said pumps and said mixing means to increase the velocity of said liquids, said orifices oriented to discharge said liquids into said chamber in a direction promoting substantial mixing with one another; and
conduit means connected to said mixing means downstream of said orifices for discharging the output thereof to a tank of fuel oil for use by said engine.

4,095,572
FUEL SYSTEM FOR COMPRESSION IGNITION ENGINE
Robert L. Scholtz, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.
Filed Aug. 18, 1976, Ser. No. 715,604
Int. Cl.² F02M *5/10*
U.S. Cl. 123—140 MP **5 Claims**



1. Apparatus comprising:
an air breathing internal combustion engine having an intake manifold and a compressor for delivering air to said intake manifold at a pressure level generally increasing as a direct function of increasing engine power level;
means for delivering fuel to said engine at a pressure level which increases as a direct function of increasing engine rpm and increasing operator demand;
pressure modulating means connected between said fuel delivery means and said engine having a cavity responsive to a pressure signal for varying the pressure level of fuel from said fuel delivery means as a direct function of the level of said pressure signal;
conduit means connecting said pressure varying means to the pressure existing in said intake manifold; and
means for forming an orifice in series flow relation to said conduit means and means forming a housing between said orifice and said cavity, said housing means and said cavity forming a chamber for producing a delay of transient increases in pressure signals from said manifold to said pressure varying means, thereby delaying the increase in fuel rate to said engine.

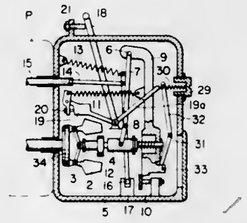
4,095,573
ARRANGEMENT FOR CONTROLLING THE INJECTION QUANTITY OF AN INJECTION INTERNAL COMBUSTION ENGINE
Karl Kollmann, Leonberg, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany
Filed Sep. 13, 1976, Ser. No. 723,033
Claims priority, application Germany, Sep. 13, 1975, 2540986
Int. Cl.² F02D *1/04*
U.S. Cl. 123—140 MP **19 Claims**



1. An arrangement for the control of the injection quantity of an injection internal combustion engine, comprising a suction pipe, a fuel injection pump being connected to the suction pipe and having an adjusting means for adjusting the feed-quantity of the fuel, a pneumatic measuring means including a diaphragm means and a longitudinally displaceable diaphragm-bolt operatively connected with said diaphragm means, means including a control lever means for adjusting the adjusting means of the fuel pump by said diaphragm-bolt, said diaphragm means being acted upon on one side substantially by the outside air pressure and partially delimiting on the other side a vacuum chamber formed in said measuring means, idling spring means in said vacuum chamber urging the diaphragm means and therewith the diaphragm - bolt outwardly in the direction toward an increase of the feed quantity, and vacuum chamber being in communication by way of a vacuum line means with a part of the suction pipe, an outward member for the internal combustion engine, the pivot point of the control lever means being additionally adjustable within the pivot plane of the control lever means at least indirectly by said output control member, characterized in that the suction pipe includes a non-throttlable Venturi section, the control lever means is supported at a pivot point with its end opposite said adjusting means on an actuating member operatively connected with said output control member, said diaphragm-bolt engaging said control lever means in its central area to retract said diaphragm-bolt inwardly with an increasing vacuum in said vacuum chamber and therewith displace said adjusting means to smaller injection quantities by pivoting the control lever means about its pivot point on said actuating member, and said control lever means being adjustable at said pivot

point with an increasing output adjustment of said output control member substantially in the same direction as the diaphragm-bolt movement with an increasing vacuum in said vacuum chamber.

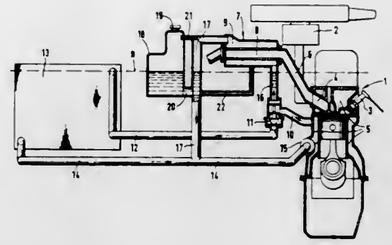
4,095,574
MECHANICAL GOVERNOR FOR INTERNAL COMBUSTION ENGINE
Masao Yoshino, and Koichi Mori, both of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan
Filed Dec. 13, 1976, Ser. No. 750,321
Claims priority, application Japan, Dec. 15, 1975, 50-168144[U]
Int. Cl.² F02D *1/04*
U.S. Cl. 123—140 R **3 Claims**



1. In a mechanical governor for an internal combustion engine including centrifugal expansion means driven by the engine, a shifter axially movable by the expansion means in a first direction, a pivoted, spring biased tension lever for urging the shifter in a second, opposite direction, speed control means for adjusting the spring tension, a fuel supply control rod, and mechanical linkage means coupling the control rod to the shifter for movement therewith, an improved torque control mechanism characterized by:
(a) a pivoted torque lever,
(b) an adjustable torque spring,
(c) stop means on the tension lever engageable with the torque lever, and
(d) an extension arm rigidly secured to the speed control means for camming the torque lever against the torque spring and out of engagement with the stop means at partial speed settings, whereby the torque control mechanism is disengaged from the governor and disabled at partial speed settings, but is released from the extension arm and acts against the tension lever biasing at full speed settings when the engine speed drops below a predetermined level.

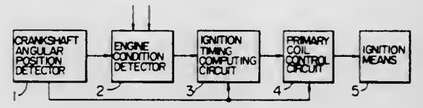
4,095,575
INTERNAL COMBUSTION ENGINE
Leitermann Wulf, Bad Wimpfen, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Germany
Filed Jun. 30, 1976, Ser. No. 701,179
Claims priority, application Germany, Jul. 2, 1975, 2529376
Int. Cl.² F02M *31/00, 17/00*
U.S. Cl. 123—142.5 R **2 Claims**

1. An internal combustion engine having a cooling liquid circuit comprising a cooling jacket, a radiator and supply and return pipes between the cooling jacket and the radiator, a heat exchanger traversed by an exhaust gas pipe, the heat exchanger being mounted above the liquid level of the circuit, a supply connection connecting said heat exchanger to said supply pipe, a return connection connecting the upper part of said heat exchanger to said return pipe, a drain connecting the lowest point of the heat exchanger to said circuit, and a thermostat valve for controlling the flow of liquid from said supply pipe to said heat exchanger and radiator in such way that when a predetermined temperature of the liquid is reached the supply



pipe is cut off from the heat exchanger and connected solely to said radiator.

4,095,576
DWELL TIME CONTROL SYSTEM
Tadashi Hattori; Minoru Nishida, and Yoshiki Ueno, all of Okazaki, Japan, assignors to Nippon Soken, Inc., Nishio, Japan
Filed Sep. 28, 1976, Ser. No. 727,534
Claims priority, application Japan, Oct. 2, 1975, 50-119114
Int. Cl.² F02P *9/00*
U.S. Cl. 123—148 E **16 Claims**



1. A dwell time control system for use in combination with an internal combustion engine which is provided with an ignition coil having primary and secondary windings, ignition timing control means for producing an ignition timing signal at a time instant corresponding to at least one of operating parameters of said engine, and spark means connected to said ignition coil for sparking in response to an induced voltage of said secondary winding, said control system comprising:
crankshaft angular position detecting means disposed to detect first and second predetermined angular positions of a crankshaft of said engine for producing first and second crankshaft angular position signals, said first crankshaft angular position being located in an advanced position in relation to said second crankshaft angular position in the direction of rotation of said crankshaft;
a charge and discharge current control circuit connected to said crankshaft angular position detecting means and said ignition timing control means and including capacitor means for controlling dwell time, said charge and discharge current control circuit being responsive to said second crankshaft angular position signal to start charging of said dwell time controlling capacitor means, said control circuit being responsive to said ignition timing signal produced from said ignition timing control means in response to said first and second crankshaft angular position signals to terminate the charging of said capacitor means, said control circuit being responsive to the next first angular position signal produced after the generation of said ignition timing signal to start discharging of said capacitor means; and
an ignition coil energization control circuit connected to said ignition timing control means, said charge and discharge current control circuit and said ignition coil and responsive to said ignition timing signal to interrupt the flow of current in the primary winding of said ignition coil and to cause said spark means to spark, said ignition coil

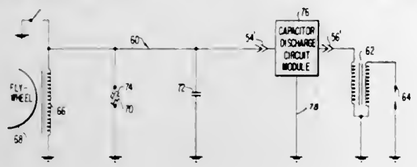
energization control circuit starting the flow of current in the primary winding of said ignition coil when the voltage across said discharging capacitor means decreases to a predetermined value.

4,095,577

CAPACITOR DISCHARGE IGNITION METHOD AND APPARATUS

Harold E. Anderson, 46267 Chuckwagon Rd., Squaw Valley, Calif. 93646

Filed Mar. 2, 1976, Ser. No. 663,201
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 CC **16 Claims**



8. In an ignition system for an internal combusion engine including a high voltage transformer coupled to a gap ionization discharge device and connected to a magneto coil in which an electrical signal is induced by engine responsive rotation of a magnetic member through flux cutting proximity therewith, and including contact breaker points for intermittently grounding the electrical signal from the magneto coil, a method of converting the system to a capacitor discharge ignition system:

(a) circumventing the operation of the contact breaker points;

(b) disconnecting the high voltage transformer from the magneto coil; and,

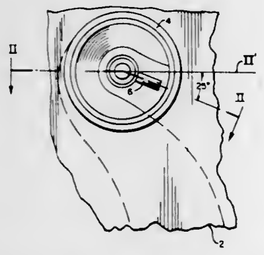
(c) connecting a capacitor discharge circuit including a capacitor which is charged by by an electrical potential of a first polarity induced in the magneto coil, and an electronic switch, responsive to a drop from a peak in the electrical potential of opposite polarity from said first polarity induced in said magneto coil, in circuit between the high voltage transformer and the magneto coil.

4,095,578

INDUCTION CONDUITS OF INTERNAL COMBUSTION ENGINES

Giuseppe Allara, Nichelino (Turin), and Giorgio Marchetti, Regina Margherita-Collegno (Turin), both of Italy, assignors to Fiat Societa per Azioni, Turin, Italy

Filed Aug. 31, 1976, Ser. No. 719,291
Claims priority, application Italy, Dec. 24, 1975, 70183 A/75
Int. Cl.² F01L *3/00*
U.S. Cl. 123—188 M **2 Claims**



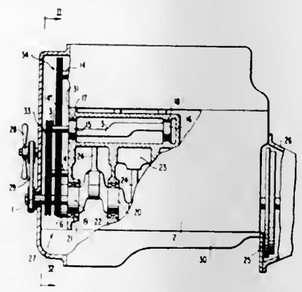
1. In a cylinder head for an internal combustion engine including a valve seat, a valve guide and a valve cooperating with the valve guide and valve seat, an induction conduit terminating in the valve seat and including, in the wall of the induction conduit intermediate the valve guide and the valve seat, an appendage projecting into the interior of the conduit and disposed in the radial plane with respect to the longitudinal axis of the valve, said radial plane being inclined at an angle of between 0° and 45° to the transverse axis of the valve parallel to the axis of the engine shaft and the appendage, in plan view having a rectangular cross sectional shape, being delimited laterally by a first surface substantially parallel to said longitudinal axis of the valve and delimited at its end facing the valve seat by a second surface substantially orthogonal to the first, the said second surface being machinable for the selective removal of material to control the degree of turbulence caused by the appendage in the air flowing through the conduit in use thereof.

4,095,579

ENGINE BALANCER DRIVING MECHANISM

Seizo Iwasa, Kyoto, and Kazuo Onoue, Kameoka, both of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1975, Ser. No. 645,102
Claims priority, application Japan, Dec. 26, 1974, 49-3582
Int. Cl.² F02B *75/06;* **F16H** *7/00*
U.S. Cl. 123—192 B **2 Claims**



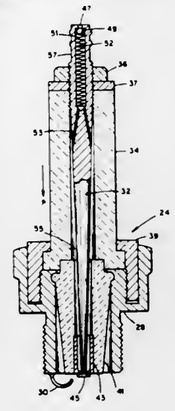
1. A four cylinder in-line engine comprising a front wall, a crank-shaft, at least one auxiliary mechanism, a balancer driving mechanism of the type which includes at least one pair of balancer shafts disposed at desired spacings on the opposite sides of the plane including longitudinal axes of said cylinders and substantially in parallel with said crank-shaft axis, said balancer shafts being rotated in the opposite directions to each other at twice the rotational rate of the crank-shaft of the engine, and one of said balancer shafts which is disposed at the lower side of said longitudinal cylinder axes being rotated in the opposite direction to the crank-shaft, a plurality of rotating means mounted, respectively, on a driving shaft of said auxiliary mechanism, on said crank-shaft, and on the balancer shafts, and endless drive means engaging all of said rotating means, and wherein said rotating means mounted on one of the balancer shafts is in engagement with the inner periphery of said endless drive means, and said rotating means mounted on the other of said balancer shafts, is in engagement with the outer periphery of said endless drive means, said engine further comprising a cam-shaft, a rotating means mounted on said cam-shaft and a cam-shaft driving mechanism, said cam-shaft driving mechanism being driven by said crank-shaft and being located in a space between the front wall of the engine and said balancer driving mechanism, said cam-shaft driving mechanism and the front wall of said engine defining a dead space therebetween and said auxiliary mechanism of said engine being located in said dead space.

4,095,580

PULSE-ACTUATED FUEL-INJECTION SPARK PLUG

Ian Murray, and Clement A. Tatro, both of Livermore, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 22, 1976, Ser. No. 734,918
Int. Cl.² F02D *3/00*
U.S. Cl. 123—32 SJ **6 Claims**



1. A spark plug responsive to an ignition pulse for injecting fuel into the combustion chamber of a reciprocating internal combustion engine and for igniting the injected fuel, including:

fuel storage means;

means for receiving fuel for passage to said storage means;

means for receiving an ignition pulse; and

means responsive solely to an ignition pulse applied to said pulse receiving means for injecting fuel from said fuel storage means into the combustion chamber and for igniting the injected fuel, said responsive means comprising:

first and second electrodes;

a piezoelectric material electrically connected between said electrodes and defining with said first electrode said storage means; and

means for normally blocking the flow of fuel from said storage means,

said piezoelectric material being responsive to a pulse applied across said electrodes to deform and thereby cause a pressure buildup in said storage means and to cause said blocking means to open for injection of the fuel in said storage means into the combustion chamber, and

said first electrode being centrally located within said storage means and having an upper end as an element of said fuel receiving means and a lower end as an element of said blocking means.

4,095,581

FIREPLACE CONSTRUCTION

Thomas F. Billmeyer, and Francis L. Faehling, both of Wisconsin Rapids, Wis., assignors to Preway Inc., Wisconsin Rapids, Wis.

Filed Aug. 14, 1975, Ser. No. 604,613
Int. Cl.² F24B *7/00*
U.S. Cl. 126—121 **1 Claim**

1. In a fireplace construction adapted to be housed in a structure, the combination of:

a sheet metal firebox having an open side, two opposite side walls adjacent said open side and a combustion gas outlet adapted to be in fluid communication with a flue, each side wall having an opening formed therein;

a door for substantially sealing said open side;

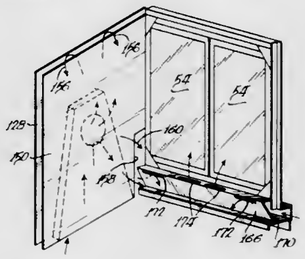
a sheet metal housing at least partially surrounding said firebox in close proximity hereto;

a relatively low inlet in said housing through which air in a structure housing said fireplace may enter said housing;

a relatively high outlet in said housing through which air in said housing may exit the housing to re-enter the structure housing the fireplace;

said housing, inlet and outlet defining a first air flow path for circulating air;

a pair of conduits each in fluid communication through an opening with the interior of said firebox for establishing second and third air flow paths extending through and isolated from said first air flow path, said conduits extending from a point adapted to be located exteriorly of the structure housing the fireplace to its respective opening in each side wall of said firebox to provide a source of combustion air from a location exterior of the structure housing the fireplace;



a pair of spaced apart vertical sheet metal baffles located within said firebox one spaced from each side wall, each opening being in communication respectively with the space defined between each baffle and side wall, each baffle including a cutout adjacent said open side near the lower extremity thereof and an upper end spaced from the top of said firebox to permit combustion air to pass thereover; and

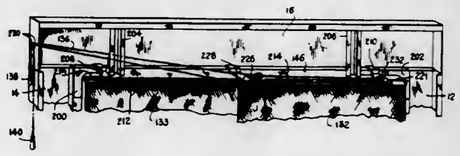
a baffle structure disposed across the lower forward end of said firebox between said baffles, said baffle structure having oppositely disposed open ends and defining passageways for directing air upwardly across the door and downwardly across the bottom of said firebox, the cutouts of said baffles being generally aligned with said open ends of said baffle structure so that combustion air is delivered into said open ends.

4,095,582

FIREPLACE ENCLOSURE

Harrison F. Edwards, Norwich, N.Y., assignor to Bennett-Ireland, Inc., Norwich, N.Y.

Division of Ser. No. 648,387, Jan. 12, 1976, Pat. No. 4,027,650.
This application Nov. 19, 1976, Ser. No. 743,230
Int. Cl.² F24C *15/02*
U.S. Cl. 126—140 **4 Claims**



1. A fireplace enclosure, comprising in combination:

(a) a frame having substantially vertical side members and substantially horizontal top and bottom members extending and respectively connected to the side members,

(b) two curtain rods disposed substantially in alignment, with adjoining ends in overlapping relation, supported by the frame at the rear upper portion thereof.

(c) two collapsible wire mesh screens respectively carried by

and slidable along said curtain rods between open positions providing access to the fireplace and closed positions where adjoining portions overlap,

(d) a pulley device carried by the frame at one side thereof,

(e) a pull-chain connected with the overlapping ends respectively of the wire mesh screens and having a portion going around said pulley device, the ends of the chain being accessible at one side of the frame to enable it to be pulled for the purpose of opening and closing the mesh screens, and

(f) chain guide means located at the overlapping portions of the rods, providing a single loop through which the chain passes, whereby the latter is continuously supported at the center of the frame,

(g) said curtain rods being constituted as a single continuous piece of material having bent portions constituting the loop of the guide means.

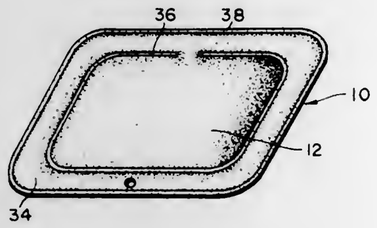
(h) oppositely moving portions of said pull-chain engaging and being supported by oppositely located portions of said loop as the chain is operated.

4,095,583

SELF-CONTAINED WARMING PAD

Russell H. Petersen, Sturtevant; Edmund A. Weaver, Racine, both of Wis., and Frederick P. Kober, Bayside, N.Y., assignors to Chem-E-Watt Corporation, Racine, Wis.

Filed Nov. 19, 1976, Ser. No. 743,437
Int. Cl.[2] F24J *1/04*
U.S. Cl. 126—263 **41 Claims**



1. A self-contained warming pad comprising:

a heating element;

a dose of activating liquid adjacent to said element and separate therefrom;

a frangible container containing said liquid; and

a substantially liquid-impervious covering layer means to enclose said element and said container, said layer means defining at least one tortuous air passage therethrough, whereby said layer means serves both to promote sustained production of heat and to prevent liquid from exiting the pad.

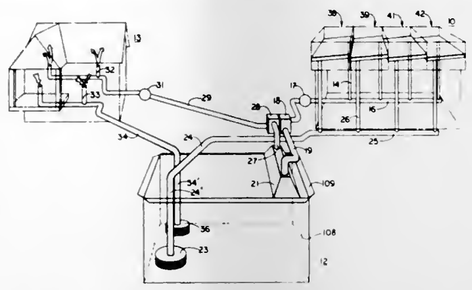
4,095,584

SOLAR HEATING SYSTEM

Othmar W. Pies, 7041 Vine St., Cincinnati, Ohio 45216

Filed Jul. 14, 1976, Ser. No. 705,079
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—270 **4 Claims**

1. A solar heating system which comprises a heat accumulating structure having a roof including a backing panel, a corrugated metal panel mounted on and overlying the backing panel to form air heating channels between the backing panel and the metal panel, end portions of the metal panel projecting beyond ends of the backing panel, transverse header channels formed under the end portions of the metal panel and in communication with the air heating channels, gasket means for closing ends of the air heating channels outboard of the transverse channels, the gasket means including a block of resilient material having an upper face conforming to and engaging the underside of the metal panel to form a seal therewith to close ends of the air heating channels, means for forming a seal between each block and an associated one of the transverse channels, means for directing air into one of the transverse header channels to be directed along the air heating channels into the other of the transverse header channels so that the air is heated when the sun shines on the metal panel, a heat storage chamber formed in a pit in the ground, the heat storage chamber including an air impervious membrane lining a bottom and side walls of the pit, rocks mounted inside and filling the pit, a concrete slab overlying the rocks and upper edge portions of the membrane, and means for directing heated air from the other transverse channel through the chamber to heat the rocks.

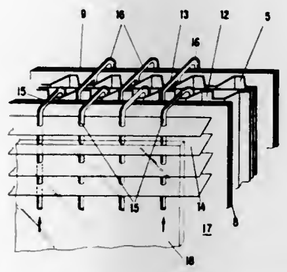


4,095,585

SOLAR ENERGY COLLECTOR WITH ON SITE STORAGE

Bernard Oquidam, Bourg de Peage, France, assignor to Compagnie pour l'Etude et la Realisation de Combustibles Atomiques, Paris, France

Filed Dec. 14, 1976, Ser. No. 750,373
Claims priority, application France, Dec. 30, 1975, 75 40429
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **9 Claims**



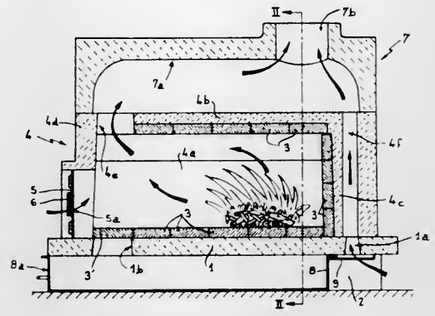
1. In a solar energy collector with on site storage constituted of a glass partition and a storage unit separated by a free space enclosing at least one solar heat absorbing element; the storage unit comprising first and second insulating panels which are essentially parallel and, between these panels, a structure formed of two corrugated walls having a part of their surfaces in contact with each other and joined at this part of their surfaces, the assembly of panels and structure defining at least three separate volumes; a first volume between the first panel and the opposite corrugated wall, a second volume between the two corrugated walls, and a third volume between the second panel and the second corrugated wall, at least one of these volumes being in fluid communication with the free space between the partition and the storage unit and constituting with it a primary circuit, and at least one other of these volumes being in fluid communication with a user and constituting with it a secondary unit.

4,095,586

BREAD OVEN

Guy Selva, Lyon, France, assignor to F.M.I.B. —Selva Papin et Eugene Selva Reunis, Lyon, France

Filed Sep. 1, 1976, Ser. No. 719,528
Claims priority, application France, Nov. 21, 1975, 75 36414
Int. Cl.[2] F21B *1/02*
U.S. Cl. 126—273 R **4 Claims**



1. In an oven comprising a horizontally elongated hollow refractory lined body including a base, a roof, a first end and a second end, with said first end having an air inlet aperture and with said roof being formed with a fume vent, wherein said fume vent is disposed adjacent said first end of said body in such manner that when a solid fuel is disposed on the base of said body adjacent the second end thereof, the inlet air flows along the base of said body while the flames and hot gases flow along the roof to uniformly heat same, wherein a portion of the base is selectively removable to define a first aperture in the base, and wherein the oven further comprises support means for supporting the refractory lined body, an ash pan disposed under a portion of said support means, a second aperture defined in said portion of the support means in alignment with said first aperture to allow cinders and embers from said fuel to be transferred from said body into said ash pan, a counter-draft passage formed in said second end of said body, an inlet opening defined in said support means adjacent said second end of said body in alignment with said counter-draft passage, said ash pan having first and second substantially vertical end walls with said second end wall being situated in the vicinity of said second end of said body and with said first end wall being formed with an air inlet aperture, and said ash pan being slidable longitudinally of said body between a first position in which said inlet opening of said counter-draft passage is free of said ash pan and said counter-draft passage communicates with the outer atmosphere and a second position in which said ash pan is located below said inlet opening and said counter-draft passage communicates with the inside of said ash pan to promote combustion of the embers therewithin.

4,095,587

HEALTHY MAGNETIC ORNAMENT

Mutsuo Ishikawa, Tokyo, Japan, assignor to TDK Electronics Co., Ltd., Tokyo, Japan

Filed Apr. 22, 1976, Ser. No. 679,489
Claims priority, application Japan, Dec. 22, 1975, 50-173306[U]
Int. Cl.[2] A61N *1/42*
U.S. Cl. 128—1.3 **3 Claims**

1. A magnetic ornament for use in the promotion of good health and for personal adornment, said ornament comprising at least one capsule, having end faces, of a non-magnetic metal having a corrosion resistant surface, said capsule having a first axis through the end faces thereof, said capsule having a hollow interior; at least one chain of a non-magnetic, corrosion-resistant metal, said chain being linked to the end faces of said capsule; and at least one piece of a rare earth cobalt permanent magnet completely enclosed within the hollow interior of said capsule, said permanent magnet having a peripheral surface and two end faces wherein at least one pair of diametrically opposed poles are formed on said peripheral surface, said magnet having a first axis passing through said end faces,

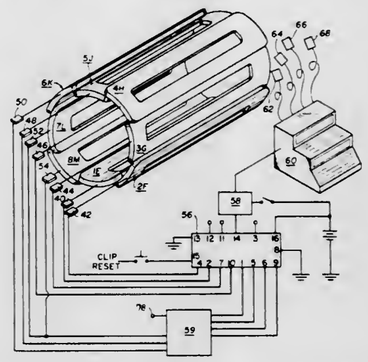
parallel to the first axis of said capsule, and a second axis passing through said pair of diametrically opposed poles, wherein said first axis of said magnet is perpendicular to said second axis and lies in the plane of said ornament which said ornament is lying in a flat plane.

4,095,588

VASCULAR CLEANSING

Joseph Goldman, 8 MacIntosh La., Monsey, N.Y. 10252; Guy Adams, 5 Briarwood Ave., Monroe, N.Y. 10950, and Shirley Goldman, 8 MacIntosh La., Monsey, N.Y. 10252

Filed Jul. 19, 1976, Ser. No. 706,905
Int. Cl.[2] A61B *17/00*
U.S. Cl. 128—1.5 **8 Claims**



2. A method of cleansing a vascular system of a person said method including the following steps:

resting the person on a table;

placing the table in an environment where the effects of the earth's magnetic field are minimized;

orienting a plurality of separate coils to have two connected in series on diametrically opposite sides of and about the table to have a coil on top and a coil on bottom as one pair and a coil on the left and a coil on the right as another pair thereby encircling an axis passing through the person in the environment aforesaid; and

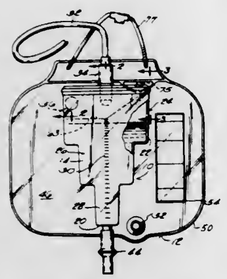
conducting current of a variable frequency and amplitude through one pair and thence the another pair in one direction and thereafter conducting current in another direction in the one pair and thence the another pair to create an electromagnetic field about one pair and then the another pair of coils, at least, so as to oscillate and rotate red corpuslces in the vascular system to contact and thereby scrub the walls of the system with debris loosened being carried away by flow of the system.

4,095,589

COMBINATION URINE METER AND DRAINAGE RECEPTACLE

James G. Manschot, Mukwonago; Byron L. Mather, and Larry A. Salvadori, both of Milwaukee, all of Wis., assignors to Plastronics, Inc., Milwaukee, Wis.

Filed May 20, 1975, Ser. No. 573,853
Int. Cl.² A61B *19/00*
U.S. Cl. 128—2 F **14 Claims**



1. A combination urine meter and drainage receptacle comprising:

a liquid meter of semi-rigid material having at least one volume calibrated chamber and an inlet opening through which liquid may be introduced into the interior thereof, said meter having an upper portion in which said inlet opening is located and a lower portion in which said liquid can accumulate;

a liquid drainage receptacle in the form of a bag made of flexible material, said bag having an upper portion positioned adjacent said meter upper portion; and

a liquid communication means for said meter and drainage receptacle comprising a liquid conduit extending from the upper portion of said meter to the upper portion of said drainage receptacle, said liquid communication means adapted to permit relative movement of said meter with respect to said drainage receptacle to thereby facilitate drainage of liquid from the interior of the meter through said liquid conduit and into said drainage receptacle by simply tilting said meter with respect to said drainage receptacle, said liquid communication means including a semi-rigid tubular assembly fastened at one end to said meter and fastened at its other end to said liquid drainage receptacle, said semi-rigid tubular assembly comprised of a tubular fitting having a flange sealed to one wall of said liquid drainage receptacle, said tubular fitting having a pair of concentrically spaced circular walls providing a groove therebetween, said tubular assembly further including a collar formed integrally with one wall of said meter, said collar being sealed in said groove by said tubular fitting to thereby provide a fluid tight liquid conduit between said meter and said receptacle.

4,095,590

EXTERNAL CARDIAC RESUSCITATION AID

Roy Major Harrigan, Bromley Mountain Rd., Manchester, Vt. 05254

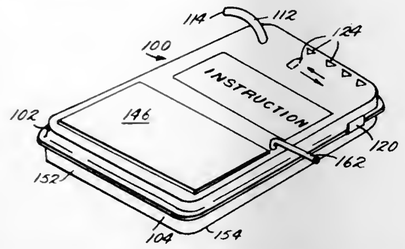
Continuation-in-part of Ser. No. 609,109, Aug. 29, 1975, which is a continuation-in-part of Ser. No. 541,762, Jan. 17, 1975, abandoned. This application May 20, 1976, Ser. No. 688,348
Int. Cl.² A61H *1/00*
U.S. Cl. 128—24 R **15 Claims**

1. Apparatus for use in administering cardiopulmonary resuscitation to a human patient or for use as a training aid in the application of cardiopulmonary resuscitation, comprising:

means for receiving manually applied forces;

means in operative relationship with said receiving means for sensing said forces;

means in operative relationship with said sensing means for indicating said forces; and



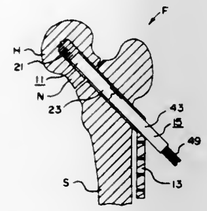
a rigid member in operative relationship with said force receiving means for enabling substantially even distribution of said forces over a predetermined area.

4,095,591

COMPRESSION SCREW SYSTEM

Charles M. Graham, Jr., and Thomas L. Craig, both of Memphis, Tenn., assignors to Richards Manufacturing Co., Inc., Memphis, Tenn.

Filed Jan. 27, 1977, Ser. No. 763,031
Int. Cl.² A61B *17/18*; A61F *5/04*
U.S. Cl. 128—92 BB **10 Claims**



4. A system for applying compression to a fractured bone, said system comprising:

(a) a lag screw for being anchored to the bone on one side of the fracture, said lag screw including a first end for being selectively anchored to the bone and including a second end;

(b) compression plate means for being selectively attached to said second end of said lag screw and to the bone on the other side of the fracture to allow compression to be applied between said lag screw and said compression plate means to aid in the healing of the fracture in the bone, said compression plate means including a barrel member having an aperture therethrough for passing over said second end of said lag screw, said compression plate means including means for nonrotatably attaching said barrel member to said lag screw, said compression plate means including a body member for being fixedly attached to the bone; and

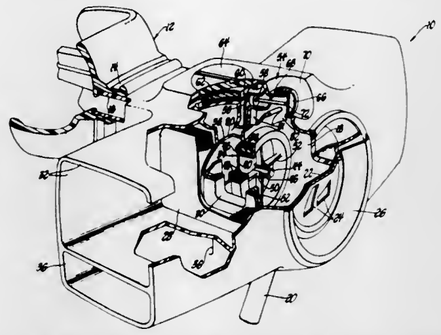
(c) barrel guide means for guiding said barrel member of said compression plate means onto said second end of said lag screw, said barrel guide means including an extension member for attachment to said second end of said lag screw, said extension member being of sufficient length so as to extend outward of the bone when attached to said lag screw and when said lag screw is anchored to the bone, said extension member having the same outer circumference as said second end of said lag screw so that said barrel portion of said compression plate means will pass thereover and will be aligned with said second end of said lag screw when passed over said extension member.

4,095,592

DOUBLE BREATH DIVERS VALVE

John B. Delphia, 1021 Schuyler St., Milford, Mich. 48042

Filed Dec. 27, 1976, Ser. No. 754,166
Int. Cl.² A62B *7/00*
U.S. Cl. 128—142 R **10 Claims**



1. A breathing assembly of the type used for underwater diving and comprising; breathing chamber means for storing breathing gas, fresh gas supply means for feeding fresh breathing gas into said breathing chamber means to replace breathing gas that has been consumed and exhausted to the ambient medium, breathing passage means for conveying breathing gas from said breathing chamber means to a consumer and returning consumed gas to said breathing chamber means, and a normally-opened exhaust valve means in communication with said breathing chamber means for exhausting breathing gas from said breathing chamber means to the ambient medium in response to each breathing cycle, and including control means operable upon said exhaust valve means for allowing said exhaust valve means to open only in response to the occurrence of a plurality of breathing cycles while allowing said valve means to open during each breathing cycle only upon the inoperation of said control means.

4,095,593

COOLING SYSTEM FOR REMOVING METABOLIC HEAT FROM AN HERMETICALLY SEALED SPACESUIT

Bruce W. Webbon, San Jose; Hubert C. Vykukal, Los Altos, and Bill A. Williams, Morgan Hill, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 23, 1976, Ser. No. 753,978
Int. Cl.² A62B *7/14*
U.S. Cl. 128—142.7 **1 Claim**

1. In combination with a hermetically sealed spacesuit including a bulbous helmet affixed to a thorax section of a rigid, tubular configuration, an improved cooling system for removing metabolic heat and gaseous wastes generated by a wearer comprising:

an elastomeric body suit including a thorax section, leg sections, arm sections and a head section adapted to be donned by a wearer and received within said spacesuit;

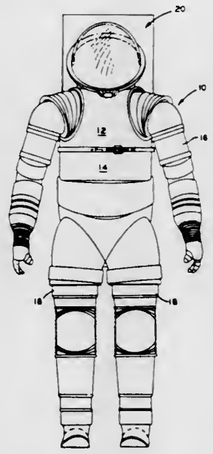
a quick disconnect unit having a first section mounted on said spacesuit interior in reach of said wearer and a second section mounted on said body suit and adapted to be mated in a releasably coupled relationship with said first disconnect section, said first section having first and second inputs and an output mating with first and second outputs and an input, respectively, on said second section;

circuit means for channeling a flow of water through the thorax section and the head section of said body suit, said circuit means coupled between said first outlet and said inlet of said second section of said disconnect unit;

said spacesuit having a water inlet orifice, a water outlet orifice, a gas inlet orifice, and a gas outlet orifice grouped in said thorax section, said orifices being adapted to link to a life support system external to said spacesuit;

means for ducting gas from said gas inlet orifice to the interior of said helmet and to said second inlet of said first section of said disconnect unit;

means for ducting water from said water inlet orifice to said first input of said first section of said disconnect unit and for ducting water from said output of said first section to said water outlet orifice;



a gas distribution network comprising a manifold mounted on said body suit and a flexible conduit connecting said manifold to said second outlet of said second section of said disconnect unit; and

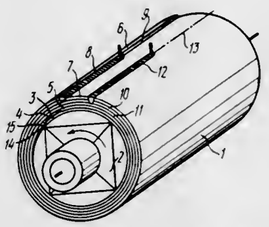
flexible tube means secured to said body suit for channeling gas from said manifold to all arm and leg extremities of the wearer.

4,095,594

METHOD OF MANUFACTURING LAMINATED SHELLS

Boris Evgenievich Paton; Simon Lvovich Mandelberg; Semen Mikhailovich Biletsky; Vyacheslav Anastasievich Atamanchuk, all of Kiev; Zakhar Osipovich Knyazhinsky, Dnepropetrovsk; Yakov Efimovich Osada, Moscow, and Julian Vasilievich Kotenzhi, Khartsyzsk Donetskoi oblasti, all of U.S.S.R., assignors to Institut Electrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR, Kiev, U.S.S.R.

Filed Feb. 15, 1977, Ser. No. 768,772
Int. Cl.² B23K *31/02*
U.S. Cl. 228—143 **3 Claims**



1. A method of manufacturing laminated shells for high pressure vessels and pipes, including:

forming a shell from a sheet by wrapping it into a laminated coil having a plurality of layers; forming welds joining an inner end of said sheet to an adjacent inner layer of said coil;

forming a weld joining an outer end of said sheet to an adjacent outer layer of said coil; and,

joining together at least three outer layers of said coil by penetrating said layers along a line equidistant from the edge of the outer end of the sheet.

4,095,595

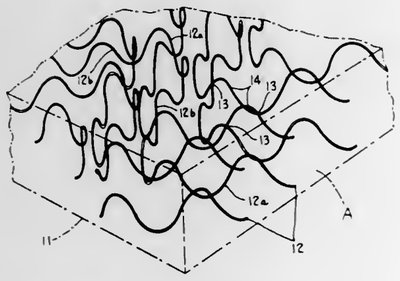
NON WOVEN ROLLED BANDAGE

Ralph B. Stanford, 130 Ridgewood Rd., Radnor, Pa. 19087

Filed Jan. 12, 1977, Ser. No. 758,829

Int. Cl.[2] A61L *15/00*

U.S. Cl. 128—156 **5 Claims**



1. A rolled bandage comprising:

a foraminous non woven elongated strip material rolled in open width;

exposed slit edges carried on said strip material;

said strip material being formed of spaced continuous extruded filaments of hydrophilic polymer each having portions extending alternately in the lengthwise and crosswise directions;

fused bonded intersections of adjacent lengthwise and crosswise portions of respective filaments; and

loops in said filaments between said fused bonded intersections in both lengthwise and crosswise portions;

whereby slit edges need not be folded and linting is avoided while affording controlled stretchability in the lengthwise and crosswise directions of said strip.

4,095,596

NASAL INHALER

Michael A. Grayson, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Nov. 26, 1976, Ser. No. 745,082

Int. Cl.[2] A61M *15/08*

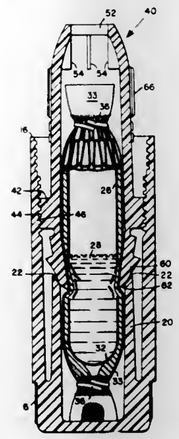
U.S. Cl. 128—198 **8 Claims**

1. A nasal inhaler comprising:

an elongated hollow body having an open end, a closed end and means to support an ampul,

an elongated frangible fluid containing ampul supported in said body by said supporting means with its axis substantially on the axis of the body,

an elongated one piece nozzle moveably mounted in the open end of the body for movement further into the body along the longitudinal axis of the body, means forming an air passage between the nozzle and the body for admitting air into the interior of the body, and means within said body including a member moveable transversely to the axis of the ampul and responsive to the



movement of the nozzle further into the body for fracturing the side of the ampul and releasing the fluid.

4,095,597

ARRANGEMENT FOR MEASURING CROSS-SECTIONAL FLUCTUATIONS OF CONDUITS STREAMED THROUGH BY FLUIDS AND FOR SUPPLYING INDICATIONS OF VOLUMETRIC FLOW AND/OR CONDUIT ELASTICITY BASED THEREON

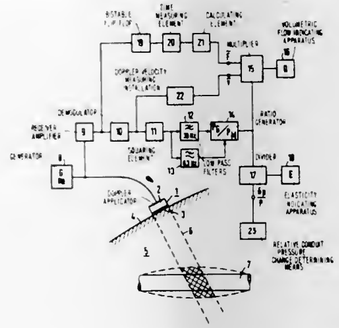
Dieter Hassler, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 25, 1976, Ser. No. 661,247

Claims priority, application Germany, Mar. 5, 1975, 2509568

Int. Cl.[2] A61B *5/02*

U.S. Cl. 128—205 Z **4 Claims**



1. In a measuring arrangement comprising apparatus for measuring cross-sectional fluctuations of conduits streamed through by fluids, in particular blood vessels, pursuant to the Ultrasound-Doppler method, including an ultrasound transmitter-receiver system; a doppler apparatus for determining the intensity of the doppler signals; and a dividing element for the obtained doppler signal intensities, the improvement comprising: said transmitter-receiver system having a single ultrasound transmitter-receiver for projecting ultrasound into the fluid and for receiving the ultrasound reflected by the fluid; means being operatively connected to said doppler apparatus for forming the intensity of the doppler signals with amplitude fluctuations and the timewise arithmetic median value of the intensity without material fluctuations, said dividing element being connected to said means for forming a quotient of said intensities, as a measure of the fluctuation of conduit cross-sectional plane.

4,095,598

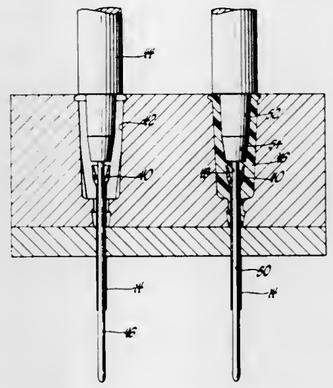
CATHETER

August E. Tschanz, Lansdale, and Robert W. Geiger, Geigertown, both of Pa., assignors to Teleflex Incorporated, Limerick, Pa.

Filed Nov. 18, 1976, Ser. No. 743,038

Int. Cl.[2] A61M *25/00*

U.S. Cl. 128—214.4 **5 Claims**



1. A catheter assembly comprising: a plastic tube, a plastic hub, said tube having an irregular end shaped as a bulb which does not conform to the shape of the remainder of the tube and with the outer periphery of said bulb disposed at different distances radially from the axis of said tube, said hub being disposed about and contiguous with both the interior and exterior of said irregular end.

4,095,599

DEVICE FOR COLLECTING BODY EXCRETIONS AND METHOD OF USING SAME

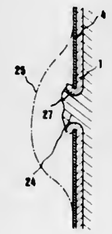
Denise Simonet-Haibe, Paris, France, assignor to Laboratoires Biotrol Societe Anonyme, Paris, France

Filed Jan. 10, 1977, Ser. No. 757,915

Claims priority, application France, Feb. 18, 1976, 76 04474

Int. Cl.[2] A61F *5/44*

U.S. Cl. 128—283 **13 Claims**



1. A device for draining and collecting body excretions, comprising a gum-based flat, plate-like member adapted to come into contact with the user's skin round the location from which excretion is to be discharged having a hole enabling the free flow of excretion therethrough and lines of reduced strength extending radially outwardly from said hole, a support on which a bag for collecting excretion is adapted to be secured, the support being of supple material and having an aperture larger than the hole in the gum-based member and annular zones concentric with said aperture and secured to said support by manually tearable attachment points for enlarging the size of said aperture in said support by removal of at least one of said annular zones, the gum-based member being operatively connected to the support by pushing the portion of the member surrounding the hole having said lines of reduced strength through said aperture and around the edge of said aperture in the support when positioning the device on the user, thereby forming a wrap-around pad tightly embracing and sealing said edge of the aperture and the location from which the excretion is discharged when in position on the user.

4,095,600

NORMALLY-SOLID, BIOABSORBABLE, HYDROLYZABLE, POLYMERIC REACTION PRODUCT

Donald James Casey, Ridgefield, and Martin Epstein, Norwalk, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 691,749, Jun. 1, 1976, Pat. No. 4,048,256.

This application May 5, 1977, Ser. No. 793,988

Int. Cl.[2] A61L *17/00*; C08G *63/12, 63/52*

U.S. Cl. 128—335.5 **2 Claims**

1. A sterile surgical element produced from the polymeric reaction product of (A) a polyglycolic acid composition and (B) a polyester of diglycolic acid and an unhindered glycol; wherein the amount of (B) used is between about 2% and 50%, by weight, based on the total weight of (A) and (B); wherein (A), before reaction with (B), has a molecular weight of at least 30,000 and (B), before reaction with (A), has a molecular weight sufficiently high so as to provide a polymeric material possessing self-supporting film-forming properties.

4,095,601

ELECTROTHERAPEUTIC APPARATUS

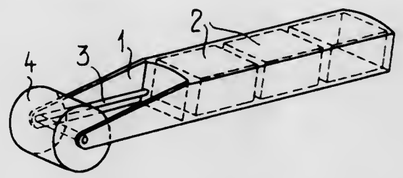
Charles Walter Aufranc, deceased, late of Rheineck, Switzerland, and by Ida Aufranc, heir, Buhofstrasse 49, 9424 Rheineck, Switzerland

Filed Jun. 3, 1976, Ser. No. 692,459

Claims priority, application Switzerland, Jun. 9, 1975, 7381/75

Int. Cl.[2] A61N *1/04*

U.S. Cl. 128—405 **4 Claims**



1. An electrotherapeutic apparatus for external applications comprising circuit means for generating direct-current voltage pulses hving an amplitude between 4 and 22 volts and a frequency of about 8.5 Hz, said circuit means including circuitry for producing a square wave voltage course of said pulses having a pulse duration substantially equal to the time span between two successive pulses, means for applying said pulses to a living body, said pulse applying means comprising an electrode in the form of a roller, said roller having a surface formed of substantially pyramid-shaped electrically conductive parts including tips, the pyramid-shaped parts at the region of said tips having substantially square flattened portions, said flattened portions having an edge length of approximately 0.5 mm, said pyramid-shaped parts being arranged in adjacent rows, the pyramid-shaped parts of said adjacent rows being offset with respect to each other, the spacing between the geometric tips of the pyramid-shaped parts neighboring one another and located in successive rows being 6.955 mm and means connected between said circuit means and said electrode for supplying said voltage pulses to the tips of said pyramid-shaped parts.

4,095,602

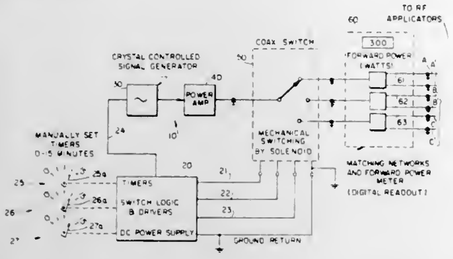
MULTI-PORTAL RADIOFREQUENCY GENERATOR

Harry H. Leveen, 800 Poly Pl., Brooklyn, N.Y. 11209

Continuation-in-part of Ser. No. 686,300, May 14, 1976. This application Sep. 27, 1976, Ser. No. 726,843

Int. Cl.[2] A61N *1/40*

U.S. Cl. 128—413 **4 Claims**



1. In an apparatus for the application of radio frequency electromagnetic energy to a biological substrate including generator means for generation of radio frequency electromagnetic power and applicator means connected to the radio frequency power output of said generator means for applying said power output of said generator means to a said biological substrate, the improvement in which said applicator means comprises a plurality of applicator pairs for setting up a radio frequency electromagnetic field therebetween when connected to said radio frequency generator means, switching means for coupling the power output of said radio frequency generator means selectively across each said pair, one pair at a time, and control means for actuating said generator means including means for actuating said switching means to couple said power output thereof to each of said applicator pairs in predetermined sequence.

4,095,603

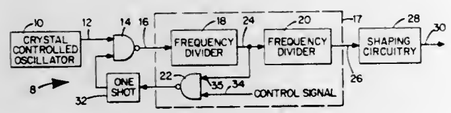
CARDIAC PACER EMPLOYING DISCRETE FREQUENCY CHANGES

Gomer L. Davies, Fort Lauderdale, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Dec. 17, 1976, Ser. No. 751,259

Int. Cl.[2] A61N *1/36*

U.S. Cl. 128—419 PT **12 Claims**



1. A fully implantable cardiac pacer comprising

a cardiac stimulation generator capable of producing stimulation pulses at at least two controlled and well-defined frequencies, said generator including at least one component having an operating condition which can change,

monitor circuitry responsive to the condition of at least one said component of said pacer to provide an output signal indicative of said condition, said output signal characterized by having a plurality of defined states, and

said generator having

clock means for generating primary clock pulses at a frequency higher than the frequency of said stimulation pulses, and

frequency changing means responsive to said monitor output signal and said primary clock pulses for generating said stimulation pulses at one of said well-defined frequencies depending upon the state of said output signal.

4,095,604

CIGARETTE-MAKING MACHINES

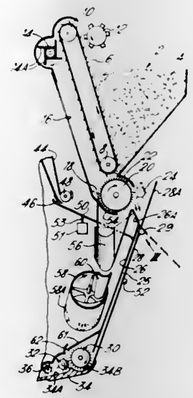
Francis A. M. Labbe, Neuilly-sur-Seine, France, assignor to Molins Limited, London, England

Continuation of Ser. No. 415,470, Nov. 11, 1973, abandoned. This application Apr. 6, 1976, Ser. No. 674,197

Claims priority, application United Kingdom, Nov. 15, 1972, 52718/72

Int. Cl.[2] A24C *5/39*

U.S. Cl. 131—21 A **35 Claims**



25. A hopper for a cigarette making machine comprising feed means for delivering a metered flow of tobacco; a first conveyor having an upwardly moving surface portion, a wall extending downwards towards said upwardly moving surface portion of said first conveyor to form a space between the confronting surface of said wall and the upwardly moving surface portion of said first conveyor, means for driving said first conveyor, the feed means being arranged to shower tobacco into the space, and the first conveyor being adapted to carry the tobacco from the space substantially immediately upon arrival in the space; a downwardly extending channel defined by spaced walls; means for projecting the tobacco on the first conveyor into the upper end of the channel, whereby the tobacco piles up in the channel to form a continuous carpet; and second conveyor means for feeding the carpet of tobacco from the lower end of the channel.

4,095,605

RECOVERY SYSTEM FOR USE WITH A BATCH PROCESS FOR INCREASING THE FILLING CAPACITY OF TOBACCO

Lucas Jones Conrad, Winston-Salem, N.C., assignor to Reynolds Leasing Corporation, Jacksonville, Fla.

Filed Sep. 2, 1976, Ser. No. 720,022

Int. Cl.[2] A24B *3/18*

U.S. Cl. 131—134 **10 Claims**

1. An apparatus which can be used to store, supply and recover a condensable compound used in a processing system in a vaporous state comprising:

(a) a closed tank having a supply of said condensable compound in its liquid state in the bottom of said tank and a chilling liquid supply less dense than the condensable compound floating on said compound.

(b) means for separating the upper portion of the tank into a condensor and compressor section;

(c) means for maintaining the chilling liquid at a selected temperature;

(d) vapor introduction means for introducing said compound in its vapor state received from the processing system into the chilling liquid supply in the condensor section of the tank whereby the vapor passes through the chilling liquid and is condensed into its liquid state, the liquid compound settling to the compound supply at the bottom of the tank;

(e) supply line connecting said tank to said processing system for delivering said compound in its liquid state to said processing system;

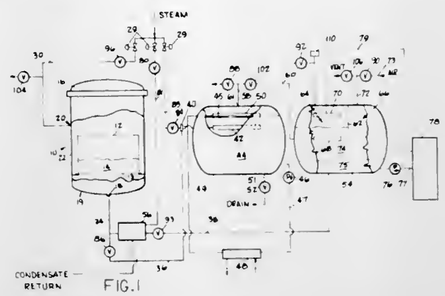


FIG. 1

(f) means for regulating and maintaining pressure in the compressor section of said tank to force the liquid compound from said tank as required; and

(g) control means associated with said processing system to regulate the supply of said compound to said processing system.

4,095,606

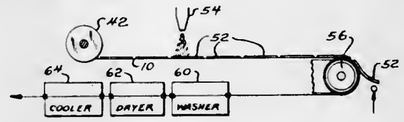
METHOD FOR CARRYING FLEXIBLE GOODS SUCH AS TOBACCO

Warren E. Frandsen, Arlington Heights, Ill., assignor to T & F Industries, Inc., Rolling Meadows, Ill.

Filed Aug. 23, 1976, Ser. No. 716,377

Int. Cl.[2] A24B *3/18*

U.S. Cl. 131—140 R **3 Claims**



1. A method of handling flexible materials comprising: placing said flexible materials in contact with a carrier film composed of an ultra high molecular weight polyethylene having a molecular weight in excess of 3,000,000; storing said materials on said carrier film for a period of time; carrying said flexible materials on said carrier film past an adhesive spray; and releasing said materials from said carrier film by flexure of said carrier film.

4,095,607

COIN HANDLING APPARATUS

Gerald E. Newton, and Emilio A. Caccamo, both of Philadelphia, Pa., assignors to Mars, Incorporated, McLean, Va.

Filed May 25, 1976, Ser. No. 689,747

Claims priority, application United Kingdom, Jun. 2, 1975, 23834/75

Int. Cl.[2] G07D *3/04*

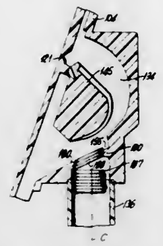
U.S. Cl. 133—1 A **19 Claims**

1. Apparatus for handling coins of one denomination having a characteristic thickness and diameter comprising:

an open-topped coin tube having a substantially vertical central axis and having a predetermined capacity for retaining facially stacked coins,

chute means having a downwardly inclined coin slide surface for directing coins to the open top of the coin tube and across the top of the tube when it is filled to capacity,

wherein the improvement comprises means extending inwardly of the inner surface of the coin tube at its top on the upstream and on the downstream sides of the coin tube with respect to the coin slide surface incline, for retaining an oriented coin in a jam prevention orientation by upstream skewing in which the upper surface of the coin forms an extension of the coin slide surface of the chute when the coin tube is filled to the capacity of the coin tube.



4,095,608

PLASTIC COIN HOLDER

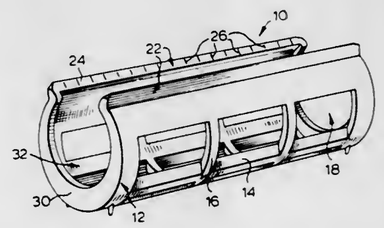
Gordon W. Holmes, Mississauga, Canada, assignor to Professional Packaging Limited, Mississauga, Canada

Filed Oct. 19, 1976, Ser. No. 733,916

Claims priority, application United Kingdom, Oct. 22, 1975, 43455/75

Int. Cl.[2] G07D *9/00*; A45C *11/28*

U.S. Cl. 133—8 R **10 Claims**



1. An integrally-formed holder for disc-like objects constructed of flexible polymeric material and comprising:

an elongate body having a C-shaped cross-section and a radius of curvature substantially equal to the radius of said disc-like objects, and

a continuous end wall integral with said body at each end thereof, said end walls defining a C-shaped opening in each end of said body of smaller radius of curvature than the radius of curvature of said body and including a central portion and two end portions along the curvilinear length thereof,

said C-shaped end openings encompassing the axis of said body within their periphery,

said end walls being constructed normally to maintain said radius of curvature of said body substantially equal to the radius of said disc-like objects and to impart a spring grip strength to said body sufficient to hold and entrap said disc-like objects in said holder, whereby disc-like objects are held in snug fit within said body and are prevented from accidental dislodgement from said holder,

said end portions of said end walls permitting limited resilient flexure of said holder about the axis of said body to increase the radii of curvature of said body and said end wall openings and to increase the rectilinear distance between the curvilinear extremities of said body beyond the diameter of said disc-like object to permit insertion and removal of the disc-like objects through said curvilin-

ear extremities while said central portion flexes very little during said flexure,

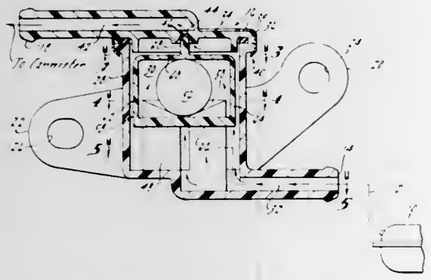
said end walls exerting a resilient force on said body during said flexure and said increase of radii of curvature urging said body to assume said radius of curvature substantially equal to the radius of said disc-like objects, whereby, upon release of the force inducing said limited flexure, said end wall resiliency is relaxed by urging said body to said radius of curvature thereof and said radius of curvature of said body is resiliently restored to that substantially equal to the radius of said disc-like objects to achieve said snug fit with said disc-like objects within said body.

4,095,609

ROLL-OVER VALVE FOR MOTOR VEHICLES

Frank J. Martin, Ann Arbor, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Sep. 27, 1976, Ser. No. 727,080
Int. Cl.² F16K *17/36*
U.S. Cl. 137—43 **11 Claims**



1. A valve device comprising a valve body adapted for mounting in a substantially upright position in a motor vehicle, the valve body defining a valve chamber and including:

an upper outlet communicating with the valve chamber;

an inlet communicating with the valve chamber;

a raised seat disposed in the valve chamber below the outlet and including an upper concave conical surface portion and at least one slot extending across a portion of the raised seat and downwardly into it;

a freely movable ball resting on the conical surface, the ball being normally positioned at the center of the conical surface when the valve is upright and rolling up the conical surface when the valve is inclined, and

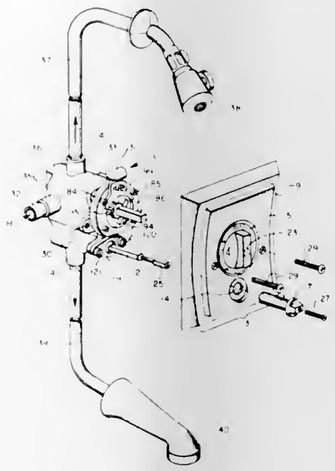
a cage for the ball, the cage being arranged for vertical reciprocable movement in the chamber by the ball as it rolls on the conical seat, the cage including a cage top member disposed below the upper outlet and above the ball and adapted to close the outlet upon being moved toward the outlet, at least one bottom cage cross member disposed below the ball and in the seat slot for vertical reciprocal movement therein when the ball rolls up and down the conical surface, and side members extending between the top and bottom cage members for maintaining them in a fixed space relationship at least on the order of the diameter of the ball whereby the ball fits between the top and bottom cage members and urges the cage upwardly by contacting the top member upon inclination of the valve and downwardly by contacting the bottom member upon returning the valve to the upright position to provide both positive closing and positive opening of the valve outlet by the ball.

4,095,610

PRESSURE EQUALIZING SHOWER VALVE

Charles H. Priesmeyer, Park Ridge, Ill., assignor to Powers Regulator Company, Skokie, Ill.

Filed Mar. 25, 1977, Ser. No. 781,290
Int. Cl.² F16K *19/00*
U.S. Cl. 137—100 **6 Claims**



1. A valve for mixing, in a selected ratio, hot and cold water and for selectively directing mixed water to either a bathtub faucet or to a shower head, comprising:

a control chamber;

two inlet chambers on either side of the control chamber and communicating with the control chamber through inlet passages having smaller cross-sections than those of the inlet chambers;

a flexible plate subdividing said control chamber into two compartments and having projections extending therefrom in a generally normal direction through the inlet passages, said projections having portions with enlarged cross-sections near their ends inside the inlet chambers;

a mixing chamber having two bores, each communicating with the different compartment of the control chamber and having an outlet exit;

temperature control means inside said mixing chamber, for restricting the communicating through each of the bores;

a diverter bore having in its cylindrical wall a first and a second outlet opening and an inlet opening, communicating with the outlet exit;

a diverter fitting closely inside the bore, one end of the otherwise cylindrical diverter having a flat side wall, said diverter having a hole through the other end, the hole extending in the direction perpendicular to the axis of the diverter; and

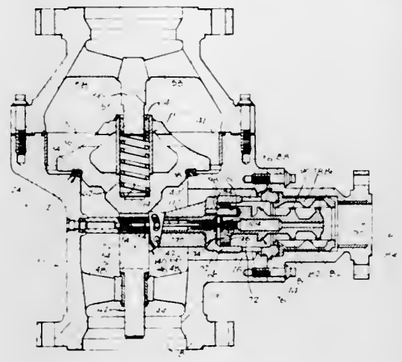
actuating means for sliding the diverter into a first position in which the hole through the diverter provides communication between the inlet opening and the first outlet opening and for sliding the diverter into a second position in which the communication between the inlet opening and the second outlet opening is established through the volume between the flat side wall of the diverter and the conduit walls, and for rotating said diverter so as to partially or completely close the inlet opening in either of the two positions.

4,095,611

MODULATING FLOW CONTROL VALVE ASSEMBLY

Heinz K. Hetz, Halicong, Pa., assignor to Yarway Corporation, Blue Bell, Pa.

Filed Jan. 17, 1977, Ser. No. 759,764
Int. Cl.² G05D *11/00*
U.S. Cl. 137—115 **14 Claims**



1. A modulating flow control valve assembly including main check valve means movable between a fully closed and a fully open position in response to the flow requirement of a demand system and including an intermediate position wherein the flow to the demand system corresponds to a preselected minimum flow from a pressure source, and bypass valve means movable between a fully closed and a fully open position, and control means responsive to the position of said main check valve means for controlling the position of said bypass valve means such that said bypass valve means is in its fully open position when said main check valve means is in its fully closed position and such that said bypass valve means is in its fully closed position when said main check valve means is in its intermediate position, said control means including a control chamber communicating with the inlet side of said main check valve means and piston means associated with said bypass valve means, said piston means being slideable in said control chamber with one surface thereof being exposed to fluid therein and with the opposite surface thereof being exposed to fluid on the inlet side of said bypass valve means, said control means further including pilot valve means for controlling fluid pressure in said control chamber, operating means operatively associated with said pilot valve means and said main check valve means for moving said pilot valve means to a position wherein fluid is vented from said control chamber thereby reducing fluid pressure acting on said one surface of said piston means as said main check valve means is closing and for allowing said pilot valve means to move to a position wherein fluid flow from said control chamber is throttled thereby increasing fluid pressure acting on said one surface of said piston means as said main check valve means is opening.

4,095,612

GATE VALVE

Philip P. Hardcastle, Houston, Tex., assignor to Equipment Renewal Company, Houston, Tex.

Filed Feb. 14, 1977, Ser. No. 768,277
Int. Cl.² F16K *19/00*
U.S. Cl. 137—246.22 **1 Claim**

1. A gate valve comprising:

a. a body having a flow passage therethrough;

b. spaced annular seating members in said body;

c. seal means between said seating members and said body;

d. a gate member positioned between said seating members and having a surface to close off the flow passage through said body and an opening for alignment with the flow passage through said body, said gate member comprising:

1. a pair of rectangular plate members;

2. means connecting said plate members together but accommodating limited relative movement therebetween; and

3. spring means tending to urge said plate members apart;

e. said annular seating members each including:

1. an annular surface for abutting said gate;

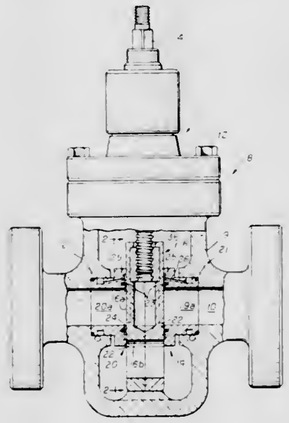
2. annular teflon seal means in each surface for sealing with said gate;

3. an annular groove on each of said annular surfaces;

4. sealant passage means communicating with each of said annular grooves; and

5. projecting spaced vertical guide surfaces for abutting said gate member to retain it aligned in said body;

f. a stem rotatably supported by said body and having a



threaded portion engaged with said gate whereby rotation of said stem raises and lowers said gate;

g. said body having a sealant flow passage communicating with sealant passage means in said seating members; and

h. said means connecting said plate members together comprising:

1. passage means extending through each plate member;

2. recess means in each plate member and intersecting said passage means;

3. connector means in said recess means and extending between said plate members;

4. pin means in said connector means and extending in said passage means of each plate member; and

5. said pin means being smaller in size than said passage means whereby said plate members may move relative to each other.

4,095,613

PNEUMATIC SIDE ROLL MOVER

Loren R. Townsend; Morris E. Epp, 1217 Maple, both of Sidney, Nebr. 69162, and Walter J. Schmidt, 1809 7th Ave., Scottsbluff, Nebr. 69631

Filed Apr. 25, 1977, Ser. No. 790,255
Int. Cl.² B05B *3/18*
U.S. Cl. 137—344 **3 Claims**

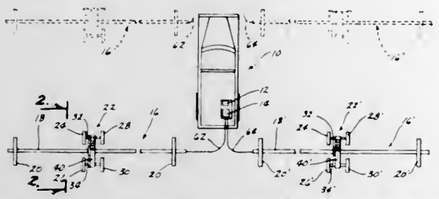
1. In combination,

a side roll wheel line irrigation system comprising an elongated irrigation pipe having opposite ends and being supported by a plurality of spaced apart wheels, said pipe serving as an axle for said wheels,

at least one pneumatic side roll mover apparatus associated with said pipe for moving said pipe in a sideways direction over the area to be irrigated,

said side roll mover apparatus comprising a wheeled frame means operatively secured to said pipe, an air operated hydraulic pump means on said frame means connected to

a hydraulic motor drive means operatively connecting said hydraulic motor to said pipe whereby actuation of said hydraulic motor will cause said wheeled frame means and said pipe to be propelled in said sideways direction,



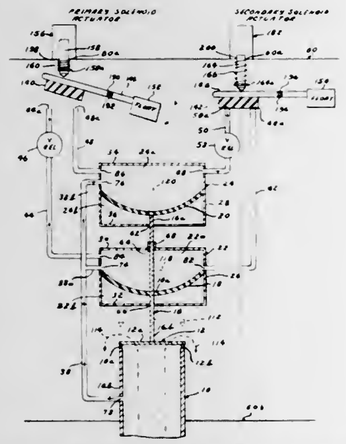
and pneumatic supply means for supplying air under pressure to said air operated hydraulic pump means.

4,095,614

LIQUID LEVEL CONTROL SYSTEM

Frank E. Marmon, Marietta, Ga., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 5, 1976, Ser. No. 734,063
Int. Cl. F16k *31/34, 31/02*
U.S. Cl. 137—414 **7 Claims**



7. Apparatus for controlling inlet flow and liquid level within a tank, comprising:

an inlet for pressurized liquid;

a valve member for opening and closing the inlet;

two separate cavities forming first and second pressurization chambers;

a means responsive to fluid pressure in each of the two pressurization chambers for closing said valve;

a conduit connecting the pressurized liquid at the inlet to each of the two pressurization chambers;

a first and second pressure bleed passage communicating with the first pressurization chamber, either being capable of bleeding fluid pressure from said first chamber;

a third and fourth pressure bleed passage communicating with the second pressurization chamber, either being capable of bleeding fluid pressure from said second chamber;

a first closure means for sealing said first and third pressure bleed passages;

a second closure means for sealing said second and fourth pressure bleed passages;

a first and second liquid level responsive means for actuating said first and second closure means, respectively;

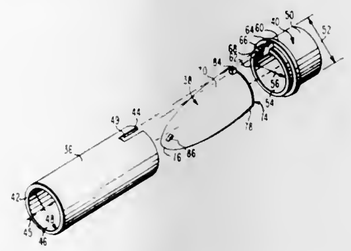
a first and second solenoid means for actuating said first and second closure means, respectively, configured such that when said first solenoid means is deenergized said first closure means seals the first and third bleed passages irrespective of the state of said first liquid level responsive means, and when said second solenoid means is deenergized said second closure means seals the second and fourth bleed passages irrespective of the state of said second liquid level responsive means, while energizing either solenoid inhibits that solenoid's effect on its respective closure means.

4,095,615

CHECK VALVE AND SIPHON TUBE ASSEMBLY EMPLOYING SAME

Larry R. Ramsauer, San Jose, Calif., assignor to Ramco Manufacturing, Inc., San Jose, Calif.

Filed May 21, 1976, Ser. No. 688,837
Int. Cl.² F16K *15/03;* **F04F** *10/00*
U.S. Cl. 137—527.8 **5 Claims**



1. A check valve comprising:

a generally tubular retaining member having a first end, a first inner diameter, a collar formed proximate said first end and a key extending from said collar to a location beyond said first end;

a generally tubular body having an axis therethrough and including an inner surface having a second inner diameter that is slightly larger than said first inner diameter, said body further having a second end and a slot extending from said second end, said slot serving to receive said key when said collar abuts said second end; and

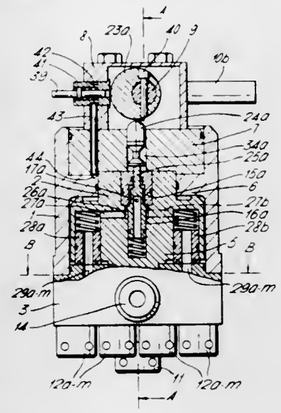
a flapper valve formed from a portion of a tube having a third inner diameter that is substantially equal to said first inner diameter and having an outer diameter that is substantially equal to said second inner diameter, said valve having an outer surface that is symmetrical in plan view and is tapered between a first end and a second end, said valve further being generally triangular in side view so as to form a periphery between and including said first end and said second end, said outer surface extending a dimension such that when said valve is disposed in said body said outer surface forms a predetermined angle in side view relative to said axis and said periphery contacts said inner surface, said valve further including a slot-engaging member hingedly disposed in said slot adjacent said key such that said valve is movable between an open and a closed position, whereby when said valve is in said open position said outer surface is adjacent said inner surface and said third inner diameter lies on an imaginary cylindrical surface substantially corresponding to said first inner diameter such that fluid entering said retaining member and flowing in a direction through said body is capable of substantially unrestricted flow, and whereby when said valve is in said closed position said outer surface in side view lies at said predetermined angle relative to said axis and said periphery contacts and forms a seal with said inner surface such that when fluid flow is in an opposite direction it moves said valve to said closed position which substantially restricts fluid flow in said opposite direction.

4,095,616

HYDRAULIC CONTROLLER

Karl Krieger, Wuppertal, Germany, assignor to Hermann Hemscheidt Maschinenfabrik, Wuppertal-Elberfeld, Germany

Filed Nov. 22, 1976, Ser. No. 744,101
Claims priority, application Germany, Nov. 25, 1975, 2552730
Int. Cl.² E21D *23/26;* **F15B** *13/06;* **F16K** *11/18*
U.S. Cl. 137—596 **17 Claims**



1. An hydraulic controller for controlling the flow of hydraulic fluid to and from hydraulic jacks, the controller comprising: a casing; first and second inlets in the casing adapted to be connected in use of the controller to separate sources of pressurised hydraulic fluid; a plurality of jack supply openings in the casing for connection in use of the controller to jack supply lines to serve for the supply of fluid to said jacks and to receive fluid from said jacks; a return line outlet in the casing for connection in use of the controller to a reservoir of hydraulic fluid; a flow-directing member rotatable in the casing; first and second passages extending through the flow-directing member, said first and second passages having inlet and outlet ends, said inlet ends communicating with said first and second casing inlets respectively, said first and second passages being out of communication with each other; first and second valve members mounted in the flow-directing member and movable to open and close respective ones of said first and second passages; valve operating means operable to open both of said valves simultaneously, the flow-directing member being movable between a plurality of selectively available positions in each of which the outlet ends of the first and second passages communicate with selected jack supply openings whilst other jack supply openings are connected to the return line outlet, the controller further comprising locking means which operate in at least one of said selectively available positions of the flow-directing member to prevent movement of the first valve to a position for opening said first passage, the locking means thus preventing fluid flow from the first inlet to at least one jack supply opening.

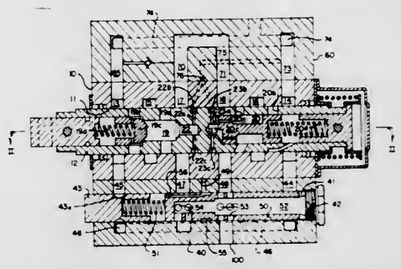
4,095,617

CONTROL VALVES

Robert F. Hodgson, Youngstown, Ohio, assignor to Commercial Shearing, Inc., Youngstown, Ohio

Continuation-in-part of Ser. No. 683,956, May 6, 1976, abandoned. This application May 31, 1977, Ser. No. 802,248
Int. Cl.² F15B *13/02*
U.S. Cl. 137—596.13 **5 Claims**

1. A pressure compensated directional control valve comprising a directional control valve for selectively operating a fluid motor at controlled speed, said valve having inlet and outlet ports and first and second motor ports for connection to opposite sides of a fluid motor, a longitudinal bore in said control valve, a valve spool movable in said bore, said valve spool being hollow at each end forming spaced chambers selectively communicating through the valve spool walls with the inlet ports, outlet ports and work ports and with a pair of spaced grooves surrounding the valve spool, flexible annular band check means surrounding each groove, a pressure sensing port communicating selectively with each groove in the spool, a pressure compensating valve having an axial bore, an inlet port connected to the inlet port of said control valve, an outlet port connected to the outlet port of said control valve, a pressure sensing port communicating with the pressure sensing port of the directional control valve, a valve member movable



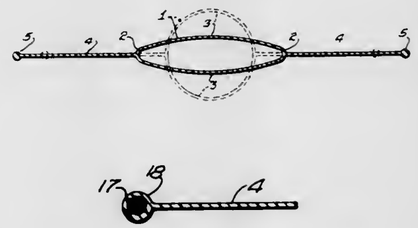
in said axial bore, means biasing said valve member to a position normally blocking said outlet from said inlet port, said valve member having opposite surfaces thereon exposed respectively to fluid pressure from said inlet port and to fluid pressure at said pressure sensing port acting with said biasing means, said valve member being movable in response to fluid pressure differential between its inlet port and pressure sensing port through the pressure sensing port of the directional control valve to connect said inlet and outlet ports for bypassing input pressure fluid to thereby regulate the input flow through said directional control valve to one of said work ports.

4,095,618

RODENT DETERRENT IRRIGATION TUBE

Lloyd Spencer, 220 Patrician Way, Pasadena, Calif. 91105

Division of Ser. No. 570,382, Apr. 22, 1975, abandoned. This application Oct. 4, 1976, Ser. No. 729,839
Int. Cl.² F16L *11/12*
U.S. Cl. 138—103 **5 Claims**



1. A rodent deterrent irrigation tube, comprising:

a. an essentially flat tube member arranged, when subjected to increasing water pressure to assume an increasingly cylindrical configuration;

b. and webs extending laterally beyond diametrically opposite margins of the tube member and forming rodent barriers of sufficient width to prevent biting contact across the web into the tube member, the tube member and webs presenting essentially flat surfaces further deterring biting contact with the tube member; and

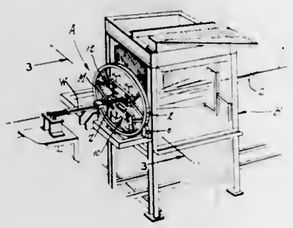
c. a rodent deterrent is disposed within and confined to the remote margins of the webs.

4,095,619

YARN INSERTING AND PACKING MACHINE

Albert W. Kallmeyer, St. Louis County, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Apr. 11, 1977, Ser. No. 786,455
Int. Cl.² D03D *35/00*
U.S. Cl. 139—22 **18 Claims**



1. A machine for inserting cross yarns through an array of longitudinal yarns, said machine comprising: a transfer arm longer than the width of the array and having a supply of weaving yarn on it with the yarn being suitable for use as the cross yarns; first and second support means capable of engaging and releasing the transfer arm, each of the support means further being capable of rotating the transfer arm such that the transfer arm passes through the array and is transferred from the first means to the second means and vice-versa, with the rotation being about an axis located to the side of the array, the first means being capable of supporting the arm at an end position beyond one side of the array and the second means being capable of supporting the arm at another end position beyond the other side of the array; a yarn laying arm pivotally connected to the transfer arm and having a free end through which the weaving yarn passes; and actuating means for causing the yarn laying arm to rotate relative to the transfer arm as the transfer arm is transferred between the first and second support means, with the rotation being such that the free end of the yarn laying arm moves from the end position at which the transfer arm is initially located to the end position to which the transfer arm is transferred after passing through the array of longitudinal yarns, whereby the weaving yarn is laid through the array to form a cross yarn therein.

4,095,620

PROJECTILE FOR WEFT INSERTION

Victor F. Sepavich, West Boylston, and Petras Cyvas, Worcester, both of Mass., assignors to Crompton & Knowles Corporation, New York, N.Y.

Filed Sep. 28, 1977, Ser. No. 837,346
Int. Cl.² D03J *5/06*
U.S. Cl. 139—196.2 **17 Claims**

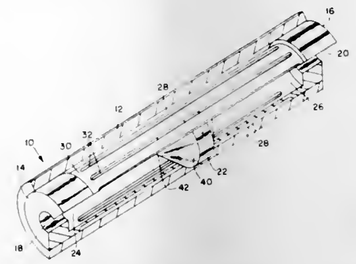
1. A projectile for use in a loom in which filling picks are inserted from an outside supply source comprising:

(a) an elongated body having an inlet opening at one end and an outlet opening at the opposite end thereof;

(b) an outer wall defining the outer configuration of said body;

(c) an inner wall defining a filling storage chamber within said body, said storage chamber being connected to said inlet opening;

(d) a passageway located between said outer wall and said inner wall and connected to said outlet opening; and



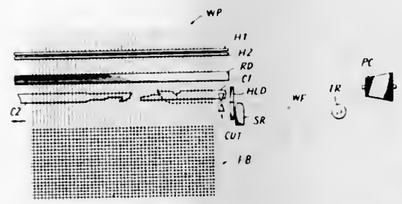
(e) at least one aperture in said inner wall for connecting said storage chamber to said passageway.

4,095,621

WOOF BREAKAGE DETECTION SYSTEM FOR A SHUTTLELESS WEAVING MACHINE

Arao Kakinaka, Nishinomiya, Japan, assignor to Kasuga Denki Co., Ltd., Osaka, Japan

Filed Feb. 10, 1977, Ser. No. 767,615
Claims priority, application Japan, Feb. 17, 1976, 51-16085
Int. Cl.² D03D *51/34*
U.S. Cl. 139—370.2 **16 Claims**



1. A system for detecting the breaking of woof as it is fed to a shutterless weaving machine during each weaving cycle of said machine, comprising:

means for monitoring the movement of said woof as it is fed into said weaving machine and producing a signal indicative thereof;

means for pulling said woof in said weaving machine during each said weaving cycle;

means for producing a timing signal at a predetermined phase point of each said weaving cycle;

means connected to said monitoring means and said timing signal producing means for determining, after a predetermined amount of time following the beginning of said timing signal, any non-movement of said woof during said timing signal and producing a break signal indicative thereof;

said determining means including a means for receiving said timing signal and producing a disabling signal for said predetermined amount of time after the beginning of said timing signal and an enabling signal after said predetermined amount of time;

means connected to said disabling/enabling signal producing means and to said timing signal producing means for gating the remainder of said timing signal following said predetermined amount of time;

means connected to receive said monitoring means movement signal for gating said remainder timing signal to produce an unbroken woof signal; and

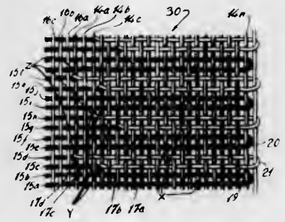
means connected to receive said unbroken woof signal and said remainder timing signal for defining a break determining time period following the beginning of said remainder timing signal and producing said break signal when said unbroken woof signal does not occur during said break determining time period.

4,095,622

WOVEN SEAM IN FABRIC AND METHOD OF MAKING SAME

Donald George MacBean, Pierrefonds, Canada, assignor to JWI Ltd., Montreal, Canada

Filed Nov. 23, 1976, Ser. No. 744,323
Claims priority, application United Kingdom, Nov. 27, 1975, 48826/75
Int. Cl.² D03D *25/00*; D21F *1/12, 7/10*
U.S. Cl. 139—383 A **13 Claims**



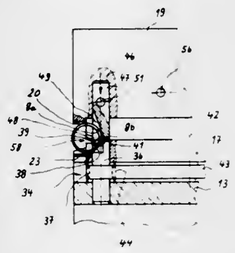
1. A woven fabric as used for supporting a paper web on a paper making machine, said fabric having interwoven weft and warp strands with the strands in the machine direction being flexible strands incapable of retaining a stable crimp, the improvement comprising a plurality of spaced apart replacement monofilament strands having stable crimp characteristics as replacement for a plurality of said machine direction flexible strands, said monofilament strands extending in the machine direction and in a seam area for interconnecting opposed ends of said fabric to form an endless belt having a seam which is substantially flat, said replacement monofilament strands having been substituted for flexible machine direction strands in said seam area and interwoven with added cross machine strands which are removed cross machine strands from said woven fabric seam area or strands taken from identical fabric, said replacement monofilament strands having crimps of the same configuration as crimps in the machine direction strands of the fabric.

4,095,623

APPARATUS FOR SEVERING AND DEFORMING THE ENDS OF HELICAL BINDERS FOR PADS OR THE LIKE

Jörn-Uwe Lemburg, and Dieter Stolley, both of Hamburg, Germany, assignors to E. C. H. Will (GmbH & Co.), Hamburg, Germany

Filed Aug. 2, 1977, Ser. No. 821,177
Claims priority, application Germany, Jan. 29, 1977, 2703718
Int. Cl.² B21F *35/02*
U.S. Cl. 140—92.7 **18 Claims**



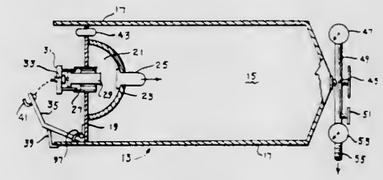
1. Apparatus for severing and deforming at least one end convolution of a helical binder which is threaded through the openings of a stack of loose leaves or the like, comprising a locating device having means for holding at least the end convolution of and a binder in a predetermined position; a severing tool; means for operating said tool so as to clip the end convolution of the binder occupying said predetermined position, said tool having means for bending the free end portion of the clipped end convolution over the neighboring convolution of the binder occupying said position; a hold-down device; means for moving said hold-down device between the end convolution and the neighboring convolution of the binder occupying said position; a loop forming device; and means for actuating said loop forming device so as to convert the bent end portion of the end convolution of the binder occupying said position into a loop which surrounds the neighboring convolution, said hold-down device having a first guide face and at least one of the other two devices having a second guide face which cooperates with said first guide face to define a channel confining the end portion of the end convolution during conversion into said loop.

4,095,624

PRESSURE TANK

Elisha C. Davis, 1344 Davis Ave., Enumclaw, Wash. 98022

Filed Nov. 26, 1975, Ser. No. 635,463
Int. Cl.² B65B *3/04*
U.S. Cl. 141—18 **4 Claims**



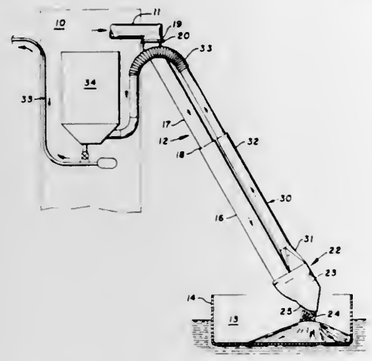
1. A pressure tank for receiving and storing gas under pressure from a gas generating source comprising a main pressure tank having an interior and side walls, a substantially flat base on said tank, a chamber for holding gas operatively attached to said base of said tank, said chamber having a curved forward wall extending into the interior of said tank, a check valve fixedly positioned in the forward wall of said chamber for allowing gases within said chamber to flow into the interior of said tank and for preventing gases in said tank from flowing into said chamber, a receptacle in the base of said tank in operative communication with the interior of said chamber, a replaceable charging cartridge positioned in said receptacle, said cartridge containing combustionable material suitable for producing gases, the forward end of said cartridge in operative communication with the interior of said chamber and the rearward end of said cartridge having a primer disposed therein exposed outside said receptacle, a closure cap removable to replace said charging cartridge and normally enclosing the rearward end of said cartridge positioned in said receptacle, a firing pin positioned in the center of said closure cap adjacent the rearward end of said cartridge, and a pivotally mounted striker operatively attached to the base of said tank for striking said firing pin upon release, said firing pin slidably positioned within said closure cap being urged forward to contact the primer with sufficient force to cause the primer to ignite and produce flames and hot gases causing the combustionable material in said cartridge to ignite thereby producing combustion gases which fill said chamber and pass through said check valve into said main pressure tank raising the pressure therein to a higher level whereby successive cartridges may be ignited to raise the pressure in the main pressure tank to a desired level.

4,095,625

DUST CONTROL SYSTEM FOR GRAIN LOADING

Donald E. Marpe, Bloomington, Minn., assignor to Peavey Company, Minneapolis, Minn.

Continuation-in-part of Ser. No. 595,783, Jul. 14, 1975, abandoned. This application Jan. 19, 1977, Ser. No. 760,684
Int. Cl.² B65B *1/06*
U.S. Cl. 141—93 **5 Claims**



1. Apparatus for removal of air-borne dust emitted discharge delivery of particulate solids from an elevated supply source and through conduit means, said apparatus comprising:

(a) descending chute means comprising an enclosed column extending between a collecting port at the upper receiving end and a gravity fed delivery spout at the discharge end, said upper receiving end being adapted to be coupled to an elevated supply source;

(b) said delivery spout comprising a generally enclosed shroud with an open bottom wall defining a discharge opening and including an arcuately disposed lead-in flow diverter plate extending generally in continuation with an exterior wall portion of said enclosed column, and extending arcuately inwardly of said enclosed column and terminating along a substantially horizontally disposed forward surface with the said forward surface extending across the width of said chute means and defining one edge of said discharge opening:

(c) a generally vertically disposed abutment plate means disposed generally forwardly of said flow diverter plate and arranged in spaced relationship from said diverter plate forward surface and defining the opposed edge wall of said discharge opening, said abutment plate means being positioned along and intersecting the normal flow path of particulate solids passing from said lead-in flow diverter plate and with said abutment plate means being mounted in a plane generally normal to the flow path of said particulate solids upon passing said diverter plate; and

(d) dust collecting duct means separated from said descending chute means and having one end coupled to said spout shroud above said discharge opening and with the opposed end of said duct collecting dust means being coupled to a solid-air separator means.

4,095,626

VAPOR RECOVERY IN A LIQUID DISPENSING UNIT

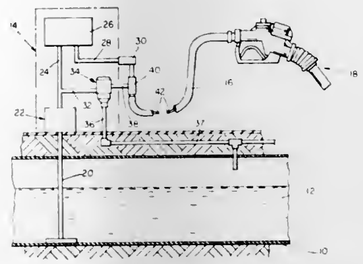
James W. Healy, 54 Plymouth Rd., Wakefield, Mass. 01880

Continuation-in-part of Ser. No. 553,529, Feb. 27, 1975, Pat. No. 4,057,086, and Ser. No. 656,124, Feb. 9, 1976, Pat. No. 4,056,131. This application Jun. 21, 1977, Ser. No. 808,617
Int. Cl.² B65B *57/14*
U.S. Cl. 141—206 **9 Claims**

1. A vapor recovery system for use with systems for dispensing volatile liquids, such as liquid fuels, from a reservoir wherein the liquid is pumped under pressure through a hose and discharged through a vapor recovery dispensing nozzle into the inlet of a container such as a fuel tank, the novel vapor recovery system comprising

a liquid jet gas pump having its liquid inlet in communication with the pressurized liquid so as to receive a portion thereof, and

a vapor conduit having one end in said nozzle and adapted to be placed in communication with the interior of said container when said nozzle is inserted into said inlet and the other end in communication with the vapor inlet of said jet pump,



the outlet of said jet pump discharging into said reservoir,

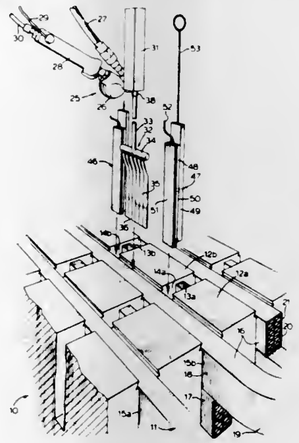
whereby vapor displaced from said container as it is filled will be drawn off through said conduit by suction created by the passage of said liquid through said jet pump.

4,095,627

CORONA INHIBITION IN DYNAMOELECTRIC MACHINES

Palmer Lonseth; Hubert Gerald Panter, and Donald G. Moorby, all of Peterborough, Canada, assignors to Canadian General Electric Company, Toronto, Canada

Filed Feb. 10, 1976, Ser. No. 656,791
Claims priority, application Canada, Mar. 7, 1975, 221543
Int. Cl.² B65B *3/04*
U.S. Cl. 141—250 **4 Claims**



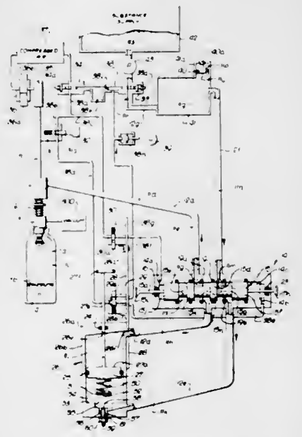
1. Apparatus for injecting an uncured, semiconducting, elastomeric material between coil sides and slot walls of an electromagnetic component of a dynamoelectric machine; said component including a core member having a plurality of stacks of magnetic laminations spaced apart axially to define interstack spaces; axially directed slots in said core member; spacers disposed radially in said interstack spaces and extending between said slots to define ducts for coolant flow; and coil sides disposed in said slots; said apparatus comprising a body portion; material release means secured to said body portion and adapted for receiving said material under pressure from a source; an injector tool having a tubular stem projecting from said body portion and terminating in a flat nozzle assembly adapted to be inserted into the narrow space between a coil side and slot wall of a core stack by way of the slot opening, said injector tool containing material flow passages in communication with the output of said release means, through which material released by said release means flows and then discharged from orifice means in the tip of said nozzle assembly; and a pair of blocking devices adapted for insertion into the ducts adjoining said core stack for blocking off said space at these ducts.

4,095,628

ANTIDRIP VOLUMETRIC RAPID FILLING MACHINE WITH ANTIFOAMING FEATURE AND SIMPLIFIED CONTROL VALVE

Herman Laub, III, 244 N. San Marino, San Gabriel, Calif. 91775

Filed Sep. 16, 1976, Ser. No. 723,774
Int. Cl.² B65B *3/32*
U.S. Cl. 141—367 **31 Claims**



1. A system for filling containers with flowable substance from a source thereof, comprising:

a dispensing nozzle, connected to receive such substance from the source along a flow path, for discharging such substance into each such container;

metering means, connected to the supply and upstream of the nozzle, adapted to premeasure, at a flow rate determined in part by an orifice along the flow path within the metering means, the volume of such substance discharged along the flow path from the source into each such container;

flow-rate control means, disposed within the metering means and activated in response to discharge of a specified fraction of the said volume of substance into each container as established by the internal operation of the metering means, for restricting said orifice and thereby restricting the flow rate of such substance.

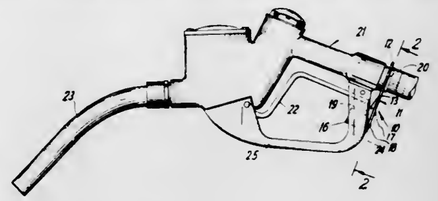
4,095,629

SELF-SERVICE GASOLINE PUMP HANDLE CLIP

Robert F. Jordan, R.F.D. #4, Merrow Rd., Auburn, Me. 04210

Filed Mar. 10, 1975, Ser. No. 556,935
Int. Cl.² B65B *3/04*; G05G *5/06*
U.S. Cl. 141—392 **7 Claims**

1. In combination with a gasoline pump handle, said gasoline pump handle including an end portion, a lever guard, a pump lever, said pump lever having a free end, a slot in said lever guard, said slot adjacent the free end of said pump lever, a gasoline pump handle clip comprising a frame including a hook and a plate depending from said hook, and latch means intermediate of said plate extending outward from said plate and adapted to extend through said slot and engage said pump



lever to lock said lever without need for further manual holding, said hook adapted to freely attach to said end of said gasoline pump handle.

4,095,630

WOOD LATHE CUTTING TOOL

Chester E. Kirk, 727 NW. 16th St., Corvallis, Oreg. 97330, and Owen E. Raab, 11825 Glendale Way South, Seattle, Wash. 98168

Filed Mar. 22, 1977, Ser. No. 780,082
Int. Cl.² B27C *7/06*
U.S. Cl. 142—56 **10 Claims**

1. A wood lathe cutting tool comprising an elongated rigid bar-like assembly for use in a generally vertical position in relation to a horizontally rotating workpiece, the lower end of said bar-like assembly adapted to be freely engaged rockably with a solid support below the rotating workpiece, whereby the cutting tool can be manually rocked in a vertical plane about its lower end toward and away from the rotating workpiece while the tool is being gripped near its upper end, and a tool bit means on said bar-like assembly between the upper and lower ends thereof at a proper height to enable the tool bit means to engage and cut into the rotating workpiece, said tool bit means including a bit element projecting radially beyond the bar-like assembly.

4,095,631

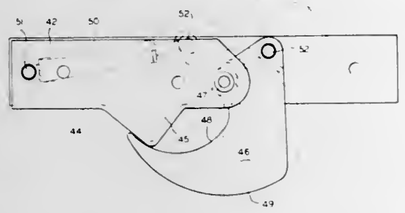
HOLDING ARM

Eugene James Kielb, Spokane, Wash., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Feb. 10, 1977, Ser. No. 767,426
Int. Cl.² A01G *23/08*
U.S. Cl. 144—34 E **5 Claims**

1. For use in conjunction with a tree harvesting apparatus

comprising a tree shear mechanism and a grapple mechanism, a mechanism for accumulating cut trees, the accumulator mechanism cooperable with the grapple mechanism for gathering cut trees, the accumulator mechanism comprising a base portion mountable on the tree harvesting apparatus, a power arm for gripping the accumulated trees, the power arm comprising a curved member having an inner end pivotably mounted on the base portion of the accumulator mechanism, the curved member having a curved inner surface to receive the cut trees and a curved outer surface concentric with the pivot axis of the accumulator mechanism to facilitate disengagement of the curved member from between a newly cut tree held by the grapple mechanism and the accumulated trees cooperatively engaged by the grapple mechanism and the



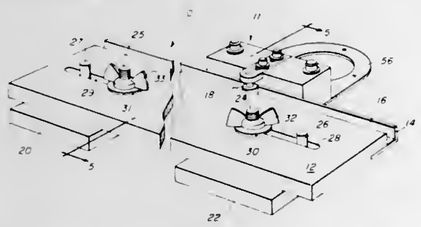
accumulator mechanism, the pivot axis of the power arm being generally aligned with the longitudinal axis of the tree to be cut, power means pivotally connected between the base portion of the accumulator mechanism and the inner end of the curved member of the power arm, the pivotal connection for the power means of the curved member being laterally disposed from the pivot axis of the power arm at the inner end of the curved member, the power means cooperating with the curved member for opening and closing the power arm to gather cut trees in cooperation with the grapple mechanism, and an abutment means provided at the forward end of the base portion of the accumulator mechanism coopertively engaging the curved outer end of the power arm to retain the cut trees in a space provided therebetween.

4,095,632

STRAIGHT EDGE CUTTING GUIDE FOR ROUTER AND CIRCULAR SAW

John M. Raulinaitis, 65 Union St., Cambridge, Mass. 02141

Filed Aug. 1, 1977, Ser. No. 820,476
Int. Cl.[2] B27C *5/10*
U.S. Cl. 144—136 C **2 Claims**



1. Guide apparatus for a tool having a cutting blade, including routers, circular saws, sabre saws and the like, comprising in combination:

a straight edge assembly on which a bearing block assembly is movable including:

a substantially straight hardwood bar;

a substantially straight L-shaped metal angle iron track having a horizontal flange firmly attached along the entire length of said hardwood bar and having a vertical flange extending upwards at a uniform distance from said hardwood bar such that said L-shaped metal angle iron forms an open channel parallel to the longitudinal edge of said hardwood bar to receive a cam follower bearing;

clamping means on each end of said straight edge assembly for securing said straight edge assembly to a workpiece;

a movable bearing block assembly including:

a main bearing block;

two cam follower bearings positioned within machined recess in the vertical face of said bearing block, each of said cam follower bearings having an axis of rotation perpendicular to the bearing block assembly and having rolling surfaces extending equidistant forward of the vertical face of said bearing block;

an outrigger bearing support arm mounted transversely to the top surface of said bearing block, extending forward of the vertical face of said bearing block, and having adjustment slots for alignment;

a third cam follower bearing suspended vertically downward from the forward overhanging end of said outrigger bearing support arm, having an axis of rotation parallel to the axes of rotation of said first two cam follower bearings, being positioned forward of and between said first two cam follower bearings;

said third cam follower bearing being positioned to move in said channel in said straight edge assembly, its rolling surface being positioned to grip the interior side of the vertical flange of said L-shaped metal angle iron;

said first two cam follower bearings having their rolling surfaces being positioned to grip the exterior surface of said L-shaped metal angle iron;

an adapter plate means fastened securely to said bearing block and extending outward therefrom for mounting a tool to said bearing block assembly;

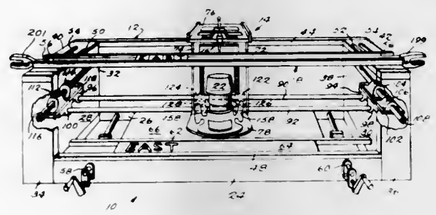
said bearing block assembly with said adapter plate secured thereto being able to move lengthwise along said straight edge assembly by means of said cam follower bearings such that a tool affixed to said adapter plate will make a straight cut.

4,095,633

WOODCARVER AND ENGRAVER MACHINE

Jerome W. Kimball, 14 W. 43rd St., Savannah, Ga. 31401, and Kenny H. Kimball, 2401 Dolphin Dr., Savannah, Ga. 31406

Filed Jan. 10, 1977, Ser. No. 758,049
Int. Cl.[2] B27Q *35/04*; B27C *5/10*
U.S. Cl. 144—144 R **14 Claims**



1. An engraving machine comprising:

frame means for supporting the machine, said frame means having front, rear and side portions;

work holding means attached to said frame means for holding at least one piece of work being engraved;

means attached to said frame means for mounting at least one template having a pattern thereon;

cutting means for cutting said workpiece;

tracing means for tracing the pattern on a template mounted in said mounting means including a stylus vertically movable with respect to said cutting means and frame means between a normal and tracing position, and a spring urging said stylus toward said normal position and toward said workpiece, said stylus being positioned closer to said template than the distance between said cutting means and said workpiece when said stylus is in said normal position so that said stylus contacts said template before said cutting means contacts said workpiece and then moves vertically with respect to said cutting means while in contact with said template and against the urging of said spring;

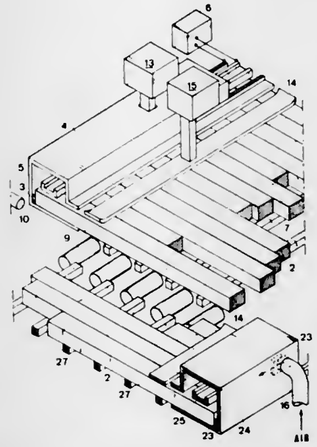
carriage means movably mounted to said frame means so as to be movable in any direction within a given horizontal plane for supporting both said tracing means and said cutting means in a fixed relationship with respect to each other when said stylus is in said tracing position and in different vertically separated horizontal planes.

4,095,634

PLANT FOR FINGER-JOINTING WOOD-BOARDS

Benkt Berglund, Sollentuna, and Olov Ohlsson, Österskär, both of Sweden, assignors to Svenska A.B. Elphiac, Solna, Sweden

Filed Mar. 30, 1977, Ser. No. 782,835
Int. Cl.[2] B27F *5/00*
U.S. Cl. 144—317 **13 Claims**



1. A plant for jointing wood-boards, comprising dielectric heating means, guiding and transporting means for the boards to convey the ends of the boards into and out of the dielectric heating means, means for cutting fingers into the heated ends of the boards, located at the output of the dielectric heating means, means for applying glue to the heated, fingered ends of the boards, located at the output of the cutting means, assembling and pressing means, located at the output of the glueing means, for assembling the glued, heated, fingered ends of the boards in an end-to-end relationship and pressing them one against the other, whilst curing the glue is provided by the heat accumulated in the heated fingered ends.

12. A method of jointing wood-boards, comprising the steps of:

a. heating the ends of said boards;

b. cutting fingers into said heated ends of said boards;

c. applying glue to said heated, fingered ends of said boards;

d. assembling said glued, heated, fingered ends of said boards in an end-to-end relationship;

e. pressing said glued, heated, fingered boards one against the other; and

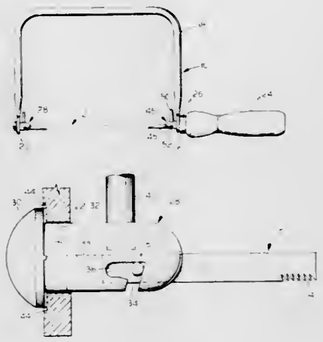
f. curing said glue by means of the heat accumulated in the heated, fingered ends.

4,095,635

COPING SAW WITH IMPROVED BLADE RETENTION MEANS

Walter J. Hutchins, West Hartford, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Oct. 12, 1976, Ser. No. 731,733
Int. Cl.[2] B27B *21/00*
U.S. Cl. 145—33 D **7 Claims**



1. A saw comprising:

A. a holder including

1. a generally U-shaped frame having a pair of spaced legs;

2. a handle secured adjacent the free end of one leg of said frame;

3. a pair of elongated anchor bolts supported adjacent the free ends of said frame and having blade mounting portions extending inwardly of said legs and towards each other, each of said blade mounting portions having a slot extending axially from the inner end thereof and a generally L-shaped notch intersecting said axial slot with a sloping leg portion sloping from the periphery thereof towards the opposite leg of said frame and an axial leg portion extending from the inner end of the sloping leg portion towards the adjacent leg; and

B. a saw blade having end portions disposed within said axial slots of said anchor bolts and having transversely extending pins on said end portions seated within said notches at the inner end of said sloping leg portions thereof, said axial leg portions of said L-shaped notches being substantially greater in width and length than the diameter of said pins, deflection of said legs of said frame resulting in camming of said pins into said axial leg portions of said notches.

4,095,636

BOWLING BALL BAG AND FRAME

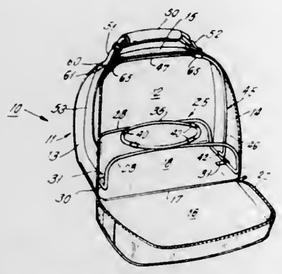
Kenard Emerson Urion, Dover, and John Harrison Tyre, Smyrna, both of Del., assignors to Leeds Travelwear, a division of Rapid-American Corporation, Clayton, Del.

Filed Feb. 18, 1977, Ser. No. 769,877
Int. Cl.[2] A45C *11/00*
U.S. Cl. 150—52 A **8 Claims**

6. A frame for a bowling ball bag comprising a lower frame section having a pair of parallel longitudinal members carrying at least one circular horizontal member between them, said circular horizontal member having a diameter less than a bowling ball and being adapted to receive and position a bowling ball; said longitudinal members each having legs extending downwardly by a distance greater than the depth to which a bowling ball may extend downwardly into said circular horizontal member;

said frame having a central vertical loop extending above said longitudinal members, said central vertical loop having a section overlying the center of said circular horizontal member and hence the center of gravity of any ball which may be carried thereby;

a bag being provided; said frame being mounted in said bag; said bag having a handle at the top;



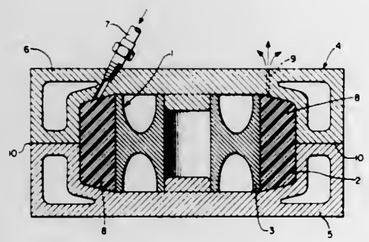
said handle being secured through the top of said bag to said section of said central vertical loop overlying said circular horizontal member.

4,095,637

SOLID POLYURETHANE TIRE/WHEEL ASSEMBLY

Ram Murthy Krishnan, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 585,141, Jun. 9, 1975, abandoned. This application Nov. 19, 1976, Ser. No. 743,431
Int. Cl.[2] B60C *1/00*; C08G *18/32*; C08K *5/12*; B29D *3/02*
U.S. Cl. 152—323 **6 Claims**



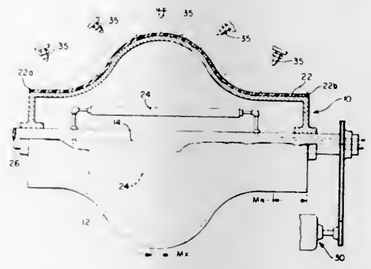
1. A solid industrial polyurethane tire where said polyurethane is prepared by reacting (A) a curative of 1,3-propane diol with a prepolymer of diphenylmethane-4,4'-diisocyanate and a polymeric polyol or (B) a curative complex of 4,4'-methylene dianiline and a salt selected from sodium chloride, sodium bromide, sodium iodide, sodium nitrite, lithium chloride, lithium bromide, lithium iodide, lithium nitrite and sodium cyanide, where said salt is first dispersed in a plasticizer selected from at least one of dioctyl phthalate, tetraethylene glycol di(2-ethylhexoate) and dibutoxyethoxyethyl formal, with a prepolymer of a diisocyanate selected from (1) diphenylmethane-4,4'-diisocyanate and (2) toluene diisocyanate with a polymeric polyether polyol; where said polymeric polyol has a molecular weight in the range of about 800 to about 2500 comprised of polypropylene ether glycol in the amount of (i) about 90 to about 100 weight percent when combination (A) is used, (ii) about 30 to about 80 weight percent when combination (B-1) is used or (iii) about 50 to about 100 weight percent when combination (B-2) is used, where the corresponding remainder of said polymeric polyol is selected from at least one of (a) a polyether ester selected from at least one of diethylene glycol, dipropylene glycol and dibutylene glycol ester of a dicarboxylic acid selected from at least one of adipic acid, isophthalic acid, phthalic acid and terephthalic acid and (b) at least one polyester polyol derived from a saturated hydrocarbon diol having 2 to 6 carbon atoms and a dicarboxylic acid selected from at least one of adipic, succinic, azelaic, phthalic and terephthalic acids, where the ratio of isocyanato groups to hydroxyl groups of said polymeric polyols is in the range of about 1.7/1 to about 2.3/1 and where the ratio of sum of hydroxyl groups of said 1,3-propane diol, if used, and amine groups of said 4,4'-methylene dianiline complex, if used, to the excess isocyanato groups over said polymeric polyol hydroxyl groups is in the range of about 0.8/1 to about 1.1/1, said tire characterized by (A) a polyurethane having a compression set of about 15 to about 45 percent determined by ASTM D-395 Method B and a Goodrich flex life of about 15 minutes or more (ASTM D-623 test modified by having a 437 psi load at 38° C. starting temperature and a 0.15 inch stroke, or (B) capable of supporting an incrementally increased load up to at least about 7700 pounds for at least about 65 hours at a speed of about 3 miles per hour when said wheel assembly has a ground contacting tire portion with an outside diameter of about 15 inches, a width of about 5 inches and an inside diameter of about 11 inches adhered to a steel centered core.

4,095,638

MANUFACTURING OF INNER TUBES FOR TIRES

Donald R. Thompson; Paul R. Matvey, both of Akron, and William J. Hampshire, Peninsula, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 561,817, Mar. 25, 1975, abandoned. This application Mar. 22, 1976, Ser. No. 669,372
Int. Cl.[2] B29H *15/00*
U.S. Cl. 152—349 **10 Claims**



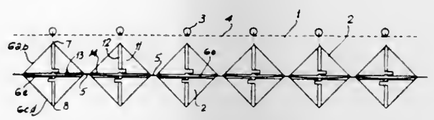
1. The method of making an inner tube for a vehicle tire comprising rotating a rigid former about an axis, spraying a self-curing elastomeric composition in liquid suspension on the surface of the former while the latter rotates to form on the surface a continuous, homogenous, single layer sleeve, drying the sleeve to a non-tacky elastic state while the sleeve remains on the former, transposing one circular edge of the sleeve axially over the intermediate portion of the sleeve to a position on the sleeve near its other edge, then joining the two edges of the sleeve to form a closed toroid, and then removing the cured toroidal tube from the former.

4,095,639

INSULATING SCREEN

Declan Francis Ryan, 15 Mardyke St., Athlone, County Westmeath, Ireland

Filed Jul. 16, 1976, Ser. No. 705,989
Claims priority, application Ireland, Jul. 18, 1975, 1612/75
Int. Cl.[2] E06B *3/94*; A47H *5/00*
U.S. Cl. 160—84 R **6 Claims**



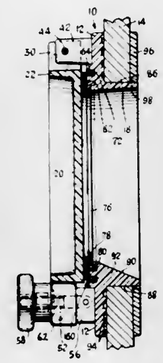
1. A thermally insulating screen which can be deployed and withdrawn by extension and retraction in its own plane, comprising at least one integral layer of similar tubular air chambers of flexible plastics film sheets in parallel formation, without a rigid framework and defining screen sidewalls, and an inextensible tie member fixed to said at least one layer to limit the extension of the screen chambers, each chamber being adapted to fold flat into a plane perpendicular to the layer on retraction of the screen, each chamber moreover having at least one open end and being provided at said open end with at least one guard flap constituting an extension of one of said film sheet sidewalls and being folded substantially perpendicular to said sidewall during chamber extension to substantially close off said at least one open end to permit the passage of air in quantity through said open end during expansion and contraction of the chamber only during erection and retraction of the screen, but which renders the interior or each chamber in the deployed screen substantially unventilated, upon erection to substantially restrict convection air flow through said at least one open end of said chamber.

4,095,640

BOAT WINDOW

Frank S. Beckerer, Jr., 40 Dock Rd., Milford, Conn. 06460

Filed Feb. 2, 1977, Ser. No. 765,101
Int. Cl.[2] E06B *3/32*
U.S. Cl. 160—92 **16 Claims**



1. A self-draining, leak-resistant boat window, comprising in combination:

(a) a frame body comprising a continuous mounting flange for engagement with an inner surface surrounding an opening in the wall of a boat,

(b) said body including a spigot connected with said flange and defining the window opening and having a lower portion with an upwardly facing drain surface constituting a sill, said spigot being adapted to extend through said wall opening of the boat,

(c) a transparent window pane for closing off the window opening formed by the spigot,

(d) means hingedly connecting said window pane to said mounting flange,

(e) cooperable latch means on said flange and pane, for securing the latter in a closed position,

(f) means defining a peripheral groove in said mounting flange, and

(g) a gasket carried by the mounting flange and engageable with peripheral portions of the window pane when the latter is in the closed position,

(h) said gasket having a yieldable portion adapted to flatten in cross-section when the pane engages it,

(i) said gasket further including protruding means receivable in the peripheral groove in said mounting flange, said frame body having a removable window screen frame, portions of which are interposed between the spigot and the yieldable portion of said gasket,

(j) the yieldable portion of said gasket overlying at least parts of said screen frame and holding the latter in position,

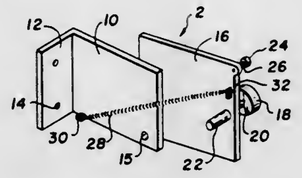
(k) upper surfaces of the yieldable portion of the gasket and of the screen frame being disposed at a level above the surface of said sill, whereby water splashed thereon and against the window pane can drain by gravity from the vicinity of the yieldable portion of the gasket and from the vicinity of the window pane outwardly and in directions away from said pane.

4,095,641

ATTACHMENT FOR AN OVERHEAD DOOR

Bruce Edgar Olson, 2341 - 208th St., Langley, British Columbia, Canada

Continuation of Ser. No. 640,918, Dec. 15, 1975. This application Jan. 10, 1977, Ser. No. 757,837
Int. Cl.[2] E05D *15/24*
U.S. Cl. 160—209 **4 Claims**



1. In combination with an overhead door of the type having limited head room, the door comprised of hingedly connected sections and movable between a closed vertical position and an open, horizontal position within the head room on single continuous tracks, one track each located adjacent a door side and each track including an inner roller supporting edge and an outer edge, the improvement comprising an attachment including,

a first member adapted for rigid attachment to a top corner section of the door and extending inwardly past the inner edge of a track so as to have a part thereof disposed at all times inwardly past said track inner edge,

a second member in parallel relationship with said first member,

pivot means connecting said second member to said first member part disposed inwardly of the track inner edge,

means on the members limiting pivotal movement of the members,

a shaft and roller assembly carried by said second member with said roller entrained at all times on a single track,

an abutment flange on said second member at all times in outward proximity of the track outer edge,

a stop disposed on the outer edge of the track coacting with said abutment flange during door travel, such coaction imparting rotational movement to said second member about the axis of said shaft and roller assembly to thereby advance said pivot means and said first member in a direction to expedite closure of the top door section,

said stop including angulated limbs, one of said limbs disposed for contact by said abutment flange during door closing travel, another of said limbs of said stop disposed for contact by said abutment flange during initial door opening travel to retard upward travel of the second member and compel occurrence of joint rotational movement of the first and second member about said pivot means, and

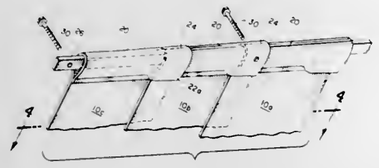
said top section of the door during initial upward door opening movement moving jointly about the axis of said pivot means which axis simultaneously moves away from the track inner edge about the axis of said shaft and roller assembly to thereby retract the top door section toward the rail to provide clearance from overhead obstructions.

4,095,642

PLASTIC STRIP DOOR

Donald J. McKinnon, and Duane M. McKinnon, both of Chino, Calif., assignors to Cool Curtain, Inc., Pomona, Calif.

Filed Jul. 27, 1977, Ser. No. 819,329
Int. Cl.² A47H *1/00*
U.S. Cl. 160—332 **14 Claims**



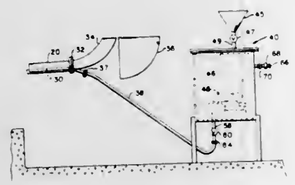
1. A door comprising a plurality of elongated flexible strips for hanging in a wall opening, a vertical edge of each of said strips overlapping an adjacent strip, the upper end of each strip being folded on itself to form a loop sized to receive a support bar, a portion of the upper end of the strip being attached to the body of the strip at a location spaced from the end of the strip, and a portion of the upper end of said strip on one vertical edge being unattached to the body of the strip at said location to permit said unattached loop portion to overlap the edge of the adjacent strip.

4,095,643

AGENT FEEDER FOR PIPE CASTING APPARATUS

Carl P. Farlow; Joel P. Sutherland, and William E. Snow, all of Birmingham, Ala., assignors to American Cast Iron Pipe Company, Birmingham, Ala.

Filed Nov. 29, 1974, Ser. No. 528,442
Int. Cl.² B22D *13/10, 13/02*
U.S. Cl. 164—301 **9 Claims**



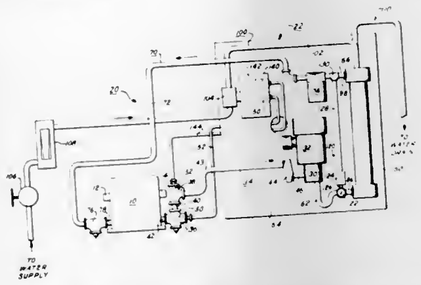
1. Apparatus for casting pipe comprising:
(a) a rotatable mold;
(b) a trough for delivery of molten metal from a source thereof to the interior of said mold;
(c) means for imparting a relative motion between said rotatable mold and said trough, whereby the molten metal is discharged from a discharge end of said trough as said trough moves with respect to said mold;
(d) a tube supported in a fixed relationship with respect to said trough for delivery of a mixture of solid, fine agents to said discharge end of said trough, whereby the fine agents are delivered to the interior of said mold; said tube having an inlet and an outlet;
(e) a feeder assembly for providing a measured charge of the solid, fine agents to said tube inlet and including a pressure-tight chamber, a first agent-introducing conduit and associated first valve means for selectively regulating the introduction of the fine agents into said chamber, a second gas-introducing conduit and associated second valve means for selectively introducing pressurized carrier gas within said chamber, and maintaining the pressure within said chamber in the range of 10 to 15 psi, feeding means disposed within said chamber including a first hopper positioned to receive the introduced fine agents, a first vibratory sloped try disposed beneath said hopper and selectively energizable for controlling the rate of flow of the charge of the agents at a measured rate, and a third exit conduit disposed to receive the measured charge of particles and associated third valve means for selectively controlling the flow of the mixture of the measured charge of agents and the carrier gas to said tube inlet.

4,095,644

COOLING SYSTEM FOR GEAR REDUCERS

Robert O. Huff, Columbus, Ind., assignor to Reliance Electric Company, Columbus, Ind.

Filed Nov. 10, 1976, Ser. No. 740,353
Int. Cl.² F28F *27/00*
U.S. Cl. 165—13 **10 Claims**



1. A cooling system for gear reducers having a housing with a lubricant therein, comprising a pump, a motor for driving said pump, a hot lubricant line for connecting said pump to the reducer housing, a heat exchanger, a pump outlet line connecting said pump to said heat exchanger, a return line connecting said heat exchanger to the reducer housing, a supply line connecting said heat exchanger to a source of coolant, a discharge line for said coolant from said heat exchanger, a control valve in said supply line, means for sensing the temperature in said hot lubricant line anterior to said pump and regulating the operation of the control valve in said coolant supply line, and a base structure supporting said pump, heat exchanger and connecting lines as a unitary assembly.

4,095,645

LINEAR UNIFORM HEAT WRAP CONTROL

William A. Massey, Mount Holly, N.J., assignor to Molins Machine Company, Inc., Cherry Hill, N.J.

Filed Jan. 12, 1977, Ser. No. 758,611
Int. Cl.² F28D *11/02*
U.S. Cl. 165—13 **10 Claims**

1. A heat wrap control, comprising:
set point means for selectively providing a set point heat signal indicative of the amount of heat to be transferred to a moving web,
speed sensing means for providing a reference speed signal indicative of the speed of the web, and
control means operatively associated with said set point means and said speed sensing means for controlling wrap of the web about a preheater drum to effect uniform heat transfer to the web.

7. A method of controlling the amount of heat transferred to a moving web, comprising:

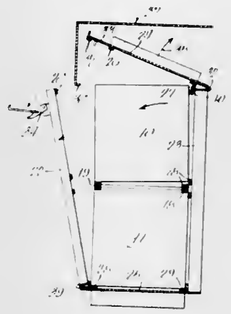
selectively providing a set point heat signal indicative of the amount of heat to be transferred to a moving web,
providing a reference speed signal indicative of the speed of the web, and
controlling wrap of the web about a heated drum to effect uniform heat transfer to the web as a function of said set point heat and reference speed signals.

4,095,646

HEAT EXCHANGE STRUCTURE

Dennis C. Granetzke, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.

Filed Jan. 10, 1977, Ser. No. 758,129
Int. Cl.² F28F *7/00*
U.S. Cl. 165—77 **10 Claims**



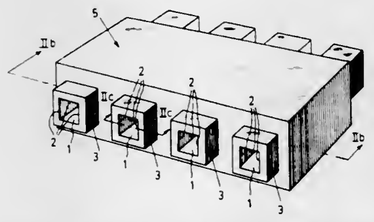
1. A heat exchanger structure, comprising: a rectangular heat exchanger having opposite sides including a top and bottom; a supporting frame enclosing said heat exchanger having open sides including an open top side and bottom side and open lateral sides; hinge means at one end of said frame sides for opening outwardly of the heat exchanger top side; gasket means sealing the edges of the heat exchanger to adjacent edges of said frame; and releasable clamp means drawing one of said frame sides toward the heat exchanger for releasably clamping all said frame sides to said frame at said gaskets.

4,095,647

HEATING DEVICE

George Albert Apolonia Asselman, and Josef Wilhelmus Johannes Maria Van der Leegte, both of Eindoven, Netherlands, assignors to U.S. Philips Corporation, Briarcliff Manor, N.Y.

Division of Ser. No. 378,245, Jul. 11, 1973, Pat. No. 3,955,618.
This application Nov. 13, 1975, Ser. No. 631,506
Claims priority, application Netherlands, Jul. 9, 1972, 7209936
Int. Cl.² F28D *15/00*
U.S. Cl. 165—105 **3 Claims**



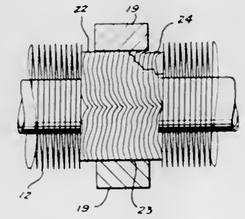
1. Heating apparatus for use with a heat source, which comprises an enclosed common heat reservoir, at least a portion of at least one wall of said common heat reservoir being associated with said heat source, a plurality of separate isothermal heating units traversing through said common heat reservoir and being formed of concentrically arranged spaced inner and outer tubular members, each end of each heating unit extending outwardly of said common heat reservoir, each said inner tubular member defining a heating chamber and each said pair of spaced tubular members together defining an annular heat reservoir in communication with said common heat reservoir, each end of each said annular heat reservoir being closed, a first capillary material on the inner surface of the walls of said common heat reservoir, a second capillary material on the inner surface of the walls of each said annular heat reservoir, and a third capillary material extending between said second capillary material and said first capillary material, and a vaporizable and condensible heat-transporting medium in said common heat reservoir and said annular heat reservoirs, said medium, when heat is supplied to the common heat reservoir by said heat source, vaporizing and flowing into the annular heat reservoirs wherein it condenses and provides heat for transmittal through the respective inner tubular members into the respective heating chambers, the resulting medium condensate flowing back into said common heat reservoir at least partly by means of said third capillary material.

4,095,648

TUBE BUNDLES

Kelly V. Shipes, Houston, Tex., assignor to Hudson Products Corporation, Houston, Tex.

Filed Jul. 1, 1976, Ser. No. 701,624
Int. Cl.² F28F *1/36, 9/00*
U.S. Cl. 165—162 **17 Claims**



1. A tube bundle, comprising a plurality of parallel rows of finned tubes, the axes of adjacent tubes in adjacent rows being arranged in triangular patterns, headers fixedly connected to the opposite ends of the tube, a portion of the fins of each tube being radially inwardly crushed to provide an annular recess between adjacent uncrushed fins having a base formed by bent-over outer end portions of the fins, said recesses being generally laterally aligned with one another, and a rigid strip extending between adjacent rows of tubes intermediate the ends thereof, each strip having arcuate surfaces on one side thereof which fit closely about portions of the bases of the tubes of one adjacent row and arcuate surfaces on the other side thereof which fit closely about portions of the bases of the tubes of the other adjacent row.

4,095,649

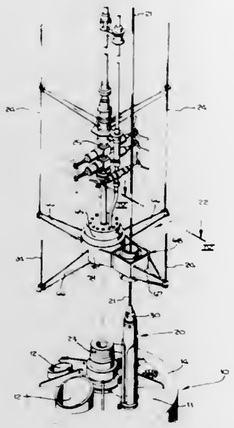
REENTRY SYSTEM FOR SUBSEA WELL APPARATUS

Georges M. Chateau, Pau, France, and Chester B. Falkner, Jr., Huntington Beach, Calif., assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

Filed Jan. 13, 1977, Ser. No. 759,032
Int. Cl.² E21B *7/12*
U.S. Cl. 166—0.5 **16 Claims**

1. In a reentry system for a subsea station having a well apparatus provided with protected receptacles for receiving well equipment lowered from the sea surface, the combination of:
an elongated guide post means on said apparatus;
one of said protected receptacles supporting and housing said guide post means in retracted position;
means for moving said guide post means into an extended exposed position;

engagement means cooperable with said guide post means for positioning an adaptor frame structure on said apparatus;



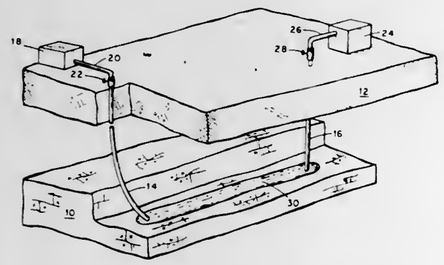
said engagement means including self-adjusting means for guiding cooperation of said frame structure with said guide post means.

4,095,650

METHOD FOR INCREASING THE CALORIFIC VALUE OF GAS PRODUCED BY THE IN SITU COMBUSTION OF COAL

Lowell Z. Shuck, Morgantown, W. Va., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 10, 1977, Ser. No. 823,480
Int. Cl.² E21B *43/24*
U.S. Cl. 166—256 **4 Claims**



1. A method for the production of combustible gas by the in situ gasification of coal in subterranean coal bed, comprising the steps of penetrating the coal bed with at least one borehole, initiating combustion of the coal disposed contiguous to the borehole, and selectively varying the absolute pressure with the resulting combustion zone at a level which will provide sufficient leakage of natural water in the coal bed into the combustion zone for providing a CO and H_2 producing reaction between the water and hot carbon in the combustion zone to increase the Btu content of the combustible gas from about 25 to 100 Btu/SCF.

4,095,651

PROCESS FOR SELECTIVELY PLUGGING AREAS IN THE VICINITY OF OIL OR GAS PRODUCING WELLS IN ORDER TO REDUCE WATER PENETRATION

Guy Chauveteau, Rueil Malmaison, and Jean-Claude Moulu, Le Vesinet, both of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Filed Sep. 24, 1976, Ser. No. 726,225
Claims priority, application France, Sep. 25, 1975, 75 29833
Int. Cl.² E21B *33/138*
U.S. Cl. 166—294 **13 Claims**

1. A process for reducing or suppressing water penetration from an underground formation into at least one portion of a well for oil and/or hydrocarbon gas production traversing said formation, which comprises the following steps:

a. injecting a stable limpid aqueous saline solution of a water-soluble non-crosslinked polymer P at a concentration C from a well into the portion of the formation from where water penetration into the well must be reduced or suppressed, said stable limpid, saline polymeric solution having an inversely proportional viscosity-salt concentration behavior, the viscosity η_2 of said solution being such that $\eta_2 < \eta_1$ where η_1 is the viscosity of a solution of the water-soluble polymer P at concentration C in water of the formation, the lower viscosity η_2 being obtained in said stable, limpid, saline, polymeric solution by the presence of a sufficient quantity of alkali metal salt, alkaline earth metal salt, or mixtures thereof;

b. placing the well on production of oil and/or gas which permits the fluids of the formation to contact that part of the formation which contains the adsorbed polymer, whereby the oil and/or gas selectively passes through said part of the formation to flow into the well, while the water production is reduced.

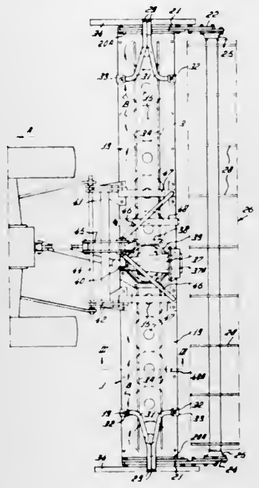
4,095,652

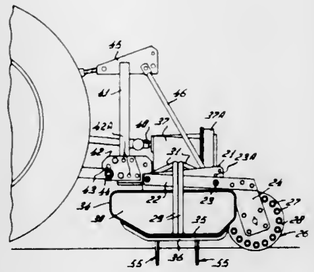
IMPLEMENT COUPLING MEMBER

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Division of Ser. No. 421,111, Dec. 3, 1973, Pat. No. 4,046,201.
This application Jun. 9, 1977, Ser. No. 805,028
Claims priority, application Netherlands, Apr. 12, 1972, 7216407
Int. Cl.² A01B *59/06*
U.S. Cl. 172—47 **7 Claims**

1. A soil cultivating implement comprising a frame and a plurality of soil working members rotatably mounted on upwardly extending axes, said members being supported along the length of an elongated frame portion that extends transverse to the direction of travel, a coupling member interconnected to said frame portion and positioned at the front thereof for coupling the implement to a three-point hitch of a tractor, said coupling member comprising an upper coupling point and two spaced apart lower coupling points, each lower point comprising a pair of upright apertured plates that are separated from one another and a respective vertical plate on said frame portion extending between said pair of plates, said vertical plate having a hole in alignment with any of the apertures in said pair of plates, bolt means being passed through each pair of plates and respective vertical plate, and the relative position





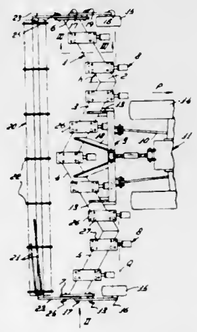
of of the frame portion to said coupling member being changeable in both vertical and horizontal directions.

4,095,653

SOIL CULTIVATING IMPLEMENTS

Cornelis van der Lely, 7 Brilschenrain, Zug, Switzerland

Filed Jul. 29, 1976, Ser. No. 709,927
Claims priority, application Netherlands, Jul. 29, 1975, 7509003
Int. Cl.² A01B *49/02*
U.S. Cl. 172—177 **7 Claims**



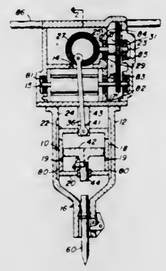
1. A soil cultivating implement connectable to a multiple point lifting hitch of a tractor, comprising a frame having elongated frame beams assembled end to end at junctures that define a substantially W-shape, when viewed in plan, the assembly including outermost beams and interior beams that extend generally horizontal and transverse to the direction of travel and each beam extending at an oblique angle to the direction of travel, said beam mounting two spaced apart deep tillage members that depend therefrom and said tillage members being fixed to said beam intermediate the ends thereof, a multiple point coupling hitch having laterally extending arms with coupling points and said hitch being fastened to substantially the mid-point of the assembly by plate means and support means, said plate means and support means extending upwardly and forwardly from connections on said interior beams to further connections on said arms, said further connections being spaced from said coupling points, said hitch being located adjacent a vertical plane that extends transverse to the direction of machine travel and said plane containing the foremost tips of alternate junctions of the beams, said outermost beams being positioned laterally of said hitch.

4,095,654

IMPACT DEVICE WITH MULTIPLE CONNECTING RODS AND GEARING

Frederick W. Ross, 755 Klamath Dr., Del Mar, Calif. 92014

Filed Nov. 15, 1976, Ser. No. 742,109
Int. Cl.² B25D *9/00*
U.S. Cl. 173—118 **15 Claims**



1. An impact device having a frame with exciter-reciprocative means mounted thereon for driving a reciprocating element in reciprocation along a substantially straight selected path relative to the frame, output tool means, ram means free for reciprocation substantially along the selected straight path for impacting against the output tool means, and coupler means operatively interconnecting the reciprocating element to the ram means for actuation thereof upon reciprocation of the reciprocating element, said exciter-reciprocative means comprising:

a crankshaft rotatably mounted on crankshaft bearings secured on said frame,

a rotary motor mounted on said frame and having a rotor shaft with rotor axis,

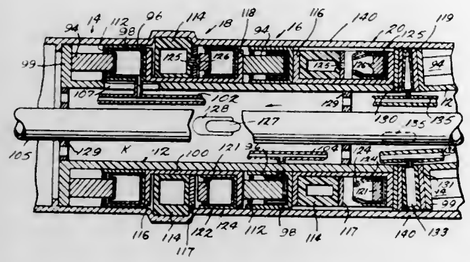
gearing means operatively interconnecting said rotor shaft with said crankshaft for rotation thereof at a rotational speed different from that of said rotor shaft,

at rotary two connecting rods operatively connected to said crankshaft in a spaced relation for actuation thereby in substantially the same rotational phase at substantially the same crank radius positioning operatively connected to reciprocate and rotary element along said selected path upon rotation of said crankshaft, and

said rotaty motor mounted on said frame substantially between said crankshaft and said reciprocating element and substantially between at least two of said at least two connecting rods, said positioned of said coupler means, said rotor motor, said crankshaft and said at least two connecting rods providing means for substantially longer connecting rods to substantially reduce extraneous vibra-

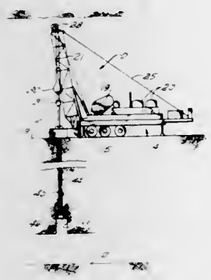
tions and extraneous forces occurring therefrom during operation.

4,095,655
EARTH PENETRATION
William L. Still, P.O. Box 878, Purcellville, Va. 22132
Filed Oct. 14, 1975, Ser. No. 621,787
Int. Cl.[2] E21B *11/02, 1/06*
U.S. Cl. 175—19 **33 Claims**



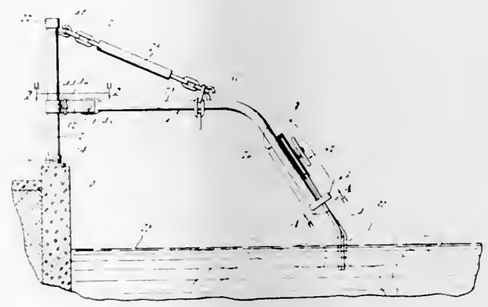
1. An assembly for providing lateral thrusts in an area having a confined radial dimension, said assembly comprising
(a) a generally tubular mandrel of a fixed lateral length,
(b) a pair of generally toroidal lateral force cells mounted on and surrounding said mandrel and each being expandable and retractable in said lateral direction, the combined length in the lateral direction of said lateral force cells being a fixed amount less than the length of said mandrel, each of said lateral force cells having means associated therewith for restricting the radial expansion thereof so that each of said toroidal lateral force cells has a substantially constant radial dimension,
(c) a pair of generally toroidal radial force cells mounted on and surrounding said mandrel each having a substantially fixed lateral dimension but being expandable in the radial direction,
(d) said radial and lateral toroidal force cells being alternately disposed on said mandrel, and
(e) means for selectively expanding or contracting said force cells for movement of said assembly in the lateral direction.

4,095,656
RAISE BORE DRILLING
Gordon B. French, Bakersfield, Calif., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.
Filed Mar. 3, 1976, Ser. No. 663,547
Int. Cl.[2] E21C *23/00*
U.S. Cl. 175—53 **9 Claims**



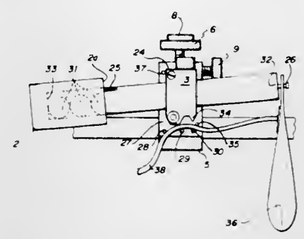
1. In a method of raise bore drilling in which a drill string extends in a pilot hole between a rotary action raise bore drilling bit at the lower end of the pilot hole and a drill string drive means above and adjacent the upper end of the pilot hole, the drill string drive means including means operable for applying torque and axial tension to the drill string while affording axial motion of the drill string therepast, the improvement comprising using a drill string which is non-round over at least substantially the entirety of its length between the drive means and the bit for concurrently transmitting torque and axial tension from the drive means to the bit for operating the bit.

4,095,657
SWIMMING APPARATUS
George Hohwart, 2765 Eager Rd., Howell, Mich. 48843
Filed Oct. 10, 1975, Ser. No. 621,581
Int. Cl.[2] A63B *31/00*
U.S. Cl. 272—71 **8 Claims**



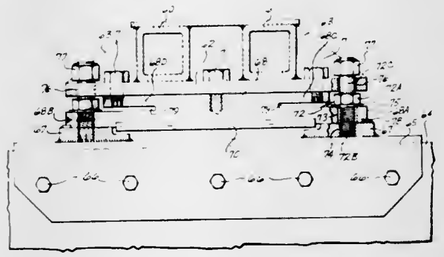
1. A swimming apparatus for holding and supporting a swimmer in a pool of water while at the same time allowing the swimmer to swim naturally, to change from one swimming position to another, and to roll and twist during swimming, the apparatus comprising
support means adapted to be attached to a stationary mounting means adjacent to said pool and having a cantilever member extending laterally over said pool and terminating at the outer end thereof at a position adjacent the swimmer;
a belt support member having a first end portion secured to said cantilever member intermediate the end thereof, and a second free end portion projecting outwardly from said cantilever member; means mounted on said second end portion of said belt support member and having the periphery thereof exposed, said periphery defining a belt engaging surface facing away from said outer end of said cantilever member;
an endless, rope-like belt means having a portion thereof looped over said support member and engaged with said surface, said belt means also including a portion extending from said support member which is of sufficient length to be wrapped at least once around the swimmer's waist when the latter is in swimming position in said pool, said belt means being operative to travel back and forth around the support member and about the swimmer as the latter rolls and turns in swimming or moves from one swimming position to another;
guide means on said cantilever member outboard of said support member and located between said support member and the portion of said belt means wrapped around the swimmer for slidably receiving portions of said endless belt means between said support member and the swimmer and operative to gather and confine the same to prevent said belt means from slipping along the body of the swimmer while permitting said confined portions to slide back and forth therein as the belt means moves on the support member and around the swimmer in response to the swimmer's movements; and
means for adjusting the position of said support member along said cantilever member to provide compensation for variable conditions such as water level and swimmer size.

4,095,658
FLUID MEASUREMENT DEVICE
Ray Kendall, and Burt Henry McGhee, both of Fort Worth, Tex., assignors to Iso AB, Inc., Dallas, Tex.
Filed Nov. 22, 1976, Ser. No. 744,121
Int. Cl.[2] G01G *13/02, 1/18, 1/36;* **A61M** *5/00*
U.S. Cl. 177—118 **21 Claims**



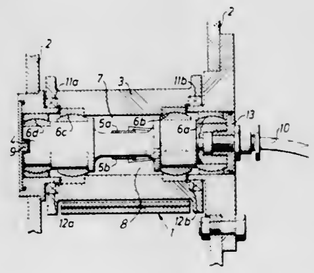
1. A fluid collection and dispensing device for use in connection with a fluid container and flexible tubing leading thereto comprising:
(a) a hollow balance bar having a first closed end and a second closed end;
(b) a balance bar mounting member through which said balance bar extends, pivotally attached to a first rotatably adjustable clamping means;
(c) a second fixed clamping means comprising a means for rotatable attachment of said first adjustable clamping means;
(d) spherical weights disposed within said hollow balance bar;
(e) an adjustable counter weight, operatively engaged with said first end of said balance bar;
(f) opposing flexible tube constricting means on said balance bar mounting member and said first rotatably adjustable clamping means; and
(g) a means for attaching a hanging fluid container affixed to said second end of the balance bar.

4,095,659
DEFLECTION-RESTRAINED LOAD CELL FOR ON-BOARD VEHICLE WEIGHING SYSTEMS
Carl Blench, Stanwood, and Carl R. Harris, Kirkland, both of Wash., assignors to Eldec Corporation, Lynnwood, Wash.
Filed Jun. 10, 1976, Ser. No. 694,652
Int. Cl.[2] G01G *19/12*
U.S. Cl. 177—136 **8 Claims**



1. In a load cell assembly providing part of an on-board load weighing system for a vehicle having a frame member and a load support member to which the load which is to be measured is applied, the load cell assembly being adapted to be located between the load support member and the frame member and including elongated beam means having a central portion and first and second ends, means for securing the first and second ends of the beam means to the frame member of the vehicle and for elevating the central portion of the beam means above the frame member, elongated load concentrating means to be secured to the load support member and integral with the central portion of the beam means and having first and second ends defining, in combination with the first and second ends of the beam means, a pair of slots extending inwardly from said ends for directing the applied load to the central portion of the beam means, an improvement comprising:
restraining means to be secured to the frame member for limiting deflection of the first and second ends of the load concentrating means in a direction toward the load support means.

4,095,660
ROLLER
Kurt Eilert Johansson, Timmermansgatan 12, S-981 00 Kiruna, Sweden
Filed Sep. 15, 1976, Ser. No. 723,323
Claims priority, application Sweden, Sep. 18, 1975, 7510442
Int. Cl.[2] G01G *19/08, 3/14*
U.S. Cl. 177—136 **10 Claims**



1. Apparatus for indicating a charge or load on an axle (**4**), first means (**6a, 6d**) for supporting said axle (**4**) at two positions which are spaced apart in the longitudinal direction of said axle (**4**), said first means including self-aligning means for floatingly journalling said axle at said two positions relative to a support (**2**);
a substantially inelastic roller (**3**) on said axle (**4**), on the peripheral surface of which roller said charge or load is arranged to act;
second means (**6b, 6c**) for rotatably supporting said roller (**3**) on said axle (**4**) and for permitting said roller (**3**) to float relative to said axle (**4**) at two spaced positions respectively disposed adjacent said spaced supporting positions of said axle (**4**) and substantially equally spaced relative to the centre of said axle (**4**);
at least one transmitter (**5**) mounted on said axle (**4**) and located in the area between said spaced roller supporting positions for generating a signal in response to, and as a function of, deflection of said axle (**4**) under the influence of said charge or load acting on said roller (**3**) ; and
third means (**14, 15, 16**) coupled to said at least one transmitter (**5**) for indicating the weight of said load or charge as a function of said signal.

4,095,661
WALKING WORK VEHICLE
James R. Sturges, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed May 9, 1977, Ser. No. 795,034
Int. Cl.[2] B62D *57/02*
U.S. Cl. 180—8 E **9 Claims**

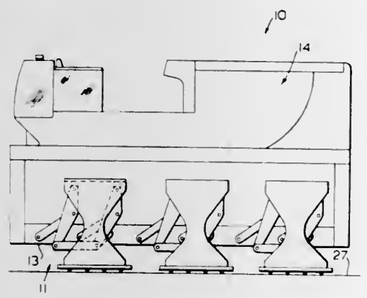
1. In a work vehicle having first and second opposed side portions, a frame, a power source, and a work element, the improvement comprising:
a plurality of separate, movable feet positioned along each side portion of the vehicle; and
means for connecting each foot to the frame and the power

source for controllably moving each foot in a preselected manner sufficient to move the vehicle along the ground at a substantially constant velocity and maintain the frame of the vehicle substantially parallel to the ground,

said connecting means of each foot comprising:

a first pair of spaced apart connecting elements each having first and second end portions and being pivotally connected at the first end portion to the frame;

a second pair of spaced apart connecting elements each having a first and second end portions and a middle portion and being pivotally connected to the second end portion of a respective first connecting element

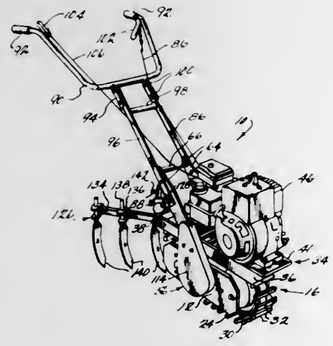


a connecting member pivotally connected at each end portion to a respective first end portion of a second connecting element at locations sufficient for maintaining the second pair of connecting elements substantially parallel one to the other during the operation thereof;

second means for pivotally connecting each foot to the second end portion of each second connecting element at spaced locations sufficient for maintaining a ground contacting surface of the foot substantially parallel with the frame during the operation thereof; and

third means for connecting one of the connecting elements to the power source.

4,095,662
GARDEN TRACTOR
Alvin S. Beachy, Salisbury, Pa. 15558
Filed Nov. 30, 1976, Ser. No. 746,019
Int. Cl.² B62D *55/00*
U.S. Cl. 180—9.22 **8 Claims**



1. A garden tractor comprising:

a pair of generally rectangular plates,

a cylindrical member extending transversely between the central portion of said plates with its axis disposed horizontally and having its ends rigidly secured thereto so as to maintain said plates in parallel relation with respect to each other in generally vertical planes and with the longitudinal extent thereof generally horizontal,

an endless track assembly carried by and between said plates for driving movement in an endless path encircling said cylindrical member,

a generally horizontally extending frame disposed above said plates and said endless track assembly including a sleeve fixedly carried in depending relation to the central portion of said horizontally extending frame on each side thereof and rotatably mounted around an associated end of said cylindrical member, and a handle structure extending upwardly and rearwardly from said horizontally extending frame by which an operator is enabled to pivot said horizontally extending frame about the axis of said cylindrical member by virtue of the mounting of said sleeves around said cylindrical member,

a first shaft mounted on said horizontally extending frame for rotational movement about an axis parallel to the axis of said cylindrical member,

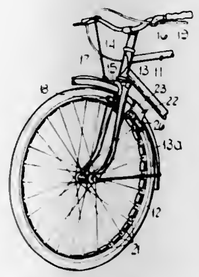
an internal combustion engine carried by said horizontally extending frame and releasably drivingly connected with said first driven shaft,

a second shaft mounted within said cylindrical member with its ends extending transversely outwardly of said plates for rotation about an axis concentric with the axis of said cylindrical member,

first endless drive means extending between said first shaft and an end of said second shaft, and

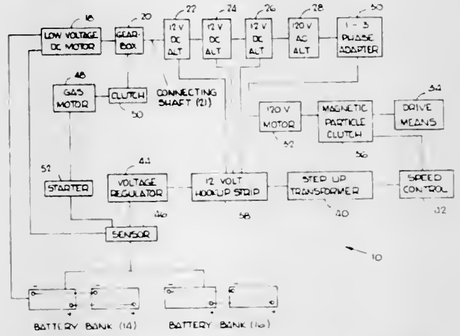
second endless drive means extending between an end of said second shaft and said endless track assembly.

4,095,663
CYCLES
Edward Norman Gaffney, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England
Filed Nov. 11, 1976, Ser. No. 741,061
Int. Cl.² B60L *11/12*
U.S. Cl. 180—33 C **3 Claims**



1. An electrically assisted pedal cycle including means whereby the rider of the cycle can propel the cycle, an electric motor and an associated electric storage battery carried by the frame of the cycle for assisting the rider in propelling the cycle, and a generator operable by rotation of a ground engaging wheel of the cycle, said generator being defined by a plurality of magnets disposed around the rim of said ground engaging wheel of the cycle, and a stator assembly carried by the frame of the cycle and positioned adjacent said wheel rim, said stator assembly including a winding connectible to said battery by means of a manually operable, normally open switch, and a rectifier, the arrangement being such that closure of said switch while said wheel rotates relative to said stator assembly completes an electrical circuit between the stator winding and the battery, whereby electricity generated by passage of said magnets adjacent the stator assembly is supplied to said battery by way of said rectifier to charge said battery, and said wheel is braked by the associated regenerative braking effect the cycle further including a friction brake and a manually operable control mechanism for operating said friction brake, the contacts of said normally open switch being closed by initial movement of the brake control mechanism prior to the application of significant braking force by way of the friction brake which is controlled by said mechanism whereby said brake control mechanism can effect electromagnetic regenerative braking of the cycle without significant braking force from the friction brake.

4,095,664
ELECTRIC MOTOR DRIVEN AUTOMOTIVE VEHICLE HAVING A MAGNETIC PARTICLE CLUTCH
George A. Bray, Rte. 1, Box 1227, Shingle Springs, Calif. 95628
Filed Nov. 29, 1976, Ser. No. 745,586
Int. Cl.² B60K *1/02*
U.S. Cl. 180—65 R **4 Claims**



1. An electric motor power means suitable for boats, cars, and other vehicles, comprising:

(a) a constant speed electric motor of predetermined voltageand current,

(b) an alternator of the same predetermined voltage electrically connected to said constant speed motor

(c) a plurality of rectified alternators of a separately predetermined voltage,

(d) a DC motor coupled to the alternator (b) and to the DC rectified alternators to drive said alternator and said DC rectified alternators

(e) a DC battery means connected to said DC motor wherein the output voltage of the battery means is the same as the voltage of the DC motor and the predetermined voltage of the DC rectified alternators

(f) means to electrically connect the outputs of the DC alternators to the DC battery means to supply electrical energy back to recharge said battery means, and

a drive shaft of said vehicle

a magnetic particle clutch coupled between said constant speed motor and said drive shaft, and

means for varying the coupling strength of the magnetic particle clutch;

whereby variations in the coupling strength will produce variations in the speed of rotation of the drive shaft.

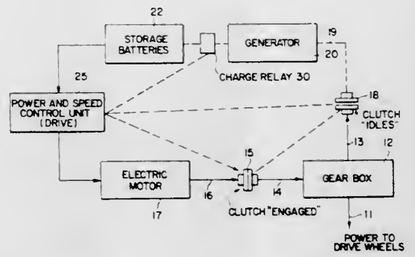
4,095,665
ELECTRIC CAR
Donald A. Armfield, Scranton, Pa., assignor to The Raymond Lee Organization, Inc., New York, N.Y.
Filed May 5, 1977, Ser. No. 793,883
Int. Cl.² B60L *7/12*; B60K *1/07*
U.S. Cl. 180—65 D **3 Claims**

1. An electro-mechanical drive and brake system for a vehicle comprising,

an electric motor, the shaft of which is linked by a first electric actuated clutch when engaged to a first shaft of a gear box,

an electric generator, the shaft of which is linked by a second electric actuated clutch when engaged to a second shaft of said gear box,

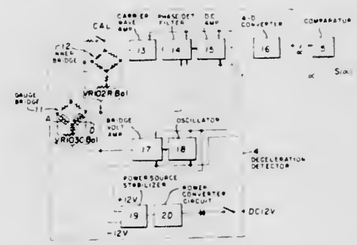
a rechargeable battery which is electrically linked by a control unit to said motor, said control unit also being independently linked to each clutch and to a relay,



contacts of which join the generator to said battery when the relay is set to a first mode and disconnect the generator from said battery when the relay is set to a second mode,

said gear box linking both said first shaft and said second shaft to the drive shaft of the vehicle.

4,095,666
APPARATUS FOR PREVENTING COLLISION OF VEHICLES
Kousaku Baba, Yokosuka, and Kazuhiro Ban, Amagasaki, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo and Nissan Motor Company, Limited, both of, Japan
Filed Mar. 30, 1977, Ser. No. 783,002
Claims priority, application Japan, Apr. 2, 1976, 51-36741
Int. Cl.² B60K *27/00, 33/00*
U.S. Cl. 180—98 **5 Claims**



1. An apparatus for preventing collision of a vehicle comprising:

a device for measuring a distance R from a driving vehicle to an obstacle and a relative velocity V of said driving vehicle to said obstacle;

a circuit for generating a damping signal when the relation of said distance R, said relative velocity V and a preset deceleration α becomes the relation of $R < V^2/2\alpha$;

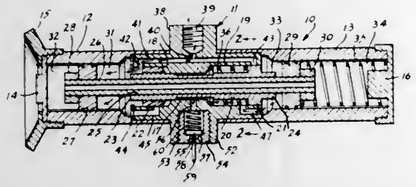
a deceleration detector for detecting the actual deceleration α' of said driving vehicle, said deceleration detector including oscillator circuit means for generating an unmodulated carrier wave, strain gauge bridge means connected to said oscillator circuit means for modulating said carrier wave in accordance with said actual deceleration α', and demodulating circuit means connected to said strain gauge bridge means for demodulating said modulated carrier wave and generating a signal proportional to said actual deceleration α'; and a correction circuit for comparing the actual deceleration α' detected by said deceleration detector with the present deceleration α and correcting the damping signal depending upon the comparative data.

4,095,667

PORTABLE UNDERWATER SIGNALLING TRANSDUCER

Joseph Mahig, 701 SW. 91st St., and Carl Thomas Allen, 4175 NW. 12th Ave., both of Gainesville, Fla. 32601

Filed Jan. 19, 1977, Ser. No. 760,808
Int. Cl.[2] B63B *45/08*; G01L *19/12*
U.S. Cl. 181—120 **6 Claims**



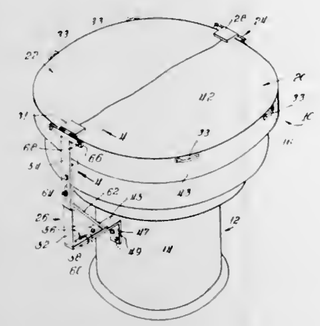
1. A portable selectively operated underwater signalling transducer for transmitting an audible signal from one location to another location comprising a body having an axial bore extending therethrough, a housing connected to said body and having a sound generating diaphragm at one end, a slide valve slidably mounted in the bore of said body, said slide valve having an axial bore, a connecting rod slidably mounted in the bore of said slide valve, piston means mounted on each end of said connecting rod, means for connecting said body to a source of air under pressure, said slide valve including airflow directing means for controlling the flow of air under pressure within said body for moving said connecting rod alternately in opposite directions so that said connecting rod strikes said diaphragm to generate acoustic waves, said slide valve having portions extending outwardly of said body in a position to be engaged by said pistons so that movement of said pistons causes said slide valve to move and direct the air under pressure in a different direction, and a selectively operable manually actuated control valve for controlling the flow of air under pressure through said body to cause said connecting rod to reciprocate.

4,095,668

SOUND SUPPRESSING MACHINE COVER

Edward A. Derka, Des Plaines, Ill., assignor to A.B.C.C.O. Industries, Incorporated, Wood Dale, Ill.

Filed Jul. 6, 1976, Ser. No. 700,361
Int. Cl.[2] G10K *11/00*
U.S. Cl. 181—202 **9 Claims**



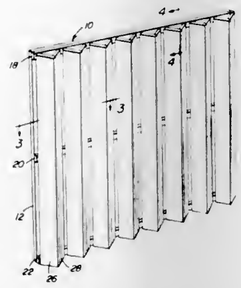
1. A cover for suppressing sound from a machine, comprising: a pair of oppositely-disposed spaced-apart brackets adapted to be mounted on opposite sides of the machine; a pair of cover members having sound suppressing material thereon and connected to and supported by said brackets extending in a cantilevered manner therefrom and in a closed position at least partially over the machine, attaching means supported by one of said brackets for mounting pivotally at least one of said cover members to said one of said brackets to enable the pivotally attached cover member to move to an upstanding disposition in an open position; and stop means for limiting the movement of the pivotally mounted cover member between its open position and its closed position, said stop means having a first surface for engaging and holding down the upper surface of said one of said cover members at one side of the pivotal connection to support said one of said cover members in its horizontal closed position with the major portion thereof extending at the other side of its pivotal connection in a cantilevered manner and having a second surface for engaging the upper surface of the opposite side of said pivotal connection when said one of said cover members is moved to its open position to position it thereat.

4,095,669

SOUND BARRIER

William R. Bond, Sr., 20565 NW. Rock Creek Blvd., Portland, Oreg. 97229

Filed Feb. 10, 1977, Ser. No. 767,666
Int. Cl.[2] E04B *1/99*
U.S. Cl. 181—210 **10 Claims**



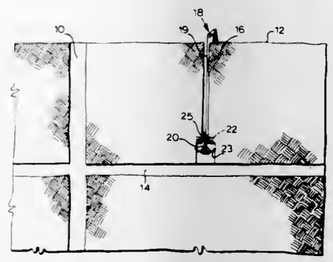
1. A sound barrier including an imperforate backing panel, substantially free of openings therethrough, a plurality of elongated, generally parallel imperforate angle members of substantially V-shaped cross section supported from said backing panel in position spaced slightly outwardly of one side thereof and with the apex portions of said V-shaped angle members facing outwardly of said one side, said angle members being oriented in substantially parallel equally closely spaced apart relation.

4,095,670

FOLDABLE PLATFORM FOR RAISE DRILLING

Angus C. H. Martin, Mississauga, Canada, assignor to Raise Contracting, Limited, Mississauga, Canada

Filed Jan. 14, 1977, Ser. No. 759,438
Claims priority, application Canada, Jun. 9, 1976, 254476
Int. Cl.[2] E04G *3/10, 3/14*
U.S. Cl. 182—128 **3 Claims**



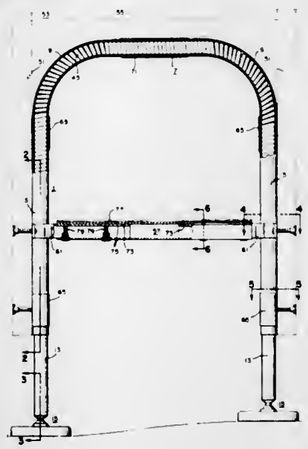
1. A rectractable platform structure comprising: a central framework portion, four main floor panels extending outwardly from the framework portion in directions defining a cross, and including a first main floor panel, a second main floor panel disposed at 180° from the first, and third and fourth main floor panels each disposed at 90° from the first, each main floor panel being pivotally mounted on said framework portion for movement between a first position in which it extends substantially horizontally away from the framework portion and a second position in which it extends substantially vertically upward in close juxtaposition with said framework portion, and a plurality of secondary floor panels disposed in the quadrants between the main floor panels, each secondary floor panel being pivotally mounted to another panel along juxtaposed aligned edges, and each secondary floor panel being capable of pivotal movement between a first position in which it extends in a horizontal plane and a second position in which it is folded through at least 90°, all panels being substantially coplanar when they are horizontally disposed, each main panel being defined in part by an inner rectilinear edge along which it is pivotally mounted to said framework portion, and two parallel spaced-apart rectilinear side edges perpendicular to said inner edge, said first main floor panel having a substantially triangular secondary floor panel pivotally mounted to each of its two side edges, said second main floor panel having a substantially trapezoidal secondary floor panel pivotally mounted to each of its two side edges, each trapezoidal secondary floor panel having a triangular secondary floor panel pivotally mounted to the edge remote from its edge of attachment to the main floor panel, each of said third and fourth main floor panels having a substantially triangular secondary floor panel pivotally mounted to each of its two side edges, whereby two of the quadrants between main panels are filled by two triangular secondary panels each, and the other two of such quadrants are filled by two triangular and one trapezoidal secondary panel each.

4,095,671

ADJUSTABLE SELF-LOCKING LEVEL SUPPORT

David E. Forristall, Suisun, and Allen C. Wright, Moraga, both of Calif., assignors to Utility Products, Inc., Oakland, Calif.

Filed Feb. 1, 1974, Ser. No. 438,735
Int. Cl.[2] E06C *7/44*
U.S. Cl. 182—202 **4 Claims**



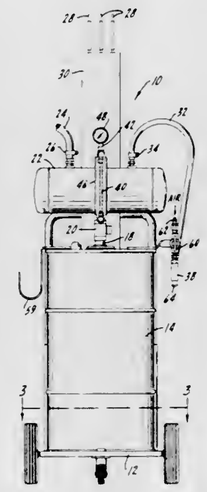
1. A self-locking level support applicable to ladders or the like of different widths comprising a two part U-shape housing with one part slidably overlapping the other to form an adjustable bridge between the two legs of said housing, a pressure responsive self-locking assembly in each leg of said housing, each said self-locking assembly including means, in the absence of pressure on said assembly, for establishing and maintaining an unlocked condition thereof, a leg extension extending from a leg of said U-shape housing in slidable relationship therewith and in pressure transfer relationship with the proximate pressure responsive self-locking assembly, a similar leg extension likewise extending from the other leg of said U-shape housing in slidable relationship and in pressure transfer relationship with the proximate pressure responsive self-locking assembly, and pressure transfer means installed between said pressure responsive self-locking assemblies and in pressure transfer relationship therewith.

4,095,672

APPARATUS FOR REMOVAL OF LUBRICATING COMPOSITION AND METHODS FOR USING SAME

Frank J. Senese, Hickory Hills, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Filed Apr. 7, 1976, Ser. No. 674,358
Int. Cl.[2] F01M *11/04*
U.S. Cl. 184—1.5 **9 Claims**



1. An apparatus for removing lubricating composition from the crankcase oil pan of an internal combustion engine through the lubricating composition dipstick well of said engine which comprises:

a hollow probe, having first and second ends, through which said lubricating composition passes from said oil pan, said first end of said probe being capable of reaching the proximity of the bottom inside surface of said oil pan through said dipstick well;

a conduit, having first and second ends, through which said lubricating composition passes from said probe means, said first end of said conduit being attached to said second end of said probe means so as to provide fluid communication between said probe means and said conduit;

a vacuum chamber being attached to and providing fluid communication with said second end of said conduit, said vacuum chamber being under sufficient vacuum so as to cause lubricating composition to pass from said conduit into said vacuum chamber and to be collected therein;

a vacuum source in fluid communication with said vacuum chamber capable of providing said vacuum chamber with the desired level of vacuum; and

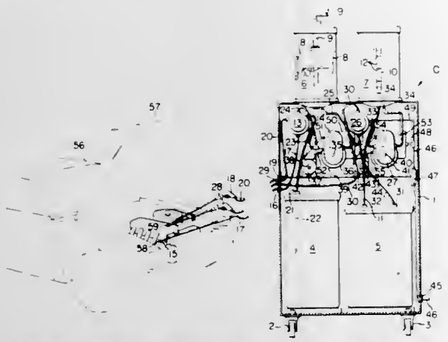
an adjustable signalling means for providing a distinctly audible pitch acting in response to the amount of vapor flowing to said vacuum chamber to signal when removal of said lubricating oil composition from said crankcase oil pan is complete.

4,095,673

OIL CHANGER

Shigeo Takeuchi, Nagoya, Japan, assignor to Beauty Hanbai Kabushiki Kaisha, Nagoya, Japan

Filed Jun. 21, 1976, Ser. No. 698,205
Claims priority, application Japan, Jun. 19, 1975, 50-84492[U]
Int. Cl.² F01M *11/04*
U.S. Cl. 184—1.5 **8 Claims**



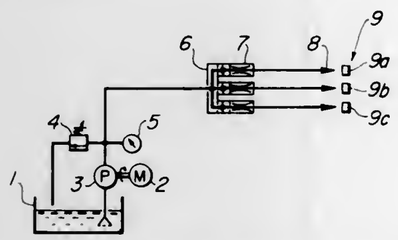
1. An oil changer comprising a first transparent tank for inspecting the contamination degree of used oil drawn therein, a first reservoir for waste oil, a first pneumatically driven pump having an outlet port connected with said first tank and an inlet port connected with a three-way valve leading to said first reservoir and an external oil sump, said three-way valve being adapted to selectively place said first tank into communication with said first reservoir or with said external oil sump, a second transparent tank for storing and metering fresh oil, a second reservoir for fresh oil, and a second pneumatically driven pump having an outlet port connected with said second tank and an inlet port connected with a two-way valve leading to said second reservoir and said external oil sump, said two-way valve being adapted to selectively place said second tank into communication with said second reservoir or with said external oil sump.

4,095,674

LOW PRESSURE AUTOMATIC LUBRICATION SYSTEM

Tadao Kido; Yoshihiko Satou, both of Katsuta, and Kou Tayama, Niiza, all of Japan, assignors to Hitachi, Ltd.; Hitachi Elevator and Service Co., Ltd. and Nanshin Kikoh Company, Limited, all of, Japan

Filed Apr. 27, 1976, Ser. No. 680,857
Claims priority, application Japan, Apr. 30, 1975, 50-51409
Int. Cl.² F01M *9/00*
U.S. Cl. 184—6.1 **14 Claims**



1. A low pressure automatic lubrication system of the type which feeds oil to at least one operating body at a low pressure for lubrication, comprising:

a pump;

nozzle having at its one end a circular end face and including an orifice, one end of said orifice being open to said circular end face, oil pumped by said pump means being fed through said orifice to said operating body; and

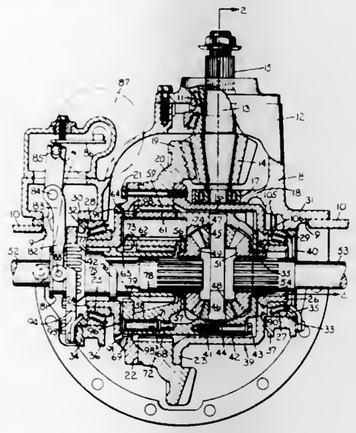
control means positioned between said pump and said nozzle means for controlling the flow of oil from said pump to said nozzle means; said orifice having a diameter d_1 and a length l_1, and said circular end face of said nozzle means having an outer diameter of d_2, wherein $d_1 = 0.3$ mm to 0.8 mm, $d_2 \leqq 2d_1$, and $l_1 \leqq 6d_1$, and said nozzle means has a passage connected to the other end of said orifice, said passage having a diameter D which satisfies the relationship of $D > 2d_1$.

4,095,675

MULTI-SPEED PLANETARY DRIVE AXLE ASSEMBLY

Dale Kenneth Bell, Ortonville, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Jul. 28, 1976, Ser. No. 709,446
Int. Cl.² F16H *1/44*
U.S. Cl. 184—6.12 **4 Claims**



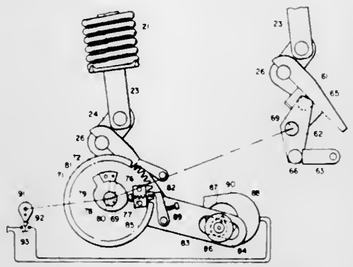
1. In a multi-speed drive axle assembly of the type comprising an axle housing for holding a pool of lubricant, a differential carrier mounted to said housing; a differential case having a pair of oppositely disposed substantially parallel end walls, a boss extending axially outward from each of said end walls and being rotatably mounted in bearings seated in said differential carrier, a differential cage including a pair of side members rotatably supporting a differential mechanism within said differential case and adjacent one end wall of said differential case, a planetary reduction within said differential case and adjacent the other said end wall of said differential case, said planetary reduction including a plurality of pinion gears with each pinion gear mounted for rotation about a shaft, each said shaft being seated at one end in an aperture provided to one of said differential cage side members and the other end of each shaft being seated in an aperture provided to an end plate secured to said one differential cage side member, said end plate being closely adjacent and substantially parallel to said other end wall of said differential case and having an outer peripheral edge in close proximity to an interior surface of said differential case, a plurality of grooves extending axially across the outer peripheral edge of said end plate, a plurality of lubricant inlet passages through said one end wall of said differential case, a groove formed on the interior surface of said one differential cage side member and common to said apertures mounting said pinion gear shafts, a lubricant passage extending axially along each of said pinion shafts interiorly of its respective pinion gear, a plurality of lubricant outlet passages through said other end wall of said differential case, said outlet passages being spaced radially outward from said pinion shafts, a lubricant discharge groove on the interior surface of said other end wall of said differential case, said discharge groove being common to said outlet passages and means providing lubricant at said lubricant inlet passages whereby said lubricant will flow into said differential case and said differential cage and radially outward from said groove on the interior surface of said one differential cage side member through said passages along said pinion shafts and through said grooves extending axially across the outer peripheral edge of said end plate to said discharge groove and said lubricant outlet passages.

4,095,676

STORED ENERGY OPERATOR FOR BREAKERS

Francis M. Howe, Carmel, and Simon Yin, Fremont, both of Calif., assignors to Howe-Yin Research Co., Inc., Fremont, Calif.

Filed Nov. 23, 1976, Ser. No. 744,243
Int. Cl.² H01H *3/30*; F03G *1/08*
U.S. Cl. 185—40 R **7 Claims**



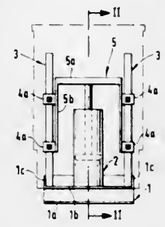
1. A stored energy operator for breakers which includes a spring adapted to be compressed for storing energy for operating an associated breaker when the spring is released, a spring arm mounted on a spring shaft for compressing said spring, a lever mounted on said spring shaft to rotate said shaft and spring arm to compress said spring, a drive lever including a drive shaft for rotating said lever, a driven gear rotatably carried on said drive shaft, and means for coupling said gear to said drive shaft during spring compression and decoupling said gear from said drive shaft when the spring is released to operate the breaker.

4,095,677

HOISTING APPARATUS

Hans A. V. Johannson, Trehäradsvägen, Eslöv, Sweden (5241 00)

Filed Mar. 9, 1976, Ser. No. 665,296
Int. Cl.² B66B *9/04*
U.S. Cl. 187—17 **4 Claims**



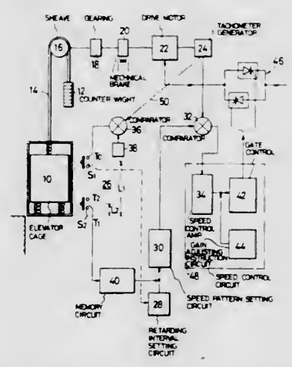
1. A hoisting apparatus for hoisting or lifting an object disposed beside the apparatus, and including: a frame; two substantially vertical guide members fixedly mounted on the frame in spaced, parallel relationship; a vertically extendable power actuator device mounted on said frame between said guide members, and including a vertically movable shaft; at least two guide sleeves slidably received on and encircling each guide member, said guide sleeves being positively guided for movement along their respective guide members and being spaced vertically apart; a coupling member carried by each guide sleeve on the front side thereof for coupling to the object to be hoisted or lifted; a pair of vertical elements, one secured to the inner portion of the guide sleeves on each guide member; and a bridging element connecting the upper end portions of said vertical elements and extending horizontally therebetween, said vertical elements and said bridging element lying generally in a plane passing through the longitudinal axes of said vertical guide members, the guide sleeves on one guide member being positioned opposite and at the same level as the corresponding guide sleeves on the other guide member, and said bridging element being connected with the upper end of said shaft.

4,095,678

CONTROL APPARATUS FOR AN ELEVATOR SYSTEM

Yastami Kito, Tokyo, Japan, assignor to Nippon Otis Elevator Company and Kabushiki Kaisha Meidensha, both of Tokyo, Japan

Filed Mar. 30, 1976, Ser. No. 671,814
Claims priority, application Japan, Apr. 3, 1975, 50-40862
Int. Cl.² B66B *1/30*
U.S. Cl. 187—29 R **9 Claims**



1. A control apparatus for an elevator system in which a rotation speed of a drive motor for driving said elevator system is controlled by supplying a deviation signal obtained by comparing a speed signal of said drive motor including an induction motor with a driving pattern setting signal; said control apparatus comprising a position check device provided in a hoist way of a cage of said elevator and for checking a position of said cage in motion, a retardation time interval setting circuit for setting a retardation time interval for retarding the speed of said drive motor, a speed pattern setting circuit which begins to an operation depending on a signal from said retardation time interval setting circuit and for setting a retarding pattern of said elevator, and a speed pattern correcting circuit storing a deviation signal obtained by comparing a signal corresponding to an output signal of said speed pattern setting circuit with a reference speed setting signal of a reference speed setting circuit and applying said deviation signal to said speed pattern setting circuit for correcting said speed pattern.

4,095,679

STOP MEANS FOR SELF-PROPELLED SPRINKLER

Robert W. Walker, 4381 County Rd. U, Wiggins, Colo. 80654

Filed Nov. 23, 1976, Ser. No. 744,349
Int. Cl.² B60T *3/00*
U.S. Cl. 188—32 **6 Claims**

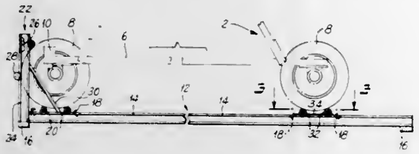
1. Stop means for interrupting the motion of self-propelled sprinkler means having power driven ground wheels, wherein the stop means is portable and is separate from the sprinkler means, and when in use, is positioned on the ground in front of the sprinkler means, in the path of movement of the sprinkler means, whereby when the sprinkler means mates with the stop

means, motion of the sprinkler means ceases even though the ground wheels continue to rotate; said stop means comprising:

a first elongated frame adapted to lie flat on the earth to extend along the path of at least one power driven ground wheel of a sprinkler;

a second frame rigidly fixed to and upstanding from a forward end of said first frame;

at least a first pair of spaced freely rotatable rollers on said



first frame, extending transversely thereof adjacent said second frame and arranged to support the power driven ground wheel thereon; and

at least one freely rotatable roller on said second frame, generally parallel to the rollers of said pair, and spaced upwardly from said pair of rollers in position to engage the front of the power driven ground wheel resting on said pair of rollers and thereby block forward tractive movement of said wheel.

4,095,680

COMBINED DYNAMIC AND MECHANICAL BRAKING SYSTEM FOR AUTOMOTIVE VEHICLES

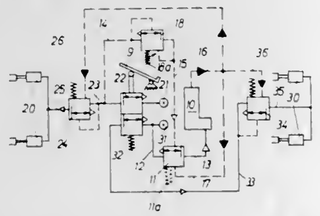
Klaus Vogelsang, Crailsheim, Germany, assignor to Voith Turbo GmbH & Co. KG, Crailsheim, Germany

Filed Mar. 17, 1977, Ser. No. 778,673

Claims priority, application Germany, Mar. 31, 1976, 2613660

Int. Cl.[2] F16D *65/36*

U.S. Cl. 188—156 **9 Claims**



1. A braking system for vehicles, comprising a dynamic brake, particularly a hydrodynamic brake arranged to furnish a range of braking forces including a predetermined minimum braking force; at least one mechanical brake; means for actuating said brakes, including as input element movable from a starting position to and between a plurality of additional positions each corresponding to a different braking force, one of said positions being that in which said dynamic brake furnishes a minimum braking force; and means for retarding the actuation of said mechanical brake in dependency on the magnitude of braking force furnished by said dynamic brake so that the braking force furnished by said mechanical brake decreases in response to increasing braking force furnished by said dynamic brake and vice versa and said mechanical brake is applied only when the braking force furnished by said dynamic brake is insufficient, said actuating means further including control means for causing said mechanical brake to furnish, when actuated alone while said input element assumes said one position, a braking force which at least approximates said predetermined minimum braking force furnished by said dynamic brake.

4,095,681

SAFETY BRAKING DEVICE FOR A UNIT MOVING ALONG A SURFACE, IN PARTICULAR FOR A LIFT CAR

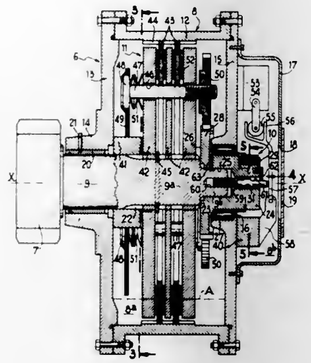
Pierre Marcel David, Le Pre Fleuri - rue Sylvain Vigneras, 92380 Garches, France

Filed Feb. 18, 1977, Ser. No. 770,142

Claims priority, application France, Feb. 23, 1976, 76 04886

Int. Cl.[2] B60T *8/02*

U.S. Cl. 188—187 **9 Claims**



1. A safety braking device for stopping a unit movable along a surface, in particular a lift car, when the speed of the unit becomes superior to a predetermined speed, comprising a case for fixing to the moving unit, a shaft rotatively mounted in the case and having one end outside the case, a drive wheel carried by said one end for slip-free engagement with said surface to be rotated by said surface upon said movement of said unit and thereby rotate the shaft, a disc assembly comprising fixed annular discs having an inner periphery and connected to be held against rotation relative to the case and movable discs connected to rotate with the shaft, the fixed discs being interposed between the movable discs and the fixed discs and movable discs being coaxial to and movable axially of the shaft, a support member connected to rotate with the shaft by releasable connecting means, a centrifugal element carried by the support member, an abutment which is fixed relative to the case, a gear wheel connected to rotate with the support member and coaxial with the shaft, axial thrust means for urging the discs together and comprising a thrust assembly comprising a screw which has a head located at one end of the disc assembly and extends freely through aligned openings of the movable discs and is disposed radially inwardly of said inner periphery and outwardly of the shaft and a gear pinion screwthreadedly engaged on the screw beyond an opposite end of the discs and meshed with the gear wheel, the centrifugal element being movable between a position of rest in which position it is incapable of encountering the abutment and an outer position in which outer position it is brought by the effect of centrifugal force and is capable of encountering the abutment and stopping rotation of the support member beyond a reference speed of rotation of the support member corresponding to said predetermined speed, said releasable connecting means being released and thereby allowing the stoppage of the support member while allowing rotation of the shaft when the centrifugal element encounters the abutment, whereby continued rotation of the shaft causes the pinion to roll around the gear wheel and move along said screw towards the screw head.

4,095,682

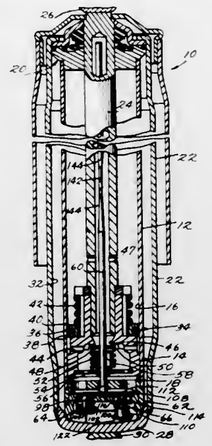
SHOCK ABSORBER WITH IMPROVED POSITION SENSITIVE ASSEMBLY

Michael H. Ostrowski, Glen Ellyn, Ill., assignor to Maremont Corporation, Chicago, Ill.

Filed May 5, 1977, Ser. No. 794,021

Int. Cl.[2] F16F *9/342*

U.S. Cl. 188—289 **15 Claims**



1. A direct acting hydraulic shock absorber adapted to be connected between the sprung and unsprung masses of a vehicle comprising:

inner and outer tubular members,

said inner tubular member defining a cylindrical chamber,

a piston slidably mounted within said cylindrical chamber,

a piston rod extending from one side of said piston outwardly from one end of said inner tubular member,

closure means on said one end of said inner tubular member closing the adjacent end of said outer tubular member and slidably sealingly engaging said piston rod,

connecting means on the end of said piston rod for connecting said shock absorber to one of said masses,

an end closure on the opposite end of said outer tubular member,

connecting means on said end closure for connecting said shock absorber to the other of said masses,

hydraulic fluid filling rebound and compression spaces within said cylindrical chamber on the piston rod side of said piston and on the opposite side thereof respectively and partially filling an annular reservoir space between said inner and outer tubular members,

said piston having a central passage therethrough and an annular valve seat intermediate the opposite ends thereof surrounding said central passage,

a rebound valve in said piston disposed in cooperating relation with said valve seat,

spring means on said piston acting on said rebound valve to maintain the same seated on said valve seat with a predetermined spring force,

said piston having compression passage means extending therethrough radially outwardly of said central passage,

spring pressed piston valve means controlling said compression passage means,

compression valve means between said compression space and said reservoir space,

replenishing valve means between said compression space and said reservoir space,

said rebound valve having a central opening therein,

a fluid metering element extending longitudinally through said central opening and cooperating therewith independently of the seated or unseated condition of said rebound valve to provide for the passage through said central opening of a maximum volume of hydraulic fluid between said rebound and compression spaces when said piston is in a predetermined position within said inner tubular member and for such passage therethrough of a gradually diminishing volume when said piston moves in said inner tubular member in either direction from said predetermined position beyond a predetermined extent whereby the shock absorber's characteristics produced under the control of said rebound valve and said piston valve means are supplemented and altered regardless of the seated condition of said rebound valve or said piston valve means and in accordance with the position and displacement of said piston in said inner tubular member,

the improvement which comprises an assembly for mounting (1) one end of said fluid metering element within the end of said inner tubular member adjacent said end closure and (2) said compression and replenishing valve means in hydraulic fluid flow control relation between said reservoir space and said compression spaces, said assembly comprising

a first annular wall member mounted adjacent said end closure having first surface means facing said end closure disposed in fluid communicating relation with said reservoir space, second surface means facing in a direction away from said end closure and toward said piston, a central recess formed in said second surface means, and a pair of openings spaced from said recess extending from said second surface means to said first surface means,

means mounting said replenishing valve means in operative relation within one of said pair of openings,

means mounting said compression valve means in operative relation within the other of said pair of openings,

a ball fixed to said one end of said fluid metering element and seated within said recess,

a second annular wall member having means in the central portion thereof for (1) enabling said fluid metering element to extend therethrough and (2) grippingly engaging said ball to maintain the same within said recess,

means for peripherally securing said second annular wall member to said first annular wall member and to the adjacent end of said inner tubular member,

said second annular wall member having opening means between the periphery and the central portion thereof extending axially therethrough for communicating the hydraulic fluid within said compression space with the second surface means of said first annular wall member.

4,095,683

DIAPHRAGM SPRING CLUTCH

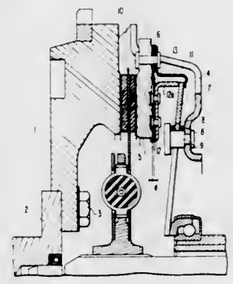
Hiroshi Ban, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Apr. 29, 1976, Ser. No. 681,669

Claims priority, application Japan, May 14, 1975, 50/64559[U]

Int. Cl.[2] F16D *13/44*

U.S. Cl. 192—70.18 **3 Claims**



1. In a diaphragm spring operated clutch of the type having a clutch disc disposed intermediate a flywheel and movable pressure plate and a cover secured to said flywheel supporting

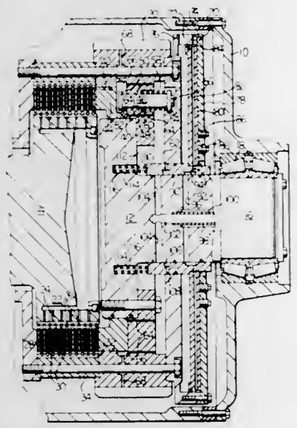
a diaphragm spring and said movable pressure plate, the improvement comprising said pressure plate having a main annular part and an auxiliary annular part disposed parallel to each other and said clutch disc, a plurality of radially extending plate springs disposed intermediate and connected to said main part and said auxiliry part, said plate springs having a wavy cross-section in the circumferential direction with at least a central portion thereof engaging said auxiliary part and a lateral portion of each side thereof in engagement with said main part to separate said auxiliary part from said main part when the clutch is disengaged, means connecting said central portion of said plate springs to said auxiliary part, each of said plate springs having a radially outwardly projecting ear portion, a plurality of strap means connecting said main part of said pressure plate to said cover, a plurality of retracting springs disposed in operative engagement with said diaphragm spring and common attaching means for securing said strap means, said retracting springs and the ear portion of each of said plate springs to said main part of said pressure plate, said diaphragm spring being disposed in engagement with said auxiliary part for applying a clutch engaging force to said main part through said auxiliary part and said plate springs.

4,095,684

FLUID OPERATED CLUTCH

Harold E. Rowen, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 13, 1976, Ser. No. 731,881
Int. Cl.[2] F16D *23/10, 43/24*
U.S. Cl. 192—103 FA **9 Claims**



9. A fluid operated clutch comprising:

a rotary input member;

a rotary output shaft axially aligned with said rotary input member;

a pack of interleaved clutch discs, alternate ones of which being carried by and rotatable with said input member, the others of said discs being carried by and rotatable with said output shaft, substantially all of said discs being axially shiftable;

an actuator carried by said input member in axial alignment with said pack and operable, when actuated, to compress said pack to engage said discs;

means defining an annular, expandable chamber carried by said input member, said chamber including an axially shiftable wall;

means for supplying a liquid to the interior of the chamber; and

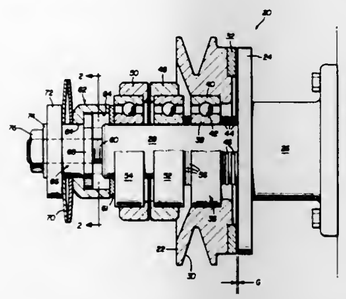
means responsive to the force applied to said wall for applying a force to said actuator, said responsive means including a force amplifier operatively interposed between said wall and said actuator so that a greater force is applied to said actuator than is applied to said wall.

4,095,685

ADJUSTABLE CLUTCH ASSEMBLY

Raymond F. McDonald, Winneconne, and Merlyn L. Curtis, Oshkosh, both of Wis., assignors to J. I. Case Company, Racine, Wis.

Filed Feb. 14, 1977, Ser. No. 768,116
Int. Cl.[2] F16D *13/75*
U.S. Cl. 192—111 B **8 Claims**



1. A clutch assembly having opposed clutch elements relatively rotatably about a common axis, one of said clutch elements supported on a shaft for axial movement on a bearing, spring means normally spacing said clutch elements and clutch means urging said one clutch element into frictional engagement with the opposed clutch element, against the force of said spring means, upon actuation of said clutch, the improvement comprising:

said shaft having an axially threaded end, an adjustment nut threadably received on said shaft having a polygonal exterior portion, a cup-shaped slide member having a polygonal opening receiving said nut polygonal exterior portion in rotationally interlocking relation, said slide member having an end portion operably engaging said one clutch element and said nut having a stop means limiting axial movement of said slide toward said clutch element and a spring means normally biasing said slide means toward said clutch element, whereby the gap between said clutch elements may be adjusted by threading said adjustment nut on said shaft.

4,095,686

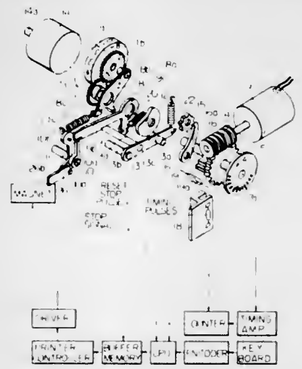
PRINTER HAVING SWINGABLE PRINTING RINGS

Katsuhiko Okabe, Tokorozawa, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Jul. 1, 1977, Ser. No. 812,375
Claims priority, application Japan, Jul. 7, 1976, 51-80611; Jul. 29, 1976, 51-90674; Aug. 21, 1976, 51-100035; Aug. 21, 1976, 51-100036; Aug. 26, 1976, 51-114362[U]; Sep. 21, 1976, 51-127242[U]; Sep. 22, 1976, 51-128030[U]
Int. Cl.[2] B41J *1/22*
U.S. Cl. 400—150 **18 Claims**

1. Printer having a plurality of rotatable printing rings each bearing on the periphery thereof a plurality of printing characters and a platen, each of said printing rings being individually moved selectively by means of a driving shaft driven by a driving motor toward said platen after selection of a desired character from said plurality of characters during the rotation of each printing ring upon issuance of a printing signal from a control circuit of said printer so to permit a line of printing of desired characters to be given on a paper located around said platen between said platen and said printing rings by the abutment of the respective printing rings against said platen during a predetermined number of revolution of said driving shaft, wherein the improvement comprises in combination a gear

integral with each printing ring, a plurality of swingable printing ring supporting levers each having a shaft secured to the free end of said lever, said shaft rotatably supporting the respective printing ring, each of said printing ring supporting levers being biased by a spring so as to be swung in the direction to move said printing ring supported thereon away from said platen, a plurality of driving gears secured to said driving shaft and each meshing with said gear of the respective printing ring so as to rotate the latter about the axis of said shaft for selection of a desired character by said printing signal, each printing ring supporting lever being swingably supported on said driving shaft so as to permit each printing ring to move in orbital path around said driving shaft and abut against said platen, a plurality of driving levers swingably supported on said driving shaft and each biased by a spring in the direction in which said printing rings are moved toward said platen, each of said driving levers engaging with the respective printing ring supporting lever so as to urge said printing ring thereon toward said platen against the action of said spring of said printing ring supporting lever, a plurality of select levers each releasably arresting the respective driving lever at a position in which each printing ring is held apart from said platen by the engagement of the respective printing ring supporting lever with said driving lever, a plurality of electromagnetic members selectively actuated for a short time by said control circuit upon issuance of the printing signal and each coupled with the respective select lever so that, when the



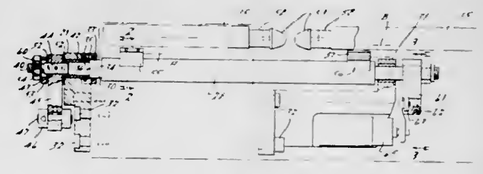
respective electromagnetic member is actuated in synchronism with the selection of said desired character during the rotation of said printing ring, said select lever coupled therewith is moved to release said driving lever arrested thereby so as to permit the same to be swung by said spring thereof for urging said printing ring supporting lever to move said printing ring thereon toward said platen, stopper means for limiting the swinging movement of each driving lever to a position whereby said printing ring supporting lever is swung further together with said printing ring thereon by virtue of the inertia thereof against the action of said spring thereof after said driving lever is stopped by said stopper means thereby permitting said printing ring to abut against said platen for the printing operation while the respective printing ring supporting lever is swung back by said spring thereof after the abutment of said printing ring thereof against said platen so as to be held by said driving lever which is held at said stopped position by said stopper means thereby clearing said printing ring from said paper, reset means engageable with the respective driving lever and actuated in synchronism with the rotation of said driving shaft so as to allow each driving lever to be swung for actuating the respective printing ring supporting lever after releasing of said driving lever from said select lever at the beginning of the rotation of said driving shaft while said reset means urges each driving lever upon completion of said predetermined number of revolution of said driving shaft so that the respective driving lever is arrested by said select lever thereof which has restored its initial position by the deactuation of said electromagnetic member thereof to return each printing ring at its initial starting position, signal emitting means rotated in synchronism with said driving shaft, signal receiving means cooperating with said signal emitting means so as to issue an electrical signal each time one cycle of the printing operation is effected by the rotation of said driving shaft, said electrical signal being applied to said control circuit for controlling the starting and stopping of the operation of said printer, a detecting disc rotated in synchronism with said driving shaft and provided with a plurality of slits around the rotational axis thereof corresponding in number to that of the characters on the respective printing ring, and a detecting device cooperating with said slits in said detecting disc for issuing character synchronizing timing signals in timed relationship to the angular phases of the respective characters on each printing ring as it rotates, said timing signals being applied to said control circuit for permitting a desired character of said plurality of characters on each printing ring to be selected for the printing operation during the rotation of the respective printing ring.

4,095,687

ESCAPEMENT MECHANISM FOR PALLET CONTROL

Henry N. Sholket, Rutherford, N.J., assignor to Standard Tool & Manufacturing Co, Lyndhurst, N.J.

Filed Oct. 19, 1976, Ser. No. 734,005
Int. Cl.[2] B65G *21/20*
U.S. Cl. 198—345 **11 Claims**



1. In a pallet control and advancing mechanism, a supporting structure, spaced chains having supporting wear plates driven on said structure, pallets resting on said wear plates and advanced by said chains by the friction engagement between the wear plates and pallets, an escapement mechanism at a work station having a shaft mounted for rotation located between the chains where it extends parallel therewith, a stop block on each pallet disposed on opposite sides of the pallet center line on alternate pallets of a series, lugs on said shaft, one of said lugs engaging a stop block on a pallet at the work station, the other lug being spaced from the first lug for engaging a stop block on a following pallet for stopping the pallet at a following station, and means for rotating said shaft for releasing said stop block at said stations and for engaging the stop block on the following pallet to permit the chains to advance the pallets from and to said work station.

4,095,688

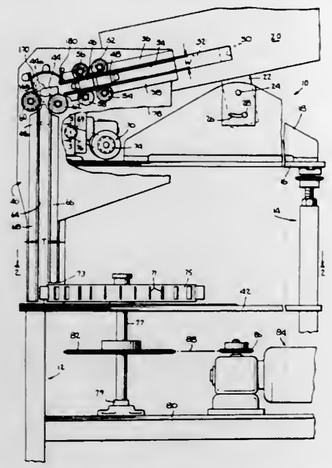
BOTTLE ORIENTING APPARATUS

Cristina S. Ionescu, Bronx, N.Y., assignor to New England Machinery, Inc., Beardsley, Conn.

Continuation-in-part of Ser. No. 665,726, Mar. 11, 1976, abandoned. This application Jun. 29, 1976, Ser. No. 700,749
Int. Cl.[2] B65G *47/24*
U.S. Cl. 198—399 **24 Claims**

1. Bottle orienting apparatus comprising guide means for receiving and advancing bottles of shoulder-and-neck construction in random neck-leading and neck-trailing dispositions, discriminating means for distinguishing bottles of neck-leading disposition from bottles of neck-trailing disposition and altering at a bottle-inverting location the disposition of each of the neck-leading bottles to respective neck-trailing dispositions, and guide means being upstream of and communicating with said discriminating means, and accelerating means cooperative with said discriminating means for accelerating away from said discriminating means bottles which have arrived at

the discriminating means in neck-trailing disposition and bottles which have been altered by the discriminating means from a neck-leading to a neck-trailing disposition, said accelerating means and said discriminating means together forming a pinch-



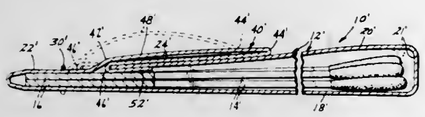
ing means downstream of said bottle-inverting location for squeezing said bottles laterally of the direction of bottle-acceleration to exercise positive frictional control over said bottles when initiating the acceleration of the latter.

4,095,689

SAFETY PACKAGE FOR MATCHES

Richard J. Mulic, 237 Cecil St. SE., Minneapolis, Minn. 55414

Continuation-in-part of Ser. No. 825,672, Aug. 18, 1977, abandoned. This application Dec. 14, 1977, Ser. No. 860,584
Int. Cl.[2] A24F *27/12, 27/00, 27/18*
U.S. Cl. 206—106 **2 Claims**



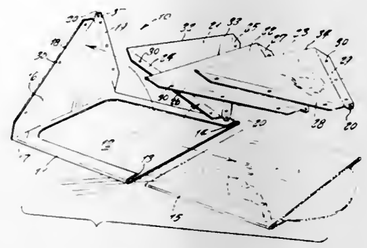
1. An improved safety cover for cardboard matches comprising:
(a) a front cover portion terminating a first lower edge,
(b) a back cover portion terminating at a second lower edge,
(c) means for hingeably attaching said front cover with said back cover,
(d) a first upturned lip portion extending from said second lower edge,
(e) a safety member extending from said first upturned lip portion including striking strip covering means defining first and second deformable surfaces resiliently secured to each other, and movable between a first position wherein said surfaces are in a flattened, overlying relationship, and a second position wherein said surfaces are opened away from each other to define a generally tubular member having an open match receiving end, said striking strip covering means normally being in said first position, and including a second upturned lip portion which cooperates with said second deformable surface to define a seating groove for said lower edge of the front cover,
(f) a match-striking strip affixed to one of said deformable surfaces interiorly of said tubular member; and
(g) a staple extending through said first upturned lip portion and said back cover.
whereby when the lower edge of the front cover is engaged in the seating groove, the striking strip covering means can be moved from its normal, flattened position to its open, tubular position by exerting a force on the front cover to shift the front cover towards the staple.

4,095,690

PYRAMID RECORD COVER AND RACK

Cliff Baldwin, c/o George Spector, 3615 Woolworth Building, 233 Broadway, New York, N.Y. 10007

Filed Mar. 9, 1976, Ser. No. 665,239
Int. Cl.[2] B65D *85/30*
U.S. Cl. 206—312 **3 Claims**



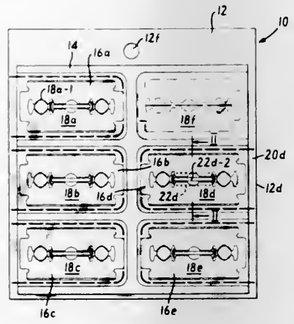
1. A record package comprising a base with means to receive a record therein in flat position in combination with a plurality of triangular sides and means for removably securing the sides to said base and to each other whereby the sides may be folded to a flat closed position adjacent to the base forming a flat cover therefor and whereby the sides may be opened and erected to form a pyramid superstructure above said base, wherein the first said means comprises a slot about the periphery of the base having spaced openings at opposite sides of said base to receive a record.

4,095,691

PACKAGE FOR RELEASABLE CONTAINMENT OF RAZOR BLADES AND THE LIKE

Clemens A. Iten, Staunton, Va., assignor to American Safety Razor Company, Staunton, Va.

Filed Jun. 10, 1976, Ser. No. 694,783
Int. Cl.[2] B65D *85/54*
U.S. Cl. 206—354 **12 Claims**



1. A package for releasable containment of a flat apertured article comprising a card having a portion separable therefrom, said article being disposed on said card portion, and an overlay disposed on said article and secured exclusively to said card at a first card location exteriorly of said card portion and at a second card location in registry with said article aperture, said card having opposed surfaces, said card portion including an expanse of area exceeding the area of said second card location and in registry therewith, said expanse having a perimeter defined by a slit so cut as to extend only through one of said

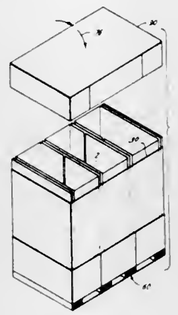
card opposed surfaces, whereby said expanse remains secured to said overlay at said second card location in retaining relation to said article after separation of said card portion from said card.

4,095,692

MOISTURE STABILIZED PACKAGE

Marcus H. Shelton, Baytown, Tex., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Jul. 12, 1974, Ser. No. 487,895
Int. Cl.[2] B65D *19/02*
U.S. Cl. 206—386 **14 Claims**



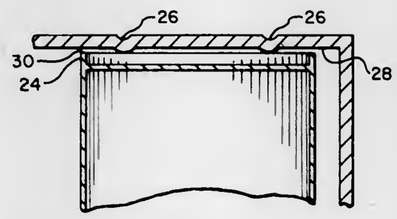
1. An improved, strength-retaining moisture-stabilized entirely enclosed package comprising in combination (a) a multicell container, having four side walls, a closed bottom and an open top forming an interior and exterior, prepared from a corrugated standard paperboard having peaks and flutes, with a polymeric film encompassing said four side wall exterior surfaces and the exterior of said bottom portion of said container and (b) a water vapor permeable cover covering said open top of said container, which cover is prepared from standard paperboard, having high porosity whereby said cover permits water vapor to be displaced upwardly from the interior of said container to pass through said cover and said film prevents air currents from passing through the interior of said container, thereby resulting in a moisture-constant state within the interior of said package.

4,095,693

RIBBED CARTON

Earl J. Killy, Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Filed May 5, 1977, Ser. No. 794,300
Int. Cl.[2] B65D *81/14*
U.S. Cl. 206—433 **8 Claims**



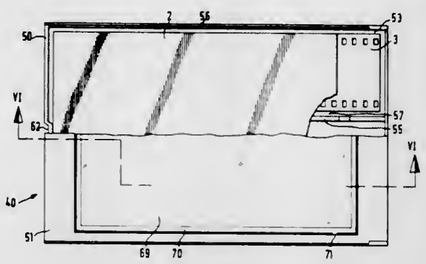
1. A carton of the type comprising:
(a) an interior portion for packaging multiple articles having a chime formed on at least one end thereof;
(b) an exterior face where printed advertising matter is placed thereon;
(c) the carton being formed from a single layer material and having a plurality of hingedly connected panels and a plurality of closing flaps;
(d) at least one of the panels of the single layer material having a series of scorelines formed on the exterior face;
(1) said scorelines causing a protuberance into the interior of the carton to lightly abut and to initially prevent a major portion of the chimes of the multiple articles packaged therein from coming in contact with the underside of said one of the panels whenever a plurality of chimed articles are initially positioned within the carton;
(2) said scorelines further serving to finally protect the exterior face of the carton from becoming disfigured by the chimes of the multiple articles making circular indentations on the interior face of the carton;
(a) said protection being obtained by the protuberance of the scorelines permitting only a predetermined portion of the scoreline protuberance to be indented by the chimes of the multiple articles whenever a plurality of cartons are stacked on top thereof; and
(3) said protection resulting in a major reduction in indentations of the chimes coming through to the exterior face of the carton to form ring-like protrusions upon multiple stacking of the cartons and thereby allowing the exterior portion of the carton to be relatively distortion free and more appealing to the customer.

4,095,694

CONTAINER FOR PHOTOGRAPHS

Jochen F. Jost, Essen, Germany, assignor to Filmosto-Projektion Johannes Jost GmbH & Co., Essen, Germany

Filed Aug. 2, 1976, Ser. No. 710,673
Claims priority, application Germany, Aug. 2, 1975, 2534678; May 3, 1976, 2619059
Int. Cl.[2] B65D *85/48*
U.S. Cl. 206—455 **23 Claims**



21. A container for containing photographs and associated strips of negatives, said container comprising a plastics material housing having means defining a first substantially rectangular compartment for containing photographs and means defining a second compartment for accomodating strips of negatives into which the strips of negatives can be at least partially inserted, the container having two oppositely disposed flat sides, a pivotal lid constituting substantially all of one said flat side and being openable to expose at least said first compartment, the second compartment communicating with an elongate cavity being provided adjacent the side of the housing beneath the first compartment and on the side thereof remote from the lid, the second compartment having an internal cross section such that a strip of negatives in looped configuration may be inserted into the compartment with the ends of the strips entering the cavity, the second compartment being defined on at least one side thereof by a lid which is pivotally supported so as to be movable to an open position in which the second compartment is exposed, the lid comprising means defining a further compartment therein, the further compartment being defined on one side by a wall which is integral with the lid and on the other side by a plate shaped insert which is movably

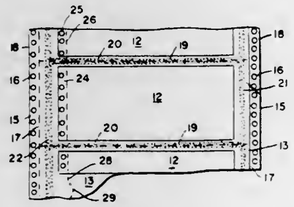
mounted on the lid and together with said wall defines a space for accommodating a photograph, at least part of the lid being formed from a material selected from the group comprising transparent materials and translucent materials so that a photograph located within said further compartment may be visible through the portion of the lid formed from the selected material.

4,095,695

STUFFED SEALED ENVELOPE ASSEMBLY AND METHOD OF MAKING

Donald J. Steidinger, Barrington, Ill., assignor to Wallace Business Forms, Inc., Hillside, Ill.

Filed Apr. 18, 1977, Ser. No. 788,273
Int. Cl.[2] B65D *27/34*
U.S. Cl. 206—610 **11 Claims**



1. An elongated assembly having a series of connected stuffed sealed envelopes comprising:

superposed continuous plies having outer side edges constituting control margins, said control margins being equipped with longitudinally aligned, spaced apart line holes, said plies defining between said control margins fronts and backs of sealed envelopes,

a rectangular insert ply within each sealed envelope,

said sealed envelopes being defined by transverse lines of weakening in the front and back plies for separating the sealed envelopes from the assembly,

lines of adhesive securing said front and back plies together along said transverse lines and along a longitudinally extending line inward of one of said control margins, the periphery of said insert ply being spaced inwardly from said lines of adhesive,

aligned lines of perforation in each of said front, back and insert plies extending parallel to but spaced within 1 inch (25.4 mm.) inwardly of the other of said control margins and defining an attaching portion in said insert ply, said attaching portion adjacent said other of said control margins terminating short of the line holes therein, and

adhesive means adjacent said other of said control margins and spaced inwardly thereof joining said front and back plies together and said attaching portion to at least one of said front and back plies.

4,095,696

PRODUCE GRADER

John R. Sherwood, Arlington, Va., assignor to AMF Incorporated, White Plains, N.Y.

Filed Feb. 4, 1977, Ser. No. 765,716
Int. Cl.[2] B07C *5/342*
U.S. Cl. 209—75 **5 Claims**

1. A method for sorting articles of produce according to a known characteristic manifested in radiation received therefrom and for sorting produce articles from nonvegetable articles, comprising

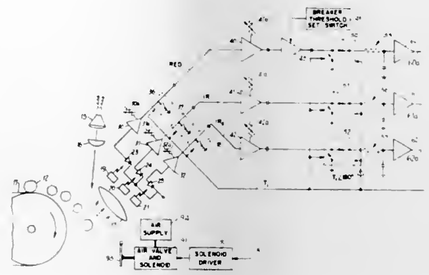
passing desired articles of produce along with mingled undesired nonvegetable articles through an inspection position,

detecting the presence of an article of the inspection position,

receiving radiation from the article at the inspection position,

in response to the received radiation determining if the detected article manifests said known characteristic by a predetermined amount,

in response to the received radiation determining if the detected article is vegetable matter or nonvegetable matter,



performing a first operation on a detected article if it manifests the known characteristic by the desired amount and is vegetable matter, and

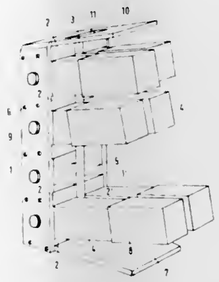
performing a different operation on a detected article if it does not manifest the known characteristic by the desired amount or is nonvegetable matter.

4,095,697

STAND FOR HOLDING PIPETTE CANS

Heinrich Matthaei, Gottingen, Germany, assignor to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed Aug. 24, 1976, Ser. No. 717,212
Claims priority, application Germany, Aug. 26, 1975, 7527001[U]
Int. Cl.[2] A47G *29/00*
U.S. Cl. 211—71 **10 Claims**



1. A pipette can holder stand to receive and removably hold a plurality of pipette cans, each adapted to hold the plurality of pipettes and permit ready removal of individual pipettes from said cans in the holder, comprising

a portable metal frame structure including upright elements (1, 1', 3);

top and bottom cross elements (7, 10) connecting the upright elements adjacent their terminal ends;

and intermediate transversely extending spacers (2, 2') connecting said upright elements transversely to subdivide the space defined between the upright elements and the top and bottom cross elements into a plurality of mutually spaced compartments (5), the spacing between the intermediate transverse spaces being just slightly larger than the outer dimension of the pipette cans to permit fitting the cans into said compartments and project therefrom, while mutually spacing the cans from each other by the width of said spacers;

wherein the bottom cross element (7) comprises an essentially flat plate-like base element projecting frontally from the upright elements (1, 1', 3) and having a size which inhibits tipping of the stand when loaded with pipette cans located in the compartments and projecting frontally therefrom;

wherein said intermediate transversely extending spacers are located on the upright in position such that the bottom of each compartment slopes downwardly from front to back to retain pipette cans inserted into said compartments by gravity;

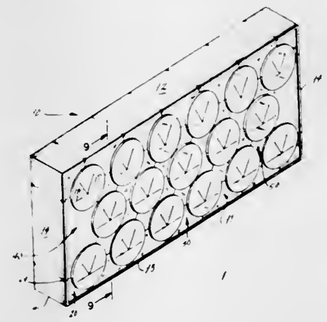
and projecting means (9) extending transversely of the compartments and forming stop elements adapted for engagement with said pipette cans to located said pipette cans in the respective compartments.

4,095,698

MODULAR STORAGE RACK SYSTEM

C. E. Wright, 70 Denrose Dr., Tonawanda, N.Y. 14150

Filed Aug. 2, 1976, Ser. No. 710,734
Int. Cl.[2] A47F *5/00*
U.S. Cl. 211—126 **4 Claims**



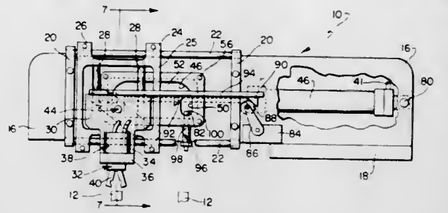
1. Modular storage system comprising a front panel having apertures therethrough, a rear panel identical to said front panel and having apertures axially aligned with the apertures of the front panel, said front panel and the rear panel comprising a plurality of pre-cut parts assembled in predetermined relation, end, top, and base panels having a combined length equal to the perimeter of the front panel, means for attaching said end panel to the front panel and to the rear panel to separate the front panel and the rear panel, at least one storage container having an axial length greater than the distance separating the front and the rear panel and secured into an aperture of the front panel and into an aligned aperture of the rear panel, wherein said pre-cut parts of the front and rear panels include corner pieces having means for abutting the adjacent end, top, or base panels and a curved surface which engages a storage container, base pieces having means to abut another base piece or a corner piece and one top or base panel and includes two curved surfaces which engage storage container, and side pieces having means to abut another side piece or a corner piece and one end panel and includes three curved surfaces for engaging storage containers, and spacer pieces having means for abutting another spacer piece, a base piece or a side piece and three curved surfaces for engaging storage containers, and means for releasibly or permanently engaging the abutting surfaces of said corner pieces, said side pieces, said base pieces, and said spacer pieces.

4,095,699

PICK AND PLACE MACHINE

James P. O'Neil, Swansea, Mass., assignor to Automation Designs Inc., Bristol, R.I.

Filed Feb. 10, 1977, Ser. No. 767,624
Int. Cl.[2] B65G *47/90*
U.S. Cl. 214—1 BB **15 Claims**



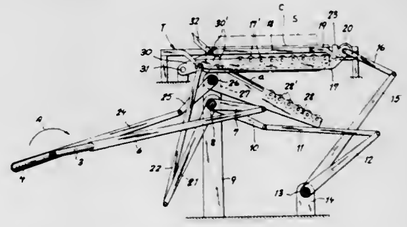
1. A pick and place machine operable to pick up a part at a loading station and thereafter to place and release the part in a delivery station spaced at least horizontally from said loading station comprising, a housing, a first member supported by said housing for free horizontal reciprocal movement with respect thereto between said stations, a second member supported by said first member for free vertical reciprocal movement with respect thereto, said second member having at least portions thereof in horizontal abutment with said first member, guide means including a track having horizontal and vertical components and a follower disposed thereon, said follower connected to said second member, means for reciprocating said follower along said track whereby vertical movement thereof actuates said second member with respect to first member and horizontal movement thereof simultaneously horizontally moves both said members, said second member including part holding means thereon, and actuation means for operating said part holding means to respectively grasp and release said part in said loading and delivery stations in response to the movement of said second member.

4,095,700

TURN-OVER DEVICE FOR SLAB MATERIALS

Dumitru Chiuaru, and Nicolae Alexandru, both of Bucharest, Romania, assignors to Institutul Pentru Proiectari de Sectii si Uzine de Laminare — Iprolam, Bucharest, Romania

Continuation-in-part of Ser. No. 755,209, Dec. 29, 1976, abandoned. This application Mar. 11, 1977, Ser. No. 777,151
Claims priority, application Romania, Dec. 30, 1975, 84386
Int. Cl.[2] B65G *7/00*
U.S. Cl. 214—1 QA **6 Claims**



1. A lever-operated turn-over device for slabs displaced by a conveyor along a path comprising:

a first pair of movable elongated arms mounted parallel to one another and arranged beneath the path of said conveyor in a horizontal position;

a second pair of swingable elongated arms lying in planes parallel to said first pair of arms;

each of said first pair of arms having a wheel mounted at a first end thereof;

a track engaging each of said wheels and forming a guide therefor;

a drive means articulated to said first end of each of said first pair of arms for moving said arms along said tracks into said conveyor path and engagement with said slab to lift said slab from said conveyor;

another articulation between said drive means and a second end of each of said first pair of arms for swinging said first arms about said wheels into a vertical position and beyond; and

a further articulation between said drive means and said second pair of arms for swinging said second pair into a vertical position adjacent said first pair of arms for receiving said slab therefrom and returning said slab to said conveyor in a turned-over position.

4,095,701

HILLSIDE BALE WAGON

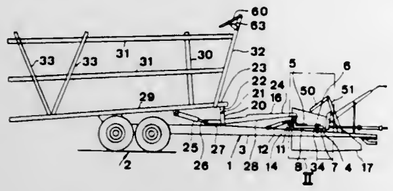
Jean-Piérre Guenon, Plombieres-lez-Dijon, France, assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Mar. 29, 1977, Ser. No. 782,595

Claims priority, application United Kingdom, Apr. 1, 1976, 13223/76

Int. Cl.² A01D *87/12*

U.S. Cl. 214—6 B **13 Claims**



1. An automatic bale wagon for hauling bales lying in a field comprising:

a mobile chassis adapted for movement in a forward direction across the field;

a bale pick-up means mounted on the chassis for picking up bales from the ground during movement of the bale wagon across the field;

a load table for receiving bales picked up from the ground by the bale pick-up means and being pivotable between a bale-receiving position and a bale-unloading position;

further bale receiving means for receiving bales from the load table on movement from the bale-receiving position to the bale-unloading position; and

means on the load table movable from an inoperative to an operative position when the load table is moving from its bale-receiving position to its bale-unloading position for retaining a bale deposited on the load table in a predetermined position during said movement of the load table.

4,095,702

MAGAZINE FOR RECEIVING AND PILING DIE CUT BLANKS

Georges Meylan, Preverenges, Switzerland, assignor to J. Bobst & Fils, S.A., Switzerland

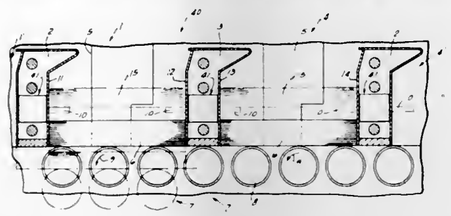
Filed Oct. 9, 1975, Ser. No. 621,007

Claims priority, application Switzerland, Nov. 6, 1974, 14821/74

Int. Cl.² B65G *57/03*

U.S. Cl. 214—8 **6 Claims**

1. In a device for receiving die cut blanks and forming a stack or pile of the blanks within a magazine having at least a pair of spaced wall members which provide a pair of spaced parallel vertical wall surfaces of a chamber of the magazine, said device including means for retaining blanks being formed into a pile in the magazine as a previously formed pile of blanks is being removed therefrom, the improvement comprising at least one of said pair of wall surfaces having a plurality of spaced apertures; and said means for retaining including a plurality of spaced separate fingers supported for movement only in a straight line path extending perpendicular to the plane of said one wall surface between a first position extending through said spaced apertures into the chamber and a second position withdrawn from said chamber; and means for shifting said fingers between said positions, said means for shifting



including an axle supported for rotation with its axis extending parallel to the vertical plane of said wall surface, said axle having means for engaging each of said fingers and moving each finger in a straight line path as the axle is rotated, said means for engaging each of said fingers including a plurality of spaced pins mounted on the axle, and said means for shifting including an actuator device, a pull rod connected to the actuator device and extending to a lever attached to said axle.

4,095,703

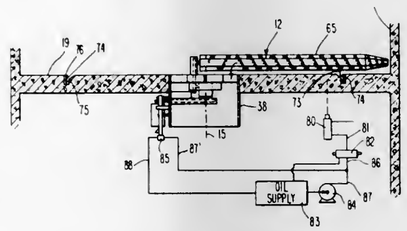
DRIVE SYSTEM FOR SILO UNLOADER

Richard L. Weaver, Rte. 4, Myerstown, Pa. 17067

Continuation of Ser. No. 641,155, Dec. 15, 1975, abandoned. This application Aug. 22, 1977, Ser. No. 826,348

Int. Cl.² B65G *65/46*

U.S. Cl. 214—17 DA **17 Claims**



1. In a drive system of the type in which a driven member has at least a pair of dissimilar drives, and wherein a first one of the drives is of the motor type for imparting a rotational drive component to the driven member, the improvement comprising movable mounting means for the motor type drive for movement of the motor from a normal operating position in response to resistance encountered by the driven member being driven by the motor type drive, and with means connecting the second of the drives to said motor for automatically de-activating the operation of said second of the drives in response to movement of the motor and automatically re-activating the operation of said second of the drives when said motor type drive returns to the normal operating position.

4,095,704

VEHICULAR DELIVERY RAMP APPARATUS

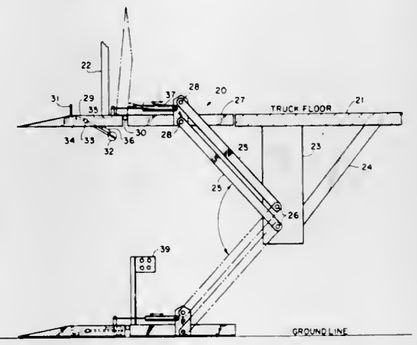
Roger D. Ratliff, Irving, Tex., assignor to PepsiCo Inc., Purchase, N.Y.

Continuation-in-part of Ser. No. 618,400, Oct. 1, 1975, Pat. No. 4,005,788. This application Sep. 16, 1976, Ser. No. 723,801

The portion of the term of this patent subsequent to Feb. 1, 1994, has been disclaimed.

Int. Cl.² B60P *1/48*

U.S. Cl. 214—77 P **9 Claims**



1. In a ramp loading apparatus including a hydraulically controlled ramp loader for raising or lowering cargo to or from a truck floor bed, the improvement comprising: a recess formed in the upper surface of said ramp loader; cargo restraint means including a gate disposed within said recess of said loader; means for imparting vertical movement to said gate within said recess for selectively elevating said gate above and lowering below said surface; an electromagnetically actuatable counterbalance being disposed below said ramp loader; means for pivotally interconnecting said gate and said counterbalance so that spatial displacement of the counterbalance in one direction imparts a generally opposite spatial displacement to said gate; electromagnetical means for applying an electromagnetic field to said counterbalance upon said gate being lowered within said recess in said loader; and means for actuating said electromagnetic means so as to generate said electromagnetic field; said means for imparting said vertical movement to said gate being inoperative upon said electromagnetic means applying said electromagnetic field to said counterbalance for maintaining said gate in a recessed mode within said recess; and timing means for limiting the period of restraint of said gate in said recess by said counterbalance.

4,095,705

AGRICULTURAL AIRPLANE LOADING DEVICE

Clifton E. Hood, P.O. Box 412, Blytheville, Ark. 72315

Filed Feb. 2, 1977, Ser. No. 764,956

Int. Cl.² B60P *1/40*

U.S. Cl. 214—83.18 **1 Claim**

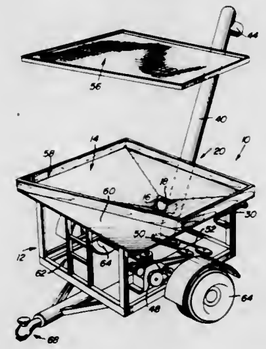
1. An agricultural airplane loading device, comprising, in combination:

(a) a rectangular, wheeled frame having four corners disposed in a common plane of the frame;

(b) a hopper mounted on the frame and provided with a lower portion forming a discharge opening arranged adjacent a corner of the frame and adjacent the plane of the frame;

(c) conveyor means arranged below the hopper for receiving material from the discharge opening of the hopper and elevating the material above the hopper to a reservoir of an airplane being loaded, the conveyor means including a longitudinally extending housing having an inlet disposed beneath the discharge opening of the hopper and an outlet disposed above the inlet for discharging material to the reservoir of an airplane being loaded, the housing extending upwardly at an angle of substantially 45° from the frame and transverse to the frame substantially at an angle 17½°, both angles being taken relative to a horizontal plane; and

(d) gate means arranged between the conveyor means and the discharge opening of the hopper for controlling flow of material from the hopper to the conveyor means, the gate means including a sliding gate element, and a control mechanism connected to the gate element for actuating same, the mechanism including a pair of handles arranged for permitting the rate of flow of material through the gate means to be controlled from different positions relative to the frame of the loading device, the conveyor means further including an auger disposed on the housing, and drive means mounted on the frame and including a pulley



affixed to the auger for rotating same, a mass arranged eccentrically on the pulley for vibrating the hopper when the conveyor means is in operation and preventing bridging and tunnelling of material in the hopper; the hopper being provided with a screen arranged for forming a sieve which reduces the size of lumped and coagulated material discharged on the screen, and a rim disposed around the periphery of the screen for forming side walls extending above a plane of the screen and storing the lumped and coagulated material on the screen in order to provide the screen with sufficient time in order to reduce the size of the lumped and coagulated material, the frame being constructed of a width narrower than a vehicle towing the device for permitting tail lights of the towing vehicle to be visible beyond the frame from the rear of the vehicle.

4,095,706

VERTICALLY SWINGING BIG BALE HANDLING AND GRASPING APPARATUS

Harold B. Schwien, and Paul A. Schwien, both of Bazine, Kans., assignors to Nichols, Farrow, Schwien and Schwien, Wichita, Kans.

Filed Apr. 11, 1977, Ser. No. 786,224

Int. Cl.² B60P *1/04*

U.S. Cl. 214—147 G **6 Claims**

1. A farm implement being a big bale handling apparatus operable to load, convey, and unload large bale members, comprising:

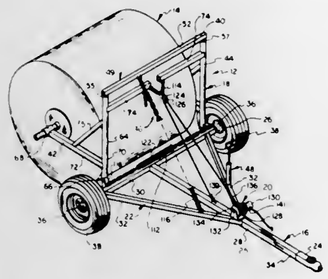
(a) a basic support assembly adapted to be connected to a conventional bumper hitch for conveyance purposes;

(b) a bale connector means mounted on said basic support assembly;

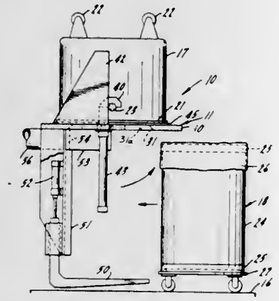
(c) a drive means connected to said bale connector means to power same;

(d) said bale connector means including a main support frame assembly connected to said basic support assembly and having first and second actuator arm assemblies pivotably connected to said main support frame assembly;

(e) each of said first and second arm assemblies having a bale connector assembly;
(f) said bale connector assemblies movable inwardly to grasp the large bale member and pivotal about a horizontal axis vertically to raise and lower the large bale member;
(g) said bale connector means having a connector assembly pivotably connecting said main support frame assembly to said support assembly;
(h) said connector assembly having said horizontal axis defining the pivotal movement of said bale connector assemblies;
(i) said first and second actuator arm assemblies each including a support member having first and second support arms secured thereto;
(j) said first support arms extended rearwardly and having said bale connector assemblies connected thereto;
(k) said second support arms connected to said drive means to control movement of said bale connector assemblies to grasp, convey, and unload the large bale member;
(l) said first and second support arms are extended perpendicular to said support member and to each other; and
(m) said second support arms having inner adjacent ends positioned midway between said support members to achieve a substantial torque action between said first and second support arms.

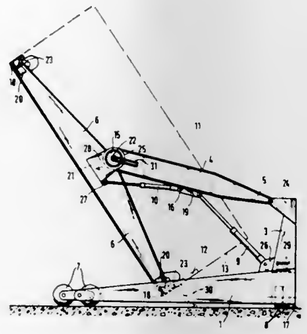


4,095,707
BULK MATERIAL TRANSFER MECHANISM
Robert M. Kowtko, Mercerville, N.J., assignor to Gould Inc., Rolling Meadows, Ill.
Filed Oct. 20, 1976, Ser. No. 734,003
Int. Cl.² B65G *21/02, 65/00*
U.S. Cl. 214—301 **4 Claims**



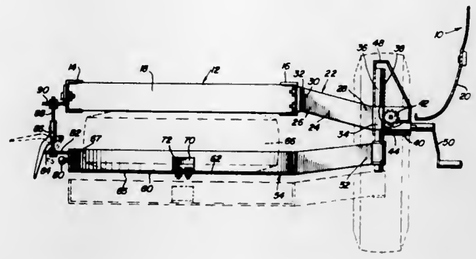
1. A material transfer mechanism for dumping the contents of an opened shipping drum into an open-topped mixing vessel with lugs thereon comprising, in combination, a frame, means mounting said frame on a support surface for 180° rotation about a fixed horizontal axis spaced above said surface at a height greater than that of said drum and said vessel, said frame including an annular plate with a center opening slightly less than the open diameter of said drum, a pair of powered hooks mounted on said frame for engaging said lugs on said vessel when the vessel is positioned beneath said plate, means for vertically moving said hooks for lifting said engaged vessel so that its open top is held against said plate, powered arm means mounted on said frame on the opposite side of said plate from said hooks, means for rotating said frame 180° about said axis so as to turn said engaged vessel upside down and position said arm means close to said support surface and beneath said drum, and means for moving said arm means independently of said hooks for lifting said drum so that its upper open end is pressed against said plate, whereupon further actuation of said means for rotating said frame to return the frame 180° to its original position turns said drum upside down to dump its contents into the vessel through said center opening.

4,095,708
REVERSING DEVICE FOR HOISTING AND TIPPING FREIGHT CONTAINERS
Helmut Gerhard, Weitefeld, Sieg, Germany, assignor to Westerwälder Eisenwerk Gerhard GmbH, Germany
Filed Oct. 22, 1975, Ser. No. 624,927
Claims priority, application Germany, Oct. 23, 1974, 2450420
Int. Cl.² B65G *65/04*
U.S. Cl. 214—313 **50 Claims**



1. A lifting and tilting device for freight containers having fittings for engagement by lifting means, said device comprising:
a. a U-shaped supporting frame having two longitudinal support legs joined at one end by a transverse beam;
b. two corner pillars mounted at the connecting points of said legs and said transverse beam;
c. a pair of lifting arms pivotally connected to said corner pillars;
d. a pair of tilting members pivotally connected to said arms and being provided with engaging means for engaging the fittings of a freight container when said freight container is located between said support legs;
e. power lifting means for lifting said arms; and
f. tilting means for tilting said tilting members, said tilting means being pivotally connected to said lifting arms;
said engaging means being movable with respects to said supporting frame in a direction substantially parallel to the pivot axis of the tilting members to accommodate engagement of said engaging means in said fittings, and
wherein each of said tilting members is constructed of a plurality of tilting member parts, a first of said tilting member parts being pivotally supported at one of said lifting arms, at least one other of said tilting member parts carrying said engaging means and being movable with respect to said first tilting member part.

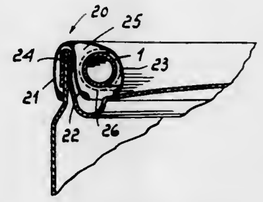
4,095,709
UNDER BODY SPARE TIRE CARRIER
Dennis E. Eller, 331 N. Thorington St., Algona, Iowa 50511
Filed Oct. 27, 1976, Ser. No. 736,196
Int. Cl.² B62D *43/04*
U.S. Cl. 214—454 **10 Claims**



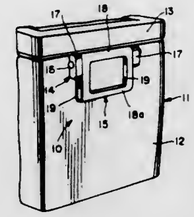
1. In combination with a vehicle having a body and a frame including opposite side longitudinal frame members laterally outwardly beyond whose rear end portions outer opposite side rear body portions of said vehicle project, a spare tire carrier including a first elongated horizontal support arm having an inner base end and an outer free end, means anchoring said base end to one of said frame member rear portions with the free end of said arm projecting outwardly toward but terminating inwardly of the corresponding rear side body portion of the vehicle, the outer free end of said arm including pivot means, a second horizontal arm having base and free end portions and including upwardly opening receptacle means on its free end portion for vertically downwardly receiving therewithin the spare wheel and tire of said vehicle, said second arm having its base end portion supported from the outer free end of said first arm for angular displacement relative thereto about an upstanding axis and swinging of said second arm between a first position with the free end portion thereof projecting toward the other frame member rear portion and said receptacle means generally centered transversely of said frame and a second position with the free end portion of said second arm projecting rearwardly from said vehicle, said vehicle including a rear bumper, the spacing of said axis outwardly from said one frame member and forwardly of said bumper and the effective length of said second arm, between said axis and said receptacle means, being such to position said receptacle means, entirely, rearward of said bumper when said second horizontal arm is in said second position, whereby said wheel may be removed from said receptacle means upon vertical upward movement relative to said receptacle means.

4,095,710
SUCKING TUBE IN COMBINATION WITH A CAN
Umberto Tomiati, Via D. Filippini, 19, Verona, Italy
Filed Jul. 13, 1976, Ser. No. 704,875
Claims priority, application Italy, Jul. 18, 1975, 25581/75
Int. Cl.² B65D *83/00*
U.S. Cl. 220—90.2 **1 Claim**

1. A sucking tube assembly in combination with a can, comprising an enclosure removably connected to the can and containing a sucking tube wound up within said enclosure, characterized in that said enclosure comprises an annular body having an inner lip, an intermediate lip and an outer lip, said outer lip being engaged over the connection area between the can body and the can bottom closure, said intermediate lip and inner lip defining in cooperation an annular chamber with said sucking tube housed therein.



4,095,711
HANDLE ASSEMBLY
James Robert Conley, Wichita, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.
Filed Aug. 20, 1976, Ser. No. 716,164
Int. Cl.² B65D *25/28*
U.S. Cl. 220—94 R **12 Claims**



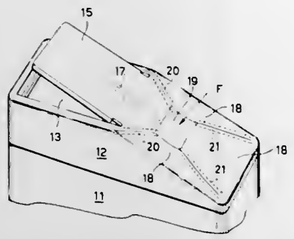
1. A handle assembly for carrying a container comprising spaced mounting members extending outwardly from said container in spaced parallel relation;
a pin extending from each of said mounting members, said pins being oppositely directed and lying along a common axis; and
a handle having a pair of oppositely facing, parallel pin-receiving channels joined at their ends at right angles to a pair of spaced parallel grip members, said pins extending into said channels to join said handle to said bracket;
said container carriable by moving said handle from a resting position to a carrying position using one of two distinct modes of movement.

4,095,712
CONTAINER HAVING SECONDARY HINGED CLOSURE
Emilio Perrella, Via S. Carlo 13, Segrate (Milan), Italy
Filed Mar. 11, 1977, Ser. No. 776,773
Claims priority, application Italy, Oct. 22, 1976, 28631 A/76
Int. Cl.² B65D *51/18*
U.S. Cl. 220—254 **3 Claims**

1. A container distributor of the type comprising a part forming the containing body and a part forming the lid, at least this latter being of an at least partially resilient plastics material, a delivery port being provided in the upper base of said part forming the lid and arranged for closing by a flap element, wherein at least the remaining portion of said upper base, which extends into said flap element and is formed as a single piece with said part forming the lid, is elastically deformable between a rest position and a delivery position in which said flap element closes and opens said delivery port respectively;
said remaining portion being configured as a truncated pyramid with the minor base facing upwards and consti-

tuting the application surface for the pressure opening the flap element,

said remaining portion comprising walls of lessening thick-



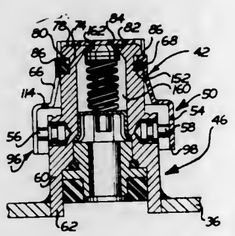
ness from the minor base towards the major base, except on the face integrally connected to said flap element; and said face integrally connected to the flap element is provided with at least one stiffening rib.

4,095,713

TAMPER RESISTANT CAP FOR QUICK-DISCONNECT COUPLING PLUG

James F. Norton, Berea, Ohio, assignor to The Coca-Cola Company, Atlanta, Ga.

Filed Jul. 8, 1977, Ser. No. 813,797
Int. Cl.² B65D *41/32*
U.S. Cl. 220—270 **24 Claims**



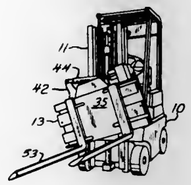
1. An apparatus comprising a container to hold fluid, a plug assembly extending from a portion of said container, said plug assembly including a plug body having an inner end portion connected with said container, an outer end portion through which fluid flows to a socket assembly when said plug assembly is connected with the socket assembly, and an annular groove disposed between said inner and outer end portions of said plug body, said plug assembly further including an annular seal ring disposed in said groove to sealingly engage a socket assembly when the socket assembly is connected with said plug assembly, said apparatus further including indicating means connected with said plug assembly for providing an indication that a socket assembly has not been connected with said plug assembly after connection of said indicating means with said plug assembly, said indicating means including a base section circumscribing said plug body at a location disposed between said container and said annular groove in said plug body to block connection of a socket assembly with said plug assembly, locking means connected with said base section for engaging said annular groove to prevent disengagement of said indicating means from plug body without breaking said indicating means, said locking means including a plurality of spaced apart locking sections which extend outwardly from said base section into said annular groove in said plug body, an end section having surface means for at least partially covering said outer end portion of said plug body, and a plurality of spaced apart side sections disposed between said locking sections, at least one of said side sections having an outer end portion connected with said end section and an inner end portion connected with said base section.

4,095,714

LOAD TILTING ATTACHMENT FOR AN INDUSTRIAL TRUCK

Frank C. Schuster, Peoria, Ill., assignor to Little Giant Products, Inc., Peoria, Ill.

Filed Nov. 8, 1976, Ser. No. 739,830
Int. Cl.² B66F *9/14*
U.S. Cl. 214—620 **9 Claims**



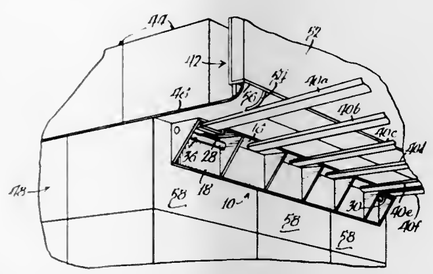
1. In a load tilting attachment for an industrial truck having a vertically movable carriage and load supporting means, said tilting arrangement comprising: a vertically disposed plate secured to and movable with said carriage, a vertically disposed tilt boy aligned with said plate, means for tilting said body in a limited arc relative to and parallel with said plate, said tilting means consisting of a spindle-bearing assembly centrally of said plate and said body for pivoting said body in a vertically disposed arc, circumferentially spaced load reaction members between said plate and said body and spaced radially from said spindle-bearing assembly for restraining rocking movement of said body relative to said plate, one of said load reaction members comprising an arcuate plate secured to said tilt body above said spindle-bearing assembly and an associated bearing plate secured to said vertically disposed plate and against which said arcuate plate bears, said arcuate plate and said bearing plate being interlocked in a hook-like arrangement to resist outward and axial rocking movement between them under load, means connecting said plate and said body for driving said body about said pivot in said arc, and means connecting said load supporting means to said body.

4,095,715

PUSHER PLATE FOR FORKLIFT VEHICLES

Teri Gene Reynolds, 201 E. Sangamon, Fisher, Ill. 61843

Filed Apr. 28, 1977, Ser. No. 791,699
Int. Cl.² B66F *9/12*
U.S. Cl. 214—620 **7 Claims**



1. A pusher plate for use with a forklift carrier having a load push-pull mechanism with a slip-sheet pallet clamp, to remove a sheet supported load from a stack, comprising:

an abutment wall;

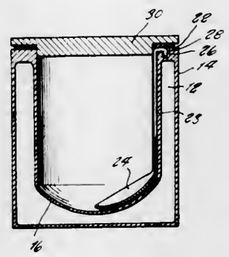
means for mounting the abutment wall on the free end of the tines of the fork with the wall extending the width of the fork and downwardly from the fork to engage and prevent displacement of the supporting stack below the slip-sheet as the slip-sheet and the load thereon are removed by the load push-pull mechanism.

4,095,716

COMBINED SPOON AND VESSEL

William T. Meany, 477 Park Pl., Brooklyn, N.Y. 11238

Filed Apr. 28, 1977, Ser. No. 791,794
Int. Cl.² B65D *23/12*
U.S. Cl. 215—100 R **8 Claims**



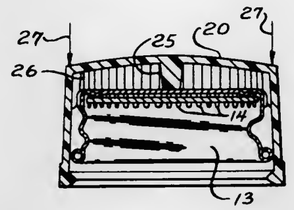
1. In combination, a tool and container, said container being formed of a hollow walled body having an interior surface and exterior surface, a base and an open mouth defined by a rim, said rim defining a recess said interior surface having a predetermined contour, said tool having a length not greater than the depth of said container, at least one surface of said tool having a contour corresponding to that of said interior surface, said tool having a hooked portion at one distal end, said hooked portion engaging said recess whereby said tool depends from said rim into said container in longitudinal alignment therewith.

4,095,717

SAFETY OVERCAP FOR STANDARD METAL SCREWCAPS

Roy A. Michaelsen, Chicago, Ill., assignor to Almar Enterprises, Inc., Royal Palm Beach, Fla.

Filed Dec. 29, 1976, Ser. No. 755,182
Int. Cl.² B65D *55/02, 85/56;* **A61J** *1/00*
U.S. Cl. 215—220 **3 Claims**



1. A safety closure overcap for standard metal screwcaps having a lower edge curl and finger gripping knurl in the sidewall adjacent a juncture with a top wall, comprising:

a plastic material molded inverted cup-shaped overcap having a top wall and depending sidewalls, said sidewalls having a height in excess of the height of the standard cap sidewall,

an annular inwardly directed flange on the overcap sidewall sized to snap over the standard cap knurl and hold the overcap assembled on the standard cap,

a knurl in the interior upper sidewall of the overcap mating the standard cap knurl, and

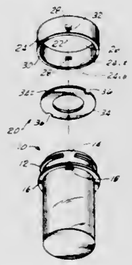
a post centrally inside the overcap top wall extending toward and adapted to engage the top wall of the standard cap to hold the overcap knurls out of engagement with the standard cap knurls unitl finger pressure upon the overcap applied above the sidewalls flexes the overcap top wall over the post acting as a fulcrum to engage the knurls in driving torque for both on and off movement of the inner screwcap.

4,095,718

CONVERTIBLE SAFETY CAP

Cheung Tung Kong, 300 E. Bellevue Dr., Pasadena, Calif. 91101

Filed Aug. 25, 1977, Ser. No. 827,717
Int. Cl.² B65D *53/00*
U.S. Cl. 215—223 **6 Claims**



1. A cap for a container of the type having locking means for use in a precautionary arrangement to prevent children from obtaining access into the container, the cap being covertible so as to cooperate with such a container to provide not only such a precautionary arrangement but also an alternative easy open arrangement to simplify separation of the cap from the container, the cap comprising:

a cover wall;

a side wall integral with the cover wall and projecting therefrom to define a container-receiving recess;

complementary locking means, located on the interior of the side wall at a position spaced from the cover wall, for use in the precautionary arrangement to engage with the container locking means to ensure that the cap can be separated from the container only when the cap is aligned in predetermined angular relationship with the container;

adjustable stopping means for use in converting between the precautionary and easy open arrangements;

the stopping means comprising a member that, in the easy open arrangement, occupies a position within the recess to act as a stop limiting travel of the container into the recess so that in the easy open arrangement the complementary locking means and the container locking means do not engage;

the side wall including a gripping surface adapted to releasably secure the cap to the container in the easy open arrangement; and

said member being movable from said position to enable further travel of the container into the recess so that in the precautionary arrangement the complementary locking means and the container locking means are engageable.

4,095,719

EDGE EXTRUSION AND ASSOCIATED CASING HARDWARE

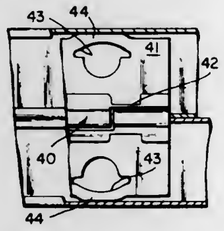
Walter C. Wolf, Rancho Palos Verdes, Calif., assignor to Thermodyne International Ltd., Hawthorne, Calif.

Filed Sep. 27, 1976, Ser. No. 726,926
Int. Cl.² B65D *7/32, 7/44, 43/16*
U.S. Cl. 220—4 B **3 Claims**

1. For use in a plastic container, which includes a top shell and a bottom shell, each shell having a peripheral rim and a sidewall, casing hardware used in combination with a pair of edge extrusions that include:

a. a first member which is adapted to longitudinally extend along the peripheral rim of the top shell so that it closes on itself and which has two parallel vertical portions which are adapted to be coupled to the sidewall of the top shell, said first member having a male joining edge running parallel to its longitudinal portion and a pair of exterior flanges coupled to one of said two vertical portions and male joining edge;

b. a second member which is also adapted to longitudinally extend along the peripheral rim of the bottom shell so that it closes on itself and which has two parallel vertical portions which are adapted to be coupled to the sidewall of the bottom shell; said second member having a female joining edge running parallel to its longitudinal portion and a pair of exterior flanges coupled to one of said two vertical portions and disposed so that said exterior flanges run parallel to said female joining edge; and



c. a rubber gasket is coupled between said male joining edge and said female joining edge thereby sealing said plastic container, said casing hardware comprising:

a. A rectangular base member, which is adapted to loosely slide between each of said pair of exterior flanges, having a set of flanges adapted for insertion into one of said exterior flanges running longitudinally along said base member on one of its sides and a set of semi-circularly cut holes adjacent to its other edges and adapted so that a portion of said base member between its other edge and said semicircularly cut hole may be forced against one of said exterior flanges and said flanges may be forced against the other of said exterior flanges thereby effecting the attaching and securing of said base member to said edge extrusion; and b. joining means for joining the top shell to the bottom shell, said joining means mechanically coupled to said rectangular member.

4,095,720

PLASTIC CARRIER FOR FLUID CONTAINERS

Franz Delbrouck, Bergisch-Gladbach, and Wilfried Nickel, Menden, both of Germany, assignors to Freya-Plastic Franz Delbrouck GmbH, Menden, Germany

Filed Aug. 30, 1976, Ser. No. 719,058

Claims priority, application Germany, Sep. 3, 1975, 2539127

Int. Cl.[2] B65D *21/02, 1/24, 1/38, 25/04*

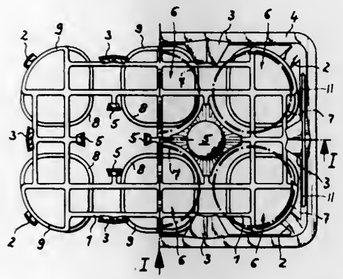
U.S. Cl. 220—21 **7 Claims**

1. In a stackable carrier for fluid containers, which carrier is of plastic and includes a bottom having a rectangular form and composed of a plurality of ribs defining a rectilinear open grid whose borders coincide with borders of the rectangle defining the bottom, a top frame defined by a closed strip of predeter mined thickness in a horizontal direction, the frame defining the upper end of the carrier, a plurality of columns extending between, and connecting, the bottom and the top frame, a plurality of stacking projections extending downwardly from the bottom, and means for dividing the interior of the carrier into a plurality of compartments each for holding a respective container in an upright position, the external height of the carrier being greater than that of the containers which it is to hold, the improvement wherein:

there is a respective one of said stacking projections associated with each of said compartments;

each of said stacking projections includes a part which projects laterally beyond the borders of the rectangle defining said bottom to present a surface for supporting a bottle whose lower portion extends laterally beyond the borders of such rectangle;

each of said stacking projections is dimensioned and positioned for causing the minimum distance between each said projection and a vertical plane passing through the outer edge of said top frame to be at least equal to the predetermined thickness of said closed strip defining said frame, and for causing the minimum distance between each adjacent pair of stacking projections to be at least twice said predetermined thickness;



at least first ones of said columns are located between said laterally projecting parts of respective adjacent pairs of said stacking projections and are connected to ribs at the borders of said open grid so that the locations of the connections of said first ones of said columns to said ribs are located on the sides of the rectangle defining said bottom;

second ones of said columns extend from said stacking projections at the corners of said carrier and merge into said frame; and

said means for dividing the interior of the carrier comprise hollow dome-shaped members located to define compartment boundaries, said members extending upwardly from said bottom, being upwardly tapered, and having a constant wall thickness, along their entire length.

4,095,721

BERRY TRAY DENESTING AND BERRY PACKAGING

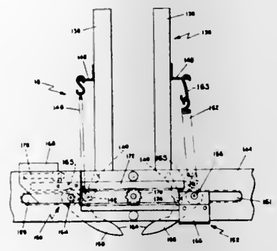
Albert W. Patzlaff, Holland, and Paul G. Beardsley, Gobles, both of Mich., assignors to Blueberry Equipment, Inc., South Haven, Mich.

Division of Ser. No. 623,463, Oct. 17, 1975, Pat. No. 4,038,807.

This application Mar. 15, 1977, Ser. No. 777,635

Int. Cl.[2] B65G *59/06*

U.S. Cl. 221—210 **4 Claims**



1. A desnesting apparatus for separating the lowermost one of a stack of botton corner-slotted containers, comprising:

a pair of spaced support members;

a magazine secured to said spaced support members for retaining a vertical stack of bottom corner-slotted containers, said magazine having an open bottom exposing the lower portion of the lowermost container in the stack;

separating means supported on said support members for horizontal reciprocating movement for entering the bottom corner slots of said containers and liftng the stack of containers from the lowermost container and then depressing the lowermost container away from the remainder of the stack to separate said container, said magazine further including rim engagement lugs pivotally supported relative to said magazine and said stack of containers, said lugs engageable with the top rim of the bottom container of the stack; and

means biasing said lugs to a stack retention position, said lugs being shiftable against the bias of said biasing means to a container release position by depressing the lowermost container and raising the stack of containers with said separating means.

4,095,722

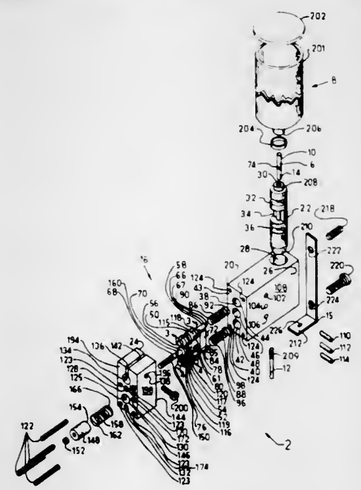
DRIPLESS DISPENSER AND METHOD OF DISPENSING A FLOWABLE MATERIAL

Kenneth L. Miller, 1230 Lawrence Rd., Carmel, Ind. 46032

Filed Mar. 19, 1976, Ser. No. 668,417

Int. Cl.[2] B65D *37/00*

U.S. Cl. 222—1 **18 Claims**



1. A dropless flowable material dispenser for dispensing measured amounts of a flowable material from a pressurized flowable material reservoir comprising a resilient pinch off tube having opposite ends and means for removably coupling said tube to said reservoir at one end thereof, nozzle means removably coupled to the other end of said pinch off tube, said nozzle means being in communication with said reservoir through said tube and means for selectively squeezing said tube to force a selected amount of said material out of said tube and nozzle means and to draw any residual amount of said material in said nozzle means back away from the distal end thereof, said squeezing means including a plurality of rams, each of said rams being selectively movable from a first position in which said ram is disengaged from said tube to a second position in which said ram engages and compresses said tube, said plurality of rams including an upper ram and an intermediate ram and a lower ram, said squeezing means further including means for moving said rams and means for sequencing the movement of said rams to fill said tube with said material by positioning said lower ram in said second position thereof, positioning said upper and intermediate rams in said first position thereof, and allowing said material to flow into said tube from said reservoir, to isolate said material in said tube by positioning said upper and lower rams in said second position thereof, and to dispense a portion of said material in said tube and to draw any residual of said material left in said tube from the distal end of said nozzle means by positioning said upper ram in said second position thereof, said lower ram in said position thereof, squeezing said tube by moving said intermediate ram from said first position thereof toward said second position thereof, and moving said intermediate ram to said first position thereof after dispensing the desired amount of said material from said tube.

4,095,723

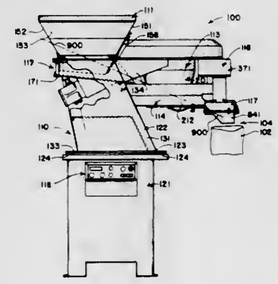
ARTICLE HANDLING SYSTEM WITH WEIGHT-CONTROLLED DISPENSER

Bernard Lerner, Hudson, Ohio, assignor to Automated Packaging Systems, Inc., Twinsburg, Ohio

Continuation of Ser. No. 618,079, Sep. 30, 1975, abandoned. This application Sep. 14, 1977, Ser. No. 833,260

Int. Cl.[2] B67D *5/14*

U.S. Cl. 222—56 **9 Claims**



1. An apparatus for forming batches of articles, comprising:

a. an upstanding base structure;

b. a vibratory feeder having a bowl-shaped feeder hopper for feeding articles from a hopper base portion upwardly along an inclined ramp toward a discharge station;

c. article supply means including an article support and drive means for driving the article support to feed articles into the feeder hopper; and,

d. electrical control means for generating an output signal to selectively start or stop the drive means to maintain a predetermined level of articles in the base of the feeder hopper, including:

i. electrically operated sensor means for sensing the level of articles in the feeder hopper and for generating an electrical input signal representative of the sensed level of articles in the feeder hopper;

ii. a manually operated electrical control means for generating an electrical reference signal representative of a desired predetermined level for articles to be maintained in the feeder hopper;

iii. comparison means connected to the sensor means and to the control for receiving and comparing the input and reference signals and for generating an output signal indicative of when the actual sensed level of articles is above and below the desired predetermined level.

4,095,724

CONTAINER FOR HOLDING AND DISPENSING FLOWABLE PRODUCTS

Ivan Perusco, Riedheim, Germany, assignor to Precision Tools Ltd., Switzerland

Filed Nov. 3, 1976, Ser. No. 738,504

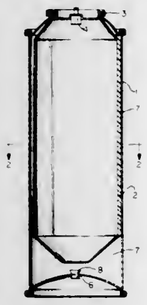
Claims priority, application Germany, Jun. 16, 1976, 2626990

Int. Cl.[2] B65D *35/28*

U.S. Cl. 222—95 **1 Claim**

1. Apparatus for holding and dispensing flowable products comprising a substantially non-flexible outer container having

a generally cylindrical inner wall, a flexible inner container for receiving a flowable product, said inner container having upper and lower end portions connected by an intermediate portion, said upper end portion being connected to said outer container, said lower end portion having a downwardly extending generally frusto-conical configuration, said intermediate portion being of non-circular cross-section and including at least three blunt angles connected by arcuate wall sections, each of said arcuate sections having a radius which is larger than the radius of the inner cylindrical wall of said outer container, the exterior surfaces of said blunt angles frictionally engaging the inner wall of said outer container, the inner sur-



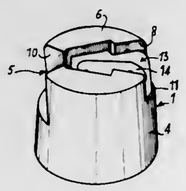
face of each of said blunt angles having a radius which is less than the radius of each of the arcuate wall sections, said blunt angles being substantially thicker than said arcuate wall sections, selectively operated discharge valve means mounted on said outer container and communicating with the contents of said inner container, and a pressure media located in said outer container and exteriorly of said inner container so that when said discharge valve means is operated said pressure media causes said arcuate wall sections to collapse inwardly and discharge material through said valve means while said blunt angles remain substantially in engagement with said inner walls of said outer container.

4,095,725

ONE-PIECE PUSHBUTTON DISPENSING CAP FOR PRESSURIZED CONTAINER

Antonin L. Goncalves, Groslay, France, assignor to L'Oreal, Paris, France

Filed Dec. 10, 1976, Ser. No. 749,373
Claims priority, application France, Jan. 14, 1976, 76 00826
Int. Cl.² B65D *83/14*
U.S. Cl. 222—153 **14 Claims**



1. A dispensing cap attachable to a pressurized container of the aerosol bomb type equipped with at least one dispensing valve, said cap comprising

a peripheral jacket having a lateral wall which defines at least one dispensing orifice and an upper wall having an opening,

a pushbutton at least partially received in said opening, said pushbutton comprising at its upper part a raidally extending tongue and in its lower part a right-angled duct one axial arm of which fits the outlet of the dispensing valve and the other arm of which is substantially radial and opens into said dispensing orifice,

two internal guide webs acting as cooperating guide slides for the tongue of the pushbutton, said webs being symmetrically positioned with respect to the axis of the cap, convergent in the direction of the dispensing orifice, and each comprising a guide shoulder dividing it into two zones,

the tongue of the pushbutton comprising on its lateral walls and between its ends, a shoulder corresponding to the guide shoulders of the guide webs, the improvement according to which:

the zone of each guide web which is closest to the dispensing orifice is set back with respect to the other zone, and edges of the lateral walls of the tongue are provided with members projecting into each space between one of the lateral walls of the tongue and the corresponding guide webs, said members being adapted to slidingly cooperate with the guide slides during depression of the pushbutton,

said pushbutton having an exposed end portion extending to a location closely adjacent to a side of the peripheral jacket opposite the said at least one dispensing opening, and said axial arm of the duct being offset with respect to said end portion;

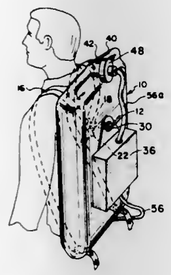
said shoulders on the lateral wall of the tongue and said guide shoulders on said jacket cooperating with each other to guide the pushbutton axially of the valve and to prevent tilting of the pushbutton toward its exposed end upon application of a force near the exposed end which tends to tilt the pushbutton with respect to the valve.

4,095,726

PORTABLE SUPPLY TANK

Valentine Hechler, IV, 26 Meadow View Rd., Northfield, Ill. 60093, and Lewis E. Masters, 120 S. Spruce St., Wood Dale, Ill. 60191

Filed Nov. 1, 1976, Ser. No. 737,074
Int. Cl.² B67D *5/64*
U.S. Cl. 222—175 **10 Claims**



1. A molded portable liquid carrying tank comprising a hermetically sealed molded body having a neck defining an upper sealing wall and two spaced substantially flat and parallel vertical front and back interbraced semi-flexible walls for carrying comfort against a person's back, said walls being marginally spaced and joined by side walls at the bottom end and forming two lower corners,

strut means integrally interbracing and surrounded at both ends by spaced flexible portions of the two spaced flexing walls above the center of gravity of the tank contents to support the flexible walls movement so that the walls yield as a unit in the same direction without substantially varying the volume capacity of the tank, and

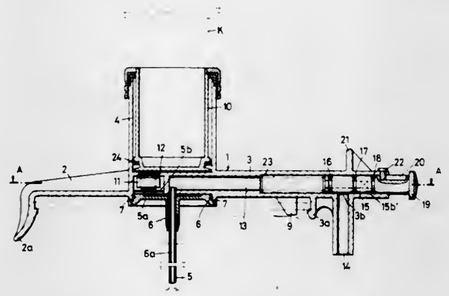
shoulder strap means engaging said strut means adjacent one end and the two lower corners for supporting the two walls of the tank as a unit to carry said tank in upright orientation with a motion that maintains wettable powders in solution in the tank.

4,095,727

APPARATUS FOR DISPENSING A LIQUID FROM A CONTAINER

Dieter Dorsch, Tscherningstr. 22, Heilbronn, Germany (D-7100)

Filed Jul. 9, 1976, Ser. No. 704,054
Claims priority, application Germany, Jul. 16, 1975, 2531697
Int. Cl.² B67D *5/54*
U.S. Cl. 222—400.8 **13 Claims**



1. An apparatus for pumping a liquid under air pressure from a container having a rim and defining an interior chamber holding the liquid from the bottom of the chamber to a predetermined liquid level, an air space being defined between the liquid level and the rim, the apparatus being disposed and locked on the container above the air space, which apparatus is a unit comprising

a. a housing defining an air inlet for delivering air into the air space and including two clamps engageable with the rim of the container for disposing and locking the housing of the container,

b. means mounted on the housing for imparting superatmospheric pressure to the air whereby the air is delivered to the space under said pressure,

c. a check valve in the inlet for preventing the air under pressure from escaping from the space,

d. a tap standpipe in communication with the bottom of the chamber and defining an air channel arranged for connection to the inlet, the air channel being in communication with the space, whereby the superatmospheric pressure in the space above the liquid level pumps the liquid into and through the standpipe,

e. a liquid outlet in communication with the tap standpipe,

1. one of the clamps defining a bore constituting a liquid conduit having one end in communication with the tap standpipe and receiving the liquid therefrom and another end in communicating with the liquid outlet for delivering the liquid thereto, and

f. a shutoff valve mounted in the liquid conduit for selectively opening and closing the outlet.

4,095,728

CONTAINER WITH IMPROVED COLLAPSIBLE POURING SPOUT

Walter K. Chlystun, 327 St. James Dr., Spartanburg, S.C. 29301

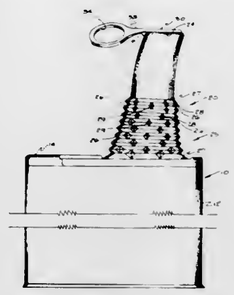
Filed Sep. 23, 1976, Ser. No. 725,931
Int. Cl.² B67D *3/00*
U.S. Cl. 222—529 **14 Claims**

9. An improved dispensing container comprising:

(a) a body;

(b) a top wall integral with said body; and

(c) a dispensing spout integral with said top wall and including a tapered, circumferentially pleated portion extending outwardly from said top wall whereby application of axial force along said spout to nest or withdraw said spout causes eversion of the tapered spout portion, at least one of said pleats having at least one means around the circumference thereof that extends generally radially with respect thereto, said at least one means being circumferentially compressible during eversion of said spout to cir-



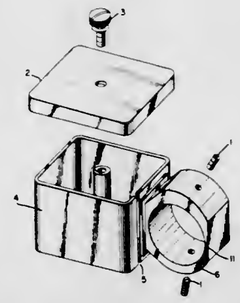
cumferentially reduce said at least one pleat to facilitate nesting and withdrawal of said spout.

4,095,729

FILTER PAPER DISPENSER

Anthony William Butera, 112 Tuthill St., Port Jefferson, N.Y. 11777

Filed Sep. 3, 1976, Ser. No. 714,951
Int. Cl.² B26F *3/02*
U.S. Cl. 225—42 **1 Claim**



1. A dispenser for filter paper comprising a housing for enclosing a roll of strip material, the housing having two parallel end walls, two parallel side walls, a bottom portion integrally connecting said walls, and a removable top, one of said end walls having a slot running from said bottom portion to said removable top, ring like bracket means attached to said one of said end walls adjacent the slot for encircling a portion of a smoke tester, and a serrated cutting edge on said bracket means, said edge being parallel to said slot and spaced from said housing.

4,095,730

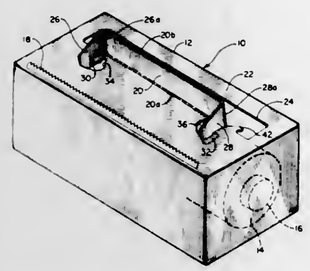
WRAPPING BRIDGE FOR A WRAP DISPENSING PACKAGE

Richard Thomas Clatterbuck, North Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 22, 1977, Ser. No. 826,501
Int. Cl.² B26F *3/02*
U.S. Cl. 225—48 **4 Claims**

1. In a package adapted for dispensing rolled wrapping stock and having a knife-edge for cutting the stock upon being drawn from the package, a wrapping bridge erectable from a panel embodying the package to effect an angular relationship between the stock and the knife-edge upon being drawn from an opening in the panel created by the bridge such that the stock is easily cut and the free end thereof maintained in an accessible position on the package, said bridge comprising a

substantially rectangular body portion formed from the package panel by a first densely perforated line, which, upon the bridge body being pressed or lifted effects its separation from the panel along the line formed by the perforations, and a second sparsely perforated line in a spaced parallel relationship to the first perforated line such as to form a hinge line upon lifting of the bridge body from the panel, and a pair of legs each



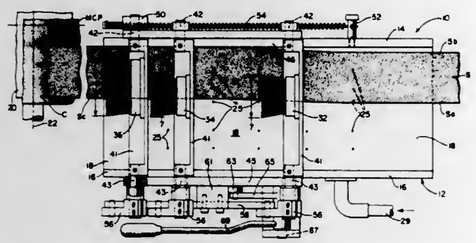
attached at either end of the bridge body portion by a sparsely perforated hinge line that is perpendicular to the bridge body hinge line, the legs being formed by a densely perforated peripheral line that effects separation of the legs and thus the end portions of the bridge from the package panel and which, upon being spearated, may be bent along their individual hinge lines in a direction substantially perpendicular to the bridge body to form stable rests for the uprighted bridge.

4,095,731

GUIDING NARROW STRIP

Antony Harding, Schieren, Luxembourg, and Michel Lemaire, Arlon, Belgium, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 4, 1977, Ser. No. 765,576
Int. Cl.[2] B29H *17/10*
U.S. Cl. 226—3 **10 Claims**



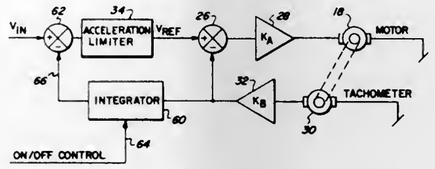
1. A method of guiding a running length strip of elastically yieldable tire building material with respect to a reference plane, comprising pulling the strip forward in a direction parallel to said reference plane, applying to the strip a drag opposing forward movement greater near the running edge thereof more distant from said plane than in the strip closer to said plane by and between a stationary plane supporting surface and resiliently fixed brush means engageable in drag-inducing relation with said strip; said drag being less than sufficient to strain said more distant edge beyond its elastically recoverable strain limit, and sufficient to cause said strip to deflect toward said reference plane.

4,095,732

METHOD AND APPARATUS FOR ACCURATELY CONTROLLING THE POSITION OF A FILM TRANSPORT DEVICE

Lauren V. Merritt, Sierra Madre, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1976, Ser. No. 755,407
Int. Cl.[2] B65H *23/18, 25/24*
U.S. Cl. 226—33 **12 Claims**



1. For use in a web transport system wherein a web is driven at a desired velocity and in a desired direction in response to an input signal, apparatus for stopping the web at a position the web occupied when an event occurred comprising:

drive means responsive to a drive signal for transporting said web;

velocity determining means responsive to the movement of said web for producing a signal representing the web velocity;

means for detecting the occurrence of said event;

distance detecting means responsive to the movement of said web for producing a signal representing the distance travelled by said web after the occurrence of said event;

means responsive to said detecting means for enabling said distance detecting means;

means responsive to said detecting means for terminating said input signal;

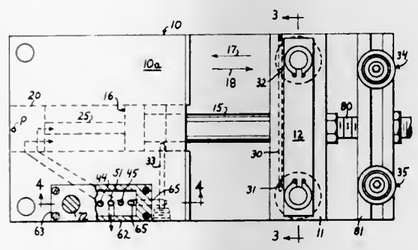
first means for combining said input signal with said distance signal and generating a composite output signal representing the total thereof, and second means for comprising said composite signal with said velocity signal and generating said drive signal representing the difference therebetween.

4,095,733

STOCK FEEDER FOR PUNCH PRESSES

Albert W. Scribner, 6 Country Club Rd., Darien, Conn. 06820

Filed May 25, 1977, Ser. No. 800,284
Int. Cl.[2] B65H *17/36*
U.S. Cl. 226—162 **7 Claims**



1. In a pneumatic feeder for advancing stock into the work station of a punch press or the like; said feeder including:

a frame;

a feed slide mounted on said frame for reciprocating movement through feed and non-feed strokes;

stock gripping means carried by said feed slide;

a first fluid motor means for actuating said feed slide;

a second fluid motor means for actuating said stock gripping means; and

conduit means defining a pair of separate fluid conducting lines that are respectively connected to said first and second fluid motor means:

a slide valve for controlling the operation of said first and second fluid motor means; said slide valve including means defining a smooth plate surface, said surface having at least three ports formed therein, two of said ports being disposed respectively at the ends of said pair of fluid conducting lines and one of said ports effectively defining an exhaust port; a valve cup member having an end face defining a smooth valving surface, said end face of said cup member being recessed, said cup member being movable back and forth between two operative valving positions while said smooth plate and valve cup surfaces are in mutual sliding engagement;

conduit means adapted to continuously supply pressure fluid to a chamber formed in said slide valve so as to bias said valve cup member against said plate surface whereby when said valve cup member is in a first one of its said two operative positions one of said two fluid conducting lines is exposed to the pressure fluid in said valve chamber while the other of said fluid conducting lines is connected through said recessed end face of said valve cup member to said exhaust port, and vice versa when said valve cup member is shifted to the second one of its said two operative positions;

a control plunger adapted to be operated in response to the operation of said punch press; and

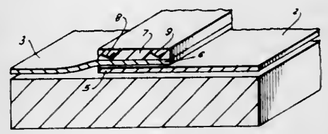
coupling means adapted to effectively couple said control plunger and said valve cup member whereby said valve cup member may be shifted between its said two operative positions in response to the movement of said control plunger.

4,095,734

METAL WALL PROVIDED WITH EITHER EXTERNAL OR INTERNAL CLADDING

Per Ingemar Persson, Nora, Sweden, assignor to Nitro Nobel AB, Gyttorp, Sweden

Filed Feb. 27, 1976, Ser. No. 662,152
Claims priority, application Sweden, Mar. 10, 1975, 7502619
Int. Cl.[2] B23K *21/00, 31/02*
U.S. Cl. 228—104 **9 Claims**



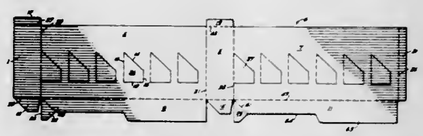
7. In a method of fastening cladding to a metal wall and testing the fastening, which cladding has a first cladding part having a first end and a second cladding part having a second end in close proximity to the first end of said cladding part, each of said first and second cladding parts being connected to at least one of the other one of said cladding parts and said metal wall by at least a first weld seam and a second weld seam, the improvement comprising: forming an elongated chamber-like space between said first weld seam and said second weld seam, closing off said elongated chamber-like space at one end, and injecting a testing medium into the open end of said chamber-like space for indicating the leakproofness of said first weld seam and said second weld seam, said step of forming an elongated chamber-like space comprising abutting said first and second ends of said first and second cladding parts, respectively, against one another, and welding a portion of said first cladding part remote from said first end thereof in a direction away from said second end of said second cladding part to said metal wall therebelow, which thereby forms said first weld seam, and welding a portion of said second cladding part remote from said first end thereof in a direction away from said first end of said first cladding part to said metal wall therebelow, which thereby forms said second weld seam.

4,095,735

MULTI-PARTITIONED CARTON

Orison W. Stone, New Haven, Vt., assignor to Potlatch Corporation, San Francisco, Calif.

Filed Mar. 29, 1977, Ser. No. 782,449
Int. Cl.[2] B65D *5/10, 5/48*
U.S. Cl. 229—39 R **12 Claims**



1. A knock down, easily erected, multi-partitioned carton formed from a single blank of foldable paperboard or like sheet material comprising,

a pair of side panels, front side panel and rear side panel;

a pair of end panels disposed in joining relationship between said side panels;

at least one pair of opposed tongues, one tongue of said pair of opposed tongues formed in one side panel of said pair of side panels and the other tongue of said pair of opposed tongues formed in the other side panel of said pair of said panels,

each tongue of said pair of opposed tongues having one edge hingedly attached to one of said side panels, said hingedly attached edge of said tongue of said pair of opposed tongues being aligned in parallel relationship to the hingedly attached edge of the other said tongue of said pair of opposed tongues;

said pair of opposed tongues directly attached to each other in partially overlapping parallel relationship whereby a carton partitioned is formed;

a pair of bottom flaps, one bottom flap of said pair of hingedly attached to one side panel of said pair of side panels and the other bottom flap of said pair hingedly attached to the other side panel of said pair of side panels,

each said bottom flap having a bottom tab hingedly attached to the same along an angled fold line;

each said angled fold line intersecting the adjacent junction of said end panel with said side panel, each said angled fold line disposed in a line which bisects the angle formed at the adjacent junction between said end panel and said side panel;

a pair of end tabs hingedly attached to the bottom edge of each of said end panels and each end tab disposed in overlapping affixed relationship to the corresponding said bottom tab, whereby said bottom flaps initially positioned in parallel relationship to said side panels when the carton is in its knocked down condition are forced into a substantially perpendicular disposition when said carton is squared;

each said bottom flap having an extended portion and a recessed portion, said extended portion of one said bottom flap disposed in locking engagement with the recessed portion of the other said bottom flap when said carton is squared, whereby said bottom flaps automatically lock when said carton is squared so as to maintain the carton in its squared condition;

a plurality of windows defined by the formation of said tongues within each said side panel, whereby articles contained within each partition area of said carton is clearly visible,

one of said pair of end panels hingedly attached on opposite sides by score lines to each said side panels, the other of

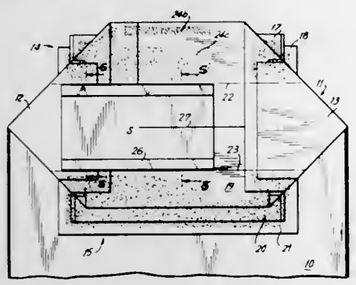
said pair of end panels hingedly attached by a score line to said rear side panel;
an end flap hingedly attached by a score line to said front side panel;
said bottom flaps hingedly attached by a score line to each of said side panel;
said end tabs hingedly attached by a score line to each of said end panels;
whereby said multi-partitioned carton upon squaring from an initially knocked-down condition automatically forms a bottom, automatically locks to maintain a rigid erected condition and automatically forms at least one partition comprising said pair of opposed tongues to define a plurality of cells or compartments and to structurally maintain the side panels in rigid spaced apart relationship and is formed from a single sheet of paperboard or like sheet material with the minimum of board usage.

4,095,736

BAG CLOSURE HAVING VALVE SLEEVE

Arthur Louis Rothschild, III, and Robert Olin Baxter, both of Camden, Ark., assignors to International Paper Company, New York, N.Y.

Filed Oct. 22, 1976, Ser. No. 735,052
Int. Cl.[2] B65D *31/14*
U.S. Cl. 229—62.5 **4 Claims**



1. A bag having an end closure, through which it is filled, the end closure comprising a valve sleeve and the valve sleeve comprising a flexible tubing secured to one face of a reinforcing strip; the other face of the strip being secured along substantially its entire length to the closure; the sleeve, including its flexible tubing and its reinforcing strip, being slit, from top to bottom, from its inner end to about its middle along an axis parallel to an axis of insertion of a filling tube through the sleeve to fill the bag; and the strip being free from securement with the closure in the area of the slit.

4,095,737

TAXIMETER AND MOUNTING ARRANGEMENT

Eduard Schuh, and Hans-Peter Scholl, both of Villingen, Germany, assignors to Kienzle Apparate GmbH, Villingen-Schwenningen, Germany

Filed Jul. 2, 1976, Ser. No. 702,275
Claims priority, application Germany, Jul. 8, 1975, 2530390
Int. Cl.[2] G07B *13/00, 15/00*
U.S. Cl. 235—30 R **3 Claims**

1. In a taximeter, a combination comprising a housing having a rear wall and a bottom wall projecting forwardly from said rear wall and having a rear edge portion and two lateral edge portions; a cover plate having a surface adapted to attach to said rear wall and provided with connector means adapted to engage with corresponding means in said housing; a mounting plate having a front end and a rear end and including mounting means for permanently installing said mounting plate in a vehicle; first interengaging portions on said mounting plate and bottom wall, comprising projections extending downwardly from said lateral edge portions of said bottom wall and straddling opposite lateral edges of said mounting plate when said housing is pushed over said mounting plate in one direction from said front edge towards said rear edge thereof so that said housing is thereafter blocked against movement relative to said mounting plate in all directions except counter to said one direction; and second interengaging portions on said mounting

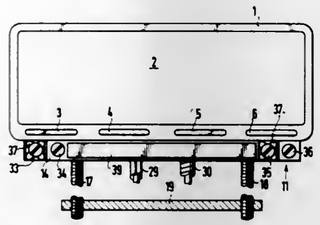


plate and cover plate, including upstanding projections extending upwardly from said rear edge of said mounting plate and engaging behind said cover plate at a side thereof which faces away from said rear wall, so as to prevent detaching of said cover plate from said rear wall when said housing is supported on said mounting plate and while said first interengaging portions remain engaged with one another.

4,095,738

ELECTRONIC CASH REGISTER WITH MEANS FOR CORRECTING ERRONEOUSLY PRINTED DATA

Tetsuya Masuo, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Nov. 10, 1976, Ser. No. 740,484
Claims priority, application Japan, Nov. 14, 1975, 50-137014
Int. Cl.[2] G06F *11/00*; G07G *5/00*
U.S. Cl. 235—309 **3 Claims**

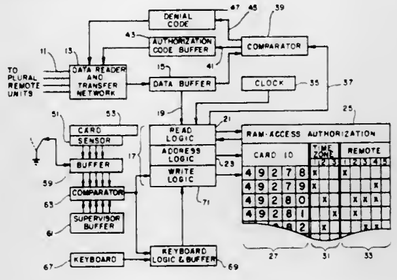
1. An electronic cash register comprising:
a keyboard including a data input key and a void key;
a central processor unit coupled to said keyboard;
a read only memory coupled to said central processor unit and storing a program therein;
a memory means coupled to said central processor unit and including a printing data memory which stores an input data item supplied from said data input key and the total of a plurality of said input data items; and
printing means including a buffer register coupled to said memory means, a printer driver coupled to said buffer register and to said central processor unit, and a printer coupled to said printer driver which prints said plurality of input data items and the total thereof successively on a recording paper;
said printer driver including: a feeding means for feeding said recording paper by one row for printing a new data item when said new data item is supplied to said buffer register from said printing data memory; and an inhibiting means for inhibiting said one row feeding of said recording paper when said void key is depressed and for printing a correcting symbol directly on a data item printed on said recording paper before said new data item is supplied to said buffer register.

4,095,739

SYSTEM FOR LIMITING ACCESS TO SECURITY SYSTEM PROGRAM

Robert J. Fox, Los Angeles, and Donald P. Sturgis, Clairmont, both of Calif., assignors to A-T-O Inc., Willoughby, Ohio

Filed Aug. 26, 1977, Ser. No. 827,993
Int. Cl.[2] G06K *5/00*; G08G *1/14*
U.S. Cl. 235—382 **13 Claims**



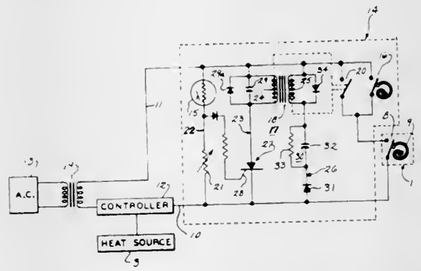
1. Apparatus for limiting programming access in a security system which provides selective access at plural remote locations based on stored data in response to data on an encoded card, comprising:
a first plurality of data encoded cards identifying a first plurality of personnel;
a second data encoded card identifying a second person;
means for selectively providing access to each of said plural remote locations, said means comprising:
data storage means defining which of said first plurality of cards shall permit access to which of said plural remote locations; and
means for reading data encoded on said first plurality of cards, for comparing said data with said data storage means, and for providing selective access based upon said comparison; and
means permitting alteration of said data storage means in response to said second data encoded card.

4,095,740

CONDITION RESPONSIVE THERMOSTAT CONTROL APPARATUS

Jon C. Wirth, 13116 N. Foxhollow Rd., 118W, Mequon, Wis. 53092

Continuation-in-part of Ser. No. 672,747, Apr. 1, 1976, abandoned. This application Apr. 4, 1977, Ser. No. 784,233
Int. Cl.[2] G05D *23/275*
U.S. Cl. 236—47 **20 Claims**



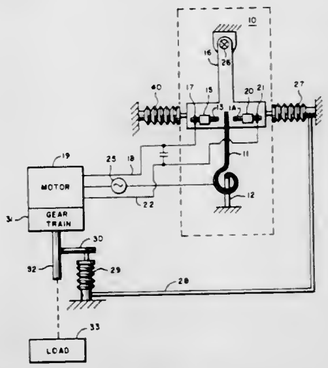
1. An illumination responsive thermostatic control apparatus for controlling the air temperature in an enclosed area, said control apparatus having a temperature control means mounted on an interior wall, said control means including main and auxiliary temperature sensitive switch means connected in series across a pair of thermostat control leads, said temperature control means having a standby sensing state for sensing of temperature and changing to a demand state in response to a demand temperature level, a light sensitive means connected across said thermostat control leads and mounted within the enclosed area and subjected to ambient area illumination, a circuit control means having an operating means connected in parallel with said light sensitive means and including a trigger switch means responsive to the light sensitive means, and a latching switch means connected to said operating means and having contact means to bypass said auxiliary switch means.

4,095,741

PROPORTIONAL ELECTRICAL CONTROL SYSTEM

Richard C. Mott, Harwood Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 14, 1976, Ser. No. 649,117
Int. Cl.[2] G05D *23/275*
U.S. Cl. 236—78 C **2 Claims**



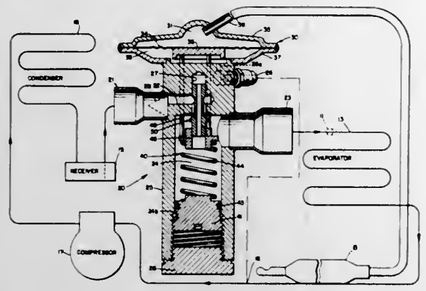
1. A proportional control system comprising:
bi-directional actuating means having a movable output adapted to change the position of a condition controlling device;
condition responsive means comprising a temperature responsive bi-metal element fixedly secured at one end and movable at another end in response to temperature, and first and second contacts fixedly secured to a support wherein said first contact is engaged by said bi-metal element when said bi-metal element moves in a first direction and said second contact is engaged by said bi-metal element when said bi-metal element moves in a second direction;
connecting means for connecting first and second contacts and said bi-metal element to said bi-directional actuating means wherein said bi-directional actuating means moves said movable output in a first direction when said bi-metal element engages said first contact and moves said movable output in a second direction when said bi-metal element engages said second contact; and,
feedback means comprising a trapped air system having a first bellows operated by said actuating means, a second bellows connected to said support and a pneumatic tube connecting said first and second bellows together wherein movement of said movable output by said bi-directional actuating means causes said support to be repositioned in a direction to disengage said bi-metal element from said first and second contacts to provide proportional control.

4,095,742

BALANCED SINGLE PORT THERMOSTATIC EXPANSION VALVE

Ernest W. Schumacher, Desoto, Tex., assignor to Virginia Chemicals Inc., Portsmouth, Va.

Filed Aug. 26, 1976, Ser. No. 718,006
Int. Cl.[2] G05D *27/00*
U.S. Cl. 236—92 B 19 Claims



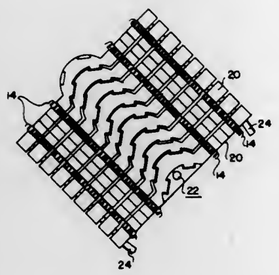
1. In a thermostatic expansion valve having a cylindrical feed bore, having a blindered, connected to an inlet means for admitting refrigerant at inlet pressures, the improvement comprising a valve pin having a lesser end portion and a greater end portion, a reduced stem portion therebetween, a lesser shoulder and a greater shoulder respectively connecting said lesser end portion and said greater end portion to said reduced stem portion, a pair of end faces, and a coaxial bore connecting said pair of end faces to each other and to an outlet chamber in said thermostatic expansion valve, said lesser end portion fitting slideably within said cylindrical feed bore and said greater shoulder forming a valve port in combination with said feed bore, between said inlet pressure in said feed bore and outlet pressure in said outlet chamber.

4,095,743

FLEXIBLE TRACK FOR ELECTRICALLY ENERGIZED MINIATURE VEHICLES

John D. Birdsall, 1262 Sunset Plaza Dr., Los Angeles, Calif. 90069

Continuation-in-part of Ser. No. 652,071, Jan. 26, 1976, abandoned. This application Nov. 29, 1976, Ser. No. 745,529
Int. Cl.[2] A63H *18/12*; E01B *23/00*
U.S. Cl. 238—10 F 6 Claims



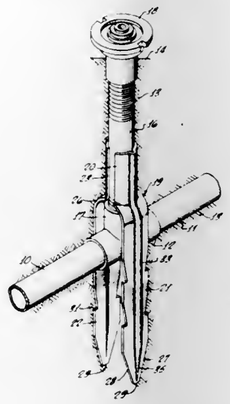
1. A track for miniature cars, trains, or the like, comprising: an elongated structure formed of a plurality of rigid traverse members each having a central hole therein and each having a central arcuate section shaped to nest with the central arcuate section of an adjacent like traverse member, each of said traverse members having an upstanding pin positioned to be received in the central hole of the adjacent like member, said track being capable of being turned laterally to curved configurations within predetermined limits, and at least one elongated electric element extending along the length of the elongated structure, said electric element being formed of electrically conductive material and being capable of substantial longitudinal extension and contraction.

4,095,744

APPARATUS AND METHOD FOR SUPPORTING AND PROTECTING SPRINKLE SYSTEM RISERS AND PIPES

Anthony T. Villelli, 1451 N. Citrus Dr., La Habra, Calif. 90631

Filed Mar. 7, 1977, Ser. No. 774,949
Int. Cl.[2] A01G *25/00*
U.S. Cl. 239—1 17 Claims



1. A method of stabilizing and supporting a portion of an underground lawn-sprinkling system, said portion comprising a riser pipe extending upwardly to a sprinkler head from a joint to an underground supply pipe, said method comprising:

(a) driving elongated vertical support means into the ground at said riser pipe in an underground lawn-sprinkling system, and

(b) employing said riser to direct the downward course of said support means as it is thus driven, whereby said support means is in stabilizing and supporting relationship to said riser after completion of said driving.

12. A device for stabilizing, supporting and protecting sprinkler system risers which are connected to underground supply pipes, said device comprising:

(a) a substantially rigid, unjointed body which is adapted to mount around a sprinkler system riser, and

(b) two fork legs rigidly connected to said body and extending downwardly therefrom,

said legs being parallel to each other and being spaced from each other a distance sufficient to permit said legs to straddle the underground supply pipe joint to which said riser is connected.

4,095,745

CONTINUOUS TUBE MULTIPLE EMITTER

Mark H. Christy, 1750 S. Zeyn St., Anaheim, Calif. 92802, and Lloyd Spencer, 220 Patrician Way, Pasadena, Calif. 91105

Filed Oct. 4, 1976, Ser. No. 729,838
Int. Cl.[2] B05B *15/02*
U.S. Cl. 239—109 12 Claims

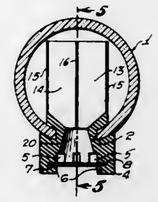
1. A continuous tube multiple emitter, comprising:

a. a continuous flow tube having a series of perforations therein;

b. a series of emitters disposed in the flow tube for discharge therefrom through said perforations;

c. each emitter forming a flush flow passage when exposed to flow tube pressure below a predetermined value and forming a drip flow passage when exposed to flow tube pressure above said predetermined value, each emitter having externally opposed surfaces of major area;

d. each emitter adapted to be positioned in the flow tube to present a surface of major area essentially perpendicular to the axis of the flow tube thereby reducing the effective area of the flow tube, whereby, upon initiating an irrigation cycle, progressive sets of said emitters create a pressure drop across each emitter thereby accelerating rise in flow tube pressure to said predetermined value, thereby reducing the number of emitters undergoing flush flow; the emitters when in drip flow reducing the flow rate in the flow tube to minimize the pressure drop across each emitter.



4,095,746

SELF-SUPPORTED WATER SWEEPER

Thomas A. Anderberg, and Richard Petrillo, both of 1031 62nd St., Oakland, Calif. 94608

Filed Jan. 31, 1977, Ser. No. 763,975
Int. Cl.[2] B05B *1/20*
U.S. Cl. 239—287 8 Claims

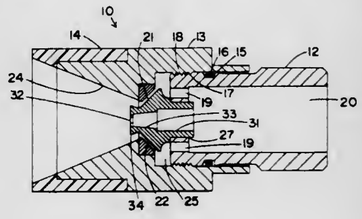
1. A surface cleaning apparatus for use with a hose connected to a liquid supply, comprising a handle member having a handle passage therethrough and adapted to connect to the hose at one end, a cross member having a cross passage therethrough in a communication with said handle passage, said cross member extending laterally from and being connected to the other end of said handle member at a junction spaced from each end of said cross member, means for sealing each end of said cross member, means for supporting said cross member in spaced relation with the surface, supporting means comprising first and second casters, swivel pins extending from each of said first and second casters, first and second holes through said cross member on opposite sides of said junction, a deformable sleeve in each of said first and second holes formed to receive said swivel pins, said swivel pins extending through said deformable sleeves, and fastening means operating to engage the ends of said swivel pins and to exert an axial force against said deformable sleeves, whereby said sleeves expand in cross section to sealably engage the boundaries of said first and second holes and said casters are secured therein, and a plurality of spray nozzles mounted in said cross member for directing a plurality of overlapping spray patterns onto the surface, said overlapping spray patterns extending laterally at least to the ends of said cross member, whereby liquid from said supply is directed through said handle passage, is diverted toward each end of said cross passage from said junction and through said spray nozzles at substantially equal pressure to impinge on the surface, thereby loosening and removing debris therefrom.

4,095,747

HIGH PRESSURE COAXIAL FLOW NOZZLES

Arthur A. Anderson, St. Paul, Minn., assignor to Specialty Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 686,713, May 17, 1976, abandoned. This application Feb. 28, 1977, Ser. No. 773,425
Int. Cl.[2] B05B *1/16*
U.S. Cl. 239—288.5 6 Claims



1. A high pressure nozzle operable for producing spaced fluid streams or a single stream of fluid having sufficient momentum so as to clean an article by the force of the fluid stream issuing from said high pressure nozzle comprising:

a first member for connecting to a constant volume supply of high pressure fluid;

said first member having at least two openings therein including a first fluid passage and a central fluid outlet, said first member operable for permitting continuous discharge of a high momentum fluid stream through said central fluid outlet, said first member reducing the diameter of the fluid stream flowing therethrough without bending the fluid stream emanating from said central fluid outlet;

said first member having a frusto-conical fluid directing surface for directing a fluid stream thereover and a fluid deflector surface for directing a second stream of fluid alongside and spaced from the fluid stream emanating from said central fluid outlet;

a second member connected to said first member, said second member movable with respect to said first member, said second member having a frusto-conical fluid directing surface for directing a fluid stream thereon;

said frusto-conical fluid directing surface on said second member and said frusto-conical fluid directing surface on said first member coacting to define a second fluid passage for directing fluid onto said fluid deflector surface;

said second fluid passage operable for being opened and closed by movement of said second member with respect to said first member to thereby produce spaced fluid streams or a single high momentum fluid stream; and

a diverging section located in said second member, said diverging section spaced from said first member and said fluid deflector surface, said diverging section and said fluid deflector surface located at a diverging angle to one another so that fluid from said second fluid passage which is directed onto said fluid detector surface does not impinge on said diverging section, said diverging section extending substantially beyond said central fluid outlet so that said central fluid nozzle is shielded by said second member.

4,095,748

APPARATUS FOR MIXING A CEMENT SLURRY WITH A GLASS FIBER

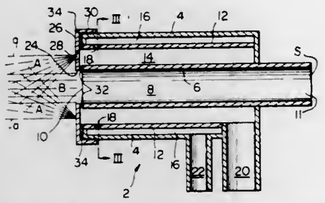
Sadao Ohtake, Nishinomiya; Shiyuji Hayashida, Osaka; Takamasa Sanada, Settsu, and Shigeki Terai, Kobe, all of Japan, assignors to Kanebo, Ltd., Japan

Filed Jul. 1, 1976, Ser. No. 701,652

Claims priority, application Japan, Jul. 4, 1975, 50-81892; Mar. 9, 1976, 51-28566[U]; Apr. 20, 1976, 51-49688[U]

Int. Cl.[2] B05B *7/14*

U.S. Cl. 239—419.3 **9 Claims**



1. A spray gun for mixing a cement slurry with glass fiber in order to produce a glass fiber reinforced-cement, said spray gun comprising:

a body having a glass fiber supply passage formed as an innermost hollow element, one end of said passage being adapted for connection with means for cutting glass fiber and means for supplying cut glass fiber to said passage by compressed air, the other end of said passage forming a discharge opening for said cut glass fibers;

said body having an outermost hollow element formed concentrically of said glass fiber supply passage;

said body having a cement slurry supply passage provided in the concentric space formed between the innermost hollow element and the outermost hollow element which passage is adapted for connection to cement slurry feeding means;

an air introduction passage formed in the outermost hollow element and communicating with said cement slurry supply passage through a plurality of air introduction holes, said outermost hollow element being adapted for connection to compressed air supply means;

a closing element provided between the periphery of said discharge opening of the innermost hollow element and the periphery of one end of the outermost hollow element and arranged in such a manner that said closing element is perpendicular to the common axial line of said innermost and outermost hollow elements; and

at least two injection holes provided in said closing element wherein each of said injection holes is inwardly inclined with respect to the direction in which the cut glass fibers flow in said glass fiber supply passage and communicating with said cement slurry supply passage so as to cause cement slurry discharged therefrom by compressed air to be directed parallel to and inwardly toward the axial line of said glass fiber supply passage and mixed with cut glass fibers discharged from the discharge opening of the glass fiber supply passage, and wherein said air introduction holes are proximate at least two diametrically opposite cement slurry injection holes.

4,095,749

NOZZLE

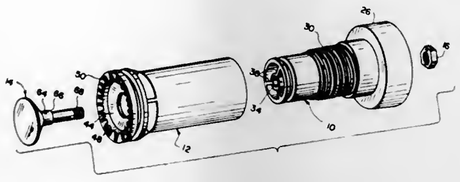
Duncan Paul Campbell, 55 Sinclair Ave., Unit 6, Georgetown, Ontario, Canada (L7G 4S4)

Division of Ser. No. 656,403, Feb. 9, 1976, Pat. No. 4,044,954. This application Apr. 20, 1977, Ser. No. 789,214

Int. Cl.[2] B05B *1/32*

U.S. Cl. 239—458 **4 Claims**

1. A nozzle comprising a hollow body; a sleeve disposed about said body and having a baffle seat, one of said sleeve and said body having a female thread formed in its inner and outer wall respectively for mating with a male thread formed on the respective inner and outer wall of the other of said sleeve and body to permit rotation of said sleeve relative to said body between upstream and downstream stop positions, said male thread having at its trailing portion an enlarged member which contacts the leading portion of the female thread when said



sleeve is at the upstream stop position and thereby prevents further upstream rotation of said sleeve; and a baffle secured to said body and having a head, which as the sleeve is rotated toward the downstream stop position, approaches said baffle seat and thereby diminishes the quantity of liquid discharging from said nozzle.

4,095,750

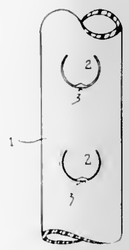
WATER CONDUIT

Gideon Gilead, 5 Nicaragua Street, Jerusalem, Israel

Filed Oct. 14, 1975, Ser. No. 621,742

Int. Cl.[2] B05B *15/00*

U.S. Cl. 239—542 **8 Claims**



1. A water conduit comprising:

a hose formed of elastic materials;

a plurality of spaced tongue-like flaps formed in the wall of said hose by means of cuts through said hose wall, each said flap being flexibly secured to said hose wall at its proximate end, the distal end thereof being separated from said wall by said cuts, said flap being resiliently movble out of position as part of said hose wall to modify the extent of the opening through said wall, said movement depending in part upon the pressure of the water within said hose, said cuts being made at an oblique angle with respect to a plane through the longitudinal axis of said hose so that the inside surface of each said flap is larger than the outside surface thereof;

one of the mating cut surfaces of each said flap and said hose being formed with a dent in a direction substantially perpendicular to the cut surfaces to provide continuous access through said hose wall independently of the position of said flap.

4,095,751

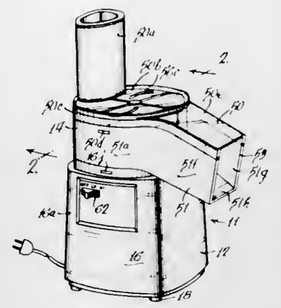
SLICING AND SHREDDING APPARATUS

Robert Lee Artin, Menomonee Falls, Wis., assignor to Oster Corporation, Milwaukee, Wis.

Filed Mar. 25, 1977, Ser. No. 781,350

Int. Cl.[2] A47J *44/00*

U.S. Cl. 241—37.5 **15 Claims**



1. A slicing and shredding appliance comprising a power unit having a housing within which is mounted an electric motor, an output drive member mounted on said housing for rotation about its axis, coupling means mounted in said housing and operable from outside of said housing to drivingly connect or disconnect said drive member with respect to said motor, a receptacle detachably mounted on said power unit, means for mounting cutting means on said drive member for rotation within said receptacle, a cover for said receptacle providing an enclosure having inlet and outlet openings for introducing food to be processed and for discharging sliced and shredded foods, said drive member being drivingly interconnected to said cutting means when said receptacle is assembled to said power unit so that said drive member rotates said cutting means, said coupling means being supported by said drive member and being axially displaceable, said cover having means for operating said coupling means by displacing it downwardly to drivingly connect said drive member to said motor, said drive member being disconnected from said motor until said cover is assembled to said receptacle and said receptacle is mounted on said power unit, said coupling means including a coupling shaft which is mounted in said drive member for axial movement between first and second positions with respect to said drive member and said cutting means.

4,095,752

MOTORIZED SHOVEL

Jean-Claude Pomeret, Saint-Lager, and Henry Bonnevaux, Lyons, both of France, assignors to Societe Civile Particullere Innovation Promotion S.C.I.P., Anse, France

Filed Sep. 15, 1976, Ser. No. 723,613

Claims priority, application France, Sep. 17, 1975, 75 29024

The portion of the term of this patent subsequent to Jul. 22, 1993, has been disclaimed.

Int. Cl.[2] B66C *23/00*

U.S. Cl. 214—151 **8 Claims**

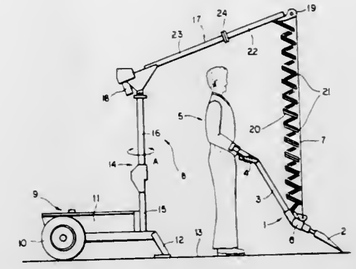
1. A motorized shovel comprising a support vehicle;

a post extending upwardly from said vehicle;

an arm projecting generally laterally from said post;

a cable extending downwardly from said arm;

a winch assembly provided with a pneumatic motor and adapted to wind up and pay out said cable respectively; and



a shovel unit suspended from said cable and provided with a handle bar formed with a control for operating said pneumatic motor.

4,095,753

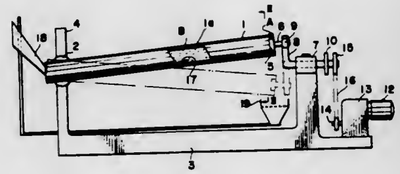
GRINDING TANK WITH ONE END HAVING CIRCULAR MOTION

Ietatsu Ohno, 1-2, 1-chome, Kasuya, Setagaya-ku, Tokyo, Japan

Division of Ser. No. 717,010, Aug. 23, 1976, Pat. No. 4,057,191. This application Apr. 5, 1977, Ser. No. 784,813

Int. Cl.[2] B02C *7/14*

U.S. Cl. 241—175 **4 Claims**



1. Apparatus for processing materials comprising in combination, a longitudinal hollow tank, restraining means holding the tank near a first end for pivoting movement, movable means engaging the tank near the other end for rotating said other tank end about an arcuate path without rotation of the tank and with the tank always diagonal to the horizontal, means for feeding materials into said first end, and means for removing materials from said other end after the materials within said tank describe a substantially spiral path flowing from said first end to the other.

4,095,754

WINDING DEVICE AND CHUCK THEREFOR

Edgar Alfredo Campo, Columbus, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 24, 1977, Ser. No. 780,909

Int. Cl.[2] B65H *17/08, 35/02*

U.S. Cl. 242—65 **11 Claims**

1. A winding device comprising

an arm

a chuck comprising

a mandrel fixed on one end of the arm

a housing rotatably mounted on the mandrel and having at least one groove with a floor cut around the periphery of the housing

a spring in at least one of the grooves wherein the spring comprises

a bottom contacting the floor of the groove

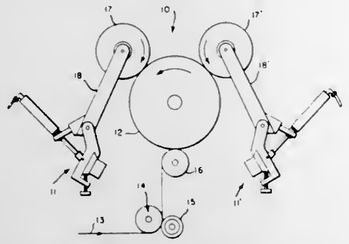
a plurality of cantilevered fingers joined to one edge of the bottom and extending out of the groove

a socket fixedly mounted to the other end of the arm

a base pivotally joined to the arm between the ends of the arm

a fluid cylinder comprising

a piston rod pivotally mounted on the base



a cylinder casing operatively engaging the piston rod

a ball carried on the casing mated with the socket to universally connect the fluid cylinder to the arm.

4,095,755

RIDER ROLL ASSEMBLY IN A WINDER

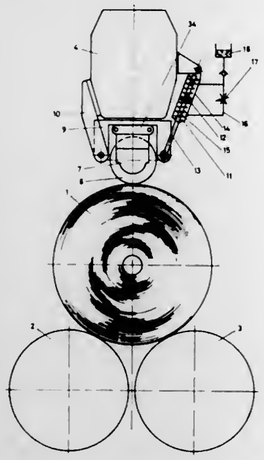
Keijo Kalevi Snygg, Karhula, and Aarne Johannes Korkolainen, Kotka, both of Finland, assignors to A. Ahlstrom Osakeyhtio, Finland

Filed Mar. 2, 1977, Ser. No. 773,619

Claims priority, application Finland, Mar. 12, 1976, 760643

Int. Cl.[2] B65H *17/08*

U.S. Cl. 242—66 **6 Claims**



1. A rider roll assembly in a winder comprising at least one load roll mounted on a movable transversal load beam and vibration absorbing means connecting the load roll to the load beam, said vibration absorber means including means operable to dissipate energy of vibrations absorbed.

4,095,756

BAIL LATCHING AND RELEASING MECHANISM FOR OPEN-SPOOL SPINNING REEL

Yasomatsu Morishita, Kure, Japan, assignor to Ryobi, Ltd., Fuchu, Japan

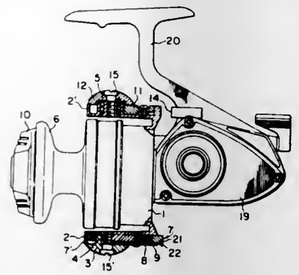
Filed Dec. 21, 1976, Ser. No. 753,162

Claims priority, application Japan, Dec. 27, 1975, 50-177565

Int. Cl.[2] A01K *89/01*

U.S. Cl. 242—84.2 G **9 Claims**

1. An automatic bail latching and releasing mechanism for an outer skirted spinning reel, comprising: a reel body (**19**), a slider kick (**14**) mounted on the reel body, a rotor (**1**) rotatably mounted to the reel body, a pair of supporting blocks (**2,2'**) provided at diametrically opposite positions outside of the rotor, a pair of bail arm levers (**3, 12**) pivotally secured to the respective supporting blocks, a bail wire (**13**) having its respective ends mounted on the bail arm levers, spring means (**5**) mounted proximate one of the bail arm levers for biasing the bail arm toward a released position, a slider (**7**) mounted in the supporting block mounting the other bail arm lever for linear movement with respect thereto, an annular opening in one end of the slider having a projection (**17**) thereon, a spring member



(**8**) for biasing the slider outwardly from said supporting block, a raised, generally arcuate cam surface (**4**) on the other bail arm lever disposed within the annular opening in engagement with the slider projection, the cam surface having a gradually increasing radius and a recess (**18**) adapted to mate with the slider projection to latch the bail wire and slider at a cocked position, the cocked slider projecting out from its supporting block and striking the slider kick as the rotor is turned to release the cocked bail wire, whereby the return of the bail wire to its released position compresses the spring member to thereby oppose the return force of the spring means and reduce the bail wire return impact.

4,095,757

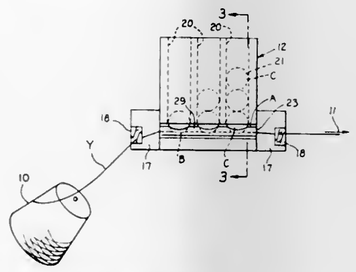
YARN TENSION DEVICE

Hans S. Singer, 191 Inglewood, Greenville, S.C. 29609

Filed Mar. 8, 1976, Ser. No. 664,689

Int. Cl.[2] B65H *59/20*

U.S. Cl. 242—151 **9 Claims**



1. A yarn tension device comprising:

a member having walls defining an elongated yarn channel;

a plurality of longitudinally aligned concave arcuate surfaces defining indentations in said member each indentation extending across and below said channel forming a continuous arcuate interruption in said yarn channel;

an arcuate rotatable element carried in each said arcuate indentation by gravity;

each said arcuate rotatable element having a surface corresponding generally but being slightly smaller than said concave arcuate surface of its corresponding indentation; and

said arcuate interruptions being of such extent as to cause the yarn moving through said yarn channel to wrap around a portion of each of said arcuate rotatable elements within said arcuate interruptions sufficiently to rotate said rotatable elements.

4,095,758

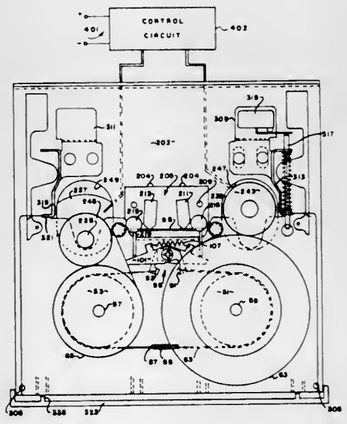
TAPE RECORDER SYSTEM

Bansi K. Shroff, Irvine, Calif., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 28, 1975, Ser. No. 635,941

Int. Cl.[2] G11B *15/32, 15/46, 15/60, 23/10*

U.S. Cl. 242—192 **18 Claims**



1. A tape transport system comprising a pair of coplanar hubs rotatable about fixed axes and a length of pliable tape carried in rolls on said hubs; a transducer cooperative with a span of tape intermediate said rolls; and drive means for driving said tape across said transducer from one said tape roll to the other said tape roll, for maintaining substantially constant tension in said entire length of tape in all modes of operation of said system and for producing hard-packed, highly reproducible and stable tape rolls, said drive means comprising a first capstan movable into engagement with the periphery of the first of said tape rolls, a second capstan movable into engagement with the periphery of the second of said tape rolls, a first variable speed motor drivingly connected to said first capstan and a second variable speed motor drivingly connected to said second capstan, a first carriage, said first motor being mounted on said first carriage and said first capstan being mounted on a rotor of said first motor, and a second carriage, said second motor being mounted on said second carriage and said second capstan being mounted on a rotor of said second motor, biasing means for biasing said capstans into driving engagement with the peripheries of said tape rolls, said biasing means including spring means through which said carriages are connected to each other, whereby said biasing means equalize the forces exerted by the capstans on the tape rolls regardless of the relative sizes of the tape rolls, and control circuit means connected to both said motors for controlling the speed of each of said motors, thereby generating a desired speed and tension in said span of tape intermediate said rolls, said capstans being the sole motive force for driving said tape across said transducer from one said tape roll to the other said tape roll.

4,095,759

DEVICE FOR STABILIZATION OF CAPTIVE AIRCRAFT

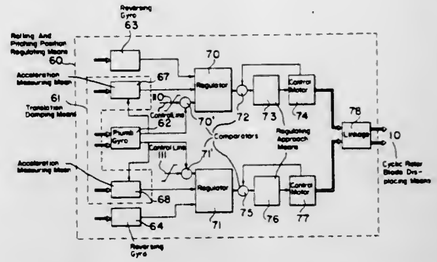
Heinz Woitschella; Wolfgang Reuter, both of Friedrichshafen, and Rolf Swik, Munich, all of Germany, assignors to Dornier GmbH, Germany

Continuation-in-part of Ser. No. 541,253, Jan. 15, 1975. This application May 6, 1976, Ser. No. 683,966

Claims priority, application Germany, Mar. 14, 1974, 2412256

Int. Cl.[2] B64C *27/68*

U.S. Cl. 244—17.17 **3 Claims**



1. In a device for the stabilization of a captive rotorcraft with a drive unit, with output regulating means, for lifting rotor blade means having cyclic and collective control of said rotor blade means, and wherein a mooring line engages below the rotorcraft center of gravity.

the improvement comprising position regulating means and translation damping means for the purpose of maintaining predetermined reference values relating to all rotorcraft axes and to translation, and adapted to influence the cyclic control of said rotor blade means,

cable line traction regulating means adapted to influence said output regulating means and said collective control of said rotor blade means, said cable line traction regulating means being adapted to operate in dependence upon cable line traction in immediate proximity to the rotorcraft and in dependence upon rpm of said rotor blade means,

and angular velocity regulating means for influencing a yaw tail assembly control nozzle means for adjusting the position of the rotorcraft about its vertical axis by generating a control thrust.

4,095,760

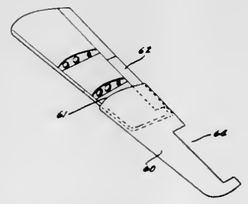
STRUCTURAL SKIN CONSTRUCTION MATERIALS AND METHOD

John H. Sommer, Belmont, Mich., and Sidney Axelrod, Skokie, Ill., assignors to James A. Black, Kent City, Mich. and Top Flite Models, Inc., Chicago, Ill.

Continuation of Ser. No. 621,413, Oct. 10, 1975, abandoned. This application Apr. 4, 1977, Ser. No. 784,075

Int. Cl.[2] B64C *3/26*

U.S. Cl. 244—123 **8 Claims**



4. In combination with a fluid craft frame, a flexible laminated heat-shrinkable covering material applied thereto, said covering material comprising interior and exterior layers of polymeric film adhesively bonded together, said interior layer

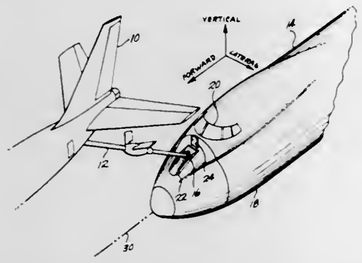
being resistant to impact, tensile, and shear forces, and being biaxially oriented, said exterior layer being resistant to ultraviolet penetration to shield said inner layer and having dissimilar coefficients of expansion and contraction from that of said inner layer, with said heat-shrinkable material providing substantially smooth and wrinkle free interior and exterior surfaces after being heat-shrunk about said frame.

4,095,761

AERIAL REFUELING SPOILER

Ardell J. Anderson, Redmond; Kenneth D. Hurley, Bellevue; Richard H. Leckman, Seattle; Ronald H. Robinson, and Edward N. Tinoco, both of Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 29, 1976, Ser. No. 727,739
Int. Cl.[2] B64D *39/00*
U.S. Cl. 244—135 A **5 Claims**



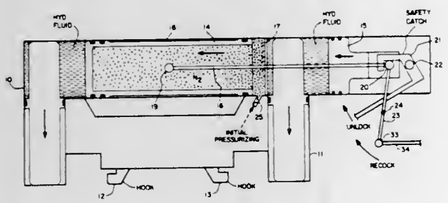
1. In combination with an aircraft having an aerial refueling apparatus for receiving fuel while in flight including a refueling receptacle located on the forward surface of its fuselage, the improvement comprising aerodynamic means mounted on said forward surface of the fuselage for improving the pitch stability of the aircraft during aerial refueling wherein said means comprises a spoiler plate having a forward face of height *h* and width *w*, and a thickness *t* substantially less than *h* or *w*, said spoiler plate being oriented such that a normal to said forward face is substantially perpendicular to the pitch axis of the aircraft.

4,095,762

GN_2 ACCUMULATOR POWERED SHAFTLESS PISTON FOR DEPENDENT DUAL EJECTOR BOMB RACK

Lloyd J. Holt, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 18, 1977, Ser. No. 816,418
Int. Cl.[2] B64D *1/04*
U.S. Cl. 244—137 R **4 Claims**



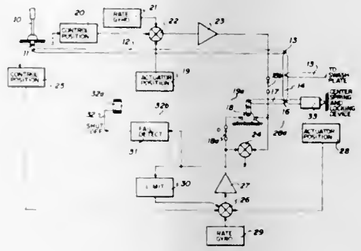
1. A stores ejecting system adapted to be attached to an aircraft for forcibly ejecting a store attached to the aircraft by releaseable attachment means comprising:
a pair of physically separated ejectors;
each of said ejectors being hydraulically actuated;
substantially cylindrical means physically and operatively connecting the pair or ejectors;
a shaftless piston contained within said cylindrical means and having a face and a skirt portion;
said face being in open communication with one of said ejectors;
another piston contained within said cylindrical means and having a face and a skirt portion;
said face of said another piston being in open communication with the other of said pair of ejectors;
an impermeable barrier in said cylindrical means between said shaftless piston and said another piston;
linkage means external of said cylindrical means operatively connecting the shaftless piston and said another piston;
a source of high-pressure fluid in communication with the interior of the skirt of the shaftless piston;
hydraulic fluid contained within a space between each ejector and the face of the shaftless piston and the face of said another piston;
so that when said high-pressure fluid causes said shaftless piston to move hydraulic is forced into said ejectors by having said shaftless piston and said another piston linked by said linkage means external to said cylindrical means.

4,095,763

FAIL SAFE AUGMENTATION SYSTEM

Kenneth E. Builta, Euless, Tex., assignor to Textron, Inc., Providence, R.I.

Filed Feb. 25, 1977, Ser. No. 771,898
Int. Cl.[2] G05D *1/00*
U.S. Cl. 244—194 **11 Claims**



1. An aircraft control system, comprising:
input means for introducing a manual commnd to position a control surface,
stability control augmentation means comprising:
(a) an actuator connected through linkage to the control surface,
(b) at least two drive circuits for said acutator, each comprising:
(i) a position sensor responsive to said input means and generating a position signal, and
(ii) a drive amplifier responsive to the position signal and providing an output to drive said actuator,
(c) means responsive to the outputs of the drive amplifiers to produce a difference signal, and
(d) means responsive to the difference signal to disable said actuator.

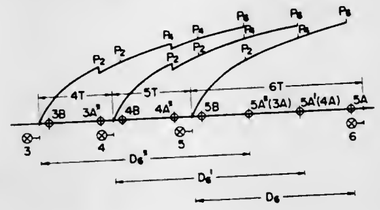
4,095,764

SPOT CONTROL TYPE AUTOMATIC TRAIN STOP SYSTEM UTILIZING GROUND CONTROL UNITS COMMON TO MORE THAN ONE BLOCK SIGNAL

Nobuhisa Osada, and Hideo Nakamura, both of Tokyo, Japan, assignors to Japanese National Railways, Tokyo, Japan

Filed Nov. 10, 1976, Ser. No. 740,721
Claims priority, application Japan, Nov. 26, 1975, 50-140847
Int. Cl.[2] B61L *3/10*
U.S. Cl. 246—182 B **8 Claims**

1. A spot control type automatic train stop system for use in a train control system having block section signals at the junctions between successive block sections of a railway line, said automatic train stop system comprising: a train unit for mounting on a train and having means, other than a train braking pattern storage means for storing a plurality of train braking patterns, responsive to a first spot information signal for generating a basic distance-speed train braking pattern for the train according to which the train can be brought to a stop from maximum train speed, and having means, other than a train braking pattern storage means for storing a plurality of train braking patterns, responsive to each of further successive spot information signals for cancelling the entire basic pattern and regenerating the balance of said basic pattern subsequent to the time of cancellation thereof, and means responsive to a cancellation signal for cancelling the basic pattern and any regenerated balance of the basic pattern; control means on said train coupled to said train unit for comparing the actual speed of the train with the speed from the generating means and braking the train when the actual speed exceeds the pattern speed; a first signal transmitting ground unit corresponding to each block section signal and positioned at a point along said railway line preceding a block section signal to which the train is to respond at a distance ahead of the block section signal at least equal to the longest braking distance of the train; signal transmitting means coupled between each block section signal and the corresponding first signal transmitting ground unit for



transmitting to said first signal transmitting ground unit a first spot information signal when the corresponding block section signal is in the stop aspect and for transmitting to said first signal transmitting ground unit a cancellation signal when the corresponding block section signal is in the caution or go aspect; at least two further signal transmitting ground units positioned at intervals between each first signal transmitting ground unit and the corresponding block section signal; further signal transmitting means coupled between each block section signal and the corresponding further signal transmitting ground units for transmitting to said further signal transmitting ground units further successive spot information signals corresponding to the respective positions of said further signal transmitting ground units when the corresponding block section signal is in the stop aspect and for transmitting to said further signal transmitting ground units a cancellation signal when the corresponding block section signal is in the caution or go aspect; and a cancellation signal transmitting ground unit positioned adjacent each block section signal for transmitting a cancellation signal to said train unit and still further signal transmitting means coupled between each block section signal and the corresponding cancellation signal ground unit for transmitting to said cancellation signal ground unit a cancellation signal when the corresponding block section signal is in the caution or go aspect.

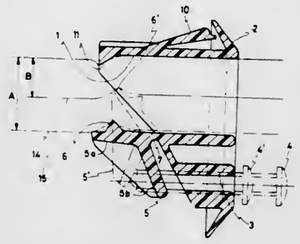
4,095,765

ADJUSTABLE CABLE CLAMP

Michele Aimar, Turin, Italy, assignor to ITW Fastex Italia, S.p.A., Turin, Italy

Filed Mar. 28, 1977, Ser. No. 781,606
Claims priority, application Italy, Apr. 14, 1976, 22289 A/76
Int. Cl.[2] H01R *13/58*
U.S. Cl. 248—56 **6 Claims**

1. A plastic adjustable strain relief clamp for retaining cables of differing diameters against axial movement relative to an irregular apertured workpiece, said clamp including a head adapted to cover said aperture and a body complementary to said irregular aperture and having an axially extending through bore capable of accepting cables of differing diameters, a second bore extending through said body parallel to said first bore and opening through said head, an integral generally L-shaped pawl having a first limb hingedly connected to said body and



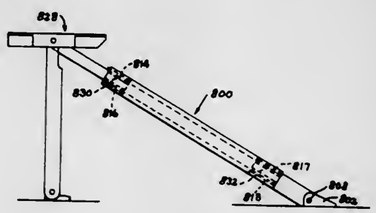
generally defining an extension of one end wall of said through bore, said pawl further including a second limb angularly disposed relative to said first limb and being so disposed that it intersects the axis of said second bore, screw means acceptable within said second bore to impinge upon the second limb of said pawl to cause said pawl to pivot about said hinge means and to bring the first limb of said pawl into locking engagement with the cable.

4,095,766

TRAILER HITCH HAVING ELASTOMER-IN-SHEAR CUSHIONING IN THE DIAGONAL STRUT

Paul E. Hicks, Jr., Florissant, and James C. Hammonds, St. Charles, both of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Division of Ser. No. 601,149, Aug. 1, 1975, which is a continuation-in-part of Ser. No. 457,256, Apr. 2, 1974, abandoned. This application Apr. 8, 1977, Ser. No. 785,989
Int. Cl.[2] B65J *1/22*
U.S. Cl. 248—119 S **4 Claims**



1. A diagonal strut energy absorbing cushioning assembly for use in a trailer hitch for holding piggyback trailers in place on railway flat cars comprising:
an inclined longitudinally extending fixed member; said fixed member having means attached thereto for attaching said strut to the deck of a railway car; at least one inclined longitudinally extending movable member spaced from said fixed member; said movable member having means for attaching said strut to a kingpin engagement assembly of a railway trailer hitch for holding in place the kingpin of a highway trailer; a resilient assembly carried by said fixed and said movable members; said resilient assembly comprising at least a pair of spaced outer plates and at least one center plate therebetween and wherein elastomeric material is attached to said center plate and to said pair of spaced outer plates, whereby when loads are applied to said kingpin engagement assembly said elastomeric material will deflect in shear and cushion said rail-

way trailer hitch; and wherein upon a draft load applied to said diagonal strut, one of said pair of spaced outer plates and said center plate moves, and the other of said pair of spaced outer plates and center plate remains fixed, relative to said fixed member; and wherein under buff loads applied to said diagonal strut, the other of said pair of spaced outer plates and said center plate moves, and the other said pair of spaced outer plates and center plate remains fixed, relative to said fixed member.

4,095,767

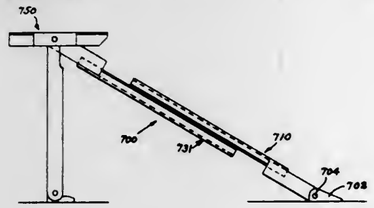
TRAILER HITCH HAVING ELASTOMER-IN-SHEAR CUSHIONING IN THE DIAGONAL STRUT

Paul E. Hicks, Jr., Florissant, and James C. Hammonds, St. Charles, both of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Division of Ser. No. 601,149, Aug. 1, 1975, which is a continuation-in-part of Ser. No. 457,256, Apr. 2, 1974, abandoned. This application Apr. 8, 1977, Ser. No. 785,991

Int. Cl.² B65J *1/22*

U.S. Cl. 248—119 S **3 Claims**



1. A diagonal strut energy absorbing cushioning assembly for use in a trailer hitch for holding piggyback trailers in place on railway flat cars comprising:

an inclined longitudinally extending fixed member; said fixed member having means attached thereto for affixing the same to the deck of a railway car; an inclined longitudinally extending movable member, spaced from said fixed member; said movable member having means for affixing said strut to a kingpin engagement assembly of a railway trailer hitch for holding in place the kingpin of a highway trailer; a resilient assembly carried by said fixed and said movable members, said resilient assembly comprising at least one elastomeric member attached to a first surface of said fixed member and attached to a second surface on said movable member, spaced from said first surface; said first and second surfaces being generally parallel; said elastomeric material being shearable between said first and second surfaces under cushioning loads; said fixed and movable members each further including spaced side portions which, together with said first and second surfaces, define a housing for said elastomeric material; said side portions including spaced juxtaposed flange portions extending away from said resilient material; one of said juxtaposed flange portions comprising a channel and the other of said flange portions comprising a projection located within said channel; said projection being movable relative to said channel to guide movement of said movable member relative to said fixed member as said resilient material deflects in shear during cushioning of said trailer hitch.

4,095,768

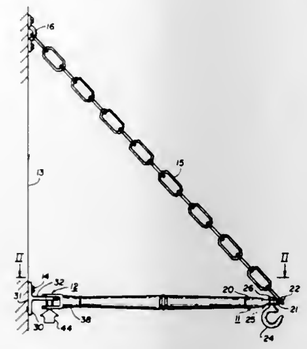
BRACKET ASSEMBLY

Lee Richard Chasen, Port Chester, N.Y., assignor to Coats & Clark, Inc., Stamford, Conn.

Filed Jan. 26, 1976, Ser. No. 652,299

Int. Cl.² A47F *5/00*

U.S. Cl. 248—290 **11 Claims**



1. A bracket assembly comprising:

a rigid elongated support rod;

a fitting having a socket for receiving one end of said rod, hook means depending from said fitting for supporting an article;

a wall bracket having a socket for receiving the other end of said rod;

means for affixing said bracket to a wall;

an elongated end support means affixable to said fitting at a position further from said wall bracket than the distance between said hook means and said wall bracket;

said support means being adapted to be affixed to said wall and a point above said wall bracket to hold said support rod in a horizontal position, the portion of said wall bracket containing the socket thereof being movable between a plurality of angular detent positions with respect to said wall.

4,095,769

FREIGHT PALLET

Gerd Fengels, Hagen, Germany, assignor to Bruggemann & Brand KG, Wetter (Ruhr), Germany

Filed Oct. 2, 1975, Ser. No. 619,001

Claims priority, application Germany, Feb. 22, 1975, 2507709

Int. Cl.² B65D *19/22*

U.S. Cl. 248—346 **8 Claims**

1. A pallet for receiving freight such as airfreight for transport by air or for an air drop release from air planes by means of parachutes, comprising:

a laterally extending core;

a pair of cover plates disposed, respectively, above and below said core and sandwiching said core therebetween;

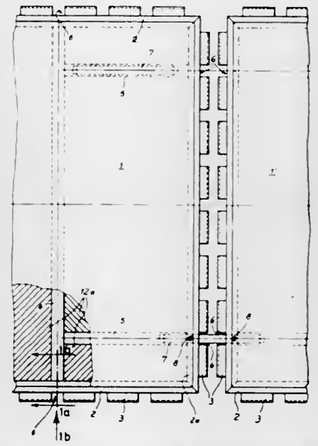
a shoulder strip extending around the periphery of said core and extending between said cover plates, said shoulder strip defining at least four edges of said pallet, at least one said pallet edge being provided with a plurality of openings therethrough;

internal connecting members holding structures mounted within said core between said cover plates and communicating with said pallet edge openings;

a plurality of connecting members, each said connecting member being removably insertable into said shoulder strip openings and said internal connecting member holding structures; and

means for releasably securing said connecting members to said pallet with a portion of each connecting member so secured projecting outwardly of said one pallet edge,

whereby a pair of such pallets may be substantially rigidly joined together edgewise by insertion and securing of such connecting members into the openings and internal connecting member holding structures of respective facing edges of the two pallets, said pallet being of a rectangular configuration and said internal holding structures comprise at least one first take-up tube extending between and affixed to the shoulder strips defining two pallet edges



generally normal to said one said pallet edge, and at least two second take-up tubes, each attached at one end thereof to said first take-up tube and are attached at the opposite end thereof to the shoulder strip defining said one pallet edge, the axially outermost portions, with respect to said pallet, of each said first and second take-up tubes communicating with openings provided in said pallet edge shoulder strips.

4,095,770

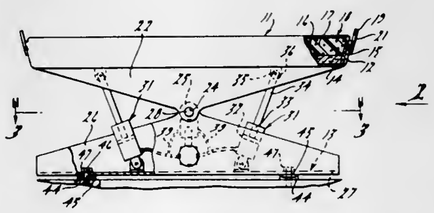
TILTABLE SEAT FOR TRACTOR AND THE LIKE

Daniel C. Long, 14314 Hamilton, Riverview, Mich. 48192

Filed Nov. 1, 1976, Ser. No. 737,612

Int. Cl.² B60N *1/02*

U.S. Cl. 248—371 **2 Claims**



1. A self-leveling, sidewardly tiltable, vehicle seat embodying a seat cushion, a support element on which said cushion is supported, triangular shaped members having the largest side secured adjacement to the forward and rearward edges of said support element with the apexes extending downwardly, a base support element having at the forward and rearward edges thereof laterally extending triangular shaped members with the apexes extending upwardly, said triangular shaped members at the forward and rearward edges of the base and cushion support elements having aligned apertures at the apexes thereof, central pivot means extending through said apertures permitting the cushion to tilt laterally when the vehicle is tilted; from the vertical, a pair of rams connected between the seat cushion and base support elements on opposite sides of said central pivot, a flexible hydraulic conduit between the bottom portion of the rams, a fluid in the conduit which passes from one bottom portion to the other bottom portion thereof when the seat cushion is tilted in either direction, reservoir means communicating with said hydraulic conduit to maintain said hydraulic conduit full of fluid, and a manual control valve in said flexible conduit which may be closed to prevent tilting of the cushion or opened to a desired degree so that when open, said fluid is caused to move at a controlled rate from one ram to the other by weight of the seat occupant to maintain the cushion in a substantially horizontal position.

4,095,771

DEVICES FOR MANUFACTURING WALL PARTITIONS

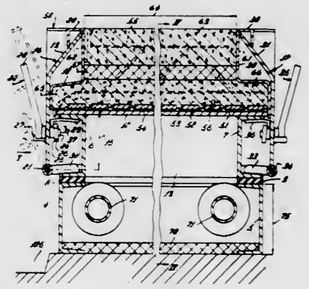
Cornelis van der Lely, 7, Brüschenrain, Zug, and Hendricus Jacobus Cornelis Nieuwenhoven, Hirssattelweg, 6340 Baar, both of Switzerland

Continuation of Ser. No. 536,037, Dec. 23, 1974, abandoned, which is a continuation of Ser. No. 314,996, Dec. 14, 1972, abandoned. This application Jul. 26, 1976, Ser. No. 708,356

Claims priority, application Netherlands, Dec. 17, 1971, 7117333

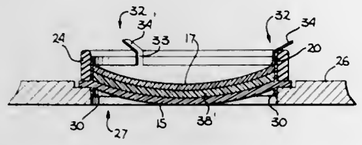
Int. Cl.² B28B *7/22*

U.S. Cl. 249—18 **21 Claims**



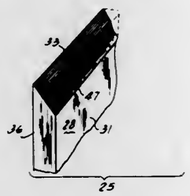
1. A device for manufacturing a partition intended as a wall, a floor, a ceiling or roof of a building, said device comprising a jig including a horizontally disposed jig floor having substantially vertical edges about its periphery, upright jig sides each having a substantially vertical portion corresponding to a said vertical edge of said jig floor and providing with said jig floor a mold for forming the partition, substantially horizontally disposed pivot means, the axis of said pivot means being located at a substantially lower level than the top of said jig floor, at least one of said jig sides being arranged to be pivotable about said pivot means whereby said one pivotable jig side with its vertical portion thereof is pivotably displaceable from a position where its vertical portion joins the corresponding vertical edge of said jig floor, a supporting frame provided for supporting said jig floor at least in part, said supporting frame comprising channel beams which each include upper and lower limbs extending outwardly, said pivot means having a pivot shaft mounted on said lower limb of one of said channel beams, a locking member for said one pivotable jig side cooperating with an upper limb of the same one of said channel beams of said supporting frame whereby said vertical portion of said one pivotable jig side is urged against said corresponding vertical edge of said jig floor, said locking member comprising a turnable clamping guide mounted on said one pivotable jig side located to cooperate with a fastening hook, said fastening hook being provided on said upper limb of said one channel beam, said clamping guide being formed by a round disc, the circumference of said disc being interrupted by a straight peripheral portion, the distance between the rotary axis of the locking member and the fastening hook exceeding the distance between said rotary axis and the straight peripheral portion.

4,095,772
CASTING APPARATUS FOR PLASTIC LENSES
Hermann P. Weber, 5506 Beckford Ave., Tarzana, Calif. 91356
Filed May 13, 1977, Ser. No. 796,699
Int. Cl.² B29C 5/00; B29D 11/00
U.S. Cl. 249—82 12 Claims



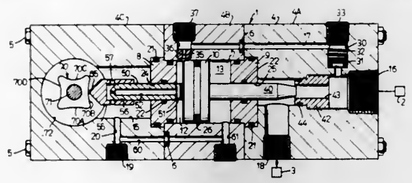
1. An apparatus for casting a lens from a liquid plastic comprising:
a lower mold member defining a first lens surface, said lower mold member for receiving said liquid plastic;
an upper mold member having a lower surface defining a second lens surface;
suspension means for suspending said upper mold member above said lower mold member so as to define a cavity between said first and second lens surface, said suspension means for maintaining said upper mold member parallel to said lower mold member while allowing said upper mold member to be drawn towards said lower mold member as said liquid plastic cures in said cavity; said suspension means including a spacer ring disposed about said lower mold member and a plurality of flexible ears extending from said upper mold member which rest upon said ring;
whereby a lens is formed in said cavity.

4,095,773
SUBASSEMBLIES FOR CUBE CORNER TYPE RETROREFLECTOR MOLDS
Henry Lindner, Elgin, Ill., assignor to Beatrice Foods Co., Elgin, Ill.
Division of Ser. No. 743,055, Nov. 18, 1976. This application Aug. 17, 1977, Ser. No. 825,245
Int. Cl.² B29C 1/00; B29D 11/00
U.S. Cl. 249—117 25 Claims



1. A subassembly for a reflector mold portion, said mold portion being adapted for incorporation into a mold for forming cube-corner type retroreflective surfaces in a body formed by such a mold, said subassembly comprising
(A) two slab shaped bodies,
(B) each one of said bodies having spaced, generally parallel respective side wall portions with connecting top and bottom edge walls, and opposed end walls,
(C) one of said bodies having at least one type of flat first facet surface defined in the region of a top edge wall portion thereof,
(D) the second of said bodies having a plurality of each of a second and a third different types of flat facet surfaces defined in at least a top edge wall portion thereof, said second and said third facet surface types each being arranged in respective paired interrelationships with each individual such second facet being so configured and so oriented relative to an individual such third facet that each such pair thereof comprises two facets of an individual cube corner-type retroreflective unit, each respective one of said second and said third facet surfaces being equal in area and shape to all others of said second and said third facet surfaces,
(E) all individual ones of each of said first, said second, and said third facet surface types being further characterized by having one edge thereof coincide with one common side edge of their respective associated said bodies,
(F) said bodies being adapted for, and spatially orientable in, a contacting, adjacent longitudinally mating, side-by-side relationship relative to respective said side wall portions thereof with all individual ones of each of said, first, said second, and said third facet surface types cooperating to define a plurality of such individual cube corner type retroreflective units, all said units comprising said plurality being generally longitudinally arranged in adjacent relationship to one another along the adjoining said top edge wall portions of said bodies,
(G) each such individual cube corner type retroreflective unit being defined by one of each of said first, said second, and said third facet surfaces, respectively, which are arranged circumferentially about an optical axis extending therethrough, all of such facet surfaces of any given such cube corner type retroreflective unit being inclined at a generally similar angle relative to said optical axis, and all such facet surfaces of any given such cube corner type retroreflective unit meeting at an apex point along said optical axis, said first facet surface in any given such cube corner-type retroreflective unit being at least equal in area to each of the respective areas of said second and said third facet surface types thereof, the interrelationship between all such facet surfaces of any given such cube corner type retroreflective unit and said optical axis thereof being such that a ray of incident light striking a predetermined surface of a body molded over said adjoining top edge wall portions, and also striking one of the facet surfaces of any given such cube corner type retroreflective unit as such is formed in said molded body within a predeterminable range of incident angles relative to said optical axis thereof as formed in said molded body, is deflected successively against the other two said facet surfaces of such cube corner type retroreflective unit as such is formed in such molded body, and is then substantially retroreflected away from such cube corner type retroreflective unit in said molded body,
(H) each respective such optical axis of all such cube corner type retroreflective units comprising said plurality being disposed substantially parallel to the other optical axes thereof, and
(I) each respective such apex point of each such cube corner retroreflective unit comprising said plurality being substantially coplanar with respect to the other apex points thereof.

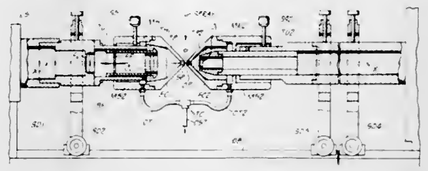
4,095,774
CAM REGULATED FLOW CONTROL VALVE
Bruce L. Garnett, Rte. 2, DePere, Wis. 54115, and John R. Herman, 3283 Davies, Green Bay, Wis. 54302
Filed Jan. 31, 1977, Ser. No. 763,912
Int. Cl.² F16K 31/12
U.S. Cl. 251—44 9 Claims



1. In a flow control valve:

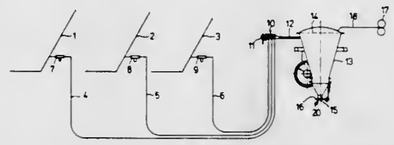
a housing having a bore, a fluid flow passage, and a drain cavity therein;
a piston slideable in said bore and dividing said bore into first and second chambers;
first and second separation means for separating said first and second chambers of said bore, respectively, from said drain cavity and from said fluid flow passage, respectively;
said housing having a fluid inlet port and a controlled flow outlet port which communicate with said fluid flow passage, said housing having a drain outlet port communicating with said drain cavity;
a piston rod connected to said piston and extending through said first separation means into said drain cavity;
a poppet connected to said piston and extending through said second separation means into said fluid flow passage to control fluid flow from said fluid inlet port to said controlled flow outlet port;
a first passage communicating between said inlet port and said first chamber;
a second passage communicating between said drain outlet port and said second chamber;
a third passage extending through said piston rod and communicating beween said first chamber and said drain cavity;
a shut-off member movably mounted on said piston rod and movable to control fluid flow through said third passage;
a movable cam mounted in said drain cavity and operatively connected to said shut-off member for controlling the axial position of said shut-off member relative to said piston rod to control fluid flow from said first chamber into said drain cavity and to thereby control the position of said piston, said piston rod and said poppet and thereby enable said poppet to control fluid flow from said fluid inlet port to said controlled flow outlet port;
and means for moving said cam to effect movement of said poppet.

4,095,775
PARTICLE EVALUATOR
Geoffrey A. Hotham, 1130 Channel Dr., Santa Barbara, Calif. 93108
Filed Dec. 22, 1975, Ser. No. 642,915
Int. Cl.² G01N 21/00, 21/18; G02B 21/34
U.S. Cl. 356—102 21 Claims



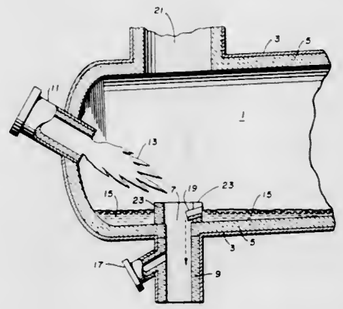
1. In apparatus for evaluating particles having a light transmitter for transmitting radiation as a beam along an optical axis to a sample zone; and
optical means for transmitting radiation from an object plane in said sample zone along said optical axis and for focusing at a picture plane images of particles at said object plane said optical means rendering said object plane conjugate with respect to said picture plane, whereby images of particles simultaneously present at said object plane are sharply defined as separate images in said picture plane;
the improvement that comprises:
means for directing a stream of said particles into said sample zone along a path transverse to said optical axis whereby separate particles may be present there simultaneously; and
wall means having apertures aligned with said optical axis on opposite sides of said sample zone for confining the flow of said stream to a narrow region at said object plane.

4,095,776
SUCTION CONVEYING AND MIXING APPARATUS
Rudi Baumann, Rosenberg; Otmar Link, Gotzingen, and Gerhard Nied, Rosenberg, all of Germany, assignors to AZO-Maschinenfabrik Adolf Zimmermann, Germany
Filed Sep. 21, 1976, Ser. No. 725,343
Claims priority, application Germany, Oct. 7, 1975, 2544716
Int. Cl.² B01F 15/00
U.S. Cl. 366—163 14 Claims



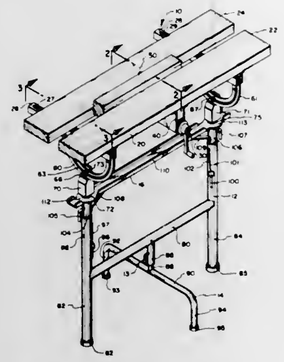
1. A suction conveying and mixing installation have a plurality of supply containers for different bulk material components, at least one suction conduit connected to the supply containers, a separator means including a mixing container for receiving said bulk material components which are separated from a conveying stream, said mixing container being connected to said suction conduit and having a bottom aperture for emptying the bulk material, a suction fan downstream of the separator means and in communication therewith, and means creating a mixing air flow in said mixing container for mixing the plurality of bulk material components which are separated out from the conveying stream, said means creating a mixing flow comprising at least one ventiltion valve in the region of the bottom aperture and means opening said ventilation valve after the end of a mixing container loading operation while the suction fan is running.

4,095,777
COMBUSTION CHAMBER WITH SLAG DAM AND DRAIN TROUGH
Donald E. Honaker, Ballwin, Mo., assignor to Monsanto, St. Louis, Mo.
Filed Nov. 15, 1976, Ser. No. 741,826
Int. Cl.² C21B 7/12
U.S. Cl. 266—45 4 Claims



1. A method for draining hot molten slag from a combustion chamber which comprises providing at least one inclined drainage trough within said combustion chamber, forming a pool of molten slag of sufficient depth to serve as a heat sink maintaining the molten slag in a flowable condition, drawing molten slag from said pool in at least one laterally thin stream flowing at a rate such that there is no substantial increase in viscosity of the molten slag after it leaves the pool, and discharging said thin stream(s) of molten slag from said combustion chamber through a slag tap-hole with essentially no contact of molten slag with any surface of sufficiently lower temperature than that of the molten slag to cause solidification of said slag on or around said tap-hole.

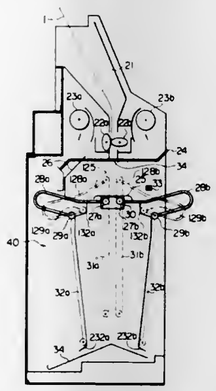
4,095,778
COMBINATION WORK TABLE AND VISE
Harold R. Wing, 1185 E. 225 North, Springville, Utah 84663
Filed Jul. 22, 1977, Ser. No. 818,178
Int. Cl.² B25B *1/02*
U.S. Cl. 269—71 **5 Claims**



1. A work table comprising:
a basal framework; and
a tiltable work platform mounted on the basal framework, means for tilting the work platform relative to the basal framework the tiltable work platform comprising a framework and a working surface secured to the framework, the working surface comprising at least two leaves comprising a first and a second leaf with at least the first leaf laterally displaceable with respect to the second leaf, the framework comprising two parallel, spaced tracks upon which at least the first leaf is slideably engaged, a single centrally disposed screw, a crank for turning the screw, a journal bearing through which the screw passes and which serves as a thrust bearing for the screw, and a boss secured to the first leaf and threadedly engaged to the screw, rotation of the screw moving the boss and the first leaf laterally relative to the second leaf, the boss configurated as a swivel, the swivel accommodating unequal lateral movement of the first leaf relative to the second leaf to thereby accommodate clamping an asymetrical object between the two leaves upon rotation of the screw.

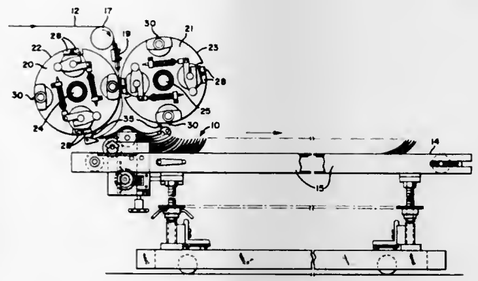
4,095,779
APPARATUS FOR STACKING A CONTINUOUS PRINTED PAPER BEING FOLDED
Tsutomu Imagi, Kakogawa; Toshiharu Fudatsuji, Zama, and Yasuhiko Torigoe, Akashi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan
Filed Jul. 20, 1976, Ser. No. 707,114
Claims priority, application Japan, Aug. 1, 1975, 50-94605
Int. Cl.² B65H *45/00*
U.S. Cl. 270—61 F **6 Claims**

1. An apparatus for folding and stacking a printed paper, comprising:
paper guide means for guiding said printed paper and having a terminal end through which said guided paper passes;
paper accumulation means for receiving said guided paper passing through said terminal end, and having a center base plate for accumulating said received paper, said paper accumulation means further including means for lowering said center base plate according to the height of the stacked paper thereon, so as to maintain an approximately constant distance between the terminal end of the paper guide means and the uppermost surface of the stacked paper on the paper accumulation means, said paper accumulation means further including two accumulation plates disposed on opposite sides of said center base plate and having a variable angular orientation with respect to said center base plate for supporting respective edge portions of the stacked paper thereon, said accumulation means further including means for pivotably swinging said two accumulation plates as said center base plate is lowered so as to vary the angular orientation of said accumulation plates in a downward direction with respect to said center base plate in such a way that the larger the distance between the terminal end of the paper guide means and the paper accumulation means, the greater the downward angular orientation of the accumulation plates, wherein said accumulation plates comprise two symmetri-



cal plates, each one end of said plates being pivotably connected to a support table which is vertically movable in accordance with the distance between the terminal end of the paper guide means and the paper accumulation means, said swinging means comprising a pair of guide rails, each having an upper end and a lower end, said pair of guide rails converging at said lower end thereof, each other end of said plates being slidably in contact with the guide rails so as to cause said accumulator plates to swing as said center base plate is lowered.

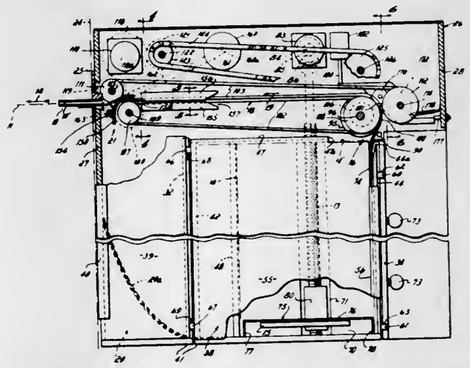
4,095,780
RETRACTING TUCKER BLADE AND BRUSH FOR CYLINDER FOLDER
Richard Allen Gaspar, Centerville, and Robert Baxter Tarburton, Dayton, both of Ohio, assignors to Harris Corporation, Dayton, Ohio
Filed Oct. 7, 1976, Ser. No. 730,355
Int. Cl.² B65H *45/16*
U.S. Cl. 270—73 **5 Claims**



1. In apparatus for zig-zag folding a flexible web, including a pair of driven cylinders disposed in parallel adjacent relation and adapted to receive the web therebetween, cooperating tucker blade and gripper means on each cylinder and effective to fold and tuck the web alternately into the gripper means on alternate cylinders at longitudinally spaced intervals along the web in response to rotation of the cylinders, and stripper means

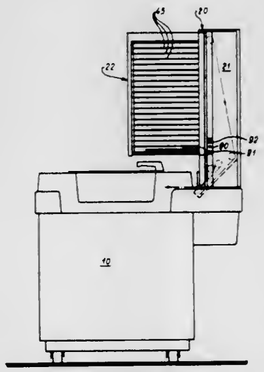
cooperating with the gripper means for releasing and guiding the folded web from the gripper means and the cylinders, the improvement comprising:
(a) a compliant sweeper, and
(b) means mounting said sweeper at a cylinder surface near a tucker blade and means within that cylinder for cyclically moving the sweeper to an extended position extending beyond the cylinder surface for contacting the web after the tucker blade has tucked the web into its associated gripper means and for maintaining said sweeper in said position extending beyond the cylinder surface after the gripper means on that cylinder has released the web thereon, for continuing to contact the web to aid the separation of the web from the cylinder surface and to protect it from the tucker blade.

4,095,781
CURRENCY DISPENSING APPARATUS
Jerome L. Kistner; Thomas R. Aultz, both of Cincinnati; John A. Lampl, Hamilton, and William T. Uhlman, Cincinnati, all of Ohio, assignors to The Mosler Safe Company, Hamilton, Ohio
Filed Sep. 17, 1976, Ser. No. 724,112
Int. Cl.² B65H *3/14, 5/08*
U.S. Cl. 271—12 **16 Claims**



1. A currency dispenser for sequentially feeding single bills of currency from the top of a vertical stack of superimposed horizontally disposed bills, comprising:
a vacuum pickup member overlying said stack, said pickup member having a suction head and being mounted for rotation about a first generally horizontal axis whereby said suction head moves through a circular path when said pickup member rotates about said first horizontal axis, said path at its lower extremity being proximate a pickup region defined by the location of the uppermost bill of said underlying vertical stack,
upper and lower cooperating feed belts trained over upper and lower sets of spaced rotatable cylindrical rolls for transporting a bill therebetween, one of the rolls of said lower set being rotatable about a second generally horizontal axis,
means for moving said belts during an operational cycle to effect transport of a bill therebetween along a transport path from the nip of a bill entrance end proximate said one roll of said lower set to a bill exit end displaced therefrom,
means to rotate said pickup member about said first axis during said operational cycle,
means for mounting said upper and lower sets of rolls for rotation about their respective axes with said one roll axially displaced relative to said pickup member and with said second axis of said one roll generally parallel to, but offset from, said first axis of said pickup member for rendering said circular path of said suction head noncoincident with and below the surface of said one cylindrical roll in said pickup region while rendering said circular path substantially coincident with said surface of said one cylindrical roll in the region of said nip, thereby minimizing interference in said pickup region between the uppermost bill of said stack and said lower feed belt during vacuum pickup by said suction head of said uppermost bill from the top of said stack while maximizing transfer of a bill from said suction head to said upper and lower belts in the region of said nip,
said second axis of said one roll lying on an imaginary line which passes through the area defined by said path of said suction head to facilitate pickup of a bill in said pickup region by said suction head and transfer to said belts in less than 360° of movement of said suction head.

4,095,782
COLLATING APPARATUS
Theo Pierre Chretien Breuers, Venlo, and Andreas Theodorus Heijnen, Tegelen, both of Netherlands, assignors to Oce-van der Grinten N.V., Venlo, Netherlands
Filed Mar. 17, 1977, Ser. No. 778,378
Claims priority, application Netherlands, Mar. 18, 1976, 7602821
Int. Cl.² B65H *39/10*
U.S. Cl. 271—173 **8 Claims**



3. A collating apparatus for the collation of sheets, comprising a frame, at least one series of adjacent trays located in the frame, conveying means for conveying the sheets to be collated one by one along a path extending near the trays, guide elements associated with the trays which can be brought into the path of movement of the sheets to be collated, each guide element being movable between two positions, a first position wherein the guide element extends into the path of movement of the sheets for guiding sheets, and a second position wherein the guide element is situated out of the path of movement of the sheets, each guide element being activatable from the first to the second position by laying a sheet down into the corresponding tray with which the guide element is associated, the first position of each guide element being the only stable position of equilibrium, and each guide element being provided with a locking element which, when the guide element has been brought to the second position, positively locks the guide element in that position.

4,095,783
APPARATUS FOR CREATING AN ILLUSION
Steven R. Bailey, R.R. 1, Prole, Iowa 50229
Filed Oct. 1, 1976, Ser. No. 728,635
Int. Cl.² A63J *21/00*
U.S. Cl. 272—8 R **2 Claims**

1. Apparatus for creating an illusion comprising:
a housing;
means forming a chamber in said housing;
a first opening disposed in said housing leading from the

exterior of said housing to said chamber for permitting visual access to said chamber;

door means for selectively opening or closing said first opening;

a second opening disposed in said housing leading from the exterior of said housing to said chamber, said second opening being substantially in alignment with the first said opening;

door means for selectively opening or closing said second opening;

a third opening disposed in said housing leading from the exterior of the housing to said chamber, the first said opening being adjacent one end of said housing and the third opening being adjacent the other end of the housing;

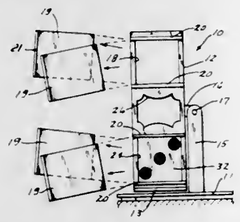
door means for selectively opening or closing said third opening;

a fourth opening disposed in said housing leading from the exterior of the housing to said chamber, said fourth opening being in alignment with said third opening; and, door means for selectively opening and closing said fourth opening;

a fifth opening disposed in said housing leading from the exterior of said housing to said chamber, said fifth opening being formed between the first said opening and the third opening;

a sixth opening leading from the exterior of said housing to said chamber, said sixth opening being in alignment with said fifth opening thereby forming a visual passageway through said housing;

means selectively receivable in said chamber for selectively creating the illusion of either a parallelepiped or an empty space comprising:



a first substantially flat member;

a second substantially flat member rigidly connected to said first flat member and disposed substantially normal to said first flat member;

a third substantially flat member rigidly connected to said first flat member and disposed substantially normal to said first flat member and substantially parallel to said second flat member;

a fourth substantially flat member; and

means for pivotally attaching said fourth flat member adjacent to said first flat member whereby said fourth flat member is pivotally movable between a first position whereby said fourth flat member is normal to said first, second and third flat members, and a second position whereby said fourth member is substantially parallel to said first flat member and substantially normal to said second and third flat members;

means for frictionally holding said fourth member in said first position thereof;

means for inconspicuously moving said fourth flat member from the first to the second position thereof said moving means comprising a flexible line attached to said first and fourth members whereby pushing on said line when said fourth member is in the first position thereof causes it to be moved to the second position thereof;

a base member and means for pivotally attaching said housing to said base member whereby said housing is movable between a first position wherein said second opening is below said fourth opening and a second position wherein said second opening is above said fourth opening; and

means for selectively opening or closing said other end of said housing.

4,095,784

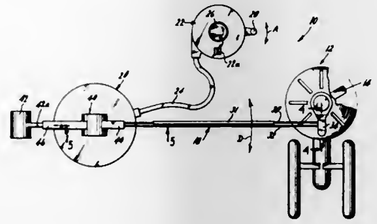
TOY AIRCRAFT SYSTEM

Melvin Kennedy, and Dietmar Nagel, both of 1675 York Ave., New York, N.Y. 10028

Filed Nov. 5, 1976, Ser. No. 739,072

Int. Cl.[2] A63H *27/04*

U.S. Cl. 272—31 A **8 Claims**



1. A toy aircraft system comprising: a tower defining a system axis and including a source of electrical power; a flight boom having a remote end and a near end; pivot means for mounting said flight boom at said near end to said tower for rotation about said system axis for pivotal movement about an elevational axis, said flight boom including an aircraft control arm and an inactive arm; an aircraft mounted on said remote end of said control arm and said inactive arm and adapted for flight about said system axis, including a propeller for moving said aircraft and an electric motor mounted within said aircraft and connected to drive said propeller; said control arm and said inactive arm together supporting the weight of said aircraft and being electrically conductive to supply electricity from said tower to said aircraft; means for electrically connecting said control arm and said inactive arm to said source of electrical power; and means for electrically connecting said control arm and said inactive arm to said electric motor.

4,095,785

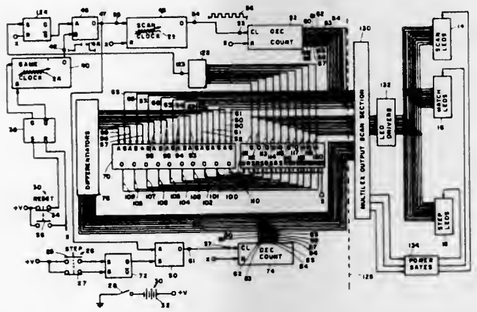
MANUALLY INDEXED ELECTRONIC MATCHING GAME

Gary L. Conner, 16820 White Creek Rd., Sand Lake, Mich. 49343

Filed Jan. 19, 1977, Ser. No. 760,650

Int. Cl.[2] A63B *71/04*

U.S. Cl. 273—1 E **19 Claims**



1. An electronic game comprising:

scanning signal generating means for developing a repetitive series of sequentially occurring pulses;

first display means coupled to said scanning signal generating means for providing a repetitive scanning display;

player actuated switch means;

sequencing circuit means coupled to said switch means for developing sequencing pulses in response to the actuation of said switch means;

second display means coupled to said sequencing circuit means for displaying said sequencing pulses;

coincidence detecting means coupled to said generating means and to said sequencing means for providing an output signal when a pulse of said repetitive series of pulses coincides with a sequencing pulse from said sequencing means; and

third display means coupled to said coincidence detecting means for displaying said output signals.

4,095,786

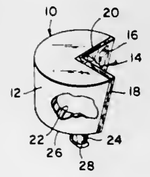
POOL TABLE POCKET INSERT

Leo D. Foley, R.D. No. 3, Titusville, Pa. 16354

Filed Nov. 2, 1976, Ser. No. 738,024

Int. Cl.[2] A63D *15/00*

U.S. Cl. 273—4 A **6 Claims**



1. The combination of a pool table and a pool table pocket insert, said pool table comprising a lateral playing surface, said playing surface bounded by four elongated cushions upstanding from said playing surface, a pair of 1st pockets disposed in a pair of opposed cushions, four 2nd pockets disposed in and between adjacent cushions, said 1st and 2nd pockets extending outwardly from said playing surface and downwardly from the uppermost regions of said four cushions and said playing surface, each of said four cushions having a surface thereof disposed adjacent said playing surface, said surface of said cushions being resilient, said pocket insert comprising a hollow inflatable bladder dimensioned for insertion selectively into one of said first and said second pool table pockets, said bladder providing a ball contacting surface having inherent elasticity substantially the same as said surface of said lateral cushions, said ball contacting surface of said bladder being disposed adjacent to said surface of said lateral cushions when said bladder is selectively inserted in said 1st and 2nd pockets, said ball contacting surface of said bladder causing a contacting ball to react equivalent to said lateral cushions, means for inflating and deflating said bladder, said inflating means including valve means fixedly secured to the outermost surface of said bladder, said valve being means for communicating air into said bladder and for retaining said air therein, said valve means disposed on a lowermost surface of said bladder when said bladder has the uppermost surface thereof disposed adjacent said uppermost regions of said cushions.

4,095,787

WORKOUT DEVICE FOR TENNIS HAVING A VARIABLE SPEED CONTROL

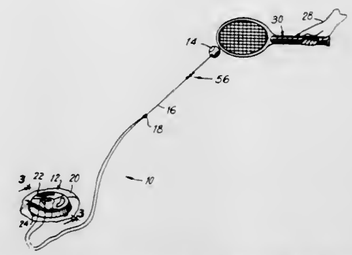
Albert Saferstein, 4797 Boston Post Rd., Pelham Manor, N.Y. 10803

Filed Mar. 22, 1976, Ser. No. 669,465

Int. Cl.[2] A63B *61/00*

U.S. Cl. 273—29 A **8 Claims**

1. An apparatus for practicing tennis by the stroking of a tethered ball comprising an anchor base; a tether line connected to said base having a relatively short inelastic cord connected to an end of a generally long elastic cord, and a ball at one end of said inelastic cord; swivel means; said swivel means being a Y-shaped yoke connection having a pair of legs attached between said base and an intermediate section of said elastic cord, said yoke having loops at each leg thereof and said elastic cord passing through said loops; adjusting means connected to the other end of said elastic cord, said adjusting means also being slidable on said elastic cord intermediate the ends thereof for variably adjusting the length of said elastic



cord from substantially between full length and substantially half-length by doubling up upon itself a length of said elastic cord to form a loop; whereby said means for adjusting said cord enables a player to control the return speed or rebound action of said ball from slowest at substantially full length of said elastic cord to fastest at substantially half-length of said elastic cord.

4,095,788

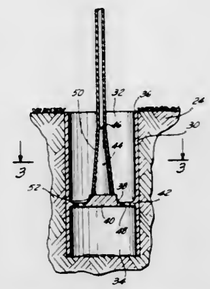
FLAG POLE HOLDER

William Benenson, 118 E. 60th St., New York, N.Y. 10022

Filed Apr. 14, 1977, Ser. No. 787,573

Int. Cl.[2] A63B *67/00*

U.S. Cl. 273—34 R **2 Claims**



1. A golf ball cup including a flag pole holder comprising:

a unitary elongated holder body, open at both ends, which is cylindrical in configuration and adapted for closely fitting into a designated hole of predetermined depth at a predetermined location on the golf green, the upper rim of said holder body being slightly below or just even with the ground surface of said designated hole and the bottom rim resting on the bottom of said hole;

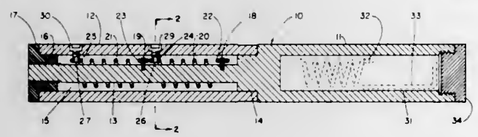
a generally circular web the periphery of which is integrally attached to the cylindrical wall within said holder body generally intermediate the top and bottom rims of said body;

a centrally located pin member having tapering sides projecting above said web at the center thereof and integral with said web, said pin member fitting into the tapered bottom opening of the flag pole to thereby support said flag pole in an upright position;

a plurality of equally separated elongated openings radially disposed in said web about said centrally located pin to the periphery of the web adapted for easy draining of water,

dirt and mixtures thereof through said web into the ground at the bottom of the cup;
said centrally located pin being adapted to engage a tapered bottom opening in a golf flag pole to thereby maintain said pole in an upright condition in the center of the cup on the web as the load supporting means; and
said pin having a height which is below the upper rim of said cup and below the ground surface whereby there is no obstruction by said pin to a golf ball entering the cup.

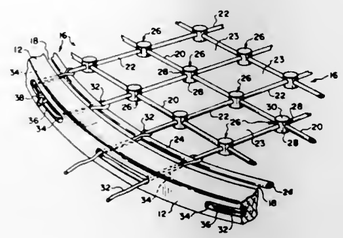
4,095,789
TORSION SPRING TYPE WRIST EXERCISING DEVICE
George Mueller, 52 Grandview St., Huntington, N.Y. 11743
Filed Mar. 1, 1977, Ser. No. 773,275
Int. Cl.² A63B *21/02*
U.S. Cl. 272—140 **2 Claims**



1. A torsional twist wrist exercising device which comprises:
(a) a pair of hand grips having roughened exterior surfaces disposed in contiguous end-to-end relation on a common central longitudinal axis, said grips being operatively interconnected with each other so as to normally maintain their contiguous relation, but permitting rotative movements thereof relative to each other about their common axis;
(b) a central longitudinally extended shaft affixed at one end to one of the grips, the other end of said shaft being free;
(c) a central longitudinally extended bore of diameter greater than the diameter of the shaft formed within the other grip for coaxially receiving the shaft;
(d) a plurality of torsion springs operatively supported upon the shaft;
(e) a plurality of projecting members supported upon the shaft each of which is adapted to engage a loop formed at one end of each spring;
(f) a plurality of projecting members supported upon the wall defining the interior surface of the bore each of which is adapted for alternatively engaging and disengaging a loop formed at the other end of each loop;
(g) a cap member threadably engaged to the free end of the shaft for maintaining the grips in contiguous end-to-end relation during exercising use;
(h) a compartment formed within the grip to which the shaft is attached; and
(i) a closure member for the compartment.

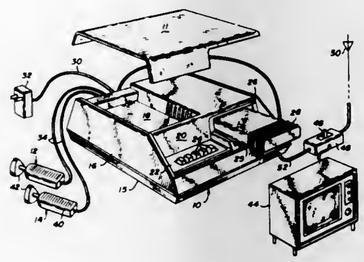
4,095,790
TENNIS RACKET WITH TENSIONED ONE-PIECE BALL-STRIKING FRICTION IMPARTING GRID
Bronislaw Swiecicki, 3757 N. Oriole Ave., Chicago, Ill. 60634
Filed Apr. 8, 1977, Ser. No. 786,040
Int. Cl.² A63B *51/02*
U.S. Cl. 273—73 D **5 Claims**

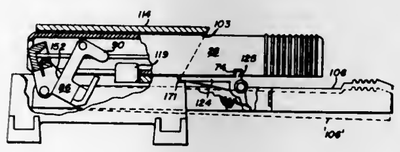
1. In a tennis racket having a generally elliptical rigid open frame from which there projects outwardly a manipulating handle, a flexible ball-striking grid centered within and encompassed by said frame, said grid being of one-piece integral molded plastic construction and including a generally elliptical peripheral rim portion the major and minor axes of which are slightly less in extent than the extent of the major and minor axes of the frame, a criss-cross pattern of strands extending coextensively across said peripheral rim portion in checkerboard fashion and including a series of longitudinally extending transversely spaced parallel strands and a series of transversely extending longitudinally spaced parallel strands, all of said strands lying in the medial plane of the elliptical frame, said strands defining a series of generally square openings through the grid, said longitudinally extending strands intersecting said transversely extending strands in the general plane of the grid at quadrilaterally disposed regions throughout the grid, a pair of relatively small outstanding juncture masses integrally formed on said grid at each strand intersection, each juncture



mass defining a pair of oppositely extending protuberances which project out of the general plane of the grid on opposite sides thereof and serve to enhance the frictional characteristics of the grid during game-playing operations when a tennis ball strikes either side of the grid, and means extending between the rim portion of the grid and the elliptical frame at spaced regions therearound for tensioning the grid across the frame.

4,095,791
CARTRIDGE PROGRAMMABLE VIDEO GAME APPARATUS
Ronald A. Smith, Los Gatos, and Nicholas F. Talesfore, San Jose, both of Calif., assignors to Fairchild Camera and Instrument Corp., Mountain View, Calif.
Filed Aug. 23, 1976, Ser. No. 716,909
Int. Cl.² A63F *7/06*
U.S. Cl. 273—85 G **11 Claims**

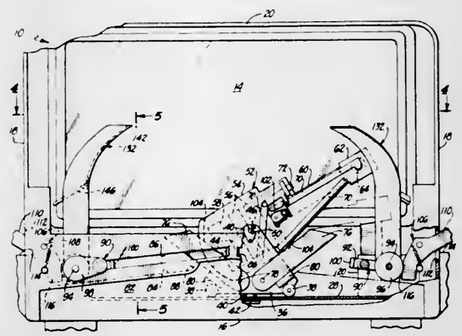




1. Video game apparatus comprising:
player control means for developing play control signals;
cartridge means including data storage means containing auxiliary video signal generating information, said cartridge means including an outer housing having a locking recess therein and a printed circuit board having electronic components mounted thereto, said outer housing enclosing said circuit board and said electronic components forming said data storage means; and

console means including;
a plurality of parameter selection switches for developing play parameter signals,
chute means for receiving said cartridge means and having connector means for providing electrical connection to said data storage means, said chute means including a locking means having a detent for engaging said locking recess of said cartridge means to hold said cartridge means in a received position, and
video signal generating means including microprocessor means for processing video signal generating information including said auxiliary information, said generating means being responsive to said play parameter signals and said play control signals and operative to generate video signals suitable for input to the antenna terminals of a standard television set to cause the television set to develop visual images corresponding to said video signals.

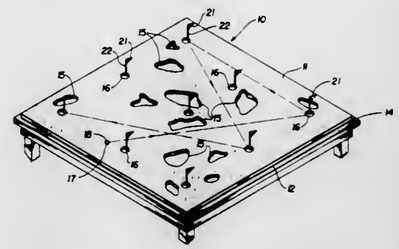
4,095,792
GAME STRUCTURE
Hideyuki Kanno, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Oct. 18, 1976, Ser. No. 733,392
Claims priority, application Japan, Oct. 27, 1975, 50-129558[U]
Int. Cl.² A63F *9/00*
U.S. Cl. 273—85 R **7 Claims**



7. A game structure which includes:
a housing having a front surface through which an object can be viewed, said front surface having opposed ends,
a carriage movably mounted within said housing in back of said front surface, said carriage being located between said ends of said front surfaces and being capable of moving between different positions relative to said front surface,
an arm pivotally mounted on said carriage so as to be capable of being pivoted parallel to said front surface between different positions adjacent to said ends,
visible means for simulating a member which is moved as said game is played supported on said extremity of said arm remote from said carriage, said visible means being located so as to be capable of being viewed through said front surface,
two separate means for controlling the movement of said arm and said carriage relative to said housing so that as said game is played the movement of said arm is controlled through the actuation of said separate means.

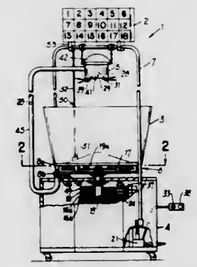
4,095,793
MARBLE GAME RESEMBLING GOLF
Otis Eugene Ray, P.O. Box 40302, St. Petersburg, Fla. 33743
Filed Apr. 4, 1977, Ser. No. 784,338
Int. Cl.² A63F *7/06*
U.S. Cl. 273—87 R **2 Claims**

1. A marble game simulating golf comprising a flexible mat constructed and arranged to resemble a golf course and at least one marble to be propelled by a finger of a player of the game on the top surface of the mat, said mat comprising a top comparatively thick carpet grass layer and a comparatively thin bottom layer immediately underlying said top layer, the top carpet grass layer having a plurality of spaced randomly shaped and differently sized cut-outs formed therethrough resembling sand and water hazards on a golf course and having a plurality of comparatively small regularly sized circular cut-outs in spaced relation to the first-named cut-outs and



resembling the holes of a golf course, the top surface of said bottom layer being colored and such coloring being visible to a player through the first-named cut-outs to resemble the color of sand and water hazards on a golf course, said top and bottom layers being joined along a marginal edge only to maintain said top and bottom layers in registration, and hole marker flags having standards formed from bendable pipe cleaners and including horizontal bases which are removably insertable between said top and bottom layers at the marginal edge of said circular cut-outs resembling holes of a golf course.

4,095,794
BALL DROP AND ELECTRICAL READOUT ROTATING RECEPTACLE HAVING A VACUUM CONDUIT BALL RETURN
Joseph Benjamin Garto, 2240 E. 8th St., Brooklyn, N.Y. 11223; Anthony Garto, 2075 Shore Pkwy., Brooklyn, N.Y. 11214, and Alfred Garto, 2075 E. 16th St., Brooklyn, N.Y. 11229
Filed Mar. 1, 1977, Ser. No. 773,196
Int. Cl.² A63F *5/02, 7/02*
U.S. Cl. 273—101 **13 Claims**



1. An improved apparatus employing one or more token means which are caused to be released and fall by gravity from an opening formed in a token means supply compartment, by movement of closure means of said compartment from a closed to an open position, said token means proceeding to spaced locations formed in a rotatable receptacle disposed below said token means supply compartment; said spaced locations being formed to receive said token means after attaining a rest position in a lower surface of said rotatable receptacle; normally open switch means disposed at each of said spaced locations for causing the position of said tokens in said rotatable receptacle to be shown on a display means electrically connected to

said switch means and responsive to engagement of said switch means to a closed position during the presence of token means at said spaced locations; said apparatus being provided by: supply compartment switch means disposed in working relation to said closure means, for urging said closure means to return to the closed position after release of said token means; moveable support means disposed upon the lower surface of said rotatable receptacle, having said normally open switch means affixed thereto, for moving said switch means out of position with respect to said spaced locations and permitting said token means to proceed beyond said spaced locations under gravity action into channel means formed beneath said rotatable receptacle; conduit means extending from said channel means into said token means supply compartment for forming a continuous line of passage from a point proximate to said spaced locations to said token means supply compartment; and pressure forming means acting within said line of passage, for developing a pressurized fluid stream therein, whereby said token means are caused to be drawn into said fluid stream from said channel means and advanced upwardly into said token means supply compartment.

4,095,795

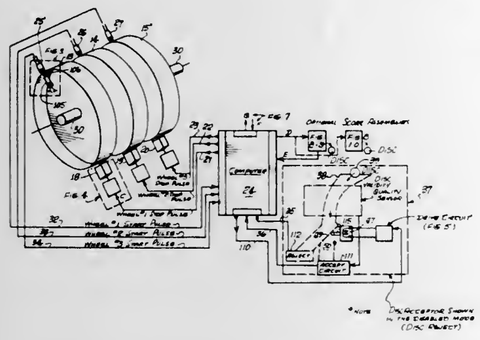
AMUSEMENT APPARATUS AND METHOD

James C. Saxton, 79 Georgetown Dr., Amherst, N.H. 03031; Bruce H. Osterberg, 12344 Escala Dr., San Diego, Calif. 92128, and Joseph C. Kawan, 2034 Paramount Dr., Hollywood, Calif. 90068

Continuation-in-part of Ser. No. 482,225, Jun. 24, 1974, abandoned. This application Jun. 9, 1975, Ser. No. 585,454

Int. Cl.² A63F *5/04*

U.S. Cl. 273—143 R **31 Claims**



1. An amusement apparatus comprising: a plurality of like symbol-displaying means for repetitively displaying respective series of symbols sequentially during an operating period of said apparatus, and computer means effective to select at the commencement of each operating period a single complete set of said symbols comprising one symbol of each of said displaying means and including means causing displaying of said selected set of symbols at the end of said operating period.

30. That method of controlling the final display of a combination of n symbols comprising one symbol of each of n like series of symbols and the symbols of which series are cyclically serially displayed, which comprises randomly generating n series of digital number codes, one for each series of symbols, assigning each series of number codes to a respective series of symbols prior to cyclically displaying the symbols of the respective series thereof, storing one each of said codes generated at the time of commencement of cyclical displaying of the series of symbols, and subsequently terminating cyclical displaying of the series of symbols at respective points in the cyclical serial display represented by respective ones of the previously stored number codes, whereby determination of the set of symbols to be finally displayed is selected by random process at the time of initiation of the cyclical displaying of symbols.

4,095,796

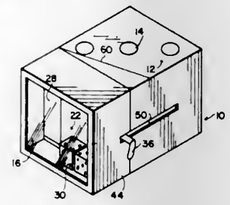
DICE SHAKER

Marvin Monson, 4524 Montview Blvd., Denver, Colo. 80207

Filed Nov. 2, 1976, Ser. No. 738,140

Int. Cl.² A63F *9/04*

U.S. Cl. 273—145 C **5 Claims**



3. A device for shaking dice comprising:
a container adapted to receive one or more dice;
a transparent window at one end of said container;
an interior partition within said chamber parallel to said window dividing the interior of said container into a display chamber adjacent said window and a mixing chamber, a slot in said interior partition extending along one side wall of said container and establishing communication between said mixing chamber and display chamber;
closure means within said container for covering said slot to captively retain one or more dice passed from said mixing chamber to said display chamber in said display chamber adjacent said window;
said closure means including a panel movably mounted in said container;
said panel being flat and substantially covering said slot and said partition in its closed position; and
means connected with said panel and including an actuating member accessible outside said container for moving the edge of said panel adjacent said one side wall along a path parallel to the plane of said partition to uncover said slot and for concurrently moving the opposite edge of said panel away from said partition whereby when said panel is moved to uncover said slot the plane of said panel slopes toward said slot.

4,095,797

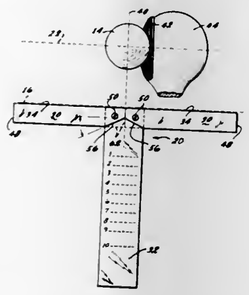
GOLF CLUB SWING TRAINING DEVICE

Nicholas V. Breese, 4413 Melvin Rd., Lakeworth, Fla. 33461

Filed Apr. 26, 1976, Ser. No. 680,132

Int. Cl.² A63B *69/36*

U.S. Cl. 273—186 C **1 Claim**



1. A training device which defines for golfers an impact zone and the proper orientation of the club head and the club head face in the impact zone, said device consisting of:
(a) a body made from flat rigid materials and being of T-shape formed by two straight arms extending at right angles from opposite sides of a first end of a straight bar-shaped leg, the edges of said arms farthest from the second end of said leg being straight and aligned to define a first visible straight line to be positioned adjacent to a ball and between the golfer and the ball and to be substantially aligned with the desired direction of ball travel to indicate the direction the club head should go in the impact zone, the outer ends of said arms forming visible ends appropriately spaced to define an impact zone, said leg defining a second visible straight line to be positioned between the golfer and the ball, the second line generally bisecting said first line and being at right angles to said first line, said second line to extend toward the ball to thereby indicate the direction the club face should parallel in striking the ball,
(b) means for pivotally connecting said arms at their inner ends to said leg so that they can be pivoted to a collapsed position aligned with said leg for carrying and storing, and means to secure said arms in collapsed and spread positions, said first end of said leg forming a straight line at 90° to said second line to assist in aligning said arms to form said first line at 90° to said second line,
(c) said leg having double the width of each arm so that said arms can store side-by-side on said leg in their collapsed positions, said inner ends of said arms actually physically abutting when said arms are aligned in their spread positions to form said first line, the pivotal connection of each arm to said leg being located at the center of a square defined by the width of the arm and an equal distance from the inner end of the arm, each arm at its inner end being relieved on a line extending from a point thereon defined as a point substantially midway between the centers of pivotal connection of said arms to said leg to the adjacent outer edge of said leg when viewed with the arms aligned at 90° to said leg, whereby said arms will not interfere with each other in moving to collapsed position of said arms, and
(d) indicia on the upper face of said leg instructing the golfer in usage including indicating substantially aligning said first line with the desired direction of ball travel and indicating moving said club head parallel to said first line in striking said ball while maintaining said club head face parallel to said second line.

4,095,798

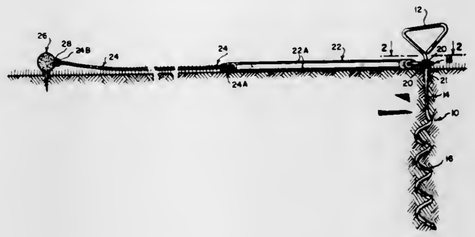
GOLF GAME PRACTICE DEVICE

Walter G. Marple, 17 Beech Pl., Woodbury, N.J. 08096

Filed Jul. 22, 1976, Ser. No. 707,629

Int. Cl.² A63B *69/36*

U.S. Cl. 273—200 R **4 Claims**



1. A golf game practice device comprising:
(a) an anchoring stake having a handle portion, a shank portion and a helical screw portion adapted to be turned into the ground;
(b) a swivel member located at said shank portion and adapted to rotate arond the longitudinal axis thereof;
(c) one end of an elongated elastic member attached to said swivel member;
(d) one end of an at least 18 foot length of cord removably attached to the other end of said elongated elastic member; and
(e) the other end of said cord removably attached to a staple imbedded in a wound rubber core golf ball adapted to be driven by a golf club in a natural line of flight across said stake.

4,095,799

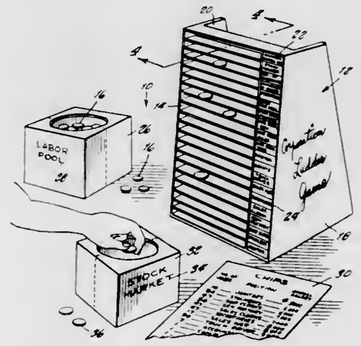
CORPORATE LADDER GAME

Claude A. Stringer, 7317 S. Winchester, Chicago, Ill. 60636

Filed Mar. 28, 1977, Ser. No. 781,706

Int. Cl.² A63F *3/00*

U.S. Cl. 273—241 **5 Claims**



1. Game apparatus comprising:
an upright gameboard having a plurality of slots in a front face thereof simulating rungs on a ladder,
a plurality of indicia on the front face of said gameboard associated with each slot therein designating a job category in a corporation,
a container,
a plurality of chips in said container, preselected ones of said chips corresponding to one of the job categories on said gameboard and containing a number indicum, and
a chip sheet containing indicia associated with the monetary value of the job represented by each of said chips,
whereby a player can select one of said chips and multiply the monetary value of the chip indicated on the chip sheet by the number indicum on said chip to obtain a point value, the number indicum on said chip also being used to establish the number of turns remaining for the player selecting said chips, and the selected chip being disposed in the corresponding job category slot in the front face of said gameboard.

4,095,800

MAP BOARD GAME APPARATUS

Yannis Konsolas, 342 E. 49th St., Apt. D, New York, N.Y. 10017

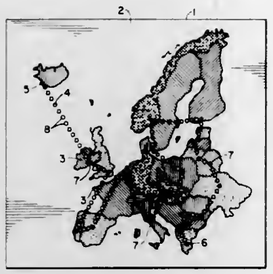
Filed Oct. 13, 1976, Ser. No. 731,903

Int. Cl.² A63F *3/04*

U.S. Cl. 273—251 **8 Claims**

1. A game apparatus comprising:
a. a game board having a map including a plurality of selected countries each distinguishable from the others by the color thereof and means defining a path on the game board map including a plurality of first stopping points and one second stopping point in each country corresponding to the capital city of the country;
b. a plurality of movable game members for moving along said path; and
c. selecting means for effecting movement of the game members along the path including a base and a pointer rotatably mounted thereon, wherein said base has an inner radial band thereon divided into a plurality of selectable

segments each having indicia thereon for instructing the moving of a game member a number of points along the path and an outer radial band concentric with the inner band and divided into a plurality of equal size selectable



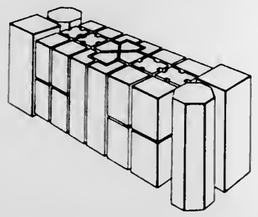
segments each having indicia thereon associated with a different one of said countries for instructing the moving of a game member to the second stopping point in the country associated therewith.

4,095,801

CHESSMEN CONTAINED BY CHESS BOARD OR A CUBE CONTAINER

Ross John Kembar, 4678 Eastridge Road, North Vancouver, British Columbia, Canada

Filed Jul. 30, 1976, Ser. No. 701,516
Int. Cl.[2] A63F *3/02*
U.S. Cl. 273—260 **3 Claims**



1. A standard set of chessman comprising 32 pieces; 2 kings, 2 queens, 4 castles, 4 bishops, 4 knights and 16 pawns;
each of said pieces having a constant cross section throughout its length,
said cross section of said 4 bishops being a polygon having three 90° interior angles and two 135° interior angles with not more than 5 sides,
said cross section of said four knights being a 6 sided L shaped polygon,
the shapes of said cross sections of said 2 queens, 4 castles, 4 bishops and 4 knights being indicative of the direction these pieces move in the conventional game of chess,
the shape and dimensions of the said 4 castles, 4 bishops, 4 knights and 16 pawns being such that they are adapted to be vertically nested into a rectangular parallelepiped.

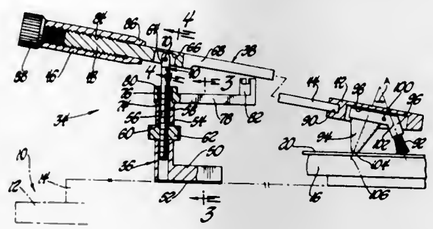
4,095,802

ARM RECORD CLEANER

Richard C. Horian, 1740 Strickland Dr., Bloomfield Hills, Mich. 48013, and James G. Horian, 7340 Indiana, Dearborn, Mich. 48126

Continuation-in-part of Ser. No. 737,296, Nov. 1, 1976, abandoned. This application Jul. 21, 1977, Ser. No. 822,571
Int. Cl.[2] G11B *3/58*
U.S. Cl. 274—47 **10 Claims**

1. An arm record cleaner comprising: a base; a cleaner arm including a front end having a cleaning head and a rear end as well as an intermediate portion between the ends; a vertical post having an upper end that supports the intermediate portion of the arm and a lower end that projects downwardly from the arm; a first threaded connection that supports the lower end of the post on the base for vertically adjustable movement; a cleaning member pivotally supported on the



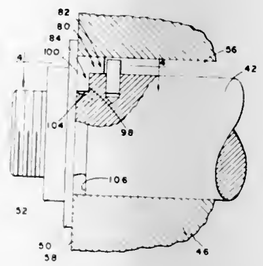
cleaning head and including a brush and a soft pile cleaning edge positioned toward the post from the brush; a counterweight; and a second threaded connection that supports the counterweight on the rear end of the arm for movement toward and away from the cleaning head upon counterweight rotation so as to control the pressure between the head and a record being cleaned.

4,095,803

KEYWAY OIL SEAL ASSEMBLY

Charles David Meier, Hartsville, and Shelby Lewis Olvey, Columbus, both of Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Aug. 23, 1977, Ser. No. 827,049
Int. Cl.[2] F01P *5/10;* **F16J** *15/40*
U.S. Cl. 277—12 **11 Claims**



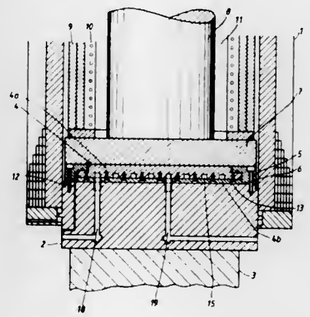
1. Apparatus comprising:
a first member
a second member telescoped over said first member,
means for forming a groove extending axially from an end face of one of said members and a relatively rigid key and the like connected to the other of said members and projecting into said groove to prevent, at least in part, relative rotation of said members.
a resilient seal having a first portion receivable in one end of said groove and a second portion forming a shoulder abutting the end face of one of said members adjacent said keyway; and
a relatively rigid element connected to one of said members for compressing said resilient seal against the end of said groove, thereby expanding said seal to abut the walls of said groove and form a barrier against the passage of liquid through said groove.

4,095,804

SEALING MEANS FOR HIGH TEMPERATURE, HIGH PRESSURE, CYLINDRICAL FURNACES

Staffan Elmgren, Ljungby, and Lennart Svensson, Hyllinge, both of Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Aug. 16, 1977, Ser. No. 825,100
Claims priority, application Sweden, Aug. 23, 1976, 7609298
Int. Cl.[2] F16J *15/02;* **H05B** *1/00*
U.S. Cl. 277—12 **7 Claims**



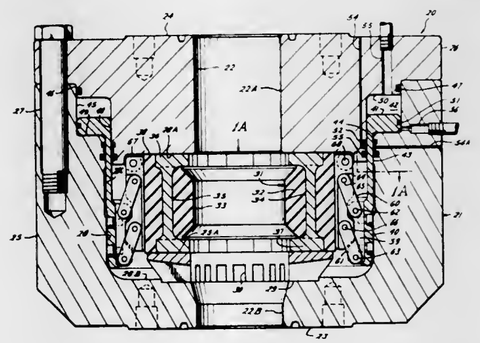
1. Sealing means for use with a cylindrical, elongated, high temperature, high pressure, material treatment furnace comprising vertical, hollow cylindrical means defining a high pressure gaseous medium containment chamber, an end closure projecting into said hollow cylindrical means and a cooling plate structure including means defining a coolant passage mounted on the end closure for preventing harmful heating of the latter, said sealing means comprising:
an attachment ring disposed in surrounding relationship to said cooling plate structure for retaining the latter against said closure and fastened to the end closure by bolt means,
there being an annular gap defined between said plate structure and said ring; and
sealing means positioned to prevent pressure medium from said chamber and coolant from said passages from forcing their way into said gap.

4,095,805

ANNULAR BLOWOUT PREVENTER

Herbert Allen, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.

Filed Oct. 15, 1976, Ser. No. 732,802
Int. Cl.[2] E21B *33/06*
U.S. Cl. 277—27 **11 Claims**



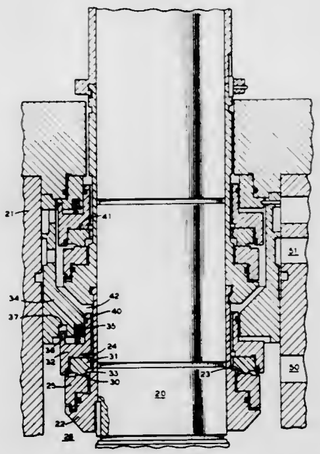
1. An annular blowout preventer, comprising a housing having a vertical bore therethrough and an annular recess about the bore, a packer comprising an annulus of resilient material mounted within the recess for movement between an open-bore position and a constricted position for sealing about a pipe or upon itself, a plurality of rigid plates circumferentially spaced about the packer, actuating means vertically reciprocable within the recess outwardly of the plates, and links extending between and engaging the actuating means and plates for swinging in vertical planes toward a more horizontal position, and thus moving said plates inwardly to force the packer inwardly to a constricted position, upon movement of the actuating means in one direction, and toward a more vertical position to permit the plates to be moved outwardly and said packer to move toward open-bore position, upon movement of the actuating means in the opposite direction, and means for so reciprocating the actuating means.

4,095,806

SEAL ARRANGEMENT

John D. Dempsey, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Jul. 5, 1977, Ser. No. 813,135
Int. Cl.[2] F16J *15/40*
U.S. Cl. 277—27 **6 Claims**



1. A fluid seal arrangement for a high pressure vertical pump for use in a nuclear reactor cooling system comprising: a housing containing a fluid pressurizable internal chamber; a shaft passing through the chamber wherein said shaft is laterally deflectable;
a seal runner mounted on the shaft for rotation therewith within the chamber having an annular sealing face disposed transversely to the shaft axis;
a seal ring attached to the housing about the shaft in axially floating relationship within the pressure chamber generally opposite said seal runner;
said seal ring having a first annular area surface bounded by an inner balancing diameter and an outer diameter disposed transversely to the shaft axis, said first annular area surface being subject to fluid closing forces acting to urge the seal ring axially toward the annular sealing face of the runner when the chamber is pressurized;
said seal ring having a stepped area surface generally opposite the first area surface and disposed transversely to the shaft axis including an annular sealing face and a second annular area surface;
said annular sealing face axially projecting toward the seal runner and being bounded by an inner diameter and an outer diameter; said second annular surface being internally bounded by the outer diameter of the annular sealing face and a larger outer diameter; said second annular area surface being subject to fluid opening forces acting to urge

the seal ring axially away from the annular sealing face of the runner when the chamber is pressurized;

said outer diameter of the sealing face being greater than the balancing diameter such that the closing forces acting on the first annular area surface exceed the opening forces acting on the second annular area surface, the excess closing forces being balanced by an interfacial fluid film that developes between the annular sealing face of the seal ring and the seal runner when the chamber is pressurized; and

said annular sealing face of the seal runner having a width sufficiently wider than the annular sealing face of the seal ring to preclude run off of the seal faces at maximum lateral shaft deflection.

4,095,807

SLIDE RING SEAL

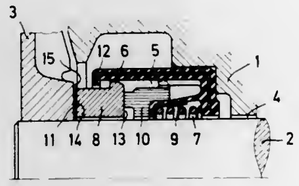
Siegfried Jandt, Leverkusen, and Gerhard Hammerschmidt, Burscheid, Rheinland, both of Germany, assignors to Goetzewerke Friedrich Goetze AG, Burscheid, Germany

Continuation of Ser. No. 646,836, Jan. 5, 1976, abandoned. This application Aug. 15, 1977, Ser. No. 824,692

Claims priority, application Germany, Jan. 3, 1975, 2500098

Int. Cl.² F16J *15/36*; C09J *7/02*

U.S. Cl. 277—40 **2 Claims**



1. In a slide ring seal for arrangement between relatively rotating machine components, the combination comprising

(a) a housing;

(b) a slide ring stationarily supported in said housing and having a first end face;

(c) a counter ring rotatably supported in said housing and having a second end face oriented towards said first end face and a third end face oriented outwardly of said housing;

(d) a spring supported in said housing and urging said slide ring, with its said first end face, into contact with said second end face of said counter ring; said housing combining said slide ring, said counter ring and said spring into an integral structural unit; and

(e) a double-sided adhesive foil having a first side and an oppositely oriented second side; said first side of the foil being attached to said third end face of said counter ring and said second side of the foil being attachable to a machine component for effecting a torque-transmitting and sealing adherence of said counter ring to the machine component.

4,095,808

ANTI ROTATION SEAL ASSEMBLY

Richard E. Glasson, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Jan. 6, 1977, Ser. No. 757,256

Int. Cl.² F16J *15/34*

U.S. Cl. 277—81 R **10 Claims**

1. An anti rotation seal assembly for use with a rotatable shaft having an annular wear surface thereon, said assembly comprising:

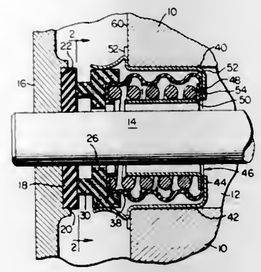
a non rotatable seal housing,

a bellows assembly positioned within said housing;

a sealing washer having an annular nose portion adapted to engage said wear surface,

means for urging said sealing washer toward said wear surface to maintain a seal therebetween,

a pair of parallel substantially planar outwardly facing surfaces formed on said sealing washer;



a pair of flexible tabs secured to said seal housing and extending in a direction parallel to the central axis of said nose portion for yieldingly engaging said substantially planar surfaces, said tabs providing spring biased contact against said parallel planar surfaces for restraining relative rotation of said sealing washer while permitting longitudinal movement thereon.

4,095,809

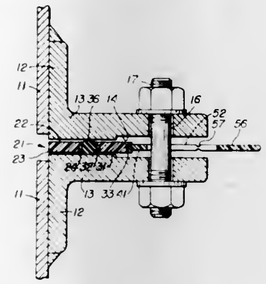
SNAP-IN FLANGE SEAL

Franklyn D. Smith, 88 W. Jackson St., Hayward, Calif. 94544

Division of Ser. No. 630,972, Nov. 12, 1975, Pat. No. 4,002,344. This application Oct. 6, 1976, Ser. No. 730,223

Int. Cl.² F16J *15/06*

U.S. Cl. 277—180 **1 Claim**



1. A seal for two abutting flat surfaces having means to draw said surfaces together comprising an inner member, an outer member of the same thickness and being in the same plane as said inner member, said members being relatively non-resilient and having flat, uninterrupted top and bottom surfaces, both said members being continuous and having no split, said members being separated from each other by a gap, each said member having an edge facing said gap, each said edge having a groove extending away from said gap at the midplane of said edge and said edge having axially disposed thin top and bottom axial surfaces between said groove and the top and bottom surfaces of said members, each said groove in cross-section having a truncated V-shape with the sides of said V disposed at approximately a 15° angle to the top and bottom surfaces of said members, and a circular cross-section rubber-like O-ring in said gap and partially in each said groove, the volume of said O-ring relative to said gap, the thickness of said members and the volume of said grooves being such that, when said O-ring is fully compressed by said flat surfaces being drawn together, said inner and outer members not being deformed and the top and bottom edges of said O-ring projecting above the top and bottom surfaces of said members and said O-ring substantially

filling said grooves and said gap, said O-ring not being permanently deformed by being thus fully stressed, said rings being proportioned so that the ratio of $a/b = 0.0835/0.125$, approximately, and the ratio of $c/b = 0.010/0.125$, approximately, where "*a*" is the depth of said groove inward from said edge, "*b*" is the thickness of either said inner or outer member and "*c*" is the width of said thin top and bottom surfaces of said member.

4,095,810

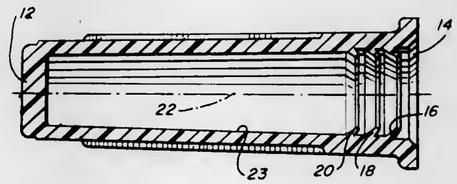
GILL-TYPE TIP PROTECTOR FOR SEALING OPEN TUBES AND THE LIKE

Lee K. Kulle, Mundelein, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 17, 1977, Ser. No. 760,208

Int. Cl.² F16J *15/10*

U.S. Cl. 277—208 **4 Claims**



1. A tubular sealing member defining a bore and an open mouth, and further defining a plurality of spaced, annular sealing members in said bore to grip a tube to be sealed, the improvement comprising:

a plurality of said spaced, annular sealing rings defining, in cross section, flexible, elongated projections which, in turn, define longitudinal axes which incline toward said open mouth in acute angle relationship to the axis of said bore, the longitudinal axes of said projections being at least 0.01 inch long, the average thickness of each said projection being less than the length of its longitudinal axis, the inner diameter of said bore between the open mouth and the sealing ring nearest to said open mouth being greater than the inner diameter of said bore between consecutively inwardly positioned sealing rings and the inner diameter of the bore between consecutive sealing rings decreasing in value in the direction inwardly of said sealing member from said open mouth.

4,095,811

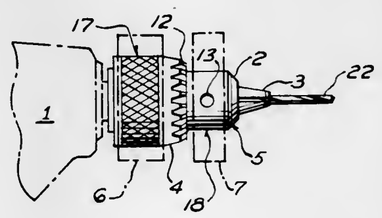
CHUCK JAW OPERATING AND CLOSING DEVICE

Max Cohen, 272 Gilsum St., Keene, N.H. 03431

Filed Dec. 13, 1976, Ser. No. 749,605

Int. Cl.² B25B *13/44*; B25G *1/02*

U.S. Cl. 279—1 K **2 Claims**



1. A means for opening and closing the chuck jaws of a chuck assembly to insert or replace drill bits in power drills, said chuck assembly having a chuck, said chuck having an outer periphery, pivot holes in the other periphery of the chuck, a chuck outer cylinder, said chuck outer cylinder having an outer periphery, comprising, an anchor ring, said anchor ring having a flat inner surface, studs extending inwardly from said flat inner surface of said anchor ring, whereby when said anchor ring is placed over the outer periphery of said chuck, the studs engage the pivot hole in the chuck periphery; an annular drive sleeve made of a material that is resilient, said drive sleeve having a flat inner surface of a size to contact securely the periphery of the chuck outer cylinder, when said annular drive sleeve is placed over the said periphery of said chuck outer cylinder, whereby when the anchor ring is rotated and the drive sleeve is held in a fixed position, the chuck outer cylinder will remain in a fixed position and the chuck jaws will open or close in accordance with the direction of the rotation of the anchor ring.

4,095,812

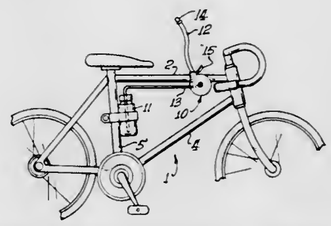
BICYCLE DRINKING APPARATUS

V. Lopez Rowe, 2680 Saturn Ave., Huntington Park, Calif. 90255

Filed Jan. 5, 1977, Ser. No. 756,813

Int. Cl.² B62J *11/00*

U.S. Cl. 280—289 R **4 Claims**



1. A drinking apparatus for a bicycle, comprising:

a generally cylindrical container for a potable liquid;

a clamp means to attach said container to a frame member of a bicycle;

a drinking straw of flexible suction tubing;

a reel housing and a rotatable reel therein, said straw being retractably stored and wound on said reel;

rotary spring means in said housing biasing said reel to retract said straw;

a mouthpiece on the free end of said straw;

a hinged sanitary cap on said housing covering said mouthpiece when said straw is retracted; and

a fluid-tight rotary connection between the inner end of said straw and said container.

4,095,813

SKI ATTACHMENT FOR HILL CLIMBING

Karen L. Hall, P.O. Box 1127, Hamilton, Mont. 59840

Filed Dec. 16, 1976, Ser. No. 751,325

Int. Cl.² A63C *7/10*

U.S. Cl. 280—604 **9 Claims**

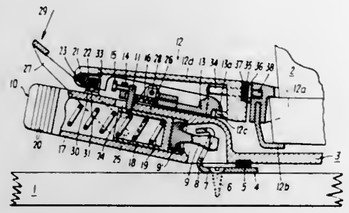
1. An elongated ski attachment for hill climbing, said attachment including a pair of elongated flexible multiple strand rope sections having front and rear end portions, attaching means securing said front end portions together, said rope sections, rearwardly of said portions, each including means defining a plurality of transverse passages therethrough at a plurality of points spaced therealong toward, but spaced from, said rear end portions, said rope sections being alternately and slidingly received through each other with each rope section portion extending through the other rope section being slidingly received through one of said transverse passages defined in the other rope section, said rear end portions of said rope sections

extending sufficiently from the adjacent passage to enable said rear end portions to be looped over the rear end of the associated ski and secured to said rope sections adjacent said adjacent passage.

4,095,814
HEEL HOLDER

Erwin Weigl, Brunn a. Gebirge, and Josef Svoboda, Schwechat, both of Austria, assignors to TMC Corporation, Baar, Switzerland

Filed Sep. 17, 1976, Ser. No. 724,175
Claims priority, application Austria, Sep. 24, 1975, 7327/75
Int. Cl.[2] A63C *9/08*
U.S. Cl. 280—618 **10 Claims**

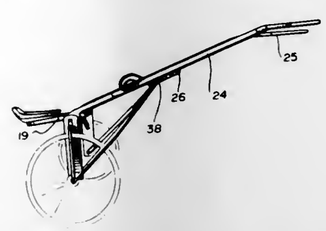


1. In a heel holding device for a safety ski binding having a heel holder and support means for pivotally securing said heel holder to a sole plate adjacent the rear end thereof, a holding member mounted on a ski, said sole plate being held in a boot holding position by a locking member supported for movement against the force of a spring, said locking member being mounted on the rear end portion of said sole plate and releasably engaging said holding member, said sole plate being secured adjacent its front end against a lifting off from said ski and being movable relative to said ski between said boot holding position and a boot releasing position, the improvement comprising a locking element movable into and out of locking engagement with said heel holder to hold, when in said locking engagement, a heel of a ski boot to said sole plate, connecting means for connecting said locking member to said locking element so that a movement of said locking member in response to a separating force between said ski and said ski boot will effect a movement of said locking element toward said out of locking engagement position with said heel holder and wherein said support means supports said heel holder for movement about mutually perpendicular axes extending transversely to the longitudinal axis of the ski.

4,095,815
RACING SULKY

Stanley W. Mitchell, 1180 Center St. R.R.#1, Windsor, Ontario, Canada

Filed Jan. 3, 1977, Ser. No. 756,362
Int. Cl.[2] B62C *1/08*
U.S. Cl. 280—63 **5 Claims**

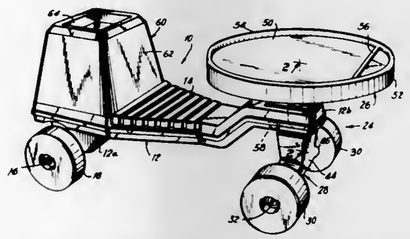


1. A racing sulky comprising a horizontal crossbeam member, a pair of laterally spaced shafts fixed to said crossbeam and extending forwardly for support by a horse, a seat fixed to said crossbeam rearwardly thereof, a pair of support leg assemblies pivotally joined to the ends of said crossbeam and carrying wheels at their lower extremities, a pair of struts connecting said lower extremities of said support legs to said shafts at points forward of said wheels, said struts being adjustable whereby the center of gravity of the sulky with the driver mounted on the seat is adjustable and corner brace assemblies angularly, swingably connected between said crossbeam and said support legs, each said corner brace assembly including an elongated plate member and a rod member, each said plate member including bent end portions with a hole provided through each end portion and the ends of each said rod member being threaded, said threaded portions passing through said holes in the bent end portions of said plate member and through holes provided in brackets fixed to said crossbeam and legs, with the bracket and plate being held together between threaded fasteners on said threaded portions.

4,095,816
TOY VEHICLE CONSTRUCTION

Michael Langieri, 8 Cedar St., Butler, N.J. 07450

Filed Dec. 20, 1976, Ser. No. 752,360
Int. Cl.[2] B62B *7/04*
U.S. Cl. 280—87.02 R **12 Claims**

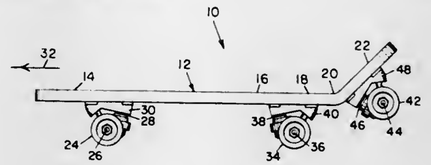


1. A toy vehicle construction comprising a body defining a seat for said vehicle, a pair of rear wheels mounted on a rear portion of said body; front wheel means; steering assembly means for supporting said front wheel means and for pivotable mounting to a forward region of said body so that said body is supported on said rear wheels and said front wheel means, said steering assembly means including a steering member for rotating said steering assembly means and front wheel means as a unit to effect steering, said steering member further including an essentially flat horizontal wall defining a playing surface, and a peripheral wall surrounding said playing surface and defining a shallow rim projecting upwardly from said playing surface, said peripheral wall also projecting downwardly from said playing surface for grasping by the rider, said horizontal wall substantially bridging said rim.

4,095,817
WHEELIE SKATEBOARD

Daniel R. Cohen, Port Washington, N.Y., assignor to Gustave Miller, Miami, Fla.

Filed Aug. 12, 1976, Ser. No. 713,676
Int. Cl.[2] A63C *17/04*
U.S. Cl. 280—87.04 A **1 Claim**



1. A wheelie skateboard (**10**) comprising an elongated platform (**12**) for supporting a person, the platform having a forward end section (**14**), a longitudinal center line section (**16**) and a rear end section (**18**) in approximately the same plane with said forward (**14**) and center line (**16**) sections, and an inclined kicktail section (**24**) extending integrally upwardly and rearwardly from said platform end section (**18**) and merging smoothly therewith, a first pair of wheels (**24**) and a common axle (**26**) coupled to and positioned beneath said platform forward end section (**14**), a second pair of wheels (**34**) and a common axle (**36**) therefor coupled to and positioned beneath said platform rearward end section (**18**), and a third pair of wheels (**42**) and a common axle (**44**) therefor coupled to and and positioned beneath said kicktail section (**22**), whereby a person positioned on said platform (**12**) forward of said kicktail section (**22**) may ride on said skateboard supported on said first (**24**) and second (**34**) pairs of wheels (**24** and **34**), or positioned at least partly on said kicktail section (**22**) may ride said skateboard (**10**) supported on said second (**34**) and third (**42**) pairs of wheels.

4,095,818
TRAILER FRAME

Marjorie Ann M. Smith, 509 Juniper Dr., Pasadena, Calif. 91105

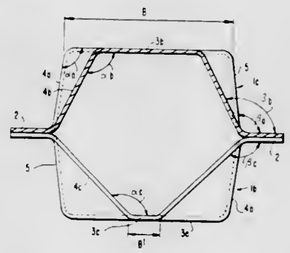
Filed Sep. 22, 1976, Ser. No. 725,572
Int. Cl.[2] B60G *11/04*
U.S. Cl. 280—789 **12 Claims**

1. A trailer frame structure comprising:
a pair of substantially parallel, elongated frame members, each frame member being of generally Z-shaped cross-sectional configuration and having an upright web and top and bottom flanges extending along opposite edges of the upright web, the upright webs having outside surfaces facing outwardly along the length of the trailer structure;
brace means holding the frame members in spaced apart relationship with said top flanges extending outwardly and having bottom surfaces thereof facing downwardly along outside portions of the frame members, said bottom flanges extending inwardly and having upper surfaces thereof facing upwardly to provide means for supporting a load carried by said bottom flanges and positioned inboard the upright webs and below the top flanges of the frame members;
tongue means having spaced apart elongated structural members adapted for connection to a towing vehicle;
means securing the tongue structural members to corresponding frame members;
a pair of longitudinally spaced apart spring mounting brackets and means rigidly securing each bracket to a corresponding frame member below the bottom surface of the top flange, above the load-carrying bottom flange, and adjacent the outside surface of the upright web of the frame member;
a pair of suspension springs extending alongside each frame member, each suspension spring extending between the brackets on a corresponding frame member;
means securing the ends of each suspension spring to the spring's corresponding brackets;
axle means extending transversely below the frame members and adapted for connection to a pair of wheels for supporting the trailer frame above the ground, the axle means being secured to the suspension springs, the opposite ends of the axle means extending upwardly adjacent to and outboard of the frame members and having means for securing the wheels to the ends of the axle means to rotate the wheels about a transverse axis elevated above the plane of the bottom load-supporting flanges of the frame members.

4,095,819
LONGITUDINAL BEARER FOR THE CHASSIS OF MOTOR VEHICLES

Dieter Schaper, Sindelfingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Sep. 24, 1976, Ser. No. 726,444
Claims priority, application Germany, Sep. 26, 1975, 2542974
Int. Cl.[2] B62D *21/00*
U.S. Cl. 280—784 **11 Claims**



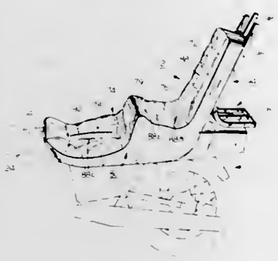
1. A longitudinal bearer for motor vehicles, comprising two approximately trough-shaped profile means including bottom wall means and connecting wall means as well as flange means, the two profile means being connected together at said flange means, characterized in that the width dimensions of the bottom wall means are reduced in the longitudinal direction and in that the connecting wall means between the flange means and the bottom wall means extend evermore inclined to the contours of the longitudinal bearer and thereby become wider in said longitudinal direction.

4,095,820

SEAT ASSEMBLY FOR A CYCLE

Michael W. Hanagan, Somers, Conn., assignor to Corbin Gentry, Inc., Somersville, Conn.

Filed Oct. 22, 1976, Ser. No. 735,073
Int. Cl.² B62J *1/08, 7/04*
U.S. Cl. 280—289 A **11 Claims**



1. A seat assembly for mounting a cycle frame comprising:
A. a structural saddle having a horizontally extending base and a generally vertically extending back, the upper surface of said base defining a seat platform and the leading surface of said back defining a backrest platform and the trailing surface of said back defining a mounting platform;
B. generally L-shaped stiffener means secured to and structurally reinforcing said base and said back of said saddle;
C. hinge means mounted on said saddle on one side of the longitudinal centerline thereof and retaining means mounted on said saddle on the opposite side of said centerline from said hinge means, said hinge means and said retaining means cooperating to enable said saddle to be pivoted for movement between a locked lowered position and an unlocked raised position on said cycle frame;
D. a generally L-shaped frame member having a generally vertically extending safety bar portion and a luggage rack portion extending generally horizontally from the lower end of said safety bar portion;
E. means rigidly affixing said safety bar portion of said frame member to said mounting platform of said saddle back so that at least a portion of the length of said safety bar portion extends adjacent to said mounting platform of said saddle back, and said luggage rack portion extends rearwardly of said saddle back at a point spaced above the lower end thereof to provide clearance for the pivotal movement of said seat assembly between its lowered and raised positions;
F. a seating pad cooperatively configured and mounted on said saddle, said seating pad having an upper surface and comprising a base cushion and a back cushion; and
G. means affixing said seating pad to said saddle with said base cushion supported on said seating platform and said back cushion on said backrest platform.

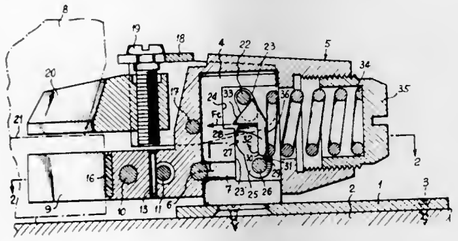
4,095,821

SAFETY SKI BINDING

Georges Pierre Joseph Salomon, Annecy, France, assignor to Etablissements Francois Salomon et Fils, Annecy, France

Filed Jun. 18, 1976, Ser. No. 697,537
Claims priority, application France, Jun. 20, 1975, 75 19439
Int. Cl.² A63C *9/08*
U.S. Cl. 280—628 **16 Claims**

1. A safety binding for skis which releases at least laterally and comprises:
a vertical pivot integral with a base secured to the ski;
a binding rotating upon the pivot and carrying means for retaining the boot;
a system for locking said retaining means, said system being mounted in the binding and ensuring that the boot is maintained in a specific position upon the ski, said locking system comprising at least one resilient element and opposing a vertical retention force and a lateral retention force, respectively, to the vertical lift and lateral displacement of the boot, said resilient element being preset to allow the boot to be released when subjected to predetermined stresses in the plane of the ski;
and a compensating mechanism acting upon said locking system, in order to cause the lateral retention force applied to the boot to vary inversely to the vertical retention force, said compensating mechanism including:



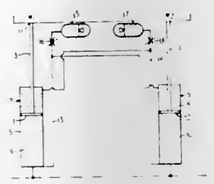
a first part mounted to pivot about an axis at right angles to the longitudinal axis of the ski and located between the kinematic chain consisting of the resilient element and a reaction part which is fixed in relation to the ski;
and a second part mounted in the binding so as to be mobile in relation to the first part, and cooperating, through a system of ramps, with the boot-retaining means opposing the lifting of said boot.

4,095,822

SUSPENSION MEANS

Frank Warburton Thornhill, 66 Auburn Road, Kingston, Tasmania 7150, Australia

Filed Sep. 24, 1976, Ser. No. 726,313
Claims priority, application Australia, Sep. 25, 1975, PC3335
Int. Cl.² B60G *9/00*
U.S. Cl. 280—702 **1 Claim**



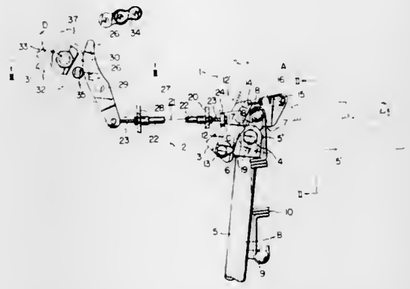
1. Suspension apparatus comprising first and second pistons displaceable within first and second cylinders respectively, each piston having a rod and dividing respective cylinders into upper and lower chambers, either said piston rods or said cylinders being adapted for connection to a body to be stabilized, and fluid communicating lines between the upper chamber of said first cylinder and the lower chamber of said second cylinder and between the upper chamber of said second cylinder and the lower chamber of said first cylinder and wherein each of said fluid communicating lines is provided with an auxiliary line connected in turn through respective adjustable metering valves to respective hydraulic accumulators.

4,095,823

AUTOMATIC SIDE STAND RETREATING DEVICE FOR MOTORCYCLE

Tsutomu Nishida, Akashi, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Apr. 7, 1977, Ser. No. 785,567
Claims priority, application Japan, May 7, 1976, 51-57755
Int. Cl.² B62H *1/02*
U.S. Cl. 280—764 **15 Claims**



1. A device for turning a pivoted side stand of a motorcycle from a service position to a retreated position, comprising
means for urging the side stand in a direction towards said retreated position;
a first lever member adapted to be shifted between a release position and a lock position, said first lever member including a lock member adapted for retaining the side stand in said service position when the first lever member is in said lock position;
means for urging the first lever member in a direction towards said lock position;
stopper means connected to the side stand for retaining the first lever member in said release position when the side stand is positioned in said retreated position;
a projection member rigidly provided on a rotary member of the motorcycle for rotation therewith; and
a second lever member adapted to be shifted between a contact position at which the second lever member is positioned within the passage of rotation of the projection member and a retracted position at which the second lever member is not brought into contact with the rotating projection member, said first and second lever members being interconnected with each other through a connecting means such that shifting of the second lever member to said retracted position due to the rotation of the projection member results in shifting of the first lever member to said release position whereas shifting of the first lever member to said lock position results in shifting of the second lever member to said contact position.

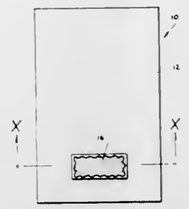
4,095,824

SECURE CONTEST CARD

Gilbert Bachman, Atlanta, Ga., assignor to Dittler Brothers, Inc., Atlanta, Ga.

Filed Jul. 1, 1976, Ser. No. 701,959
Int. Cl.² S42D *15/00*
U.S. Cl. 283—6 **5 Claims**

1. A contest card for temporarily and completely concealing the presence, absence, position or nature of indicia printed on said card comprising a smooth surface card stock material having an upper surface and a lower surface, indicia printed on the upper surface of said card stock material, an opaque sectionally removable mask overlying said indicia, and a patterned intermediate layer of material positioned immediately above said indicia but beneath said opaque mask, said patterned layer



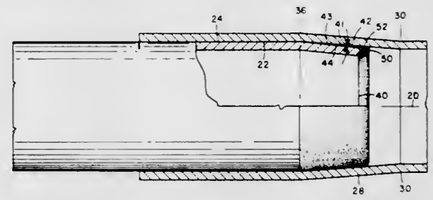
being transparent so that an observer may read the indicia after removal of the mask.

4,095,825

TAPER PIPE JOINT

Major Gene Butler, 14707 Early Hollow, Cypress, Tex. 77429

Continuation-in-part of Ser. No. 580,997, May 27, 1975, abandoned. This application Sep. 30, 1976, Ser. No. 727,923
Int. Cl.² F16L *13/10*
U.S. Cl. 285—55 **10 Claims**



1. The method of making a taper pipe joint between a first metal pipe and a second metal pipe, characterized by:
(a) making a bell at one end of the first pipe, said bell having a cylindrical section and an adjacent conical end section tapering inwardly toward the longitudinal axis of the pipe; the inner diameter of the bell's cylindrical section being slightly smaller than the outer diameter of the second pipe to form a metal-to-metal interference fit therebetween;
(b) making a pin at one end of the second pipe, said pin having a conical end section tapering inwardly and whose taper angle is larger than the taper angle of the bell's conical section, whereby the angular difference between said conical sections defines a cavity therebetween, and
(c) placing a liquid adhesive in said cavity, between the inner conical wall of the bell and the outer conical wall of the pin, to thereby form a sealed joint between said conical sections, and an annular ring at the mouth of said cavity.

4,095,826

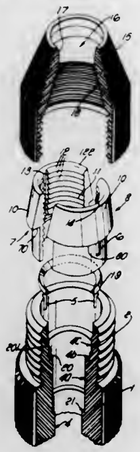
CONNECTOR FOR RIGID PLASTICS PIPES

Elio Borradori, Lugano, Switzerland, assignor to Endermill Anstalt, Liechtenstein

Filed Nov. 29, 1976, Ser. No. 745,775
Claims priority, application Switzerland, Dec. 1, 1975, 015593/75
Int. Cl.² F16L *21/06*
U.S. Cl. 285—330 **9 Claims**

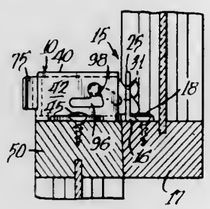
1. A connector for rigid plastic pipe comprising a central cylindrical member with an axial bore in the form of three stepped diameters which increase symmetrically from the centre of the member to its respective ends, and into which are inserted the rigid pipes to be connected, the two opposing ends of the cylindrical member being provided with an outer thread, two female elements threaded on said member and each having internally, a cone frustum cavity forming a radial pressure surface, a pair of internally toothed semi-circular locking seg-

ments positioned in each end of said member and engageable by said pressure surface of said female element for, forming a contractable cylindrical seat adapted to lock both axially and torsionally the pipe inserted therein, interengaging complimentary recess and projection means on the inner ends of said



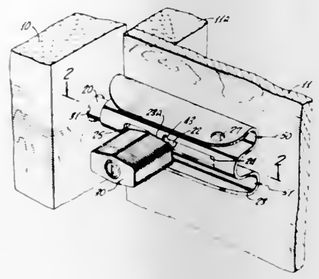
central member and on the outer wall of each of said locking segments respectively to torsionally constrain both said segments against rotation relative to said members, and cooperating abutment means on each of the segments and the member to prevent axial movement of the segments with respect to the member.

4,095,827
WINDOW LOCK
Harold L. Stavenau, Owatonna, Minn., assignor to Truth Incorporated, Owatonna, Minn.
Filed Dec. 23, 1976, Ser. No. 753,703
Int. Cl.² E05C *5/00*
U.S. Cl. 292—65 **6 Claims**



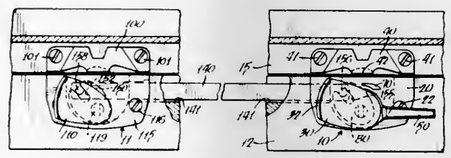
1. A window lock having catch means mountable on one window element and a locking member mountable on another window element with said locking member having a locking notch engageable with the catch means, means mounting said locking member for linear movement between an advanced position with said locking notch adjacent said catch means and a retracted position spaced from said catch means, said mounting means also enabling said locking member to pivot away from the direction of said linear movement, an operating member interconnected with said locking member for causing said linear movement of said locking member and mounted for movement between window unlocked and locked positions in one direction along a path extending generally toward said catch means, and means operable as said operating member approaches said window locked position and said locking member is in said advanced position to pivot said locking notch of said locking member into interengagement with the catch means and move the locking member a short distance in a direction away from said catch means to effect tight interengagement therebetween.

4,095,828
LOCKING ASSEMBLY
Eldon Dwayne East, 4522 Casa Oro Dr., Yorba Linda, Calif. 92686
Filed Feb. 14, 1977, Ser. No. 768,079
Int. Cl.² E05C *1/04, 13/02*
U.S. Cl. 292—148 **7 Claims**



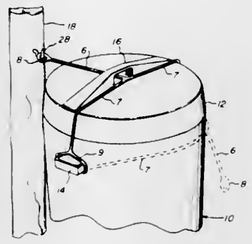
1. A locking assembly comprising:
a bolt member;
a barrel member, said barrel member including a central portion thereof for slidably mounting and enclosing said bolt member, said barrel member further including outer edge portions reversed upon themselves to form grooves for receiving means for mounting said barrel member of said locking assembly;
each of said barrel member and said bolt member having at least one aperture therein such that the apertures can be selectively aligned whereby a lock member can be inserted therethrough internally of said barrel member,
said outer edge portions of said barrel member being reversed upon themselves by approximately 180° for a substantial distance such that the outer edges extend above said barrel member whereby said grooves are formed so as to protect said means for mounting and prevent access thereto.

4,095,829
WINDOW LOCK
Marlo G. Van Klompenburg, Owatonna, Minn., assignor to Truth Incorporated, Owatonna, Minn.
Filed Dec. 29, 1976, Ser. No. 755,187
Int. Cl.² E05C *3/08*
U.S. Cl. 292—241 **13 Claims**



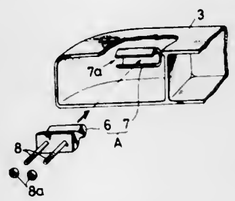
1. A window lock having a cam member engageable with a keeper, comprising, a base, said cam member being rotatably mounted on said base for rotational movement only about a fixed axis between a retracted position and an extended lock position, a handle member mounted on said base for rotational movement generally about said axis, and motion-transmitting means including a lost motion connection between said handle member and cam member whereby initial rotation of the handle member toward either of two positions at either side of said axis does not cause any movement of the cam member to result in a lesser rotation of said cam member between retracted and extended positions.

4,095,830
CONTAINER AND COVER TIE DOWN APPARATUS
Michael P. Spellman, 9943 Wentworth Ave., Bloomington, Minn. 55420
Continuation-in-part of Ser. No. 679,665, Apr. 23, 1976, Pat. No. 4,009,897. This application Jan. 7, 1977, Ser. No. 757,595
Int. Cl.² E05C *19/18*
U.S. Cl. 292—288 **4 Claims**



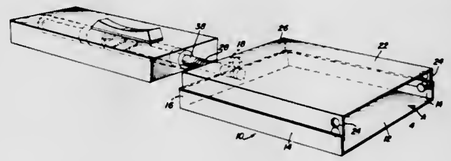
1. A container cover and hold down apparatus formed from resilient tensioning material, comprising:
(a) a first leg having a looped end;
(b) second and third legs having looped ends, each looped end having a plurality of raised bosses arranged at spaced intervals, said second and third leg looped ends adapted for encircling container handles; and
(c) a handle on said first leg between said first leg looped end and said second and third legs.

4,095,831
VEHICLE BUMPER DEVICE
Taro Hagiwara, and Shojiro Seki, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Japan
Filed Dec. 2, 1976, Ser. No. 746,791
Claims priority, application Japan, Dec. 9, 1975, 50-165246
Int. Cl.² B60R *19/06*
U.S. Cl. 293—62 **2 Claims**



1. In a vehicle having a vehicle body and an impact receiving bar spaced at a distance from a longitudinal end of the vehicle body, the improvement comprising:
a side bumper spaced at a distance from a lateral side of the vehicle body and having one end fixed to one end of the impact receiving bar;
a male piece secured to one of said lateral side of the vehicle body and an opposite end of said side bumper; and
a female piece secured to the other one of said lateral side of the vehicle body and an opposite end of said side bumper;
said male piece having an enlarged portion adapted for engaging in said female piece, said male piece being made of a rigid material,
said female piece being made of a springy material and having a slot, said female piece detachably receiving said enlarged portion of said male piece upon pressing, in assembly, said side member towards said lateral side of the vehicle body with said enlarged portion of said male piece aligned with said slot, said slot of said female piece extending in a direction to allow said male piece to disengage from said female piece when said side bumper moves along the longitudinal direction of the vehicle body.

4,095,832
ROTATING COOKING SPATULA
Keith Harold Slinker, P.O. Box 526, Lexington Park, Md. 20653
Filed Mar. 10, 1977, Ser. No. 776,185
Int. Cl.² A47J *43/28*
U.S. Cl. 294—8 **9 Claims**

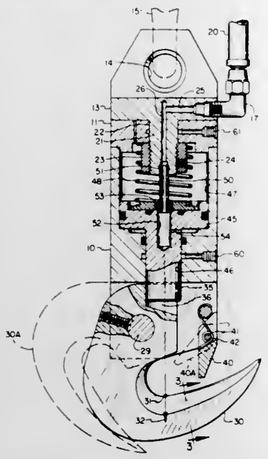


9. A cooking utensil device comprising:
means for manually turning food items while being cooked including;
a combination support and cooking structure for reception of food items therewithin comprising a two-part receptacle unit, a first part having a substantially flat food supporting surface with three side walls around the perimeter thereof, a second part of similar configuration with a flat supporting surface having three side walls around the perimeter thereof, said second part telescopically engageable with said first part and when engaged the overall unit may receive food through the one end opening thereof; handle structure; rotatable support means connecting said handle structure with said combination support and cooking structure; said handle structure comprising turning means for turning said rotatable support means and to thereby effect a corresponding turning of said combination support and cooking structure with food therein; said turning means comprising structure adapted to be operated by one's thumb when holding said handle in one's hand.

4,095,833
SWIVEL-MOUNTED PNEUMATIC-CONTROLLED RELEASING HOOK DEVICE
Charles B. Lewis, Milwaukie, Oreg., assignor to Cranston Machinery Company, Inc., Oak Grove, Oreg.
Filed Nov. 18, 1976, Ser. No. 742,891
Int. Cl.² B66C *1/38*
U.S. Cl. 294—83 R **6 Claims**

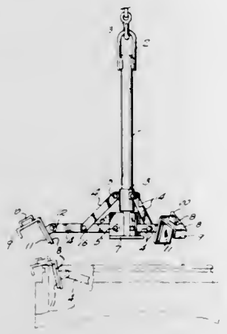
1. A swivel-mounted pneumatic-controlled releasing hook device comprising a body, a swivel having a lifting eye mounted for rotation on one end of said body, an air line connection in said swivel, a hook pivotally mounted on the other end of said body for movement between a carrying position and a release position, a latch pin engageable with said hook to hold said hook in carrying position, a spring holding said latch pin in said engagement with said hook, a piston in said body for retracting said latch pin, and passageways for transmitting air

pressure in said air line connection to said piston to retract said latch pin, said passageways including an air tube on said swivel



extending axially through said piston, said piston being slidable and rotatable on said air tube.

4,095,834
SELF-ATTACHING LIFTING DEVICE
Richard H. Strauss, 4364 Daisy St., Springfield, Oreg. 97477
Filed Dec. 9, 1976, Ser. No. 749,046
Int. Cl.[2] B66C *1/44*
U.S. Cl. 294—97 **5 Claims**



1. A lifting device for automatic load attachment by a lifting instrumentality to loads having an inner wall surface, said device comprising,

a centrally disposed post structure adapted at its upper end for attachment to a lift line of the instrumentality,

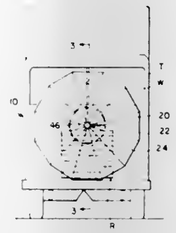
arms pivotally attached on a fixed axis to the post structure and normally extending outwardly therefrom in a radial manner,

an arm locking assembly on said post structure including arm attached links,

a load engaging pad assembly carried by each of said arms, each pad assembly being of angular configuration and thereby adapted for initial rested engagement with the upper edge of the load to be lifted, and

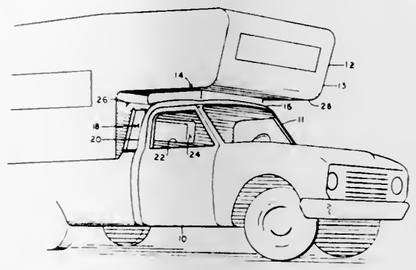
single axis pivot means interconnecting each pad assembly to its arm to permit free rotational movement between each arm and pad assembly during load attachment whereby the arms, subsequent to pad assembly contact with the load upper edge, may swing downwardly to enter that area defined by said inner wall surface of the load with the effective arm length, during subsequent upward movement of the post structure, being increased so as to assure positive pad assembly-load engagement during lifting.

4,095,835
FLOW-NOSE DEPLOYABLE STREAMLINING FOR VEHICLES
John E. Ensor, 1409 Mt. Carmel Rd., Parkton, Md. 21120
Filed Jul. 14, 1977, Ser. No. 815,597
Int. Cl.[2] B62D *35/00*
U.S. Cl. 296—1 S **25 Claims**



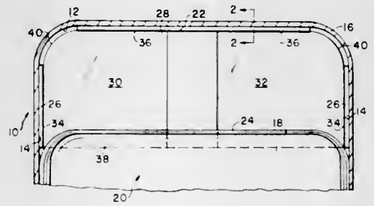
1. In streamlining apparatus forwardly deployable from a vehicle, the improvement comprising: a stem having first and second ends; means for attaching the first end of the stem to a vehicle with the stem forwardly protrusive from the vehicle, a plurality of panels, means for holding the plurality of panels at the second end of the stem, at an angle thereto, and means for unfolding the plurality of panels into conical array for streamlining and for folding the plurality of panels into overlap position for storage.

4,095,836
INFLATED LOAD BEARING CUSHION FOR CAMPER VEHICLES AND THE LIKE
John E. Pettit, 18219 46th Pl. S., Seattle, Wash. 98188
Continuation-in-part of Ser. No. 516,783, Oct. 21, 1974, which is a continuation of Ser. No. 273,931, Jul. 21, 1972, abandoned. This application Feb. 26, 1976, Ser. No. 661,787
Int. Cl.[2] B60P *3/32*
U.S. Cl. 296—23 MC **4 Claims**



1. For use with a vehicle having a cab and a removable component such as a camper, the cab and camper having at least a pair of adjacent, spaced apart surface areas, a load bearing cushion insertable between said surface areas, said cushion being constructed of airtight flexible material and having top, bottom and side walls forming an airtight, expansible, inflatable chamber, said side walls being so dimensioned that, upon insertion between the cab and camper spaced apart surface areas and inflation, said cushion will fit tightly between the surface areas to stabilize the vehicle and removable component, at least one of said top and bottom walls of said cushion being provided with suction cup means thereon and over a substantial portion of said one wall to firmly engage with one of said surface areas upon inflation of said cushion whereby said cushion is retained between the surface areas regardless of even substantial relative articulating movement between the spaced surface areas are caused by road travel of the vehicle - removable component combination, wherein said chamber is in the form of a generally rectangularly configured torus of four sections, said suction cup means being arranged in clusters and effectively anchoring about half the surface area of said one wall and wherein at least one of said four sections of said cushion defines by said rectangularly configured torus is free of said suction cup means clusters so as to function as a rain and debris barrier upon insertion and inflation of said cushion in the vehicle-removable component combination.

4,095,837
AIR PARTITION FOR AUTOMOBILE PASSENGER COMPARTMENTS
Harry E. Hunter, 164 Ball Farm Rd., Oakville, Conn. 06779
Filed Sep. 27, 1976, Ser. No. 727,245
Int. Cl.[2] B62D *33/04*
U.S. Cl. 296—24 R **7 Claims**



1. A partition for segregating the air space within the passenger compartment of an automobile or the like relative to the passenger seats thereof comprising:

an elongated upper support track for removable affixment to the inner roof portion of an autombile, said track being located substantially above the backrest of a passenger seat provided by said automobile when installed therein;

a plurality of side brackets for removable affixment to the opposed inner wall portions of said automobile each of said plurality of brackets disposed in a plane defined by said upper support track and said backrest; and

a transparent curtain being fixedly secured on the lateral free edges thereof to said side brackets, the uppermost free edge of said curtain being affixed to said elongated upper upper support track, the lowermost free edge of said curtain disposed in a touching relationship with said backrest, said curtain having two flexible halves each independently affixed to said elongated upper support track, a plurality of spherical elements, said plurality of spherical elements fixedly secured to said uppermost free edge of said curtain, said elongated upper support track providing at least one longitudinal groove therein, said groove for capturing and slidably engaging each of said plurality of spherical elements therein thereby permitting the opening and closing of said two flexible halves of said curtain .

4,095,838
TRUCK EXTENSION
Arnold A. Beeler, Fergus Falls, Minn., assignor to The Raymond Lee Organization, Inc., New York, N.Y.
Filed Sep. 9, 1976, Ser. No. 721,917
Int. Cl.[2] B62D *21/14*
U.S. Cl. 296—26 **2 Claims**

1. A foldable extension adaptable for mounting to the top of a side of a truck for increasing the volume of the body of the truck comprising

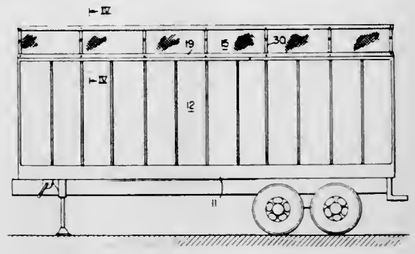
a flexible fabric material,

a pair of channel members each externally fixed to an opposed longitudinal border of the fabric, and

a plurality of jack-knife foldable support assemblies that pivotally join the two channel members, with

each side channel member formed of a U-shaped section, and oriented so that the open portion of each channel member faces the open portion of the other, and

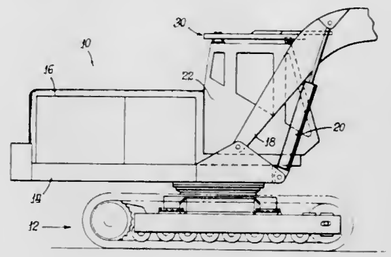
each foldable support assembly is formed of a pair of U-shaped channel section support legs pivotally joined together, with each support leg pivotally extending into an open portion of a channel member to which it is pivotally



joined and with a first support leg extending into an open portion of a second support leg,

said support legs of a size such that the first support leg fits into the open portion of the second support leg, in the folded condition of the support legs, and each said leg of a size to fit into the open portion of each channel member so that in the retracted folded positon of the device the legs of the foldable support assembly rest inside the open portion of the channel members.

4,095,839
FALLING OBJECT PROTECTIVE STRUCTURE
Dean Merrill Lawrence, Aurora, and Gary Lee Popdan, Sandwich, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed May 24, 1976, Ser. No. 689,284
Int. Cl.[2] B62D *27/00*
U.S. Cl. 296—28 C **15 Claims**



1. A falling object protective structure for hydraulic excavators or the like having an operator's cab which includes generally vertical support members and a top mounted on said support members, comprising:

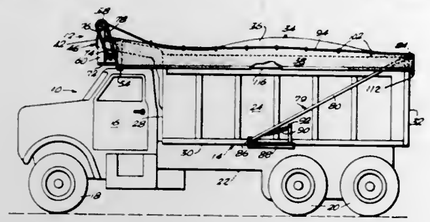
a canopy assembly adapted for disposal over an excavator operator's cab and extending forwardly thereof;

rear mounting means for mounting the canopy assembly to an excavator cab at the rear thereof; and

front mounting means for attachment of the canopy assembly to an excavator cab at the front thereof, and wherein said front mounting means includes pivot means for allowing pivoting of the canopy assembly with respect to portions of said front mounting means and an excavator cab to which such portions are affixed upon vertical loading of the canopy whereby the canopy assembly may pivot

under such loading to avoid bending moments at said front mounting means.

4,095,840
RETRACTABLE COVER FOR A TRUCK BODY
Boyd Ray Woodard, 6995 NW. 32 Ave., Miami, Fla. 33147
Filed Jan. 17, 1977, Ser. No. 759,865
Int. Cl. B60j *11/00*
U.S. Cl. 296—100 **5 Claims**



1. A retractable, flexible cover for the open top of the load-carrying body of a truck providing a forwardly projecting platform from the forward top end thereof comprising:

A. a generally U-shaped support frame including,

1. a pair of parallel side legs, pivotally connected at their lower ends to the respective side walls of the load-carrying body, intermediate the forward and rear ends thereof, and
2. a transverse cross rod fixed between the upper ends of said legs;

B. a cover including,

1. a main body portion sized to cover the open top with the rear end thereof fixed to said cross rod and the forward end thereof fixed relative to the front end of the forwardly projecting platform, and
2. a pair of side skirt portions, adapted to cover a substantial heighth of the top edge portion of the respective side walls of the body and said skirt portions terminating at a marginal edge;

C. means to anchor the forward and rear ends of the respective skirt portions;

D. tension spring means normally urging said U-shaped frame to a rearward position;

E. reversible drive means fixed relative to the platform;

F. connection means from said drive means to said cross rod to permit said cover to be extended to a covering relation to the open top with said skirt portions in an overlapping relation to said top edge portions when said reversible drive means is actuated in a first direction, and to be retracted to a gathered, accordion type of condition over and alongside of said platform when said reversible drive means is actuated in a second direction; (and)

G. elastic tensioning means secured along the margins of said skirt portions to normally apply tension forces and yieldable to be stretched over a load; and

H. said means to anchor comprising a pair of vertical members fixed relative to the platform and a pair of projections fixed relative to the opposed ends of said transverse cross rod.

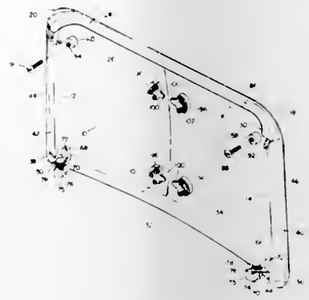
4,095,841
TRANSPARENT AUTOMOBILE TOP
James O. Thompson, Florence, and Winston D. Slatton, Muscle Shoals, both of Ala., assignors to Thompson & Slatton, Inc., Florence, Ala.
Filed Dec. 13, 1976, Ser. No. 749,629
Int. Cl.[2] B60J *7/18*
U.S. Cl. 296—137 B **3 Claims**

1. A single piece removable top for an automotive vehicle adapted to cover two openings in the top of the vehicle separated by a longitudinally extending support bar, said vehicle including ledges adjacent to the side rear corners of said openins, and said top comprising:

a generally rectangular sheet of transparent material being of a thickness of 3/16 to 5/16 inch;

said sheet extending concave downward to the sides and front of said sheet; and

attachment members secured to corner regions of said sheet for attaching said top to said vehicle and two rear corner attachment means, each including:

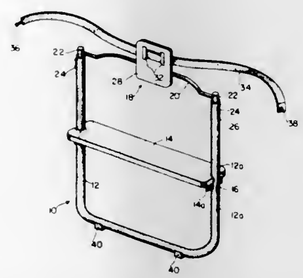


a supporting block attached to the rear underside of each rear corner region of said sheet,

an arm rotably attached to said block and oriented to rotate about a fore and aft, with respect to vehicle, axis, and

a second block rotably attached about a fore and aft, with respect to vehicle, axis to each said arm, and including adjustable means for locking said second block at a selected distance above said arm and over a said ledge.

4,095,842
SEAT FOR GARDENING AND THE LIKE
Julius Tretick, Westerlo, N.Y., assignor to Tredhill Manufacturing Co. Inc., N.Y.
Filed Apr. 27, 1977, Ser. No. 791,571
Int. Cl.[2] A47C *1/00*
U.S. Cl. 297—4 **12 Claims**



1. A wearable seat device adapted to be attached to the person of a user for use in gardening and the like, said seat device comprising:

a generally U-shaped frame member including a pair of side portions and a substantially straight base portion;

a seat member;

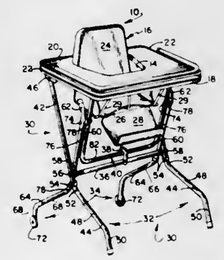
means for adjustably mounting said seat member between the side portions of said frame member extending between the upper ends of the side portions of said frame members intermediate the ends thereof;

a belt support assembly including a bar member extending between the upper ends of the side portions of said frame member and a belt mounting plate mounted on said bar member;

means for securing said belt support assembly to said frame member; and

belt means, attached to said belt mounting plate, for detachably securing said seat device to the person of a user, said belt means, in use, surrounding the waist of the user such that said frame member extends downwardly therefrom behind the user in close proximity to the body of the user.

4,095,843
HEIGHT ADJUSTMENT APPARATUS FOR CHILD SUPPORT
James C. Hirsch, 2148 Tanglewood, Highland Park, Ill. 60035
Filed Feb. 2, 1977, Ser. No. 764,839
Int. Cl.[2] A47B *39/00*
U.S. Cl. 297—136 **11 Claims**



1. A height adjustment arrangement for supporting on a floor a baby feeding table including a table top carrying a seat foldable between a closed position and an open position suspended from an opening in said top and spaced from the perimeter of said table top, the improvement comprising:

a first pair of parallel legs having spaced ends,

first pivot means for each leg pivotally connecting along a common axis the respective leg adjacent one end of each leg with said table top at a respective spaced position located intermediate said seat and said perimiter for rotation about a common axis,

another pair of parallel legs having spaced ends,

first and second intermediate pivot means pivotally connecting a respective one leg of said other pair with a respective leg of said first pair at a position intermediate the ends of each connected leg,

a tubular cross bar extending past opposite edge portions of said seat and between said first and said second intermediate pivot means,

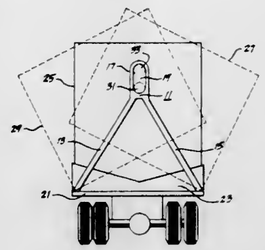
first and second securing means held in said cross bar adjacent a respective end of the cross bar for securing the first and second intermediate pivot means independently to said cross bar at respective positions spaced apart by a distance greater than the distance between opposite edge portions of said seat,

a U-shaped lever bar pivotally connected with each leg of said other pair along a common axis spaced from said intermediate pivot means and from the ends of said lever bar,

last pivot means pivotally connecting said lever bar with said table top along a common axis at a position intermediate said seat and the perimiter of said table top and spaced from the first pivot means,

and locking means for locking said first pair of legs against pivotal movement relative said other pair of legs in each of two angular positions of said first pair of legs relative said other pair of legs.

4,095,844
SUPPORT STRUCTURE AND DRIVING MECHANISM FOR TILTING, SLIDING EDGE DISPENSERS
Loren W. Kent, 1239 E. Carlton Ave., Orange, Calif. 92667
Filed May 10, 1977, Ser. No. 795,651
Int. Cl.[2] B60P *1/32*
U.S. Cl. 298—14 **11 Claims**

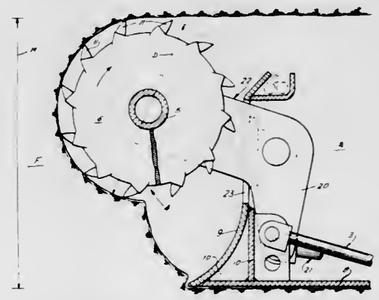


1. In combination with a tilting, sliding edge dispenser wherein a base member with a flat planer surface has a container with at least one opening normally closed by the planer surface when the container is in a first position relative to the base member, and wherein a portion of at least one opening has at least one linear edge, wherein the container is adapted to move across the planer surface in tilting engagement therewith from the first position to a second position while maintaining the linear edge in sliding contact with the planer surface to scrape the contents of the container before the linear edge and thereby dispense the contents therefrom, the improvement comprising:

pivot means fixedly attached to the containers; and

a support structure rigidly attached to the base member and having elongated receptacle means for receiving said pivot means in rotating and sliding engagement therewith whereby said pivot means slides and rotates in said receptacle means as the container moves from the first position to the second position across the planer surface in tilting engagement therewith.

4,095,845
METHOD OF AND APPARATUS FOR THE MINING OF COAL
Friedrich-Wilhelm Paurat, Alte Hunxer Str. 45, Friedrichsfeld, Germany (4222)
Filed Jul. 23, 1976, Ser. No. 708,081
Claims priority, application Germany, Jul. 26, 1975, 2533518
Int. Cl.[2] E21C *25/68, 25/06*
U.S. Cl. 299—18 **9 Claims**



1. A method of mining coal along a wall which comprises the steps of:

disposing along said wall a chain of articulated excavating worms;

rotating said worms; and

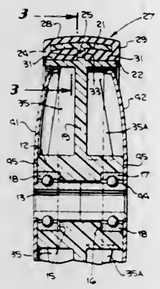
urging said worms against said wall in succession at inclinations of 5° to 50° thereto whereby the worms inclined to said wall bite into the latter and other worms along said wall displace material excavated by the inclined worms therefrom.

4,095,846

WHEEL WITH MOLDED TIRE FOR CARTS

David B. Agins, 5520 Burnett Ave., Van Nuys, Calif. 91411

Filed Aug. 26, 1976, Ser. No. 717,916
Int. Cl.² B60B *5/02*
U.S. Cl. 301—37 R **1 Claim**



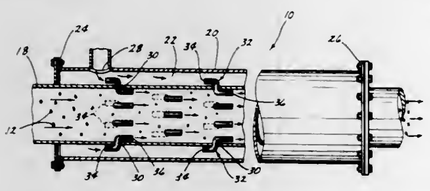
1. A wheel for mounting on a spindle axle and comprising a central hub, a bearing aperture through the hub, a radial web extending centrally of the hub, an outer rim extending concentric with a bearing aperture from each side of the web, an inner rim spaced from the outer rim and extending concentric with the bearing aperture from each side of the web; a molded tire tread covering the outer rim, a tire inner ring integral with the tread and filling the space between rims, and ring ties extending through the web at intervals and integral with the inner ring on each side of the web; said tire tread being of a polyurethane plastic and said rims and hub being of a polypropylene plastic; radial spokes arcuately spaced on each side of the web from the hub to the inner rim, the spokes on one side of said web being in a different transverse plane from a spoke in the opposite side of the web; a cover disc on each side of the wheel and covering substantially the space between the bearing aperture and the inner rim, and a bearing having inner and outer races in each end of the hub bearing aperture, said cover discs each being secured to an inner bearing race.

4,095,847

PNEUMATIC CONVEYOR

Charles W. Wear, 124 Chippewa Cir., Gretna, Nebr. 68028

Filed Apr. 25, 1977, Ser. No. 790,308
Int. Cl.² B65G *53/04*
U.S. Cl. 302—24 **2 Claims**



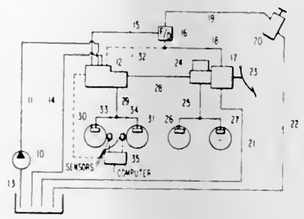
1. A pneumatic conveyor apparatus, comprising,
a first elongated hollow conveyor tube means having one end in operative communication with a source of material to be conveyed and its other end in operative communication with the area to which the material is to be conveyed,
at least one second elongated hollow tube means embracing at least a portion of the length of said first tube means, said second tube means having a larger diameter than said first tube means to define an elongated annular compartment area therebetween,
means sealing the ends of said second tube means,
a source of air under pressure in communication with said compartment area,
said first tube means having a plurality of spaced-apart air directing openings formed therein which are in communication with said compartment area,
each of said air directing openings having an intake end in communication with said compartment area and a discharge end portion in communication with the interior of said first tube means,
said air directing openings having their discharge ends disposed relative to the interior of said first tube means whereby air supplied to said compartment area will pass through said air directing openings and will be discharged into said first tube means towards said other end to convey the material towards said other end,
said air directing openings comprising an air tube having an intake end in communication with said compartment area and a discharge end portion in communication with the interior of said first tube means,
said discharge end portions being disposed substantially parallel to the longitudinal axis of said first tube means.

4,095,848

ANTI-SKID BRAKE CONTROL SYSTEM HAVING A HYDRAULIC BRAKE BOOSTER

Toshiyuki Kondo, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jun. 10, 1976, Ser. No. 694,632
Claims priority, application Japan, Jun. 11, 1975, 50-71086; Jul. 4, 1975, 50-83003
Int. Cl.² B60T *8/02*
U.S. Cl. 303—2 **7 Claims**



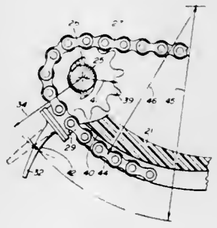
1. A brake system for vehicles comprising:
brake booster means operatively connected with a brake pedal for generating fluid pressure in response to the actuation of the brake pedal;
brake master cylinder means operatively connected with said brake booster and supplying fluid pressue to wheel brake cylinder means in response to the pressure generated by said brake booster;
said wheel brake cylinder means hydraulically connected with said master cylinder means and applying a braking force to wheels of the vehicle in response to the pressure of said master cylinder means;
brake actuator means connected in the brake fluid circuit between said master and wheel cylinder means for controlling the pressure in said wheel cylinder means;
a control valve means disposed between said actuator means and a fluid pressure source means for providing an operating fluid pressure to said actuator means;
a first fluid circuit including said fluid presure source means, a first inlet port in said control valve means, a first passage connecting said first inlet port with said actuator means;
a second fluid circuit including a reservoir and a first outlet port in said control valve means; and
a third circuit including a second inlet port in said control valve means communicating said brake booster means with a pressure chamber having a spring therein in said control valve means whereby the level of said operating fluid pressure for said actuator means is controlled to be proportional to the level of the pressure generated by said brake booster means by throttling a second passage between said first inlet and outlet ports in response to the pressure in said chamber communicating with said brake booster means.

4,095,849

TREAD FOR POWER DRIVEN SKI TYPE DEVICE

Royce H. Husted, Wheaton, Ill., assignor to Saroy Engineering, Wheaton, Ill.

Continuation-in-part of Ser. No. 599,003, Jul. 25, 1975, Pat. No. 4,035,035. This application Apr. 25, 1977, Ser. No. 790,655
The portion of the term of this patent subsequent to Jul. 12, 1994, has been disclaimed.
Int. Cl.² B62D *55/26*
U.S. Cl. 305—35 R **10 Claims**



1. In a power driven ski type of a device using a tread of the type having an endless linked chain adapted to circulate over a sprocket and a plurality of spaced propulsion cleats, each of said cleats having a snow engaging side opposite from a sprocket engaging side, a propulsion cleat comprising in combination;
a cleat attachment link adapted to form a part of said chain and having an attachment plate, and
a snow engaging section made of a resilient material attached to said attachment plate and having a roof-plate integral with a protruding blade,
wherein said protruding blade is resiliently connected to said attachment link, for preventing the creation of a destructive shock by said protruding blade between said attachment link to said sprocket and said power driven ski type of a device, when said protruding blade accelerates and decelerates over said sprocket.

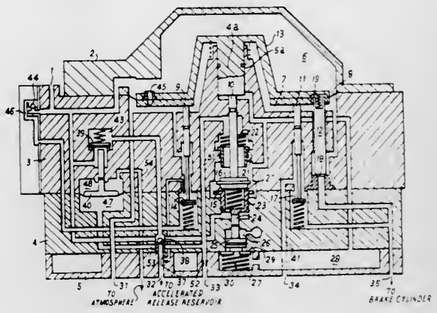
4,095,850

BRAKE CONTROL VALVE APPARATUS

David John Wickham, London, England, assignor to Westinghouse Brake and Signal Co. Ltd., England

Continuation-in-part of Ser. No. 638,463, Dec. 8, 1975, Pat. No. 4,050,745. This application Jun. 28, 1977, Ser. No. 810,723
Int. Cl.² B60T *15/52*
U.S. Cl. 303—36 **2 Claims**

1. A fluid operable brake control valve apparatus having a brake cylinder valve for controlling the supply of fluid pressure into and out of a brake cylinder, said valve being operable by a main pressure responsive member movable in response to changes of pressure when applied to a brake pipe, a quick service volume exhaust valve, having an outlet path and operable in response to such a change tending to cause a brake application, for connecting a quick service volume to the brake pipe to enhance the change at commencement of an application, accelerated release valve means operable in response to release a fluid pressure from the quick service volume to connect a charge accelerated release reservoir to the brake pipe to assist a change of pressure in the brake pipe causing such release, and a further pressure responsive member for operating said accelerated release valve, said further pressure responsive member having one side thereof connected to the outlet path from said quick service volume exhaust valve.

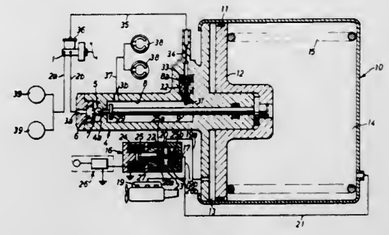


4,095,851

MODULATOR FOR ANTI-SKID BRAKE CONTROL SYSTEM

Masamoto Ando, and Tomio Tachino, both of Toyota, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 3, 1976, Ser. No. 747,212
Claims priority, application Japan, Dec. 4, 1975, 50-145329; Dec. 4, 1975, 50-145330
Int. Cl.² B60T *8/02*
U.S. Cl. 303—115 **11 Claims**



1. In an anti-skid brake control system for a wheeled vehicle having a master cylinder with a hydraulic fluid reservoir, at least one wheel brake cylinder and a hydraulic braking circuit connecting said master cylinder to said at least one wheelbrake cylinder, the system comprising: skid-sensing means for generating a signal therefrom in response to a predetermined wheel-locking conditon; a servo-motor including a piston operated in response to the signal from said skid-sensing means; a cylinder casing having a first fluid chamber connected with said master cylinder and a second fluid chamber in communication with said at least one wheel brake cylinder; cut-off valve means disposed within said first fluid chamber of said casing for interrupting fluid communication between said first and second fluid chambers; and hydraulic capacity control means including a plunger axially movable within said second fluid chamber of said casing and operatively engaged at the forward end thereof with said cut-off valve means and at the rearward end thereof with said piston of said servo-motor, said plunger being retracted toward the rearward stroke end thereof by the rearward stroke of said piston to activate said cut-off valve means and thereafter to increase the capacity of said second fluid chamber to decrease the braking pressure applied to said at least one wheel brake cylinder;
the improvement comprising braking pressure-relief valve means interposed between said second fluid chamber of said casing and said hydraulic fluid reservoir of said master cylinder for permitting fluid flow from said second

fluid chamber to said reservoir, said pressure-relief valve means being normally closed and being openable for permitting fluid flow from said second fluid chamber to said reservoir to further decrease the braking pressure applied to said at least one wheel brake cylinder after the capacity of said second fluid chamber is substantially maximized by retraction of said plunger to the rearward stroke end thereof; and flow-regulating means interposed between said relief valve means and said reservoir for controlling fluid flow from said second fluid chamber to reservoir.

4,095,852

MEASUREMENT SLIDING BEARING

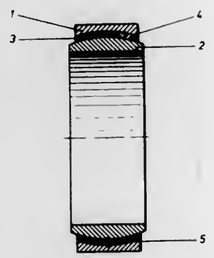
Karl-Heinz Schutz, Schweinfurt, Germany, assignor to SKF Industrial Trading & Development Company B.V., Nieuwegein, Netherlands

Filed Oct. 4, 1976, Ser. No. 728,942

Claims priority, application Germany, Oct. 15, 1975, 7532718[U]

Int. Cl.² F16C *23/02*

U.S. Cl. 308—3 R **18 Claims**



1. In a bearing assembly including first and second bearing rings with a main load zone, and a plurality of sliding bearing disks between and engaging said rings, the improvement in combination therewith of a force-measuring bearing member having the same general outside dimensions as said disks and situated between and engaging said rings as a replacement for one of said disks, said force-measuring member comprising a disk-like bearing element having an end part thereof engaging a first of said bearing rings, and a carrier with force-measuring transducing means mounted thereon, said carrier being a metal ring of L-shaped cross-section and coaxial with and secured to said bearing element with a leg portion of said L-shaped ring having a support surface with projects from said bearing element and slidingly engages said second ring.

4,095,853

DRAWER ROLLER GUIDE WITH PAIR OF ROLLERS MOUNTED ON BRACKET

Paul M. MacDonald, Scituate, Mass., assignor to P. X. Industries, Inc., Rockland, Mass.

Filed Dec. 6, 1976, Ser. No. 747,805

Int. Cl.² F16C *29/04*

U.S. Cl. 308—3.6 **2 Claims**

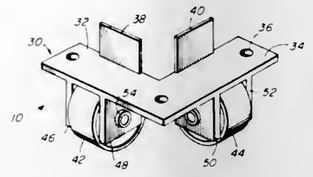
1. A roller guide for use in the corners of a cabinet opening for a drawer, comprising

(a) a bracket formed with a pair of coplanar, integral, flat right angular legs of substantially equal length, said legs being formed with spaced openings to receive fasteners therethrough,

(b) an imperforate, thin lip extending from the inner edge of each leg perpendicularly to one face of said bracket and to each other and adapted to seat against the corner edges of said cabinet opening to position said guide with respect to said drawer, and,

(c) a roller mounted to the opposite face of each of said legs for rotation about an axis parallel to the length of said legs, the periphery of each of said rollers extending beyond the plane of its respective lip to engage said drawer,

(d) a pair of spaced parallel supports extending perpendicularly from said opposite face of each leg at the mid portion thereof and integral with said bracket, said supports disposed transversely to the length of each leg, each pair of supports rotatably supporting one of said rollers,



(e) each of said rollers including a central hub, a cylindrical outer rotor and an annular medial flange connecting said hub and rotor.

4,095,854

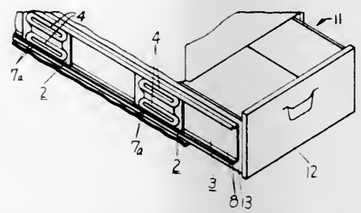
BEARING ASSEMBLY FOR A SLIDING RECTILINEAR MOTION

Hiroshi Teramachi, 2-34-8, Higashi-tamagawa, Setagaya-ku, Tokyo, Japan

Filed Oct. 26, 1976, Ser. No. 735,167

Int. Cl.² F16C *17/00*

U.S. Cl. 308—6 C **3 Claims**



1. A bearing assembly for facilitating relative sliding rectilinear motion between a first part and a second part comprising a rail body adapted to be fixedly connected to one of said parts, said rail body having opposed laterly disposed longitudinal edge portions defining spaced parallel track portions, a ball retainer means adapted to be fixedly connected to the other of said parts and adapted to be received between said track portions, said retainer means including a pair of fixedly connected complementary members to define there between an endless raceway, said complementary raceway members comprising similar stampings having opposed end portions disposed in face to face relationship in the assembled fixed position, whereby the width of the assembled end portions is less than the width of the spaced apart track portion of said rail body, said raceway members having an outer edge portion dispose contiguous to said spaced track portions of said rail body, and said outer edge portion of said endless raceway members contiguous to said track portions having a lateral cut out portion defining a window, and a series of ball bearings confined between said stamped members within said endless raceway whereby said window exposes a lateral portion of said ball bearings rolling in bearing relationship to the contiguous track portion during a sliding operation so as to minimize resistance therebetween, said track portions and raceway members being formed to complement the shape of said ball bearings disposed in rolling engagement therebetween.

4,095,855

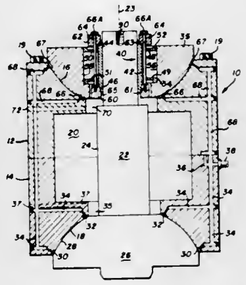
GAS LUBRICATED SPINDLE BEARING ASSEMBLY

Wayne L. Fox, Castro Valley, Calif., assignor to Fox International, Inc., Hayward, Calif.

Filed Sep. 20, 1976, Ser. No. 725,029

Int. Cl.² F16C *32/06*

U.S. Cl. 308—9 **3 Claims**



1. A gas lubricated spindle bearing comprising:

a first housing portion having a first end surface with a concave, spherically-shaped region forming a first seat means with a first plurality of circumferentially disposed air passage groove means formed thereon, a second end surface, a first bore extending between said first end surface and said second end surface, means forming a manifold for receiving a pressurized gas, and first gas channel means communicating between said first plurality of groove means and said manifold means;

a second housing portion having a third end surface with a concave spherically-shaped region forming a second seat means with a second plurality of circumferentially disposed air passage groove means formed thereon, a fourth end surface, a second bore extending between said third end surface and and said fourth surface, and second gas channel means communicating between said second plurality of groove means and said manifold means;

means fastening said first and said second housing portions so that said second surface abuts said fourth surface and said first and second bores are coaxial;

rotor means having a convex spherical surface of substantially the same curvature as said first seat means, said rotor means having a third bore formed therethrough and closely disposed to said first seat means so that said third bore is substantially coaxial with said first and said second bores;

chuck means having a convex spherical surface of substantially the same curvature as said second seat means and closely disposed to said second seat means;

spindle means having a first end and a second end and disposed through said first, second and third bores;

a twin, parallel flexure collet assembly including a first annular disk, a second annular disk facing said first annular disk and spaced axially apart therefrom, a cylindrical bushing having a first and a second end, means attaching said first disk coaxially around a portion of said cylindrical bushing proximate the first end of said bushing; and means attaching said second disk coaxially around a portion of said cylindrical bushing proximate the second end of said bushing;

means attaching the outer peripheral edges of said first and second disks to said rotor means; and

a pair of collet closing sleeves engaged to opposing ends of said bushing and securing said bushing to said spindle;

said first and second annular disks being pre-loaded in a direction to bias said rotor means and said chuck means towards their respective seat means and where pressurized gas from said manifolds flow through said channels and out said grooves to separate said chuck means and said rotor means from their respective seats by a layer of lubricating gas.

4,095,856

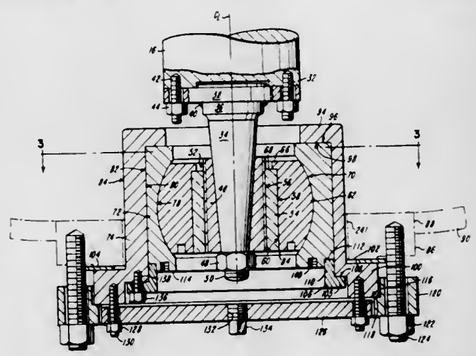
ADJUSTABLE BOTTOM STEP BEARING

Richard E. Markovitz, Cincinnati, Ohio, assignor to Brighton Corporation, Cincinnati, Ohio

Filed Jan. 24, 1977, Ser. No. 761,719

Int. Cl.² F16C *23/10*

U.S. Cl. 308—29 **25 Claims**



1. A bearing for the lower end of an elongate shaft which is rotatably suspended from its upper end, the bearing having a longitudinal centerline and comprising:

a bearing sleeve concentrically connected to the shaft lower end to be rotatable therewith;

a replaceable bushing receiving said bearing sleeve;

an intermediate member having a bushing receiving means defined therein which receives said bushing therein so that the inner surface of said intermediate member is concentric with said bushing, said intermediate member having an arcuate outer surface;

an inner eccentric ring surrounding said intermediate member and having an arcuate inner surface shaped to correspond to and to receive said intermediate member outer surface in a manner which permits said intermediate member to move with respect to said inner ring for compensating for tilting of the shaft with respect to a vertical orientation thereof; and

shaft displacement compensating means which compensates for misalignment of the shaft with respect to the bearing longitudinal centerline, said displacement compensating means including an outer eccentric ring surrounding said inner eccentric ring.

4,095,857

OIL DEFLECTOR

Clifford Augustus Palmer, Huddersfield, England, assignor to Holset Engineering Company Limited, Huddersfield, England

Filed Nov. 23, 1976, Ser. No. 744,373

Claims priority, application United Kingdom, Nov. 25, 1975, 48324/75

Int. Cl.² F16C *1/24*; F04B *39/04*; F01M *11/04*

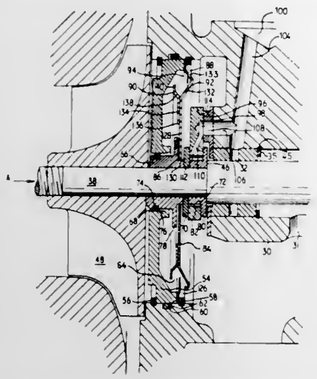
U.S. Cl. 308—168 **12 Claims**

1. An oil deflector for use with a horizontal shaft rotatably supported by at least one oil lubricated bearing assembly for rotation, said deflector comprising:

a stationary member disposed generally in a plane at right angles to said shaft and having a first side thereof facing said bearing assembly, said member having a central aperture through which said shaft extends with a relatively close clearance and a plurality of apertures through said member at points spaced radially outward from said central aperture,

means for defining an outwardly facing generally annular

channel on the second side of said member and forming a perimeter around said central aperture but inward of said plurality of apertures for collecting and directing downward oil passing through said plurality of apertures,



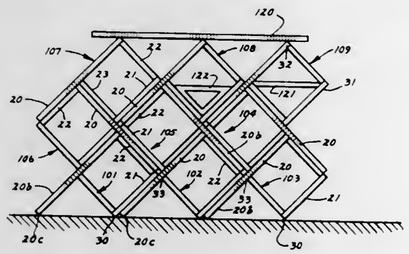
at least one of said apertures being formed at approximately the lowermost portion of said member for directing oil form said channel to the first side of said member.

4,095,858

BOOK CASE APPARATUS

John L. Hopf, 3322 Blaisdell Ave., #201, Minneapolis, Minn. 55408

Filed Feb. 2, 1977, Ser. No. 764,834
Int. Cl.² A47B *53/00*
U.S. Cl. 312—198 **6 Claims**



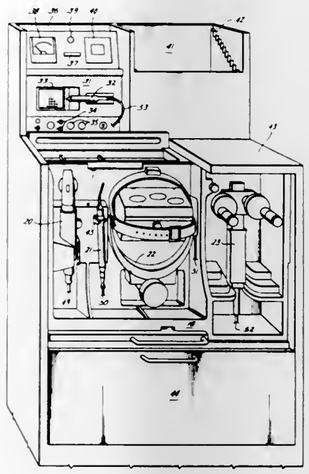
1. A book case or the like on a supporting surface comprising a plurality of identical, generally P-shaped modules, each module including an elongated first wall, a second wall, a third wall and a fourth wall, each of the second, third and fourth walls being of a substantially shorter length than the first wall, the first end portions of the second and third walls being joined to the first wall in spaced relationship to one another, the first and second end portions of the fourth wall being joined the second end portions of the second wall and third wall respectively, the first end portion of the third wall being joined to the first wall about midway the first wall first and second end portions, the first wall second end portion having a terminal end, the first wall first end portion being joined to the second wall first end portion, and the first and fourth walls being parallel to one another and perpendicular to the second and third walls, said plurality of modules including a first module and a second module having their first walls parallel to one another and inclined at substantial angles to both the horizontal and vertical, the fourth wall of the second module abutting against the first wall of the first module, the terminal ends abutting against the supporting surface and the corner portion defined by the juncture of the third and fourth walls of each the first and second modules abutting against the supporting surface.

4,095,859

PORTABLE EYE EXAMINATION SYSTEM CART

Thomas A. Decker; Christian L. Kuether; Robert E. Williams, and Dan B. Jones, all of Houston, Tex., assignors to Baylor College of Medicine, Houston, Tex.

Filed Jan. 5, 1977, Ser. No. 757,107
Int. Cl.² A47B *81/00*
U.S. Cl. 312—209 **6 Claims**



1. A portable eye examination system cart comprising,
a body of generally rectangular outline,
roller means mounted to the bottom of the body for free rolling movement,
an instrument console in the front portion and extending to a top portion of the body, the console including means to support eye examination instruments and devices,
an openable cover enclosing the front and the top portion of the body,
an electric power system carried by the cart effective to provide electric power to the eye examination instruments and devices which are electrically operated,
the electric power system including an indicator mounted on the cart indicating whether the electric power system is on and off, an emergency on and off switch, and a plug for an electric outlet,
the means to support the eye examination devices including on and off switches for one or more of the eye examination instruments and devices which are electrically operated arranged to be in an off position when supporting and in an on position when not supporting them,
the body including a closable storage compartment and means for carrying patient charts, and
a tray disposed at the upper portion of the body for containing supplies.

4,095,860

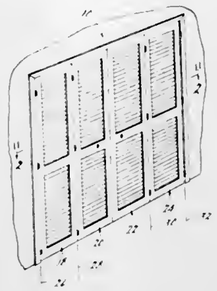
STORAGE SYSTEM

Artel R. Henson, Bloomfield Hills, Mich., assignor to Disco Engineering, Inc., Bloomfield Hills, Mich.

Filed Jan. 24, 1977, Ser. No. 761,646
Int. Cl.² A47B *87/00*
U.S. Cl. 312—242 **21 Claims**

1. In combination with a hinged door for a closet-like enclosure, said door having an interior surface confronting the interior of said enclosure when said door is in a closed position, a storage system comprising,
a pair of spaced parallel mounting sections affixed on said interior surface and extending generally vertically therealong,
wherein said mounting sections define a plurality of laterally

aligned pairs of openings and a storage container adapted to be mounted on said mounting sections at selected vertical stations along said mounting sections, defined by said pairs of openings, and



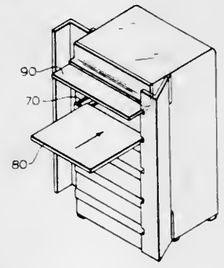
at least two mounting elements extending between said container and said mounting sections for securing said container to said panel at said selected station.

4,095,861

DUST-PROOF CART

Adam Kachidurian, Newton, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Sep. 12, 1977, Ser. No. 832,118
Int. Cl.² A47B *97/00*
U.S. Cl. 312—250 **2 Claims**



1. A dust-proof cart comprising
a housing having solid bottom, top, side and rear walls but having an open front wall,
means inside said housing for removably supporting trays,
a dust-proof closure for the open front of said cart,
said closure comprising a plurality of spaced-apart, horizontally extending louvers, and
a pair of pivotable brackets secured to said side walls adjacent to said open front end and adapted to close over and hold said louvers in place, one of said brackets having a series of notches adapted to be engaged by a louver when the louver is in the raised position to expose the inside of said cart.

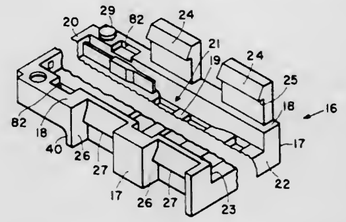
4,095,862

METHOD AND APPARATUS FOR CONNECTING FLAT CABLE

David A. Hatch, Sherborn, Mass., assignor to Pin Tek, Inc., Sherborn, Mass.

Filed Oct. 19, 1976, Ser. No. 733,949
Int. Cl.² H01R *3/06*
U.S. Cl. 339—14 R **32 Claims**

1. An electrical connector for flat ribbon cable having a plurality of transversely spaced elongate conductive wires within an insulative sheath and comprising:
dielectric housing means defining an internal cavity, cable openings for accommodating entry into said cavity of ends of a pair of parallel longitudinally aligned flat ribbon cables, and conductor openings for accommodating entry into said cavity of a plurality of conductor elements, said housing means comprising a first housing part having an open side and defining a first cavity portion of said cavity and a second housing part having an open side and defining a second cavity portion of said cavity, said first and second housing parts being engaged to close said open sides;
a distinct divider part positioned within said cavity so as to electrically isolate said first cavity portion from said second cavity portion;
first grounding means retained within said first cavity portion and operative to electrically connect together a plurality of conductive wires in one of the cables;



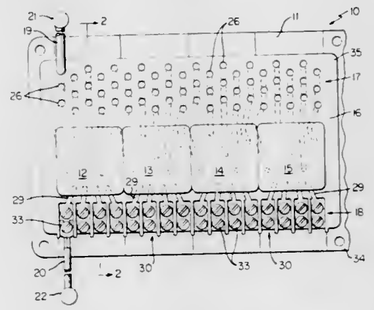
second grounding means retained within said second cavity portion and operative to electrically connect together a plurality of conductive wires in the other cable;
a first plurality of electrically isolated coupling elements retained within said first cavity portion and each operative to electrically connect a different one of said conductive wires in the one cable to a respective different one of the conductor elements; and
a second plurality of electrically isolated coupling elements retained within said second cavity portion and each operative to electrically connect a different one of said conductive wires in the other cable to a respective different one of the conductor elements.

4,095,863

MANIFOLD MEANS AND SYSTEM FOR ELECTRICAL AND/OR PNEUMATIC CONTROL DEVICES AND METHOD

George T. Hardin, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Mar. 30, 1977, Ser. No. 783,045
Int. Cl.² H01R *3/04*
U.S. Cl. 339—15 **30 Claims**



1. In a manifold means adapted to detachably carry on one side thereof a plurality of pneumatically and electrically operated control units each of which is adapted to be fluidly and

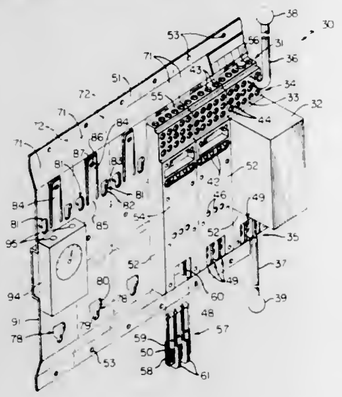
electrically interconnected to pneumatic means and electrical means of said manifold means that respectively have external interconnection means on said one side of said manifold means so that external pneumatic and electrical lines can be interconnected to the same side of said manifold means that said units are adapted to be interconnected thereto, the improvement wherein said manifold means comprises a pair of plates secured together in stacked relation with one of said plates defining at least that part of said one side of said manifold means that carries said external interconnection means and is adapted to detachably carry said control units.

4,095,864

MODULAR MANIFOLDING MEANS AND SYSTEM FOR ELECTRICAL AND/OR PNEUMATIC CONTROL DEVICES AND PARTS AND METHODS

George T. Hardin, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Mar. 30, 1977, Ser. No. 782,844
Int. Cl.² H01R *3/04*
U.S. Cl. 339—15 **46 Claims**



1. In a manifold means adapted to detachably carry on one side thereof a plurality of pneumatically and electrically operated control units each of which is adapted to be fluidly and electrically interconnected to pneumatic means and electrical means of said manifold means that respectively have external interconnection means on said one side of said manifold means so that external pneumatic and electrical lines can be interconnected to the same side of said manifold means that said units are adapted to be interconnected thereto, the improvement wherein said manifold means comprises a plurality of like manifold modules secured together to provide a manifold unit and each having part of said pneumatic means and said electrical means and having one side thereof forming part of said one side of said manifold means, said one side of each manifold module being adapted to carry one of said control units and has said external interconnection means respectively for said pneumatic means and electrical means thereof.

4,095,865

TELEMETERING DRILL STRING WITH PIPED ELECTRICAL CONDUCTOR

Early B. Denison; Leon L. Dickson, both of Houston, Tex., and Gary L. Marsh, New Orleans, La., assignors to Shell Oil Company, Houston, Tex.

Filed May 23, 1977, Ser. No. 799,485
Int. Cl.² H01R *3/04*
U.S. Cl. 339—16 R **10 Claims**

1. An improved pipe section for use in a rotary drill string, said drill string including an electrical conductor extending through each pipe section, said pipe section comprising:

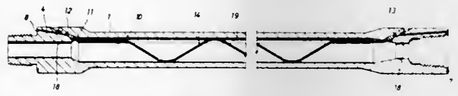
a section of uniform diameter drill pipe, said drill pipe having external upset ends;

a pin tool joint, said pin tool joint having a smaller internal diameter than said drill pipe, and in addition, being joined to one end of said drill pipe;

a box tool joint, said box tool joint having a smaller internal diameter than the drill pipe, and in addition, being joined to the other end of said drill pipe;

a conduit, said conduit having a helical form with straight end portions, the outer diameter of said helix being sized to firmly engage the inner wall of the drill pipe when said conduit is placed in the drill pipe;

a passageway formed in both said box and pin tool joints, the



ends of said conduit being formed to align with said passageways;

sealing means, one of said sealing means being disposed in each of said passageways to both form a fluid-tight seal between said conduit and said passageway, and in addition, mechanically anchor said conduit in said passageways; and

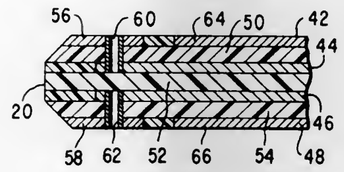
an insulated electrical contact ring disposed in the sealing shoulders of both said box and pin joints, said passageways communicating with said contact rings whereby an electrical conductor may be attached to the contact rings in one of said joints, and extend through said passageways and conduit, and be attached to the contact in the other of said joints.

4,095,866

HIGH DENSITY PRINTED CIRCUIT BOARD AND EDGE CONNECTOR ASSEMBLY

Peter S. Merrill, San Diego, Calif., assignor to NCR Corporation, Dayton, Ohio

Filed May 19, 1977, Ser. No. 798,505
Int. Cl.² H05K *1/07*
U.S. Cl. 339—17 E **11 Claims**



1. A high density printed circuit board and edge connector assembly comprising:

a high density printed circuit board having a printed circuit pattern on said board and a printed circuit pattern within said board;

a first row of terminals located on said board adjacent one edge of said printed circuit board;

a second row of terminals located on said board coplanar with said first row of terminals and spaced back from said edge further than said first row of terminals;

connections to said first and second rows of terminals consisting of conductor means extending from said printed circuit pattern within said board to terminals in said first row and extending from said printed circuit pattern on said board to terminals in said second row; and

an edge type circuit board connector including a housing for receiving and positioning said board, and first and second sets of spring type electrical contact means located to

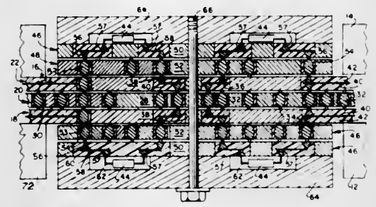
engage said first and second rows of terminals respectively.

4,095,867

COMPONENT CONNECTION SYSTEM

Howard L. Parks, Woodland Hills, Calif., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Oct. 10, 1974, Ser. No. 513,649
Int. Cl.² H01R *13/28*
U.S. Cl. 339—92 M **4 Claims**



1. A circuit module comprising:

a stack of substantially metallic wafers, each having islands of conductive material each encircled by a solid dielectric material with one end of each island connected to a respective island of another wafer by a malleable metal portion for extending a respective electrical connection in a Z-axis direction through said stack and one surface of each wafer connected to one surface of an adjacent wafer of the stack by a respective malleable metal portion to extend a common connection through said stack and each end wafer of said stack providing an external surface for said stack with the islands of each end wafer terminating adjacent the respective external surface;

a metal frame member engaging the external surface of each end wafer and including means for clamping said wafers and each frame member under pressure to place said wafers and frame members in close heat transmitting relationship through the malleable metal portions with each frame member having a passageway enabling access to a portion of each external surface and the conductive islands of each end wafer;

a plurality of substantially metallic component wafers each located in a respective passageway and having conductive islands with each component wafer conductive island encircled by a solid dielectric and extending toward opposite surfaces of the respective component wafer;

a like plurality of substantially metallic connector wafers, each interposed between a corresponding component wafer and an accessible external surface portion of said stack with each connector wafer having conductive slugs, each connector wafer slug encircled by a solid dielectric and spaced in registry with a respective component wafer conductive island and a respective conductive island terminating adjacent the external surface of a respective end wafer for extending a respective connection in a Z axis direction to and from the connected islands of said stack with separate conductive malleable means located between one end of each component wafer conductive island and each slug at one surface of said connector wafer and between the other surface of said connector wafer and the accessible external surface portion of each end wafer;

a plurality of active circuit components each having terminals connected to the other end of selected ones of said component wafer islands;

detachable securing means including a metal pressure cap received in each passageway and an elongate metal member extending into said stack and through a respective component wafer and respective connector wafer in the respective passageway with each cap in close heat transmitting relationship to one frame member and in overlapping heat transmitting engagement with one surface of a respective component wafer for applying pressure through the respective component wafer and the respective connector wafer and through the separate malleable means and conductive slugs to said stack for extending respective electrical connections between said terminals and respective islands of said stack and to provide a common connection between said stack and component wafer while detachably securing the respective component and connector wafers in close heat transmitting relationsip to the cap and stack,

one wafer in said stack having a group of conductive islands adjacent one edge thereof, each island in said group of islands connected to a respective other island of said one wafer; and

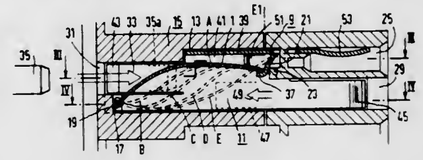
a connector supported by one frame member in heat transmitting relationship and having a terminal connected to each island of said group for extending external electrical connections to and from said stack.

4,095,868

CONTACTING DEVICE FOR CONNECTING THE END OF AN ELECTRIC WIRE

Erik Luithle, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed May 9, 1977, Ser. No. 794,795
Claims priority, application Germany, May 19, 1976, 2622323
Int. Cl.² H01R *9/08, 13/62*
U.S. Cl. 339—95 D **15 Claims**



1. In a contact device for connecting the end of an electrical wire in which an elastically deformable leaf spring mechanically fastens the wire end to a contact element with a contact surface and insures sufficient contact pressure between the end of the wire and the contact element, the leaf spring, having a first end disposed in the stationary manner against an abutment and a second end which is moveably supported at a support surface, the distance between the abutment and the support surface for said second end being smaller than the length of said leaf spring, said leaf spring convexally bent and pressed, when in a clamped position, with the end of the wire against the contact surface of said contact element, the improvement comprising, said support surface and second end of said spring cooperating such that, in one stable position of said leaf spring, said leaf spring second end will press a wire against the contact surface of the contact element and in another stable position will release said wire; and access openings in said contact device for permitting an outside mechanical influence to be applied to said leaf spring to move it between said one and other stable positions, the leaf spring being flexed in opposite directions in one and the other stable positions.

4,095,869

APPARATUS FOR TUNING NARROW BAND WAVE GUIDE REFLECTORS

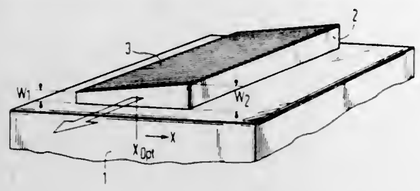
Achim Reichelt, and Gerhard Winzer, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jul. 22, 1976, Ser. No. 707,644
Claims priority, application Germany, Sep. 29, 1975, 2543469
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96.14 **5 Claims**

1. An apparatus for tuning narrow band wave guide reflectors comprising:

a. a substrate;

b. a wave guide reflector layer arranged on the substrate having periodic perturbations; and
c. means for adpating the effective index of refraction n_{eff} of



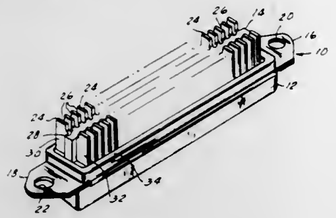
the wave guide reflector layer to fulfill the Bragg condition of the reflection comprising providing said wave guide reflector layer with a thickness which changes continuously over the width of the layer.

4,095,870

STRAIN RELIEF ADAPTER FOR AN ELECTRICAL CONNECTOR

Istvan Mathe, Cicero, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 679,091, Apr. 21, 1976, abandoned, which is a continuation of Ser. No. 537,192, Dec. 30, 1974, abandoned. This application Feb. 2, 1977, Ser. No. 764,974
Int. Cl.² H01R *13/58*
U.S. Cl. 339—103 R **21 Claims**



1. A strain relief adapter for insulated conductors which are forced into insulation-piercing contact portions supported spaced apart by an electrical device which supports said adapter, said adapter comprising:
a plurality of pressure members spaced apart corresponding to the spacing of the insulation-piercing contact portions to engage and press against first portions of the insulated conductors;
conductor clamping means spaced from said pressure members for receiving and clamping second portions of the insulated conductors along lines parallel to the first portions of the conductors; and
force diversion means spaced from said pressure members and from said conductor clamping means for receiving the conductors partially wrapped thereabout and preventing dislocation of the first portions in response to the application of tensile forces to the conductors.

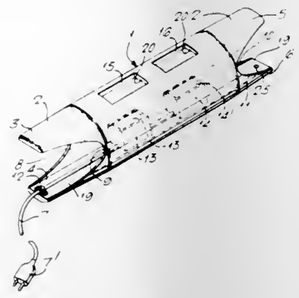
4,095,871

PORTABLE ELECTRIC CURRENT SUPPLY DEVICE FOR BUILDING SITES AND THE LIKE

Hans Holte, N-3810 Gvarv i Telemark, Norway

Filed Jan. 11, 1977, Ser. No. 758,445
Claims priority, application Norway, Jan. 14, 1976, 760123
Int. Cl.² B65H *75/40*; H01R *13/60*
U.S. Cl. 339—119 C **9 Claims**

1. Portable electric current supply device for building sites and the like, consisting of a housing which in its interior holds current distribution equipment, other electrical equipment and/or instruments, all connected to a common supply cable, and which is provided with means for carrying the device, characterized in that the housing takes the form of the pipe of solid, somewhat resilient material which at each end has extentions forming two opposite flaps serving as bumpers and as side boundaries for a coil of the supply cable, and that the carrying



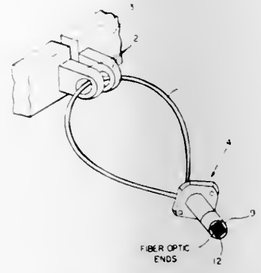
means is constituted by one or more openings which are provided in the pipe wall substantially in the area between two oppositely directed flaps and also serve as access openings to the equipment in the interior of the housing.

4,095,872

SECURITY SEALING SYSTEM USING FIBER OPTICS

Lorin R. Stieff, Kensington; Charles L. Pruitt, Hyattsville; Reinhard R. Ulrich, Rockville, all of Md., and Frank S. Houck, Falls Church, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 13, 1977, Ser. No. 759,161
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96.24 **10 Claims**



1. A security seal for detecting tampering with a secured enclosure, the seal comprising:
a length of fiber optic bundle for conducting light along individual fibers within the bundle;
a collar fastening the free ends of the bundle together so that the individual fibers in one of the bundle ends become arbitrarily intermixed with the individual fibers in the other bundle end, with all of the fiber ends facing the same direction; and
an opening formed in the collar to permit viewing of the intermixed fibers at their ends.

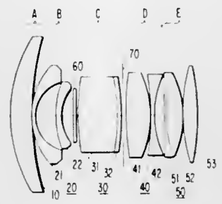
4,095,873

MINIATURE AND LARGE APERTURE RETROFOCUS WIDE-ANGLE PHOTOGRAPHIC LENS

Sugiyama Takahiro, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 2, 1976, Ser. No. 672,935
Claims priority, application Japan, Apr. 4, 1975, 50-40994
Int. Cl.² G02B *9/64*
U.S. Cl. 350—195 **20 Claims**

1. A wide angle photographic lens system comprising at least five lens groups positioned in order from the object to the image side of the lens system, the first lens group being a positive lens consisting of a positive meniscus lens element convex to the object, the second lens group being a negative lens and consisting of two negative meniscus lens elements, the third lens group being a positive lens and consisting of in the order mentioned a thick positive lens element joined to a nega-



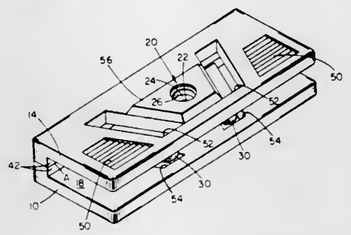
tive lens element, the fourth lens group being a positive lens and comprising at least a positive lens element and a negative lens element, and the fifth lens group being a positive lens and comprising at least two positive lens elements wherein the first positive lens element of said fifth group consists of a negative lens joined to a positive lens, and a diaphragm being interposed between said third lens group and said fourth lens group.

4,095,874

HAND-HELD MICROSCOPE

Robert B. Wallace, 2 Taylor St., Littleton, Mass. 01460

Continuation-in-part of Ser. No. 619,625, Oct. 6, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,624
Int. Cl.² G02B *27/02*
U.S. Cl. 350—239 **16 Claims**



1. In a microscope unit comprising a stage capable of being illuminated and defining a specimen position, a viewing aperture arranged to accept and hold a lens, and means enabling adjustment of the distance between said lens and said stage for focusing, the improvement wherein said lens and said stage are resiliently joined by connecting structure means which include hand pressure regions for stressing said connecting structure means to change the distance between said lens and said stage in a resilient manner, in unstressed position said structure establishing a nonfocused rest relation between said lens and said stage, the range of movement permitted by stressing said connecting structure means to a focusing position in response to deflection of said hand pressure regions enabling focusing between said lens and said stage, and release of said pressure enabling return by said connecting structure means of said lens and said stage, and comprising top and bottom members extending as cantilevers from said connecting structure means, one carrying said viewing aperture with said lens and the other defining said stage, at least one of said parts being resiliently deflectable toward the other about said connecting structure means for focusing.
and wherein said top and bottom members are provided with said hand pressure regions at points spaced from said lens in a manner whereby the motion of said members in response to hand pressure at said regions translates into relatively reduced motion between said lens and said stage.

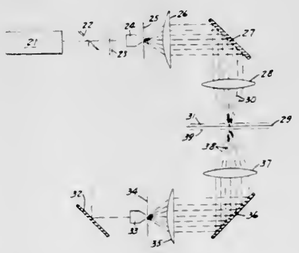
11. An initially flat blank suitable for folding to form a microscope of clamshell-like configuration, characterized as being a sheet of a relatively rigid material in rectangular form comprising in order
(a) first and second top member sections of equal dimensions having centrally-positioned openings, said first top member section being foldable through **180°** to be adhered to said second top member section to form a top member with said openings alined to form a lens aperture suitable for positioning and holding a lens therein when said first top member section is adhered to said second top member section;
(b) a first relatively narrow connecting structure means section being foldable relative to said top member;
(c) first and second bottom member sections of equal dimensions having centrally-positioned openings, said second bottom member section being foldable through **180°** to be adhered to said first bottom member section to form a bottom member with said openings alined to form a light-admitting aperture, said bottom member being foldable relative to said first connecting structure means section; and
(d) a second relatively narrow connecting structure means section being foldable relative to said second section of said bottom member for adhering to said first connecting structure means section to form said clamshell configuration with said light admitting aperture being alinable with said lens aperture and said top and bottom members being joined in hinged relationship in a nonfocusing position alterable to a focusing position by hinged movement between said top and bottom members.

4,095,875

METHOD OF FORMING A RETROREFLECTIVE MATERIAL VIA LIGHT INTERFERENCE FRINGE PATTERNS

Pui Kum Lee, White Bear Lake, and Wolfgang H. Strehlow, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

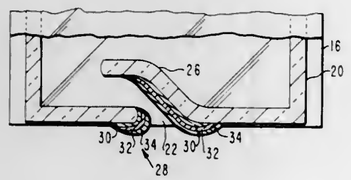
Division of Ser. No. 548,439, Feb. 10, 1975, Pat. No. 4,036,552. This application Apr. 28, 1977, Ser. No. 791,958
Int. Cl.² G02B *5/18*
U.S. Cl. 350—320 **11 Claims**



11. A method of making a retroreflective material comprising the steps of
a. providing a sheet-like photosensitive medium which after selective exposure to light may be developed to provide on one surface thereof a surface relief pattern corresponding to the light source areas,
b. recording in said medium by directing thereat two interfering light beams an optical element consisting of a light interference fringe pattern having associated therewith a given focal length,
c. changing the position of the photosensitive medium with respect to the two light beams and repeating the recording step to record a plurality of said optical elements in the medium,

d. developing the medium to provide on a surface thereof a relief pattern corresponding to the plurality of optical elements, and
e. providing a reflective surface on the opposite side of the medium corresponding to the back focal plane defined by said focal length,
whereby light directed from a source onto the developed surface of the medium is transmitted through the medium, reflected from the opposite side and retroreflected back towards the source.

4,095,876
LIQUID CRYSTAL DEVICE AND METHOD FOR PREPARING SAME
Carel Willem Horsting, W. Millington, and William Bernard Hall, Stockton, both of N.J., assignors to RCA Corporation, New York, N.Y.
Filed Dec. 8, 1975, Ser. No. 638,849
Int. Cl.[2] G02F *1/13*
U.S. Cl. 350—343 **15 Claims**

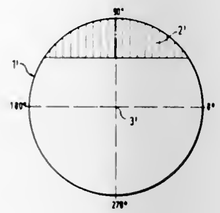


1. A liquid crystal device comprising
two closely spaced glass plates having a conductive layer thereon on facing sides thereof maintained apart with a seal to define an enclosure therebetween and containing a liquid crystal composition filling said enclosure, said seal comprising
a glass strip having a gap along the periphery of said glass plates,
a barrier portion behind said gap,
a multi-component metal coating within said gap but not closing it formed by sputtering in sequence a first layer of titanium or chromium and a second layer of platinum or palladium, and
a layer of solder fused to said metal coating and completely closing said gap.

4,095,877
SOFT CONTACT LENS FROM A MACROMOLECULAR BLOCK COPOLYMER
Vladimir Stoy; Otto Wichterle, and Artur Stoy, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia
Filed Aug. 18, 1975, Ser. No. 605,510
Claims priority, application Czechoslovakia, Sep. 26, 1974, 8072-74
Int. Cl.[2] G02C *7/04*; G08C *00/00*; B29D *11/00*
U.S. Cl. 351—160 **5 Claims**

1. A soft contact lens suitable for substantially permanent wear and having a concavo-convex cross-sectional shape with its concave surface adapted to fit the human eye, which lens is formed from a water-swelled hydrogel (a) containing about 50 to about 90% by weight of water at swelling equilibrium with water at 20° C. and (b) consisting of a macromolecular block copolymer comprising (i) multiple segments of acrylonitrile units and (ii) multiple segments of acrylamide units and (iii) 0 to 20 molar % of other monomeric units, said macromolecular block copolymer being obtained from the partial acid hydrolysis of polyacrylonitrile and comprising in its water-swelled condition two distinct but inseparable phases, one of said phases being composed essentially of non-swelled crystalline or quasi-crystalline polyacrylonitrile segments non-covalently cross-linked by strong dipoles between nitrile groups and detectable by X-ray analysis showing the usual polyacrylonitrile pattern, the other of said phases being amorphous and being predominantly composed of highly swelled hydrophilic polyacrylamide segments.

4,095,878
SOFT CONTACT LENS WITH FLATTENED REGION FOR AUTOMATIC ORIENTATION
Peter Fanti, Hamburg, Germany, assignor to Titmus Eurocon Kontaktlinsen GmbH & Co. KG, Aschaffenburg, Germany
Continuation of Ser. No. 561,508, Mar. 24, 1975, abandoned. This application Nov. 22, 1976, Ser. No. 743,857
Claims priority, application Germany, Mar. 28, 1974, 2415108
Int. Cl.[2] G02B *5/23*
U.S. Cl. 351—161 **9 Claims**



1. A soft contact lens adapted to the cornea comprising a lens body with a generally spherical concave inner surface and a generally convex outer surface, said lens body having a central horizontal axis, said outer surface having a flattened region along at least one portion of its periphery on said convex outer surface, said flattened region extending substantially in parallel to said central horizontal axis, the thickness of said lens increasing continually in said flattened region in the direction toward the optical center of said lens and said flattened region, on each circumferential line thereof, having one point of minimum thickness from which said thickness increases in both directions along said circumferential line, whereby said flattened region cooperates with eyelid movement of a user to automatically orient said lens and to maintain a horizontal orientation of said central horizontal axis.

4,095,879
COLOR COPYING APPARATUS
Hajime Katayama, Tokyo; Akiyoshi Torigai, Machida; Masashi Suda, Irima, and Osamu Hoshino, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 531,385, Dec. 10, 1974, abandoned. This application Jul. 15, 1976, Ser. No. 705,439
Claims priority, application Japan, Dec. 13, 1973, 48-140959; Dec. 19, 1973, 48-143214; Dec. 19, 1973, 48-143215; Dec. 20, 1973, 48-143065; Dec. 20, 1973, 48-143069
Int. Cl.[2] G03G *15/01*
U.S. Cl. 355—4 **19 Claims**

1. A copying apparatus for forming a single electrostatic latent image selectively having one of a plurality of color components of an original image, or sequentially forming a plurality of electrostatic latent images corresponding respectively to said plurality of color components, said images being formed on a moving photosensitive medium, said apparatus comprising:
a photosensitive medium;
means movably mounting said photosensitive medium;
exposure means for projecting therethrough an original image upon said photosensitive medium for exposure;
filter means including a predetermined number of color resolving filter units selectively movable into the projection path of said exposure means;
position signal generating means for generating a signal in response to the movement of any of said filter units into the projection path of said exposure means;
primary position signal generating means for generating a signal in response to the setting of said filter units into a predetermined primary position;
means disposed adjacent said photosensitive medium to form an electrostatic latent image on said photosensitive medium corresponding to the projected image;
selector means for selecting between a first mode of operation wherein any one of a plurality of color image components of an original is formed on said photosensitive medium, and a second mode wherein said plurality of color

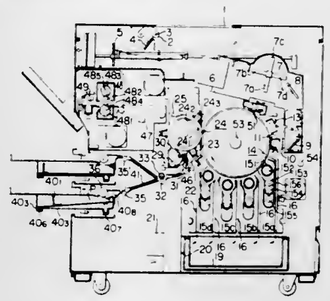
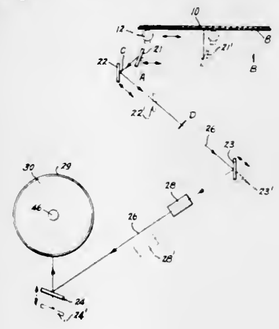


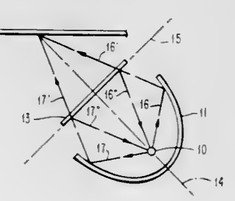
image components of an original are formed on said medium; and
program control means having an input coupled to said selector means and including means for detecting a signal from said position signal generating means and means for detecting a signal from said primary position signal generating means, said program control means being operable to detect, when the second mode has been selected by said selector means, whether a predetermined one of said filter units extends across the projection path of said exposure means, and, if it does not so extend, drive said filter means to position said predetermined filter unit across the projection path.

4,095,880
EXTENDED RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE
David K. Shogren, Ontario; Edward C. Bock, Webster, and Edwin Zucker, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Jun. 27, 1975, Ser. No. 590,906
Int. Cl.[2] G03G *15/28*; G03B *27/34*
U.S. Cl. 355—8 **31 Claims**



1. A variable magnification reproduction machine comprising:
holding means comprising a platen for holding a document,
document scanning means for scanning a document at said platen,
image receptor means for receiving an image of said document scan by said document scanning means,
imaging means for focusing an image of said document onto said receptor means,
means for adjusting said imaging means for selecting between different document magnification values; and
means for correspondingly changing the scanning rate of said document means for each value of said magnification values and correspondingly changing the distance traveled for only some of said magnification values whereby the distance traveled by said document scanning means is limited to a predetermined distance which equals approximately the size of said platen.

4,095,881
EFFICIENT ILLUMINATION SYSTEM
Randall Adrian Maddox, Longmont, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.
Continuation of Ser. No. 620,086, Oct. 6, 1975, abandoned. This application Dec. 20, 1976, Ser. No. 752,957
Int. Cl.[2] G03B *27/52*
U.S. Cl. 355—30 **18 Claims**



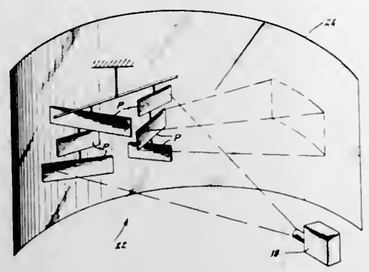
1. An illumination system including an incandescent light source with a filament and bulb wall and including means for separating the visible light spectrum from the infrared spectrum and redirecting a substantial portion of said infrared spectrum to the light source, comprising:
a reflector means for reflecting both the infrared and visible spectrum, said reflecting means shaped into a conic section with a focal point, said light source located at the focal point of said reflector means;
a filter means for separating said visible light from said infrared light, said filter means receiving rays from said reflector means; and
infrared reflecting means receiving rays from said filter means for reflecting at least a substantial portion of said infrared spectrum back upon said light source,
whereby said filament and bulb wall are heated by the infrared radiation.

4,095,882
PROJECTED IMAGE DISPLAY SYSTEM
John J. Karamon, 118 East Ave., Stamford, Conn. 06840
Filed Apr. 1, 1976, Ser. No. 672,831
Int. Cl.[2] A63J *3/00*; G03B *21/56, 21/00*
U.S. Cl. 353—122 **5 Claims**

1. A visual image display system characterized by novel visual effects, cmprising:
a mobile formed of a plurality of adjacent panels together forming a substantially continuous and complete image-receiving surface when aligned;
means for suspending each panel for continuous random horizontal rotation relative to the other panels without collision with the other panels in the mobile;
the mobile having a plurality of panels in the vertical direction, the lower panels in the vertical direction being suspended from the panels thereabove;
means for impinging air currents upon the panels to cause

them to rotate horizontally in a continuous apparently random manner relative to one another; and

means for projecting a visual photographic image upon the rotating panels of the mobile;



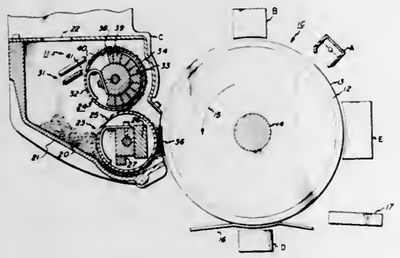
whereby the full projected photographic image is separated by the rotating panels into individually moving components each independently changing in linearity and focus, and then periodically is reformed partially or wholly when adjacent panels move into alignment and form a continuous surface.

4,095,883

MAGNETIC MIXING APPARATUS AND PROCESS

Delmer G. Parker, Rochester, and Robert D. Bonham, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 2, 1976, Ser. No. 654,501
Int. Cl.² G03G *15/00*; B05B *5/02*
U.S. Cl. 355—3 DD **30 Claims**



1. In a mixing apparatus for mixing a magnetizable developer material for use in developing images on an image recording surface, said apparatus including: means for supporting a blanket of developer material for movement in a desired direction; and means for mixing said developer material; the improvement wherein, said mixing means comprises:

means for magnetically dividing said blanket of developer material into a plurality of adjacent streams of said developer material and for controlling the trajectory of said streams so that the trajectory followed by one stream is different from the trajectory followed by another of said streams;

said magnetic dividing means including first magnetic field generating means for providing a substantially non-uniform magnetic field transversely of said desired direction; and

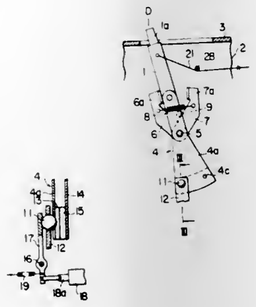
second magnetic field generating means for providing a substantially uniform magnetic field transversely of said desired direction, said second magnetic field generating means being positioned to act upon said blanket of developer material prior to said first magnetic field generating means.

4,095,884

EXPOSURE CONTROLLING APPARATUS FOR ELECTROPHOTOGRAPHIC COPYING MACHINE

Toyoo Okamoto, Yokohama, and Kenji Kojima, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 25, 1976, Ser. No. 717,890
Claims priority, application Japan, Aug. 29, 1975, 50-105527
Int. Cl.² G03G *15/04*
U.S. Cl. 355—3 R **7 Claims**



1. An exposure controlling apparatus for an electrophotographic copying machine comprising:

an operating member movable between a first, neutral position and a second position;

means for biasing the operating member toward the first position;

means for locking the operation member at any position intermediate the first and the second position when the operating member is moved from the first toward the second position, said locking means comprising:

a first frictional member on the operating member;

a second frictional member which remains stationary on the copying machine; and

ball means for urging the first frictional member into abutting relationship with the second frictional member;

an exposure control means for adjusting the passage of a quantity of exposure radiation to a selected location in the copying machine;

means extending between and connected with the operating member and the exposure control means and responsive to a movement of the operating member for actuating the control means to adjust the quantity of exposure radiation passed to said location; and

unlocking means for releasing the locking means.

4,095,885

POLARITY SWITCH CIRCUIT FOR COPYING APPARATUS

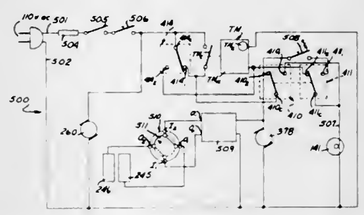
Lawrence M. Freeman, 599 Ansley Ct., NE., Atlanta, Ga. 30324, and Francis T. Arnold, 2379 Tristan Cir., NE., Atlanta, Ga. 30345

Continuation of Ser. No. 479,985, Jun. 17, 1974, abandoned, which is a division of Ser. No. 304,519, Nov. 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 146,114, May 24, 1971, Pat. No. 3,730,622. This application Nov. 8, 1976, Ser. No. 739,946
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 CH **2 Claims**

1. In an apparatus for electrostatically copying images from an original document medium onto photoconductive copy paper including a supply of copy paper, image forming means for reproducing the image from the original document medium onto said copy paper, and conveying means for moving said copy paper from said supply of copy paper through said image forming means, the improvement comprising:

corona charging means for imposing an electrical charge on said copy paper as said copy paper moves from said supply of copy paper to said image forming means said corona charging means including a first corona unit facing that surface of said copy paper to be electrostatically charged and a second corona unit facing that surface of said copy paper opposite that surface to be charged;

power supply means having a first output with a first electrical polarity and a second output with a second electrical polarity opposite to said first polarity; and, a reversing switch operatively and alternatively connecting said first and second outputs to said corona charging means to alternatively impose a charge on said copy paper of said first polarity and said second polarity, said switch including a first input electrically connected to said first output of said power supply means; a second input electrically connected to said second output of said power supply means; a first corona output electrically connected to said first corona unit; a second corona output electrically connected to said second corona; a housing mounting said inputs and said corona outputs along a circular path so that said inputs are located at diametrically opposite positions on said path and said corona outputs are located at diametrically opposite positions on said path with said corona outputs shifted 90° with respect to said inputs; a rotor rotatably mounted in said housing about a rotational axis extending through the center of said circular path and defining a cylindrical periphery thereon concentric with said circular path, said rotor further defining a pair of diametrically opposed, outwardly facing slots therein opening onto said cylindrical periphery of said rotor and oriented generally parallel to the rotational axis of said rotor; a first thin elongate contact member; and a second



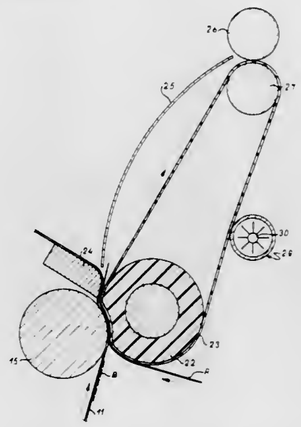
thin elongate contact member, each of said contact members including an inwardly extending resilient protrusion sized to be resiliently received in one of said rotor slots centrally located along the length of said contact member and a pair of opposed resilient contact arms extending outwardly from opposite sides of said protrusion, each of said contact members having a length equal to about 90° of the periphery of said rotor, said protrusion on said first contact member received in one of said rotor slots to mount said first contact member on said rotor in alignment with said inputs and said outputs for movement with said rotor, said protrusion on said second contact member received in the other of said rotor slots to mount said contact member on said rotor diametrically opposite said first contact member and in alignment with said inputs and said outputs for movement with said rotor so that the resiliency of said contact arms of each of said contact members are urged away from said cylindrical periphery of said rotor toward positively contact said inputs and said outputs so that said first contact member alternatively connects said first input to said first corona output when said rotor is in said first position and to said second corona output when said rotor is in said second position, and said second contact member alternatively connects said second input to said second corona output when said rotor is in said first position and to said first corona output when said rotor is in said second position and so that said first and second corona output and said first and second corona units are disconnected from said power supply means for a prescribed minimum period of time while said rotor is moved between said first and second positions.

4,095,886

PROCESS AND APPARATUS FOR FIXING IMAGES

Gerardus A. J. Koeleman, Velden, and Franciscus A. A. E. van de Laarschot, Geldrop, both of Netherlands, assignors to Océ-van der Grinten N.V., Venlo, Netherlands,

Filed Mar. 16, 1977, Ser. No. 778,067
Claims priority, application Netherlands, Mar. 18, 1976, 7602822
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 FU **14 Claims**



1. In a process for fixing onto paper images formed of thermoplastic material, wherein the material of such an image in thermally softened condition is transported through a pressure zone while being pressed between and in contact with the paper and a belt moving together through said zone, and upon leaving said zone the paper and belt are separated from each other by forced movement of the belt along a path turning away from the paper, the improvement which comprises maintaining the thickness of said belt, the speed of movement of said belt and the radius of curvature of said path in a relationship represented by the formula $(D \times V/R) \geqq 0.05$, in which D is said thickness (in meters), V is said speed (in meters per second) and R is said radius (in meters).

4,095,887

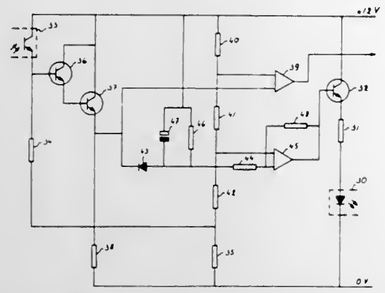
DETECTOR CIRCUIT FOR ELECTROPHOTOGRAPHIC COPIER

Jozef Marie van Herten, Venlo, and Bastiaan Bernard Boele Eertink, Grubbenvorst, both of Netherlands, assignors to Oce-van der Grinten N.V., Venlo, Netherlands

Filed Aug. 2, 1976, Ser. No. 710,785
Claims priority, application Netherlands, Aug. 8, 1975, 7509460
Int. Cl.² G03G *21/00*
U.S. Cl. 355—3 BE **9 Claims**

1. In an electrophotographic copying apparatus comprising a photoconductive belt having on one side thereof regularly spaced markings the reflectivity of which differs from the average reflectivity of the said belt side, detector means including a light source and a photoelement located adjacent to said belt side for generating a signal pulse each time a marking passes the detector means and a copying control circuit to receive the signal pulses, the improvement which comprises said detector means including means for emitting a detector signal proportional to the amount of light sensed by said photoelement, a signal modifying circuit separated from said copying control circuit and including means for maintaining an

output signal at a level corresponding to the average value of said detector signal and a detector light control circuit including means responsive to said output signal for controlling the intensity of said light source.



4,095,888

COLOR ELECTROPHOTOGRAPHY APPARATUS

Motoaki Kawazu; Masataka Ide, and Atsushi Kawamura, all of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 9, 1975, Ser. No. 585,202

Claims priority, application Japan, Jun. 10, 1974, 49-65722; Jun. 14, 1974, 49-67713

Int. Cl.² G03B *27/74*

U.S. Cl. 355—4 **7 Claims**

1. Color electrophotography apparatus comprising:
a photoconductive member;
a plurality of elongated light transmitting elements provided between the surface of the photoconductive member and the surface of an original document, the cross sectional area of the light transmitting elements constituting an exposure aperture;
drive means for producing relative movement between the original document, photoconductive member and light transmitting elements so that the original document and photoconductive member move relative to the ends of the light transmitting elements at the same speed;
illumination means to illuminate the original document for three sequential color separation exposures so that three respective color images are formed on the surface of the photoconductive member by the light transmitting element; and
means for covering the ends of predetermined numbers of the light transmitting elements and thereby the exposure aperture in accordance with the brightness of illumination of the original document by the illumination means during the color separation exposures in such a manner that the effective brightness of illumination is the same for the three color separation exposures.

4,095,889

EXPOSURE SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE

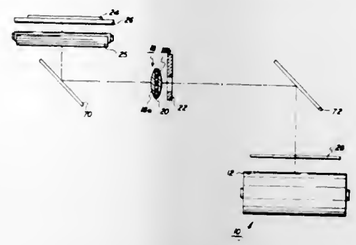
Robert N. Goren, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 22, 1976, Ser. No. 651,315

Int. Cl.² G03G *15/01;* **G03B** *27/76*

U.S. Cl. 355—4 **8 Claims**

1. An electrophotographic printing machine of the type having an electrostatic latent image of an original document recorded on a photoconductive member, wherein the improvement includes:
means for illuminating the original document;
a lens for creating a light image of the original document from the light rays transmitted thereto;
a screen member positioned in the optical light path and spaced from the photoconductive member for modulating the light rays transmitted therethrough; and
an opaque member operatively associated with said lens and having a plurality of equally spaced transparent regions therein with the distance between said screen member and photoconductive member being proportional to the distance between said opaque member and photoconductive member, said screen member being spaced from the photoconductive member a distance such that the light rays transmitted through different transparent regions of said opaque member and passing through said screen member are in coincidence with one another on the photoconductive member.



4,095,890

XEROGRAPHIC COPYING APPARATUS

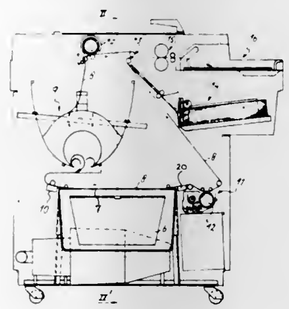
Jozef Marie van Herten, Venlo, Netherlands, assignor to Océ-van der Grinten N.V., Venlo, Netherlands

Filed Jun. 24, 1976, Ser. No. 699,652

Claims priority, application Netherlands, Jun. 24, 1975, 7507493

Int. Cl.² G03G *15/00*

U.S. Cl. 355—14 **14 Claims**



1. In a xerographic copying apparatus comprising a photoconductive imaging medium movable along a processing path having in succession therealong a device for charging said medium, a station for exposure of the charged medium to form a charge image thereon, and a station for developing the charge image, and exposing means including at least one light source for illuminating an original and thereby imagewise illuminating the charged medium at said exposure station, the improvement which comprises means for detecting the intensity of the illumination issued by said exposing means and for emitting a signal when said intensity is below a level sufficient to form on the charged medium a charge image properly developable at said developing station, and means responsive to said signal for discharging the charged medium at a location in said path between said exposure station and said developing station, thereby preventing development if a proper charge image is missing.

4,095,891

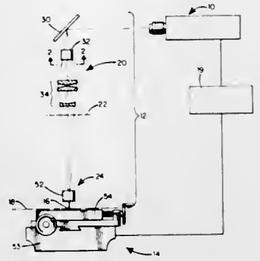
ON-THE-FLY PHOTORESIST EXPOSURE APPARATUS

Howard Byron Lovering, Bedford, Mass., assignor to GCA Corporation, Bedford, Mass.

Filed Dec. 27, 1976, Ser. No. 754,332

Int. Cl.² G03B *27/48, 27/50*

U.S. Cl. 355—50 **2 Claims**



1. An on-the-fly exposure system for exposing surfaces coated with photoresist materials comprising
a dye laser source of electromagnetic energy capable of lasing at a wavelength to which the photoresist is highly sensitive,
a synchronization means operable in combination with said laser source to provide pulses of electromagnetic energy from the laser source at predetermined times while the photoresist is in continuous motion relative to the laser, said pulses having a duration of less than about 250 nanoseconds,
an optical projection system having
an object plane,
an image plane,
a first optical system for projecting a substantially uniform spatial distribution of electromagnetic energy from said laser onto said object plane, said first optical system including an integrator means, and
a second optical system for imaging said object plane onto said image plane,
a movable support surface for supporting said photoresist coated surface in the image plane and for continuously moving the photoresist coated surface in the image plane in response to a set of commands from the synchronization means, and
means to provide a pattern in the object plane limiting the spatial distribution of energy reaching the image plane.

4,095,892

PHOTOGRAPHIC DEVELOPING APPARATUS EMPLOYING AN EASEL SELECTIVELY LOCATABLE ON A SUPPORT

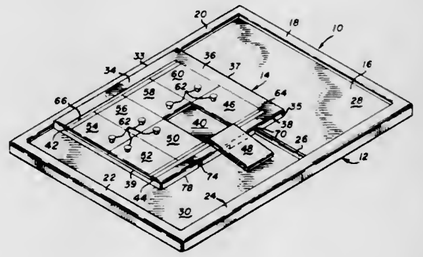
Leonard A. Thornton, 902 Lockwood La., Santa Cruz, Calif. 95066

Filed Sep. 17, 1976, Ser. No. 724,414

Int. Cl.² G03B *27/58*

U.S. Cl. 355—74 **16 Claims**

1. A photographic developing apparatus comprising:
an easel having a rectangular shape in plan view with opposed upper and lower edges, opposed first and second side edges and opposed top and bottom surfaces, said easel including first and second opposed elongated sidewalls adjacent said side edges and protruding from said top surface so as to form the central portion of said top surface into a rectangular planar paper support surface having an areal dimension capable of supporting a sheet of photographic print paper, a plurality of covers arranged in first and second parallel columns in a covering relationship on said paper support surface, first hinge means for hinging said covers in said first column to said first sidewall such that said covers are capable of being selectively opened and closed, second hinge means for hinging said covers in said second column to said second sidewall such that said covers are capable of being selectively opened and closed, and first means formed on said bottom surface that are capable of being engaged; and
an easel support including a planar surface having a central area corresponding to a predetermined location, four elongated elements protruding from said planar surface and arranged in a rectangular pattern, said elements each including an inner locating surface so as to provide opposed first and second side surfaces and opposed upper and lower surfaces, said side surfaces and said upper and lower surfaces having a dimension such that when said easel is positioned on said planar surface with its lower edge and its first side edge abutting said lower and said first surfaces, respectively, the upper cover in the second column is in said predetermined location, and second means forming a portion of said planar surface into an easel guide and serving to cooperate with said first means so as to engage and retain said easel in a plurality of fixed locations, each said fixed location corresponding to a location wherein a cover is disposed in said predetermined location, whereby when the first side edge abuts said first surface and said first and second means are engaged each cover in said second column is capable of being located in said predetermined location, and whereby when the second side edge abuts said second surface and said first and second means are engaged each cover in said first column is capable of being located in said predetermined location.



4,095,893

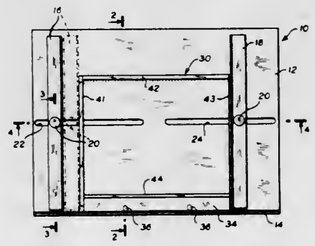
ADJUSTABLE ENLARGING EASEL

Frederic B. Handsman, Bayside, N.Y., assignor to Ehrenreich Photo-Optical Industries, Inc., Woodbury, N.Y.

Filed Oct. 13, 1976, Ser. No. 731,944

Int. Cl.² G03B *27/58*

U.S. Cl. 355—74 **7 Claims**



1. An adjustable enlarging easel including in combination a plate for holding a sheet of photographic paper that is to be exposed, a flange extending upward along one side of the plate, retainers supported by the top surface of the plate and extending generally normal to the flange, two slots opening through the plate and which extend from a mid-portion of the plate

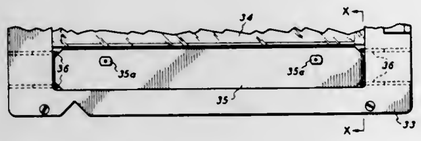
toward opposite edges thereof, a clamping element located on the underside of the plate under each retainer and permanently connected loosely to its associated retainer, and a connector extending from each of the retainers to its respective clamping element and operable to pull the clamping element into contact with the underside of the plate to clamp the retainer in a fixed position for holding a sheet of photographic paper at a predetermined location on the easel, the connector for each retainer being a screw with a knob head at its upper end and a shoulder on the underside of the knob head in position to contact with the retainer, said screw extending through the slot and retainer and being connected to the clamping element below the plate for pulling the clamping element toward the underside of the plate to clamp the retainer in any set position on the plate when said knob head is rotated on said screw.

4,095,894

MICROFORM CARD HOLDER FOR MICROPRINTER

Robert George Holliday, Ann Arbor, Mich., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 3, 1977, Ser. No. 814,252
Int. Cl.[2] G03B *27/62*
U.S. Cl. 355—75 **2 Claims**



1. A microform card holder for an office-type microprint copier, comprising:

a platen comprised of a first frame containing a substantially transparent first plate member having at least one linear edge, and a bar member disposed along said edge;

wherein, said bar member has at least one raised pin for engaging a perforation of a microform card;

wherein, the corners of said bar member are at acute angles with respect to the edges thereof;

and wherein said first frame has openings which accept four set screws adapted to adjustably impinge the four angled corners of said bar member to modify the position thereof with respect to said first frame.

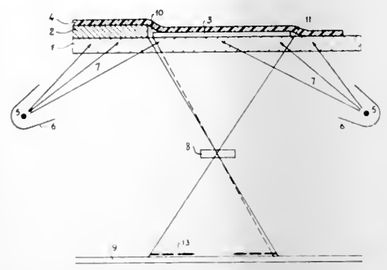
4,095,895

METHOD AND MEANS FOR PREVENTING EDGE SHADOW EFFECTS DURING EPISCOPIC EXPOSURE OF AN ORIGINAL

Franciscus J. H. M. Seelen, and Andreas P. H. M. Timmermans, both of Venlo, Netherlands, assignors to Oce-van der Grinten N.V., Venlo, Netherlands

Filed Aug. 26, 1976, Ser. No. 717,883
Claims priority, application Netherlands, Sep. 1, 1975, 7510270
Int. Cl.[2] G03B *27/32, 27/54, 27/62*
U.S. Cl. 355—77 **8 Claims**

1. A method for preventing edge shadow effects upon episcopic exposure of an original lying underneath a platen cover on a transparent exposure plate, which comprises during such exposure passing light through a light transmitting member at least a portion of which is disposed on said plate underneath said cover in the plane of the original and directing light transmitted by said member onto a side edge of the original from an edge of said member confronting said side edge.

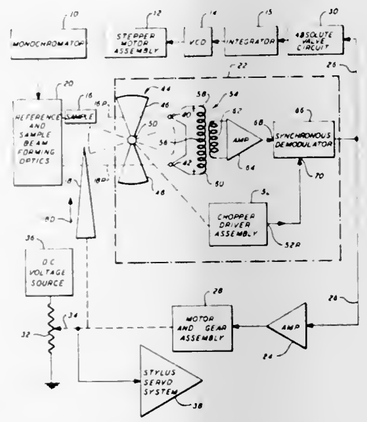


4,095,896

ADAPTIVE GRATING RATE CONTROL

Paul Conway Talmadge, Ansonia, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed May 10, 1976, Ser. No. 684,978
Int. Cl.[2] G01J *3/42*
U.S. Cl. 356—89 **3 Claims**



1. In a spectrophotometric apparatus including means for scanning a spectrum to produce radiation of monotonically varying wavelength, means for forming of said radiation a sample beam and a reference beam, means for detecting and comparing the respective intensities of said sample and reference beams to generate an error signal representative of the difference in intensity of said beam, the improvement comprising feedback means for conlrotting the scanning rate of said scanning means as a function of the integral of said error signal when said error signal has a magnitude above a threshold.

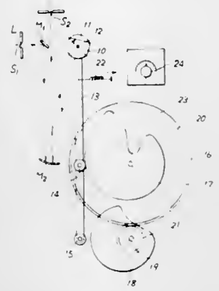
4,095,897

WAVELENGTH DRIVING DEVICE FOR USE IN MONOCHROMATORS

Yoshio Tsunazawa, and Masanao Nishida, both of Kyoto, Japan, assignors to Shimadzu Seisakusho Ltd., Kyoto, Japan

Filed Sep. 27, 1976, Ser. No. 726,838
Int. Cl.[2] G01J *3/14*
U.S. Cl. 356—100 **13 Claims**

1. A wavelength driving device for use in monochromators, comprising: means for dispersing light into different wavelengths; cam means comprising a first and a second cam; means interposed between said cam means and said dispersing means and operable in response to said cam means to operate said dispersing means so that only each predetermined one of said cams operates at one time to cause said dispersing means to provide wavelengths within a predetermined portion of the whole wavelength range covered by said dispersing means; said interposed means comprising lever means connected to said dispersing means and a first and a second cam follower mounted on said lever means; said first and second cams so contoured and mechanically connected to each other that for a predetermined angle within one revolution of said first cam said first cam follower alone is in contact with said first cam while for the remaining rotational angle of said first cam said second cam follower alone is in contact with said second cam.

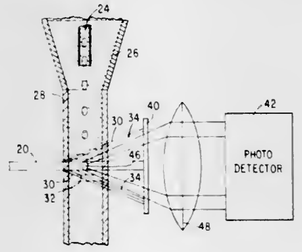


4,095,898

PARTICLE ANALYSIS SYSTEM WITH PHOTOCHROMIC FILTER

Mack J. Fulwyler, Los Alamos, N. Mex., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Filed Jun. 10, 1976, Ser. No. 694,531
Int. Cl.[2] G01N *21/00, 15/02*; G02B *5/23*
U.S. Cl. 356—103 **1 Claim**



1. A particle analysis system including in combination;

means for forming a flow stream containing particles to be detected,

a source of light for producing a light beam,

means for directing said light beam through said flow stream at a first location in a first direction, said light beam passing through said flow stream producing light reflections and a light pattern, said light pattern, light reflection and light beam passing through said flow stream varying rapidly and for a short time period in response to passage of a particle through said first location,

a background light filter aligned with said light beam for receiving said light beam passed through said flow stream and for receiving said light pattern and light reflections, said background light filter being operative to slowly increase in optical density at the points thereon where said light pattern light beam and light reflections strike said filter and attenuate said light pattern, light beam and light reflections as they pass through said filter in said first direction, said filter being substantially insensitive to said rapid, short time period variations in said light pattern, light reflections and light beam for passing said variations through said filter in said first direction substantially unattenuated, said filter including a photochromic transparent medium,

photodetector means for receiving said light beam, light pattern and light reflections passed through said filter in said first direction, said photodetector means operative to develop signals which vary in accordance with variations in said light reflections, light pattern and the light beam received thereat, and

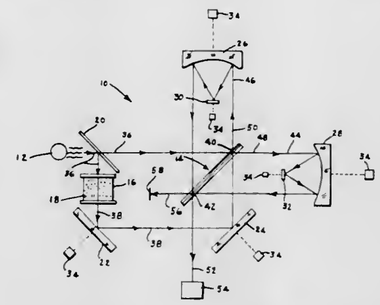
detection means coupled to said photodetector means and operative in response to said signal variations to detect said particle.

4,095,899

APPARATUS FOR DOUBLE-BEAMING IN FOURIER SPECTROSCOPY

George A. Vanasse, Chelmsford, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 662,995
Int. Cl.[2] G01B *9/02*
U.S. Cl. 356—106 S **1 Claim**



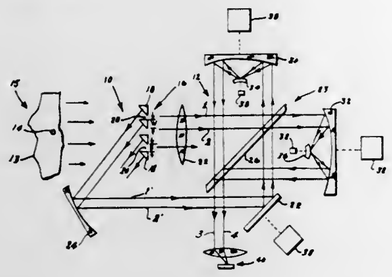
1. An apparatus for performing double-beaming in Fourier spectroscopy comprising a single source of radiant energy for producing a beam of radiation, means in optical alignment with said beam of radiation for splitting said beam emanating from said source into a first and a second input beam, a cell being in optical alignment with said second input beam, said cell having a gas located therein, said second input beam passing through said cell, said first input beam having a spectrum corresponding to the spectrum of said source while said second beam emanating from said cell has a spectrum corresponding to the spectrum of said source minus the spectrum of the radiation absorbed by said gas within said cell, a beamsplitter in optical alignment with said first and second input beams, said first input beam striking said beamsplitter on a preselected location on one face thereof, said second input beam striking said beamsplitter on said preselected location on a face of said beamsplitter opposite said one face, a plurality of mirror assemblies in optical alignment with said first and second input beams and said beamsplitter for causing said first and second input beams to intersect each other at another location on said beamsplitter resulting in an output beam therefrom, said other location on said beamsplitter being spaced apart a distance from said preselected location sufficient to prevent overlapping of said first and second input beams at said preselected location with said output beam, at least one of said plurality of mirror assemblies being made up of a pair of optically aligned and opposed mirrors wherein said input beams which are incident on and reflected from said mirror assembly are substantially parallel to each other and are substantially "on-axis" and means for detecting said output beam emanating from said beamsplitter, said output beam being in the form of an interferogram having structure due only to said spectrum of radiation absorbed by said gas.

4,095,900

OPTICAL TECHNIQUE FOR BACKGROUND SUPPRESSION

Randall E. Murphy, 62 Conant St., Acton, Mass. 01720; George A. Vanasse, 71 Old Stage Rd., Chelmsford, Mass. 01824, and Alva T. Stair, Jr., 76 Jennie Dugan Rd., Concord, Mass. 01742

Filed Aug. 12, 1976, Ser. No. 713,749
Int. Cl.[2] G01B *9/02*
U.S. Cl. 356—106 S **7 Claims**



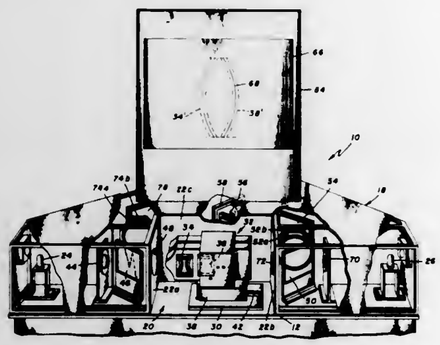
1. An apparatus for use during target detection comprising a plurality of reflective elements spaced a predetermined distance apart from each other for dividing structured background radiation containing said target into first beams of light containing said background radiation alone and second beams of light containing both said background radiation and said target radiation, said space between said reflective elements being substantially equal to the width of each of said reflective elements and said width being substantially equal to or greater than 10 times the wavelength of said background and target radiation, and means optically aligned with said first and said second beams of light for suppressing the radiation common to both said first and said second beams of light and for producing an output beam in the form of an interferogram having stucture due only to said target radiation.

4,095,901

ALIGNMENT APPARATUS FOR ROLLING MILL ROLLER GUIDES

Willem Brouwer, Lexington, and Richard J. Reardon, Boylston, both of Mass., assignors to Morgan Construction Company, Worcester, Mass.

Filed Mar. 28, 1977, Ser. No. 781,581
Int. Cl.[2] G01B *11/27, 11/26;* B21C *51/00*
U.S. Cl. 356—153 **9 Claims**



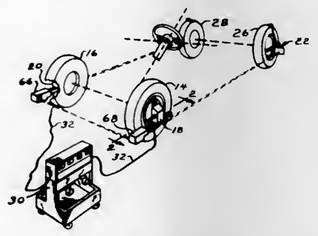
1. Apparatus for observing the relative alignment of two pairs of guide rollers on a rolling mill roller guide, comprising: first and second light sources; means for mounting the roller guide in a position such that the two pairs of guide rollers are spaced along an axis extending between said light sources; a first dichroic mirror arranged along said axis between said first light source and one of the pairs of guide rollers, a second dichroic mirror arranged along said axis between said second light source and the other of the pairs of guide rollers, each of said dichroic mirrors having the capacity to transmit different colored light, with the light transmitted by one dichroic mirror being reflected by the other dichroic mirror away from said axis; a screen remote from said axis; and projection means for projecting the light reflected by each of said dichroic mirrors onto said screen to thereby produce different colored images of each of the pairs of guide rollers.

4,095,902

AUTOMOBILE WHEEL ALIGNMENT DEVICE AND METHOD

Richard H. Florer, Blue Grass, and Peter A. Puetz, Davenport, both of Iowa, assignors to Applied Power Inc., Milwaukee, Wis.

Filed Mar. 1, 1976, Ser. No. 662,966
Int. Cl.[2] G01B *11/275*
U.S. Cl. 356—155 **38 Claims**



1. An apparatus for measuring angular relationships of vehicle wheels comprising: a head unit; means for positioning the head unit in a predetermined relationship with a first vehicle wheel; means for selectively projecting a beam relative to the head unit to beam receiving means; the selective projecting means being connectable to a power source; beam receiving means; means for positioning the beam receiving means relative to second, third and fourth vehicle wheels; means for measuring the positional orientation of said third and fourth vehicle wheels in relation to a reference axis for determining a vehicle thrust-line reference; and indicating means for registering angular relationships between beams projected to beam receiving means on said second and third vehicle wheels and the reference axis for indicating the angular disposition of the first and second vehicle wheels with respect to the vehicle thrust-line reference.

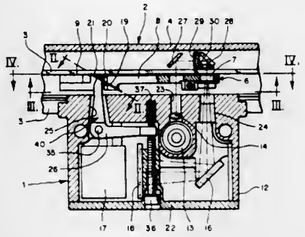
4,095,903

MEASURING APPARATUS

Kurt Feichtinger, Katzwalchen, Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Germany

Filed Mar. 14, 1977, Ser. No. 777,116
Claims priority, application Germany, Mar. 18, 1976, 2611459
Int. Cl.[2] G01B *11/04*
U.S. Cl. 356—169 **24 Claims**

1. A measuring apparatus comprising:
an elongated hollow body;
a measuring scale attached within the hollow body;
a reading unit for the measuring scale; and
means for coupling the reading unit to a measured object in a hinge-like manner and for urging the reading unit against auxiliary guide surfaces;
said coupling means comprising a first coupling part provided with an arcuate surface, a second coupling part provided with a planar surface to contact the arcuate surface, and a spring member to maintain the first and second coupling parts in contact and to urge the reading units against the axuiliary guide surfaces.

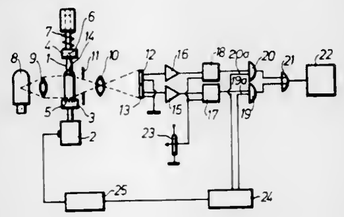


4,095,904

DEVICE FOR OBJECTIVE CHECKING FOR FOREIGN BODIES IN OPTICALLY TRANSPARENT CYLINDRICAL CONTAINERS FILLED WITH LIQUIDS

Hans Joachim Klein, Wuppertal; Fritz Henze, Leverkusen, both of Germany; Bernhard Vinzelberg, deceased, late of Leverkusen, Germany (by Selma Margot Vinzelberg, Peter Vinzelberg, heirs), and by Susanne Klein nee Vinzelberg, heir, Remscheid, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 19, 1976, Ser. No. 687,845
Claims priority, application Germany, Jun. 11, 1975, 2525912
Int. Cl.[2] G01N *21/24*
U.S. Cl. 356—197 **8 Claims**



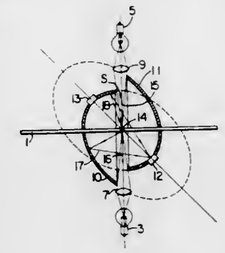
1. An apparatus for monitoring for foreign bodies in an optical transparent container containing a liquid, comprising means for producing a beam of light for passing through the container, a device for rotating the container and subsequently braking the rotating motion, a plurality of photodetectors arranged one above another, an amplifier connected to each of the photodetectors, gate means for switching on the amplifiers to activate the photodetectors in groups successively from top to bottom and a control unit operatively connected to the gate means to enable same to effect activation of the photodetectors in a sequence which is defined by the disappearance of the vortex from the scanning field associated with the respective photodetector group and a lens provided with aperture means for imaging the central portion of the liquid column onto the photodetector array.

4,095,905

SURFACE-DEFECT DETECTING DEVICE

Asahiro Kuni, Tokyo, and Nobuyuki Akiyama, Yokohama, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 17, 1976, Ser. No. 715,218
Claims priority, application Japan, Aug. 20, 1975, 50-100210; Oct. 17, 1975, 50-124395
Int. Cl.[2] G01N *21/32*
U.S. Cl. 356—200 **26 Claims**



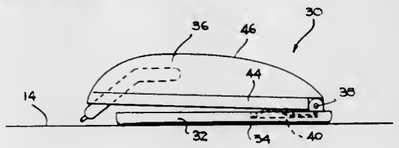
1. A surface-defect detecting device comprising:
illuminating means for illuminating a zone on the surface of a material to be inspected;
reflecting means including at least a pair of reflecting surfaces for reflecting and focussing light being irregularly reflected at said illuminated zone by the presence of defects, said reflecting surfaces having first focal points at said illuminated zone and second focal points to which said irregularly reflected light is reflected by said reflecting surfaces; and
photoelectric detecting means positioned at said second focal points for converting said irregularly reflected light into electrical signals being representative of defects on the surface of said material to be inspected.

4,095,906

WRITING INSTRUMENT

Marvin Elmer Sackett, 5430-A Garfield Ave., Sacramento, Calif. 95841

Filed Aug. 16, 1976, Ser. No. 714,852
Int. Cl.[2] A46B *11/00, 17/08*
U.S. Cl. 401—48 **2 Claims**



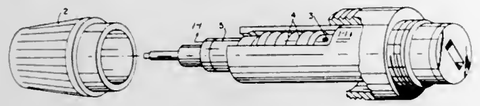
1. A writing instrument for writing on paper and the like that presents a flat, smooth writing surface, said instrument comprising:
a pear-shaped paper engaging body having a wide rear portion and a narrow forward neck portion;
a stylus positioned within said neck portion and angled downward at an acute angle from the vertical, said stylus having its point substantially in the plane of the bottom surface of said body,
the pear-shaped body having a lower portion for sliding upon a writing surface and an upper portion for carrying said stylus;
spring means between said upper and lower portions for biasing said lower and upper portions away from each other;
said spring means comprising a leafed spring between said upper and lower portions;
and further comprising a substantially horizontal pivot be-

tween said upper and lower portions and positioned upon the rearward end of said body.

4,095,907
COVER FOR SCRIBER

Lasse Kuparinen, Hamburg, Germany, assignor to Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.

Filed Sep. 22, 1976, Ser. No. 725,618
Claims priority, application Germany, Sep. 25, 1975, 2542734; Sep. 25, 1975, 7530355[U]
Int. Cl.² B43K *5/18*
U.S. Cl. 401—225 **2 Claims**



1. In a capillary writing pen of the type having an ink reservoir communicable with a writing tip, the improvement comprising:

(A) an expansion chamber interconnecting the reservoir and ambient air as a capillary channel apart from the writing tip and having an inner and outer wall for the flow of ink;

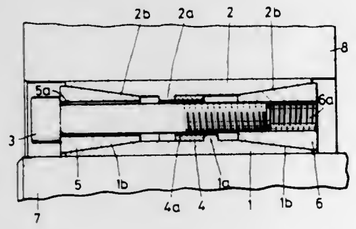
(i) an inner wall of said chamber having a series of continguous indentations extending transversely such that in cross-section a triangular wave profile is defined with respect to the outer wall of said chamber, and

(ii) said indentations further defining within said capillary channel successive areas of expansion and constriction, such that ambient air is entrapped in the areas of expansion and menisci of ink are formed in the areas of constriction.

4,095,908
COUPLING UNIT

Horst-Dieter Schäfer, Willich; Paul Loosen, Krefeld; Ulrich Klören, Krefeld, and Hans-Martin Thiele, Krefeld, all of Germany, assignors to Ringfeder G.m.b.H., Krefeld-Uerdingen, Germany

Filed Mar. 2, 1977, Ser. No. 773,841
Claims priority, application Germany, Mar. 5, 1976, 2609042
Int. Cl.² F16D *1/06*
U.S. Cl. 403—16 **7 Claims**

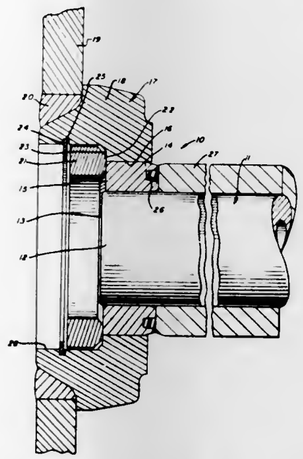


1. An arrangement for coupling a shaft with a surrounding hub, comprising an inner annular member surrounding said shaft and having an outer circumferential face including two first sections which taper coaxially in mutually opposite axial directions of said inner member; an outer annular member having two axial ends and an inner circumferential face surrounding said outer circumferential face with clearance and having two second sections each having a taper and each forming with one of said first sections a wedge-shaped annular clearance; tensioning members received in the respective wedge-shaped clearances; first means for drawing said tensioning members inwardly of the respective wedge-shaped clearance to thereby force said inner member against the shaft and said outer member against the hub; and second means coacting with said first means and operative for dislodging said tensioning members from said wedge-shaped clearance when desired, by applying an axially acting force from one and the same axial end irrespective of which one of said tensioning members is to be dislodged, and said second means comprising an abutment ring and a pair of axially spaced abutments each provided on one of said outer and inner circumferential faces, respectively, and confining said abutment ring between them and each preventing movement of said abutment ring in one axial direction while the respective outer and inner faces allow such movement in the opposite axial direction.

4,095,909
CARTRIDGE PIN MOUNTING

John P. Mackoway, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 11, 1977, Ser. No. 814,374
Int. Cl.² F16C *11/00*
U.S. Cl. 403—14 **9 Claims**



1. A cartridge pin mounting wherein a cartridge pin is secured in accurately preselected relationship to a frame portion having a mounting hole opening outwardly through an outer surface thereof, said mounting comprising: surface means on said pin defining an outwardly longitudinally facing outer end surface and a radially outer peripheral surface complementary to said mounting hole, said surface means being installed in said mounting hole with said outer end surface flush with said frame outer surface to provide a preselected accurate mounting of said pin in said frame portion hole; and retaining means on said frame portion longitudinally outwardly of said frame outer surface for maintaining the surface means against undesirable longitudinally outward displacement and thereby maintain the flush disposition of said surface means outer end surface and said frame outer surface.

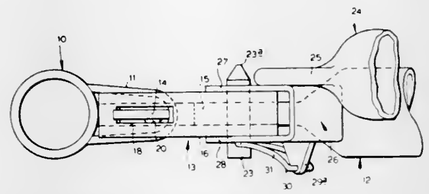
4,095,910
BUILDERS SCAFFOLDING JOINTS

Raymond Ernest Steele, Kenilworth, and Andrew Charles Owens, Hereford, both of England, assignors to Kwikform Limited, Birmingham, England

Filed May 11, 1977, Ser. No. 795,921
Claims priority, application United Kingdom, May 15, 1976, 20181/76
Int. Cl.² E04G *7/00*
U.S. Cl. 403—49 **13 Claims**

1. A scaffolding structure comprising upright members connected together by cross members and including additional members which serve as braces, including at least one brace secured to a member, the brace being provided with at least

one transverse pin and the member being provided with an aperture for the reception of the pin, the brace having means

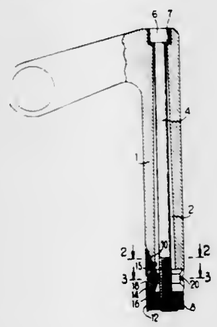


captively associated therewith for releasably restraining the brace from movement in a direction longitudinally of the pin.

4,095,911
BLOCKING DEVICE FOR A HANDLE-BAR STEM

Bernard Lacroix, Montbeliard, France, assignor to Cycles Peugeot, Valentigney, France

Filed Jun. 29, 1976, Ser. No. 700,927
Claims priority, application France, Jul. 11, 1975, 75 21911
Int. Cl.² F16B *2/14*
U.S. Cl. 403—104 **4 Claims**

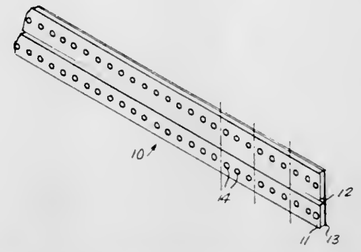


1. In a structure comprising in combination: a handle-bar stem having a cylindrical plunger tube for insertion in a cylindrical fork tube of a wheeled vehicle, and a device for blocking the plunger tube in the fork tube; the improvement comprising in combination a tightening screw extending through the plunger tube in coaxial and rotatable relation to the plunger tube, a nut screwthreadedly engaged on and coaxial with the screw, the plunger tube defining at least three first bevelled faces in the vicinity of a lower end of the plunger tube, the nut defining a number of second bevelled faces corresponding to the number of first-bevelled faces, the second faces of the nut being upwardly convergent and the first faces of the plunger tube being downwardly convergent relative to the axis of the plunger tube, and expanding means comprising a number of double wedges arranged around the axis of the screw corresponding to the number of first-bevelled faces, each double wedge having a planar bevelled third face and a planar bevelled fourth face respectively bearing laterally against a corresponding first face of the tube and a corresponding second face of the nut, said first, second, third and fourth faces having in planes perpendicular to the axis of the plunger tube a rectilinear contour whose radius is centered on the axis of the plunger tube, and the planar faces of said double wedges terminate in spaced lateral edges which are in engagement with those of an adjacent double wedge along the median plane transverse thru said double wedges, with the outer peripheries of said double wedges contiguous with the outer periphery of said plunger tube, the screw having an enlarged end portion which is in axial abutting relation to the stem and is accessible from outside the stem, and the screw being cooperative with the nut to urge the double wedges radially outwardly against the fork tube by axial displacement of the nut on the screw upon rotation of the screw relative to the plunger tube, and means for retaining the double wedges between the plunger tube and the nut.

4,095,912
BEAM CONNECTION PLATE

Charles A. Hagberg, 732 N. Midvale Blvd., Madison, Wis. 53705

Filed Apr. 20, 1977, Ser. No. 789,288
Int. Cl.² F16B *7/00*
U.S. Cl. 403—187 **3 Claims**

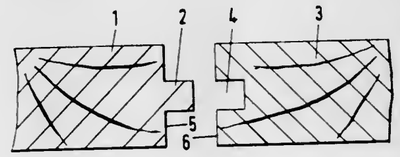


1. A beam connection plate for joining structural members comprising a sheet steel plate, an indentation along the center line of the plate, a thin backing plate attached over the steel plate, and a plurality of evenly spaced holes along the sides of the steel plate wherein the connection plate is cut to fit between the horizontal arms of an I beam and wherein the vertical arm of the I beam is placed within the indentation, and a welding bead is laid between the vertical arm and the connection plate.

4,095,913
TONGUE AND GROOVE JOINT

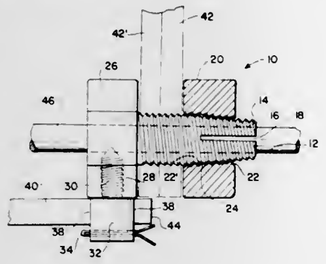
Nils Ingvar Pettersson, Bruksvagen 31, 752 41 Uppsala, and Olle Gideon Carlsson, Brillingevägen 3, 754 45 Uppsala, both of Sweden

Filed Oct. 6, 1976, Ser. No. 729,998
Claims priority, application Norway, Jun. 11, 1976, 762032; Germany, Jun. 14, 1976, 2626530; United Kingdom, Jun. 14, 1976, 24613/76
Int. Cl.² B25G *3/02*
U.S. Cl. 403—364 **5 Claims**



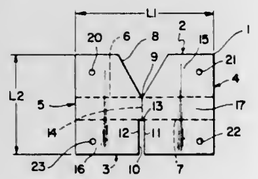
1. A first member adapted to form a tongue and groove joint with a second member, said first member being provided, with means defining a groove on one edge thereof said groove having two parallel sides and a base transverse thereto, said groove being provided with a spacer member in the form of a protuberance extending into said groove from its base, said protuberance being formed integrally with the material forming the member, said second member being provided on an edge thereof opposed to said edge provided with said groove, with a tongue, said protuberance being adapted to space said tongue from said base of said groove, wherein the distance between the innermost part of said protuberance and said edge in which said groove is formed is less than the distance between the tip of said tongue and said edge on which said tongue is formed.

4,095,914
FASTENER FOR SECURING A SHAFT TO A PLATE
Wilbur J. Thomsen, Round Lake, Minn. 56167
Filed Feb. 28, 1977, Ser. No. 772,352
Int. Cl.[2] F16B *39/36*
U.S. Cl. 403—389 1 Claim



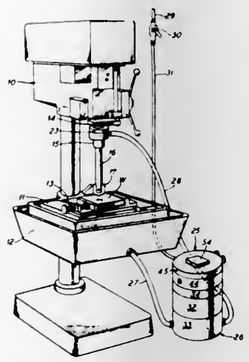
1. Fastener apparatus comprising cone means having a longitudinal opening, said opening running the full length of said cone means, said opening adapted to receive shaft means, said cone means having screw threads on the surface extending longitudinally from the tapered end towards the base thereof, longitudinal slot means in the tapered end of said cone means, said longitudinal slot means projecting from said screw threads into said opening, nut means having mating threads therein adapted to threadably engage said threads on said cone means, said mating threads extending around a cone shaped opening in said nut means, the surface of said cone shaped opening being substantially the same dimensions as the outer conical surface of the tapered end of said cone means, the base of said cone means terminating in flange means extending away from said opening, plate means removably attached to said flange through locking means, said plate means projecting towards said screw threads, said locking means comprising a set screw, said set screw extending into a head projecting beyond said flange, said plate having an opening therein for receiving the head of said set screw, plate securing means extending from said head of said set screw for holding said plate on said apparatus, said plate securing means comprising an opening in said head of said set screw, key means insertable through said opening in said head for engaging the surface of said plate and for holding said plate against said flange when said plate is positioned on said set screw.

4,095,915
CANVAS CORNER MOUNT
Carr F. Druell, Kennewick, Wash., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed May 27, 1977, Ser. No. 801,228
Int. Cl.[2] G09F *1/10*
U.S. Cl. 403—402 2 Claims



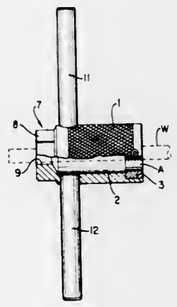
1. A canvas corner mount, comprising
a single sheet of substantially rigid bendable material of rectangular configuration having first and second spaced parallel edges of predetermined length and third and fourth spaced parallel edges of shorter than the predetermined length perpendicular to and joining the first and second edges, said sheet having first and second spaced parallel imaginary lines parallel to the first and second edges, the first imaginary line being the same distance from the first edge as the second imaginary line is from the second edge, a triangular notch cutout in said sheet and having its vertex on the first imaginary line and its base opposite said vertex opening at said first edge, and a narrow rectangular notch cutout in said sheet and extending from the second imaginary line to the second edge, the rectangular notch having long sides parallel to the third and fourth edges, a short side on the second imaginary line and another short side opening on the second edge, said cutouts being symmetrical about a center line parallel to the third and fourth edges, said sheet being folded along the first imaginary line to position a first area between the first imaginary line and the first edge perpendicular to the remainder of the sheet and being folded in the opposite direction along the second imaginary line to position a second area between the second imaginary line and the second edge perpendicular to a third area between the imaginary lines and extending parallel to and in the opposite direction from the first area, and said sheet being folded along the center line to close the triangular notch cutout whereby the two parts of the first edge are perpendicular to each other and the rectangular notch becomes a right angle.

4,095,916
TIMED INTERMITTENT AIR PROPELLED LIQUID COOLANT SYSTEM FOR MACHINE TOOLS
Earl J. Hammond, Frankenmuth, Mich., assignor to Houdaille Industries, Inc., Buffalo, N.Y.
Filed May 11, 1977, Ser. No. 795,709
Int. Cl.[2] B23B *35/00, 51/06, 3/00*
U.S. Cl. 408—1 R 26 Claims



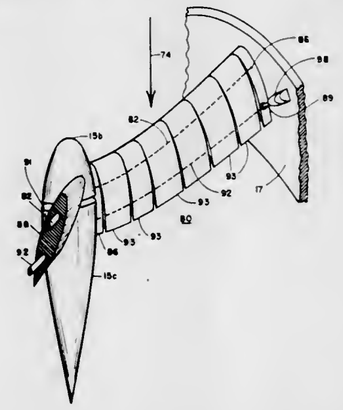
4. The method of cooling the tool of a machine tool and the workpiece engaged by the tool which comprises forming a column of liquid coolant, intermittently air pressure loading and venting to the atmosphere the top of said column of liquid coolant at selected frequencies and for selected durations, feeding coolant from said column to the tool of the machine tool, discharging liquid coolant under pressure at the tip of the tool against the workpiece, and recirculating coolant from the machine tool to said column when the column is under atmospheric pressure.

4,095,917
DIE HOLDER
Arden L. Wesner, 1235 Venus, St. Joseph, Mich. 49085
Filed Oct. 1, 1976, Ser. No. 728,750
Int. Cl.[2] B23G *1/46*
U.S. Cl. 408—239 R 1 Claim



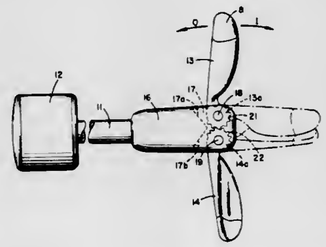
1. In a device for receiving and rotating a threading die, the combination comprising:
an elongated rigid body part having an elongated opening extending centrally therethrough, said elongated opening including an elongated central opening portion terminating at the opposite ends thereof in first and second end opening portions disposed adjacent the opposite ends of said body part;
said first opening portion being disposed adjacent and opening outwardly through one end of said body part, said first opening portion being bounded by a plurality of circumferentially spaced, inwardly facing flat walls which define a hexagonal die-receiving opening shaped for reception of a threading die therein;
said second end opening portion being disposed adjacent and opening outwardly through the other end of said body part, said second opening portion being bounded by a plurality of circumferentially spaced, inwardly facing flat walls which define a substantially rectangular extension-receiving opening shaped for the reception of a rectangular driving extension;
said body part adjacent said other end thereof being provided with at least one pair of opposed external flats for the reception of a wrench, said flats being substantially radially aligned with the walls defining the extension-receiving opening;
said body part also having a pair of handle openings formed radially therein on substantially diametrically opposite sides thereof, said handle openings being disposed intermediate the opposite ends of said body part and projecting radially inwardly from the outer peripheral surface thereof;
a pair of elongated rodlike handles having the inner ends thereof releasably secured within said pair of handle openings, said handles projecting radially outwardly of said body part in substantially diametrically opposite directions;
said die-receiving opening, said wrench section and said extension-receiving opening all being symmetrical about the central longitudinal extending axis of said central opening portion;
whereby a die held within the die-receiving opening of said body part may be rotated simultaneously with said body part as desired by manual application of force to said handles, by manual application of force through a wrench onto the flats of the wrench section, or by manual application of force through an extension to the walls defining said extension-receiving opening.

4,095,918
TURBINE WHEEL WITH CATENARY BLADES
William J. Mouton, Jr., Box 10515, New Orleans, La. 70181, and David F. Thompson, Box 183, Darby, Pa. 19023
Continuation-in-part of Ser. No. 622,568, Oct. 15, 1975, abandoned, which is a division of Ser. No. 467,772, May 7, 1974, abandoned. This application Dec. 2, 1976, Ser. No. 746,971
Int. Cl.[2] F01D *25/28*
U.S. Cl. 415—7 16 Claims



1. In a fluid-current motor including an axial-flow turbine wheel having sets of elongated blade structures extending radially from one blade end at a central hub to another end at a blade shroud-ring rim, said shroud ring being retained in a circumferential recess within the throat of a surrounding coaxial nozzle, said nozzle carrying sets of elongated strut structures and sets of elongated strut-vane structures extending inwardly from the inside of the nozzle to any axial wheel-hub-bearing housing associated with said wheel, the improvement comprising: providing at least one of said three sets with preshaped tensile members in the form of relaxed catenaries, with catenary bows lying at least partially in the fluid force directions.

4,095,919
FOLDABLE PROPELLERS
Nils Oluf Ehrenskjold, Kolding, and Torben Munk, Virum, both of Denmark, assignors to Gorivaerk AS, Kolding, Denmark
Continuation-in-part of Ser. No. 487,220, Jul. 10, 1974, Pat. No. 3,981,613. This application Jul. 16, 1976, Ser. No. 705,896
Claims priority, application United Kingdom, Jul. 11, 1973, 33044/73; Oct. 23, 1973, 49219/73
Int. Cl.[2] B63H *1/24*
U.S. Cl. 416—142 8 Claims



1. Fluid pumping apparatus comprising, in combination a shaft, means for rotating said shaft, and blade means for pumping fluid in a direction substantially parallel to the axis of said shaft independent of the hydrodynamic forces of said fluid, said blade means comprising a pair of blades adapted to be fully

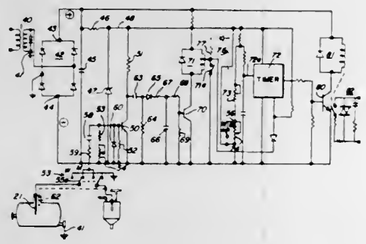
submerged in the fluid to be pumped and wherein said blades are adapted to assume a folded position extending rearwardly from said shaft and substantially parallel to the shaft axis, means for pivotally mounting said blades at their inner ends on said shaft for immersion within the fluid to be pumped, said blades being freely pivotal during the rotation of said shaft into an equilibrium angular position throughout an angular range extending in both directions from a 90° position and in a common axial plane with respect to the axis of said shaft to thereby balance the centrifugal and hydrodynamic forces exerted on said blades during the pumping of the fluid so that the blades freely assume a position depending on the centrifugal and hydrodynamic forces exerted thereon to pump the fluid in a direction substantially parallel to the shaft axis.

4,095,920

PUMP CONTROL

Lyle L. Needham, Bellwood, and Bruno J. Marusarz, Chicago, both of Ill., assignors to Babson Bros. Co., Oak Brook, Ill.

Filed Sep. 8, 1975, Ser. No. 611,177
Int. Cl.[2] A01J *5/00*; F04B *49/06*; G05D *9/12*
U.S. Cl. 417—12 **8 Claims**



1. In a liquid handling system having a liquid receiving chamber with a liquid level sensing electrode extending downwardly therein, a liquid level sensing circuit comprising:
- a transistor amplifier having an emitter-collector output circuit and a base control element;
- a capacitor connected in series between said electrode and the base of said transistor;
- a source of alternating signal;
- a full wave diode bridge rectifier having an input and an output, the input connected to said alternating source and the output providing a DC operating potential for said transistor output circuit;
- a common electrical reference for the source of alternating signal and the liquid in the receiver;
- a circuit connected with said source through said electrode and the liquid in the receiver, and with said transistor base element to cause the transistor amplifier to conduct when liquid contacts said electrode;
- a sensitivity resistor connected in shunt with the base-emitter circuit of said transistor amplifier;
- a diode connected from said base to the DC output of said rectifier bridge, said sensitivity resistor being connected in parallel with said diode; and
- means responsive to conduction of said transistor to indicate the liquid level in the receiver.

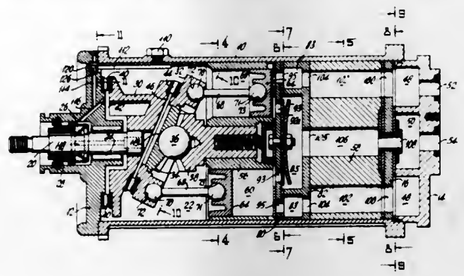
4,095,921

MULTI-CYLINDER COMPRESSOR HAVING SPACED ARRAYS OF CYLINDERS

Masaharu Hiraga, Isesaki, Japan, and Brian J. Taylor, Dallas, Tex., assignors to Sankyo Electric Co., Ltd., Isesaki, Japan

Filed Oct. 14, 1976, Ser. No. 732,349
Int. Cl.[2] F04B *27/08*
U.S. Cl. 417—269 **15 Claims**

1. A compressor comprising a housing having first and second end members, one of said end members defining inlet and outlet means for a fluid to be compressed, a first cylinder arranged within said housing, a second cylinder arranged within said housing and spaced axially from said first cylinder, means for directing fluid to and from said first and second cylinders, first and second piston means respectively axially movable within said first and second cylinders and respectively defining with said first and second cylinders first and second pump chambers, a rotor extending through the other of said end members into the interior of said housing, a wobble plate



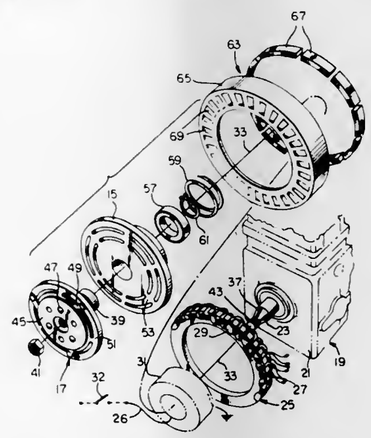
operatively connected to said rotor for rotation therewith, and first and second angularly offset drive means of different axial lengths operatively connected to said wobble plate and respectively to said first and second piston means for respectively imparting reciprocating movement to said first and second piston means within said first and second cylinders, thereby to compress the fluid in said pump chambers in said first and second cylinders.

4,095,922

ELECTRO-MECHANICAL DEVICE

James B. Farr, Ann Arbor, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Oct. 20, 1976, Ser. No. 734,116
Int. Cl.[2] F04B *21/00*
U.S. Cl. 417—313 **11 Claims**



1. A unified compressor-generator assembly for a vehicle engine comprising:
- compressor means for compressing refrigerant in an automobile air conditioning system including a housing having an end face and a rotatable driving shaft extending from said end face;
- a hub member rotatably supported on said shaft and adapted to be driven by said engine to rotate about said shaft;
- a flywheel connected to said hub member and rotatable therewith, said flywheel having an annular flange portion at the periphery thereof adjacent said housing end face,

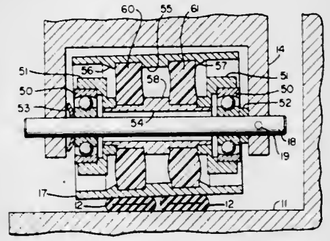
said flange portion having a support surface concentric with said shaft;
- generator rotor elements supported on said support surface of said flywheel flange portion;
- a generator stator assembly supported on said housing end face concentrically within said rotor elements and surrounding said shaft; and
- selectively actuable clutch means for drivingly coupling said hub member to said shaft, said clutch means including a portion fixedly secured to said shaft and rotatable therewith, a clutch plate adapted drivingly to engage said hub member, and a coil concentrically surrounding said hub member and adapted when energized to urge said clutch plate into driving engagement with said hub member.

4,095,923

PERISTALTIC PUMP WITH ACCOMMODATING ROLLERS

Herbert M. Cullis, Silver Spring, Md., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation-in-part of Ser. No. 616,642, Sep. 25, 1975, abandoned. This application Aug. 16, 1976, Ser. No. 714,459
Int. Cl.[2] F04B *43/08, 43/12, 45/06*
U.S. Cl. 417—475 **29 Claims**



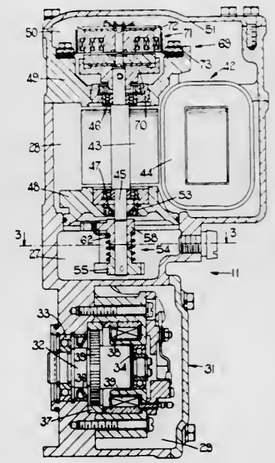
1. A peristaltic pump which is capable of pumping two tubings of different diameter and which has an arcuate race;
- one or more peristaltic pumping tubings disposed along the length of the race and having inlet and discharge portions;
- a rotary shaft mounted to rotate about an axis coincident with the axis of said race;
- a sweep arm;
- means to adjustably mount said sweep arm on said rotary shaft;
- a spindle fixedly mounted on said sweep arm in spaced relationship with said race, the constant distance between said spindle and said race being determined by the adjustment of the mounting of said sweep arm;
- bearing means rotatable on said spindle;
- a sleeve rotating about said spindle and supported by said bearing means;
- annular elastomeric means supported by said sleeve; and
- a rigid surface roller supported by said elastomeric means concentrically about said spindle; said elastomeric means permitting skewing of the roller axis;
- said rigid roller being of such size as to squeeze and substantially occlude said peristaltic tubing between the surface of said roller and the race at a given adjustment of said mounting of said sweep arm;
- whereby, when said rotary shaft is rotated, the said rigid surface roller sweeps along the length of the one or more peristaltic pumping tubings in said race, thereby stripping said peristaltic pumping tubings and pumping fluid contained therein and forcing said fluid from said inlet portion to said discharge portion, and
- whereby, when two peristaltic pumping tubings of different diameters are utilized, the rigid surface roller can be variably deflected as a result of deflection of the elastomeric support therefor by variable force applied to its rigid surface by two peristaltic pumping tubings, despite the said constant distance between said spindle and said race, determined by said adjustment of the mounting of said sweep arm.

4,095,924

HOUSING FOR FUEL PUMP CONTROL ASSEMBLY

Pierre Henri Peltret, London, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Aug. 31, 1976, Ser. No. 719,334
Claims priority, application United Kingdom, Jul. 2, 1976, 27633/76
Int. Cl.[2] F04B *7/04, 39/10*; G05G *11/00*
U.S. Cl. 417—499 **20 Claims**



1. A fuel pump assembly comprising a first housing for containing injection pump means, a second housing secured to the first housing including a housing part secured to a main part of the second housing, an end plate located within said main part of the second housing in spaced relationship to said housing part, sealing means provided intermediate said end plate and said main part of the housing said end plate constituting a dividing wall defining in said second housing a first and second compartment, a movable control member extending from said first housing into said first compartment, an actuator located in said second compartment having an output shaft extending through said end plate, said shaft having an axis of movement substantially at right angles to but offset from an axis of movement of said control member, link means mounted on said shaft engageable with said control member, and a fluid seal member mounted on said end plate engaging with said shaft to prevent flow of lubricant between said compartments.

4,095,925

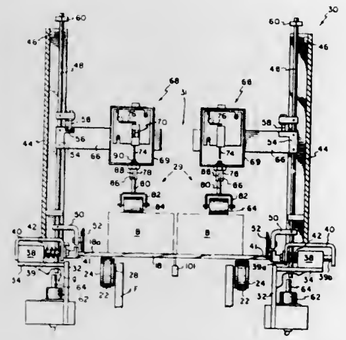
CEMENTITIOUS PRODUCT MAKING SYSTEM WITH PRODUCT HEIGHT GAUGING MECHANISM

Harry F. Cruzen, and Robert W. Gresham, both of Alpena, Mich., assignors to Besser Company, Alpena, Mich.

Continuation-in-part of Ser. No. 732,388, Nov. 14, 1976, Pat. No. 4,036,570, which is a continuation of Ser. No. 684,154, May 7, 1976, abandoned, which is a division of Ser. No. 475,757, Jun. 3, 1974, Pat. No. 3,963,397. This application Jun. 3, 1977, Ser. No. 803,410
The portion of the term of this patent subsequent to Jun. 15, 1993, has been disclaimed.
Int. Cl.[2] B28B *17/00, 1/08*
U.S. Cl. 425—141 **5 Claims**

1. In an improved cementitious product making system having a frame means; a product forming mold mounted thereon at a mold station and having a mold cavity for receiv-

ing cementitious material; mechanism mounted by the frame means operably connected to supply material to the mold and to pack material in the mold when cementitious material is supplied thereto, to aid in formation of a product in the mold cavity; product receiving means carried by the frame system for receiving a newly formed product made in the mold and comprising a transfer means and a support pallet surface upon which the product is carried for downstream movement from the molding station; means on the frame system for relatively moving the mold and at least a portion of the product receiving means to release the product from the mold and including a stripper head; the improvement comprising: gauging carrier means; means, supporting the gauging carrier means at a gauging station, for vertical movements toward and away from the



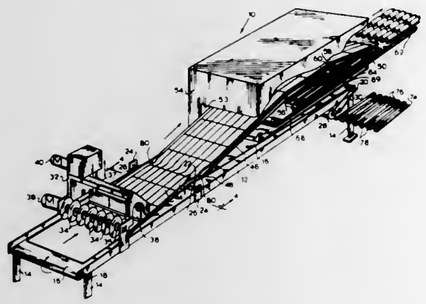
product receiving means from a raised non-gauging position to a lowered gauging position; upper and lower sensor devices carried thereby, the lower sensor device being mounted vertically at a location to locate on the upper level of the support surface, the upper sensor device being supported at a laterally inboard location to sense the level of the upper surface of the product; means for moving said carrier means vertically away from lowered gauging position; means for sensing the presence of a product receiving means and a newly molded product at said gauging station and controlling the carrier means to permit its movement down to gauging position; and a control circuit mechanism connected to the upper sensor device to respond to variations from a predetermined norm, including means for controlling said mechanism to correct the condition.

4,095,926

APPARATUS FOR DEPOSITING DOUGH ONTO PANS THEREFOR

Wray D. Paul, 135 Hattaway Dr., Altamonte Springs, Fla. 32701

Filed Apr. 28, 1976, Ser. No. 681,028
Int. Cl.² A21C *11/10*
U.S. Cl. 425—307 **20 Claims**



15. Apparatus for delivering a plurality of dough portions to a pan therefor, said apparatus adapted for use with a first, flexible conveyor for transporting said dough portions in a first direction, said apparatus comprising:

means elevating a portion of said first conveyor with respect to the remainder of said first conveyor, said elevated portion being between the ends of said first conveyor;

a second conveyor having a pickup end and a discharge end;

a third conveyor positioned under said discharge end of said second conveyor;

means for supporting said second and third conveyors over said first conveyor with said pickup of said second conveyor justapositioned adjacent said first conveyor at said elevated portion thereof along said first direction from said elevating means; and

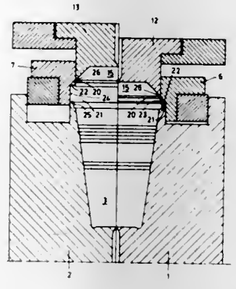
means feeding said pans onto said third conveyor whereby said pans receive said portions from said discharge end of said second conveyor.

4,095,927

APPARATUS FOR BLOWING, COMPRESSING, AND SEVERING TO FORM AN ARTICLE

Paul Roberg, Hilchenbach; Bernhard Löbbert, Bergneustadt; Christof Paschke, Hilchenbach; Hermann Staehle, Stuttgart; Wulf Kamp, Kelkheim; Manfred Dicks, Niederhausen, and Otto Plajer, Kelkheim, all of Germany, assignors to Schloemann-Siemag Akt., Dusseldorf and Hoechst Aktiengesellschaft, Frankfort, both of, Germany

Filed Sep. 13, 1976, Ser. No. 722,568
Claims priority, application Germany, Sep. 13, 1975, 2540910; Oct. 6, 1975, 2544680
Int. Cl.² B29D *23/03*
U.S. Cl. 425—525 **2 Claims**



1. Apparatus for carrying out blow molding of a plastic parison, comprising:

(a) means providing an axially extending parison,

(b) a divided blowing mold having at least one cavity, said cavity having a circular opening at one end, having a counterbore at its edge, which cavity opening is coaxial to the parison, the mold also having an annular guide groove coaxial of and spaced outwardly of the cavity opening,

(c) means inflating the parison in the mold to conform to the cavity,

(d) a divided annular upsetting ring having a bore with a diameter which is slightly less than the counterbore diameter, and having a recess along its lower inside edge with a diameter substantially equal to the inside diameter of the guide groove, thereby allowing the recessed end of the upsetting ring to be slidable in the guide groove, means being attached thereto for moving the upsetting ring coaxially of the mold whereby a portion of the blown parison is compression molded into an article, and

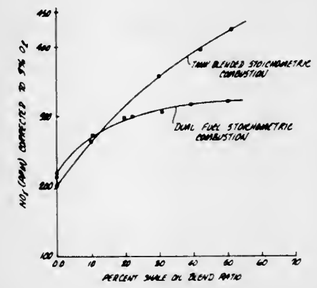
(e) a divided separating punch which is generally cylindrical with an outer diameter substantially equal to that of the bore in the upsetting ring, which punch is inserted in the upsetting ring so as to be attached to the upsetting ring for sliding in an axial direction relative thereto, said punch having a frusto-conical recess opening onto its mold-directed end, said recess having its large diameter at the free end, means being attached to the separating punch to move it coaxially of the upsetting ring to sever portions of the compression and blow molded article.

4,095,928

METHOD OF REDUCING NITROGEN OXIDE EMISSIONS IN FLUE GAS

Dale A. Jones, Whittier, and Mansour N. Mansour, Hacienda, both of Calif., assignors to Southern California Edison Company, Rosemead, Calif.

Filed Feb. 14, 1977, Ser. No. 768,579
Int. Cl.² F23C *7/00*
U.S. Cl. 431—8 **26 Claims**



1. A method of reducing nitrogen oxide emissions from fuel burning, comprising:

burning in a first combustion zone nitrogen-rich fuels;

burning in a second combustion zone nitrogen-poor fuels; and

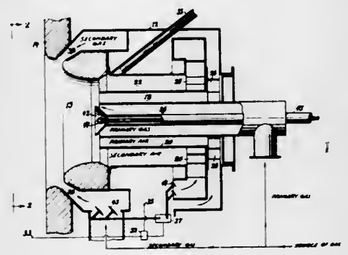
burning both said fuels simultaneously and in a manner to cause the combustion gases from the burning of said nitrogen rich fuels to pass through said second combustion zone.

4,095,929

LOW BTU GAS HORIZONTAL BURNER

Michael S. McCartney, Bloomfield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 14, 1977, Ser. No. 777,219
Int. Cl.² F23N *1/02*
U.S. Cl. 431—19 **2 Claims**



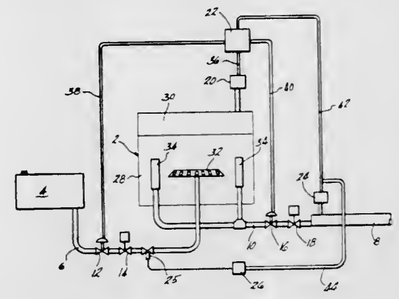
1. Apparatus for burning a low energy gas comprising a furnace wall having a divergent opening for the exhaust of gas and combustion air therethrough, a windbox associated with said opening, a flow passageway in said windbox adapted to supply combustion air to said opening, a partition dividing said passageway into a primary air stream and a secondary air stream that exhaust into said opening, a burner in said opening for the generation of a flame, a source of supply for a quantity of fuel gas, a primary gas duct extending from the source of supply to said burner to exhaust continuously into said opening, and means forming an outlet port downstream from and concentrically surrounding said divergent opening adapted to exhaust a stream of secondary gas into the secondary air stream without increasing gas flow through said opening.

4,095,930

FUEL BURNING SYSTEM

Duane A. Huston, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Filed Nov. 2, 1976, Ser. No. 737,977
Int. Cl.² F23N *1/00*
U.S. Cl. 431—90 **1 Claim**



1. A system for burning at least two fuels in a burner wherein the second fuel is available in varying amounts, said system comprising:

(a) first supply means for supplying a first fuel to the burner;

(b) second supply means for supplying a second fuel to the burner;

(c) transmitter means for sensing the available supply of said second fuel;

(d) demand sensor means for sensing the total fuel required to be sent to the burner;

(e) first controller means for controlling the flow of said first fuel to said burner;

(f) second controller means for controlling the flow of said second fuel to said burner;

(g) on-off valve means for shutting off or turning on the supply of said first fuel to said burner;

(h) proportioning means operative in response to the sensing of the available supply of said second fuel and the total fuel required for proportioning the total fuel supplied to the burner between the first and second fuel to use as much of the second fuel to meet the total fuel requirement; and

(i) controller means operative in response to the sensing of the available supply of said second fuel for closing said on-off valve means when the available supply of said second fuel is adequate to meet the total fuel requirement and for opening said on-off valve means when the available supply of said second fuel is inadequate to meet the total fuel requirement; and

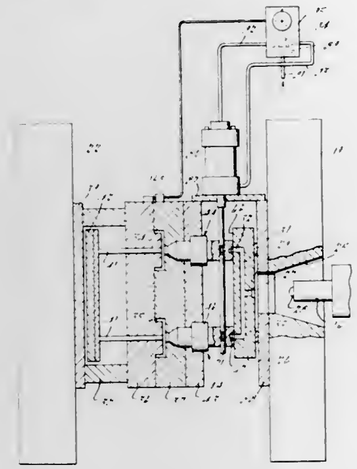
(j) first and second flame safeguard valve means, positioned toward said first and second supply means from said off-on valve means and second controller means, respectively, for automatically shutting off the supply of first and second fuels responsive to existence of any one of a plurality of potentially unsafe conditions.

4,095,931

INJECTION MOLDING MACHINE AND METHOD

David M. Reitan, Union Lake, Mich., assignor to Incoe Corporation, Troy, Mich.

Filed Dec. 1, 1975, Ser. No. 636,367
Int. Cl.[2] B29F *1/03*
U.S. Cl. 425—564 **12 Claims**



1. A shut-off bushing for an injection molding machine comprising an elongated hollow outer body having a central axis, a shank within and fixed to said body, the facing surfaces of the body and shank forming an axially uninterrupted material passage, a relatively narrow delivery orifice formed in one end of said body by radially inwardly extending portions thereof and leading from said material passage, said one end of the body being immovable with respect to the remainder of the body, a shut-off pin slidably mounted in said shank and movable into closed position with respect to said orifice, said pin being at all times in non-obstructing relation with said material passage, heating means disposed inwardly of said material passage and in thermally conductive relation with said shank and said pin, and actuating means connected to said pin for moving said pin to its closed position independently of the pressure in said material passage and at said orifice.

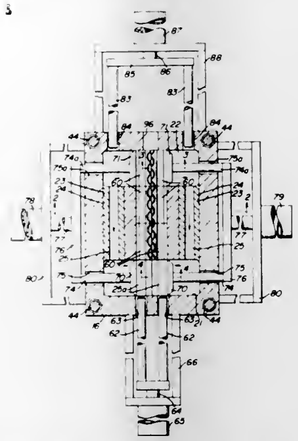
4,095,932

APPARATUS FOR MAKING CONTINUOUS CHAIN

Frank Tome, 666 W. Sandy Ridge Rd., Doylestown, Pa. 18901

Filed Feb. 17, 1977, Ser. No. 769,411
Int. Cl.[2] B29F *1/022*
U.S. Cl. 425—575 **10 Claims**

1. Apparatus for molding a length of plastic chain formed of interengaged chain links comprising
an intermediate fixedly mounted die carrying plate having a longitudinal main slot and side slots therealong,
pairs of die members having mold cavities therein, and movable in said slots,
die carriers at the rear end of said main slot for the reception of said die members advanced to said rear end and for moving said die members to positions adjacent said side slots,
means positioning said die carriers,
means carried by said plate for urging said die members along said side slots to the front of said plate,
die carriers at the front end of said slot for positioning said pairs of die members at said front end,
means positioning said die carriers at said front of said slot,
means carried by said plate for urging said die members along said main slot,
additional die members for positioning in meeting relation to at least one of said pairs of dies at a predetermined position along said slot,
said additional die members having mold cavities therein



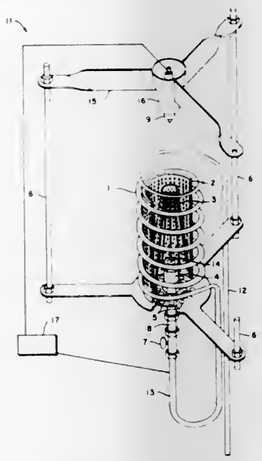
cooperating with the mold cavities in the dies of one of said pairs to provide die cavities for interengaged links of chain, and
means supplying moldable material into said die cavities.

4,095,933

FUEL HANDLING AND COMBUSTION SYSTEM

John B. Schumacher, Huron, S. Dak., assignor to International Commercial Enterprises, Inc., Alexandria, Va.

Filed Sep. 2, 1977, Ser. No. 830,027
Int. Cl.[2] F23D *11/44*
U.S. Cl. 431—11 **21 Claims**



1. A fuel handling and combustion system, comprising:
(a) means for conveying fuel from a source to one end of said system;
(b) coil means for preheating and conveying said fuel to the other end of said system;
(c) at least one compression chamber;
(d) means to convey said fuel from said coil means at said other end of said system to said compression chamber;
(e) a spud having a spud orifice downstream of said compression chamber for releasing said fuel, prior to any admixture with air, at said other end flowing in a direction toward said one end of said system along the central axis of said coil means;

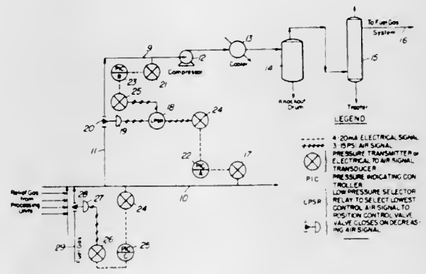
(f) a perforated inside fire control cone surrounding said spud and located within the space enclosed by said coil means; and
(g) a perforated outer secondary air cylinder surrounding said fire control cone and located within the space enclosed by said coil means.

4,095,934

WASTE GAS RECOVERY

Larry F. Jensen, Harbor City; Frank D. Hartzell, Manhattan Beach, and William S. Hutchison, Los Angeles, all of Calif., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 24, 1977, Ser. No. 780,892
Int. Cl.[2] F23N *1/00*
U.S. Cl. 431—89 **3 Claims**



1. In a complex of process units for conversion of combustible feed materials to desired products having a common fuel gas system for supply of fuel gas to individual process units, a common relief system for collection of combustible gases at pressure relief devices associated with said process units, an incinerator, a pressure relief header connected to said incinerator for discharge into said incinerator, and means to supply said combustible gas so collected to said header; the improvement to permit recovering fuel value of the said collected combustible gases to the maximum extent consistent with safety of the said complex which comprises:
(1) compressor means adapted to compress said collected combustible gases to the pressure of said fuel gas system,
(2) means to conduct gases discharged from said compressor means into said fuel gas system,
(3) a gas supply conduit communicating with said header and with intake of said compressor means,
(4) a control valve in said conduit adapted to close the same,
(5) means to generate a signal representative of pressure in said header,
(6) means to generate a signal representative of vacuum in said conduit between said valve and the intake of said compressor means,
(7) means responsive to said signals adapted to close said valve when the lesser of said signals is below a predetermined minimum.

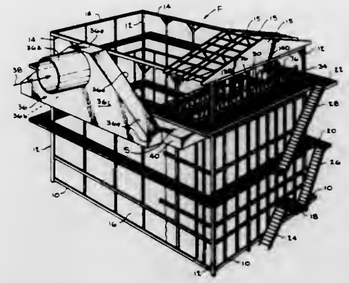
4,095,935

FURNACE WITH PLENUM ARCHES

Denis A. Menegaz, Houston, Tex.; Elmars Blumenaus, San Francisco, Calif., and Richard Estile H. Ray, Houston, Tex., assignors to Pullman Incorporated, Chicago, Ill.

Filed Apr. 23, 1976, Ser. No. 679,525
Int. Cl.[2] F23D *11/02*
U.S. Cl. 431—167 **12 Claims**

1. An air delivery and burner system for a furnace which comprises:
air inlet means for receiving preheated inlet air;
a plurality of air ducts extending across the top of said furnace, each air duct forming a plenum arch,
each plenum arch extending from said air inlet means and adapted to receive preheated air from said air inlet means and supported at each end;
suspension means mounted with the furnace for suspending



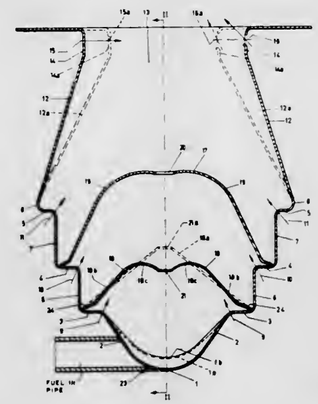
each of said plenum arches between said ends; and
burners spaced within each of said plenum arches extending downwardly into the furnace.

4,095,936

POT BURNER

Willem Godijn, Hilversum, Netherlands, assignor to Research Instituut "Sesto" B.V., Hilversum, Netherlands

Filed Oct. 9, 1975, Ser. No. 621,243
Int. Cl.[2] F23D *5/04*
U.S. Cl. 431—337 **4 Claims**



1. A burner comprising
a housing having an elongated trough shape in its longitudinal direction and having walls in a substantially diamond-shaped configuration in transverse cross-section,
a burner mouth located substantially at the top of said housing,
a bottom portion of said trough shaped housing inclining downwards from both ends of said trough shape in the longitudinal direction and having means to receive a supply of liquid fuel,
a first partition in the interior of said housing having two part-walls extending upwardly from said housing walls and forming arches extending toward each other substantially near a vertical plane of symmetry of said diamond-shaped configuration of said housing,
said two part-walls having a central flame opening therebetween on the opposite side of a common tangent line to said arches from said burner mouth,
said housing having orifices below said first partition,
a second partition above said first partition and having two

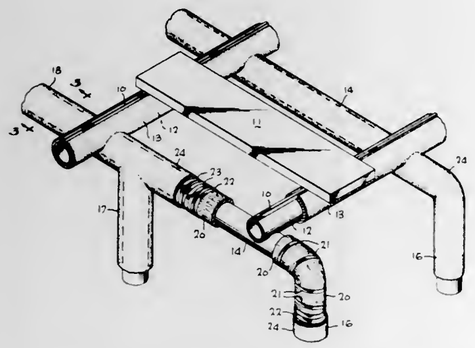
part-walls extending upwardly from said housing walls and having a flame opening therebetween,
said housing having orifices below said second partition with inflowing air through said orifices,
said housing extensions defining said burner mouth parallel to said vertical plane of symmetry and having orifices therein,
said burner mouth having a width and said orifices in said extensions being directed to cause the inflowing air through said orifices in said extensions to flow only substantially as far as said vertical plane of symmetry or slightly beyond.

4,095,937

INSULATION FOR WATER COOLED PIPES IN A REHEATING FURNACE

Steven C. Colburn, La Palma, and Marion H. Black, Anaheim, both of Calif., assignors to Hitco, Irvine, Calif.

Filed Nov. 8, 1976, Ser. No. 740,062
Int. Cl.[2] F27D *9/00, 3/02*
U.S. Cl. 432—3 **9 Claims**



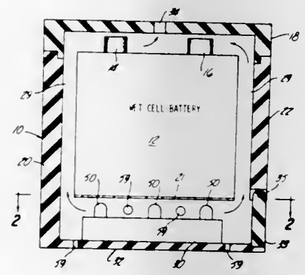
7. A method of insulating a water cooled member of a skid rail system in a reheating furnace comprising the steps of:
wrapping a permeable resilient mat of fibrous refractory material around the water cooled member in abutting relationship;
wrapping a tape of fibrous refractory composition around the mat to cover the mat;
applying a layer of non-penetrating refractory mortar on the outside of the tape; and
allowing the mortar to harden and form a rigid outer shell.

4,095,938

ARCTIC VEHICLE BATTERY HEATER

Joseph J. Mikaila, 2643 Lake Charnwood, Troy, Mich. 48084

Filed Mar. 21, 1977, Ser. No. 779,856
Int. Cl.[2] F24J *3/00*
U.S. Cl. 432—225 **5 Claims**



1. In an arctic vehicle equipped with battery ignition: the improvement comprising means for heating the vehicle battery to improve its electrical output energy capability preparatory to start-up of the vehicle, said heating means comprising at least one catalytic heater positionable in close adjacency to an outer side surface of the battery casing for directing heat energy through said casing into the battery electrolyte, an upright battery-reception box having sidewalls thereof spaced from the battery casing surfaces to form passages for heated gases flowing upwardly from the catalytic heater, and means forming gas escape openings therein tending to confine hot gases to the space surrounding the battery.

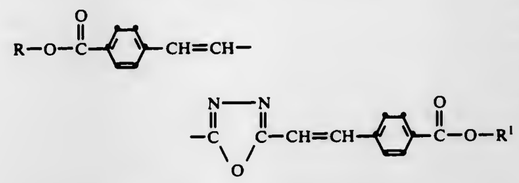
4,095,939

OPTICALLY BRIGHTENED POLYESTERS WITH 2,5-BIS-(P-CARBOALKYLSTYRYL)-OXADIAZOLE

James G. Pacifici, and Richard H. S. Wang, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 9, 1977, Ser. No. 794,858
Int. Cl.[2] D06P *1/38;* **C09K** *11/00*
U.S. Cl. 8—1 W **3 Claims**

1. Polyester material containing from about 0.001% to about 5.0% by weight of at least one compound of the formula



wherein R and R^1 are independently selected from alkyl of 1-12 carbons, cycloalkyl of 5-10 carbons, and alkyl of 1-10 carbons substituted with one or more of —OH, alkoxy of 1-6 carbons, Cl, Br, alkylamino of 1-6 carbons and cycloalkyl of 5-10 carbons.

4,095,940

PROCESS FOR THE PRODUCTION OF CAMOUFLAGE DYEINGS AND PRINTS

Rudolf Weingarten, Schwalbach, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 5, 1973, Ser. No. 324,066
Claims priority, application Germany, Jan. 5, 1972, 2200323
Int. Cl.[2] D06P *1/00*
U.S. Cl. 8—15 **7 Claims**

1. A process for the production of camouflage dyeings and prints on synthetic or regenerated fibers or foils or on blends containing synthetic or regenerated fibers to obtain dyed materials having camouflage properties in the visible range and infrared reflection values of from 20 to 50 percent within the infrared range between 700 and 1100 nm, which comprises the steps of:
(a) providing fibers or foils containing small amounts of carbon black as a mass coloration; and
(b) cross-dyeing or cover-printing the mass colored fibers or foils of step (a) with a dyestuff suited for the fibers or foils in shades that provide camouflage colors in the visible range of the spectrum.

4,095,941

FIBER PREPARATION AGENTS TO PRODUCE A MARKED SEPARATING CAPABILITY

Ulrich Cuntze, Hofheim, Taunus; Gustav Dollinger, Egelsbach, and Rolf Kleber, Neu-Isenburg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sep. 30, 1975, Ser. No. 618,055
Claims priority, application Germany, Oct. 4, 1974, 2447410
Int. Cl.[2] D06D *3/00, 5/00*
U.S. Cl. 8—18 A **12 Claims**

1. A process for the lubrication of synthetic staple fibers to yield a low fiber cohesion which comprises applying onto the fibers prior to the textile spinning processes a condensation product obtained by condensation of 1.2 to 1.8 mols of a fatty acid having from 14 to 18 carbon atoms and 1 mol of hydroxy ethyl ethylene diamine or hydroxy propyl ethylene diamine.

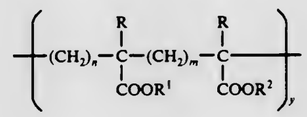
4,095,942

PRINTING OF HYDROPHOBIC TEXTILES WITHOUT AFTERWASH AND PRODUCT THEREOF

Kurt A. Dellian, Greensboro, and Fernand Schlaeppi, High Point, both of N.C., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 8, 1976, Ser. No. 665,038
Int. Cl.[2] D06P *5/00, 7/00*
U.S. Cl. 8—62 **12 Claims**

1. In a process for printing synthetic thermoplastic textiles without washing, comprising the steps of printing on the textile an aqueous dispersion of a non-ionic organic colorant, a thickener, and an effective wetting amount of a non-ionic or anionic surfactant, subsequently drying the textile, and finally heating the textile to fix the colorant, the improvement which comprises using as the thickener, about 0.05 to about 0.5% by weight of a compund of the formula



wherein
R is hydrogen or lower alkyl,
R^1 and R^2 are hydrogen, sodium, potassium, ammonium, mono-lower alkyl ammonium, di-lower alkyl ammonium, tri-lower alkyl ammonium, or tetra-lower alkyl ammonium,
m is 0 or 1,
n is 2 - m, and
y is 5000 to 50,000, in the substantial absence of other electrolytes.

4,095,943

PROCESS FOR THE PRODUCTION OF SOLUTIONS OF LOWER ALIPHATIC CARBOXYLIC ACID SALTS OF CATIONIC DYESTUFFS

Walter Lang, Pfeffingen, and Gert Hegar, Schonenbuch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 3, 1975, Ser. No. 627,996
Claims priority, application Switzerland, Nov. 6, 1974, 14841/74
Int. Cl.[2] C09B *67/00;* **D06P** *1/62*
U.S. Cl. 8—92 **16 Claims**

1. A process for producing a solution of a salt of a lower aliphatic carboxylic acid of a cationic dyestuff which consists essentially of converting a cationic dyestuff halide salt into the salt of a lower aliphatic carboxylic acid by reacting the halide salt with a 100 to 2,000% excess of the corresponding carboxylic acid in the presence of a 100 to 250% excess of an epoxide compound having a maximum of 12 carbon atoms.

4,095,944

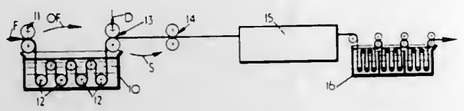
TREATMENT OF TEXTILE MATERIALS

Clifford Duckworth, Shipley, England, assignor to Mather & Platt Limited, Park Works, England

Continuation of Ser. No. 494,799, Aug. 5, 1974, abandoned. This application Jun. 4, 1976, Ser. No. 693,244
Claims priority, application United Kingdom, Aug. 4, 1973, 37107/73
Int. Cl.[2] D06M *9/04, 1/10*
U.S. Cl. 8—115.7 **11 Claims**

1. A method of mercerizing unregenerated cellulosic textile material derived from spun yarns comprising the steps of presenting the textile material for saturation with an alkaline swell-

ing agent at a concentration of 8.75% or more and at a temperature of 50° C or more for an immersion time of 10 seconds or



less, and squeezing excess agent from the textile material, said agent being caustic soda, the material being cotton fabric.

4,095,945

PROCESS FOR TREATING TEXTILE ARTICLES

Kohei Umetani, and Masakazu Date, both of Takatsuki, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Jul. 23, 1976, Ser. No. 707,938
Int. Cl.² D06M *9/00, 13/28;* C09D *5/18*
U.S. Cl. 8—115.7 **17 Claims**

1. A process for rendering a textile material flame retardant, which comprises applying to the textile material (1) a phosphorus-containing condensation product obtained (A) by heating a tetrakis(hydroxymethyl)phosphonium compound at 151° - 180° C. at reduced pressure under acidic conditions to condense said phosphonium compound through dehydration and deformaldehydation reactions, the molar ratio of P-CH_2-P linkage/P-CH_2OCH_2-P linkage in said condensation product being 0.8 - 4.0, or (B) by heating a tetrakis(hydroxymethyl)-phosphonium compound at 120° - 180° C. in the presence of 0.001 - 0.02 mol of an amino group-containing compound per mol of said phosphonium compound at reduced pressure under acidic conditions to condense said phosphonium compound through dehydration and deformadelhydation reactions, the molar ratio of P-CH_2-P linkage/P-CH_2OCH_2-P linkage in said condensation product being 0.8 - 4.0, (2) a nitrogen-phosphorus-containing condensation product obtained by condensing a tetrakis(hydroxymethyl)phosphonium compound with an aminoplast precursor, and (3) an aminoplast precondensate, the weight ratio of (1):(2) being from 90:10 to 10:90 and the weight ratio of (1) + (2) : (3) being from 80:20 to 99:1; and fixing (1), (2) and (3) on the textile material.

4,095,946

ARTICLE FOR CLEANING AND CONDITIONING FABRICS

Kenneth L. Jones, and Gary W. Kingry, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 25, 1977, Ser. No. 781,400
Int. Cl.² B08B *3/00*
U.S. Cl. 8—137 **29 Claims**

1. A laundry article, providing cleaning and fabric conditioning benefits, for use in both the washer and the dryer, consisting essentially of a water-insoluble substrate, carrying:
(a) an effective amount of a detergent composition comprising from about 5 to 95% of a water-soluble surface-active agent; and
(b) an effective amount of an intimate mixture, having a maximum solubility in water of 50 ppm at 25° C, and a softening point of from 100° to 200° F, consisting essentially of
(i) from about 10 to 90% by weight of quaternary ammonium fabric-conditioning compounds having the formula $[R_1R_2R_3R_4N]^+Y^-$, wherein one or two of the R_1, R_2, R_3, or R_4 groups is an organic radical containing a group selected from a C_{12} to C_{22} aliphatic radical, or an alkyl phenyl or alkyl benzyl radical having 10 to 16 carbon atoms in the alkyl chain, the remaining group or groups being selected from C_1 to C_4 alkyl, C_2 to C_4 hydroxy alkyl, and cyclic structures in which the nitrogen atom forms part of the ring, Y constitutes an anionic radical selected from the group consisting of hydroxide, halide, sulfate, methyl sulfate, and phosphate ions; and
(ii) from about 10 to 90% by weight of a dispersion inhibitor, being a solid organic material having a maximum solubility in water of 50 ppm at 25° C and a softening point in the range of 100° to 200° F, said material being selected from the group consisting of paraffinic waxes, cyclic and acyclic mono- and polyhydric alcohols, substituted and unsubstituted aliphatic carboxylic acids, esters of cyclic and acyclic mono- and polyhydric alcohols and acids, condensates of C_2 to C_4 alkylene oxide with any of the foregoing types of materials whether or not said materials themselves meet the above solubility and softening point limits, and mixtures thereof.

19. A method of laundering and conditioning fabrics comprising the steps of:
(a) agitating said fabrics in an aqueous laundry solution to which has been added a substrate composition carrying an effective amount of a detergent composition, such that said detergent composition is dissolved in the laundry solution, and a fabric conditioning agent, such that said conditioning agent is not substantially dissolved in the laundry solution; and
(b) tumbling said fabrics, under heat, in a laundry dryer together with said substrate composition such that said conditioning agent is transferred to said fabrics while they are being dried.

4,095,947

RECOVERY OF SIZES

Hans Wolf, Ludwigshafen; Heinz Leitner, Mannheim, and Wolfgang Schenk, Schwetzingen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Germany

Filed Sep. 13, 1976, Ser. No. 722,519
Claims priority, application Germany, Oct. 1, 1975, 2543815
Int. Cl.² D01C *3/02;* D06L *1/06*
U.S. Cl. 8—138 **10 Claims**

1. A process for the recovery of a size from a fabric of which the warp is sized with a water-soluble polymer of acrylic acid or an alkali metal salt or ammonium salt thereof, which comprises treating the sized fabric with from 30 to 300 percent by weight of water, based on the dry weight of the fabric, at from 5° to 95° C, separating the resulting size solution from the fabric, and collecting the size.

10. A process for the recovery and re-use of a size from a fabric in which the warp is sized with a water soluble polymer of acrylic acid on an alkali metal or ammonium salt thereof, which comprises contacting the sized fabric with from 30 to 300 percent by weight, based on the dry weight of the fabric, of water containing no additives and at most small amounts of impurities at 5° to 95° C for a period of less than 1 minute to form a regenerated aqueous size solution, separating the regenerated size solution from the fabric, using the regenerated size solution directly and as such as to make another aqueous sizing solution of said water soluble polymer, and using the latter sizing solution to size additional warp yarn.

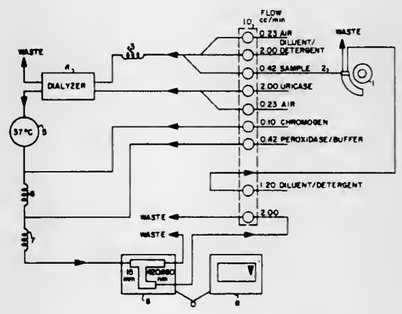
4,095,948

DETERMINATION OF URIC ACID

Paul Hunziker, Basel, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 513,794, Oct. 10, 1974, abandoned.
This application Jul. 22, 1976, Ser. No. 707,596
Claims priority, application Switzerland, Oct. 19, 1973, 14807/73
Int. Cl.² G01N *21/26, 31/14, 31/22, 33/16*
U.S. Cl. 23—230 B **28 Claims**

1. A method for the quantitative analysis of uric acid in biological fluids consisting essentially of providing in continuous flow the sequential steps comprising:
(a) combining, in continuous flow, a measured sample of a specimen of test fluid with an aqueous solution of an alkali metal or alkaline earth metal salt diluent;
(b) passing the resulting mixture through a dialysis zone, thereby separating from said mixture a clear aqueous solution;
(c) mixing said clear aqueous solution with a buffered uricase solution with a pH of 8.5 to 10;
(d) incubating the resulting aqueous solution;
(e) mixing at pH 5.5 to 8.5 the hydrogen peroxide produced



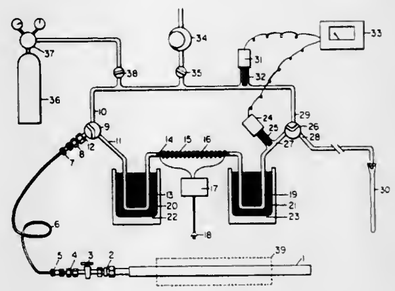
in step (d), by sequential or concurrent flow, with a first reagent comprising a buffered aqueous solution of a chromogen in the leuco form consisting of an unsubstituted or nuclear-substituted benzidine or diphenyline and a second reagent comprising a buffered aqueous solution of peroxidase, thereby forming a colored solution; and
(f) flowing said colored solution to an analyzing zone and photometrically determining quantitatively, during the flow of said colored solution through said analyzing zone, the uric acid content of the sample.

4,095,949

PREPARATION AND MEASUREMENT OF ULTRA MICRO AMOUNTS OF NITROGEN

Robert John Flett, 3450 Durocher, Apt. No. 3, Montreal, Quebec, Canada

Filed Nov. 30, 1976, Ser. No. 746,225
Claims priority, application Canada, Dec. 8, 1975, 241213
Int. Cl.² G01N *31/12*
U.S. Cl. 23—230 PC **12 Claims**



8. A method for the micro analysis of nitrogen-containing matter to determine the nitrogen content which comprises:
i. providing an evacuated system including a combustion tube containing a micro sample of nitrogen-containing matter.
ii. introducing oxygen gas to said combustion tube and combusting said micro sample,
iii. converting gaseous nitrogen oxides formed in said combusting to nitrogen and removing non-nitrogen containing gases produced in said combustion from the gaseous state such that said system contains the nitrogen of said microsample in a gaseous state,
iv. measuring the amount of gaseous nitrogen and spectrometrically determining the nitrogen stable isotope ratio.

4,095,950

METHOD FOR THE CHROMATOGRAPHIC ANALYSIS OF A TECHNETIUM-CONTAINING MIXTURE

Stephen Kahn, Walnut Creek, Calif., assignor to Bio-Dynamics, Inc., Indianapolis, Ind.

Filed Jun. 11, 1976, Ser. No. 695,108
Int. Cl.² G01N *31/08*
U.S. Cl. 23—230.3 **20 Claims**

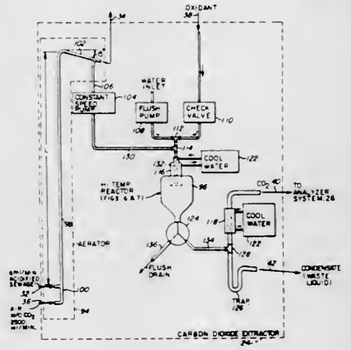
1. A method for the chromatographic analysis of a technetium-containing mixture of unbound, reduced technetium, free pertechnetate, and reduced technetium bound to an elutable carrier, the method being for determining the percentage of the bound, reduced technetium present in the mixture without requiring isolation of the bound, reduced technetium from the other technetium components, comprising the steps of:
a. placing a first sample of the technetium-containing mixture on a first chromatographic adsorbent;
b. developing the first adsorbent with an aqueous salt solution to transport the free pertechnetate and the bound, reduced technetium to a second zone away from the unbound, reduced technetium remaining in a first zone;
c. placing a second sample of the technetium-containing mixture on a second chromatographic adsorbent;
d. developing the second solvent adsorbent with a suitable liquid organic solvent to transport the free pertechnetate to a fourth zone away from the bound, reduced technetium and the unbound, reduced technetium remaining in a third zone;
e. determining the radioactivity of the technetium present in at least zones one and four of said first and second adsorbents and
f. calculating the percentage amount of bound, reduced technetium present in the mixture.

4,095,951

ORGANIC CARBON ANALYZER SYSTEM

Louis S. DiCola, Lincoln, R.I.; Donald W. Kemp, Marion, Mass., and H. Duane Evans, Portsmouth, R.I., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 473,116, May 24, 1974, Pat. No. 3,964,868.
This application Jun. 17, 1976, Ser. No. 697,176
The portion of the term of this patent subsequent to Jun. 22, 1993, has been disclaimed.
Int. Cl.² G01N *31/12*
U.S. Cl. 23—253 PC **4 Claims**



1. An organic carbon analyzer system comprising:
means for treating a material having inorganic and organic carbonaceous substances to provide a first volatile com-

pound of carbon from said inorganic carbonaceous substance;

means coupled to said treating means for dispersing said material in a first gaseous carrier, said first gaseous carrier absorbing said first volatile compound from said material;

means coupled to said dispersing means for replacing said first gaseous carrier with a second gaseous carrier free of said first volatile compound, said second gaseous carrier reacting with said material to provide a reacted material and a second volatile compound of carbon from said organic carbonaceous substance;

means coupled to said replacing means for separating said second volatile compound and said second gaseous carrier from said reacted material, said separating means comprising a passage for conducting said second volatile compound and said second gaseous carrier and said reacted material, said separating means further comprising a chamber positioned adjacent said passage and holding water in proximity to said second volatile compound and said second gaseous carrier and said reacted material for condensing said reacted material; and

means coupled to said passage of said separating means for analyzing said second volatile compound.

4,095,952

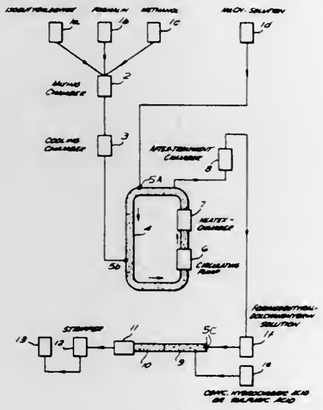
APPARATUS FOR MAKING (DL) PANTOLACTONE

Joachim Schmidt; Wolfgang Bamberg; Hartmut Grumert; Erhard Schorm, and Christian Weigelt, all of Jena, Germany, assignors to Veb Jenapharm Jena, Jena, Germany

Division of Ser. No. 667,410, Mar. 16, 1976, which is a continuation of Ser. No. 476,290, Jun. 4, 1974, abandoned, which is a division of Ser. No. 298,831, Oct. 19, 1972, abandoned. This application Oct. 15, 1976, Ser. No. 733,019

Int. Cl.² B01J *1/00*

U.S. Cl. 23—260 **3 Claims**



1. An apparatus for the continuous production of DL-α-hydroxy-β,β-dimethyl-α-butyrolactone (DL-pantolactone), the said apparatus comprising

a mixer;

dosage means for passing isobutyraldehyde and formalin into the mixer;

a circulatory reactor;

a circulation pump, a heat exchanger and an outlet, these three members forming part of the circulatory reactor and disposed one after the other in the direction of flow of a reactant;

duct means connecting the mixer with the circulatory reactor and dosage means and an inlet nozzle forming part of said duct at the inlet to said circulatory reactor;

an additional inlet and injection nozzle for passing a sodium cyanide solution into the circulatory reactor, the inlet for said last duct being provided between said outlet and said inlet duct from the mixing chamber;

a cooling chamber interposed between said mixing chamber and said inlet to said circulatory reactor;

an aftertreatment chamber having a longitudinally extending shape and duct means connecting said outlet of said circulatory reactor and one end of said aftertreatment chamber;

a longitudinally extending reactor, a first and a second lengthwise adjoining reaction chambers forming part of said latter reactor, duct means including an injection nozzle and dosage means connecting the other end of said aftertreatment chamber with the inlet end of said longitudinal reactor for passing the formed formisobutyraldol cyanohydrine solution into the first chamber of said longitudinal reactor, duct means including dosage means for passing an acid into the first chamber of said longitudinal reactor, the said first chamber clad with a heat conducting acid resistant material; and

the said second chamber communicating with said first reaction chamber and provided with a heat insulating material;

a pressure adjustment valve for controlling the pressure in said second reaction chamber provided at the outlet end of said longitudinal reactor and separating means and duct for passing the formed product from said pressure valve to said separating means.

4,095,953

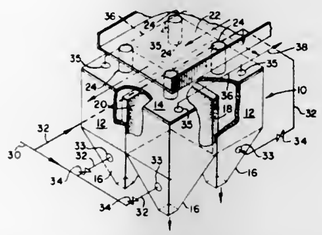
MODULAR SYSTEM FOR REDUCING SULFUR DIOXIDE

Carl Gutterman, and Peter Steiner, both of Edison, N.J., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Continuation of Ser. No. 648,701, Jan. 13, 1976, abandoned. This application Apr. 11, 1977, Ser. No. 786,549

Int. Cl.² C01B *17/04*; B01J *8/12*

U.S. Cl. 23—277 R **4 Claims**



1. A system for reducing sulfur dioxide comprising a reactor vessel divided into a plurality of modular reactor vessel sections, each section including a lower hopper portion and an upper portion having at least one wall connecting with a wall of said hopper portion, said sections being connected in an abutting relation so that said walls together define an upper boundary wall of the reactor vessel, partition means disposed within said upper boundary wall for dividing the upper portion of said vessel into a plurality of compartments respectively communicating with said hopper portions, a coal inlet located in the upper portion of each compartment, a single coal supply means for continuously supplying coal to each compartment through the respective coal inlets so that the coal will pass downwardly by gravity through said compartments and their corresponding hopper portions, a gas inlet located in each hopper portion, gas supply means for continuously supplying gas to each hopper portion through the respective gas inlets so that the gas will pass upwardly through said hopper portions and their corresponding compartments and contact said coal in a counterflow relation, gas discharge means located in the upper portion of each compartment, and coal discharge means located in the lower portion of each hopper.

4,095,954

METHOD FOR REMOVAL OF LAST TRACES OF SOLUBLE ASH AND ELEMENTS FROM SOLVENT REFINED COAL

Fred Henry Kindl, Schenectady, N.Y., assignor to Encotech, Inc., Schenectady, N.Y.

Division of Ser. No. 634,283, Nov. 21, 1975, Pat. No. 4,058,976. This application Jun. 14, 1976, Ser. No. 695,405

Int. Cl.² C10L *9/10*

U.S. Cl. 44—1 B **10 Claims**

1. A method of treating solvent refined coal to remove soluble ash and make it suitable for direct firing into a gas turbine comprising:

feeding solvent refined coal and water into a closed pressure-tight vessel to form a pumpable slurry, the amount of water being a minimum of 10% of the weight of coal for proper cleaning and up to about 3 times the weight of coal to provide a pumpable slurry;

heating said slurry in said closed vessel to a temperature of about 500° to 550° F and at corresponding steam-water saturation pressures of from about 675–1035 psig for a period of approximately ½ to 2 hours;

gently agitating while heating to insure low shear liquid-solid contact during said heating; and

separating the water from said coal whereby the sodium and potassium salts are reduced to less than 1 part per million.

4,095,955

FUEL SEPARATION PROCESS

Edgel P. Stambaugh, Worthington, and Satya P. Chauhan, Columbus, both of Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Filed May 5, 1976, Ser. No. 683,518

Int. Cl.² C10L *9/10*; C10B *57/00*

U.S. Cl. 44—1 R **7 Claims**

1. A method of treating fine particles of a solid carbonaceous fuel of the coal or coke type to reduce its content of undesired constituents at least including sulfur or ash or both, comprising,

forming a mixture of the fuel particles with a liquid aqueous leaching solution, containing one or more cations selected from Groups IA and IIA, which is effective to dissolve the undesired constitutents,

exposing the mixture to temperatures in the range of about 150° to 375° C under a pressure of at least the autogenous steam pressure until the solution has dissolved the undesired constituents of the fuel to such an extent that the undesired constituent content of the fuel particles has been reduced to less than a desired limiting value,

separating the major portion of the solution from the fuel particles under temperature and pressure conditions and within a time period such that the amount of the undesired constituents dissolved in the solution is not substantially reduced by precipitation, adsorption on the fuel particles, or chemical recombination therewith.

7. A method as in claim 1 which comprises rapidly cooling the mixture to less than 100° prior to the separating step, and performing the separating step before a substantial portion of the undesired constituents has precipitated from the cooled solution.

4,095,956

WASTE PROCESSING SYSTEM

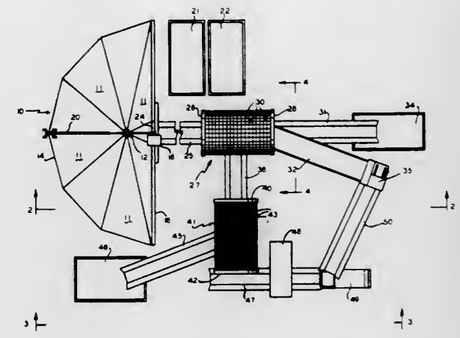
William H. Holmes, Fayetteville, N.Y., assignor to Holmes Bros., Inc., Syracuse, N.Y.

Filed Jul. 7, 1976, Ser. No. 703,270

Int. Cl.² B30B *11/00*; C10L *5/22*

U.S. Cl. 44—13 **6 Claims**

1. In a waste processing system, a pick pit in which municipal waste is deposited, the pit being a dished receiving area having a substantially continuous bottom surface for temporarily holding the waste, mechanical means for sorting the waste in the pit and removing outsized material therefrom, a first rotating trommel for receiving the remaining waste and removing the bulky material therefrom, the trommel having holes that are at least one foot in diameter, a second rotating trommel for receiving waste that passes through the holes of



the first trommel, the second trommel having holes that do not exceed 2.5 inches in diameter, and packaging means for receiving waste that does not pass through the holes of the second trommel and conditioning it for use as fuel.

4,095,957

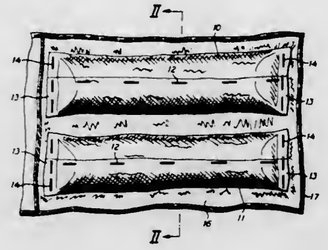
FUEL ELEMENT

John Harry Orsing, Avangsgatan 2, Raa, Sweden

Filed Mar. 22, 1977, Ser. No. 780,136

Int. Cl.² C10L *11/00*; B65D *65/00*

U.S. Cl. 44—40 **10 Claims**



1. A fuel element for grilling or imparting a smoked flavor to food, comprising a porous noncombustible glass fiber casing; a combustible fuel in solid form enclosed within the casing; the casing having pores in a sufficient number and size to permit the entry of a volume of air necessary to support combustion of the fuel, while retaining therein the fuel and substantially all of the combustion residue therefrom; and a combustible fluid in an amount to ignite the fuel; the casing and the fuel and fluid contents thereof being wholly enclosed in an evacuated wrapper of substantially gas- and liquid-impermeable sheet material, the wrapper retaining therewith the combustible fuel and combustible fluid.

4,095,958

APPARATUS AND METHOD FOR PRODUCING COMBUSTIBLE GASES FROM BIOMASS MATERIAL

Robert A. Caughey, Antrim, N.H., assignor to Forest Fuels, Inc., Keene, N.H.

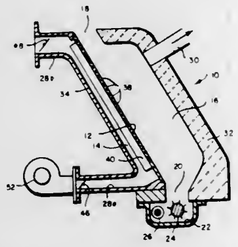
Filed Jun. 21, 1977, Ser. No. 808,619

Int. Cl.² C10J *3/00*

U.S. Cl. 48—111 **17 Claims**

1. A reactor for producing combustible gases suitable for delivery to the firebox of a furnace comprising means defining a confining retort, said means containing at the top a charging

opening, a grate, means supporting the grate in the retort in a downwardly inclined position with its upper end adjacent the charging opening at the top, said grate dividing the retort into a plenum chamber at the downwardly facing side and a mixing chamber at the upwardly facing side, means for feeding a biomass material through the top opening to the upwardly facing side of said downwardly inclined grate in the form of a substantially uniformly thick bed for burning of the biomass material resting on the grate in the zone near the lower end of the grate and destructive distillation of the biomass material resting on the grate and the evolution of a gaseous medium in the zone above the zone of burning, said grate containing a plurality of relatively small openings through which primary



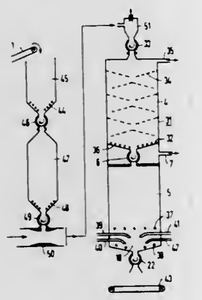
air is supplied to the bed resting on the upwardly facing side of the grate in a sufficient quantity to sustain combustion and convert the burning mass to CO and ash, a pit at the bottom of the grate for receiving the ash means for supplying an excess of primary air to the downwardly facing side of the grate at the lower end, and a plurality of transversely spaced, longitudinally extending fins at the downwardly facing side of the grate so that the air flows along the downwardly facing side of the grate at a rate to maintain the grate and ash resting thereon at below the fusing temperature of the ash so that it remains particulate and, hence, loose and free to slide continuously downwardly on the upwardly facing side of the grate into said pit.

4,095,959

COAL GASIFICATION APPARATUS

Konrad Künstle, Rottenbach; Christian Koch, and Kurt Reiter, both of Erlangen, all of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim, Germany

Filed Feb. 14, 1977, Ser. No. 768,498
Claims priority, application Germany, Mar. 6, 1976, 2609320
Int. Cl.² C10J *3/20*
U.S. Cl. 48—73 **6 Claims**



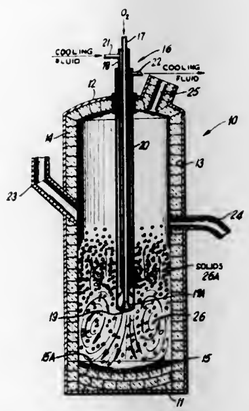
1. In coal gasification apparatus having a hydrogenation gasifier chamber for gasifying a portion of coal fed therein in the presence of hydrogen, a coal inlet means in said hydrogenation gasifier chamber for the introduction of said coal into the upper portion of said chamber, said chamber containing intermediate baffles over which the coal slowly slides down a hydrogen inlet means in said hydrogenation gasifier chamber for the introduction of hydrogen in said chamber, a residue discharge outlet means in the bottom of said hydrogenation gasifier chamber for the discharge of unconverted coal containing ash from said chamber, a product gas outlet means near the top of said hydrogenation chamber for the release of gas produced therein, a steam gasifier vessel for gasifying said unconverted coal in the presence of steam, an unconverted coal inlet means in said steam gasifier vessel for the introduction of said unconverted coal in said vessel, a steam inlet means in said steam gasifier vessel for the introduction of steam in said vessel, an ash discharge outlet means in the bottom of said steam gasifier vessel for the discharge of said ash from said vessel, the combination therewith of disposing the hydrogenation gasifier chamber and the steam gasifier vessel in a common vertical tank with said residue discharge outlet means of the hydrogenation gasifier chamber above said unconverted coal inlet means of the steam gasifier vessel and interposing a partition with a central opening containing a pressure lock between said outlet and said inlet, said pressure lock having a rotating lock receptacle with an opening which is alternatingly connected to the space inside the hydrogenation chamber and the space inside the steam gasifyer vessel to permit unconverted coal to flow into the steam gasifier vessel and prevent gas generated in the vessel from passing into the hydrogenation gasifier chamber, an oxygen inlet means in said steam gasifier vessel for the introduction of oxygen to effect partial combustion of said unconverted coal, a gas release outlet means in said steam gasifier vessel for the release of gas from said vessel, and a first heat exchanger through which said gas from said gas release outlet means passes in heat exchange with steam prior to entering said steam inlet means and wherein said steam gasifier vessel has said steam inlet in said steam gasifier vessel separate from said oxygen inlet and said steam inlet separates the bottom of the common tank from the above steam gasifier vessel forming a residue-oxidation chamber wherein the oxygen inlet is located and wherein residual oxidation of residual coal takes place.

4,095,960

APPARATUS AND METHOD FOR THE GASIFICATION OF SOLID CARBONACEOUS MATERIAL

Reinhardt Schuhmann, Jr., 1206 Hayes St., West Lafayette, Ind. 47906

Filed Nov. 9, 1976, Ser. No. 739,846
Int. Cl.² C10J *3/46*
U.S. Cl. 48—197 R **16 Claims**



1. A process for promoting gasification reaction between an oxygen-rich gas and particulate carbonaceous solids to produce a combustible effluent gas and a residue which comprises,
continuously feeding particulate carbonaceous fuel solids to a closed bottom jet-fluidized reactor,
said reactor having a roof enclosure,

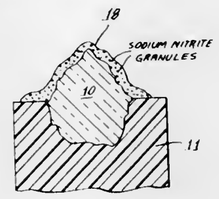
directing an oxygen-rich gaseous jet stream into said reactor by means of a lance passing axially through said roof enclosure to fluidize said carbonaceous solids and to effect gasification reactions,
said oxygen-rich gas and said particulate carbonaceous solids being fed to the reactor at rates proportioned to effect exothermic reaction and provide reactor temperatures of at least about 1600° F,
discharging said gaseous jet stream into said reactor at a nozzle velocity sufficient to form a highly turbulent and rapidly circulating suspension of particulate solids deflecting substantially radially outwardly on the bottom, upwardly on the outside and then inwardly and downwardly below the jet, said circulating suspension defining a reaction zone adjacent to the bottom of said reactor,
maintaining total feed rates of said oxygen-rich gas and carbonaceous solids to provide an average upward velocity of effluent gas substantially above the minimum fluidization velocity for said particulate solids, and
removing said effluent gas and residue formed by said gasification from said reactor.

4,095,961

METHOD FOR PRESERVING THE GRINDING CHARACTERISTICS OF A GRINDING TOOL

John C. J. Wirth, 98 Ponus Ave., Norwalk, Conn. 06850

Continuation of Ser. No. 548,107, Feb. 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 191,844, Oct. 26, 1971, abandoned, and Ser. No. 501,093, Aug. 27, 1974, abandoned, which is a continuation-in-part of Ser. No. 166,093, Jul. 26, 1971, Pat. No. 3,833,346. This application Nov. 5, 1976, Ser. No. 739,355
Int. Cl.² B24B *17/00*; C08G *51/12*
U.S. Cl. 51—281 R **15 Claims**



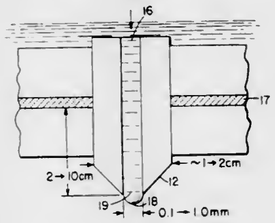
1. Method for preserving the cutting or grinding characteristics of a cutting or grinding tool while maintaining the surface of a metal workpiece at an accelerated rate of cutting or grinding comprising;
effecting contact and relative motion between said workpiece and a cutting or grinding edge of a cutting or grinding tool;
applying to the interface between the edge of said cutting or grinding tool and said workpiece, an effective amount of at least one compound which will undergo melting without decomposition upon exposure to the frictional heat generated at said interface during periods of such contact and relative motion, said compound being selected from the group consisting of sodium nitrite, potassium nitrite, sodium nitrate, potassium nitrate, lithium nitrite, lithium nitrate, potassium chromate, potassium dichromate and mixtures thereof;
whereby, said compound, upon exposure to said frictional heat, undergoes melting and reduces the surface temperature generated at said interface by the heat absorption due to heating said compound to the melting point, the latent heat of melting of said compound and the additional heat absorption of the molten compound, while simultaneously forming a lubricating liquid film at said interaface.

4,095,962

ELECTROSTATIC SCRUBBER

Clyde N. Richards, 4887 Mission Blvd., San Diego, Calif. 92109

Filed Mar. 31, 1975, Ser. No. 563,689
Int. Cl.² B03C *3/16*
U.S. Cl. 55—10 **17 Claims**



1. A method for producing highly charged droplets without effecting corona discharge which comprises:
(a) conducting a liquid to be formed into said highly charged droplets to a nozzle having a tip from which said liquid protrudes; and
(b) forming a substantially uniform electric field over the surface of said liquid protruding from said tip, said electric field being sufficiently large to pull said highly charged droplet free of said tip without creating corona discharge.

4,095,963

STABILIZATION OF DEODORIZED EDIBLE OILS

Dewey D. Lineberry, Louisville, Ky., assignor to Chemetron Corporation, Chicago, Ill.

Filed Feb. 17, 1977, Ser. No. 769,809
Int. Cl.² B01D *19/00*
U.S. Cl. 55—54 **9 Claims**

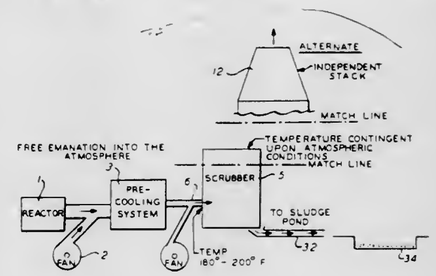
1. In a process of steam deodorizing edible animal and vegetable fats and oils the improvement which comprises conducting the steam deodorization in contact with a peroxide value stabilizing amount of molybdenum metal, molybdenum oxides or mixtures thereof, which has been added to the apparatus in which the steam deodorization is conducted.

4,095,964

SCRUBBER TOWER

Francis Earl Carnicle, 600 Rte. 10, Whippany, N.J. 07981

Filed Sep. 28, 1976, Ser. No. 727,495
Int. Cl.² B01D *47/12*
U.S. Cl. 55—241 **3 Claims**



1. Apparatus for scrubbing pollutants from an extremely hot, highly corrosive off-gas from a reactor chamber comprising, a scrubber tower comprising stacked baffles arranged in levels with the baffles in each level extending parallel to each other and perpendicular to the baffles in the adjacent levels, said baffles being composed of fire retardant treated wood which can withstand a temperature up to at least 230° F to provide non-combustible, corrosion resistant impact members on the

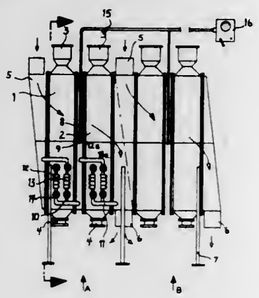
surfaces of which off-gas passing through the scrubber impinge for the entrapment of pollutant particles and the removal thereof from the off-gas stream, a plenum chamber at the bottom of said tower, means connecting said reactor chamber to said plenum chamber and means connected between said reactor chamber and the plenum chamber for cooling said off-gas prior to its entry into said plenum chamber to a temperature below 230° F, means at the top of said scrubber for dispersing water downwardly into said scrubber in a mist of fine droplets so that the impingement surfaces of said baffles are kept continuously coated with a continuous downwardly flowing water stream, and means for exhausting scrubbed gas, substantially free of pollutants, from the top of said scrubber into the ambient air.

4,095,965

ABSORPTION FILTER

Gerhard Max Neumann, and Detlef Sinhuber, both of Berlin, Germany, assignors to Delbag-Luftfilter GmbH, Germany

Filed Aug. 4, 1976, Ser. No. 711,536
Claims priority, application Germany, Aug. 27, 1975, 7527377
Int. Cl.² B01D *53/30*
U.S. Cl. 55—270 **6 Claims**



1. An absorption filter for the purification of gas and/or airstreams, especially those containing toxic or radioactive contaminants, said absorption filter comprising:

a filter housing having an inlet and an outlet and first and second filter chambers, each charged with a granular absorption substrate, said housing inlet communicating with said first filter chamber and said outlet communicating with said second filter chamber, each filter chamber having transverse gas-permeable walls, said first and second filter chambers being separately chargeable with said substrate, said filter chambers being disposed in series in the direction of gas flow, an intermediate section joining said first and second filter chambers in an air-tight fashion such that the flow is from said inlet through said first filter chamber to said second filter chamber via said intermediate section and exhausted through said outlet;

a sensing probe disposed in said intermediate section to monitor the degree of saturation of the substrate in said first filter chamber;

a monitoring instrument connected to said probe and responsive to a predetermined degree of saturation of said substrate in said first filter chamber for triggering a warning signal; and

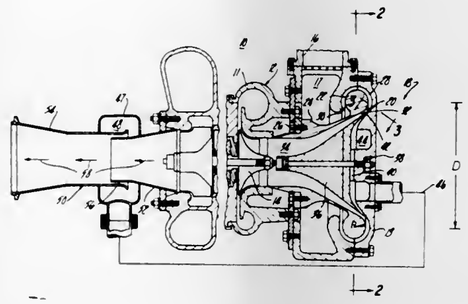
a bypass filter section having an inlet connected to said housing inlet and an outlet connected to said intermediate section and filled with an absorption substrate, the length of said bypass filter section corresponding to the absorptive capacity of the filter substrate in said first filter chamber.

4,095,966

AIR CLEANER

Walter F. Isley, Grosse Pointe Farms, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Oct. 27, 1976, Ser. No. 736,167
Int. Cl.² B01D *19/00*
U.S. Cl. 55—394 **5 Claims**



1. An air-solid separator comprising:

a housing having an air inlet, an air outlet and an annular chamber in fluid communication with both the inlet and outlet,

an annulus stationarily secured to the housing so that the annulus defines a semitoroidal fluid passageway having a first end open to the air inlet and a second end open to the air outlet wherein said annulus includes a substantially conical portion adapted to deflect the air flow from the air inlet into the semitoroidal passageway,

said housing having an annular opening around the outer periphery of said semitoroidal fluid passageway adjacent its second end, said opening having one edge which extends radially inwardly into said semitoroidal passageway a predetermined distance,

a substantially conical member coaxially positioned with said annulus in said housing, the base of said conical member being adjacent to but spaced from said housing said predetermined distance so that the space between the base of the conical member and the housing forms the annular opening while the outer edge of the base forms the inner edge of the annular opening, and

means connected to the outlet of said housing and positioned downstream from said semitoroidal passageway for inducting fluid flow into said housing inlet, through said semitoroidal passageway and out through said housing outlet whereby the air flow through said semitoroidal passageway exceeds a predetermined velocity so that solid particles suspended in the air from the air inlet centrifugally move to the outer periphery of said semitoroidal fluid passageway and form an annular layer of solid particle laden air having a thickness less than said predetermined distance which flows through said annular opening,

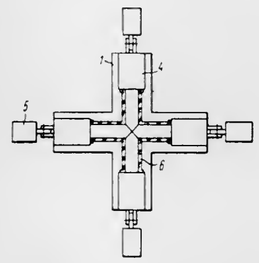
wherein said air inlet is separated from the air outlet by said conical portion of the annulus so that said air inlet and air outlet are adjacent each other and positioned on the same side of said annulus whereby air flowing from said inlet to said outlet through said semitoroidal passageway must pass around substantially the entire periphery of the annulus before encountering the annular opening.

4,095,967

METHOD OF MANUFACTURING GLASS FITTINGS WITH SIDE CHANNEL

Felix Arkadievich Matveev, ulitsa Petrozavodskaya, 21, kv. 140; Anatoly Nikolaevich Orlov, ulitsa Vavilova, 89, kv. 24; Anatoly Alexeevich Rudakov, Altaiskaya ulitsa, 18, kv. 13, and Vladimir Sergeevich Chikmarev, Kashirskoe shosse, 132, korpus 3, kv. 310, all of Moscow, U.S.S.R.

Filed Oct. 21, 1976, Ser. No. 734,433
Int. Cl.² C03B *9/14, 11/00*
U.S. Cl. 65—77 **2 Claims**



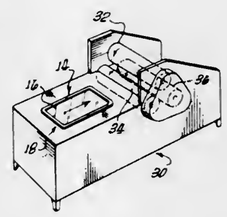
1. In a method for manufacturing glass fittings comprising supplying a molten material to a mold, said mold having a charging opening and a plurality of side channels corresponding to the fitting to be manufactured, said side channels meeting at a center of intersection; pressing said molten material in said mold with at least one movable plunger at least partially disposed within said mold to form said fitting; and removing said fitting from said mold; the improvement wherein all of said side channels are arranged substantially horizontally, said charging opening is disposed at said center of intersection, each side channel is provided with a movable plunger, and said pressing is performed simultaneously by all of said plungers in all of said side channels.

4,095,968

METHOD OF BENDING GLASS SHEETS WITHOUT HEATING

Charles R. Bristow, Arcadia, Calif., assignor to Le Van Specialty Co. Inc., City of Industry, Calif.

Filed Oct. 25, 1977, Ser. No. 844,725
Int. Cl.² C03B *23/02*
U.S. Cl. 65—104 **10 Claims**



1. A method of bending a glass sheet having a substantially rigid frame structure mounted thereon, wherein the steps of the method comprise:

providing a substantially flat sheet of glass of a predetermined thickness;

mounting a rigid bendable frame structure to said flat sheet of glass; and

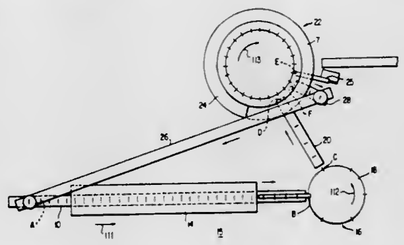
applying force to the frame structure to cause said frame structure to bend in a single plane in an arcuate manner, whereby a radius curvature is formed in said glass-and-frame structure.

4,095,969

SYSTEM FOR MANUFACTURING CIRCULAR FORMED LAMP TUBES

Goro Nakano, Kawasaki; Hidehiko Yoshida, Chigasaki, and Yasuo Sakata, Ome, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Aug. 31, 1976, Ser. No. 719,133
Int. Cl.² C03B *23/14*
U.S. Cl. 65—281 **4 Claims**



1. In a system for manufacturing fluorescent lamp tubes having a circular form from such lamp tubes having a straight form which includes a conveyor system provided with rail members interconnecting a heating station for softening said straight form lamp tubes, a bending station for softening said softened straight form lamp tubes into a circular form and an exhausting station having located therein a plurality of heads for performing operations of exhausting and introducing gas and tipping off an exhaust tube of said lamp tubes, the improvement comprising:

a carrier device for supporting said lamp tubes at each of said stations wherein said carrier device comprises roller members supporting said carrier device on said rail members, lamp-tube-holder means having a pair of holders for gripping said lamp tubes, and means for actuating said holders into a gripping position.

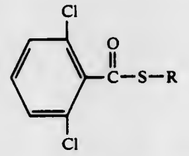
4,095,970

2,6-DICHLOROTHIOLBENZOATES AND USE THEREOF AS PLANT GROWTH REGULATORS

Alan A. MacDonald, Albany, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Jun. 16, 1976, Ser. No. 696,672
Int. Cl.² A01N *9/12;* **C07C** *153/09*
U.S. Cl. 71—72 **52 Claims**

1. A compound having the general structural formula



wherein R is selected from the group consisting of alkyl having 1-6 carbon atoms, cycloalkyl having 3-6 carbon atoms, cycloalkylmethyl wherein the cycloalkyl group has 3-6 carbon atoms, phenyl, substituted phenyl, and aralkyl having 7-10 carbon atoms.

4,095,971

TOBACCO SUCKER CONTROL

Roland L. Cargill, Kendall Park, N.J., assignor to Rhodia, Inc., New York, N.Y.

Filed Mar. 8, 1977, Ser. No. 775,466
Int. Cl.² A01N *9/20*
U.S. Cl. 71—78 **10 Claims**

1. A process for the inhibition of axillary budding in tobacco

plants which comprises the steps of topping the plant during the development stage of apical influorescence and applying to said plant or its environs, at about the time of said topping, an axillary budding-inhibiting amount of an agriculturally acceptable composition containing as active budding-inhibiting agent the D isomer of 2-phenylcarlamoyloxy-N-ethylpropionamide.

4,095,972

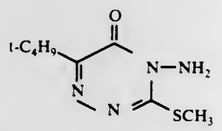
HERBICIDAL COMPOSITION OF PARTICULAR TRIAZINONE AND DIPHENYL ETHER

Robert Rudolf Schmidt, Cologne; Ludwig Eue, Leverkusen, and Lothar Rohe, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 25, 1977, Ser. No. 790,352
Claims priority, application Germany, May 8, 1976, 2620371
Int. Cl.² A01N *9/02*
U.S. Cl. 71—93 **10 Claims**

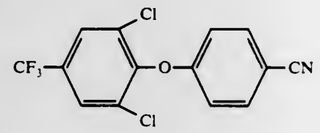
1. A herbicidal composition consisting essentially of

(1) 4-amino-6-tert.-butyl-3-methylthio-1,2,4-triazin-5-one of the formula



(I)

and (2) 2,6-dichloro-4-trifluoromethyl-4'-cyano-diphenyl ether of the formula



(II)

the weight ratio of the compound (I) to the compound (II) being between about 1:1.4 and 1:5.

4,095,973

COMPOSITION FOR INCREASING YIELD OF PULSE

Seiichi Maeda, Wakayama; Kan Mori, Kawasaki, and Tsuneyuki Takeno, Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Nov. 1, 1976, Ser. No. 737,780
Claims priority, application Japan, Nov. 6, 1975, 50-133290
Int. Cl.² A01N *9/14*
U.S. Cl. 71—103 **5 Claims**

1. A method of increasing the yield of peanuts which comprises applying thereto an effective amount of the composition which comprises from 0.01 to 10 wt. percent of an admixture of a sulfonate of the formula:

R^1SO_3M

wherein R^1 is an alkyl or alkenyl group having 8 to 20 carbon atoms and M is selected from the group consisting of potassium, sodium, calcium, monoethanolammonium, and diethanolammonium; 0.1 to 0.5 wt. parts of a nonionic surface-active agent per weight part of said sulfonate and an inert diluent.

4. A method of increasing the yield of peanuts which comprises applying thereto an effective amount of the composition which comprises from 0.01 to 10 wt. percent of a sulfonate of the formula

R^1SO_3M

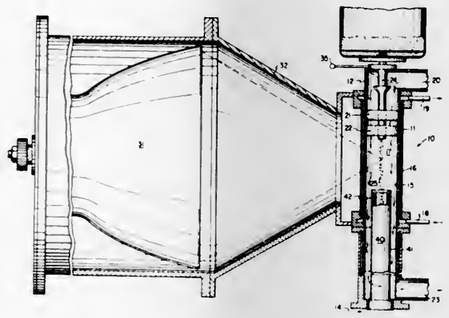
wherein R^1 is an alkyl or alkenyl group having 8 to 20 carbon atoms and M is selected from the group consisting of potassium, sodium, calcium, monoethanolammonium, and diethanolammonium; and an inert diluent.

4,095,974

HIGH TEMPERATURE CHEMICAL REACTION PROCESSES UTILIZING FLUID-WALL REACTORS

Edwin Matovich, Brea, Calif., assignor to Thagard Technology Company, Irvine, Calif.

Division of Ser. No. 616,393, Sep. 24, 1975, which is a continuation-in-part of Ser. No. 271,560, Jul. 13, 1972, Pat. No. 3,933,434, Ser. No. 591,949, Jun. 30, 1975, Pat. No. 4,044,117, and Ser. No. 606,222, Aug. 20, 1975. This application Dec. 10, 1976, Ser. No. 749,419
Int. Cl.² B22F *9/00*; C22B *1/00*
U.S. Cl. 75—0.5 B **2 Claims**



1. A high temperature chemical reaction process which comprises:

(a) generating an annular envelope of an inert fluid which is substantially transparent to radiation within a shell of a refractory material which reflects radiation; the volume enclosed by the shell constituting a black body cavity, the envelope having substantial axial length and the interior of the envelope defining a reaction chamber;

(b) passing a mineral ore and hydrogen, carbon, synthesis gas or other reducing agent into the black body cavity and through the reaction chamber along a predetermined path substantially coincident with the longitudinal axis of the envelope, the reactants being confined with the reaction chamber; and

(c) directing high intensity radiant energy into the reaction chamber to coincide with at least a portion of the predetermined path of the reactants, sufficient radiant energy being absorbed within the reaction chamber to raise the temperature of the reactants to a level required to initiate and sustain a reduction of the mineral ore to a lower valence state.

2. A high temperature chemical reaction process which comprises:

(a) generating an annular envelope of an inert fluid which is substantially transparent to radiation within a shell of a refractory material which reflects radiation; the volume enclosed by the shell constituting a black body cavity, the envelope having substantial axial length and the interior of the envelope defining a reaction chamber;

(b) passing an inorganic compound and hydrogen, carbon, synthesis gas or other reducing agent into the black body cavity and through the reaction chamber along a predetermined path substantially coincident with the longitudinal axis of the envelope, the reactants being confined within the reaction chamber; and

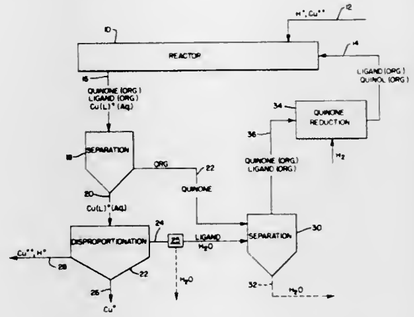
(c) directing high intensity radiant energy into the reaction chamber to coincide with at least a portion of the predetermined path of the reactants, sufficient radiant energy being absorbed within the reaction chamber to raise the temperature of the reactants to a level required to initiate and sustain a reduction of the inorganic compound to a lower valence state.

4,095,975

CONTINUOUS RECOVERY OF COPPER METAL FROM ACIDIC SOLUTIONS

Alkis S. Rappas, Arlington, and John N. Gerlach, Burlington, both of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Apr. 25, 1977, Ser. No. 790,275
Int. Cl.² C22B *15/12*
U.S. Cl. 75—108 **30 Claims**



17. A process for recovering copper from an aqueous phase comprising an acidic copper bearing liquor, said process comprising the steps of:

A. contacting the aqueous phase with an organic phase comprising a substantially water immiscible organic solvent containing:

(1) a solubilized quinolic compound capable of reducing cupric ions to cuprous ions; and

(2) a solubilized nitrile capable of stabilizing cuprous ions in aqueous solutions;

B. allowing components of the organic phase to react with copper values to produce a stabilized cuprous nitrile complex in the aqueous phase and quinonic compound in the organic phase;

C. separating the aqueous and organic phases;

D. removing the nitrile from the complex in the aqueous phase to produce nitrile vapor and to disproportionate the cuprous ions to copper metal and solubilized cupric ions;

E. reducing the quinonic compound produced in the organic phase in step B to quinolic compound;

F. siolubilizing the nitrile vapor produced in step D in the organic phase; and

G. recycling the organic phase containing the nitrile and quinolic compound to step A.

4,095,976

WELDABLE ALLOY

Robert B. H. Herchenroeder, Kokomo, Ind., assignor to Cabot Corporation, Kokomo, Ind.

Continuation-in-part of Ser. No. 644,843, Dec. 29, 1975, abandoned, which is a continuation-in-part of Ser. No. 99,738, Dec. 21, 1970, abandoned. This application Aug. 2, 1976, Ser. No. 710,577
Int. Cl.² C22C *19/05*
U.S. Cl. 75—122 **11 Claims**

1. A weldable and oxidation resistant alloy consisting essentially by weight of:

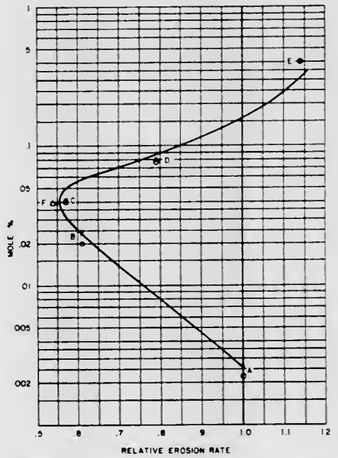
about 20 - 23% chromium
about 17 - 20% iron
up to 1% tungsten
about 7 - 10% molybdenum
about 0.05 - 0.15% carbon
about 0.2 - 1% silicon
up to 2.5% cobalt
up to about 1% manganese
about 0.05 to 0.5% aluminum
an effective amount of lanthanum to provide weldability and high temperature oxidation resistance to about 0.08% and in a sufficiently concentrated form that the total amount of all other rare earth metals is less than the amount of lanthanum, and the balance nickel, and incidental impurities.

4,095,977

MATERIAL FOR MAKING ELECTRICAL CONTACTS, PROCESS FOR MAKING MATERIALS, AND CONTACTS MADE WITH THE MATERIAL

Jr. Brugner, Fox Point, Wis., assignor to Square D Company, Park Ridge, Ill.

Filed Aug. 13, 1976, Ser. No. 714,068
The portion of the term of this patent subsequent to Mar. 8, 1994, has been disclaimed.
Int. Cl.² B22F *3/00*
U.S. Cl. 75—234 **42 Claims**



1. A contact material in powder form for use in making electrical contacts for power level applications consisting essentially of a first metal selected to have a relatively high electrical conductivity, an oxide of a second metal selected to impart desired qualities to the material added in an amount from a minimum effective amount up to a maximum equal to the limit of solubility of the second metal in the first metal, and an additive material in oxide form selected to have a low electronic work function added in an amount of from about 0.01 to about 0.78 molecular percent of the total contact material with said oxides of the first and second metals uniformly distributed throughout the material.

22. A sintered electrical contact for use in electrical contactors for power level applications comprising a first metal selected to have a relatively high electrical conductivity, an oxide of a second metal selected to impart desired embrittlement qualities to the contact added in an amount from a minimum effective amount up to a maximum equal to the limit of solubility of the second metal in the first metal, and an additive material in oxide form selected to have a low electronic work function and added in the approximate range of from 0.01 to 0.078 molecular percent of the total of the first metal, the oxide of the second metal and the additive material with said oxides of the first and second metals uniformly distributed throughout the material.

4,095,978

HARD TANTALUM NITRIDE BASE ALLOYS

Richard Kieffer, Vienna, Austria, assignor to Ugine Carbone, Grenoble, France

Continuation of Ser. No. 519,923, Nov. 1, 1974, abandoned. This application Nov. 5, 1976, Ser. No. 739,065
Int. Cl.[2] C22C *1/05, 29/00*
U.S. Cl. 75—238 **5 Claims**

1. A hard, fritted alloy consisting essentially of from 70 to 97 percent by weight of a hard phase and from 3 to 30 percent by weight of a binder,

said hard phase comprising cubic tantalum nitride in an amount of at least 73 percent by weight, and the remainder a compound of cubic structure selected from the group consisting of the metallic carbides and nitrides of metals in Groups IV-A and V-A, and

said binder comprising at least 70 percent by weight of at least one of the metals selected from the group consisting of iron, nickel and cobalt, and from 0 to 30 percent of at least one of the metals selected from the group consisting of chromium, molybdenum and tungsten.

4. A method for manufacturing hard, fritted alloys comprising the steps of:

a. producing a solid solution comprising at least 73 percent by weight cubic tantalum nitride and the remainder a compound of cubic structure selected from the group consisting of the metallic carbides and nitrides of metals in Groups IV-A and V-A,

b. mixing the solid solution with a binding powder comprising at least 70 percent by weight of at least one of the metals selected from the group consisting of iron, nickel and cobalt, and from 0 to 30 percent of at least one of the metals selected from the group consisting of chromium, molybdenum and tungsten,

c. heating the mixture to a temperature from 1400° to 1700° C. at a nitrogen pressure of 30 to 200 bars, and

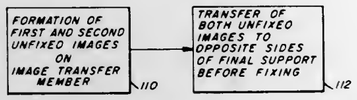
d. rapidly cooling said alloy.

4,095,979

METHOD AND APPARATUS FOR PRODUCING DUPLEX COPIES

Alphonse Benjamin DiFrancesco, Penfield, and Charles Thomas Hage, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 14, 1977, Ser. No. 768,665
Int. Cl.[2] G03G *13/16*
U.S. Cl. 96—1.4 **11 Claims**



1. A method of producing first and second images on opposite sides respectively of a support comprising:

forming first and second transferable unfixed images on an image transfer member; and

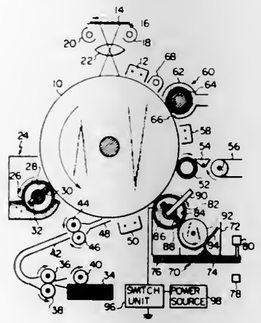
transferring said first and second transferable unfixed images from said image transfer member to opposite sides respectively of a support before fixing of either of said unfixed images to said support.

4,095,980

DRUM CLEANING METHOD AND APPARATUS FOR ELECTROSTATOGRAPHY

Toyokazu Satomi, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 4, 1976, Ser. No. 693,242
Claims priority, application Japan, Jun. 11, 1975, 50-70461
Int. Cl.[2] G03G *21/00*
U.S. Cl. 96—1.4 **30 Claims**



1. A method of electrostatography comprising the steps of:

a. radiating a light image onto a photoconductive member to produce an electrostatic image thereon;

b. applying a toner substance to the photoconductive member to develop the electrostatic image into a toner image;

c. pressing a copy sheet against the photoconductive member to transfer the toner image to the copy sheet;

d. producing relative sliding movement between the photoconductive member and a brush in such a manner that the brush slidably contacts an exposed back surface of the copy sheet and a portion of the photoconductive member external of the copy sheet to remove toner substance from said portion; and

e. separating the copy sheet from the photoconductive member.

4,095,981

PHOTOGRAPHIC MATERIAL CONTAINING AN ENERGY-SENSITIVE ORGANIC O-NITROARYLIDENE DYE AND PHYSICAL DEVELOPMENT PROCESS OF FORMING AN IMAGE WITH SAID MATERIAL

Charles A. Goffe, deceased, late of Brockport, N.Y. (by Patricia Anne Goffe, executrix); Philip W. Jenkins, and David M. Sturmer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

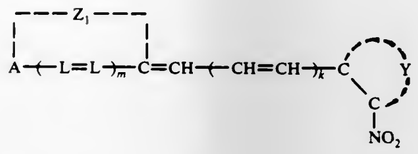
Filed May 24, 1976, Ser. No. 689,326
Int. Cl.[2] G03C *1/00, 5/24*
U.S. Cl. 96—48 PD **15 Claims**

1. A non-silver halide, photographic element comprising a support having thereon a layer comprising:

(a) a silver salt of an organic acid or nitric acid oxidizing agent,

(b) a binder, and

(c) an energy sensitive dye represented by the following formula:



wherein:

(a) *k* represents 0 or 1;

(b) *m* represents 0 or 1;

(c) each L represents a methine group;

(d) A represents oxygen, sulfur or N—R_1;

(e) R_1 represents an alkyl group, an alkenyl group or an aryl group;

(f) Z_1 represents the nonmetallic atoms necessary to complete a basic, cyanine dye type heterocyclic nucleus forming a 5- or 6-membered heterocyclic ring whose skeletal atoms consist of the oxygen, sulfur or nitrogen atom of A, carbon atoms and one other atom chosen from the group consisting of carbon, oxygen, nitrogen, selenium and sulfur atoms, and

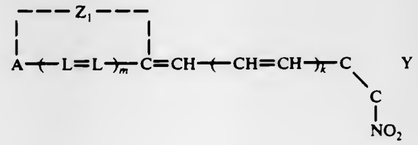
(g) Y represents the atoms necessary to complete a nitro-substituted phenyl or naphthyl group.

13. A process of developing a latent image formed by imagewise exposure to light in an imagewise exposed, non-silver halide photographic element comprising a support having thereon a layer comprising

(a) a silver salt of an organic acid or nitric acid oxidizing agent,

(b) a binder, and

(c) an energy sensitive dye represented by the following formula:



wherein:

(a) *k* represents 0 or 1;

(b) *m* represents 0 or 1;

(c) each L represents a methine group;

(d) A represents oxygen, sulfur or N—R_1;

(e) R_1 represents an alkyl group, an alkenyl group or an aryl group;

(f) Z_1 represents the nonmetallic atoms necessary to complete a basic, cyanine dye type heterocyclic nucleus forming a 5- or 6-membered heterocyclic ring whose skeletal atoms consist of the oxygen, sulfur or nitrogen atom of A, carbon atoms and one other atom chosen from the group consisting of carbon, oxygen, nitrogen, selenium and sulfur atoms, and

(g) Y represents the atoms necessary to complete a nitro-substituted phenyl or naphthyl group, comprising contacting said element with a physical developer bath to develop said latent image.

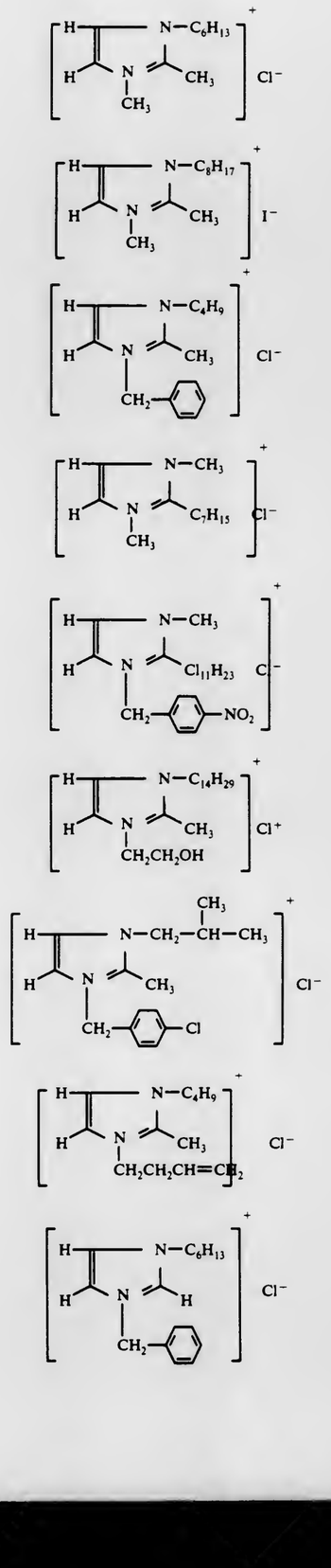
4,095,982

METHOD OF DEVELOPING A SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

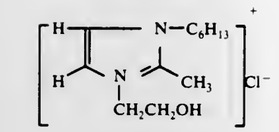
Masakazu Yoneyama; Isao Shimamura, both of Minami-ashigara; Shinzo Kishimoto, and Kazunori Hasebe, both of Fujimiya, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

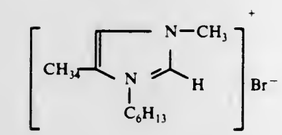
Filed Oct. 19, 1976, Ser. No. 733,827
Claims priority, application Japan, Oct. 24, 1975, 50-127989
Int. Cl.[2] G03C *5/26, 5/30, 1/06*
U.S. Cl. 96—50 PT **22 Claims**

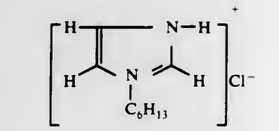
1. A method of developing a silver halide photographic light-sensitive material which comprises imagewise exposing said material to light, developing the photographic light-sensitive material with a silver halide developing agent in the presence of a compound selected from the group consisting of

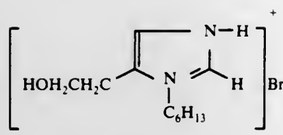


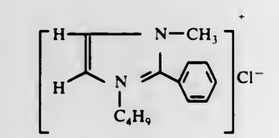
-continued

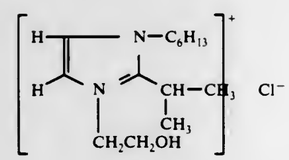


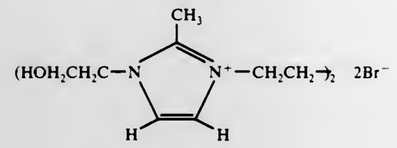


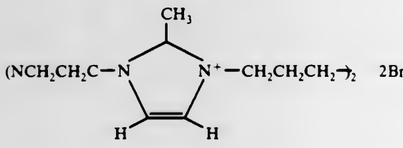












said compound being present in a bath prior to development, the developer bath, or a silver halide emulsion layer of the photographic light-sensitive material.

4,095,983

PHOTOGRAPHIC MATERIAL COMPRISING CYCLIC SULFONAMIDE SUBSTITUTED YELLOW COLOR COUPLERS

Erich Wolff, Leverkusen, and Dieter Lowski, Bergheim, Erft, both of Germany, assignors to AGFA-Gevaert AG, Germany

Filed Dec. 7, 1976, Ser. No. 748,207

Claims priority, application Germany, Dec. 16, 1975, 2556620

Int. Cl.² G03C *7/00, 1/40*

U.S. Cl. 96—77 **4 Claims**

1. Colour photographic material comprising at least one light-sensitive silver halide emuslion layer and containing in said silver halide emulsion layer or a layer adjacent thereto, a benzoyl or alkoyl acetanilide yellow-forming coupler, characterised in that the anilide ring has directly substituted on it the nitrogen of a cyclic alkylene sulphonamide group in which the cycle has 5 or 6 members.

4,095,984

DEVELOPMENT INHIBITOR RELEASING COUPLER AND PHOTOGRAPHIC ELEMENT CONTAINING SAME

Tohru Sueyoshi; Nobuo Furtachi; Akio Okumura, and Tadao Shishido, all of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

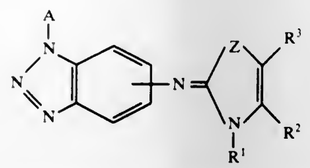
Filed Dec. 29, 1976, Ser. No. 755,302

Claims priority, application Japan, Dec. 29, 1975, 51-159263

Int. Cl.² G03C *1/40, 5/30, 7/00, 1/34*

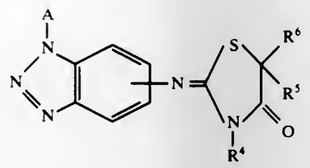
U.S. Cl. 96—100 N **15 Claims**

1. A silver halide photographic element comprising a silver halide emulsion layer containing a photographic coupler capable of releasing a development inhibitor upon reaction with an oxidation product of a color developing agent and represented by the following general formula (I)



(I)

wherein A represents a coupler residue substituted in the coupling off position with the benzotriazole moiety shown in the formula; Z represents a sulfur atom, a selenium atom or an oxygen atom; R^1 represents an aliphatic group; and R^2 and R^3, which may be the same or different, each represents a hydrogen atom, an aliphatic group, an alkoxy group, a hydroxy group, or an aromatic group or R^2 and R^3 can combine and represent the atoms necessary to form a benzene ring or a naphthalene ring; or represented by the following heneral formula (II)



(II)

wherein A represents a coupler residue substituted in the coupling off position with the benzotriazole moiety shown in the formula; R^4 represents an aliphatic group or an aromatic group; and R^5 and R^6, which may be the same or different, each represents a hydrogen atom, an aliphatic group or an aromatic group.

4,095,985

THERMAL BARRIER COMPOSITIONS

William F. Brown, Bonduel, Wis., assignor to Vast Products, Inc., Bonduel, Wis.

Filed Oct. 5, 1976, Ser. No. 730,259

Int. Cl.² C09K *3/28*

U.S. Cl. 106—15 FP **5 Claims**

1. A composition which is particularly adapted for coating surfaces to provide them with a thermal barrier coating to protect them from the detrimental effects of fire which is comprised of an aqueous blend consisting essentially of (a) 5–25 volume percent lithium mica, (b) 1–60 volume percent wollastonite, (c) 1–50 volume percent aluminum trihydrate, (d) 25–70 volume percent nepheline syenite, (e) ½–3 volume percent sodium bicarbonate, (f) 10–15 volume percent sodium aluminum sulfate, (g) 1–15 volume percent borax, (h) 10–25 volume percent raw vermiculite, (i), 5–55 volume percent sodium silicate and water, the total water in the blend being less than about 30 volume percent.

4,095,986

ALKALI-RESISTANT GLASS COMPOSITIONS

Osaku Matsuda; Kouzo Inoue, and Shuji Tsunematsu, all of Tosu, Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Aug. 27, 1976, Ser. No. 718,102

Claims priority, application Japan, Jul. 15, 1976, 49-8481951

Int. Cl.² C03C *5/04, 13/00;* **C04B** *31/06*

U.S. Cl. 106—52 **7 Claims**

1. An alkali-resistant glass composition consisting essentially of 40 - 55% by weight of SiO_2, 6 - 12% by weight of Al_2O_3, 8 - 30% by weight of CaO, 3 - 6% by weight of an alkali metal oxide, 3 - 10% by weight of ZrO_2, 2 - 20% by weight of ZnO and optionally 2 - 7% by weight of Fe_2O_3.

4,095,987

METHOD OF AND COMPOSITION FOR CEMENTING OIL WELLS

Thad O. Walker, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 29, 1976, Ser. No. 755,314

Int. Cl.² C04B *7/352*

U.S. Cl. 106—92 **6 Claims**

1. A method of cementing a zone in an oil well penetrating a subterranean formation comprising injecting down the well and positioning in the zone to be cemented a hydraulic cement aqueous slurry composition comprising dry hydraulic cement, and from about 0.05 to about 5.0 percent by weight, based on dry hydraulic cement of a cement friction reducing additive consisting of hydrolyzed cereal solids which is comprised of hydrolyzed cereal solids which is comprised of from about 15% to about 25% by weight di-saccharides, tri-saccharides, tetra-saccharides, and penta-saccharides, and from about 75 to about 85% by weight hexa-saccharides and above, and sufficient water to form a pumpable slurry, and allowing the cement thus positioned to set to a monolithic mass.

4,095,988

SELF HARDENING SUSPENSION FOR FOUNDATION ENGINEERING PURPOSES

Viliam Jancek, and Jan Gresa, both of Bratislava, Czechoslovakia, assignors to Vyskumny ustav inzenierskych stavieb, Bratislava, Czechoslovakia

Continuation-in-part of Ser. No. 596,508, Jul. 16, 1975, abandoned. This application Nov. 2, 1976, Ser. No. 738,106

Claims priority, application Czechoslovakia, Jul. 19, 1974, 6298/74

Int. Cl.² C04B *7/02, 7/00*

U.S. Cl. 106—97 **10 Claims**

1. A self-hardening suspension for foundation engineering consisting essentially of by volume (a) 40 to 80% water, (b) a powder mass consisting essentially of from 10 to 40% cement, 2 to 18% bentonite, 1 to 15% hydraulic lime, 0 to 15% ashes and 0 to 40% ground slag and filling materials, and wherein the ratio by weight between water and powder mass is in the range of 0.5:1 to 6.5:1.

4,095,989

STABILIZED DICALCIUM ALUMINATE HYDRATES

Werner Dosch, Alfred-Mumbacherstr. 19, 65 Mainz, and Claudia Koestel, Claudiusstrasse 15, 4 Dusseldorf, both of Germany

Continuation-in-part of Ser. No. 594,488, Jul. 9, 1975, abandoned. This application Mar. 16, 1977, Ser. No. 778,295

Claims priority, application Germany, Jul. 11, 1974, 2433363

Int. Cl.² C04B *7/32*

U.S. Cl. 106—104 **8 Claims**

1. In the production of a structure including a concrete or mortar rich in aluminate cement wherein said concrete is formed by mixing said cement with water to hydrate and thereafter permitting the mixture to harden, the improvement which comprises adding to the mixture of cement and water an ionic compound containing anions X^{n-} whereby there are formed and are present in the end product mixed crystals of the formula

$$[Ca_2Al(OH)_6]^+ [(m/n)X^{n-} (1-m)\ Al(OH)_4^- \cdot mAl(OH)_3; aq]^-$$

wherein X^{n-} is an anion of charge n selected from the group consisting of NO_2^-, SO_3^{2-}, $S_2O_3^{2-}$, $Fe(CN)_6^{3-}$, $Fe(CN)_6^{4-}$, MnO_4^-, ClO_3^- and CrO_4^{2-}, and m is $\leqq 1$, whereby the mortar or concrete is stabilized in strength.

4,095,990

DRY FLEXIBLE GLUE COMPOSITIONS AND METHOD OF MAKING SAME

Moses Konigsberg, Tenafly, N.J., assignor to Hudson Industries Corporation, West Orange, N.J.

Filed Jul. 26, 1976, Ser. No. 708,486

Int. Cl.² C09H *11/00*

U.S. Cl. 106—136 **9 Claims**

1. A dry flexible glue composition dispersible in water to form a ready-to-use glue comprising from 10 to 90 parts by weight of an animal glue; the balance being a finely divided, highly absorbent, siliceous compound of an alkaline earth metal or a synthetic silica, containing from 100 to 500 percent by weight thereof of a liquid glue plasticizer absorbed therein.

4,095,991

ENHANCEMENT OF HETEROPOLYSACCHARIDE SOLUBILITY

Pierre Falcoz, Champagne au Mt d'Or; Pierre Celle, Caluire, and Jean-Claude Campagne, Mell, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Jan. 26, 1976, Ser. No. 652,323

Claims priority, application France, Jan. 31, 1975, 75 03640

Int. Cl.² C08L *5/00;* **C08B** *9/00*

U.S. Cl. 106—208 **11 Claims**

6. A composition of matter adapted as a viscosity increasing additive for aqueous media, said composition comprising [1] a calcium salt of a heteropolysaccharide obtained through fermentation of carbohydrates by means of bacteria of the genus Xanthomonas, and [2] at least one member selected from the group consisting of an organic acid and an anhydride of such organic acid, said at least one member having at least one pK value between 5 and 7, and the calcium salt or salts of said at least one member being soluble in water.

11. A solution, in an aqueous medium, of the composition of matter as defined by claim **6**.

4,095,992

COATINGS CONTAINING STARCH ESTERS

Stephen Edward Rudolph, Glenwood, and Raymond Charles Glowaky, Matteson, both of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Division of Ser. No. 609,327, Sep. 2, 1975, Pat. No. 4,011,392. This application Dec. 3, 1976, Ser. No. 747,275

Int. Cl.[2] C08L *3/06*

U.S. Cl. 106—213 **5 Claims**

1. A coating composition comprising an effective amount of a mixed ester of starch with up to about 50% by weight of said starch ester of an organic crosslinking agent and from about 0 to 60% by weight of said starch ester of pigment;

said mixed ester of starch characterized as having an average molecular weight ranging up to about 100,000 and an average degree of substitution ranging from 0.5 to 3.0 wherein at least about 0.1 of the total degree of substitution consist of ester groups having pendant carboxyl groups; said ester of starch derived from

(a) low molecular weight hydrolyzed starch and the derivatives thereof having a plurality of anhydroglucose units and

(b) at least about 0.5 mole of acylating agent for each anhydroglucose unit of the hydrolyzed starch and the derivatives thereof;

said acylating agent consisting of (i) from about 0.1 to 2.9 moles of at least one anhydride of a polycarboxylic acid and (ii) from 0.1 to 2.9 moles of at least one agent selected from the class consisting of anhydrides of monocarboxylic acids and acyl halides of monocarboxylic acids.

4,095,993

METHOD FOR PREPARING POLYCRYSTALLINE FIBROUS TiO_2 PIGMENT

John P. Preston, Toms River, N.J., assignor to N L Industries, Inc., New York, N.Y.

Filed Mar. 18, 1977, Ser. No. 779,140

Int. Cl.[2] C09C *1/36*

U.S. Cl. 106—300 **11 Claims**

1. Process for producing a fibrous, polycrystalline, rutile TiO_2 composition wherein the individual fibers have a cross-section dimension in the range of from 0.04 to 0.3 millimicrons and a ratio of length to cross-section in the range of from 1.5 to about 25 comprising the steps of: hydrolyzing a titaniium sulfate-iron-sulfate solution to form a titania hydrate, filtering, bleaching and washing said hydrate to remove the soluble iron salts therefrom, said bleached hydrate being substantially iron-free but containing from 5% to 15% H_2SO_4 associated with said hydrate, slurrying said hydrate and treating said hydrate with a sufficient amount of an ammoniacal agent selected from the group consisting of ammonia, ammonia hydroxide and ammonium carbonate to neutralize the titania hydrate slurry to a pH of from 5 to 11, washing said titania hydrate to remove the soluble salts therefrom and retaining no more than about 2% SO_3 in said hydrate, calculated on a TiO_2 basis, adding to the washed substantially sulfate-free TiO_2 hydrate a mineralizing complex consisting essentially of a potassium salt in an amount from 0.0 to 2.0% calculated as K_2O, and calcium salt in an amount from 1.0 to 6.0% calculated as CaO, a compound of boron in an amount from 0.5 to 2.0% calculated as B_2O_3 and rutile promoter sol in an amount of about 6.0%, all percentages based on the weight of TiO_2, calcining the treated hydrate at temperatures in the range of from 812° to 865° C., washing the calcine to remove calcium ions, milling the calcine and optionally hydroclassifying and finishing the milled calcine.

4,095,994

SOFT-SETTLING FLUOSILICATE-TREATED SILICA FLATTING AGENT

Roger A. Crawford, Wadsworth, and Laurence E. Jones, Barberton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 7, 1977, Ser. No. 757,721

Int. Cl.[2] C09C *1/30*

U.S. Cl. 106—308 B **37 Claims**

1. A method of preparing metal fluosilicate treated silica flatting agent which comprises:

independently feeding pellets of amorphous, precipitated silica and divalent metal fluosilicate to a mill and blending the silica and the fluosilicate therein while in a dry, finely divided state;

recovering from the mill dry, treated silica having a fluosilicate content, calculated as F, of between about 0.1 and 10 percent by weight of silica and having its particles in sizes useful for flatting agent; and

aging said dry, fluosilicate-treated silica for a time sufficient to render the treated silica more soft settling than untreated silica in a coating formulation, said silica containing during such aging at least 1 weight percent adsorbed water.

4,095,995

POROUS AGGREGATE FOR LIGHT-WEIGHT CONCRETE

Fritz Ullrich, Obersulm-Eschenau, Germany, assignor to Chemotechnik Gesellschaft fur Baustoffchemie mbH & Co., Germany

Filed Nov. 25, 1974, Ser. No. 526,933

Claims priority, application Germany, Nov. 27, 1973, 2358913

Int. Cl.[2] C04B *7/02*

U.S. Cl. 106—308 Q **30 Claims**

1. Porous aggregate for light-weight concrete, characterized in that the individual particles of the aggregate are covered at least partly by a dry additive, which, with a cement slurry, forms a gel-like protective layer scarcely permeable to water, said protective layer facilitating a bond between the aggregate and the cement, said additive being a water-soluble polyethylene oxide of high molecular weight.

4,095,996

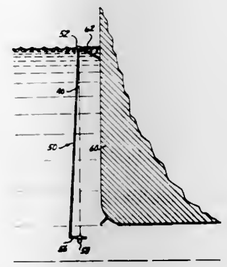
METHOD OF AND APPARATUS FOR THE REMOVAL OF SEA GROWTH FROM SUBMERGED SHIP HULL SURFACES

Bradley E. Meyers, Seattle, Wash., assignor to Roy E. Disney, Burbank, Calif.

Division of Ser. No. 430,606, Jan. 4, 1974, Pat. No. 3,961,594. This application Jan. 2, 1976, Ser. No. 646,344

Int. Cl.[2] B08B *7/00*

U.S. Cl. 134—1 **7 Claims**



1. The method of removing sea-growth from the surface of an object comprising the steps of:

(a) forming a network from an explosive cord, said network including a plurality of sequentially detonatable segments connected together with connecting means, said connecting means comprising nonpropagative connectors and detonation delay units;

(b) positioning the network substantially parallel and at a predetermined spaced relationship away from the surface of the object, said spaced relationship being effective to remove sea-growth from said surface and to substantially prevent damage to said surface upon detonation of said cord; and

(c) detonating said segments sequentially, while maintaining the network and the surface submerged in a liquid.

4,095,997

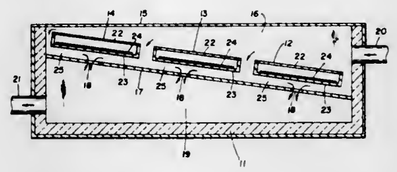
COMBINED SOLAR CELL AND HOT AIR COLLECTOR APPARATUS

Kenneth F. Griffiths, 31 London Ter., New Rochelle, N.Y. 10804

Filed Oct. 7, 1976, Ser. No. 730,361

Int. Cl.[2] H01L *31/04*

U.S. Cl. 136—89 HY **14 Claims**



1. A solar collector comprising a frome having a bottom wall and side walls defining a partially enclosed space, a heat producing solar cell located within the frame and having one side exposed for illumination, said solar cell being mounted to permit flow of air therearound within the space, an air retaining plate mounted beneath the unlit side of said solar cell and spaced therefrom to provide a slot for movement of air therebetween, said plate being spaced from the bottom wall of said frame to define therewith a sub-space for the retention of air therein, and an outlet in said frame in communication with the sub-space for the removal of air retained therein.

4,095,998

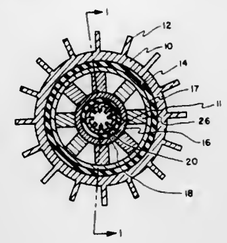
THERMOELECTRIC VOLTAGE GENERATOR

Charles M. Hanson, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 30, 1976, Ser. No. 728,379

Int. Cl.[2] H01L *35/04, 35/30*

U.S. Cl. 136—208 **7 Claims**



1. A vehicle hot exhaust thermoelectric voltage generator utilizing hot exhaust pipe gases from an internal combustion engine for providing electrical energy, said generator comprising in combination:

an exhaust pipe having a plurality of inner fin heat collectors on the interior thereof;

an inner layer of insulation around the exterior of said exhaust pipe at least surrounding said plurality of heat collectors, said inner layer of insulation being electrically insulative and heat conductive;

a plurality of inner electrical contacts contiguous with said inner layer of insualtion;

a plurality of thermoelectric elements comprised of alternate N- and P-type semiconductors having air spaces therebetween;

a plurality of outer electrical contacts;

an outer layer of insulation contiguous with and surrounding said plurality of outer electrical contacts, said outer layer of insulation being electrically insulative and heat conductive, wherein said plurality of inner electrical contacts connected across alternate air spaces to said N- and P-type semiconductors to form hot thermojunctions at the interface of said plurality of inner electrical contacts and said plurality of N- and P-type semiconductors and wherein said plurality of outer electrical contacts connected across alternate air spaces to said N- and P-type semiconductors to form cold thermojunctions at the interface of said plurality of outer electrical contacts whereby said plurality of N- and P-type semiconductors are electrically in series;

a heat sink contiguous with said outer layer of insulation; and

electrical connections connected to opposite ends of the serially connected plurality of thermoelectric elements for providing an electrical energy source to an external device by the Seebeck effect across the serially connected plurality of thermoelectric elements.

4,095,999

HEAT-TREATING METHOD

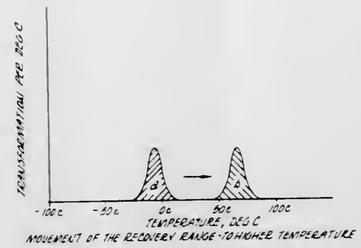
Greville B. Brook, Bucks, England; Peter L. Brooks, Palo Alto, and Roger Iles, Foster City, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 550,847, Feb. 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 417,067, Nov. 19, 1973, abandoned. This application Oct. 26, 1976, Ser. No. 735,737

Claims priority, application United Kingdom, Nov. 17, 1972, 52343/72

Int. Cl.[2] C22F *1/00, 1/08*

U.S. Cl. 148—11.5 R **43 Claims**



1. A method for expanding the hysteresis loop of a metallic composition in its martensitic state, said hysteresis loop being defined by the M_f, M_s, A_f and A_s temperatures, comprising slowly heating said composition to a temperature above the normal A_s to impart an elevated temperature A_s, hereinafter referred to as $A_{s'}$, terminating the slow heating and deforming said composition while in the martensitic state to impart heat recoverability.

4,096,000

ANNEALING SEPARATOR FOR SILICON STEEL SHEETS

Toshiya Wada, and Toshihiko Takata, both of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Apr. 8, 1974, Ser. No. 459,232
Claims priority, application Japan, Apr. 11, 1973, 48-41134
Int. Cl.² B23K *35/24*
U.S. Cl. 148—27 **2 Claims**

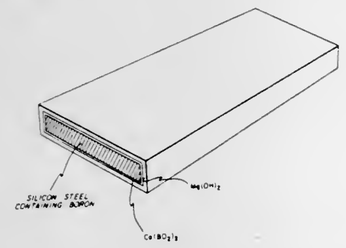
1. An annealing separator for silicon steel sheets consisting essentially of not less than 90.00% by weight of MgO and 0.01 to 2.0% by weight of B_2O_3 in the form of $nMgO.B_2O_3$ with the balance being unavoidable impurities.

4,096,001

BORON-CONTAINING ELECTRICAL STEEL HAVING A CALCIUM BORATE COATING AND MAGNESIA OVERCOATING, AND PROCESS THEREFOR

Ronald H. Arendt, and Matthew J. Curran, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 7, 1977, Ser. No. 774,806
Int. Cl.² H01F *1/04*
U.S. Cl. 148—113 **9 Claims**



1. The method of producing grain-oriented silicon-iron sheet which comprises the steps of providing a fine-grained, primary-recrystallized, silicon-iron sheet containing 2.2 to 4.5 percent silicon, between about three and 50 parts per million boron, and between about 15 and 95 parts per million nitrogen in the ratio to boron of one to 15 parts per part of boron, electrolyzing an aqueous solution consisting essentially of calcium acetate and boric acid with solid $Ca(BO_2)_2$ with the silicon-iron sheet being arranged as the cathode in said solution and the said solution being at a temperature of at least about 65° C and thereby covering the sheet with an adherent electrically-insulating coating of $Ca(BO_2)_2$, then electrolyzing an aqueous solution consisting essentially of solid magnesia-buffered magnesium acetate with the resulting coated sheet arranged as the cathode in said magnesium acetate solution and thereby covering the $Ca(BO_2)_2$ coating with a substantially thicker $Mg(OH)_2$ coating, and thereafter subjecting the resulting double coated sheet to a final heat treatment to develop (110) [001]secondary recrystallization texture in the silicon-iron sheet.

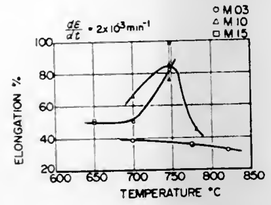
4,096,002

HIGH DUTY DUCTILE CAST IRON WITH SUPERPLASTICITY AND ITS HEAT TREATMENT METHODS

Katsuya Ikawa, and Yuichi Tanaka, both of Muroran, Japan, assignors to Riken Piston Ring Industrial Co. Ltd., Nishishinbashi, Japan

Filed Jun. 4, 1975, Ser. No. 583,681
Claims priority, application Japan, Sep. 25, 1974, 49-110160
Int. Cl.² C21D *5/00*
U.S. Cl. 148—138 **9 Claims**

1. A ductile cast iron; having a structure comprising a grain refined matrix and the spheroidal graphites, said matrix being composed substantially of ferrite and fine cementite particles in said ferrite room temperature and composed substantially of fine austenite and fine ferrite grains at the temperature ranging from eutectoid temperature to about 50° C above the eutectoid temperature, and containing enough amount of at least one of



carbide stabilizing elements to obtain maximum strain rate sensitivity factor of more than 0.3 on the deformation at the temperature ranging from the eutectoid temperature to about 50° C high above that eutectoid temperature.

4,096,003

ALUMINUM, AMINE NITRATE SENSITIZED GEL EXPLOSIVE COMPOSITIONS

Oldrich Machacek, Allentown, Pa., assignor to Atlas Powder Company, Tamaqua, Pa.

Filed Jun. 10, 1977, Ser. No. 805,422
Int. Cl.² C06B *45/00*
U.S. Cl. 149—2 **28 Claims**

1. In a gel explosive composition comprising inorganic oxidizing agents, water, entrapped air and gelling agents, the improvement comprising including therein:

(a) from about 1 to about 10 weight percent of at least one amine nitrate sensitizer selected from the group comprising lower alkyl and alkanol amine nitrates; and

(b) from about 1 to about 10 weight percent of an aluminum sensitizer having a surface area per unit weight of from about 3 to about 9 sq. m/g;

said weight percentages based upon the total weight of the gel explosive composition.

4,096,004

REPAIR COMPOSITION FOR STEELMAKING FURNACES AND THE LIKE

Michael D. La Bate, 115 Hazen Ave., Ellwood City, Pa. 16117, and Erwin F. Franzen, R.D. No. 7, #457, Valparaiso, Ind. 46383

Filed Jul. 19, 1976, Ser. No. 706,397
Int. Cl.² C04B *35/04*; C06B *45/06, 33/14*
U.S. Cl. 149—18 **4 Claims**

1. An exothermic repair mix for steel making furnaces and the like consisting essentially of:

from 50% to 75% magnesite
from 8% to 18% iron oxide
from 6% to 16% aluminum
from 2% to 10% sodium nitrate
from 2% to 10% bauxite
from 0.5% to 4% metal halide
from 4% to 8% coal tar pitch
from 0 to 10% sodium borate.

4,096,005

PYROTECHNIC CLOUD SEEDING COMPOSITION

Thomas W. Slusher, Louisville, Colo., assignor to Nuclei Engineering, Inc., Louisville, Colo.

Filed Jun. 13, 1977, Ser. No. 805,854
Int. Cl.² C06B *45/08*
U.S. Cl. 149—18 **7 Claims**

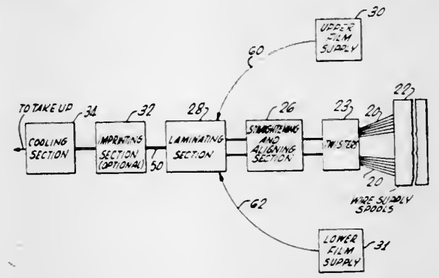
1. A pyrotechnic cloud seeding composition comprising a silver iodate containing oxidizing agent, a light metal fuel, a binder and an "effectiveness" improving compound selected from the group consisting of hexachlorobenzene, hexabromobenzene, pentachlorobenzene, pentabromobenzene, tetrachlorobenzene, tetrabromobenzene, hexachlorocyclohexane, hexabromocyclohexane, hexachloroethane, hexabromoethane and mixtures thereof, said compound being solid at temperatures normally encountered in the preparation and handling of the pyrotechnic composition prior to ignition thereof.

4,096,006

METHOD AND APPARATUS FOR MAKING TWISTED PAIR MULTI-CONDUCTOR RIBBON CABLE WITH INTERMITTENT STRAIGHT SECTIONS

Patrick Joseph Paquin, Hamden, Conn., assignor to Spectra-Strip Corporation, Garden Grove, Calif.

Filed Sep. 22, 1976, Ser. No. 725,539
Int. Cl.² H01B *13/06*
U.S. Cl. 156—55 **15 Claims**



1. A method for making multi-conductor cable having a plurality of longitudinally extending insulated conductor pairs with each of said insulated conductor pairs having twisted pair portions alternating in series, with straight portions, which comprises:

in a first cycle, twisting a plurality of individual insulated moving conductors into parallel twisted pair portions having a predetermined length of twist, terminating the twisting of each of said twisted pair portions but not the forward movement of said conductors forming said twisted pair portions, and shortly after the termination of twisting of said twisted pair portions positively maintaining each of said moving, insulated conductors forming said twisted pair portions along straight, precisely laterally spaced, paths for a predetermined distance to thereby form said straight portions of said multi-conductor cable;

successively repeating the said first cycle to form insulated conductor pairs having twisted pair portions alternating, in series, with said straight portions;

simultaneous with said first and successive cycles of operation laminating said twisted pair portions of said insulated moving conductors and said straight portions of said insulated moving conductors, between plastic sheets, while positively maintaining a first precise lateral spacing of said twisted portions during lamination, and positively maintaining a second precise lateral spacing of said straight portions alternating with said twisted portions, during lamination; and

cooling the laminated cable so formed.

4,096,007

IMPREGNATING FLUID-PERMEABLE ADHESIVE TAPE OR FOIL FOR FIXING COILED ELECTRICAL CONDUCTORS

Erhard Braunling; Karl D. Kuhlmann, and Peter Lutz, all of Hamburg, Germany, assignors to Beiersdorf Aktiengesellschaft, Hamburg, Germany

Continuation of Ser. No. 553,777, Feb. 27, 1975, abandoned. This application Jan. 19, 1977, Ser. No. 760,512
Claims priority, application Germany, Feb. 27, 1974, 2409297
Int. Cl.² B32B *3/10, 3/16, 7/14*; C09J *7/04*; H01B *13/30*
U.S. Cl. 156—55 **6 Claims**

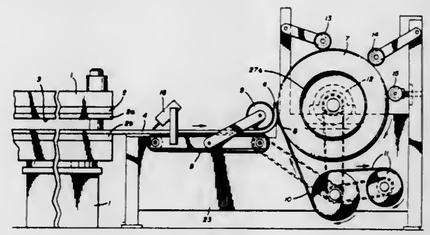
1. A method of binding coiled electrical conductors comprising applying to said conductors an adhesive tape consisting essentially of a pliant and liquid-permeable support material and a self-adhesive composition coated on one side of said support and covering up to 50% of said side, said composition being selected from the group consisting of heat-crosslinked natural or synthetic rubber, heat-crosslinked silicon rubber or heat-crosslinked polyacrylate.

4,096,008

METHOD OF MANUFACTURE AND RETREADING OF TIRES

Don A. Taylor, Wadsworth, Ohio, assignor to Victor E. Buehrle, Akron, Ohio, a part interest

Continuation-in-part of Ser. No. 485,905, Jul. 5, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,219
Int. Cl.² B29H *17/36*
U.S. Cl. 156—96 **8 Claims**



1. A method of securing a tire tread to a tire carcass comprising the steps of

(A) at least partially pre-curing a tread strip in a suitable apparatus;

(B) applying a strip of cushion gum material to the periphery of an adjacently disposed tire carcass;

(C) transporting said tread strip to said tire carcass;

(D) applying said tread strip to the periphery of said tire carcass;

(E) applying bonding heat at the interface of said cushion gum material, said tread strip and said tire carcass at least sufficient to vulcanize said cushion gum material to said strip and said tire carcass;

(F) said tread strip being heated to a temperature at least as great as the temperature required to vulcanize said cushion gum material; and

(G) said tread strip being applied to said tire carcass in said heated condition to supply said bonding heat.

4,096,009

BONDING RUBBER TO METAL

Shinichi Yoshida, Hamamatsu, Japan, assignor to Honny Chemicals Company, Ltd., Kobe, Japan

Filed Aug. 26, 1976, Ser. No. 717,928
Claims priority, application Japan, Aug. 29, 1975, 50-104686
Int. Cl.² C25D *3/28*
U.S. Cl. 156—151 **30 Claims**

1. The process for bonding rubber to a ferrous metal substrate which comprises depositing a layer of copper from a

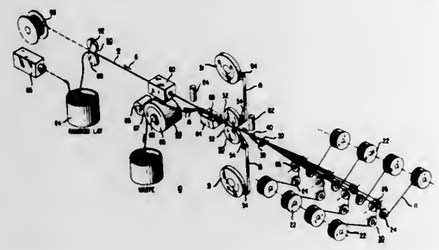
copper salt solution on said ferrous metal substrate by electroless deposition or electrodeposition, wherein when electroless deposition is used the copper salt solution is free of cupric halide, applying an adhesive thereover, said adhesive consisting essentially of an interpolymer of about 50 to about 99% by weight of a conjugated diene, about 1–45% by weight of a heterocyclic base and 0 to about 40% by weight of at least one additional copolymerizable monomer, thereafter contacting said adhesive with the rubber to be bonded and bonding by heat and pressure, said copper layer being deposited in an amount falling within the range of from about 0.1 to about 9.5 g/m^2 and sufficient to provide a bond strength between the copper coated substrate and the rubber of 40 Kg/2 cm to 90 Kg/2 cm according to the H-Test as defined in the above specification.

4,096,010

METHOD AND APPARATUS FOR MANUFACTURING OPTICAL FIBER RIBBONS

William Lamar Parham, and Morton Jefferson Saunders, both of Atlanta, Ga., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 7, 1977, Ser. No. 766,380
Int. Cl.² B32B *5/00*; G02B *5/14*
U.S. Cl. 156—179 **14 Claims**



1. A method for manufacturing an optical fiber ribbon structure comprising a plurality of precisely arranged coplanar and parallel optical fibers secured to a ribbon-like supporting medium, comprising:

directing with at least a fiber-aligning guide said plurality of optical fibers from supply reels into parallel paths in a predetermined plane of travel;

bringing together said optical fibers and said supporting medium to produce an optical ribbon structure with extraneous outer segments extending beyond the outermost fibers at either side of said ribbon;

severing said cutter segments from said optical ribbons; and

advancing said severed outer segments to simultaneously advance said ribbon structure, said optical fibers and said supporting medium.

7. Apparatus for manufacturing an optical fiber ribbon comprising a plurality of parallel optical fibers secured to a ribbon-like supporting medium, wherein said optical fiber ribbon includes segments of said ribbon-like supporting medium extending beyond the outermost fibers, said apparatus comprising:

means including a fiber-aligning guide for directing said fibers into predetermined parallel paths of travel;

means for bringing together said medium and said fibers to manufacture said ribbon;

means for stripping said outer segments from said ribbons; and

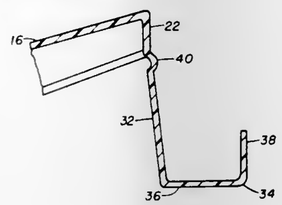
means for advancing said stripped outer segments so as to advance said ribbon, the remaining medium and said fibers in unison.

4,096,011

METHOD OF MANUFACTURING EXTERIOR SIDING

Stanley J. Sanders, Roslyn, and Vincent Fava, Massapequa, both of N.Y., assignors to Aegean Industries, Inc., Roslyn, N.Y.

Filed Dec. 10, 1976, Ser. No. 749,254
Int. Cl.² B29C *17/02, 17/03*
U.S. Cl. 156—196 **15 Claims**



1. A method of manufacturing a self-supporting exterior facing layer of a thermoplastic polymer for use in an insulating siding unit for home installation, comprising the steps of:

(a) molding a thin, uniformly thick sheet of thermoplastic polymer into a generally rectangular plank including a pattern of molded depressions and protuberances, and a flat plate extending into a generally U-shaped portion projecting outwardly of one edge of said plank;

(b) concurrently molding an arcuate depression forming an integral hinge connection intermediate said projecting flat plate and said rectangular plank;

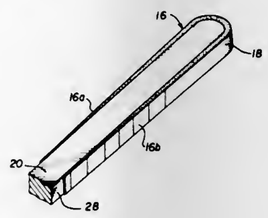
(c) and subsequently bending said projecting flat plate and U-shaped portion in a negative arc about said arcuate depression into substantially folded relationship with said plank whereby said projecting flat plate and U-shaped portion overlies the edge of said plank to which it is joined.

4,096,012

METHOD OF FORMING A SPAR LAYUP FOR AN AERODYNAMIC ROTOR BLADE

Raymond P. Belko, MR. Blackwood, N.J., and Ed. Frank, Glenolden, Pa., assignors to The Boeing Company, Seattle, Wash.

Filed Aug. 30, 1976, Ser. No. 718,520
Int. Cl.² B29C *17/04*
U.S. Cl. 156—214 **4 Claims**



1. A method of forming a spar layup for an aerodynamic rotor blade including the steps of:

a. laying-up a continuous tape strand onto an elongated mandrel to form a generally U-shaped strap of a given thickness, with leg portions having parallel generally vertically disposed faces;

b. removing the strap from the mandrel;

c. contouring the leg portions of the strap to a desired airfoil portion;

d. repeating steps a–c to form a further generally U-shaped contoured strap; and

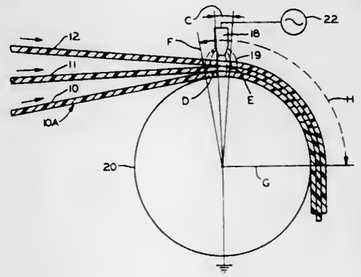
e. mounting both straps onto an assembly mandrel to form complementary portions of the spar layup.

4,096,013

METHOD OF BONDING SHEETS IN AIR BY ALTERNATING CURRENT CORONA DISCHARGE AND APPARATUS FOR SAME

H. Harald Lutzmann, Cleveland Heights, Ohio, and Paul D. Frayer, Hattiesburg, Miss., assignors to National Can Corporation, Chicago, Ill.

Continuation of Ser. No. 449,242, Mar. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 259,112, Jun. 2, 1972, Pat. No. 3,823,061, which is a continuation-in-part of Ser. No. 152,436, Jun. 11, 1971, abandoned. This application Jun. 2, 1976, Ser. No. 692,195
The portion of the term of this patent subsequent to Jul. 9, 1991, has been disclaimed.
Int. Cl.² B29C *27/04*; B32B *31/12*
U.S. Cl. 156—272 **10 Claims**



1. A method of laminating two or more sheets together comprising the steps of

(a) introducing a plastic sheet into a visible alternating current corona discharge in air so that at least one surface of said plastic sheet is exposed to said corona discharge sufficiently to effect a change in the hydrophilic characteristics of said surface,

(b) introducing a second sheet, which is chemically dissimilar to said plastic sheet into said visible alternating current electrical corona discharge in air so that at least one surface of said second sheet is exposed to said discharge sufficient to effect a change in the hydrophilic characteristics of said surface,

(c) contacting the treated surfaces of said sheets with each other while said surfaces are still within said visible alternating current corona discharge to bond said sheets together, and

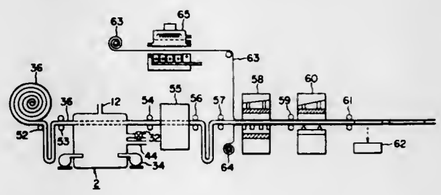
(d) withdrawing the bonded sheets from the said mentioned visible alternating current corona discharge.

4,096,014

METHOD OF MANUFACTURING CUSHION MATERIALS

Muneharu Urai; Koji Kogure, and Youichiro Haraguchi, all of Tokyo, Japan, assignors to Takeji Saito, Tokyo, Japan

Division of Ser. No. 610,175, Sep. 4, 1975, Pat. No. 4,044,715. This application May 31, 1977, Ser. No. 801,731
Claims priority, application Japan, Sep. 17, 1974, 49-105981
Int. Cl.² B29C *19/04*; B32B *31/00*
U.S. Cl. 156—273 **7 Claims**



1. A method of making a cushion material, which comprises the steps of floating fine powdery welding material in a cloud-like layer form, passing a sheet of foamed plastic material over said cloud-like layer of the fine powdery welding material, blowing up said fine powdery welding material from said cloud-like floating layer to be injected into the full thickness of said sheet of foamed material in the predetermined spaced areas thereof, applying a surface material layer and backing material layer on the opposite surfaces of said sheet of foamed material to form a sandwich structure, and then carrying out high frequency welding on the sandwich structure at the areas impregnated with said fine powdery welding material.

4,096,015

METHOD OF MAKING LAMINATED PLASTIC CARDS

Toshio Kawamata; Yutaka Inaba; Kuniyasu Shiroishi, and Shigeru Morishita, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Minamiashigara, Japan

Filed Jul. 12, 1976, Ser. No. 704,402
Claims priority, application Japan, Jul. 18, 1975, 50-88082
Int. Cl.² B29C *27/04*; B32B *31/20*
U.S. Cl. 156—273 **6 Claims**

1. A method of making a laminated plastic card of a uniform thickness having an identification member interposed between layers thereof comprising the steps of:

interposing at least one thermoplastic sheet between a pair of thermoplastic cover sheets, at least one of said pair of thermoplastic cover sheets being transparent,

inserting an identification member having smaller surface dimensions than said sheets and smaller thickness than the total thickness of said sheets between said at least one transparent cover sheet and said sheet interposed between said cover sheets,

sandwiching said sheets and member between a pair of flat electrodes of a high-frequency dielectric heating device,

exerting a pressure uniformly on the sheets and member with said electrodes, and

applying a high-frequency wave to the electrodes to heat the sheets and member from inside,

said thermoplastic sheet interposed between the cover sheets being made of a material which is more easily softened by high-frequency dielectric heating than the material of which said cover sheets are made.

4,096,016

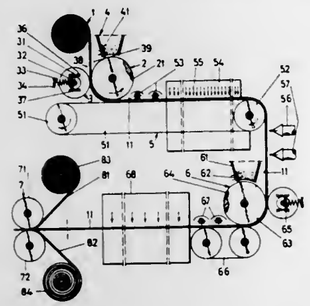
PROCESS FOR MAKING AND USING HIGH FREQUENCY WELDABLE MATERIAL

Gerhard Pohl, Professorenweg 33, Giessen, Germany

Continuation of Ser. No. 355,955, Apr. 30, 1973, abandoned, which is a division of Ser. No. 3,950, Jan. 9, 1970, Pat. No. 3,734,813. This application Dec. 5, 1975, Ser. No. 638,415
Claims priority, application Germany, Jan. 25, 1969, 1903667; Mar. 15, 1969, 1913209; Jun. 10, 1969, 1929352; Jul. 16, 1969, 1936199
Int. Cl.² B29C *19/04*
U.S. Cl. 156—274 **16 Claims**

1. A process for producing a composite structure, particularly a rustle-free composite structure which is permeable to gas, vapor and liquid and which is resistant to the action of detergents and dry cleaning agents, comprising the steps of forming a patterned arrangement comprised of a plurality of spaced-apart depressions on an exterior surface of a support member; advancing sequential portions of said surface beneath a filling station; cooling each of said sequential surface portions as it travels beneath said filling station; filling said spaced-apart depressions at said filling station with at least one discrete powder particle of dipolar plastic material by permitting grav-

ity descent of said powder particles from said filling station towards said depressions as the support member passes beneath the filling station, the cooling of each of said sequential surface portions as it travels beneath said filling station preventing the initiation of plasticization of the powder particles and thereby insuring proper entry of the latter into said depressions; advancing a sequential surface portion upon filling of said depressions thereof towards an applicator station; preheating a flexible support web so as to cause said powder particles to become tacky over the area of their surfaces facing outwardly and towards said flexible support web; and contacting the respective sequential surface portion at said applicator station with at



least one boundary surface of said flexible support web which is permeable to gas, vapor and liquid, and transferring said tacky particles from said depressions onto said one boundary surface so as to form and bond said patterned arrangement thereon.

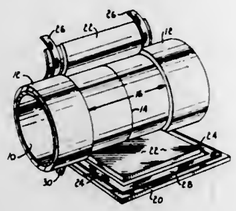
2. In a process as defined in claim 1; and further comprising the steps of superimposing a layer in pressure-contact with said support web upon said patterned arrangement of particles; and forming high-frequency weld lines along said layer and said support web which are bonded together by melting the particles which have a high loss factor so that the particles will melt when subjected to high-frequency fields.

4,096,017

METHOD AND ARTICLE FOR FORMING FIELD JOINTS ON PIPE COATED WITH THERMOPLASTIC MATERIAL

Richard L. Wyke, Bartlesville, Okla., and G. Joe Hennon, Kansas City, Mo., assignors to H. C. Price Co., Bartlesville, Okla.

Filed Feb. 18, 1977, Ser. No. 770,091
Int. Cl.² B29C *19/06*
U.S. Cl. 156—275 **19 Claims**



1. A method of joining first and second segments of thermoplastic material, said first segment comprising spaced apart sections of a corrosion protective pipe coating and said second segment comprising a sheet of material adapted to be placed around a pipe in overlapping relationship to said first segment, said method comprising:

providing a resistance wire;

placing first and second lengths of said resistance wire in spaced apart relationship along said sheet in locations whereby when said sheet is wrapped around a pipe each of said lengths will circumscribe the pipe;

placing a third length of wire on said sheet in transverse relationship to said first and second lengths whereby when said sheet is wrapped around the pipe said third length will extend longitudinally of the pipe a distance greater than the distance between said spaced apart sections;

wrapping said sheet around said spaced apart sections of said first segment in overlapping relationship to the latter to bring said segments into contiguous relationship with said resistance wire sandwiched therebetween; and

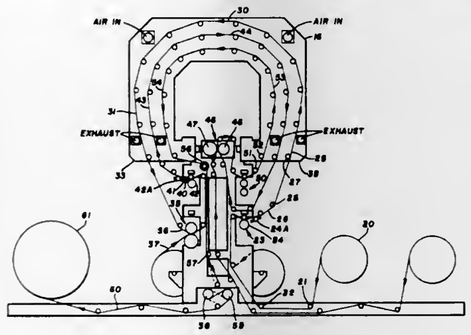
energizing said wire to thereby produce sufficient heat to weld said segments together.

4,096,018

LAMINATOR ASSEMBLY

David R. Hardt, East Greenwich, R.I., assignor to Sheldahl, Inc., Northfield, Minn.

Continuation of Ser. No. 644,516, Dec. 29, 1975, abandoned.
This application Sep. 12, 1977, Ser. No. 832,402
Int. Cl.² B05C *9/14;* **B32B** *35/00*
U.S. Cl. 156—381 **3 Claims**



1. In a laminator system for the continuous treatment and lamination of a plurality of flexible webs, the system including a plurality of unwind stands for retaining and accommodating delivery of individual supplies of said webs to said laminator system, each unwind stand being adapted for the continuous delivery of a web into said laminator system, and rewind means for receiving a finished laminate from said laminator system, applicator stations for applying a film of fluid adhesive to selected portions of said web surfaces, drying chamber means arranged to receive coated webs from said applicator stations for conditioning said adhesive film to form a conditioned web, and laminator stations for bonding the surface of said conditioned webs to a second web surface; said laminator system being characterized in that:

(a) said drying chamber being an annular enclosure having a generally inverted "U" configuration and including a pair of generally upright legs coupled together with an enclosed cross-member extending across the top thereof, each of said legs and said cross-member having a front and a back secured thereto to complete the enclosure, said cross-member being in communication with each of said legs, at opposed ends thereof, and with mutually adjacent first and second web access openings being formed at the base of each of said legs;

(b) means for carrying said webs along a predetermined path alternately through adhesive applicator stations and laminator stations for forming composite webs, and including means for carrying adhesive bearing webs from said applicator stations through said drying chamber;

(c) guide rolls for creating a web path including a plurality of generally parallel and concentric web spans extending through said drying chamber and including a first series of guide rolls for carrying a web along a first plurality of

spans extending through a first applicator station adjacent said first access opening of said drying chamber for application of a film of solvent-bearing adhesive to a first surface of said web, thence through said drying chamber to a first laminator station diposed adjacent said second access opening of said drying chamber to form a first compositve web, and with said first series of guide rolls carrying said first composite web through a second adhesive applicator station adjacent said first laminator station for coating a portion of one surface of the web received from said first laminator station;

(d) a second series of guide rolls for carrying said coated composite web from said second adhesive applicator station adjacent said second access opening through said drying chamber and along a second plurality of spans spaced from and generally parallel to said first plurality of spans through said drying chamber into a second laminator station disposed adjacent said first access opening to form a second composite web, and with said second series of guide rolls carrying said second composite web through a third adhesive applicator station adjacent said second laminator station for coating a portion of one surface of the web received from said second laminator station;

(e) a third series of guide rolls for carrying said coated second composite web from said third adhesive applicator station adjacent said first access opening through said drying chamber and along a third plurality of spans spaced from and generally parallel to said first plurality of spans through said drying chamber into a third laminator station disposed adjacent said second access opening to form a third composite web; and

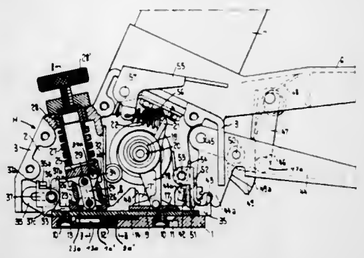
(f) a fourth series of guide rolls for carrying said third composite web to said rewind station, each guide roll of each series of guide rolls being disposed to contact that surface of the web which is opposed to the web surface to which the film of adhesive has been applied.

4,096,019

TENSIONING- AND FRICTION WELDING APPARATUS

Peter Lehmann, Kirchdorf, Switzerland, assignor to Strapex AG, Wohlen, Switzerland

Filed Mar. 4, 1977, Ser. No. 774,255
Claims priority, application Switzerland, Mar. 8, 1976, 2839/76
Int. Cl.² B32B *31/00*
U.S. Cl. 156—494 **10 Claims**



1. A tensioning- and friction welding apparatus for a band formed of thermoplastic material and strapped about an article, comprising:

a counter-clamping jaw;

a displaceable-welding clamping jaw for both tensioning and welding the band;

an inclined drive lever for driving the welding-clamping jaw to-and-fro relative to the counter-clamping jaw;

return movement-blocking means for blocking return movement of the band;

said counter-clamping jaw and said welding-clamping jaw cooperating to engage therebetween the ends of the band clamped between said jaws;

said return movement-blocking means engaging with the ends of said band;

said counter-clamping jaw and said welding-clamping jaw tensioning the band and after reaching a predetermined band tension welding said band ends to one another;

means for locking the counter-clamping jaw in a work position; and

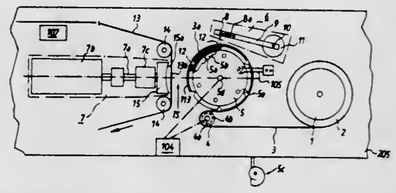
means for unlocking said counter-clamping jaw from said work position and for enabling displacing the same in the direction of the tension applied to the band.

4,096,020

APPARATUS FOR ATTACHING ADHESIVE-COATED BANDS TO PHOTOGRAPHIC FILMS OR THE LIKE

Prithwis Basu, Munich; Günter Neumann, Grunwald, and Günther Kaiser, Munich, all of Germany, assignors to AGFA-Gevaert AG, Leverkusen, Germany

Filed Nov. 13, 1973, Ser. No. 415,384
Claims priority, application Germany, Nov. 17, 1972, 2256364
Int. Cl.² B32B *31/00*
U.S. Cl. 156—519 **19 Claims**



1. Apparatus for attaching adhesivecoated bands to selected portions of elongated webs, particularly to weakened portions of photographic films, comprising positioning means arranged to locate successive portions of a web at a transfer station; a rotary suction conveyor having a peripheral surface provided with spaced-apart axially parallel grooves, said conveyor being disposed at said transfer station and being normally spaced apart from a web portion which is located at said station; a supply of adhesive tape; means for feeding the tape from said supply to said conveyor so that the latter attracts the leader of the tape; means for severing the leader so that the latter yields a succession of adhesive-coated bands, including a heated wire and means for moving the wire sideways against the leader of the tape on said conveyor so that the wire melts the leader and thereby effects the separation of a band therefrom, said wire being arranged to enter with clearance one of said grooves during severing of the leader, and said moving means maintaining said heated wire parallel to the axis of said conveyor prior to, during, and subsequent to said heated wire entering each parallel groove; means for driving said conveyor so as to place successively formed bands into register with successive web portions at said stations; and applicator means for connecting the web portion at said station with the respective and so that the band adheres to the web portion.

4,096,021

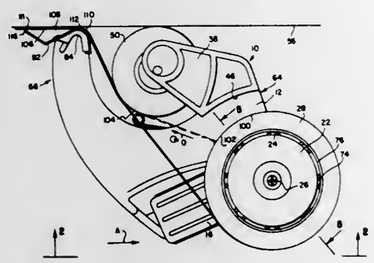
HAND HELD MASKING MACHINE

Danny L. Pool, 2025 E. Jackson, Phoenix, Ariz. 85034, and Robert R. Pool, 607 E. Franklin, Mesa, Ariz. 85204

Filed Mar. 17, 1977, Ser. No. 778,704
Int. Cl.² B32B *31/00*
U.S. Cl. 156—527 **12 Claims**

1. In a hand held masking machine: a frame; a rotary tape roll holder rotatably mounted on said frame; an elongated rotary paper roll holder rotatably mounted on said frame; said paper roll holder having a rotary axis and first and second ends; an elongated paper guide bar mounted on said frame in substantially parallel spaced relation to said rotary axis of said

paper roll holder; said tape roll holder having a rotary axis generally parallel to said rotary axis of said paper roll holder; said tape roll holder having an end portion; said first end of said paper roll holder disposed in spaced overlapping relation to said end portion of said tape roll holder; whereby an edge of tape dispensed from said tape roll holder is spaced from and overlaps an edge of said paper disposed substantially in alignment with said first end portion of said paper roll holder; said frame having first and second offset portions adjacent to which



said end portion of said tape roll holder and said first end of said paper roll holder respectively are disposed; a manually holdable handle on said frame; said handle spaced from said first offset portion of said frame in a direction toward which said end portion of said tape roll holder is directed; whereby said tape roll holder may be operated in close proximity to a building room corner or the like with said handle disposed substantially spaced therefrom; said paper roll holder extending from said second offset portion of said frame in said direction.

4,096,022

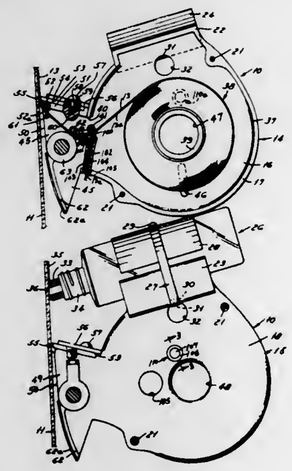
TAPE DISPENSER AND APPLICATOR

Harry J. Crawford, 22955 Glenmoor Heights Dr., Farmington, Mich. 48024

Continuation-in-part of Ser. No. 666,869, Mar. 15, 1976, Pat. No. 4,026,757. This application May 6, 1977, Ser. No. 794,408

Int. Cl.² B32B *31/20, 35/00*

U.S. Cl. 156—577 **5 Claims**



1. In a tape dispenser for applying pressure sensitive adhesive tape on a flat surface, the combination comprising:

(a) a housing having a tape storage chamber, including a tape roll supporting means for rotatably supporting a roll of paper lined pressure sensitive adhesive tape in said chamber;

(b) a roll of pressure sensitive adhesive having a paper liner covering the adhesive tape rotatably mounted on said tape roll supporting means;

(c) said housing having an outward extension on one side thereof through which is formed a tape dispensing path, and which extension has on its outer face a tape discharge opening for discharging the tape from the housing and applying it to a flat surface;

(d) a pressure means operatively carried on said housing extension in a position over said opening for pressing said tape on a flat surface as it is discharged from the housing extension opening;

(e) a V-shaped stripper means mounted in said housing for engagement with the paper liner on the tape for stripping the paper liner from the tape as it is unrolled and discharged from the dispenser housing;

(f) discharge passage means between said housing and said outward extension for discharging from the housing the paper liner stripped from the tape;

(g) said pressure means comprising an elongated pressure pad mounted radially to the axis of rotation of a roll of tape on said tape roll supporting means, and having a tapered outer end face which bears against the adjacent face of the tape discharged from the housing through the tape discharge opening for exerting pressure on the tape to apply it to a flat surface as the tape dispenser is pulled over said flat surface; and,

(h) a guide roller operatively mounted on said outward extension adjacent said pressure pad for guiding the tape under the pressure pad as the tape emerges from the tape discharge opening in the housing.

4,096,023

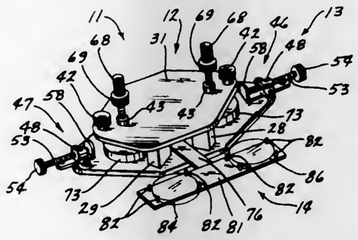
LENS SEALING CLAMP

Carl F. Bivens, 810 E. 26th St., Des Moines, Iowa 50317

Filed May 6, 1976, Ser. No. 683,764

Int. Cl.² B25B *5/14;* **B30B** *1/20*

U.S. Cl. 156—580 **7 Claims**



1. An optical lens clamping apparatus for use with a plurality of lenses and with adhesive material, said apparatus comprising:

first means for aligning the peripheral edges of a plurality of stacked lenses;

means for comprising a plurality of stacked lenses; and

means for supporting said first means for aligning and said means for compressing, said means for supporting including upper and lower plates and second means for aligning the peripheral edges of a plurality of stacked lenses, said plates being interconnected and spaced apart by said second means for aligning, said means for compressing being affixed to said plates, the plurality of lenses being stacked within said means for compressing, said first means for aligning being affixed to said lower plate and first operating upon the stack of lenses, said means for compressing secondly operating upon the stack of lenses, whereby a plurality of stacked lenses having adhesive material placed adjacent the peripheral edges thereof are made to stick together; and further wherein said plates are parallel, said first means for aligning including a first pressure screw assembly being affixed to said lower plate and extending parallel to said plates, the lenses being stacked between said second means for aligning and said first pressure screw assembly, said first pressure screw assembly being extendable toward the peripheral edges of the stacked lenses, said second means for aligning receiving the peripheral edges of the stacked lenses thereagainst upon extension of said first pressure screw assembly against the lenses.

4,096,024

METHOD FOR CONTROLLING THE SOLIDIFICATION OF A LIQUID-SOLID SYSTEM AND A DEVICE FOR THE APPLICATION OF THE METHOD

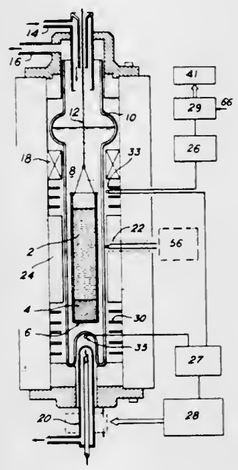
Pierre Dusserre, and Claude Potard, both of Saint-Egreve, France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 2, 1976, Ser. No. 691,989

Claims priority, application France, Jun. 11, 1975, 75 18286; May 6, 1976, 76 13551

Int. Cl.² B01J *17/08*

U.S. Cl. 156—601 **8 Claims**



1. A method for measuring the solidification of a two-phase liquid-solid system wherein solidification is caused by cooling of and occurs in the liquid phase, said method comprising:

measuring variations in the volume of the liquid-solid system resulting from changes in molar volume due to transfer between liquid and solid phases in the system during solidification;

controlling the rate of solidification by adjusting the temperature of the liquid-solid system responsive to said variations in volume.

4,096,025

METHOD OF ORIENTING SEED CRYSTALS IN A MELT, AND PRODUCT OBTAINED THEREBY

Jarda L. Caslavsky, Lexington; Frederick Schmid, Marblehead; Charles P. Gazzara, Reading; Dennis J. Viechnicki, Wellesley, and James W. McCauley, Wakefield, all of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

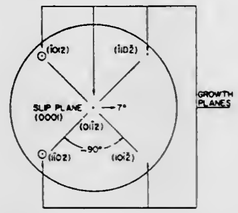
Continuation-in-part of Ser. No. 444,442, Feb. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 276,213, Jul. 28, 1972, abandoned. This application Jun. 23, 1975, Ser. No. 589,317

Int. Cl.² B01J *17/08;* **C01F** *7/02*

U.S. Cl. 156—616 R **4 Claims**

1. In a method for the production of a large transparent single crystal of corundum having a hexagonal structure comprising the melting of said material in a crucible having a generally vertical wall and a horizontal bottom, the improvement comprising: cutting a seed crystal such that it has six growth planes **(0112)**, **(1102)**, **(1012)**, **(0112)**, **(1102)**, and **(1012)**;

orienting said growth planes **(0112)** and **(0112)** of said seed crystal such that they are at an angle of about 7° to the horizontal bottom of said crucible, and said other growth planes **(1102)**, **(1012)**, **(1102)**, and **(1012)** of said seed crystal are oriented substantially parallel to the generally vertical wall of said crucible;



melting said seed crystal to a substantially hemispherical shape; and

cooling said seed crystal and said material such that said material nucleates and grows in a substantially hemispherical fahsion and assumes the crystallographic orientation of said seed crystal which process minimizes the thermal strain on the single crystal.

4,096,026

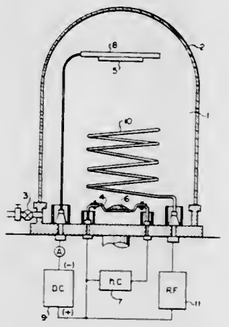
METHOD OF MANUFACTURING A CHROMIUM OXIDE FILM

Susumu Takeuchi, Tokyo, Japan, assignor to Toppan Printing Co., Ltd., Tokyo, Japan

Filed Jul. 27, 1976, Ser. No. 709,181

Int. Cl.² C23C *15/00, 11/08*

U.S. Cl. 156—656 **12 Claims**



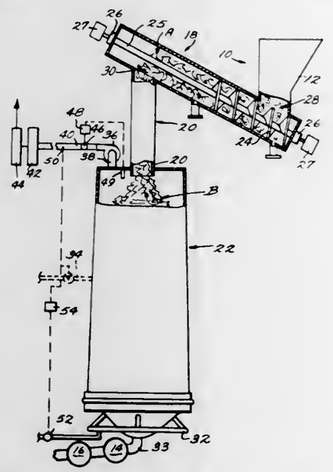
1. A method of manufacturing a chromium oxide film which comprises the steps of scattering particles of chromium metal in an atmosphere selected from the group consisting of a mixture of CO_2 gas and inert gas, a mixture of CO gas and inert gas and a mixture of CO_2 gas, CO gas and inert gas, the inert gas content being 65 to 95% by volume based on the whole gas mixture, oxidizing scattered particles of chromium metal in the gaseous atmosphere and depositing the oxidized particles of chromium metal on a substrate.

4,096,027

SYSTEM FOR PRESTEAMING WOOD CHIPS AT OR NEAR ATMOSPHERIC PRESSURE WITH MINIMUM DISPLACEMENT OF AIR

Michael I. Sherman, Glens Falls, N.Y., assignor to Kamyr Inc., Glens Falls, N.Y.

Filed Feb. 19, 1976, Ser. No. 659,402
Int. Cl.[2] D21C *1/02, 3/24, 7/06, 7/12*
U.S. Cl. 162—18 **8 Claims**



3. A method for presteaming wood chips and the like in a sealed vertical presteaming vessel having a chips inlet in a top portion thereof, and a chips outlet at a bottom portion thereof prior to digestion, comprising the steps of

introducing steam under low pressure into said presteaming vessel,

introducing wood chips and the like into said wood chips inlet of said presteaming vessel while providing an isolation seal in the area of introduction to minimize the amount of air that will flow into said presteaming vessel through said chips inlet thereof,

said step of introducing being accomplished by packing and elevating said wood chips and the like, forming an isolation seal with the wood chips during the packing and elevating thereof to prevent entry of air into said presteaming vessel,

maintaining said presteaming vessel substantially at or slightly below atmospheric pressure, by substantially continuously exhausting gases from a top portion of said presteaming vessel at a rate dependent upon the pressure existing in said presteaming vessel,

expelling presteamed wood chips and the like from said presteaming vessel chips outlet, and

sensing the temperature of gases exhausted from said presteaming vessel and controlling the rate of steam introduction based on the temperature of the gases exhausted from said presteaming vessel.

4. A method as recited in claim 3 comprising the further step of impregnating said wood chips and the like with digesting liquor in a lower portion of said presteaming vessel.

4,096,028

FEED FORWARD CONTROL OF DISSOLVED SOLIDS IN A COUNTERCURRENT SEPARATION AND WASHING ZONE

Roy R. Rosenberger, Wheaton, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Nov. 26, 1976, Ser. No. 745,357
Int. Cl.[2] D21C *9/02;* **G06F** *15/46*
U.S. Cl. 162—49 **10 Claims**

1. A continuous process for controlling in a zone of countercurrent particulate solids separation and washing (a) the amount of dissolved material separated from an input slurry fed into the input slurry end of said zone and (b) the amount of dissolved material carried out from the product stream output end of said zone in the liquid phase of a product stream from said product stream output end,

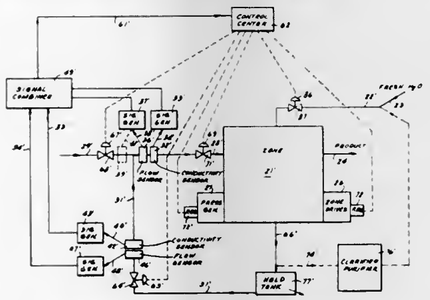
said input slurry stream being comprised of a mixture of a starting slurry stream and a terminal recovered recycle liquid stream,

said starting slurry stream being comprised of dispersed particulate solids and washable removables in a liquid phase, said starting slurry liquid additionally containing dissolved material,

said terminal recovered recycle liquid stream having been derived from counter-current particulate solids separation and washing in said zone, said terminal recovered recycle liquid containing washable removables and dissolved material therein, said terminal recovered recycle liquid being held in a holding region before being mixed with said starting slurry stream,

said product stream being comprised of particulate solids and a product slurry liquid, said particulate solids having been subjected to separation and washing in said zone, said product slurry liquid containing dissolved material therein,

said zone comprising at least one stage of continuous particulate solids separation with simultaneous washing of such separated particulate solids by a countercurrently flowing stream of recycle liquid, a drive for operating said zone, and a pressure generator for removal of liquid from said particulate solids being separated in said zone,



said recycle liquid comprising a fresh liquid, said recycle liquid being fed into said zone at said product stream output end,

said process comprising the steps of --

(A) measuring the instantaneous conductivity of said input slurry stream and generating a first signal representative thereof,

(B) measuring (1) the instantaneous flow rate of said input slurry stream, or (2) the instantaneous flow rate of said starting slurry stream, and generating a second signal representative thereof,

(C) measuring the instantaneous conductivity of said terminal recovered liquid recycle stream and generating a third signal representative thereof,

(D) measuring the instantaneous flow rate at which said terminal recovered liquid recycle stream is admixed with said starting slurry stream and generating a fourth signal representative thereof,

(E) combining said first, said second, said third, and said fourth signals to produce a fifth signal representative of the amount of said dissolved material in said starting slurry liquid, and

(F) applying said fifth signal to at least one regulator which controls certain dynamic process variables in said zone, said regulator and said certain process variables being (1) a first valve regulator operating a first flow control valve across said recovered recycle liquid stream, or (2) a second valve regulator operating a second flow control valve across said starting slurry stream, or (3) a third valve regulator operating a third flow control valve across said input slurry stream, or (4) a fourth valve regulator operating a fourth flow control valve across said input stream of fresh recycle liquid, or (5) a speed regulator operating said drive for said zones or (6) a pressure regulator operating said pressure generator for removal of liquid from particulate solids so being separated in said zone, while simultaneously maintaining each of those remaining dynamic process variables which are not associated with said regulators within predetermined variable limits, thereby accomplishing the desired controlling.

6. Apparatus for controlling in equipment for countercurrent particulate solids separation and washing (a) the amount of dissolved material separated from an input slurry fed into the input slurry end of said equipment and (b) the amount of dissolved material carried out from the product stream output end of said equipment in the liquid phase of a product stream from said product stream output end, said equipment including

at least one stage for continuous particulate solids separation and for simultaneous washing, including operational drive means, pressure generation means for removal of liquid from particulate solids separated therein, and having an input slurry location and a product stream output location,

a starting slurry conduit means,

a terminal recovered recycle liquid conduit means,

an input slurry conduit means functionally connected to said input slurry location, to said starting slurry conduit means, and to said terminal recovered recycle liquid conduit means,

a product stream conduit means functionally connected to said product stream output location,

a fresh liquid conduit means functionally connected to said product stream output location, said apparatus comprising

(A) means for measuring the instantaneous conductivity of said input slurry stream and generating a first signal representative thereof,

(B) means for measuring (1) the instantaneous flow rate of said input slurry stream, or (2) the instantaneous flow rate of said starting slurry stream, and generating a second signal representative thereof,

(C) means for measuring the instantaneous conductivity of said terminal recovered liquid recycle stream and generating a third signal representative thereof,

(D) means measuring the instantaneous flow rate at which said terminal recovered liquid recycle stream is admixed with said starting slurry stream and generating a fourth signal representative thereof,

(E) means for combining said first, said second, said third, and said fourth signals to produce a fifth signal representative of the amount of said dissolved material in said starting slurry liquid, and

(F) means for applying said fifth signal to at least one regulator means to control selected dynamic apparatus variables in said equipment, said regulator means and said selected apparatus variables being (1) first valve regulator means operating a first flow control valve means across said recovered recycle liquid stream, or (2) second valve regulator means operating a second flow control valve means across said starting slurry stream, or (3) third valve regulator means operating a third flow control valve means across said input slurry stream, or (4) fourth valve regulator means operating a fourth flow control valve means across said input stream of fresh recycle liquid, or (5) speed regulator means operating said drive means for said equipment; or (6) pressure regulator means operating said negative pressure generation means for removal of liquid from particulate solids being separated in said equipment, while simultaneously maintaining each of those remaining dynamic apparatus variables which are not associated with said regulator means within predetermined variability limits, thereby accomplishing the desired controlling.

4,096,029

CELLULOSIC PULP DELIGNIFICATION USING AN ACIDIC BROMINE-CHLORINE MIXTURE

Jack F. Mills, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 26, 1976, Ser. No. 680,245
Int. Cl.[2] D21C *9/12*
U.S. Cl. 162—89 **17 Claims**

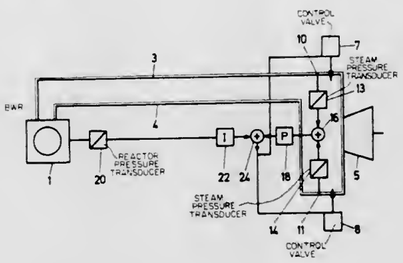
1. In a liquid phase process for delignification of cellulosic pulp involving halogenation and extraction stages wherein the halogenation is conducted by contacting such pulp with chlorine under acidic conditions and wherein lignin is extracted from such pulp in one or more alkaline extraction stages; the improvement comprising replacing the chlorine with an acidic bromine-chlorine mixture comprising between about 10 and about 70 weight percent bromine.

4,096,030

CONTROL SYSTEM FOR A BOILING-WATER NUCLEAR POWER PLANT

Arthur Oberle, Ennetbaden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Apr. 28, 1976, Ser. No. 681,272
Claims priority, application Switzerland, Aug. 22, 1975, 10895/75
Int. Cl.[2] G21C *7/32, 19/04*
U.S. Cl. 176—20 R **2 Claims**



1. In a control system for a nuclear power plant of the type comprising a boiling-water reactor and a steam turbine connected to the outlet from said reactor by way of a steam line including a control valve therein adjacent the turbine inlet, the improvement which comprises a first pressure sensing means responsive to the pressure at the reactor pressure-vessel, a first controller of the integral-action type controlled by the output of said first pressure sensing means, second pressure sensing means responsive to the pressure in said steam line immediately in advance of said control valve, a second controller of the proportional-action type or combined proportional-differential-action type controlled by the output of said second pressure sensing means, and a summing device for adding the outputs from said first and second controllers, the output from said summing device being applied to said control valve for continuous regulation thereof.

4,096,031

NUCLEAR REACTOR REFUELING SYSTEM

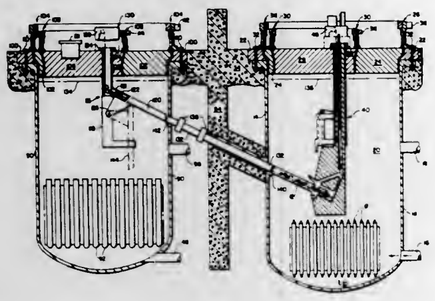
Elman E. Wade, South Huntingdon Township, Huntingdon County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 22, 1976, Ser. No. 707,594
Int. Cl.[2] G21C *19/22, 19/20;* **B66C** *17/08*
U.S. Cl. 176—32 **9 Claims**

1. A nuclear fuel transfer system including a reactor vessel, fuel assemblies positioned in a first array therein, an inlet and an outlet for circulating a coolant in a heat transfer relationship with said fuel assemblies, a first closure head disposed on said reactor vessel in a fluid tight relationship, and a storage vessel

positioned adjacent to said reactor vessel having an inlet and outlet for circulating a coolant therethrough, fuel assemblies positioned in a second array therein, and a second closure head disposed on said storage vessel, said fuel transfer system comprising:

connecting means disposed between said reactor vessel and said storage vessel for allowing the transfer of said fuel assemblies between said reactor vessel and said storage vessel while said fuel assemblies remain completely submerged in a containuous body of coolant being a single body of coolant occupying and capable of flowing among said reactor vessel, said storage vessel, and said connecting means for cooling said fuel assemblies;



first fuel assembly transfer means disposed on said first closure head and extending into said reactor vessel for transferring said fuel assemblies between said first array and said storage vessel, said first fuel assembly transfer means including a first pivotable apparatus for holding said fuel assemblies and for aligning said fuel assemblies in a position for transfer through said connecting means; and

second fuel assembly transfer means disposed on said second closure head for transferring said fuel assemblies between said second array and said reactor vessel, said first fuel assembly transfer means cooperating with said second fuel assembly transfer means for transferring said fuel assemblies through said connecting means.

4,096,032

MODULAR IN-CORE FLOW FILTER FOR A NUCLEAR REACTOR

Joseph B. Mayers, Greensburg; Walter E. Desmarchais, Monroeville, and John M. Shallenberger, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 471,736, May 20, 1974, abandoned. This application Aug. 19, 1976, Ser. No. 715,734
Int. Cl.² G21C *9/00*
U.S. Cl. 176—38 **6 Claims**

1. A system of removing potentially harmful debris from a nuclear reactor coolant circulation system before loading the reactor with fuel assemblies and during preoperational testing comprising:

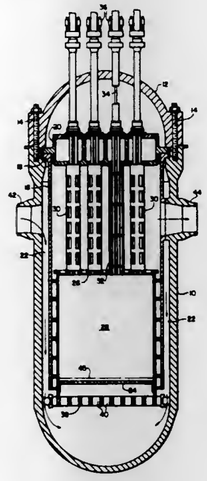
a pressure vessel having a head secured in fluid tight relationship therewith,

a coolant inlet and outlet in said vessel for accommodating flow of coolant therethrough,

spaced upper and lower core plates having coolant flow openings therein attached to support members in the pressure vessel, said upper and lower core plates providing an empty space therebetween otherwise occupied by said fuel assemblies,

an upper structure mounted near the top of said pressure vessel and control rod guide tubes and support adapters mounted between the upper structure and said upper core plate; and

multiple filter assemblies mounted on and covering the openings in said lower core plate, each of said filter assemblies including a base having filter elements in at least one coolant flow opening therein, the arrangement being such that the filter assembly opening is aligned with the lower core plate openings when each assembly is placed thereon, locking means on each of said assemblies which coact with said lower core plate and removably attaches each filter assembly to said core plate,



whereby said filter assemblies prevent the flow of metal chips and shavings past the filter elements into the reactor coolant system when a flushing liquid is circulated through the reactor during preoperational testing.

4,096,033

CORE FOR A NUCLEAR REACTOR

Robert F. Barry, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 321,410, Jan. 5, 1973. This application Jun. 20, 1975, Ser. No. 588,925
Int. Cl.² G21C *3/30*
U.S. Cl. 176—78 **6 Claims**

3. A core for a thermal nuclear reactor, said core comprising a plurality of coextending, clad fuel elements arranged in a parallel array and having a substantially circular cross-sectional configuration, said fuel elements being vertically positioned within a reactor pressure vessel, said core being of a type which is moderated and cooled by water which flows in

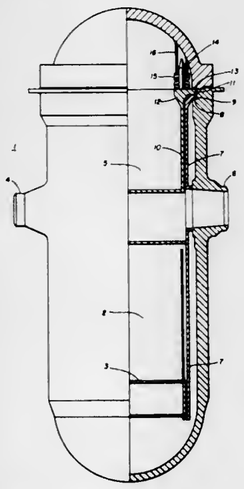
a first direction down the inside of said pressure vessel and then flows in a second direction up through said core, wherein each of said fuel elements comprises a plurality of tandem arranged fuel regions one above another with a first region being fueled with fissile plutonium which extends upward from the reactor coolant inlet end of said core, a second region being fueled with enriched fissile uranium which extends downward from the reactor coolant outlet end of said core, and an intermediate region including natural uranium interposing said first and second regions, said fuel element being substantially free from plutonium except for said first region.

4,096,034

HOLDDOWN STRUCTURE FOR A NUCLEAR REACTOR CORE

Andrew James Anthony, Tariffville, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 16, 1976, Ser. No. 751,784
Int. Cl.² G21C *13/09*
U.S. Cl. 176—87 **10 Claims**



1. In a nuclear reactor vessel, a structure for applying a holddown force to the upper guide structure barrel and the core support barrel, including,

an internal ledge formed on the upper end of the vessel,

a core support barrel positioned down and within the vessel,

a flange formed on the upper end of the core support barrel and arranged to engage the internal ledge of the vessel to hang the barrel from the ledge,

an upper guide structure barrel positioned down and within the core support barrel,

a flange formed on the upper end of the upper guide structure barrel and arranged to engage the flange of the core support barrel to hang both barrels from the internal ledge on the upper end of the vessel,

a vertical post member mounted by its lower end to upper surface of the flange of the upper guide structure barrel,

a spring structure arranged about the post member and bearing on the surface of the flange of the upper guide structure barrel,

a closure of the reactor vessel and means for seating the closure on the upper end of the vessel with a predetermined force,

and a tube attached by its upper end to the inside of the closure and arranged to extend vertically down about the post member to engage the spring structure and load the spring structure in transmission of the force seating the closure to the barrels on the vessel ledge.

4,096,035

SEPARATION OF TRACHOMA AGENT FROM GROWTH MEDIUM IMPURITIES

Roy A. Machlowitz, Glenside, and Edward H. Wasmuth, Telford, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 15, 1977, Ser. No. 806,651
Int. Cl.² C12K *7/00*
U.S. Cl. 195—1.5 **8 Claims**

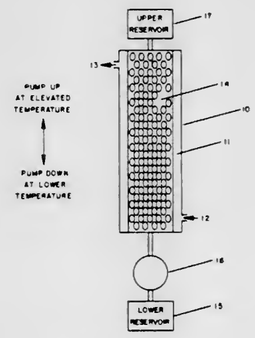
1. A method of separating trachoma agent from impurities derived from the medium in which the trachoma agent has been grown which comprises subjecting the trachoma agent to isopycnic banding in a NaBr density gradient, and recovering fractions rich in trachoma agent.

4,096,036

METHOD FOR THE SEPARATION OF WATER SOLUBLE POLYOLS

Victor S. H. Liu; Norman E. Lloyd, and Khaja Khaleeluddin, all of Clinton, Iowa, assignors to Standard Brands Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 696,281, Jun. 15, 1976, abandoned. This application Apr. 7, 1977, Ser. No. 785,464
Int. Cl.² C13D *3/14*
U.S. Cl. 195—31 F **12 Claims**



1. A method for the separation of polyol A and an uncharged water soluble substance in aqueous solution by thermal parametric pumping by the utilization of ion exchange materials which are characterized as complexing with polyol A at a first temperature and at least partially dissociating from polyol A at a second temperature comprising:

(a) passing the solution containing polyol A and an uncharged water soluble substance into a column of said ion exchange material at the first temperature to form the polyol A ion exchange material complex,

(b) withdrawing the solution from the column at the second temperature at which the polyol A ion exchange material complex is at least partially dissociated, and

(c) collecting at least two effluent portions, one being enriched in polyol A and the other being enriched in the uncharged water soluble substance.

4,096,037

ARGINASE TEST

Abdus Salam Mia, Fairless Hills, Pa., assignor to Pitman-Moore, Inc., Washington Crossing, N.J.

Filed May 24, 1976, Ser. No. 689,237
Int. Cl.² G01N *31/14*
U.S. Cl. 195—103.5 R **19 Claims**

1. A method for determining the concentration of arginase in blood serum which consists essentially of the steps of:

(1) incubating a sample of arginase-containing blood serum with an arginase-activating source of magnesium, manga-

nese, cobalt or cadmium ions at 25°–40° C for about five minutes;

(2) adding to said incubated sample an aqueous buffered solution of L-arginine or an acid addition salt thereof and incubating the mixture at 25°–40° C for a time sufficient for the arginase to catalyze the hydrolysis of said L-arginine to urea and ornithine;

(3) adding a color developer comprising an acidic aqueous solution of ninhydrin to the thus-obtained ornithine-containing mixture without prior centrifugation and removal of precipitate to form a colored ornithine-ninhydrin complex and incubating the resultant mixture at 85°–100° C for about 15 minutes; and

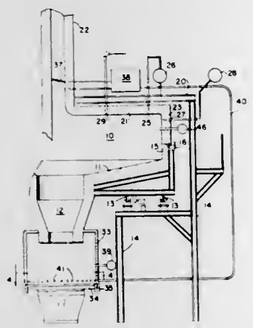
(4) after cooling, colorimetrically measuring the amount of said colored complex and calculating the concentration of arginase in the given blood serum sample from said measure.

4,096,038

METHOD AND APPARATUS FOR OPERATING A CALCINER UNDER A PRESSURE DIFFERENTIAL

Ray E. Kranz; William E. Solano, and Beverly E. Johnson, all of Pittsburgh, Pa., assignors to Salem Furnace Co., Carnegie, Pa.

Filed Oct. 1, 1976, Ser. No. 728,643
Int. Cl.² C10B *21/18, 47/30*
U.S. Cl. 201—32 **8 Claims**



1. The method of treating materials having volatiles therein which are evolved therefrom when subjected to a heat treatment within the confines of a calciner having an exhaust stack for the flow therethrough of the combustion gases created within the calciner and a soaking pit area, the improvement comprising the step of directing some of the combustion gases from the exhaust stack to combustion gas admission ports provided in the soaking pit area to provide an increase in pressure in the soaking pit area to prevent outside air from entering into and coming in contact with the materials which have been heat treated within the calciner which have been deposited into the said soaking pit area.

4,096,039

CONDITION SENSING CONTROL SYSTEM FOR DESALINATOR AUTOMATION

Howard H. Carnine, Costa Mesa, and Carter R. Robinson, Newport Beach, both of Calif., assignors to Carnine Corporation, Newport Beach, Calif.

Filed Dec. 18, 1975, Ser. No. 642,039
Int. Cl.² B01D *3/42*
U.S. Cl. 202—205 **4 Claims**

1. A control system for operating a low pressure evaporative desalinator having a mechanism for introducing heat to a boiler chamber at temperatures below the atmospheric pressure boiling point of the raw water, a mechanism for drawing a vacuum within said boiler chamber, and a mechanism for pumping fresh water from said chamber, comprising:

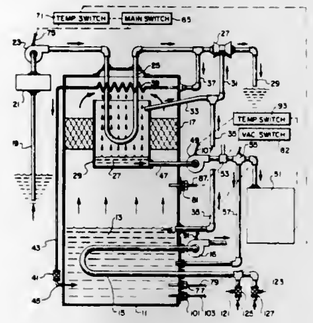
a main control switch having an ON position for activating and an OFF position for deactivating said desalinator;

means for sensing the temperature of the raw water within said boiler chamber;

means for sensing the vacuum within said boiler chamber;

means responsively connected to said temperature sensing means and said switch for activating said vacuum drawing mechanism whenever said switch is in said ON position or said temperature sensing means monitors a temperature above a first predetermined level;

means responsively connected to said switch and said vac-



uum sensing means for activating said heat introducing mechanism when said switch is in said ON position and said vacuum sensing means simultaneously monitors a pressure below a predetermined level which level is below atmospheric pressure; and

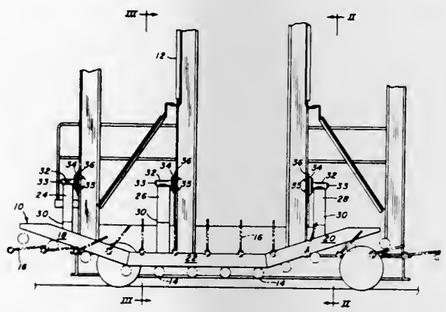
means responsively connected to said switching means, said vacuum sensing means and said temperature sensing means for activating said fresh water pumping mechanism when said switch is in said ON position, when said temperature is simultaneously above a second predetermined level and when said pressure is simultaneously below said predetermined level.

4,096,040

TRIPPER BEAM

John A. Grosko, West Mifflin, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 25, 1977, Ser. No. 781,096
Int. Cl.² C10B *39/08, 39/14, 45/00*
U.S. Cl. 202—262 **2 Claims**



1. In a pollution-controlled coke quench system which includes a slatted top quench car having a plurality of slats with cam followers and cranks attached to said slats and a tripper beam attached to a coke guide in front of a coke oven, said tripper beam for engaging said cam followers to actuate said slats, the improvement comprising:

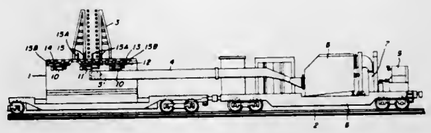
means for pivoting said tripper beam away from said quench car to disengage said cam followers.

4,096,041

SINGLE-SPOT QUENCH CAR

Donald L. Friend, Allison Park, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 664,774, Mar. 8, 1976, Pat. No. 4,039,394. This application Mar. 10, 1977, Ser. No. 776,402
The portion of the term of this patent subsequent to Aug. 2, 1994, has been disclaimed.
Int. Cl.² C10B *39/08, 39/14, 45/00*
U.S. Cl. 202—263 **8 Claims**



1. A coke quench car for receiving incandescent coke from a coke oven and transporting it to a quenching site for quenching, said car being of the type having dimensions which enable it to be filled with incandescent coke while said car remains in a fixed position relative to said coke oven, said car comprising:

(a) an open top container for said coke;

(b) a plurality of slats having substantially parallel edges transversing the top of said container, said slats having sufficient width to permit the opposing edges thereof to cooperate to form a closure which prevents the emission of fumes into the atmosphere above said car; and

(c) means for opening at least some of said slats to permit coke to pass into said quench car from above and to close said slats after coke is received in said car, said means comprising:

(1) lever means attached to one end of each slat,

(2) linkage means attached to said lever means and joining preselected groups of said slats, and

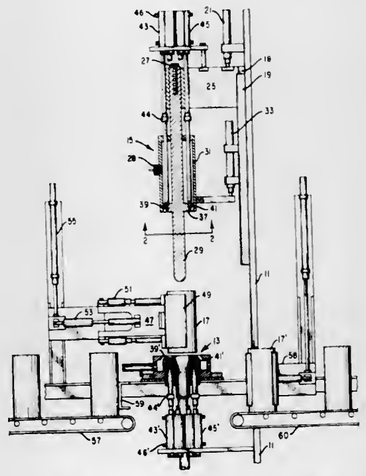
(3) means attached to said linkage means for moving said lever means to selectively open said groups of slats.

4,096,042

ELECTROPLATING METHOD AND APPARATUS

Robert B. Looney, Aiken, and William E. L. Smith, North Augusta, both of S.C., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 4, 1969, Ser. No. 814,894
Int. Cl.² C25D *3/12*
U.S. Cl. 204—1.5 **7 Claims**



1. In an apparatus for electroplating all surfaces of a tubular workpiece including a tubular anode for encompassing said workpiece and an elongated anode for penetrating said workpiece, and means for circulating electrolyte between said workpiece and said anodes, the improvement comprising:

(a) a support frame including a base assembly;

(b) a carriage assembly supported on said frame and adapted for linear reciprocal movement relative to said base assembly, said tubular and elongated anodes being supported in coaxial alignment by said carriage assembly with said tubular anode being movable along the axis of said elongated anode, said elongated anode and said base assembly including laterally extending anode surfaces for aligning in spaced facing relationship to the opposite end faces of said tubular workpiece;

(c) first contact means cooperatively supported by said carriage assembly and said base assembly for fixedly supporting and electrically maintaining said workpiece as a cathode;

(d) second contact means cooperatively supported by said carriage assembly and said base assembly in spaced relationship relative to said first contact means for fixedly supporting and electrically maintaining said workpiece as a cathode;

(e) means for alternately engaging said first and then said second contact means with said workpiece;

(f) means for moving said carriage assembly away from said base assembly to position said workpiece in coaxial alignment with said anodes, and for moving said carriage assembly towards said base assembly to position said elongated anode into said tubular workpiece in spaced relationshp to define an inner annular passageway; and

(g) means for longitudinally positioning said tubular anode around said workpiece to define an outer annular passageway, said tubular anode sealingly communicating with said elongated anode to interconnect said inner and outer passageways for the circulation of electrolyte.

6. A method of electroplating a workpiece disposed between at least two anodes comprising:

(a) engaging a first group of point locations on the surface of said workpiece during an initial time interval of no more than about 5 seconds duration with a first set of cathodically biased contacts for fixedly supporting and electrically contacting said workpiece;

(b) maintaining said workpiece in a fixed location while passing electrolyte between said workpiece and said anodes for said initial time interval to electroplate a film over exposed surfaces of said workpiece;

(c) engaging a second group of point locations on the surface of said workpiece with a second set of cathodically biased contacts disposed in spaced relationship to said first set of contacts followed by immediately disengaging said first set of contacts;

(d) maintaining said workpiece in a fixed location with engagement of said second group of point locations for a second time interval of substantially longer duration than said first time interval to electroplate exposed surfaces of said workpiece including said first group of point locations;

(e) reengaging said first group of point locations with said first set of contacts followed by immediately disengaging said second set of contacts; and

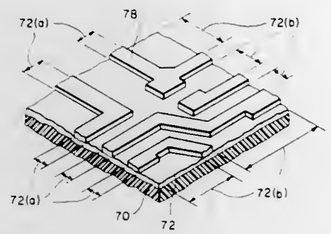
(f) maintaining said workpiece in a fixed location with engagement of said second group of point locations for a third time interval of substantially longer duration than said first time interval to complete the electroplating of exposed surfaces of said workpiece including said second group of point locations, said third time interval being about equal to the duration by which said second time interval exceeds said first time interval.

4,096,043

METHOD OF SELECTIVELY DEPOSITING A METAL ON A SURFACE OF A SUBSTRATE

Michael Anthony De Angelo, Ewing Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Jul. 11, 1977, Ser. No. 814,564
Int. Cl.² C25D *5/02*
U.S. Cl. 204—15 **18 Claims**



1. A method of selectively depositing a metal on a surface of a substrate which comprises:
(a) treating the surface with a desensitizer comprising hydrazine;
(b) selectively exposing said desensitizer-treated surface to a source of ultraviolet radiation to render a selected area thereof incapable of desensitizing a sensitizing species; and
(c) treating said radiation-exposed surface with a sensitizing species to sensitize said selected area.

4,096,044

ELECTROCHEMICAL HYDROXYLATION OF CERTAIN AROMATIC COMPOUNDS

Norman Louis Weinberg, East Amherst, N.Y., assignor to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 563,532, Mar. 31, 1975, Pat. No. 4,024,032. This application Mar. 7, 1977, Ser. No. 775,021
The portion of the term of this patent subsequent to May 17, 1994, has been disclaimed.
Int. Cl.² C25B *3/02*; C07C *29/00, 39/00*
U.S. Cl. 204—59 R **22 Claims**

1. An electrochemical hydroxylation process comprising electrolyzing an aqueous liquid comprising
(a) at least one soluble cosolvent;
(b) an aromatic substrate comprising an aromatic nucleus ring-substituted with at least one electron-withdrawing moiety and having at least one replaceable nucleus hydrogen; and
(c) an anion of a strong carboxylic acid having a pK_a (H_2O) at 25° C. value of less than about 3
to effect nuclear hydroxylation of said aromatic substrate wherein a hydroxy group replaces said hydrogen.

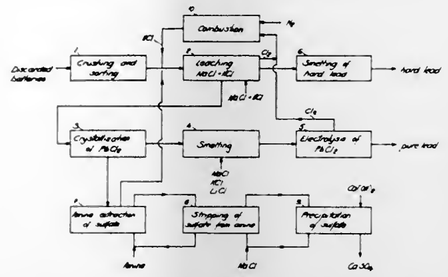
4,096,045

PROCESS FOR THE RECOVERY OF LEAD FROM LEAD SCRAPS

Heikki Ahonen, Valkeakoski; Jari Lindroos, Helsinki, and Veli Sarkkinen, Tampere, all of Finland, assignors to Lyijyvalkoistehdas Gronberg Oy - Blyvittfabriken Gronberg AB, Vantaa, Finland

Filed Mar. 24, 1977, Ser. No. 780,824
Claims priority, application Finland, Mar. 25, 1976, 760814
Int. Cl.² C25C *1/18, 1/00*
U.S. Cl. 204—117 **18 Claims**

1. A process for the recovery of lead from lead scraps such as battery scraps, comprising mixing the lead scraps at elevated temperature with an aqueous solution of an alkali metal chloride and hydrochloric acid; separating the aqueous solution containing dissolved lead chloride from insoluble hard lead, which is recovered; crystallizing the lead chloride from the cooling aqueous solution, which is separated from the lead chloride crystals; and finally subjecting the obtained lead chloride to an electrolysis for the recovery of metallic lead by a method known per se.

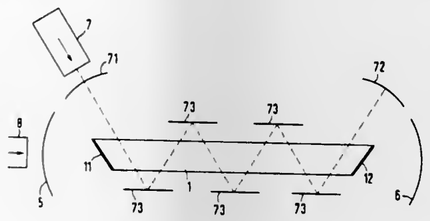


4,096,046

METHOD AND APPARATUS FOR THE SEPARATION OR ENRICHMENT OF ISOTOPES

Hans-Joachim Niemann, Erlangen, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Apr. 13, 1976, Ser. No. 676,490
Claims priority, application Germany, Apr. 22, 1975, 2517828
Int. Cl.² B01J *1/10*
U.S. Cl. 204—157.1 R **12 Claims**



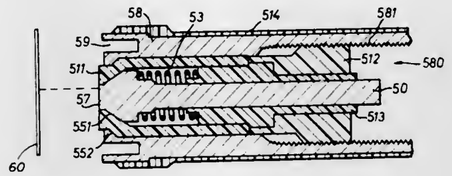
1. Method for the separation or enrichment of uranium isotopes which are bound to anisotopic substances and form with the latter a mixture of isotope compounds containing $^{235}UF_6$ and $^{238}UF_6$ which comprises the following steps:
a. irradiating said mixture of $^{235}UF_6$ and $^{238}UF_6$ compounds in gas or vapor form by a first light source to photochemically convert the isotope compounds to another mixture of isotope compounds containing $^{235}UF_5$ and $^{238}UF_5$ as different isotope compounds,
b. irradiating said photochemically converted mixture of isotope compounds of UF_5 which have only a short life in the nascent gas or vapor phase and condenses to solid stable form, before condensation, by a second light source, at a frequency to selectively excite only one said different UF_5 isotope compound of said photochemically converted mixture of isotope compounds,
c. effecting said excitation in the presence of a reactant which chemically reacts with the excited UF_5 compound of the mixture to produce a reaction product, and
d. separating the reaction products, enriched with one of the starting isotopes.

4,096,047

ELECTROANALYTICAL TRANSDUCERS

John Martin Hale, Geneva, and Eugen Weber, Hinwil, both of Switzerland, assignors to Orbisphere Corporation, Wilmington, Succursale de Collonge-Bellerive, Collonge-Bellerive, Switzerland

Filed Mar. 1, 1977, Ser. No. 773,163
Claims priority, application Switzerland, Mar. 12, 1976, 3076/76
Int. Cl.² G01N *27/30, 27/46*
U.S. Cl. 204—195 P **39 Claims**



1. A method for preventing contact by an electrolyte of selected portions of an electrode not intended to be contacted by the electrolyte in an amperometric electroanalytical transducer comprising contacting at least a part of the surface of said electrode portions with an insulator adapted to seal said selected portions of said electrode against contact with said electrolyte, maintaining the insulator and the electrode in mutually pressing engagement at a pressure of greater than about 0.1 kg/mm² at the interface thereof.

25. An amperometric electroanalytical transducer comprising insulating means including an insulator, at least one electrode having an electroanalytically effective surface portion for contact with an electrolyte, said surface portion being limited by said insulator, and means for pressingly engaging said insulator and said electrode at a pressure of greater than about 0.1 kg/mm² at the interface of said insulator and electrode for counteracting electrolyte penetration into said interface.

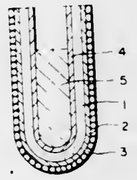
26. The transducer of claim 25, wherein said means effect a predetermined and substantially constant pressure of contact between said electrode and said insulator in an area near the electrolyte-contacting end of said interface.

4,096,048

OXYGEN SENSOR AND MANUFACTURING METHOD THEREOF

Shinichi Matsumoto, Toyota; Hirohisa Miura, Okazaki; Kiyoshi Uchida, and Yasuhiro Otsuka, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jun. 9, 1977, Ser. No. 805,109
Claims priority, application Japan, Oct. 26, 1976, 51-128627
Int. Cl.² G01N *27/46*
U.S. Cl. 204—195 S **11 Claims**



1. An oxygen sensor comprising:
a solid electrolyte sintering of an oxygen ion-conductive ceramic material;
a metal electrode formed on the measured side of said solid electrolyte sintering;
a reference oxygen pole of a mixture of metal and metal oxide charged on the opposite side of said solid electrolyte sintering;
a metal electrode formed on the side of said reference oxygen pole covering at least the total area of said solid electrolyte sintering which adjoins said reference oxygen pole, said metal electrode serving to insulate said reference oxygen pole from said solid electrolyte sintering;
a holder to support said solid electrolyte;
and a means to take out the outputs of said two metal electrodes.

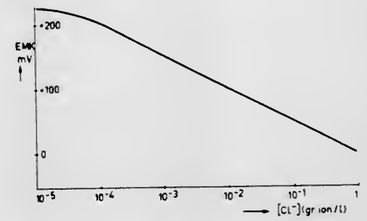
9. A manufacturing method of an oxygen sensor, comprising the steps of:
forming a solid electrolyte sintering of an oxygen ion-conductive inorganic substance;
forming a metal electrode on each side of said solid electrolyte sintering by electric plating or by pasting;
forming a reference oxygen pole by charging and sintering a mixture of metal and metal oxide on one part of the solid electrolyte in such a manner that said oxygen pole may be insulated by said metal electrode from said solid electrolyte sintering; and
assembling said solid electrolyte sintering with a holder and a means to take out the outputs of both metal electrodes.

4,096,049

METHOD FOR PRODUCING AN ION-SELECTIVE ELECTRODE

Renaat Edmond Van de Leest, and Leopold Heijne, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 25, 1976, Ser. No. 689,944
Claims priority, application Netherlands, May 30, 1975, 7506410
Int. Cl.² G01N *27/46*; B05D *3/04*
U.S. Cl. 204—195 M **2 Claims**



1. A method of producing an ion-selective electrode for selectively measuring the concentration of an ion in a solution of a mixture of ions, said method comprising chemically or electrochemically converting a silver sulfide matrix to the depth of between 0.1 and 100 μm, to an ion sensitive compound having an ion in common with said silver sulfide matrix.

4,096,050

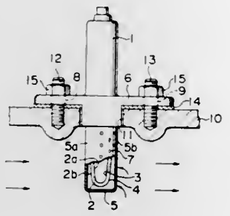
OXYGEN DETECTOR

Nobuyuki Kobayashi, Toyota, and Mitsuo Kawai, Okazaki, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 15, 1976, Ser. No. 750,879
Claims priority, application Japan, Sep. 21, 1976, 51-126998[U]
Int. Cl.² G01N *27/46*
U.S. Cl. 204—195 S **3 Claims**

1. An oxygen detector comprising:
a body including an elongated solid electrolyte oxygen sensor at one end thereof;
a flange connected to said body substantially at right angles to the central axis of said sensor for mounting said body to a wall portion of an exhaust manifold or pipe of an engine in a manner such that said sensor end of said body is

inserted into said exhaust manifold or pipe through an opening formed in said wall portion of said exhaust manifold or pipe, said flange having mounting holes arranged asymmetrically with each other with respect to the central axis of said body, and,



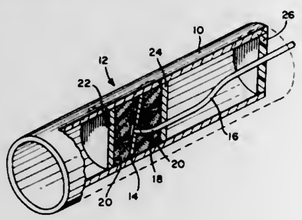
a cylindrical protective cover having a first closed free end and a second end mounted to said body in a manner of enclosing said sensor therein, said cover having a large number of small openings bored in its cylindrical wall, said openings being arranged substantially on one diametrical half side of said cylindrical wall.

4,096,051

TUBULAR ANODE FOR CATHODIC PROTECTION

Russell K. Annis, Jr.; John W. McKinney, Jr.; Robert C. Schenck, Jr., and Delvin P. Sims, all of Dayton, Ohio, assignors to The Duriron Company, Inc., Dayton, Ohio

Filed Apr. 18, 1974, Ser. No. 461,971
Int. Cl.² C23F *13/00*
U.S. Cl. 204—196 **8 Claims**



1. A tubular anode comprising a hollow straight-walled tubular anode body having solid walls of uniform thickness and having an open cylindrical interior, an electrical contact means located inwardly from the ends and within said interior of said tubular body, plastic seal means located on each side of said contact means, and an electrical conductor including an electrically insulating outer sheath, said conductor being connected to said electrical contact means and passing through one of said plastic seal means in a sealing relationship so that the seal means maintain an encapsulated anode-to-conductor electrical connection.

4,096,052

ELECTROCHEMICAL HYDROXYLATION OF CERTAIN AROMATIC COMPOUNDS

Norman Louis Weinberg, East Amherst, N.Y., assignor to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Division of Ser. No. 775,021, Mar. 7, 1977, which is a continuation-in-part of Ser. No. 563,532, Mar. 31, 1975, Pat. No. 4,024,032. This application Aug. 31, 1977, Ser. No. 829,389
The portion of the term of this patent subsequent to May 17, 1994, has been disclaimed.
Int. Cl.² C25B *3/00, 3/10*
U.S. Cl. 204—78 **11 Claims**

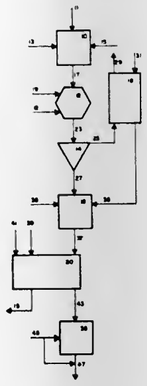
1. An electrochemical hydroxylation process comprising electrolyzing an aqueous heterogeneous mixture comprising
(a) a first phase containing a substantial amount of water;
(b) a second phase distinct from said first phase;
(c) an aromatic compound ring-substituted with at least one electron-withdrawing moiety and having at least one replaceable nulcear hydrogen; and
(d) an anion of a strong carboxylic acid having a $pK_a(H_2O)$ at 25° C. value of less than about 3
to effect nuclear hydroxylation of said aromatic compound, wherein a hydroxyl group replaces said hydrogen, and wherein said second phase contains a substantial amount of at least one liquid cosolvent.

4,096,053

SLURRY ELECTROWINNING APPARATUS

Robert C. Emmett, Jr., Salt Lake City, Utah; James K. Dicksa, Antioch, Calif.; Bruce C. Wojcik, Salt Lake City, and Frank A. Baczek, Sandy, both of Utah, assignors to Envirotech Corporation, Menlo Park, Calif.

Division of Ser. No. 719,867, Sep. 1, 1976, Pat. No. 4,066,520.
This application Jan. 17, 1977, Ser. No. 759,960
Int. Cl.² C25C *1/12, 7/00*
U.S. Cl. 204—238 **10 Claims**



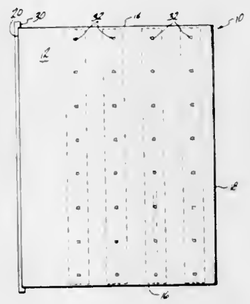
1. A system for preparing copper-bearing solids for electrowinning as a copper-bearing slurry and for electrowinning the slurry comprising:
a. a means for leaching said copper-bearing solids with a moderately strong aqueous acid to solubilize non-copper metal ions into solution in the aqueous acid;
b. a means for then adding an agent to the aqueous acid solution to reduce the copper ion concentration by forming copper-precipitate solids therein;
c. a means for then separating the copper-precipitate solids and any remaining portions of said copper-bearing solids from the aqueous acid solution, thereby to form a first stream comprising a clear liquid and a second stream comprising a slurry containing said copper-precipitate solids and remaining portion of said copper-bearing solids;
d. a tank mounted in flow communication with said separating means to receive a portion of the second stream including solids, said tank for containing a slurry of a suitable electrolyte and copper-bearing solids;
e. inlet means providing the flow communication and mounted to admit the copper-bearing solids into said tank and outlet means for discharging copper-bearing solids diminished in copper value;
f. a plurality of parallel uprightly disposed spaced-apart plates mounted in said tank, said plates having electrically conducting surfaces submerged in said slurry such that surfaces of adjoining plates face one another and are separated by a gap filled with slurry; and
g. an electrical potential means for inducing an electrical current flow across the gaps between said faced surfaces.

4,096,054

RISERLESS FLEXIBLE ELECTRODE ASSEMBLY

Steven J. Specht, and Kenneth E. Woodard, Jr., both of Cleveland, Tenn., assignors to Olin Corporation, New Haven, Conn.

Filed Oct. 26, 1977, Ser. No. 845,524
Int. Cl.² C25B *9/00, 11/03, 11/10*
U.S. Cl. 204—263 **16 Claims**



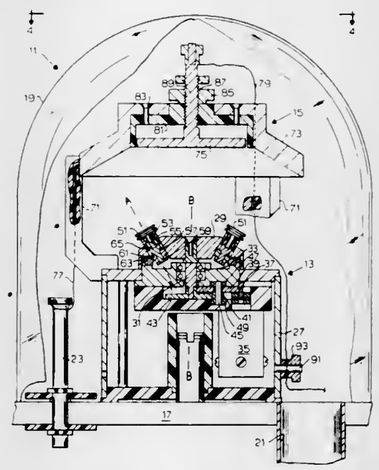
1. An expandable electrode assembly, which comprises:
(a) at least two opposed planar working faces of flexible electrically conductive material, said faces defining a riserless open chamber therebetween;
(b) at least one spring means, interposed between said working faces, for biasing said faces a limited distance away from each other and for allowing inward movement of said faces in an inward direction toward each other in response to a force applied to said working faces in said inward direction; and
(c) an electrical connector means, affixed to one edge of each of said planar faces, for electrically connecting said faces to a supportive backplate without limiting said inward movement of the edge of said faces opposite said one edge.

4,096,055

ELECTRON MICROSCOPY COATING APPARATUS AND METHODS

Andrew G. Johnson, 1714 Agadir St., Concord, Calif. 94518

Filed Dec. 29, 1976, Ser. No. 755,356
Int. Cl.² C23C *15/00*
U.S. Cl. 204—298 **8 Claims**



1. A coating apparatus for coating a specimen to be viewed by electron microscopy and comprising,
particle forming means for releasing particles to be deposited on the specimen as a coating,
specimen support means for supporting the specimen being coated,
said specimen support means including a base, a turntable mounted for rotation in the base, and a specimen holder mounted for rotation in the turntable about an axis displaced from the axis of rotation of the turntable,
drive means for rotating the specimen holder about its axis at the same time that the turntable is rotated about its axis so that the specimen is rotated in both an orbit and in a planetary motion in the orbit, and wherein the axis of rotation of the specimen holder is inclined at an angle with respect to the axis of rotation of the turntable so that the angular inclination of the specimen and the planetary movement of the specimen present all surfaces of the top and bottom of the specimen to the released coating particles and wherein the particle forming means include a hood and a mixer disc and including electrical means for producing an arc of sputtered atoms between the hood and mixer disc by charging the hood as a cathode and charging the mixer disc as an anode and including means for adjusting the distance between the hood and the mixer disc.

4,096,056

METHOD OF PRODUCING AN IMPREGNATING PETROLEUM PITCH

Samuel Isa Haywood, Bakersfield, Calif., and John Howard Semon, Barnegat, N.J., assignors to Witco Chemical Corporation, New York, N.Y.

Filed Oct. 21, 1976, Ser. No. 734,497
Int. Cl.² C10C *3/04*
U.S. Cl. 208—4 **6 Claims**

1. A two-step process for preparing an impregnating petroleum pitch having a Quinoline Insolubles of less than about 1% (ASTM D-2318), a beta resin content of less than about 15%, and Conradson Carbon of about 50% (ASTM D-189), consisting of:
(a) Passing an oxygen containing gas at a flow rate of 0.01 to about 0.2 cu. ft. oxygen/min/bbl. through an aromatic feedstock having a boiling point between 232° to 538° C, at a temperature of about 338° C to 360° C, to a pitch having a softening point of from about 30° to 100° C (ASTM D-3104), and;
(a) Stripping said pitch in an inert atmosphere to increase the softening point of said pitch to between 100° and 135° C (ASTM D-3104).

4,096,057

APPARATUS AND METHOD FOR RECOVERY OF BITUMINOUS PRODUCTS FROM TAR SANDS

Budge T. Porritt, Sandy, Utah; Lloyd A. Johanson, Ontario, Oreg., and Kenneth L. Noall, Ogden, Utah, assignors to New Energy Sources Company, Salt Lake City, Utah

Filed May 10, 1976, Ser. No. 685,199
Int. Cl.² C10G *1/04;* B01D *11/02*
U.S. Cl. 208—11 LE **8 Claims**

1. A method for separating bituminous products from tar sands wherein the tar sands are formed from granules agglomerated by bitumen, the method comprising the steps of:
obtaining a vessel;
preparing an attrition zone in the vessel by placing a cylindrical screen member in the vessel, the screen being suspended a discrete distance from the walls of the vessel;
obstructing a substantial portion of the lower end of the attrition zone with an impellor;
introducing a liquid into the vessel;
imparting an upward velocity to the liquid by rotating the impellor;
introducing chunks of tar sand into the attrition zone;
reducing the chunks of tar sand into granules by abrading

the chunks against adjacent chunks in the liquid through the upward velocity of the liquid;

confining the chunks of tar sand to the attrition zone by the cylindrical screen member;

removing the granules from the attrition zone through the cylindrical screen member surrounding the attrition zone;

directing the removed granules downwardly through the space between the screen and the vessel walls;

inhibiting the downwardly directed granules from being drawn into the impellor by surrounding the impellor with a cylindrical skirt extending downwardly from the cylindrical screen member;

removing the agglomerating bituminous products from the chunks and granules with the liquid during the preceding reducing, confining, removing, and directing steps; and

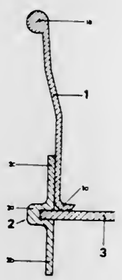
separating the removed bituminous products by directing the liquid and bituminous products from the vessel.

4,096,058

TENSIONING MEANS FOR SIFTER

Bernard Francois Borie, 13 rue des Boulangers, Paris, France

Filed Jan. 16, 1976, Ser. No. 649,876
Claims priority, application France, Jan. 24, 1975, 75 02344
Int. Cl.² B07B *1/49*
U.S. Cl. 209—403 **10 Claims**



1. A sifter comprising:

a discrete generally cylindrical shaped upper portion having an edge extending radially inward from the lower end of said upper portion;

a discrete generally ring shaped lower portion having a central section and an upper section;

a sifting screen fixedly secured to the central section of said lower portion;

means for fixedly securing said sifting screen to said central section;

means for holding said sifting screen in a tensioned state including the outer circumferential surface of the lower end of said upper portion engaging the inner surface of the upper section of said lower portion and the bottom surface of said inwardly extending edge bearing against said sifting screen;

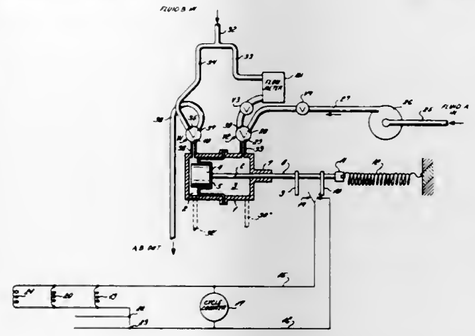
said securing means and the part of said lower portion immediately below said sifting screen each having an inner surface that extends radially inwardly no farther than said inner surface of the upper section whereby said inwardly extending edge holds said sifting screen in a tensioned state.

4,096,059

PROPORTIONING FLUIDS

Harry E. Pinkerton, Bridle Path La., Mill Neck, N.Y. 11765

Continuation-in-part of Ser. No. 685,564, May 12, 1976, Pat. No. 4,037,616, which is a continuation-in-part of Ser. No. 590,897, Jun. 27, 1975, abandoned. This application Jan. 14, 1977, Ser. No. 759,595
The portion of the term of this patent subsequent to Jul. 26, 1994, has been disclaimed.
Int. Cl.² B01D *13/00*
U.S. Cl. 210—22 A **19 Claims**



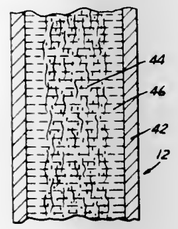
1. A method of proportioning and mixing liquids which comprises delivering a predetermined volume of first liquid to a first chamber to fill that chamber, making a connection from said first chamber to a second and larger chamber and passing said volume of first liquid from said first chamber to said second chamber through said connection while preventing the admission of further first liquid to said first chamber and connecting a supply of liquid to be mixed with said first liquid to said connection between said first and second chambers to cause said liquid to be mixed to be admitted to said connection and to said second chamber in an amount equal to the difference in volumes of said chambers.

4,096,060

METHOD UTILIZING PLUG FLOW FOR SEPARATING SOLIDS FROM LIQUID

Charles A. Lee, and Frederick M. Granberg, both of Knoxville, Tenn., assignors to Fairchild Incorporated, Beckley, W. Va.

Filed Sep. 16, 1974, Ser. No. 506,120
Int. Cl.² B01D *31/00*
U.S. Cl. 210—23 R **3 Claims**



1. A method for removing suspended solids from liquid containing suspended solids and dissolved solids capable of flowing in a condition of plug flow comprising

passing liquid with such solids therein through a conduit at a velocity producing conditions of plug flow in the conduit, whereby suspended solids preferentially accumulate in a moving plug spaced from a wall of the conduit with the liquid along said wall being relatively free of suspended solids, said wall being permeable to said liquid and at least a substantial portion of solids dissolved therein,

successively removing part of the liquid with solids dissolved therein through the wall of the conduit along respective successive portions of the conduit relatively disposed in the direction of the flow of liquid through said conduit,

the rate of removal of said liquid being such that the plug is maintained spaced from said wall with the liquid along the wall being relatively free of suspended solids, and

recirculating to said conduit, for further separation of solids and liquid, liquid with solids suspended therein that has already passed through said conduit.

4,096,061

RECOVERY AND REUSE OF PAINT SOLIDS FROM WASTE WATER

Thomas P. Brennan, Chagrin Falls, Ohio, assignor to Drew Chemical Corporation, Boonton, N.J.

Filed Jan. 5, 1977, Ser. No. 757,022
Int. Cl.² C02B *1/20*
U.S. Cl. 210—45 **7 Claims**

1. In the clarification of a latex base paint waste water, containing dispersed paint solids by flocculating the paint solids with a cationic flocculant to separate a clarified supernatant from a paint solid sludge, an improved process for recovering and reusing paint solids, comprising:

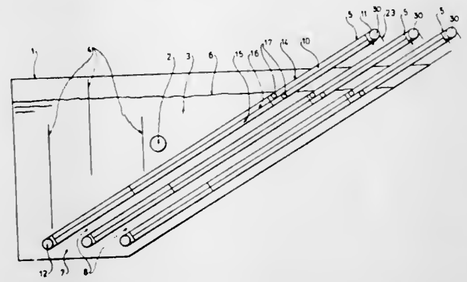
adding an anionic dispersant to said paint solid sludge and maintaining said paint solid sludge at an alkaline pH, said anionic dispersant being added in an amount to neutralize the effect of said cationic flocculant; and dispersing said paint solid sludge in an effective amount of latex paint base for the production of a latex base paint.

4,096,062

METHOD AND DEVICE FOR SEPARATION OF SUSPENDED MATERIAL FROM A FLUID FLOW

Bertel Myrèen, and Ulf Nylund, both of Turku, Finland, assignors to Paraisten Kalkki Oy - Pargas Kalk AB, Finland

Filed Sep. 30, 1976, Ser. No. 728,318
Claims priority, application Finland, Oct. 6, 1975, 752784
Int. Cl.² B01D *33/00*
U.S. Cl. 210—77 **13 Claims**



1. A method for separation of suspended solid particles from a fluid flow, whereby the fluid flow is divided into partial fluid flows in flow channels provided with an upper and a lower movable filter surface of which the upper filter surface runs against the main flow direction of the fluid and the lower in the main flow direction of the fluid, comprising maintaining the flow velocity of the fluid in the flow channels so high that the flow is turbulent but simultaneously so low that sedimentation of the suspended material takes place for the formation of a sediment and a clear top layer with a substantially reduced content of suspended material in each partial fluid flow; filtering off said clear top layer in an amount more than a half of the fluid fed to each flow channel through the upper filter surface; simultaneously suctioning less than a half of the fluid fed into the flow channel through said sediment and finally removing said sediment.

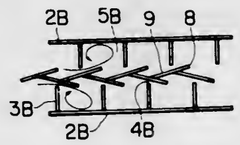
3. A device for separating suspended solid particles from a fluid flow comprising an open vat with side walls and an inlet for the suspension; a sequence of several at least partly superimposed inclined cassettes in the vat, which together with the side walls of the vat form several flow channels for the suspension and extend from a distance over the bottom of the vat to above the surface of the suspension; a frame having an upper and lower surface to more than two-thirds composed of a filter cloth; means for moving the filter cloth upwards along the upper surface of the cassette and downwards along the lower surface of the cassette, at least two suction boxes located under the filter cloth, having separate outlets, which suction boxes are open at the same time to the upper and lower surfaces, respectively, of the cassette for the withdrawal of fluid at the same time from the suspension through the filter cloth; the main part of the fluid being suctioned off through the filter cloth to the suction box which is open to the upper surface of the flow channel and a small part of the fluid being suctioned off through the suction box which is open to the lower surface of the flow channel and means for the removal of the sediment of solid particles from the filter cloth above the surface of the suspension.

4,096,063

PROCESS FOR SEPARATING FLOC AND APPARATUS

Katsuhiro Hashimoto, Yamamto, and Takao Hasegawa, Tokyo, both of Japan, assignors to Suido Kiko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 28, 1976, Ser. No. 736,363
Claims priority, application Japan, Nov. 6, 1975, 50-132439
Int. Cl.² B01D *21/08*
U.S. Cl. 210—84 **4 Claims**



1. A process for separating floc in a liquid and for accomplishing sedimentation of said floc, comprising the steps of: passing said liquid into a settling tank having a plurality of partition chambers longitudinally arranged therein with respect to the direction of flow of said liquid, said chambers being formed by a plurality of fins carried on at least one side of separating walls vertically arranged in said tank and extending in a direction parallel to the direction of flow, the edges of said fins defining at least one side of narrow passages for the flow of liquid therethrough, forming eddy currents in said partition chambers, and hitting the floc suspended in said liquid against the surfaces of said fins causing said floc to be caught in said eddy currents, whereby said floc accumulates in said eddy currents by contact of floc particles with each other to cause sedimentation and separation thereof.

4,096,064

SYSTEM FOR REMOVAL OF TOXIC HEAVY METALS FROM DRINKING WATER

Eugene R. du Fresne, Sierra Madre, Calif., assignor to Ameron, Inc., South Gate, Calif.

Filed Apr. 5, 1976, Ser. No. 673,964
Int. Cl.² B01D *35/00*
U.S. Cl. 210—120 **7 Claims**

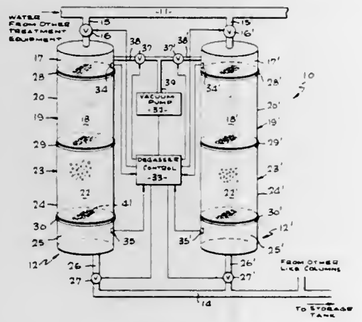
1. A system for the removal from drinking water of heavy metal ions by electrochemical replacement, said heavy metal ions being selected from the group consisting of ions of mercury, copper, selenium, nickel, lead, arsenic, chromium, cadmium and silver, comprising at least one treatment column having:

a water inlet duct and a water outlet duct,

a first cartridge containing particles of zinc, said cartridge

having screened inlet and outlet openings permitting water flow-through but retaining said zinc particles within said first cartridge, said zinc particles being activated prior to insertion of said first cartridge into said treatment column by contact with a solution of a salt of a noble metal selected from the class consisting of copper, nickel and silver,

a second cartridge containing particles of magnesium alloyed with a minor amount of manganese to inhibit water corrosion of said magnesium, said second cartridge having screened inlet and outlet openings permitting water flow-through but retaining said magnesium/manganese particles within said second cartridge, said magnesium/manganese particles being prepackaged in said second cartridge prior to insertion of said second cartridge in said treatment column, said prepackaged second cartridge having an atmosphere consisting of a gas that is non-reactive with said magnesium, said second cartridge further comprising end barrier means, covering and hermetically sealing said screened inlet and outlet to retain said non-reactive atmosphere within said cartridge, said barrier means being removed by the initial flow of water through said cartridge after said second cartridge is inserted in said treatment column, and



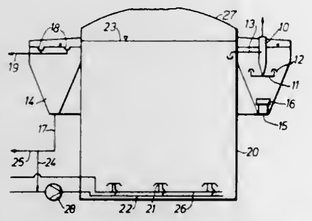
adaptor means for releasably retaining said first and second cartridges in said column with said respective inlet and outlet openings positioned to permit flow of water from said inlet duct to said outlet duct sequentially first through said first cartridge and then through said second cartridge.

4,096,065

APPARATUS FOR AEROBIC TREATMENT OF ACTIVATED SLUDGE

Werner Bruch, Dormagen; Hans Guth, Leverkusen, and Helmut Kühn, Odenthal-Gloebusch, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 15, 1976, Ser. No. 742,313
Claims priority, application Germany, Dec. 4, 1975, 2554495
Int. Cl.² B01D *19/00*
U.S. Cl. 210—188 **10 Claims**



1. In an apparatus for the gasification of a biomass in an aqueous medium in the presence of organic substances degradable by the biomass, comprising a gasification tank, and at least one clearing chamber for the gasified water-containing biomass provided concentrically around the gasification tank, the gasification tank communicating with each clearing chamber through an inlet in the latter, the improvement wherein,

a. the gasification tank is from about 10 to 32 meters high, has a height/diameter ratio between approximately 40 and 0.2, is provided adjacent its floor with gas inlet points, and is connected via inlet pipes for introducing said gasified water-containing biomass to at least one gas removal and flocculation cyclone said cyclone including the outlet means for removing said gas and a distribution means for introducing flocculated sludge into said clearing chamber;

b. means for maintaining the same liquid level in all of the clearing chambers comprising an over flow channel at about 0.1 to 2 meters below the liquid level of the gasification tank; and

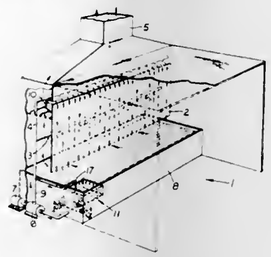
c. a sludge removal pipe connecting each clearing chamber with a collector pipe.

4,096,066

TREATING CONTAMINATED LIQUIDS

Thomas John Kearney, 34 Droitwich Rd., Worcester, England

Division of Ser. No. 647,735, Jan. 9, 1976, Pat. No. 3,994,808, which is a continuation of Ser. No. 295,939, Oct. 10, 1972, abandoned, which is a continuation of Ser. No. 51,954, Jul. 2, 1970, abandoned. This application Sep. 27, 1976, Ser. No. 726,565
Claims priority, application United Kingdom, Jul. 5, 1969, 33975/69; Apr. 21, 1970, 18928/70
Int. Cl.² B01D *21/00*
U.S. Cl. 210—195 R **6 Claims**



1. An apparatus for dispersing a material in a liquid, comprising

(1) a liquid reservoir for holding a body of liquid having a surface portion containing said material,

(2) a chamber for receiving the surface portion of the body of liquid, said chamber being dispersed centrally in the reservoir,

(3) a weir bounding the chamber and positioned in respect of the reservoir to permit gravity flow of the surface portion of the body of liquid over the weir into the chamber,

(4) a venturi pump means having

(a) a first outlet for a motive fluid,

(b) a suction inlet communicating with the chamber, and

(c) an outlet,

(5) means for delivering the motive fluid under pressure to the first inlet of the venturi pump means whereby the surface portion of the body of liquid is drawn from the chamber through the suction inlet into the venturi pump means, and

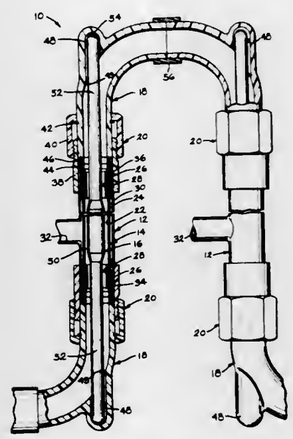
(6) the outlet of the venturi pump means opening downwardly into the reservoir centrally thereof and thereby into the liquid wherein the material is to be dispersed below the surface of the liquid.

4,096,067

VOLUME DISPLACEMENT ROD AND HOLDER

Charles L. Sargent, Ypsilanti; Allan J. Coviello, Ann Arbor, and Dennis A. Russell, Belleville, all of Mich., assignors to Thetford Corporation, Ann Arbor, Mich.

Filed Jun. 6, 1977, Ser. No. 803,646
Int. Cl.² B01D *13/00;* **C02B** *1/82*
U.S. Cl. 210—252 **10 Claims**



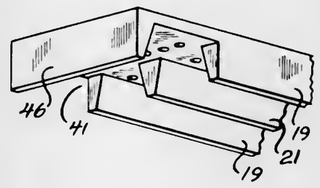
1. Apparatus for treatment of a fluid comprising a permeate collection casing having a permeate outlet port and axially aligned inlet and outlet ends, a membrane tube supported at its end portions within said casing adjacent to said inlet and outlet ends so as to provide a space between said casing and the midportions of said membrane tube for collection of permeate, conduit means coupled to said casing at each of said inlet and outlet ends in communication with the interior of said membrane tube for passage of said fluid, the permeate collection space between said casing and the exterior of said membrane tube being in communication with said permeate outlet port, a volume displacement rod supported in said conduit means and extending lengthwise through said membrane tube in spaced relation thereto so as to provide a continuous annular passageway for passage of said fluid free of obstructions between said volume displacement rod and said membrane tube, said volume displacement rod having axial extensions for supporting it in said conduit means free of other obstructions between said volume displacement rod and said conduit means.

4,096,068

CAST BEAMS FOR FILTERBED WITH CROSS FLOW AT ENDS

James Donald Walker, Aurora, Ill., assignor to Peabody Galion Corporation, Roscoe, Ill.

Filed Aug. 19, 1976, Ser. No. 715,998
Int. Cl.² B01D *23/18*
U.S. Cl. 210—293 **5 Claims**



1. A precast elongate underchanneled floor beam of the class suitable for spanning across a filter-tank floor with an open sluiceway therein across which a number of such beams are laid, in side-by-side relationship, to form a floor for supporting a bed of particulate filter media, said beam including:

a floor panel having therethrough apertures for receiving distribution nozzles and apertures for receiving tie down rods; and

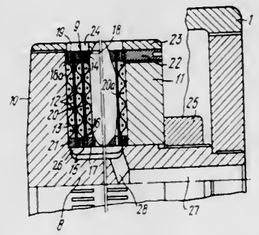
flanges formed as part of the same casting and extending downwardly from the floor panel to provide an underchannel extending lengthwise of the beam; said flanges being continuous along the intermediate portions of the length of the beam but being substantially totally omitted near the ends of the beam to provide a crossflow passage from said underchannel to the underchannel of an adjacent similar beam.

4,096,069

FILTER FOR POLYMER MELTS AND SOLUTIONS

Vladimir Konstantinovich Postavnichev, ulitsa Chernyakhovskogo, 12, kv. 85; Vladimir Ivanovich Klochkov, ulitsa Narodnogo Opolchenia, 5, kv. 57; Semen Ilich Gdalin, Oktyabrskaya ulitsa, 19, kv. 79, and Vyacheslav Vasilievich Sharonov, Sumskaya ulitsa, 12/17, kv. 209, all of Moscow, U.S.S.R.

Filed Feb. 2, 1977, Ser. No. 764,958
Int. Cl.² B01D *25/02*
U.S. Cl. 210—342 **6 Claims**



1. A filter for polymer melts and solutions comprising: a casing having an inlet opening and an outlet opening; a hollow mandrel mounted within said casing; filter elements supported in said casing by said hollow mandrel for flowing a melt or solution therethrough for filtering thereof; two filtering baffles in each of said filter elements; a spacer plate in each of said filter elements located between said two filtering baffles; each said filter elements having a sleeve having through radial passages for providing communication of the inner space of the corresponding filter element with the inner space of said mandrel, said sleeve being located on the periphery of said mandrel between said filtering baffles; each of said filter elements having a seal located between said two filtering baffles on the periphery of said spacer plate; each of said filter elements having auxiliary seals, each being located between said filter elements on the periphery of said hollow mandrel; a spacer device comprising auxiliary spacer plates, each spacer plate being located between said filter elements and corresponding to the surface of said filtering baffle; a device for recirculating filtered polymer melts or solutions alternately through said filter elements for washing the filter; clamping flanges mounted on said hollow mandrel for axially fixing said filter elements.

4,096,070

BLOOD FILTER

Francis Martin Servas, Belle Mead, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Jan. 3, 1977, Ser. No. 756,220
Int. Cl.² B01D *29/06*
U.S. Cl. 210—448 **2 Claims**

1. In a blood filter of the type having an inlet spike for insertion into an outlet of a blood bag, said spike being made from a plastic material selected from the group consisting of

polyoelifins and polycarbonates, the improvement comprising the outer surface of said spike, that is the surface which is to contact the bag opening during insertion of the filter, having a

uniformly roughened finish of from 50 to 200 micro-inches, whereby the spike may be inserted into the outlet without the use of a lubricant.

4,096,071

FABRIC TREATING COMPOSITIONS WITH MODIFIED PHASE PROPERTIES

Alan P. Murphy, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 532,276, Dec. 12, 1974, Pat. No. 4,049,858. This application Jul. 12, 1977, Ser. No. 814,962

Int. Cl.² D06M *13/20*

U.S. Cl. 252—8.6 **9 Claims**

1. A non-staining fabric softener mixture especially adapted for use in an automatic clothes dryer, comprising:

(a) a fabric softener component comprising a member selected from the group consisting of sorbitan esters characterized by at least one free hydroxyl group and a melting point of at least about 38° C, and mixtures thereof, said softener component being substantially free of un-neutralized fatty acids; and

(b) a phase-modifying component selected from the group consisting of water-soluble fatty acid soaps, and mixtures thereof, and water-soluble C_{10}–C_{20} neutralized alkyl sulfates, and mixtures thereof, the weight ratio of said softener component to said phase-modifying component being in the range of from about 100:1 to about 1:1;

said softener mixture being characterized by a melting point in the range of from about 38° C to about 100° C.

4,096,072

FABRIC CONDITIONING COMPOSITIONS

John Franklin Brock, Springdale, and Kenneth John Schilling, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 9, 1976, Ser. No. 656,218

Int. Cl.² D06M *13/46*

U.S. Cl. 252—8.8 **17 Claims**

1. Fabric conditioning particles consisting essentially of

1. from about 20% to about 55% of hydrogenated castor oil having an iodine value of less than about 20, and

2. from about 45% to about 80% of a quaternary ammonium salt fabric conditioning compound

wherein said particles have a particle size diameter of from about 5 to about 2000 microns.

4,096,073

MICROBIAL VISCOSIFIERS

Donald O. Hitzman, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 30, 1975, Ser. No. 591,969

Int. Cl.² C09K *3/00*

U.S. Cl. 252—8.55 D **7 Claims**

1. A method of producing microbial viscosifiers which comprises:

(a) contacting a fermenter effluent consisting essentially of gram-negative cells of a type which produce no extracellular material as a solid constituent with a base to raise the pH to a value within the range of 9 to 12; and

(b) aging said thus contacted material containing said base at a temperature of about 50°–212° F for a period of at least 5 minutes to increase the viscosity thereof.

4,096,074

OIL RECOVERY BY WATERFLOODING EMPLOYING CROSS-LINKED POLYSACCHARIDES FOR MOBILITY CONTROL

Stamoulis Stournas, Flemington, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 26, 1976, Ser. No. 708,727

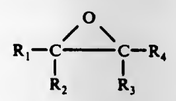
Int. Cl.² E21B *43/22*

U.S. Cl. 252—8.55 D **7 Claims**

1. In a method for the recovery of oil from a subterranean oil reservoir penetrated by spaced injection and production systems wherein an aqueous fluid is introduced into said reservoir via said injection system to displace oil to said production system, the improvement comprising:

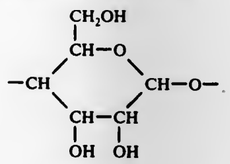
employing as at least a portion of the fluid introduced into said reservoir an aqueous solution of a viscosifier comprising the water soluble reaction product of an organic polyisocyanate having at least two reactive isocyanato groups and the addition product of an alkylene oxide and a linear, non-ionic polysaccharide, said addition product having a molecular weight of at least about 100,000,

said alkylene oxide having the formula



wherein R_1, R_2, R_3 and R_4 are the same or different and are selected from the class consisting of hydrogen and lower alkyl groups containing from one to five carbon atoms,

said linear, non-ionic polysaccharide formed of repeating structural units having the formula



said addition product being cross linked by said polyisocyanate such that there is a minimum of an average of one cross link for every 2,000 of said repeating structural units up to a maximum of an average of one cross link for every 20 of said repeating structural units.

4,096,075

SELF-LUBRICATED SOLID MATERIALS

Hajime Nakamura, Fuchu, Japan, assignor to Sankyo Oilless Industries, Inc., Tokyo, Japan

Filed Nov. 18, 1976, Ser. No. 743,004

Int. Cl.² C10M *5/00, 7/00*

U.S. Cl. 252—12.2 **1 Claim**

1. A self-lubricated solid material comprising:

a metallic matrix having a lubricated surface;

a plurality of circular cavities provided in the lubricating surface of said matrix;

a solid lubricant embedded in each of said circular cavities such that the free surface of said solid lubricant coincides with the lubricating surface of said matrix;

said circular cavities being disposed in the relation of

$$R < P < R/\cos\theta, \text{ when } 0° < \theta \leqq 45°, \text{ and}$$

$$R < P < R/\sin\theta, \text{ when } 45° \leqq \theta < 90°$$

where P is the distance between the centers of adjacent two circular cavities, R is the diameter of each of the circular cavities and θ is the angle defined between a predetermined direction and the line lying on the centers of the two circular cavities; and

the arrangement being such that the lubricity can be maintained for a long time in said predetermined direction as well as in a direction normal thereto.

4,096,076

FORGING COMPOUND

William D. Spiegelberg, Parma, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed Jan. 29, 1976, Ser. No. 653,382

Int. Cl.² C10M *1/10*

U.S. Cl. 252—30 **10 Claims**

1. A forging compound for at least partially coating workpieces of titanium and its alloys prior to hot die forging of the workpiece, said forging compound comprising a mixture of boundary layer particles and a powder of vitreous components, said boundary layer particles remaining solid at forging temperatures and being selected from boron nitride, graphite and mixtures thereof, said boundary layer particles being less than 40% and more than 7% by weight of the total vitreous and boundary layer components of the forging compound, said powder of vitreous components being substantially free of materials which have a tendency to corrosively attack the forging dies and comprising diboron trioxide in an amount between about 60 to 75% by weight of the vitreous components and silica glass to provide a desired viscosity during forging, the balance of the vitreous components comprising a metal oxide wetting agent to promote spreading of the vitreous components over the surface of the workpiece during forging, the metal oxide wetting agent being between about one-half of 1 to 5% by weight of the vitreous components and being an oxide of cobalt.

2. The compound of claim 1 wherein the boundary layer particles are boron nitride particles and the metal oxide is cobalt oxide.

4,096,077

WEAR-INHIBITING COMPOSITION AND PROCESS

Edward Antone Swakon, Warrenville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 527,714, Nov. 27, 1974, abandoned. This application Sep. 3, 1976, Ser. No. 720,265

Int. Cl.² C10M *1/54, 3/48, 1/24, 1/32*

U.S. Cl. 252—33.6 **19 Claims**

1. A composition comprising a major proportion of a natural or synthetic lubricating oil and a minor proportion of an oil-soluble wear-inhibiting additive composition, said wear-inhibiting additive composition being added in wear-inhibiting amounts and comprising benzotriazole or C_1–C_{20} alkyl substituted benzotriazole and a material selected from the group consisting of at least one half-acid half-ester, half-acid half-amide, and half-acid half-thioester of succinic or maleic acid or acid anhydride and an alcohol, amine, and mercaptan, respectively, a metal salt of at least one said half-ester, half-amide, or half-thioester, and mixtures thereof, wherein the alcohol and mercaptan comprise acyclic aliphatic compounds containing from 7 to 50 carbon atoms, wherein the amine comprises a straight-chain primary or secondary amine having from 7 to 50 carbon atoms and is selected from the group consisting of monoamines and polyamines having at least 2 carbon atoms separating each pair of nitrogen atoms, and wherein said metal salt comprises a Group IIA, Group IIB, tin or lead metal salt or mixtures thereof.

4,096,078

SYNTHETIC AIRCRAFT TURBINE OIL

Roberta Yaffe, Glenham, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Jun. 28, 1977, Ser. No. 810,718

Int. Cl.² C10M *1/48*

U.S. Cl. 252—46.7 **10 Claims**

1. A synthetic lubricating oil composition comprising a major portion of an aliphatic ester base oil having lubricating properties formed from the reaction of pentaerythritol and an organic monocarboxylic acid having from about 2 to 18 carbon atoms per molecule containing:

a. from about 0.3 to 5 percent by weight of the lubricating oil composition of an alkyl or alkaryl phenyl naphthylamine in which the alkyl radical has from 4 to 12 carbon atoms and the alkaryl radical has from 7 to 12 carbon atoms,

b. from about 0.3 to 5 percent by weight of a dialkyldiphenylamine in which the alkyl radicals have from 4 to 12 carbon atoms,

c. from about 0.001 to about 1.0 percent by weight of a polyhydroxy-substituted anthraquinone,

d. from about 0.25 to 10 percent by weight of a trihydrocarbyl phosphate ester in which said hydrocarbyl radical contains an aryl ring and contains from about 6 to 18 carbon atoms,

e. from about 0.005 to 0.02 percent by weight of 4,4'-dithiodimorpholine, and

f. from about 10 to about 100 ppm, based on the composition, of 3-amino-triazole.

4,096,079

PROTECTIVE LUBRICATING COMPOSITIONS FOR RECORDINGS

Robert P. Pardee, Boulder, Colo., assignor to Ball Brothers Research Corporation, Boulder, Colo.

Filed Sep. 10, 1976, Ser. No. 722,174

Int. Cl.² C10M *1/32*

U.S. Cl. 252—51.5 R **21 Claims**

1. A composition for imparting wear resistance and lubricity to a substrate upon which recorded signals have been stored and from which said signals can be recalled by dynamic means, said composition consisting essentially of an essentially homogeneous halogenated organic solution of a major proportion of an inert halogenated solvent, a low-molecular weight tetrafluoroethylene telomer, said telomer being a member selected from the group consisting of:

$$R(CF_2—CF_2)_aX$$

wherein R is a haloalkyl containing 1 to 4 carbon atoms, X is a member selected from the group consisting of chlorine, iodine and fluorine and a is an integer from about 6 to about 16, and

$$R'(CF_2—CF_2)_bY$$

wherein R' is a hydrogen-containing moiety of a telogen, said telogen being a tertiary hydrocarbon, Y is a member selected

from the group consisting of chlorine and chlorofluoroalkyl, and *b* is an integer from about 3 to about 8, said telomer being present in an amount of about 0.001 to 2.0 weight percent based on the total weight of said composition, and an antistatic agent selected from the group consisting of tertiary amines, fatty quaternary ammonium compounds, fatty esters, phosphate esters and polyethylene glycols, said antistatic agent being present in an amount effective to substantially reduce or remove electrostatic charge.

2. A composition for imparting wear resistance and lubricity to a substrate upon which recorded signals have been stored and from which said signals can be recalled by dynamic means, said composition consisting essentially of an essentially homogeneous halogenated organic solution of a major proportion of an inert halogenated solvent, a low-molecular weight tetrafluoroethylene telomer, said telomer being a member selected from the group consisting of:

$$R(CF_2—CF_2)_aX$$

wherein R is a haloalkyl containing 1 to 4 carbon atoms, X is a member selected from the group consisting of chlorine, iodine and fluorine and *a* is an integer from about 6 to about 16, and

$$R'(CF_2—CF_2)_bY$$

wherein R' is a hydrogen-containing moiety of a telogen, said telogen being a tertiary hydrocarbon, Y is a member selected from the group consisting of chlorine and chlorofluoroalkyl, and *b* is an integer from about 3 to about 8, said telomer being present in an amount of about 0.001 to about 2.0 weight percent based on the total weight of said composition, and as an antistatic agent, a tertiary amine of the formula:

$$HOCH_2—CH_2—\underset{\displaystyle R''}{\underset{|}{N}}CH_2—CH_2—OH$$

wherein R'' is an alkyl group having from about 4 to 20 carbon atoms present in an amount effective to substantially reduce or remove electrostatic charge.

10. A composition for imparting wear resistance and lubricity to a substrate upon which recorded signals have been stored and from which said signals can be recalled by dynamic means, said composition consisting of an essentially homogeneous halogenated organic solution of a major proportion of an inert halogenated solvent, a low-molecular weight tetrafluoroethylene telomer, said telomer being a member selected from the group consisting of:

$$R(CF_2—CF_2)_aX$$

wherein R is a haloalkyl containing 1 to 4 carbon atoms, X is a member selected from the group consisting of chlorine, iodine and fluorine and *a* is an integer from about 6 to about 16, and

$$R'(CF_2—CF_2)_bY$$

wherein R' is a hydrogen containing moiety of a telogen, said telogen being a tertiary hydrocarbon, Y is a member selected from the group consisting of chlorine and chlorofluoroalkyl, and *b* is an integer from 3 to about 8, said telomer being present in an amount of about 0.001 to about 2.0 weight percent based on the total weight of said composition and as an antistatic agent, a tertiary amine of the formula:

$$HOCH_2—CH_2—\underset{\displaystyle R''}{\underset{|}{N}}CH_2—CH_2—OH$$

wherein R'' is an alkyl group having from about 4 to 20 carbon atoms present in an amount effective to substantially reduce or remove electrostatic charge.

4,096,080

SOLID SOLUTIONS OF MAGNETIC OXIDES AND METHOD OF PREPARATION

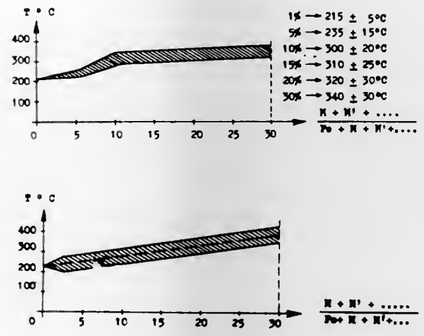
Paul Mollard, Isere; Jacques Paris, and Abel Rousset, both of Rhone, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Continuation-in-part of Ser. No. 427,674, Dec. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 269,838, Jul. 7, 1972, Pat. No. 3,873,461. This application Oct. 15, 1975, Ser. No. 622,573

The portion of the term of this patent subsequent to Mar. 25, 1992, has been disclaimed.

Int. Cl.[2] C04B *35/26*

U.S. Cl. 252—62.56 **12 Claims**



1. A method for the preparation of a metastable solid solution ferrite of defect spinel structure having vacancies, which is derived from mestastable iron sesquioxide γ-Fe_2O_3 by substituting for some of the Fe^{3+} ions and for some of the vacancies a divalent metal M taken from the group consisting of Zn, Mn, Ni, Cu, Mg and Cd, the solid solution being binary and having the formulation:

$$(\gamma\text{-}Fe_2O_3)_{1-x}(M\ Fe_2O_4)x\ 0.01 < x < 0.86$$

the method comprising the following steps:

(a) preparing by co-precipitation a water insoluble mixed oxalate containing Fe^{2+} ions and divalent ions of one of the divalent metals of said group, said mixed oxalate corresponding to the formula:

$$(Fe_{1+u}{}^{2+}M_u{}^{2+})C_4O_4 2H_2O\ 0.005 < u < 0.30$$

wherein the value of u is such that the proportion of said divalent metal with respect to iron in the said oxalate is the same as the proportion thereof in the said solid solution;

(b) heating uniformly and progressively said mixed oxalate in an oxygen containing gas to a temperature selected from within the cross-hatched area of FIG. 2 according to the proportion of divalent metal to iron plus divalent metal, and continuing the heating step until said oxalate is decomposed and most of the resultant carbon is eliminated, this heating step being stopped before formation of rhombohedric oxide γ-Fe_2O_3 is effected;

(c) heating the product of step (b) in a steam containing hydrogen atmosphere to produce a substituted magnetite formed of crystallites having an average size of more than 200 A and free from residual carbon and from metallic iron, the proportion of steam being between 7% and 90% by volume and the temperature being between 260° C and 480° C, the percentage of steam selected for inclusion in the hydrogen atmosphere increasing with said temperature;

(d) and heating said substituted magnetite in an oxygen containing gas to oxidize same at a temperature selected from within the cross-hatched area of FIG. 4 according to the proportion of divalent metal to iron plus divalent metal, this heating step being stopped before formation of rhombohedric α-Fe_2O_3 is effected.

4,096,081

DETERGENT COMPOSITIONS CONTAINING ALUMINOSILICATE AGGLOMERATES

Ronald Eugene Phenicie, Fairfield, and Rodney Mahlon Wise, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 6, 1976, Ser. No. 655,800

Int. Cl.[2] C02B *1/44;* C11D *3/12, 11/00, 17/06*

U.S. Cl. 252—89 R **18 Claims**

1. A laundering composition comprising two discrete particles the first of which is an intimate mixture consisting essentially of:

(a) from about 10 parts to about 30 parts of an aluminosilicate selected from the group consisting of:

(i) an amorphous compound of the formula $Na_x(xAlO_2.ySiO_2)$ wherein *x* has a value of from 1 to 1.2 and *y* is 1, said amorphous material being further characterized by an Mg^{++} exchange capacity of at least about 50 mg.eq. $CaCO_3/g$;

(ii) a cubic crystalline compound of the formula $Na_z[(AlO_2)_z(SiO_2)_j]kH_2O$ wherein *z* and *j* are integers of at least 6; the molar ratio of *z* to *j* is in the range of from 1.0 to about 0.5 and *k* is an integer from about 15 to 264; said cubic crystalline aluminosilicate ion exchange material having a particle size diameter from about 0.1 micron to about 100 microns; a calcium ion exchange capacity of at least about 200 mg. eq./g; and a calcium ion exchange rate of at least about 2 grains/gallon/minute gram and mixtures thereof;

(b) from about 0.7 parts to about 1.2 parts of an organic agglomerating compound having a melting point of from about 30° C to 100° C selected from the group consisting of polyethylene glycol, polypropylene glycol, the condensation product of carboxylic acid and ethylene oxide, polyoxyethylene glyceride ester, polyoxyethylene lanolin derivative, the condensation product of alkyl phenol and ethylene oxide, fatty acid, fatty alcohol and mixtures thereof; and

(c) from about 0.8 part to about 2 parts of an inorganic salt selected from the group consisting of sodium sulfate and sodium carbonate; and as a second discrete granule:

(d) a spray-dried detergent granule containing a surfactant; in a weight ratio of (*a*)+(*b*)+(*c*) to (*d*) of from about 5:1 to 1:20.

4,096,082

QUICK LATHERING TOILET BARS AND METHOD OF MAKING SAME

Leon M. Prince, Westfield, N.J., assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 419,558, Nov. 28, 1973, Pat. No. 3,989,647, which is a continuation-in-part of Ser. No. 137,228, Apr. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 54,008, Jul. 10, 1970, abandoned. This application Jun. 14, 1976, Ser. No. 695,709

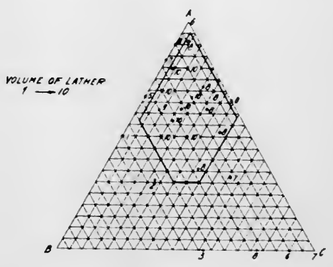
Int. Cl.[2] C11D *10/04, 9/26, 9/32*

U.S. Cl. 252—117 **8 Claims**

1. A non-mushing high lathering synthetic toilet bar having a pH of about 4.5–9.5 and consisting essentially of based on the total weight of the actives:

(i) 40% to about 85% of a primary alkane sulfonate or a mixture of alkane sulfonates wherein the carbon chain contains 12 carbon atoms or averages 12 carbon atoms;

(ii) 5% to about 35% of a natural or synthetic fatty acid or mixtures thereof wherein the carbon chain contains or averages 12 carbon atoms;



(iii) 5% to about 30% of a binder modifier selected from the group consisting of alkali metal, magnesium, or ammonium salts of C_8–C_{18} alkene sulfonates; and

(iv) based on the total weight of the bar, 5–25% water.

4,096,083

CLEANING METHODS AND COMPOSITIONS

John Joseph Clementson, and Leo Pearson, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed May 24, 1976, Ser. No. 689,542

Claims priority, application United Kingdom, May 29, 1975, 23436/75

Int. Cl.[2] C23G *5/02;* C09D *9/00*

U.S. Cl. 252—171 **3 Claims**

1. A method of cleaning an article contaminated with toner which comprises treating the contaminated article with a solvent composition consisting essentially of by weight of the total solvent mixture;

(a) at least 80% 1,1,2-trichloro-1,2,2-trifluoroethane;

(b) at least 8% but less than 15% acetone; and

(c) from 0.5 to 12% methylal.

4,096,084

SURFACE CLEANING METHOD AND MACHINE

Donald L. Thomsen, Minneapolis, and Ferdinand J. Herpers, Jr., Minnetonka, both of Minn., assignors to Tennant Company, Minneapolis, Minn.

Continuation of Ser. No. 366,429, Jun. 4, 1973, abandoned, which is a division of Ser. No. 188,760, Oct. 13, 1971, Pat. No. 3,753,777. This application Sep. 20, 1974, Ser. No. 507,738

Int. Cl.[2] C11D *3/37*

U.S. Cl. 252—173 **13 Claims**

1. In admixture, a cleansing component and a polyelectrolyte flocculating agent, said admixture being particularly characterized in that:

(a) said cleansing component is selected from the group consisting of anionic, cationic, ampholytic, and non-ionic detergents, and soap;

(b) said polyelectrolyte flocculating agent is selected from the group consisting of cationic, anionic, and non-ionic polyelectrolytes, with said polyelectrolyte being water soluble and compatible with said cleansing component, with cationic polyelectrolytes having a molecular weight greater than about 220,000; and with anionic and non-ionic polyelectrolytes having a molecular weight between 4,000,000 and 15,000,000; and

(c) the weight ratio of polyelectrolyte to cleansing component in said admixture ranging from between about 1:75,000 up to about 10:1, with the formulation having dirt flocculating and floatation properties in aqueous solutions when violently agitated upon a normally dry soiled surface for the floatation of substantially all of the dirt from said soiled surface.

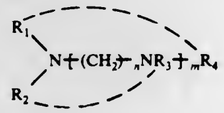
4,096,085

GAS SCRUBBING SYSTEM

Smallwood Holoman Jr.; Robert G. Asperger, both of Midland, Mich., and Leroy S. Krawczyk, Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 29, 1976, Ser. No. 736,918
Int. Cl.² C09K *3/00*
U.S. Cl. 252—189 **15 Claims**

1. A corrosion inhibited aqueous N-methyldiethanolamine or diethanolamine acid gas treating solution consisting essentially of (1) an amine compound or mixture of compounds having the formula



wherein n is an integer from 1 to 3, m is an integer 2 to an integer to yield a molecular weight of about 800 and each R represents a member selected from the group consisting of —H, $-C_nH_{2n'}OH$, $C_nH_{2n'}$, or $-C_nH_{2n'}N(R_3)R_4$, n' is an integer from 1 to 2, and wherein R_1R_3 and R_2R_4 are joined together and n' is 2; said compound being present in about 10 to about 2000 parts per million parts treating solution; (2) copper or a copper ion yielding compound in from 0 to 1000 ppm; and (3) sulfur or a sulfur atom yielding compound in from 0 to 1000 ppm.

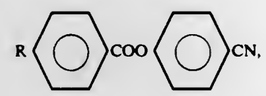
4,096,086

NEMATIC LIQUID CRYSTAL COMPOSITION

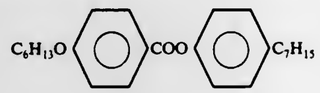
Sadao Kanbe, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Dec. 23, 1975, Ser. No. 643,884
Claims priority, application Japan, Dec. 23, 1974, 50-2439; Dec. 25, 1974, 50-4133; Dec. 26, 1974, 50-711; Jan. 30, 1975, 50-12748
Int. Cl.² C09K *3/34*; G02F *1/13*
U.S. Cl. 252—299 **8 Claims**

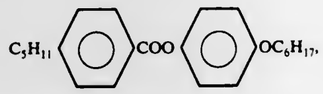
1. A nematic liquid crystal composition of net positive dielectric anisotropy having a wide temperature range of operation and suitable for use in display cells consisting apart from minor impurities and additions of 68 to 76 weight percent of at least one compound having the general formula



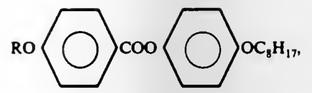
indicated by the character (I), where R is an n-alkyl group having 3 to 9 carbon atoms; and at least one compound from each of at least two types of compounds selected from the three types of compounds having respectively, the formulas



indicated by the character, (II),



indicated by the character (III) and



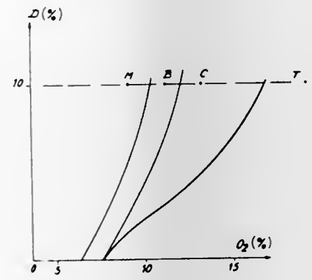
indicated by the character (IV), where R is an n-alkyl group having 5 to 6 carbon atoms.

4,096,087

ELECTROCHROMIC AND PHOTOCHROMIC MATERIAL AND A METHOD OF FABRICATION OF SAID MATERIAL

Christian Bianchin, Saint Martin d'Heres; Alain Deneuville, Vis, and Philippe Gerard, Saint Martin de la Cluze, all of France, assignors to Commissariat a l'Energie Atomique and Agence Nationale de Valorisation de la Recherche (ANVAR), both of Paris, France

Filed Mar. 7, 1977, Ser. No. 775,374
Claims priority, application France, Mar. 19, 1976, 76 08034
Int. Cl.² G02B *5/23*
U.S. Cl. 252—300 **4 Claims**



1. Electrochromic and photochromic material, wherein said material is constituted by a sub-stoichiometric amorphous oxide doped by hydrogen corresponding to the formula MO_xH_y, where M is a metal of group VI, with $2.6 < x < 2.8$ and $0.3 < y < 0.6$.

4,096,088

METHOD OF PREPARING CERIUM AND TERBIUM ACTIVATED ALUMINATE PHOSPHORS

Peter Whitten Ranby, and Doreen Yvonne Hobbs, both of London, England, assignors to Thorn Electrical Industries Limited, London, England

Division of Ser. No. 540,804, Jan. 17, 1975, Pat. No. 4,026,819. This application Feb. 7, 1977, Ser. No. 766,342
Claims priority, application United Kingdom, Jan. 17, 1974, 2279/74
Int. Cl.² C09K *11/46*
U.S. Cl. 252—301.4 R **10 Claims**

1. A method of making a magnesium, zinc and/or lithium aluminate phosphor activated by cerium and terbium and having a hexagonal (β-alumina) crystal structure, which comprises preparing a mixture of aluminum ammonium sulfate and the oxides of the magnesium, zinc and/or lithium and of the cerium and the terbium, or compounds which thermally decompose to such oxides and volatile components, and heating the mixture in air to a temperature above 1200° C, said phosphor having a ratio of Mg, Zn and/or Li_2:Al of from 0.01 to 0.5:1, of Ce:Al of from 0.001 to 0.1:1 and of Tb:Al of from 0.005 to 0.25:1.

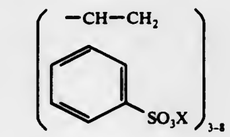
4,096,089

SALT OF SULFONATED STYRENE OLIGOMER, METHOD OF PREPARATION THEREOF, AND USE THEREOF AS DISPERSING AGENT AND VISCOSITY REDUCER

William J. Shibe, Jr., and William Wood, both of Moorestown, N.J., assignors to Sybron Corporation, Rochester, N.Y.

Filed Mar. 8, 1977, Ser. No. 775,564
Int. Cl.² B01J *13/00*; C07C *143/24*
U.S. Cl. 252—310 **5 Claims**

1. A compound having the formula



where X is Na, K, or ammonium.

4. A method of dispersing a solid in water comprising adding the compound of claim 1 to said water containing said solid.

4,096,090

CATALYZED HYDRAZINE COMPOSITIONS AND METHODS OF THEIR USE

Manfred G. Noack, Northford, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 606,550, Aug. 21, 1975, Pat. No. 4,012,195. This application Jan. 27, 1977, Ser. No. 763,195
The portion of the term of this patent subsequent to May 3, 1994, has been disclaimed.
Int. Cl.² C23F *11/18, 11/14*
U.S. Cl. 252—389 R **26 Claims**

1. A composition comprising:
(a) a hydrazine compound; and
(b) from about 0.0005 parts to about 0.1 parts by weight of an organometallic complex per part of hydrazine compound, said organometallic complex being the reaction product of:
(i) a hydroxide selected from the group consisting of cobaltous hydroxide and manganous hydroxide; and
(ii) one or more organic ligands selected from the group consisting of unsubstituted and substituted ortho-dihydroxy aromatic compounds and unsubstituted and substituted ortho-aminohydroxy aromatic compounds.

14. A method of treating a fluidic corrosive environment to remove oxygen therefrom and inhibit corrosion therein, which comprises: treating said environment with a composition comprising:
(a) a hydrazine compound; and
(b) from about 0.0005 parts to about 0.1 parts by weight of an organometallic complex per part of hydrazine compound, said organometallic complex being the reaction product of:
(i) a hydroxide selected from the group consisting of cobaltous hydroxide and manganous hydroxide; and
(ii) one or more organic ligands selected from the group consisting of unsubstituted and substituted ortho-dihydroxy aromatic compounds and unsubstituted and substituted ortho-aminohydroxy aromatic compounds.

4,096,091

LIMULUS LYSATE HAVING IMPROVED CAPACITY TO PRECIPITATE IN THE PRESENCE OF LOW ENDOTOXIN CONCENTRATIONS, AND RECONSTITUTING SOLUTIONS THEREFOR

Robert E. Hopkins, II, Deerfield, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jul. 17, 1974, Ser. No. 489,224
Int. Cl.² C09K *3/00*; G01N *33/16, 31/00*; C12K *1/04*
U.S. Cl. 252—408 **46 Claims**

1. In a Limulus lysate solution, for providing improved capacity for the solution to precipitate in the presence of extremely low concentrations of endotoxin, the improvement comprising a catalytic concentration of a material selected from the group consisting of imidazole, ionic manganese, Cleland's reagent, glutathione, alkali metal thioglycollates, thiouracil, and cysteine.

4,096,092

ZIEGLER TYPE CATALYST SYSTEM

Arthur W. Langer, Jr., Watchung, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 11, 1977, Ser. No. 767,747
Int. Cl.² B01J *31/02, 31/12*
U.S. Cl. 252—429 C **16 Claims**

1. An improved catalyst composition adaptable for use in an alpha-olefin polymerization which comprises a mixture of:
(a) at least one Group IVB to VIII transition metal halide;
(b) an alkyl metal dihalide cocatalyst, the metal of said alkyl metal dihalide cocatalyst being selected from the group consisting essentially of aluminum, gallium and indium;
(c) a compound having the structure of

$$R'_2YNR_2$$

wherein Y is selected from the group consisting of aluminum, indium and gallium, R' is selected from the group consisting of C_1 to C_{20} alkyl, branched alkyl, naphthenic or aralkyl groups and R is a C_3 to C_{10} bulky alkyl or cycloalkyl group, said cocatalyst being in a mole ratio of 0.5 to 1.5 moles of said cocatalyst to said compound.

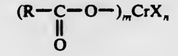
4,096,093

POLYMERIZATION CATALYST AND METHOD

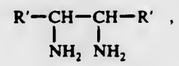
Yu-Tang Hwang, Clinton, Iowa, assignor to Chemplex Company, Rolling Meadows, Ill.

Filed Jun. 24, 1976, Ser. No. 699,536
Int. Cl.² B01J *31/02, 31/12*
U.S. Cl. 252—430 **37 Claims**

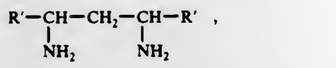
1. A catalyst prepared by dispersing on a finely divided, difficultly reducible, inorganic support of the class consisting of silica, alumina, thoria, zirconia, titania, magnesia, and mixtures and composites thereof a reaction product of (1) a chromium carboxylate essentially of the formula

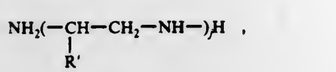


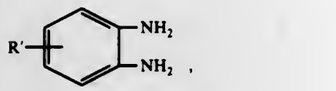
wherein R is selected from hydrogen, alkyl, alkenyl, aryl, arylalkyl, cycloalkyl, and cycloalkenyl radicals and combinations of these radicals with R containing 0–30 carbon atoms and a corresponding number of valence-satisfying hydrogen atoms, m is a whole number of 1 to 3, n is a whole number of 0 to 2, m plus n is 2 or 3 and X is a halide, alkyl or alkoxy and (2) an organic nitrogen compound capable of forming a complex with trivalent chromium and essentially of the formula of the class consisting of

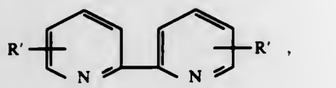


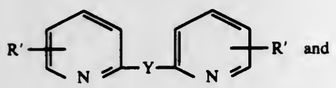
-continued

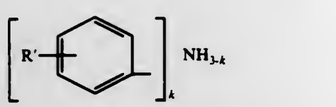












wherein each R′ is individually selected from hydrogen, alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, and arylalkyl radicals with each R′ containing 0–10 carbon atoms and a corresponding number of valence-satisfying hydrogen atoms, *j* is a whole number of 1 to 5, *k* is a whole number of 1 to 3, and Y is >CO, >NH, or $>CH_2$, and activating the resulting mixture by heating to and at an elevated temperature of from about 600°–2000° F. in a non-oxidizing atmosphere.

4,096,094

SUPPORTED CATALYSTS CONTAINING VANADIUM PENTOXIDE AND TITANIUM DIOXIDE

Kurt Blechschmitt, Schifferstadt; Peter Reuter, Bad Duerkheim, and Friedrich Wirth, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Germany

Filed Oct. 8, 1976, Ser. No. 730,827

Claims priority, application Germany, Oct. 24, 1975, 2547624

Int. Cl.² B01J *23/04, 23/18, 23/22, 21/06*

U.S. Cl. 252—440 **3 Claims**

1. A supported catalyst for the oxidation of aromatic or unsaturated aliphatic hydrocarbons, comprising an inert nonporous carrier to which is applied a layer of a catalytic composition which contains from 1 to 39.9 percent by weight of vanadium pentoxide and from 60 to 98.9 percent by weight of titanium dioxide, with a vanadium pentoxide content based on the supported catalyst of from 0.05 to 4 percent by weight, wherein the catalytic composition also contains from 0.1 to 10 percent by weight total of rubidium in the form of rubidium oxide, rubidium vanadate or rubidium sulfate and antimony in the form of antimony trioxide, antimony vanadate, or antimony sulfate in an atomic ratio Rb:Sb of from 1:2.5 to 1:30.

4,096,095

CATALYST OF A COATING ON AN ALLOY SUBSTRATE

James Anthony Cairns, Wantage, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Apr. 4, 1977, Ser. No. 784,514

Claims priority, application United Kingdom, Apr. 14, 1976, 15406/76

Int. Cl.² B01J *21/04, 23/74, 23/86*

U.S. Cl. 252—465 **8 Claims**

1. A catalyst comprising an Al-containing Fe-base alloy substrate carrying a protective adherent coating comprising a refractory oxide in association with an oxide of an element of the first period of transition elements of the Periodic Table, except iron, wherein the transition element oxide is different from the refractory oxide, and a second coating comprising catalytically active material for treating automotive exhaust gases in association with a refractory oxide wherein said coating is carried by said protective coating.

4,096,096

METHOD FOR MANUFACTURE OF CATALYST USED FOR REDUCTION OF NITROGEN OXIDES

Yasuo Nishikawa; Akira Watanabe; Tetsuya Sugimoto; Yasutoshi Mizuta, all of Okayama, and Yoshio Hatayama, Kashihara, all of Japan, assignors to Kyushu Refractories Co., Ltd., Bizen, Japan

Filed Aug. 9, 1976, Ser. No. 712,698

Claims priority, application Japan, Aug. 21, 1975, 50-101447

Int. Cl.² B01J *21/04, 23/74*

U.S. Cl. 252—466 J **3 Claims**

1. A method for the production of a catalyst for use in the reduction of nitrogen oxides, which method comprises:

(a) suspending at least one iron-containing substance selected from the group consisting of Fe_2O_3, $Fe_2O_3.nH_2O$, $Fe(OH)_2$, $Fe(OH)_3$ and $Fe_3O_4.nH_2O$ in an aqueous solution consisting essentially of water and at least one aluminum-containing substance selected from the group consisting of alumina sol, alumina gel and water-soluble aluminum salts whereby said aluminum-containing substance deposits on the surface of said iron-containing substance as a precipitate, the ratio of the suspended iron-containing substance to the aluminum-containing substance being 55 to 95 weight percent as Fe_2O_3 to 5 to 45 weight percent as Al_2O_3; and

(b) washing and drying the resultant precipitate;

(c) molding the dried precipitate;

(d) baking the molded precipitate at a temperature in the range of from 300° to 1000° C to obtain a product consisting essentially of iron oxide and alumina.

4,096,097

METHOD OF PRODUCING HIGH QUALITY SPONGE COKE OR NOT TO MAKE SHOT COKE

Tsoung-Yuan Yan, Philadelphia, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,288

Int. Cl.² H01B *1/06*

U.S. Cl. 252—510 **27 Claims**

1. In a delayed coking process for producing petroleum coke wherein a hydrocarbon feedstock is charged to a coking furnace, heated to coking temperature, charged to a coking drum, and maintained therein at coking conditions until petroleum coke is formed, and a petroleum coke product is periodically recovered from the coking drums; a method for minimizing shot coke formation which comprises adding from 0.5 to 20 percent by weight of a carbonaceous material which contains from 5 to 60 percent by weight of oxygen and which decomposes at the coking temperature to the hydrocarbon feedstock.

4,096,098

SEMICONDUCTOR CERAMIC COMPOSITION

Kazumasa Umeya, and Kazunari Yonezuka, both of Tokyo, Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,840

Claims priority, application Japan, Aug. 8, 1975, 50-96537

Int. Cl.² H01B *1/06*

U.S. Cl. 252—520 **7 Claims**

1. A semiconductor ceramic composition having positive temperature characteristics, which comprises:

(a) titanates of barium, lead and calcium which have 1 - 40 mole % of lead titanate, 1 - 22 mole % of calcium titanate and 38 - 98 mole % of barium titanate, wherein said contents of barium, lead and calcium titanates are based on 100 mole % of titanate present in said composition; and

(b) 0.03 - 0.6 mole % of a semiconductor forming component of a metal derived from the metal oxides selected from the group consisting of Nb, Ta, Bi, Sb, W, and the rare earth element oxides.

4,096,099

POROUS SYNTHETIC RESIN FILM

Kenji Koyama, and Syotaro Ohno, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed May 14, 1976, Ser. No. 686,573

Claims priority, application Japan, May 29, 1975, 50-63518

Int. Cl.² C08J *9/00*

U.S. Cl. 260—2.5 D **6 Claims**

1. A porous synthetic resin film which comprises fine cylindrical holdes of from 70 to 3,000 A in diameter which are formed by removing the fine cylindrical component from the continuous phase component of a film of a block copolymer of the AB or ABA-type.

4,096,100

BLOWING AGENTS-BIS(HYDROCARBYLSULFONYL) CARBOHYDRAZIDES

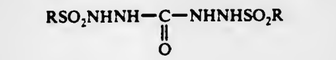
Byron A. Hunter, Woodbridge, and Irwin A. Prager, Waterbury, both of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed May 24, 1976, Ser. No. 689,448

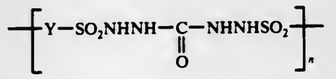
Int. Cl.² C08J *9/08, 9/10*

U.S. Cl. 260—2.5 R **9 Claims**

1. A composition comprising a gas-expandable polymeric material and a bis(hydrocarbylsulfonyl) carbohydrazide selected from the group consisting of



and



wherein R is selected from alkyl having 1 to 12 carbon atoms, aryl having 6 to 12 carbon atoms, aralkyl having 7 to 12 carbon atoms, alkaryl having 7 to 12 carbon atoms and cycloalkyl having 5 to 9 carbon atoms; and wherein Y is a difunctional radical selected from phenylene, alkarylene having 7 to 10 carbon atoms, and a group of the structure $-R^1-A-R^2-$ wherein A is selected from the group consisting of a single bond connecting R^1 and R^2, —O—, —S—, —SO—, $-SO_2-$, alkylene with 1 to 6 carbon atoms, and alkylidene with 2 to 3 carbon atoms, and wherein R^1 and R^2 are the same or different and are alkylene having 1 to 4 carbon atoms or phenylene, and wherein *n* is an integer from 2 to about 50.

4,096,101

PROCESS FOR THE PRODUCTION OF CHEMICALLY AFTER-CROSS-LINKED POLYURETHANE RESINS

Johannes Blahak, Cologne; Kuno Wagner, Leverkusen; Jan Mazinek, Cologne; Hanns Peter Muller, Leverkusen, and Artur Reischl, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jul. 12, 1977, Ser. No. 814,828

Claims priority, application Germany, Jul. 24, 1976, 2633457

Int. Cl.² C08J *9/00*

U.S. Cl. 260—2.5 BE **4 Claims**

1. A process for the production of cross-linked elastomeric, optionally cellular polyurethane resins comprising reacting:

(a) polyisocyanates,

(b) higher molecular weight polyhydroxyl and/or polyamino compounds containing filler particles.

(c) chain lengthening agents wherein said filler particles are capable of being cross-linked with formaldehyde and wherein the elastomeric polyurethanes containing fillers are cross-linked with formaldehyde or formaldehyde releasing compounds after the chain lengthening reaction has been essentially completed.

4,096,102

MOLDABLE COMPOSITIONS COMPRISING THERMOSETTING POLYESTER RESIN AND THERMOPLASTIC RESIN

Carl R. Strauss, Newark; Michael G. Roberts, Heath, and Charles E. Bolen, Newark, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 544,454, Jan. 27, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,485

Int. Cl.² C08G *63/02*

U.S. Cl. 260—22 D **14 Claims**

1. A moldable composition comprising a thermosetting polyester resin and a thermoplastic resin, said thermoplastic resin comprising the reaction product of a polyol and a dimer acid or a trimer acid, said dimer acid being an aliphatic, dibasic, long chain acid having at least 36 carbon atoms in said chain and having two alkyl side chains and having at least one ethylenic bond, said trimer acid being an aliphatic, tribasic, long chain acid having at least 54 carbon atoms in said chain and at least three alkyl side chains and at least one ethylenic bond.

4,096,103

PRESSURE-SENSITIVE ADHESIVE COMPOSITION

Pallavoor R. Lakshmanan, Houston, Tex.; Harold E. Swift, Gibsonia, and Ching Yong Wu, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 29, 1976, Ser. No. 755,160

Int. Cl.² C08K *5/01, 5/07, 5/10*; C08L *93/04*

U.S. Cl. 260—27 BB **15 Claims**

1. A pressure-sensitive adhesive composition consisting essentially of a tackifier selected from the group consisting of:

(i) an isoprene-piperylene copolymer having a Ring and Ball softening point of about 10° to about 135° C., a molecular weight of about 400 to about 3000 and a weight ratio of isoprene to piperylene of about 1:10 to about 10:1;

(ii) a piperylene/2-methyl-2-butene copolymer having a Ring and Ball softening point of about 10° to about 135° C., a molecular weight of about 400 to about 3000 and a weight ratio of piperylene to 2-methyl-2-butene of about 1:10 to about 10:1;

(iii) beta terpene resins having a Ring and Ball softening point of about 10° to about 135° C. and a molecular weight of about 300 to about 3000; and

(iiii) rosin or rosin esters having a Ring and Ball softening point of about 10° to about 190° C. and a molecular weight of about 300 to about 3000;

in combination with an elastomer comprising isoprene and piperylene having a molecular weight of at least about 40,000; and a solvent; said elastomer having been prepared by a process for preparing an elastomer comprising copolymerized C_5-hydrocarbons prepared from a hydrocarbon mixture containing C_5-monoolefinic hydrocarbons, C_5-diolefinic hydrocarbons, C_5-paraffins, C_6-paraffins and benzene, which comprises (A) heat-soaking said hydrocarbon mixture at a temperature sufficient to dimerize cyclopentadiene; (B) separating the resulting hydrocarbon mixture from the cyclopentadiene dimer; and (C) copolymerizing the resulting hydrocarbon mixture in the presence of a catalyst which comprises an iron complex, a trialkyl aluminum and a bidentate ligand capable of both pi and sigma bonding, the weight percents of the three components being 5–35 elastomer, 5–35 tackifier, and 30–90 solvent.

4,096,104

FINISH COMPOSITION FOR FIBROUS MATERIAL

Raymond G. Spain, Huntington Beach, and Albert L. Miller, Torrance, both of Calif., assignors to Hitco, Irvine, Calif.

Filed Nov. 10, 1976, Ser. No. 740,253
Int. Cl.² C08L 91/00
U.S. Cl. 260—28.5 B 16 Claims

1. A finish composition for fibrous members comprising a rubber latex and a wax emulsion, the rubber of the latex being incompatible with the wax of the emulsion, the rubber latex and the wax emulsion forming an aqueous emulsion having a solids concentration by weight of not substantially less then about 1% nor more than about 3% and the weight of the wax emulsion being 10–80% of the weight of the rubber latex.

14. A method of preparing a woven article from fibers of carbonaceous material comprising the steps of:

providing a plurality of fibers of carbonaceous material;

coating the fibers with an aqueous emulsion having a solids concentration by weight of not substantially less than about 1% and not more than about 3%, the aqueous emulsion being formed by a rubber latex and a wax emulsion, the rubber of the latex and the wax of the wax emulsion both being dispersed in the aqueous emulsion;

drying the coating to form a dry mixture of rubber and wax on the surface of the fibers;

weaving the fibers to form a woven article; and

treating the woven article to remove the mixture of rubber and wax from the surface of the fibers.

4,096,105

AQUEOUS COATING COMPOSITION

Vincent Daniel McGinniss, Valley City, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,107
The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.
Int. Cl.² C25D 13/10
U.S. Cl. 260—29.6 NR 12 Claims

1. A coating composition in aqueous dispersion for forming a heat-curable film thereof on a substrate comprising:

a polymer having at least about 5% by weight pendant primary and/or secondary amine groups, said amine groups being protonated with acid to render said polymer water dispersible; and

at least about 5% by weight of said polymer of an alpha-, beta-ethylenically unsaturated carbonyl cross-linking agent having at least two alpha-, beta-ethylenically unsaturated carbonyl groups,

said film of said coating composition being heat-curable at a temperature sufficient to volatilize the water and said acid in said film, whereby said protonated amine groups become deprotonated and said cross-linking agent cross-linking said polymer through said deprotonated amine groups by addition polymerization to form a heat-cured film on said substrate.

4,096,106

AQUEOUS COATING COMPOSITIONS CONTAINING A RESIN PREPARED FROM THE REACTION PRODUCT OF POLYBUTADIENE WITH AN UNSATURATED DICARBOXYLIC ACID OR ANHYDRIDE

Ryuji Kita, Kawasaki, Japan, assignor to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Jun. 11, 1976, Ser. No. 695,057
Claims priority, application Japan, Jun. 24, 1975, 50-77688
Int. Cl.² C08L 9/10
U.S. Cl. 260—29.7 H 8 Claims

1. In an aqueous coating composition comprising a water-soluble or water-dispersible film-forming resin, the improvement wherein said resin consists essentially of the addition product obtained by:

(a) reacting (i) an α,β-ethylenically unsaturated dicarboxylic acid or anhydride with (ii) a butadiene polymer having a number average molecular weight of 400–10,000 and containing 40–75% cis-1,4 double bonds, 20–50% vinyl 1,2 double bonds and not more than 15% trans-1,4 double bonds in the butadiene units of the polymer chain; and

(b) neutralizing the resultant addition product to render said product soluble or dispersible in water.

4,096,107

MOLDING COMPOUNDS

Michael Graeg Roberts, Heath, and Charles Edwin Bolen, Newark, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Nov. 12, 1976, Ser. No. 741,273
Int. Cl.² C08K 3/40, 5/01
U.S. Cl. 260—33.6 UA 26 Claims

1. A molding composition comprising:

(1) an unsaturated, thermosetting prepolymer;

(2) a thermoplastic polymer prepared by interpolymerization of

(a) at least one polymerizable ethylenic monomer,

(b) an organic acid or anhydride containing at least one carboxyl group and one double bond per molecule,

(c) an unsaturated elastomer having a weight average molecular weight less than 40,000, and

(d) an unsaturated elastomer having a weight average molecular weight greater than 43,000 wherein each elastomer contains at least 10% by weight of a conjugated diene;

(3) at least one unsaturated compound which is a solvent for the prepolymer and the thermoplastic polymer and which is capable of cross-linking the prepolymer; and

(4) a non-reactive solvent, with the thermoplastic polymer and the non-reactive solvent each being present in a combined amount sufficient to reduce shrinkage on cross-linking of the prepolymer with the unsaturated compound.

4,096,108

THERMOSETTABLE RESINS AND FRICTIONAL MATERIALS MADE THEREFROM

Benton Paul Webb, Richwood, and Donald Louis Nelson, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 17, 1976, Ser. No. 687,132
Int. Cl.² C08K 3/34
U.S. Cl. 260—38 18 Claims

1. An improved frictional material which comprises a filler material and a cured modified novolac, prepared by reacting

1. a methoxy functional diaryl compound with

2. a phenolic compound and

3. formaldehyde

in the presence of

4. an acid catalyst

at a temperature of from about 90° to about 190° C for from several minutes to several hours to form a modified novolac, grinding said novolac and mixing with a source of formaldehyde and said filler material, curing said mixture in a mold and heating under pressure for a sufficient time to form said improved frictional material.

4,096,109

POLYESTER FILMS USEFUL AS MAGNETIC TAPES

Masamichi Watanabe, Yokohama; Takuo Nakahara; Seiji Sakamoto, both of Machida; Kunio Bizen, Yokohama; Akikazu Yano, Yokohama, and Yuzo Otani, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Jul. 16, 1976, Ser. No. 705,914
Claims priority, application Japan, Jul. 21, 1975, 50-88991
Int. Cl.² C08K 3/16, 3/26, 5/09
U.S. Cl. 260—40 R 4 Claims

1. A polyester film useful as a magnetic tape comprising

(a) a polyester mainly consisting of polyethylene terephthalate which includes first inert particles being precipitated in the polyester-forming reaction system and having an average particle diameter of 1 to 3 microns and which shows a solution haze of 25 to 75% and

(b) 0.005 to 0.15% by weight of second inert particles which are added to said polyester (a), substantially insoluble in said polyester (a) and inert to the polyester-forming reaction and have an average particle diameter of 1 to 5 microns, with the proviso that a portion of said second inert particles which consists of particles having a particle size of 3 to 6 microns is 0.004 to 0.08% by weight of said polyester.

4,096,110

FILLED POLYESTERS CONTAINING ORGANIC TITANATE ESTERS

Salvatore J. Monte, Staten Island, N.Y., and Gerald Sugerman, Allendale, N.J., assignors to Kenrich Petrochemicals, Inc., Bayonne, N.J.

Continuation-in-part of Ser. No. 577,922, May 15, 1975. This application Sep. 30, 1975, Ser. No. 618,223
Int. Cl.² C08K 9/04
U.S. Cl. 260—40 R 12 Claims

1. A filled polyester composition comprising a polyester resin containing a filler which has been treated with an organic titanate compound having the formula: $(RO)_xTi(A)_x(B)_y$ wherein R is a monovalent alkyl, alkenyl, alkynyl, or aralkyl group having from 1 to 30 carbon atoms or substituted derivatives thereof; A is a sulfonic, a diester pyrophosphate, a diester phosphate, or substituted derivative thereof; B is OAr or OCOR'; R' is hydrogen or a monovalent organic group having from 1 to 100 carbon atoms; OAr is aroxy; $x + y + z = 4$; x and z may be 1, 2 or 3; and y may be 0, 1 or 2.

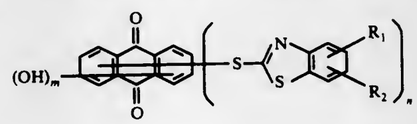
4,096,111

BULK DYEING OF POLYESTERS

Rütger Neeff, and Heinz Dietrich Jordan, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Continuation of Ser. No. 526,932, Nov. 25, 1974, abandoned. This application Mar. 30, 1976, Ser. No. 671,985
Claims priority, application Germany, Dec. 6, 1973, 2360875
Int. Cl.² C08K 5/47
U.S. Cl. 260—40 P 6 Claims

1. Process for the bulk dyeing of synthetic linear polyesters, characterised in that one or more dyestuffs of the formula



wherein

R_1 and R_2 denote hydrogen or a non-ionic substituent,

m denotes an integer from 0 to 2 and

n denotes an integer from 1 to 4 and

m and n together are not greater than 4,

are employed.

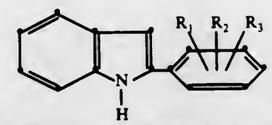
4,096,112

2-PHENYL-INDOLE DERIVATIVE STABILIZERS FOR PVC RESINS

Charles Pigerol, Saint-Ouen; Marie-Madeleine Chandavoine; Paul de Cointet de Fillain, both of Sisteron, and Souli Nanthavong, Grenoble, all of France, assignors to Labaz, France

Continuation of Ser. No. 580,092, May 30, 1975, Pat. No. 4,024,155. This application Dec. 29, 1976, Ser. No. 755,335
Int. Cl.² C08K 5/35
U.S. Cl. 260—45.8 N 3 Claims

1. Compositions comprising homopolymers and co-polymers of vinyl chloride containing a stabilizing amount of at least one stabilizer of the formula



I

wherein R_1 and R_2, which are the same or different, each represent a branched- or straight-chain alkyloxy group containing from 1 to 12 carbon atoms, a benzyloxy radical, a hydroxy radical or R_1 and R_2 represent together an alkylenedioxy radical containing from 1 to 3 carbon atoms, R_3 represents a hydrogen atom, a methyl or methoxy radical.

4,096,113

FLAME RETARDANT POLYOLEFINS

Donnie G. Brady, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 488,668, Jul. 15, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 657,821
Int. Cl.² C08K 5/17, 5/52
U.S. Cl. 260—45.8 NT 17 Claims

1. A flame-retardant polyolefin composition comprising normally solid polyolefin, a hydrohalide salt of a mono- or diamine in which the amine group is attached to or incorporated within a hydrocarbyl radical which is aromatic or aliphatic, containing 2 to 24 carbon atoms, and a phosphorus-containing flame retardant, produced by combining reactants comprising (a) at least one phosphorus oxide compound of the formula $(P_2O_5)_{0.5\text{-}1.0}(H_2O)_{0.0\text{-}1.5}$, (b) melamine, and (c) at least one saturated open-chain polyol containing from 5 to 15 carbon atoms and from 4 to 8 hydroxyl groups under suitable conditions, said suitable conditions comprising employing amounts of said reactants suitable for yielding said phosphorus-containing flame retardant and heating said combined reactants at a temperature suitable for yielding said phosphorus-containing flame retardant for a period which will assure that said phosphorus-containing flame retardant will not cause significant foaming of the polyolefin composition when said polyolefin composition is subjected to molding conditions.

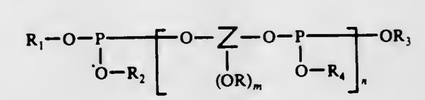
4,096,114

2,2,6,6-TETRAMETHYL PIPERIDYL-4-PHOSPHITES AS STABILIZERS FOR ORGANIC POLYMERIC MATERIALS

Motonobu Minagawa, Kosigaya; Naohiro Kubota; Toshihiro Shibata, both of Urawa, and Kazuo Sugibuchi, Adachi, all of Japan, assignors to Argus Chemical Corporation, Brooklyn, N.Y.

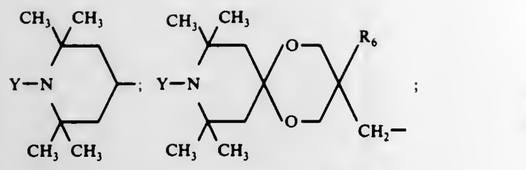
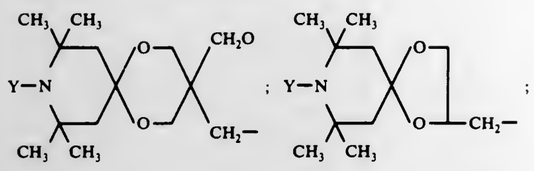
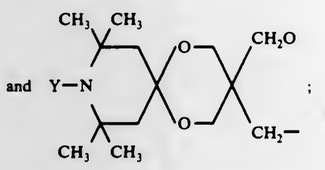
Filed Aug. 16, 1976, Ser. No. 714,940
Claims priority, application Japan, Aug. 15, 1975, 50-9929
Int. Cl.² C07D 211/06; C08K 5/34, 5/35, 5/52
U.S. Cl. 260—45.8 NZ 30 Claims

1. 2,2,6,6-tetramethyl-piperidyl-4-phosphites having the formula:

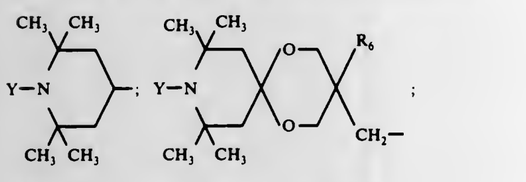
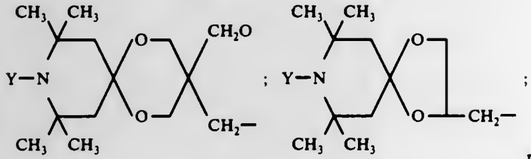
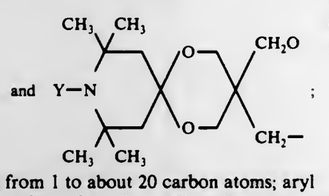


wherein:

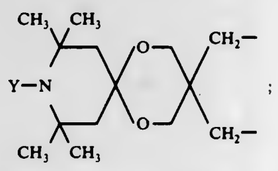
R_1 is selected from the group consisting of:

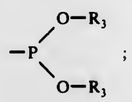
R_2, R_3 and R_4 are selected from the group consisting of:

hydrogen, alkyl having from 1 to about 20 carbon atoms; aryl and hydroxylaryl having from 6 to about 20 carbon atoms; alkyl aryl and aryl alkyl having from 7 to about 20 carbon atoms; hydroxyalkyl and hydroxyalkylene oxyalkylene having from 2 to about 30 carbon atoms; and R_1 and R_2; and R_3 and R_4; taken together to form



R is selected from the group consisting of hydrogen and



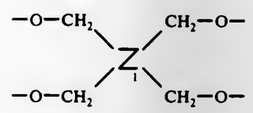
R_6 is alkyl having from 1 to about 6 carbon atoms;

Y is selected from the group consisting of hydrogen and oxygen;

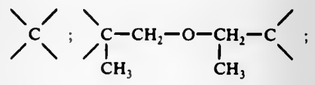
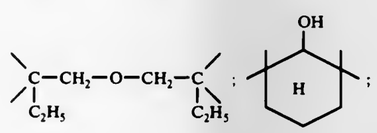
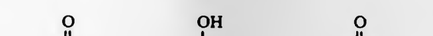
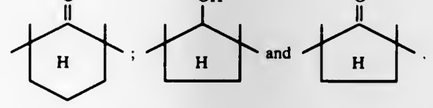
m is a number selected from 0, 1, 2, 3 and 4;

n is a number selected from zero to 20, when n is zero, at least one of R_2 and R_3 being derived from a polyol or a polyphenol; and

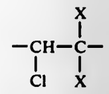
Z is selected from the group consisting of bivalent, trivalent and tetravalent alkylene having from 2 to about 30 carbon atoms; bivalent, trivalent and tetravalent arylene, bis arylene and tris, arylene, having from 6 to about 30 carbon atoms; mono, di or tri N-substituted cyanuric acid; and taken with OR, R_1 or R_2 and R_3 or R_4 to form the group:



in which Z_1 is selected from the group consisting of

21. A polyvinyl chloride resin composition having improved resistance to deterioration when heated at 350° F, comprising a polyvinyl chloride resin formed at least in part of the recurring group



and having a chlorine content in excess of 40 percent, where X is either hydrogen or chlorine; and an amount to improve resistance to deterioration of the resin of a compound in accordance with claim 1.

4,096,115

ULTRAVIOLET LIGHT STABILIZED POLYMERS

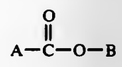
Gether Irick, Jr., and Charles A. Kelly, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 484,845, Jul. 1, 1974, abandoned. This application Nov. 29, 1976, Ser. No. 745,950

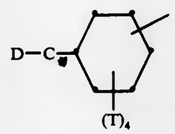
Int. Cl.[2] C08K *5/46, 5/47, 5/34, 5/35*

U.S. Cl. 260—45.8 RW **69 Claims**

1. An organic synthetic and natural polymer composition susceptible to ultraviolet light degradation stabilized against such degradation with a stabilizing amount of at least one aryl ester of a heterocyclic aromatic acid having the formula:



wherein A is a moiety selected from the group consisting of moieties having the formula:



wherein

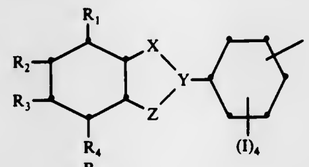
T is a hydrogen, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, chloro, bromo alkoxy, substituted amino, cyano;

C is a member selected from the group consisting of vinyl, lower alkyloxy, oxy-lower alkyl and oxy;

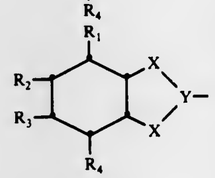
wherein

D is a member selected from the group of moieties having the formula:

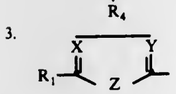
1.



2.



3.



wherein

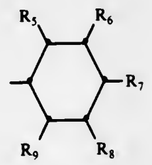
X and Y are a carbon atom or a nitrogen atom;

Z is an oxygen atom, a sulfur atom, a nitrogen atom, or a nitrogen atom containing a hydrogen atom or a substituted or unsubstituted lower alkyl group containing 1 to 12 carbon atoms;

R_1, R_2, R_3 and R_4 are hydrogen, chloro, bromo, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, alkoxy, substituted amino, cyano and the substituents R_1 and R_2, R_2 and R_3, and R_3 and R_4 combined with the carbon atoms to which they are attached are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for R_1, R_2, R_3 and R_4;

I is the same as R_1, R_2, R_3 and R_4 and is present on all positions of the benzenoid ring, except the carbon atom attached to the Y substituent and the carbon atom attached to the carboxyl group connecting the heterocyclic aromatic A group with the aromatic B group, said carbonyl connecting group is attached to the benzenoid ring in either the meta or para position from the carbon atom connected to the Y substituent; and

B is a group having the formula



wherein at least one R_5 or R_9 is hydrogen and the other R_5, R_6, R_7, R_8 and R_9 are hydrogen, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, alkoxy, substituted amino, hydroxy, carboalkoxy, nitrile, chloro, bromo and the substituents R_5 and R_6, R_6 and R_7, R_7 and R_8, and R_8 and R_9 combined with the carbon atoms to which they are attached are joined alkylene groups completing a carbocyclic ring which can be substituted with any of the substituents listed above for R_5, R_6, R_7, R_8 and R_9.

4,096,116

SMOKE-RETARDANT CHLORINATED POLYMER COMPOSITIONS

David Francis Lawson, Uniontown, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 632,334, Nov. 17, 1975, abandoned. This application Oct. 1, 1976, Ser. No. 728,815

Int. Cl.[2] C08K *5/09*

U.S. Cl. 260—45.75 M **8 Claims**

1. A polymer composition having a reduced tendency to smoke under combustion conditions, said composition consisting essentially of (a) 100 parts by weight of at least one polymer having a chlorine content of from about 5 to about 70%, based on the weight of said polymer, said polymer being chlorinated polyethylene, chlorinated polypropylene, polyvinylidene chloride, polyvinyl chloride or chlorinated polyvinyl chloride, and, (b) from 1 to 10 parts of a cobalt salt of a dicarboxylic aliphatic acid or a hydroxycarboxylic acid containing 2 to 6 carbon atoms.

2. A polymer composition having a reduced tendency to smoke under combustion conditions, said composition consisting essentially of (a) 100 parts by weight of at least one polymer having a chlorine content of from about 5 to about 70%, based on the weight of said polymer, said polymer being chlorinated polyethylene, chlorinated polypropylene, polyvinylidene chloride, polyvinyl chloride or chlorinated polyvinyl chloride, and, (b) 1 to 10 parts of a manganese salt of a dicarboxylic aliphatic acid or a hydroxycarboxylic acid containing 2 to 6 carbon atoms.

4,096,117

PLASTIC COMPOSITIONS

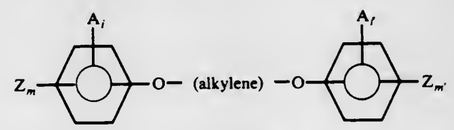
Arnold L. Anderson, Alma, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Feb. 8, 1973, Ser. No. 330,804

Int. Cl.[2] C08L *73/00*

U.S. Cl. 260—45.95 G **14 Claims**

1. A plastic composition comprising poly (phenylene oxide) and a flame retardant, said flame retardant consisting of a compound having the formula



wherein Z is bromine; m is an integer having a value of 1–5 and m' is an integer having a value of 0–4; i is an integer having a value of 0–2 and i' is an integer having a value of 1–5; alkylene is a straight or branched chain alkylene group having from 1 to 6 carbon atoms; and A is chlorine.

4,096,118
PROCESS FOR THE PRODUCTION OF AMINO SILICATE COMPOUNDS AND THEIR RESINOUS PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Filed Oct. 11, 1977, Ser. No. 840,557
Int. Cl.[2] C08G *77/04*
U.S. Cl. 260—46.5 E 12 Claims

1. The process for the production of amino silicate compounds by the following steps:

(a) mixing about 2 parts by weight of fine granular silica (SiO_2) and from about 1 to 4 parts by weight of an amino compound, selected from the group consisting of urea, thiourea, alkyl-substituted urea, alkyl-substituted thiourea, melamine, aniline, guanidine, saccharin, benzene sulfonamide, toluene sulfonamide, ammeline, dicyandiamide, aliphatic diamines, aromatic diamines and mixtures thereof, in water;

(b) adding an alkali catalyst, selected from the group of alkali metal hydroxides consisting of sodium hydroxide and potassium hydroxide, until the pH is 10 to 12;

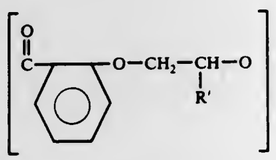
(c) heating said mixture to 70° to 110° C while agitating at ambient pressure until the water evaporates, then continue heating at a temperature between the melting and boiling temperature of the amino compound while agitating for 10 to 30 minutes, thereby producing an amino silicate compound.

4,096,119
POLYMERIZATION OF 2,3,4,5-TETRAHYDRO-4-OXO-1-BENZOXEPIN-5-ONES

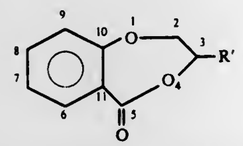
Howard P. Klein, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed Jul. 23, 1976, Ser. No. 708,241
Int. Cl.[2] C08G *63/08, 63/10*
U.S. Cl. 260—47 C 20 Claims

1. A method for making a polymer having the repeating monomer unit



where R′ is a radical selected from the group consisting of aryl, aliphatic and hydrogen; which comprises heating a compound of the formula

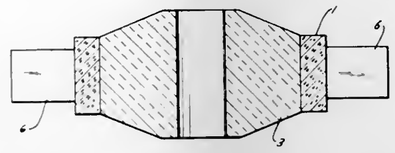


in the presence of a catalyst which will open lactone rings at a temperature sufficient to initiate ring opening.

4,096,120
METHOD OF MAKING A CERAMIC TURBINE WHEEL AND TURBINE WHEEL MADE THEREBY

Richard Grunke, Munich, Germany, assignor to MTU Munchen GmbH, Munich, Germany

Filed Jan. 8, 1976, Ser. No. 647,378
Claims priority, application Germany, Feb. 2, 1975, 2505652
Int. Cl.[2] C04B *35/58*
U.S. Cl. 264—60 5 Claims



1. A method of manufacturing a ceramic turbine wheel comprising the steps of:

(a) making a silicon nitride ring by arranging silicon powder in the form of a ring and reaction sintering the silicon in nitrogen to yield a self-supporting silicon nitride ring;

(b) making a plurality of turbine bladed by arranging silicon powder in the form of such blades and reaction sintering the powder in nitrogen to transform the powder into self-supporing blades silicon nitride;

(c) forming a composite component comprising the silicon nitride ring and a disc within the ring by hot pressing silicon nitride powder into the ring to form the disc and to sinter together the outer periphery of the disc and the inner surface of the ring, and supporting the radial outer surface of the ring against expansion during the hot pressing operation; and

(d) thereafter bonding the blades to the radial outer surface of the composite disc and ring.

4,096,121
PROCESS FOR THE PRODUCTION OF RESINOUS PRODUCTS BY CHEMICALLY REACTING SILICIC ACID WITH POLY(VINYL ACETATE) POLYMER

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Filed Mar. 4, 1977, Ser. No. 774,638
Int. Cl.[2] C08F *8/12, 8/28*
U.S. Cl. 260—66 11 Claims

1. The process for the production of poly(vinyl acetate silicate) and poly(vinyl alcohol silicate) resinous products by the following steps:

(a) mixing about 3 parts by weight of silicic acid, 3 to 6 parts by weight of poly(vinyl acetate) polymer in an aqueous dispersion and 1% to 10% by weight of an alkali catalyst; percentage is based on the weight of the silicic acid and poly(vinyl acetate) polymer;

(b) heating the mixture to 70° to 110° C for 20 to 60 minutes while agitating, thereby

(c) producing a cream colored, resinous product;

(d) adding the resinous product to water and dissolving the water soluble, resinous product, poly(vinyl alcohol) polymer, thereby

(e) recovering the white, resinous product, poly(vinyl acetate silicate) resin.

4,096,122
PROCESS FOR THE PRODUCTION OF POLYESTERS OF 1,4-BUTANEDIOL

Gerhard Schade, Witten-Bommern, and Hans Melin, Witten, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 341,185, Mar. 14, 1973, abandoned.
This application Jul. 28, 1975, Ser. No. 599,915
Claims priority, application Germany, Mar. 18, 1972, 2213259
Int. Cl.[2] C08G *63/18*
U.S. Cl. 260—75 M 20 Claims

1. A process for producing a linear polyester which consists essentially of:

(1) reacting in the presence of an ester interchange catalyst an excess of 1,4-butanediol with a lower alkyl ester of an aromatic dicarboxylic acid at a temperature of less than 200° C;

(2) removing at a temperature not above 200° C unreacted 1,4-butanediol therefrom so that the reaction mixture contains no more than 1% by weight 1,4-butanediol by applying a vacuum thereto;

(3) adding to the reaction mixture from step (2) dicarboxylic acid and reacting the resultant mixture at a temperature of 200°–250° C, the dicarboxylic acid being present in no more than a stoichiometric amount relative to any dicarboxylic acid-bis-(4-hydroxybutyl ester) and/or oligomers thereof which are formed during step (1) and being such that the mol ratio of 1,4-butanediol employed in step (1) to the sum of the mols of the lower alkyl esters of aromatic dicarboxylic acid in step (1) and the mols of dicarboxylic acid added in step (3) is between 1.05 and 1.25; and

(4) polycondensing in the presence of a polycondensation catalyst the resultant esterification product by heating the same at between 250° and 310° C in a vacuum.

4,096,123
POLYESTER ADHESIVE

Yoshiharu Niinami, and Kuniomi Etoh, both of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Dec. 12, 1975, Ser. No. 640,388
Claims priority, application Japan, Dec. 16, 1974, 49-144638
Int. Cl.[2] C08G *63/68, 63/12*
U.S. Cl. 260—75 N 6 Claims

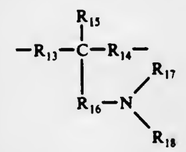
1. A polyester adhesive having as the effective component thereof a copolyester containing a tertiary amino group comprising:

(1) a terephthalic acid residue, the amount of which makes up 80 to 20 mol % of the total amount of all the carboxylic acid residues present;

(2) at least one dicarboxylic acid residue selected from the group consisting of aliphatic dicarboxylic acid residues and aromatic dicarboxylic acid residues other than a terephthalic acid residue, the amount of which makes up 20 to 80 mol % of the total amount of all the carboxylic acid residues present;

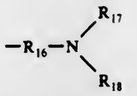
(3) at least one alkylene glycol residue, the amount of which makes up 50 to 99 mol % of the total amount of all the glycol residues present; and

(4) at least one glycol residue possessed of the group represented by the following generic formula:



(IV)

wherein R_{13}, R_{14} and R_{16} are each an alkylene group of 1 to 15 carbon atoms, R_{17} and R_{18} are either, independently, a hydrogen atom or an alkyl group of 1 to 4 carbon atoms or, in combination, make up a polymethylene group which may form a heterogeneous ring in conjunction with the adjoining nitrogen atom, and R_{15} is an alkyl group of from 1 to 3 carbon atoms or



the amount of which makes up 50 to 1 mol % of the total amount of all the glycol residues present, the said copolyester having a reduced viscosity, $\eta_{sp/c}$ as measured in chloroform as the solvent under conditions of $c = 0.4$ g/dl and 30° C in the range of from 0.2 to 2.0.

4,096,124
ESTERIFICATION PROCESS

William C. L. Wu, East Brunswick, and Raymond Eichenbaum, Spotswood, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 204,778, Dec. 3, 1971, which is a continuation of Ser. No. 856,898, Sep. 4, 1969, abandoned, which is a continuation of Ser. No. 560,105, Jun. 24, 1966, abandoned, which is a continuation-in-part of Ser. No. 485,561, Sep. 7, 1965, abandoned. This application Jan. 12, 1976, Ser. No. 648,292
Int. Cl.[2] C07C *69/82*
U.S. Cl. 260—75 M 21 Claims

1. A method for the esterification of terephthalic acid with ethylene glycol which comprises

heating, in a first stage, 1.0 mole of terephthalic acid, 1.3 – 1.7 mole of ethylene glycol and 0.01 to 0.6% based on the weight of said acid of an alkyl amine having a normal boiling point below about 200° C, at a temperature about 260° – 300° C and at a pressure above the vapor pressure of the glycol at the reaction temperature for 3 minutes to one hour until about 75 to about 85% of the acid groups initially present in the terephthalic acid have been esterified, and then

maintaining the reaction mixture from the first stage in a second stage at a temperature about 260° – 300° C while reducing the pressure to substantially atmospheric until at least about 95% of the acid groups initially present in the terephthalic acid have been esterified.

9. In a method for preparing a filament-forming polyethylene terephthalate resin by forming an esterified terephthalate acid and polycondensing the resulting esterified terephthalic acid under reduced pressure at a polycondensation temperature in the presence of a polycondensation catalyst, the improvement which comprises forming the esterified terephthalate acid by

heating in a first stage, one mole of terephthalic acid, 1.3 to 1.7 mole of ethylene glycol and 0.01 to 0.6% based on the weight of said acid of an alkyl amine having a normal boiling point below about 200° C at a temperature about 260° to 300° C and at a pressure above the vapor pressure of the glycol at the reaction temperature for three minutes to one hour until about 75 to 85% of the acid groups initially present in the terephthalate acid have been esterified, and

maintaining the reaction mixture from the first stage in a second stage at a temperature of about 260° to 300° C while reducing the pressure to substantially atmospheric until at least about 95% of the acid groups initially present in the terephthalic acid have been esterified.

4,096,125

POLYCAPROLACTONE DERIVATIVES AND COATING COMPOSITIONS THEREOF

Oliver Wendell Smith, South Charleston, and Joseph Victor Koleske, Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed May 26, 1976, Ser. No. 690,353
Int. Cl.[2] C08G *63/12, 63/52, 63/68*
U.S. Cl. 260—75 R **75 Claims**

1. A water insoluble adduct comprising the reaction product of a polycaprolactone polyol and an intramolecular anhydride of a polycarboxylic acid, wherein said polycaprolactone polyol has at least two hydroxyl groups in the molecule, a hydroxyl number of from 15 to 600 and an average molecular weight of from 290 to about 6,000, and wherein said anhydride has at least one intramolecular carboxylic anhydride group.

4,096,126

THERMOPLASTIC COPOLYESTER ELASTOMER

Chiaki Tanaka, Chita; Shinobu Nakajima, and Masanobu Morikawa, both of Nagoya, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Aug. 12, 1976, Ser. No. 713,630
Claims priority, application Japan, Aug. 22, 1975, 50-101159
Int. Cl.[2] C08G *63/18*
U.S. Cl. 260—75 R **7 Claims**

1. A thermoplastic copolyester elastomer derived from the reaction of a mixture comprising a dicarboxylic acid component, and a diol component, wherein the dicarboxylic acid component is mainly composed of terephthalic and phthalic acids in which the molar ratio of terephthalic acid to phthalic acids is about 80/20 to 35/65, and the diol component is mainly composed of 1,4-butanediol.

4,096,127

ANIONIC POLYURETHANES

Horst Schurmann; Josef Bung, both of Duren, Germany, and Hendrikus Alouisius Antonius van Aalten, Zevenaar, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed Dec. 4, 1975, Ser. No. 637,701
Claims priority, application Germany, Dec. 7, 1974, 2457972
The portion of the term of this patent subsequent to Jul. 27, 1993, has been disclaimed.
Int. Cl.[2] C08G *18/38*
U.S. Cl. 260—77.5 AM **20 Claims**

1. In a process for the preparation of an anionic polyurethane by a process which comprises reacting a polyhydroxyl compound, polyisocyanate and chain extender, the improvement which comprises reacting a monomeric, aliphatic dihydroxyl compound having an aliphatic substituent with at least 10 carbon atoms with an organic polyisocyanate to form a preliminary adduct containing NCO end groups, extending the chain of the resulting preliminary adduct by reaction with a chain extender selected from the group consisting of (1) an aliphatic, monomeric diol containing an acid group which is capable of salt formation and (2) an aliphatic, monomeric diol containing a salt group and, when the chain extender is (1) reacting at least some of the acid groups with a basic compound to form a salt.

4,096,128

POLYURETHANE ELASTOMER PRODUCED BY REACTION BETWEEN A TRIAZOLE-STABILIZED ISOCYANATE PREPOLYMER AND A DIAMINE

Kurt C. Frisch, 17986 Parke La., Grosse Ile, Mich. 48138, and Adolfas Damusis, 25830 Forestview Dr., Southfield, Mich. 48034

Filed Mar. 3, 1977, Ser. No. 774,036
Int. Cl.[2] C08G *18/10*
U.S. Cl. 260—77.5 SS **7 Claims**

1. A method for producing a urethane elastomer from an isocyanate prepolymer and a diamine reactive therewith to produce the elastomer, said method comprising producing a stabilized prepolymer by mixing therewith while at a temperature sufficiently high that the prepolymer is a liquid, from 0.1 to 1.0 equivalent per equivalent of NCO in the prepolymer, of a triazole selected from the group consisting of 1,2,3-benzotriazole, 1,2,3-tolyltriazoles and mixtures thereof, with the proviso that the amount of triazole mixed with the prepolymer is sufficient to increase the pot life of a mixture of the prepolymer with the diamine but insufficient to cause substantial impairment of the physical properties of the cured elastomer, mixing a substantially equivalent amount of the diamine with the stabilized prepolymer, and heating the resulting composition to produce the elastomer.

4,096,129

GLUTARATE-CONTAINING POLYESTERPOLYOLS, METHODS OF PREPARATION AND POLYURETHANE COMPOSITIONS DERIVED THEREFROM

William H. Cook, Bloomfield Hills, Mich., assignor to Fabridyne, Inc., Bloomfield Hills, Mich.

Filed Oct. 6, 1975, Ser. No. 619,834
Int. Cl.[2] C08G *63/04, 18/32;* C09K *3/00*
U.S. Cl. 260—77.5 AN **57 Claims**

1. A method for preparing hydroxyl terminated neutral polyesters of glutaric acid by transesterification of a diloweralkyl ester of said acid and a polyol which comprises heating a mixture of said polyol and a di-ester of said acid and a volatile lower monohydric alkanol in the presence of a catalytic amount, up to about 150 ppm tin, of a stannous salt of a carboxylic acid and at a temperature and in proportions sufficient a) to effect substantially complete transesterification with substantially complete alcoholysis of said di-ester and with distillation of the thus liberated said lower alkanol and without substantial distillation of polyol and b) to destroy the activity of the catalyst for promoting the reaction of isocyanate with active hydrogen compounds.

12. A hydroxyl terminated neutral polyester having a dicarboxylic acid moiety of at least 4 and not more than 20 carbon atoms which comprises the glutaric acid moiety and the acid moiety of another dicarboxylic acid having from 4 to not more than 20 carbon atoms prepared by heating a polyol and diloweralkyl esters of said acids and volatile lower monohydric alkanols in the presence of a catalytic amount, up to 150 ppm tin, of stannous salt of a carboxylic acid at a temperature and in proportions sufficient to effect substantially complete transesterification with substantially complete alcoholysis of said diloweralkyl esters and with the distillation of the thus liberated said lower alkanols and without substantial distillation of polyol, said polyester being characterized by a residuum of tin which, due to the processing, no longer has the activity of a catalyst for promoting the reaction of isocyanate with active hydrogen compounds, and a residuum of carbalkoxy groups.

29. A polyurethane elastomer prepared by the chain extension of an isocyanate terminated polyester urethane prepared by reacting said urethane with a curative agent of the group consisting of 1) a hydroxyl terminated polyester urethane having an average molecular weight of less than about 6,000; 2) a solution of a lower molecular weight polyol or an aromatic diamine in a hydroxyl terminated polyester urethane having an average molecular weight of less than about 6,000; 3) a solution of lower molecular weight polyol or an aromatic diamine in a hydroxyl terminated polyester, the polyester moieties of the hydroxyl terminated polyester, the isocyanate terminated polyester urethane, and the hydroxyl terminated polyester urethane, which may have the same or different polyester moieties, being the moieties of those of hydroxyl terminated polyesters prepared by a) heating a polyol and a diloweralkyl ester of glutaric acid and a volatile monohydric alkanol or a mixture of said diloweralkyl ester of glutaric acid and another diloweralkyl ester of a dicarboxylic acid having at least 4 and not more than 20 carbon atoms and a volatile monohydric alkanol in the presence of a catalytic amount, up to 150 ppm tin, of a stannous salt of a carboxylic acid and at a temperature and in proportions sufficient to effect substantially complete

transesterification with substantially complete alcoholysis of said diloweralkyl ester and with the distillation of the thus liberated said lower alkanol and without substantial distillation of polyol, said polyester being characterized by a residuum of tin which, due to the processing, no longer has the activity of a catalyst for promoting the reaction of isocyanate with the active hydrogen compounds, and a residuum of carbalkoxy groups, or by b) chain extending the hydroxyl terminated polyester prepared as above, by heating it with a chain-extending amount of a chain extender selected from the group consisting of a dicarboxylic acid of at least 4 carbon atoms and not more than 20 carbon atoms, or an anhydride thereof, and epsiloncaprolactone at a temperature sufficient to distill off any water formed to cause chain extension; 4) said aromatic diamine per se; and 5) said lower molecular weight polyol per se.

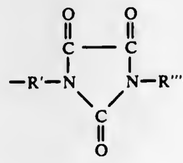
4,096,130

N,N'-SUBSTITUTED 2,4,5-TRIKETOIMIDAZOLIDINES, CORRESPONDING RESINOUS POLYMERS AND A PROCESS FOR THEIR PREPARATION

Kurt Kraft, Auringen, and Johannes Reese, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

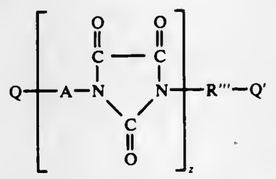
Continuation-in-part of Ser. No. 230,989, Mar. 1, 1972, Pat. No. 3,928,376, which is a continuation-in-part of Ser. No. 24,794, Apr. 1, 1970, abandoned. This application Jul. 3, 1975, Ser. No. 593,010
Claims priority, application Germany, Apr. 2, 1974, 1916932; Apr. 24, 1975, 1920845
Int. Cl.[2] C08G *18/38;* C07D *233/02;* C08K *5/34*
U.S. Cl. 260—77.5 CH **16 Claims**

1. A process for the preparation of a polymer compound containing a plurality of structural units of the formula



(II)

and having the formula



(Ic)

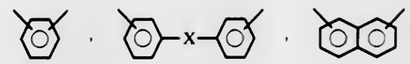
wherein one of Q and Q' are independently the group —NH—CO—OR^{IV} or hydrogen and the other —NH—CO—$COOR^{V}$ or hydrogen, a urethane or an isocyanate group; and wherein

R^{IV} and R^{V} are aliphatic hydrocarbon groups with up to 18 carbon atoms cycloaliphatic hydrocarbon groups with up to 8 carbon atoms, mononuclear aromatic hydrocarbon groups with 6 carbon atoms, or such mononuclear aromatic groups of 6 carbon atoms substituted with hydrocarbon groups having up to 14 carbon atoms,

R''' is an aromatic radical phenyl, naphthyl, phenylene, naphthylene that are unsubstituted or monosubstituted with nitro, halo, lower alkyl, lower alkoxy or haloalkyl, or an unsubstituted alkylene radical having up to 6 carbon atoms;

A is one of the radicals

I) R' which is



and that is unsubstituted or monosubstituted with lower alkyl, lower alkoxy, halo, nitro, or haloalkyl wherein X is a bond, CH_2, O, S or sulphonylene, and

II) R'''

and wherein the radicals being arranged between the imidazolidine rings in the chain always are alternatively R' derived from an oxamidic acid ester and R''' derived from an isocyanate and the various radicals R' and R''' in one chain have per se the same or a different meaning, wherein the radical A being bound to the terminal radical Q is always R',

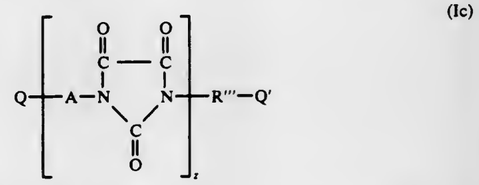
z is an integer from 3 to 70

and wherein at least one oxamidic acid ester with the grouping —NH—CO—CO—OR^{V}, wherein R^{V} is as defined, is reacted with an isocyanate or an isocyanate forming compound at temperatures of −20° to +280° C in the presence or absence of a catalyst in a ratio of

a. a diisocyanate:a bis-oxamidic ester of about (1 to 2):1 or

b. a diisocyanate:a bis-oxamidic ester of about (1 to 2):1 with a subsequent heating of the product at a temperature in the range from 200° to 250° C.

13. A process for the preparation of a compound of the general formula



(Ic)

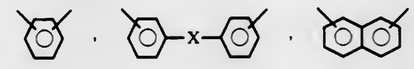
wherein one of C and Q' are independently the group —NH—CO—OR^{IV} or hydrogen and the other —NH—CO—$COOR^{V}$ or hydrogen, wherein

R^{IV} and R^{V} are aliphatic hydrocarbon groups with up to 18 carbon atoms, cycloaliphatic hydrocarbon groups with up to 8 carbon atoms, mononuclear aromatic hydrocarbon groups with 6 carbon atoms, or such mononuclear aromatic groups of 6 carbon atoms substituted with hydrocarbon groups having up to 14 carbon atoms, an urethane or an isocyanate group;

R''' is an aromatic radical phenyl, naphthyl, phenylene, naphthylene that are unsubstituted or monosubstituted with nitro, halo, lower alkyl, lower alkoxy or haloalkyl, or an unsubstituted alkylene radical having up to 6 carbon atoms,

A is one of the radicals

I) R' which is



and that is unsubstituted or monosubstituted with lower alkyl, lower alkoxy, halo, nitro, or haloalkyl wherein X is a bond, CH_2, O, S or sulphonylene, and

II) R'''

and wherein the radicals being arranged between the imidazolidine rings in the chain always are alternatively R' derived from an oxamidic acid ester and R''' derived from an isocyanate and the various radicals R' and R''' in one chain have per se the same or a different meaning,

wherein the radical A being bound to the terminal radical Q is always R',

z is 2,

and wherein at least one of A and R''' is a m-methylbenzothiazolyl radical which comprises reacting at least one oxamidic ester with the grouping —NH—CO—CO—OR^V with an isocyanate or a corresponding isocyanate-forming compound, and wherein the reaction components are at most bi-functional, at temperatures of −20° to +280° C in the presence or absence of a catalyst in a ratio of

a. a diisocyanate: a bis-oxamidic ester of about (1 to 2) : 1 or
b. a diisocyanate: a bis-oxamidic ester of about (1 to 2) : 1

with a subsequent heating of the product at a temperature in the range from 200° to 250° C.

4,096,131

ONE PACK POLYSULPHIDE SEALANTS

Norman O. Price, Warley; Harold Coates, Wombourne, and Christopher S. Ely, Warley, all of England, assignors to Albright & Wilson Limited, Worley, England

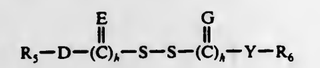
Filed Mar. 15, 1976, Ser. No. 666,908

Claims priority, application United Kingdom, Mar. 21, 1975, 11862/75; 11863/75; 11864/75

Int. Cl.^{2} C08F *28/00*

U.S. Cl. 260—79 **45 Claims**

1. A sealant composition which can be extruded and can be cured with moisture to give an elastomer, said composition comprising a fluid SH containing reaction product of (a) a silanized polysulphide which is the product of reacting under anhydrous conditions a polysulphide of formula HS $[(CH_2(R')_bCH_2S_a)_c(R''S_a)_d(SH)_f]$ $CH_2(R')_bCH_2SH$ where *a* is 1 - 5, *b* is 0 or 1, *c* is 5 - 50, *d* is 0 - 0.5c and $0.05c \geqq f \geqq d$, $1 > f$ which is *d* times (No. of free valencies in R'' - 2), R' is O, S or a divalent saturated organic radical consisting of carbon and hydrogen atoms and optionally O and/or S in COC, CS_aC or OH links, R'' is an at least trivalent saturated radical consisting of carbon and hydrogen atoms and optionally O and/or S in COC, CS_aC or OH links, with a silane of formula $Q_n SiX_{4-n}$ where *n* is 1 or 2, Q is a group capable of reacting under the reaction conditions with the SH groups of the polysulphide and at least two groups X are hydrolysable groups and the remaining group X (if any) is alkyl or chloroalkyl, the silane having 1 or 2 groups capable of reaction with SH, and the silane reacting with 3 - 30% of the SH groups of the polysulphide, and (b) a di sulphide of formula



where both *h* are 0 or both *h* are 1, and each of D and Y, which are the same or different, represents an — NR_7 group, each of E and G, which are the same or different, represents an oxygen or sulphur atom or an NR_8 group and each of R_5, R_6, R_7 and R_8 which are the same or different, represents a univalent aliphatic, cycloaliphatic or heterocyclic group, an aryl group of 6 - 13 carbon atoms, or an aralkyl group of 7 - 19 carbon atoms, a cycloaliphatic aliphatic group or a heterocyclic aliphatic group, or at least one pair of R_5 and R_7, R_6 and R_8, R_5 and R_8 or R_6 and R_8 together represent a divalent aliphatic group of 2 to 8 carbon atoms, an arylene group, a cycloalkylene group, arylalkylene group, cycloalkylalkylene group or a divalent aliphatic group of 2 to 8 carbon atoms, which is interrupted by an oxygen or sulphur atom in an ether or thioether linkage respectively, or by an imino group of formula NR_9 where R_9 is hydrogen or an alkyl, aralkyl or aryl group, or, when both *h* are 1, each of D and Y, which are the same or different, may be an oxygen or sulphur atom, the product of multiplying the molar fraction of disulphide to polysulphide by the molecular weight of the polysulphide is 200 - 3500, and the reaction of said silanized polysulphide and said disulphide having been carried out at a temperature and for a time until the disulphide disappears.

4,096,132

PRODUCTION OF P-PHENYLENE SULFIDE POLYMERS

James T. Edmonds, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 27, 1975, Ser. No. 581,344

Int. Cl.^{2} C08F *28/00*

U.S. Cl. 260—79.1 **12 Claims**

1. In a method for producing polymers by:

a. forming a composition consisting essentially of at least one p-dihalobenzene, at least one alkali metal sulfide, at least one alkali metal carboxylate, and at least one organic amide, and
b. maintaining at least a portion of said composition at polymerization conditions to produce a polymer, the improvement of admixing at least one alkali metal hydroxide into said composition of (a) thereby effectively lowering the melt flow of the polymer produced.

4,096,133

METHOD FOR QUATERNIZING POLYMERS OF WATER-SOLUBLE AMINOVINYL MONOMERS

Maurice L. Zweigle, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 618,650, Oct. 1, 1975. This application Feb. 28, 1977, Ser. No. 772,872

The portion of the term of this patent subsequent to May 17, 1994, has been disclaimed.

Int. Cl.^{2} C08F *8/44*

U.S. Cl. 260—79.3 R **14 Claims**

1. In a method for the preparation of an inherently water-dispersible polyquaternary-ammonium derivative of an amine polymer wherein a quaternizing agent is reacted with a inherently water-dispersible polymer having a polyethylenic backbone and a plurality of pendant tertiary amino groups in an aqueous medium, the improvement which comprises adjusting the aqueous medium to a pH of about 7 or less and incorporating therein a catalytic amount of a water-soluble alcohol and contacting said medium with the quaternizing agent.

4,096,134

ETHYLSULFONATE-ALKYLAMINE COPOLYMERS AS COLORANT BACKBONES

Kenneth Melvin Otteson, and Daniel Joseph Dawson, both of Menlo Park, Calif., assignors to Dynapol, Palo Alto, Calif.

Filed Dec. 8, 1975, Ser. No. 638,731

Int. Cl.^{2} C08F *28/00*; C08G *75/00*

U.S. Cl. 260—79.5 R **16 Claims**

1. A copolymer consisting essentially of a plurality of ethylsulfonate and 2 to 6 carbon atom lower alkylamine groups, the sum of the number of ethylsulfonate groups and lower alkylamine groups being from 20 to 8000 and the number of lower alkylamine groups being from 0.4 to 2.5 times the number of ethylsulfonate groups.

4,096,135

VULCANIZED PRODUCT OF TERPOLYMER AND PROCESS FOR PREPARATION THEREOF

Tetsu Ohishi, Tokyo, and Hiroshi Fukushima, Zushi, both of Japan, assignors to Nippon Zeon Co. Ltd., Tokyo, Japan

Filed Jan. 21, 1975, Ser. No. 542,794

Claims priority, application Japan, Jan. 24, 1974, 49-10387

Int. Cl.^{2} C08F *28/00*

U.S. Cl. 260—79.5 B **4 Claims**

1. A vulcanized product of an acrylonitrile/butadiene-1,3/2-methyl butadiene-1,3 terpolymer comprising 15 to 45% by weight of combined acrylonitrile and 85 to 55% by weight of combined diene, said diene consisting of 65 to 95% by weight of combined butadiene-1,3 and 35 to 5% by weight of combined 2-methyl butadiene-1,3.

4,096,136

METHOD OF SELECTIVELY REMOVING LIPOPROTEIN FROM BLOOD PLASMA OR SERUM USING SULFATED CARBOHYDRATE ION-EXCHANGERS

John Stephen Ayers, 45 Pahiatua St., and David Roderick Husbands, 73 Church St., both of Palmerston North, New Zealand

Filed Mar. 1, 1977, Ser. No. 773,270

Claims priority, application New Zealand, Mar. 4, 1976, 180199

Int. Cl.^{2} C07G *7/00*

U.S. Cl. 260—112 B **17 Claims**

1. A method of selectively removing lipoproteins from blood plasma or serum which comprises the steps:

a. adjusting the divalent cation concentration of a sample of blood plasma or serum to between 0.05 and 1.0M;
b. associating said sample with a cationic ion exchanger comprising a water insoluble, hydrophilic, water swellable matrix; a plurality of sulphate groups being chemically bonded to said matrix, the ion exchange capacity of said exchanger being provided by said sulphate groops; said matrix being a member selected from the group consisting of a cross-linked carbohydrate and a cross-linked carbohydrate substituted with hydroxy C_2–C_4 alkyl groups; and,
c. recovering lipoproteins bound to said exchanger or recovering the blood serum or plasma residue from which only lipoproteins have been extracted or recovering both said extracted lipoproteins and said serum or plasma residue.

4,096,137

GELATIN HARDENING AGENTS

Hidefumi Sera, and Kameji Nagao, both of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

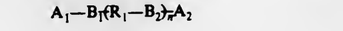
Filed Jul. 2, 1976, Ser. No. 702,321

Claims priority, application Japan, Jul. 4, 1975, 50-82443

Int. Cl.^{2} C09H *7/00*; G03C *1/30*

U.S. Cl. 260—117 **6 Claims**

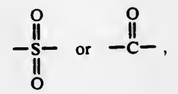
1. A method of hardening gelatin or a gelatin derivative which comprises adding thereto 0.05% to 10% by weight based on dry weight of the material to be hardened of a hardening agent represented by the following formulae (I) or (II):



(I)

(II)

wherein A_1 and A_2 each represents a azole group which is linked to B_1 or B_2 by a nitrogen atom, wherein said azole group is a 5-membered ring having 2 or 3 nitrogen atoms and a conjugated system, which may include a fused ring, B_1 and B_2 each represents



R_1 represents a divalent group selected from the group consisting of branched or cyclic alkylene groups wherein a portion of the carbon atoms thereof can be replaced by oxygen or nitrogen atoms and arylene groups having 6 to 10 carbon atoms, unsubstituted or substituted by lower alkyl, alkoxy, halogen, carboxyl or sulfoxy groups, R_2 represents a trivalent group selected from the group consisting of hydrocarbon groups having 3 to 15 carbon atoms wherein a portion of the carbon atoms can be replaced by oxygen or nitrogen atoms, and *n* represents 0 or 1.

4,096,138

IMMUNOLOGICAL TEST PROCEDURE

George H. Scherr, 50 Monee Rd., Park Forest, Ill. 60466

Filed Dec. 8, 1975, Ser. No. 638,548

Int. Cl.^{2} A23T *1/06*; C07G *7/00*

U.S. Cl. 260—121 **15 Claims**

1. The method of aggregating aqueous soluble macromolecules containing co-valently linked immunologically reactive functional groups which comprises cross-linking the macromolecules with a cross-linking agent to result in aqueous insoluble particles which particles can be utilized in an immunological agglutination reaction with antibodies specific for the reactive functional groups.

4,096,139

AZOCOUMARINIC-TYPE DYES FOR THE DISPERSE DYEING OF TEXTILE FABRICS

Ruggero Battisti, Novara, and Camillo Paffoni, Pogno (Novara), both of Italy, assignors to Montedison S.p.A., Milan, Italy

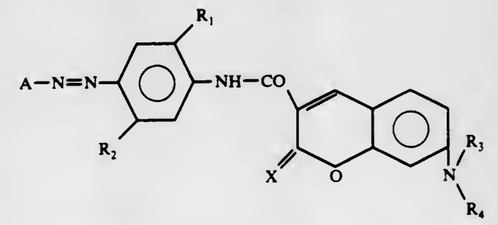
Filed Jul. 27, 1976, Ser. No. 709,089

Claims priority, application Italy, Jul. 31, 1975, 25962/75

Int. Cl.^{2} C09B *43/00, 43/12*; D06P *1/18, 3/85*

U.S. Cl. 260—152 **13 Claims**

1. An azoic dye having the general formula:



wherein: A is an aromatic radical of the benzene class which has been substituted with at least one group selected from among alkyl, alkoxyl, N-dialkylamine, halogen, cyano and nitro,

X is selected from the group consisting of NH and O;
R_1 is selected from the group consisting of H, CH_3, OCH_3 and Cl;
R_2 is selected from the group consisting of H, CH_3, OCH_3, and Cl;
R_3 is selected from the group consisting of CH_3 and C_2H_5;
R_4 is the same as R_3.

4,096,140

5-AMINO OR SUBSTITUTED AMINO-7-PHENYL OR SUBSTITUTED PHENYL-2,3-DIHYDRO-1H-1,4-DIAZEPINES

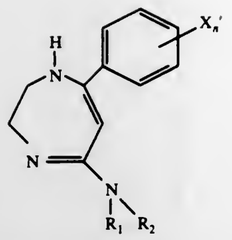
William R. Simpson, Mendham, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 528,344, Nov. 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 456,017, Mar. 29, 1974, Pat. No. 3,929,884. This application Sep. 22, 1976, Ser. No. 725,440

Int. Cl.^{2} C07D *243/06*; A61K *31/55*

U.S. Cl. 260—239 BC **32 Claims**

1. A compound of formula



wherein R_1 is hydrogen, alkyl of 1 to 6 carbon atoms or amino,
R_2 is hydrogen or alkyl of 1 to 6 carbon atoms, with the provisos that (1) at least one of R_1 and R_2 is not a tertiary alkyl group and (2) R_2 is hydrogen when R_1 is amino,
each X' is independently alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or halo, or two X's on adjacent carbon atoms together are methylenedioxy, and
n is 0, 1, 2 or 3,
or a pharmaceutically acceptable acid addition salt thereof.

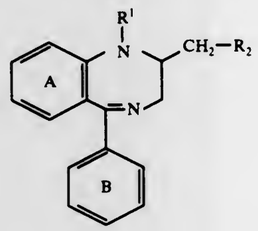
4,096,141

PROCESS FOR MAKING BENZODIAZEPINE DERIVATIVES

Wolfgang Milkowski, Burgdorf; Renke Budden, Peine; Siegfried Funke, Hannover; Rolf Hüschens, Hannover; Hans-Günther Liepmann, Hannover; Werner Stilhmer, Eldagsen, and Horst Zeugner, Hannover, all of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

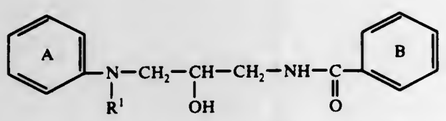
Division of Ser. No. 355,986, May 1, 1973, Pat. No. 3,998,809. This application May 12, 1976, Ser. No. 685,537
Claims priority, application Germany, May 3, 1972, 2221558
Int. Cl.[2] C07D *243/16*
U.S. Cl. 260—239 BD **4 Claims**

1. The process of making benzodiazepine derivatives of the formula



I

wherein
R^1 is hydrogen, methyl, ethyl, isopropyl, butyl, sec.-butyl, tert.-butyl, amyl, hexyl, cyclopentyl, cyclohexyl, cyclopropylmethyl, benzyl or 2-chloroethyl,
R^2 is chloro or bromo,
A and B are, independently of each other, unsubstituted or substituted by up to 2 substituents selected from the group consisting of nitro, trifluoromethyl, halogen, alkyl of up to 4 carbon atoms and alkoxy of up to 4 carbon atoms, or a pharmaceutically acceptable acid addition salt of said benzodiazepine derivative of formula I, the said process comprising
A. subjecting an acyldiamine of the formula



werein A, B and R^1 have meaning as above, or an acid addition salt of said acyldiamine, at a temperature between 110° and 130° C to the action of a phosphorus oxyhalide as cyclization agent whereby a compound of the formula I is obtained, and B optionally converting said compound of formula I to a pharmaceutically acceptable acid addition salt thereof.

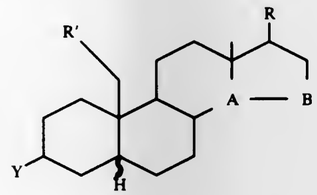
4,096,142

14,19-DIOXYGENATED STEROID COMPOUNDS AND THEIR 14-DEHYDRO ANALOGS AND PROCESS FOR THE PREPARATION THEREOF

Gunther Kruger, St. Laurent, Canada, assignor to Steele Chemicals Co. Ltd., Pointe Claire, Canada

Continuation-in-part of Ser. No. 215,669, Jan. 5, 1972, Pat. No. 3,849,402, and Ser. No. 497,730, Aug. 15, 1974, abandoned. This application Aug. 30, 1976, Ser. No. 718,921
Claims priority, application Canada, Jan. 4, 1972, 131673
Int. Cl.[2] C07J *71/00*
U.S. Cl. 260—239.55 R **18 Claims**

1. A compound of the formula



wherein R is o-pivalate or >-o-pivalate, R' is chosen from OH, O-acyl, =O, A-B is chosen from C(β-OH)-CH_2; C=CH;

and C(β-OH)-CHBr; and Y is chosen from O-acyl, =O, OH, H and O-tetrahydropyranyl ether, wherein acyl is chosen from formyl, acetyl, trimethyl acetyl and triethyl acetyl, and the Δ4, Δ5, Δ6, Δ7, Δ8 (9) dehydro analogues thereof.

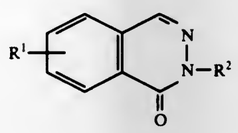
4,096,143

PROCESS FOR PRODUCING PHTHALAZINONE AND DERIVATIVES OF THE SAME

Hideo Sato; Seiji Horie; Nobuyoshi Sekikawa, and Hisatake Ono, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Jul. 21, 1976, Ser. No. 707,737
Claims priority, application Japan, Jul. 21, 1975, 50-89009
Int. Cl.[2] C07D *237/32*
U.S. Cl. 544—237 **20 Claims**

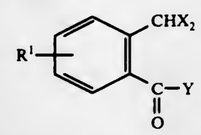
1. A process for producing a 1-phthalazinone represented by the following formula:



(I)

wherein
- R^1 represents a hydrogen atom; alkyl having 1 to 12 carbon atoms; aralkyl having a C_1 to C_{12} carbon alkyl substituted with phenyl; acyloxyl having 1 to 12 carbon atoms which may be substituted with phenyl; alkoxyl having 1 to 12 carbon atoms which may be substituted with phenyl; a halogen atom; a nitro group; an amino group; or an amido group, and
- R^2 represents a hydrogen atom; alkyl having 1 to 12 carbon

atoms; aralkyl having a C_1 to C_{12} carbon alkyl substituted with phenyl; or phenyl which may be substituted with alkyl having 1 to 4 carbon atoms, a halogen atom, a nitro group, an amino group or alkoxyl having 1 to 4 carbon atoms; by reacting in an organic solvent a benzoic acid derivative represented by the following formula:



(II)

wherein R^1 has the same meanings as defined above; X represents a halogen atom; and Y represents hydroxyl; alkoxyl having 1 to 4 carbon atoms; or a halogen atom; with a hydrazine represented by the following formula:

$$R^2\text{-}NH\text{-}NH_2 \quad \text{(III)}$$

wherein R^2 has the same meaning as defined above.

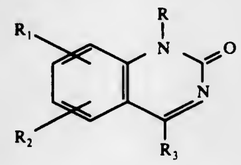
4,096,144

PROCESS FOR PREPARING QUINAZOLINONE DERIVATIVES AND THEIR 2-(N-MONO-SUBSTITUTED AMINO)-PHENYL KETONE INTERMEDIATE DERIVATIVES

Michihiro Yamamoto, Toyonaka; Masao Koshiba; Shigeho Inaba, both of Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

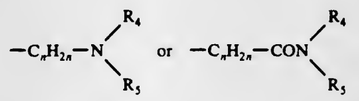
Continuation of Ser. No. 203,049, Nov. 29, 1971, abandoned. This application Jul. 1, 1975, Ser. No. 592,241
Claims priority, application Japan, Dec. 8, 1970, 45-109975
Int. Cl.[2] C07D *239/82; C07C 97/10*
U.S. Cl. 544—284 **9 Claims**

1. A process for producing quinazoline derivatives represented by the formula,

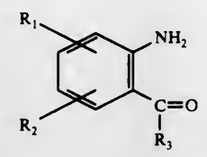


(I)

wherein R_1 and R_2 are individually a hydrogen atom, a C_1-C_4 alkyl group, a C_1-C_4 alkoxy group, a nitro group, a trifluoromethyl group, a C_1- C_4 alkylthio group, a $C_{1\text{-}C4}$ alkylsulfonyl group or a halogen atom; R_3 is a phenyl group, a halophenyl group, a C_1-C_4 alkylphenyl group, a C_1- C_4 alkoxyphenyl group, a trifluoromethylphenyl group, a C_3-C_6 cycloalkyl group, a C_5-C_6 cycloalkenyl group, a pyridyl group, a furyl group, a thienyl group or a naphthyl group; and R is a C_1-C_4 alkyl group, a C_2-C_4 alkenyl group, a C_1-C_4 haloalkyl group, a benzyl, phenethyl, chlorobenzyl or fluorobenzyl group, a C_3-C_6 cycloalkyl group, a C_3-C_6 cycloalkyl C_1-C_4 alkyl group, a C_1-C_4 alkoxy C_1-C_4 alkyl group, a C_1-C_4 hydroxyalkyl group, a C_1-C_4 alkanoyloxy C_1-C_4alkyl group, a trihalomethyl C_1-C_4 alkyl group, a C_1-C_4 alkylthioalkyl group or a group of the formula

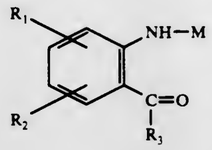


(wherein n is an integer of 1 to 3; R_4 and R_5 are individually a C_1-C_4 alkyl group provided that R_4 and R_5 may form together with the adjacent nitrogen atom an unsubstituted or optionally substituted 5-or 6-membered heterocyclic ring, which may further contain a hetero atom), which comprises contacting a 2-aminophenyl ketone derivative represented by the formula,



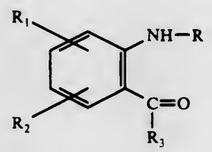
(II)

wherein R_1, R_2 and R_3 are as defined above, with an alkali metal hydride to form a metal salt of 2-aminophenyl ketone derivative represented by the formula,



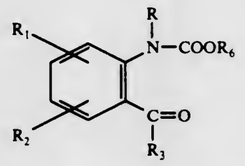
(III)

wherein R_1, R_2 and R_3 are as defined above; and M is an alkali metal atom, thereafter reacting the resultant metal salt of the formula (III) with a compound of the formula RX where R is as defined above and X is halogen to prepare a 2-(N-mono-substituted amino) phenyl ketone derivative represented by the formula,



(V)

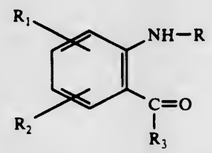
wherein R_1, R_2, R_3 and R are as defined above, and then, reacting the compound of the formula (V) with a lower alkyl haloformate or a benzyl haloformate to yield a carbamate derivative represented by the formula,



(VI)

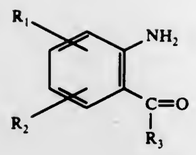
wherein R_1, R_2, R_3 and R are as defined above; and R_6 is a C_1-C_4 alkyl group or a benzyl group, and finally reacting the compound of the formula (VI) with ammonia.

2. A process for producing 2-(N-mono-substituted amino)-phenyl ketone derivatives represented by the formula,



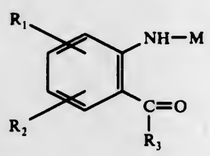
(V)

wherein R_1, R_2, R_3 and R are as defined in claim 1, which comprises contacting a 2-aminophenyl ketone derivative represented by the formula,



(II)

wherein R_1, R_2 and R_3 are as defined in claim 1, with an alkali metal hydride to form a metal salt of 2-aminophenyl ketone derivative represented by the formula,



(III)

wherein R_1, R_2, R_3 and M are as defined in claim 1, and reacting the resultant metal salt of the formula (III) with a compound of the formula RX where R is as defined above and X is halogen.

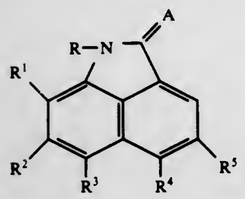
4,096,145

NAPHTHOLACTAM DERIVATIVES

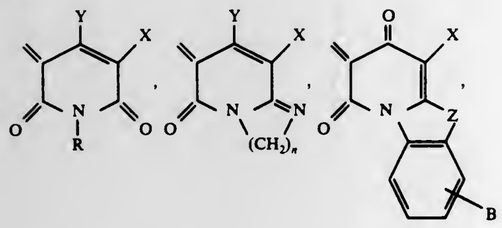
Ernst Schefczik, Ludwigshafen, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Germany

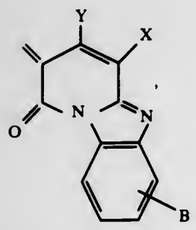
Filed Mar. 14, 1977, Ser. No. 776,943
Claims priority, application Germany, Mar. 19, 1976, 2611665
Int. Cl.[2] C07P *1/384;* C07D *401/04, 471/04*
U.S. Cl. 260—281 GN **13 Claims**

1. A compound of the formula

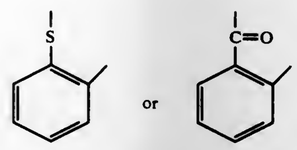


where A is



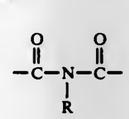


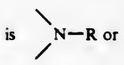
n is 2, R is hydrogen, alkyl of 1 to 12 carbon atoms, hydroxyalkyl of 2 or 3 carbon atoms, alkoxyalkyl of 3 to 8 carbon atoms, β-chloroethyl, β-cyanoethyl, C_1 to C_4 alkoxycarbonylethyl, carbamoylethyl, N-mono- or N-di-alkylcarbamoylethyl, where alkyl is of 1 to 4 carbon atoms, cyclohexyl, benzyl, phenylethyl or phenyl, R^1 is hydrogen, chlorine, bromine, methyl, ethyl, methoxy, ethoxy, nitro and phenylmercapto, or phenylmercapto substituted by chlorine, methyl or methoxy, R^2 is hydrogen or chlorine, R^3 is hydrogen, chlorine, bromine, methyl, ethyl, methoxy, ethoxy, phenoxy and nitro, alkanoylamino of 1 to 4 carbon atoms, benzoylamino, alkylsulfonylamino of 1 to 4 carbon atoms, phenylsulfonylamino, tolylsulfonylamino, alkylmercapto of 1 to 4 carbon atoms, phenylmercapto or phenylmercapto substituted by chlorine, methyl or methoxy, alkylsulfonyl of 1 to 4 carbon atoms, phenylsulfonyl, tolylsulfonyl, sulfamoyl which is unsubstituted or is monosubstituted or disubstituted by alkyl of 1 to 8 carbon atoms, hydroxyalkyl of 2 or 3 carbon atoms, alkoxyalkyl of a total of 3 to 11 carbon atoms, β-cyanoethyl, β-chloroethyl, cyclohexyl, phenylalkyl (where alkyl is of 1 to 4 carbon atoms) or phenyl, sulfopiperidide, sulfopyrrolidide, sulfomorpholide, alkanoyl of 1 to 4 carbon atoms, chloroacetyl, β-chloropropionyl, benzoyl or benzoyl substituted by chlorine, methyl or methoxy, R^4 is hydrogen, chlorine, methoxy, ethoxy, alkylmercapto of 1 to 4 carbon atoms or phenylmercapto or phenylmercapto substituted by chlorine, methyl or methoxy, R^3 and R^4 together are



or

R^5 is hydrogen, chlorine, methoxy or ethoxy, B is hydrogen, methyl, methoxy or chlorine, X is cyano, carbamoyl or CONHR, Y is hydrogen, hydroxyl, alkyl of 1 to 4 carbon atoms, chlorine, bromine, C_1 to C_4 alkoxycarbonyl or CONHR, or X and Y together are



and Z is  or —S—.

and Z is >N-R.

4,096,146

4-[5(R)-ALKYL(OR ALKENYL)-4(S)-QUINUCLIDIN-2(S) OR 2(R)-YLCARBONYL]-QUINOLINES, ANTIPODES OR RACEMATES THEREOF AND PROCESSES FOR THEIR PREPARATION

Juerg Albert Walter Gutzwiller, Bettingen, Switzerland, and Milan Radoje Uskokovic, Upper Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 354,839, Apr. 26, 1973, abandoned, which is a division of Ser. No. 212,648, Dec. 27, 1971, Pat. No. 3,753,992, which is a continuation-in-part of Ser. No. 104,785, Jan. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 837,304, Jun. 27, 1969, abandoned, which is a continuation-in-part of Ser. No. 741,913, Jul. 2, 1968, abandoned. This application Aug. 20, 1975, Ser. No. 606,252
Int. Cl.[2] C07D *453/04*
U.S. Cl. 260—284 **4 Claims**

1. Racemic-6'-chloro-dihydrocinchoninone.

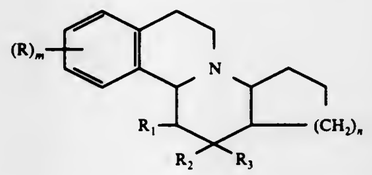
4,096,147

SUBSTITUTED AZASTEROIDS

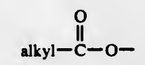
Charles Andrew Lundberg, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Continuation-in-part of Ser. No. 350,390, Apr. 12, 1973, abandoned. This application May 2, 1975, Ser. No. 574,101
Int. Cl.[2] C07D *455/06*
U.S. Cl. 260—287 AZ **17 Claims**

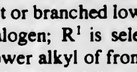
1. A compound selected from the formula



wherein R is selected from hydrogen, hydroxy, halogen, trifluoromethyl, straight or branched lower alkyl of from 1 to 6 carbon atoms, straight or branched lower alkoxy of from 1 to 6 carbon atoms,

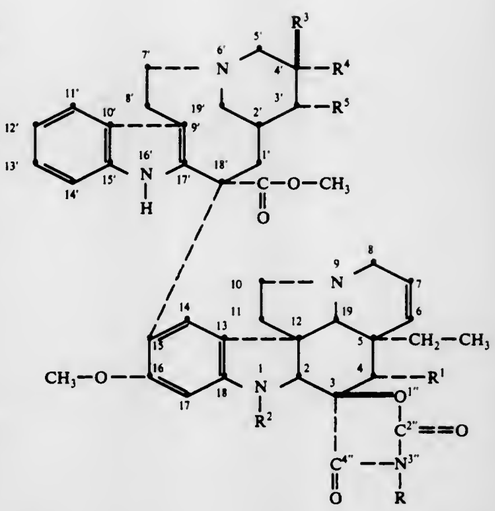


wherein the alkyl moiety has from 1 to 6 carbon atoms and may be straight or branched, alkoxycarbonyloxy, carbamoyloxy, benzoyloxy and benzoyloxy mono-, di- or tri-substituted with straight or branched lower alkyl of from 1 to 6 carbon atoms, straight or branched lower alkoxy of from 1 to 6 carbon atoms or halogen; R^1 is selected from hydrogen, straight or branched lower alkyl of from 1 to 6 carbon atoms, phenyl and benzyl; R^2 is selected from hydrogen, straight or branched lower alkyl of from 1 to 6 carbon atoms, ethynyl, ethynyl substituted with straight or branched lower alkyl of from 1 to 6 carbon atoms, phenyl, benzyl, 2-phenethyl, mono-, di- or tri- substituted phenyl, mono-, di- or tri- substituted benzyl and mono-, di- or tri- substituted 2-phenethyl wherein the substituents are on any position of the aromatic ring and are selected from straight or branched lower alkyl of from 1 to 6 carbon atoms, straight or branched lower alkoxy of from 1 to 6 carbon atoms and halogen; R^3 is selected from hydroxy,

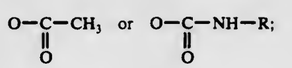


alkoxycarbonyloxy, carbamoyloxy, benzoyloxy and benzoyloxy mono-, di- or tri- substituted with straight or branched lower alkyl of from 1 to 6 carbon atoms, straight or branched lower alkoxy of from 1 to 6 carbon atoms or halogen; m is an integer of 1 or 2; n is an integer of from 1 to 3; and pharmaceutically acceptable acid addition salts thereof.

I



wherein R is H, C_1-C_4 alkyl, C_3-C_4 alkenyl, CH_2—CHX—CH_3 or CH_2—CH_2X;
wherein
X is Br or Cl;
R^1 is OH,



R^2 is H, CH_3 or CHO;
one of R^3 and R^4, when taken singly, is H or OH and the other C_2H_5;
R^5, when taken singly, is H;
and R^4 and R^5, when taken together, form an epoxide; and pharmaceutically-acceptable salts thereof.

4,096,148

OXAZOLIDINEDIONE DERIVATIVES OF VINCA ALKALOIDS

Jean C. Miller, and Gerald E. Gutowski, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 6, 1976, Ser. No. 747,575
Int. Cl.[2] C07D *519/04*
U.S. Cl. 260—287 B **7 Claims**

1. A compound of the formula

4,096,149

HYDROLYSIS OF NITRILES

Julian Feldman, and David W. Smith, both of Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Nov. 5, 1974, Ser. No. 521,014
Int. Cl.[2] C07D *213/57;* C07C *103/127, 103/133, 103/22*
U.S. Cl. 260—295.5 A **13 Claims**

1. In a method for the catalytic hydrolysis of nicotinonitrile or a nitrile of the formula RCN wherein R is an alkyl, alkenyl, cycloalkyl, aryl or alkaryl radical of 1–20 carbon atoms or said radical substituted by halogen, nitro, hydroxy, benzoyl, acetyl or cyano groups to the corresponding amide, the improvement which comprises employing as the catalyst, an effective catalytic amount of the reaction product of rhodium trichloride and a trialkyltrithiophosphite supported on a solid support selected from the group consisting of carbon, alumina, diatomaceous earth, silica, silica-magnesia, silica-alumina, zirconia, molecular sieves, organic cation exchange resins, chelating resins and ligand functionalized polymers.

4,096,150

PROCESS FOR MANUFACTURE OF TERTIARY AMINES

Jean Berthoux; Yvonick Chevallier, both of Decines, and Jacques-Pierre Martinaud, Lyons, all of France, assignors to Rhone-Progil, Courbevoie, France

Filed Dec. 3, 1973, Ser. No. 420,976
Claims priority, application France, Dec. 20, 1972, 72.46270
Int. Cl.² C07D *211/02*
U.S. Cl. 260—293.52 **8 Claims**

1. A process for the manufacture of a substituted amine comprising:

reacting at least one olefin, carbon monoxide, hydrogen and at least one secondary amine, under partial pressures of hydrogen and carbon monoxide from 10 to 120 bars, at a temperature from 60° to 250° C for a reaction time from 10 minutes to 10 hours,

in the presence of a catalyst constituted by a coordination complex of a metal of Group VIII containing at least one of the following ligands: aliphatic, aromatic, arylaliphatic phosphites, hexamethylphosphorotriamide, aliphatic and cyclic ethers, primary, secondary and tertiary amines, heterocyclic bases, disulphides, heterocycles containing sulfur or ligands including several donor atoms containing sulfur and oxygen, oxygen and nitrogen, or sulfur and nitrogen;

wherein the chain added to said secondary amine has one more carbon atom than said olefin.

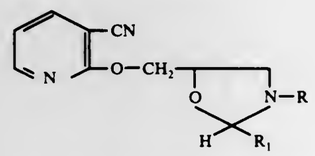
4,096,151

CERTAIN 3-CYANOPYRIDINE INTERMEDIATES

John J. Baldwin, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 533,385, Dec. 16, 1974, Pat. No. 4,000,282. This application Aug. 11, 1976, Ser. No. 713,558
Int. Cl.² C07D *213/57*
U.S. Cl. 260—294.9 **8 Claims**

1. A compound having the formula



wherein R is tert. butyl or isopropyl and R_1 is an aldehyde residue.

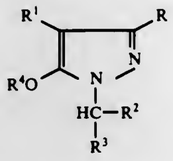
4,096,152

PYRAZOLE DERIVATIVES

Eike Moller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 532,311, Dec. 13, 1974, Pat. No. 4,002,641. This application Oct. 6, 1975, Ser. No. 619,891
Claims priority, application Germany, Dec. 20, 1973, 2363511
Int. Cl.² C07D *261/10, 263/34*
U.S. Cl. 260—307 H **9 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable nontoxid salt thereof wherein R is hydrogen or lower alkyl;

R^1 is hydrogen or lower alkyl;

R^2 is lower alkyl;

R^3 is phenyl substituted by:

(a) one or two of the same or different non-sterically hindering substituents trifluoromethyl, alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 8 carbon atoms, and alkoxy of 1 to 6 carbon atoms;

(b) one substituent selected from the group consisting of cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms and nitro;

(c) one substituent selected from the group consisting of cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms and nitro and one or two non-sterically hindering substituents selected from the group consisting of alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 8 carbon atoms, alkoxy of 1 to 6 carbon atoms, halogen and trifluoromethyl; or

R^3 is naphthyl; and

R^4 is R^5CO wherein R^5 is [a 5- to 7-membered heterocyclic ring having 1 or 2 heteroatoms selected from the group consisting of N, S and O,] oxazolyl or isoxazolyl unsubstituted or substituted by alkyl of 1 to 4 carbon atoms.

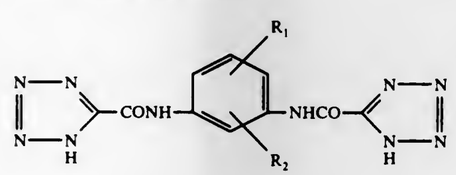
4,096,153

ARYLENE-BIS-TETRAZOLE-5-CARBOXAMIDES

John H. Sellstedt, Pottstown, and Dieter H. Klaubert, West Chester, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Jan. 21, 1977, Ser. No. 761,501
Int. Cl.² C07D *257/04*
U.S. Cl. 260—308 D **5 Claims**

1. A compound of the formula:



in which

R_1 and R_2 are , independently, hydrogen, cyano, trifluoromethyl, halo, nitro, lower alkanoyl, lower alkoxy or carbamoyl

or a pharmaceutically acceptable salt thereof.

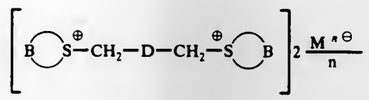
4,096,154

PROCESS FOR THE MANUFACTURE OF COMPOUNDS CONTAINING VINYL GROUPS

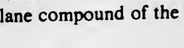
Hermann Rempfler, Binningen; Hans Bosshard, and Kurt Weber, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 374,142, Jun. 27, 1973, Pat. No. 4,016,203. This application Apr. 5, 1976, Ser. No. 673,316
Claims priority, application Switzerland, Jun. 30, 1972, 9852/72; Jun. 30, 1972, 9853/72
Int. Cl.² C07O *327/00;* A01N *9/00*
U.S. Cl. 260—327 R **6 Claims**

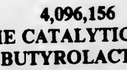
1. Process for the manufacture of sulphonium salts of the formula



wherein the two B's independently of one another represent a polymethylene ring with 4 to 7 methylene groups and can be substituted by alkyl groups with 1 to 4 carbon atoms, D denotes 4,4'-diphenylylene, 1,5- or 2,6-naphthylene, or a 9,10-dihydrophenanthrene, or a dibenzofurane radical which is bonded to the $-CH_2-$ groups in the 2,7-position, which comprises reacting a compound of the formula



wherein X denotes halogen or a



group, wherein X_1 represents an aliphatic, cycloaliphatic or aromatic hydrocarbon radical, especially alkyl having 1 to 6 carbon atoms or phenyl, and D has the meaning indicated above, in a strongly acid medium at a temperature of about −20° C to 120° C and in a molar ratio of at least 1:2, with an organic sulphide of the formula

wherein B has the given meaning and M represents the anion of the strong acid and *n* denotes the number 1 or 2.

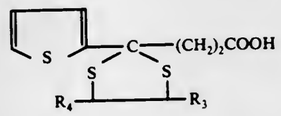
4,096,155

1,3-DITHIOLANE COMPOUNDS AND METHOD OF PREPARATION THEREOF

William Henry Gastrock, Highstown, and Goro Asato, Titusville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 720,163, Sep. 2, 1976, Pat. No. 4,075,228. This application May 23, 1977, Ser. No. 799,887
Int. Cl.² C07D *333/24*
U.S. Cl. 260—332.2 A **2 Claims**

1. A 1,3-dithiolane compound of the formula:



where R_3 and R_4 are each hydrogen or methyl.

4,096,156

PROCESS FOR THE CATALYTIC MANUFACTURE OF γ-BUTYROLACTONE

Dieter Freudenberger, Hofheim, Taunus; Friedrich Wunder, Florsheim, Main, and Hans Fernholz, Fischbach, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Nov. 23, 1976, Ser. No. 744,320
Claims priority, application Germany, Nov. 29, 1975, 2553761
Int. Cl.² C07D *307/32*
U.S. Cl. 260—343.6 **17 Claims**

1. A process for the manufacture of γ-butyrolactone by catalytic hydrogenation which comprises reacting maleic acid, maleic acid anhydride, succinic acid, succinic acid anhydride, fumaric acid, or a combination thereof, with hydrogen in the presence of a hydrogenation catalyst which contains one or more materials selected from the group consisting of silver, gold and the compounds thereof and a material selected from the group consisting of ruthenium, rhodium, palladium, osmium, iridium, platinum, and the compounds thereof.

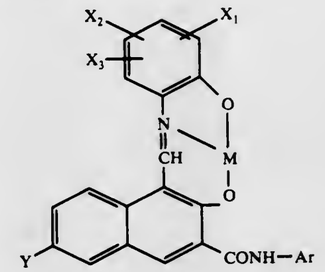
4,096,157

AZAMETHINE METAL COMPLEX COMPOUNDS

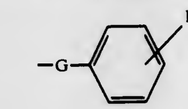
Klaus Hunger, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 607,999, Aug. 26, 1975, abandoned. This application Sep. 23, 1976, Ser. No. 725,837
Claims priority, application Germany, Aug. 28, 1974, 2441092
Int. Cl.² C07F *1/08*
U.S. Cl. 260—438.1 **9 Claims**

1. A compound of the formula



wherein X_1, X_2 and X_3, which are identical or different, are hydrogen, halogen, lower alkyl, lower alkoxy, phenyl, tolyl, nitro, lower carboalkoxy, sulfonamide, lower mono- or dialkyl sulfonamide, carbamoly, lower mono- or dialkyl carbamoyl, lower alkanoyl or a group of the formula



wherein G is —NHCO—, $-SO_2NH-$ or —CONH— and R is hydrogen, chlorine, lower alkyl, lower alkoxy, sulfonamide or carbamoyl, Y is hydrogen, chlorine or bromine; Ar is naphthyl, phenyl or phenyl substituted by 1 to 3 equal or different substituents selected from lower alkyl, lower alkoxy, lower alkylsulfonyl, lower carboalkoxy, trifluoromethyl, nitro, cyano, lower alkanoylamino, benzoylamino, carbamoyl, lower mono- or dialkyl carbamoyl, sulfonamide, lower mono- or dialkyl sulfonamide and halogen; and M is zinc, cadmium, cobalt, nickel or copper.

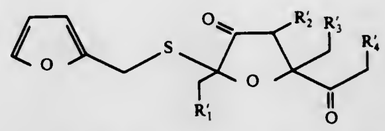
4,096,158

PROCESS FOR PREPARING 5-ACYL-2-(FURFURYLTHIO)DIHYDRO-2,5-DIALKYL-3-[2H]FURANONES

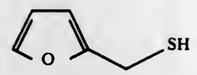
William John Evers, Middletown, and Braja Dulal Mookherjee, Holmdel, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Jul. 28, 1977, Ser. No. 819,889
Int. Cl.² C07D *307/64*
U.S. Cl. 260—347.2 **5 Claims**

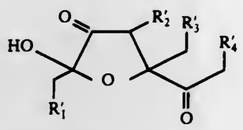
1. A process for producing a compound having the structure:



wherein R_1', R_2', R_3', and R_4' are the same or different and each represents hydrogen or methyl comprising the step of reacting furfuryl mercaptan having the structure:



with one or more dimers of C_4–C_6 alpha, beta diketone each of said dimers being the same or different and having the structure:



in the presence of an acid and an inert solvent at a temperature in the range of from about 40° C up to about 170° C.

4,096,159

PROCESS FOR CONTROLLING THE RATE OF PLATINUM INDUCED ADDITION REACTION OF SILICON BONDED HYDROGEN ATOMS TO ORGANOPOLYSILOXANES CONTAINING ALIPHATIC UNSATURATION

Wolfgang Hechtl; Ernst Wohlfahrt, both of Burghausen, and Richard Schmidlkofer, Mehring-Od, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Sep. 30, 1977, Ser. No. 838,414
Claims priority, application Germany, Oct. 15, 1976, 2646726
Int. Cl.² C07F *7/08*
U.S. Cl. 260—448.2 E **5 Claims**

1. An improved process for controlling the rate of addition of silicon bonded hydrogen atoms to organopolysiloxanes containing at least 50 silicon atoms per molecule and having aliphatic multiple bonds at room temperature in the presence of a platinum catalyst, the improvement which comprises mixing at least one organosilicon compound having the formula

$$CH_2{=}CHR_2SiO(SiR_2O)_nSiR_2CH{=}CH_2$$

in which R is selected from the class consisting of monovalent hydrocarbon radicals and substituted monovalent hydrocarbon radicals free of aliphatic unsaturation and n is a number of from 0 to 6 with (1) an organopolysiloxane containing silicon bonded hydrogen atoms or (2) an organopolysiloxane having at least 50 silicon atoms per molecule and containing aliphatic unsaturation, prior to combining organopolysiloxanes (1) and (2) in the presence of the platinum catalyst.

4,096,160

CONTINUOUS DEVOLATILIZATION OF SILANOL-TERMINATED SILICONE POLYMER

Bruce Allan Ashby, Schenectady, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Apr. 21, 1976, Ser. No. 678,738
Int. Cl.² C07F *7/20*
U.S. Cl. 260—448.2 E **10 Claims**

1. A process for continuously producing a substantially cyclic polysiloxane-free linear diorganopolysiloxane fluid which is chain-stopped primarily with hydroxy groups, said process comprising the steps of:

(i) feeding steam and a linear diorganopolysiloxane fluid chain-stopped primarily with hydroxy groups, said fluid also containing low-boiling cyclic polysiloxanes, into an evacuated, tortuous, confined passageway to form a turbulent mixture of said linear diorganopolysiloxane fluid and steam in the passageway;

(ii) passing said mixture of linear diorganopolysiloxane fluid and steam through the tortuous passageway under partial vacuum and at a temperature below that at which said cyclic polysiloxanes would normally vaporize at atmospheric pressure, to form a vaporized mixture comprising steam and cyclic polysiloxanes freed from said linear diorganopolysiloxane fluid;

(iii) removing said vaporized mixture comprising steam and cyclic polysiloxanes and said linear diorganopolysiloxane fluid which is substantially free of said cyclic polysiloxanes from the tortuous passageway; and

(iv) separating said vaporized mixture of steam and cyclic polysiloxanes from said substantially cyclic polysiloxane-free linear diorganopolysiloxane fluid.

4,096,161

PROCESS FOR THE PREPARATION OF HALOGENOSILANES

Toshio Shinohara; Masatoshi Arai, and Shoji Ichinohe, all of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Nov. 18, 1976, Ser. No. 742,845
Claims priority, application Japan, Nov. 26, 1975, 50/141486
Int. Cl.² C07F *7/08, 7/12*
U.S. Cl. 260—448.2 P **16 Claims**

1. A process for the preparation of an organohalogenosilane product expressed by the general formula

$$R^1{}_aSiX_{4-a}$$

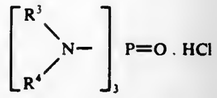
where R^1 is a hydrogen atom or a substituted or unsubstituted monovalent hydrocarbon group, a is 1, 2 or 3 and X is a halogen atom, by a reaction between an organohalogenosilane reactant expressed by the general formula

$$R^2{}_bSiX_{4-b}$$

where R^2 is a substituted or unsubstituted monovalent hydrocarbon group, X is the same as defined above, and b is 0, 1, or 2, always being smaller than the value of the above-defined a and an organopolysiloxane reactant represented by the average unit formula

$$(R^1{}_3SiO_{0.5})_p(R^1{}_2SiO)_q(R^1SiO_{1.5})_r(SiO_2)_s$$

where each R^1, which may be the same or different, is the same as defined above and p, q, r and s each are numbers satisfying the requirements of $0 \leqq p \leqq 1$, $0 \leqq q \leqq 1$, $0 \leqq r \leqq 1$, $0 \leqq s < 1$ and $(p+q+r+s)=1$, to bring about a redistribution reaction wherein the reaction is carried out in the presence of a monohydrochloride of a hexaalkylphosphotriamide represented by the general formula



where R^3 and R^4, which may be the same or different, are alkyl groups having 1 to 6 carbon atoms.

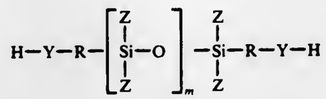
4,096,162

PROCESS FOR THE PRODUCTION OF NEW POLYSILOXANE-POLYOXYALKYLENE COPOLYMERS WITH REDUCED BURNING PROPERTIES

Erwin Windemuth, Bad Sooden-Allendorf; Manfred Dahm, Leverkusen; Manfred Dietrich, Leverkusen, and Peter Müller, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 6, 1970, Ser. No. 748,029
Claims priority, application Germany, Dec. 24, 1975, 2558523
Int. Cl.² C07F *7/08, 7/10*
U.S. Cl. 260—448.2 B **7 Claims**

1. A process for the production of polysiloxane-polyoxyalkylene copolymers, comprising (a) reacting organopolysiloxanes corresponding to the general formula:



wherein

m represents an integer of from 1 to 100,

Z, which may be the same or different, represent C_1–C_5 alkyl radical, C_6–C_{15} aryl radicals, siloxyl or siloxanyl radicals, or the group —R—Y—H,

R represents a C_1–C_6 alkylene radical which may contain one or more hetero atoms,

Y represents —NR′—, —O—,

or —S— and

R′ represents a hydrogen atom or a C_1–C_6 alkyl or C_5–C_9 cycloalkyl radical;

with polyisocyanates in an NCO:YH equivalent ratio of at least 2, heating the NCO-containing addition products thus obtained at from 110° to 160° C to cause branching, and (c) reacting the resulting branched NCO-containing addition products of relatively high molecular weight with a monofunctional polyether corresponding to the general formula:

$$R''{-}(OC_nH_{2n})_x{-}OH$$

wherein

n represents an integer of from 2 to 4,

x represents an integer of from 1 to 100 and

R″ represents a monofunctional C_1–C_{20} hydrocarbon radical optionally containing oxygen or nitrogen as hetero atoms, in an NCO:OH-ratio of from 0.8 to 1.2.

4,096,163

CONVERSION OF SYNTHESIS GAS TO HYDROCARBON MIXTURES

Clarence D. Chang, Princeton; William H. Lang, Pennington, both of N.J.; Anthony J. Silvestri, Morrisville, Pa., and Robert L. Smith, Hopewell, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 566,162, Apr. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 463,711, Apr. 24, 1974, abandoned. This application Oct. 8, 1976, Ser. No. 730,871
Int. Cl.² C07C *1/04*
U.S. Cl. 260—449 R **4 Claims**

1. In the process of converting synthesis gas, comprising carbon monoxide and hydrogen, to a hydrocarbon product by contacting such at about 450 to 1000° F with a catalyst comprising as a first component a metal carbon monoxide reduction catalyst and as a second component an acidic crystalline aluminosilicate zeolite having a silica to alumina ratio of at least 12 and a constraint index of about 1 to 12; the improvement which comprises utilizing as said carbon monoxide reducing catalyst component a methanol synthesis catalyst comprising copper or chromium containing catalysts or mixtures thereof in a finely ground form and thereby converting said synthesis gas to substantially only C_1 – C_6 paraffins composed mainly of C_2 – C_4 paraffins.

4,096,164

PROCESS FOR PRODUCING ETHANOL, ACETIC ACID AND/OR ACETALDEHYDE, FROM SYNTHESIS GAS

Paul Clifford Ellgen, Saint Albans, and Madan Mohan Bhasin, Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,556
Int. Cl.² C07C *27/06*
U.S. Cl. 260—449 R **5 Claims**

1. In a process for the reaction of a synthesis gas containing carbon monoxide and hydrogen in the presence of a hydrogenation catalyst, the improvement for selectively producing two-carbon atom oxygenated hydrocarbon products which comprises continuously contacting said synthesis gas with a heterogeneous catalyst comprising rhodium in combination with at least one element selected from the group consisting of molybdenum and tungsten at reaction conditions correlated to achieve product efficiencies based on carbon consumption in excess of 10 percent and obtain the formation of ethanol, acetic acid, and/or acetaldehyde in an amount which is at least about 50 weight percent of the two or more carbon atom compounds obtained by the reaction, which reaction conditions include a temperature within the range of from about 150°–450° C., a pressure within the range of from about 15–10,000 psig, and a mole ratio of hydrogen to carbon monoxide within the range of from about 20:1 to 1:200.

4,096,165

METHOD OF MANUFACTURING AROMATIC ISOCYANATES

Bernard A. Meyers, East Brunswick, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 1, 1976, Ser. No. 737,822
Int. Cl.² C07C *118/02*
U.S. Cl. 260—453 PH **5 Claims**

1. A method of continuously preparing aromatic isocyanates by reacting phosgene in a reactor with an aromatic primary amine under conditions in which an intermediate carbamyl chloride is formed, regulating the reactor wall temperature by supplying sufficient heat to the reactor wall to counteract the cooling effect of additional amounts of phosgene reactant on said intermediate and, by said supplied heat, sustaining the reactor wall temperature at a temperature at which the carbamyl chloride decomposes to aromatic isocyanate and above the reaction temperature prevailing during the formation of said carbamyl chloride, thereby preventing solidification of carbamyl chloride at the reactor wall and producing the desired aromatic isocyanate from the carbamyl chloride.

4,096,166

PROCESS FOR THE PREPARATION OF CARBAMATES OF N-HYDROXYTHIOIMIDATES

Jose Rafael Alvarez, Charleston, W. Va., and Julius Jakob Fuchs, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 546,997, Feb. 4, 1975, abandoned. This application Oct. 4, 1976, Ser. No. 728,948
Int. Cl.² C07C *69/00, 121/38*
U.S. Cl. 260—453 RW **5 Claims**

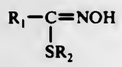
1. In the process for preparing compounds of the formula

where

R_1 is methyl, methoxymethyl, ethyl, or dimethylcarbamoyl; and

R_2 is alkyl of 1 through 3 carbon atoms or cyanoethyl; from their corresponding N-hydroxythioimidates and methyl

carbamoyl chloride, the improvement which comprises contacting an N-hydroxythioimidate of the formula



where

R_1 and R_2 are as defined above, with methyl carbamoyl chloride in a mixed solvent system containing water and a suitable water-immiscible organic solvent with a volume ratio of water to organic solvent of not less than 0.1 at a pH above 10.

4,096,167

FUNGICIDAL AND HERBICIDAL ALPHA-HALOACETANILIDES

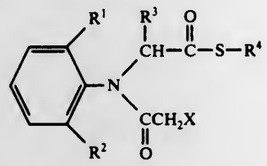
David Cheong King Chan, Petaluma, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 641,839, Dec. 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 400,287, Sep. 24, 1973, which is a continuation-in-part of Ser. No. 515,781, Oct. 17, 1974, Pat. No. 3,944,607, which is a continuation-in-part of Ser. No. 541,814, Jan. 17, 1975, abandoned. This application Feb. 17, 1977, Ser. No. 769,645

Int. Cl.² C07C *153/09;* A01N *9/12*

U.S. Cl. 260—455 R **7 Claims**

1. A compound of the formula



wherein R^1 is alkyl of 1 to 6 carbon atoms, R^2 is hydrogen or alkyl of 1 to 6 carbon atoms, R^3 is hydrogen or alkyl of 1 to 6 carbon atoms, R^4 is alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms or phenylalkyl of 7 to 10 carbon atoms substituted on the phenyl ring with up to 2 fluoro, chloro, bromo or alkyl of 1 to 2 carbon atoms, and X is fluorine, chlorine, bromine or iodine.

4,096,168

AROMATIC CARBONATES

John E. Hallgren, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 12, 1976, Ser. No. 731,493

Int. Cl.² C07C *68/00*

U.S. Cl. 260—463 **23 Claims**

1. An improved aromatic carbonate process wherein an aromatic carbonate is formed in the substantial absence of an aromatic salicylate which comprises contacting a phenol with carbon monoxide, a base, and a Group VIIIB element selected from ruthenium, rhodium, palladium, iridium, osmium or platinum having an oxidation state of plus one.

4,096,169

AROMATIC CARBONATES

Alan J. Chalk, Kinnelon, N.J., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 12, 1976, Ser. No. 731,496

Int. Cl.² C07C *68/00*

U.S. Cl. 260—463 **22 Claims**

1. An aromatic carbonate process which comprises contacting a phenol with carbon monoxide, a base, and a Group VIIIB element selcted from ruthenium, rhodium, palladium, osmium, iridium or platinum having an oxidation state greater than zero.

4,096,170

PREPARATION OF ESTERS

Marinus J. van den Brink, and Roger A. Sheldon, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

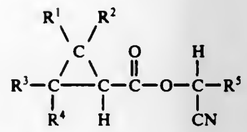
Filed May 12, 1977, Ser. No. 796,260

Claims priority, application United Kingdom, Jul. 26, 1976, 31047/76

Int. Cl.² C07C *120/00, 121/46, 121/48*

U.S. Cl. 260—465 D **13 Claims**

1. A process for the preparation of an ester of formula I



(I)

wherein R^1, R^2, R^3, and R^4 each represents an alkyl group containing from 1 to 6 carbon atoms, a cycloalkyl group containing from 3 to 6 carbon atoms, a phenyl group, an ethylenically unsaturated group containing from 2 to 4 carbon atoms, or a hydrogen atom, and R^5 represents a phenoxyphenyl group which comprises contacting

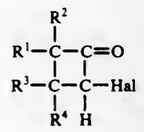
(a) an aldehyde of formula II

(II)

wherein R^5 has the same meaning as in formula I,

(b) an alkali metal, alkaline earth metal or tetrahydrocarbylammonium salt of hydrocyanic acid,

(c) a 2-halocyclobutanone of formula III



(III)

wherein R^1, R^2, R^3 and R^4 have the same meaning as in formula I and Hal represents a halogen atom, and

(d) one or more aprotic solvents.

4,096,171

PROCESS FOR THE MANUFACTURE OF DICYANOBUTENE FROM BUTADIENE, HYDROGEN CYANIDE AND OXYGEN

Robert John Benzie, and Dhafir Yusuf Waddan, both of Wilton, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 20, 1977, Ser. No. 789,186

Claims priority, application United Kingdom, Apr. 29, 1976, 17493/76

Int. Cl.² C07C *120/02*

U.S. Cl. 260—465.3 **11 Claims**

1. A process for the manufacture of dicyanobutene which comprises reacting butadiene with hydrogen cyanide in the molar ratio of about 1:10 to about 10:1 and oxygen or a gas mixture containing oxygen, with the oxygen in molar excess in relation to whichever of the hydrogen cyanide or butadiene is used in the smaller molar amount, in the presence of a catalyst comprising copper ions, ions of at least one halide selected from the group consisting of chloride and bromide, and iodide ions, and of a solvent for the catalyst which solvent does not interfere with the reaction and is not itself extensively changed by the reaction, at a temperature of about 10° to 150° C., the amount of copper ion and of combined said halide ion and iodide ion being from about 0.001 to about 0.2 mole per mole of butadiene, and the proportion of iodide ion in the combined halide and iodide ion being from about 0.1 to about 90% on a molar basis.

4,096,172

CATALYTIC PROCESS FOR THE PRODUCTION OF ACRYLONITRILE

Bruno Notari, and Vittorio Fattore, both of San Donato Milanese, Italy, assignors to Snam Progetti, S.p.A., Milan, Italy

Continuation of Ser. No. 169,801, Aug. 6, 1971, abandoned. This application Apr. 12, 1976, Ser. No. 676,130

Claims priority, application Italy, Aug. 7, 1970, 28404 A/70

Int. Cl.² C07C *120/14*

U.S. Cl. 260—465.3 **5 Claims**

1. A process for the production of acrylonitrile comprising feeding propylene, ammonia and oxygen at ratios between 1/0.7/1 and 1/1.4/3 and at temperatures between 350° C, and 550° C, at pressures between 1 atm. and 5 atms. over a catalyst consisting essentially of, as the sole catalytic agent, one having the general formula:

$$Wa\ M_b\ Me_c^{'''}\ O_d$$

wherein W is tungsten; M is bismuth; $Me^{'''}$ is iron; and O is oxygen, wherein the tungsten is present in gram atomic amounts greater than the gram atomic amounts of each individual remaining metal component or the sum of the remaining metal components, wherein the metal components of the catalyst are in the form of oxygenated compounds, and wherein *a* is 1; *b* is 0.04 to 0.8; *c* is 0.08 to 0.8; and *d* is 2.5 to 9.5, said catalyst having been calcined at a temperature in the range of from 400° C. to 800° C. for from 1 to 60 hours.

4,096,173

CHLORINATED 1-AMINOINDANE N-METHYL TRANSFERASE INHIBITORS

Bryan B. Molloy, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 28, 1977, Ser. No. 782,280

Int. Cl.² C07C *87/60*

U.S. Cl. 260—501.1 **8 Claims**

1. A compound selected from the group consisting of 4-chloro-1-aminoindane, 4,5-dichloro-1-aminoindane, 5,6-dichloro-1-aminoindane and 6,7-dichloro-1-aminoindane and pharmaceutically-acceptable acid addition salts thereof.

4,096,174

ANIONIC NAPHTHALENE THIOUREIDO-DIPHENYLOXIDES

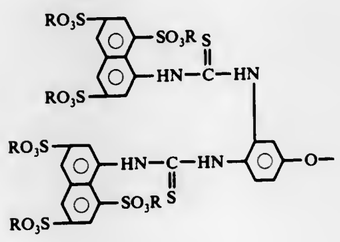
Ransom Brown Conrow, Pearl River, and Seymour Bernstein, New City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jul. 1, 1977, Ser. No. 812,194

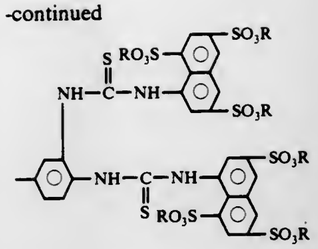
Int. Cl.² C07C *143/66;* A61K *31/185*

U.S. Cl. 260—506 **2 Claims**

1. A compound of the formula:



-continued



wherein R is a pharmaceutically acceptable salt cation.

4,096,175

EXTRACTION METHOD

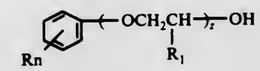
Carter G. Naylor, and Simon P. Burns, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Dec. 1, 1976, Ser. No. 746,648

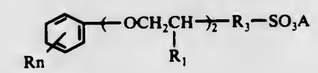
Int. Cl.² C07C *143/42*

U.S. Cl. 260—512 R **4 Claims**

1. The method of resolving a mixture of a nonionic surfactant and an anionic surfactant existing in an aqueous medium, said nonionic surfactant having a structural formula as follows:



where R is a C_1-C_{22} alkyl group, *n* is an integer of 1-3, R_1 is H or CH_3, and *z* is an integer of 1-40, said anionic surfactant having a structural formula as follows:



where R, R_1, *n* and *z* have a significance as above, R_3 is ethylene or propylene and A is an alkali metal cation which comprises the step of treating said aqueous mixture with at least an effective amount of methylal sufficient to dissolve said nonionic surfactant in said methylal and separating out the methylal phase containing the nonionic surfactant from the aqueous phase containing the anionic surfactant.

4,096,176

BENZOYLBENZOIC ACIDS

Nathan N. Crounse, Cincinnati, and Paul J. Schmidt, Sharonville, both of Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Filed Dec. 12, 1972, Ser. No. 314,443

Int. Cl.² C07C *65/20*

U.S. Cl. 260—517 **3 Claims**

1. 2-(2,4-Bis(dimethylamino)benzoyl)-3,4,5,6-tetrachlorobenzoic acid.

3. 2-(2,4-Bis(dimethylamino)benzoyl)-5-(dimethylamino)-benzoic acid.

4,096,177

PROCESS FOR THE PREPARATION OF P-ISOBUTYL-HYDRATROPIC

Leandro Baiocchi, via B. Platina 22, Rome, Italy

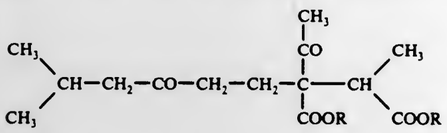
Continuation of Ser. No. 519,769, Oct. 31, 1974, abandoned. This application Nov. 30, 1976, Ser. No. 746,114

Claims priority, application Italy, Apr. 11, 1974, 50315 A/74

Int. Cl.² C07C *63/04*

U.S. Cl. 260—515 R **1 Claim**

1. A process for the preparation of p-isobutyl-hydratropic acid (I) which comprises the steps of heating at a temperature ranging from 200° to 240° C and for a period ranging from one-half to 3 hours, 1 mol of a compound of the formula



where each R represents a lower alkyl having from 1 to 5 carbon atoms, in the presence of 3 - 10 mols of a strong acid in aqueous solution or 3 to 10 mols of a salt of a strong acid with an organic base, where said organic base is selected from the group consisting of triethylamine, pyridine, picolines, quinoline and isoquinoline and then pouring said heated and thus reacted mixture into water and separating said p-isobutylhydratropic-containing product which segregates.

4,096,178

13,14-DIHYDRO-16-PHENOXY PROSTAGLANDIN E_1 ANALOGS

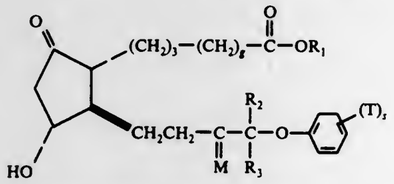
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 426,058, Dec. 19, 1973, which is a division of Ser. No. 252,030, May 10, 1972. This application Feb. 10, 1977, Ser. No. 767,443

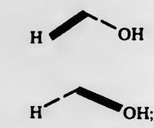
Int. Cl.² C07C *69/76*

U.S. Cl. 260—520 R **10 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein *g* is an integer from 2 to 5, inclusive; wherein M is



wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 and R_3 are hydrogen, methyl, or ethyl; wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein *s* is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl; including each of the lower dialkanoates thereof, and each of the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,096,179

13,14-DIHYDRO-16-PHENOXY PROSTAGLANDIN $F_{1\alpha}$ ANALOGS

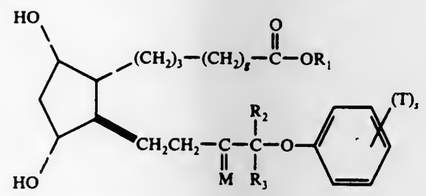
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 426,058, Dec. 19, 1973, which is a division of Ser. No. 252,030, May 10, 1972. This application Feb. 10, 1977, Ser. No. 767,444

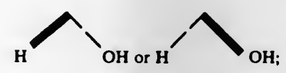
Int. Cl.² C07C *177/00*

U.S. Cl. 260—520 R **10 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein *g* is an integer from 2 to 5, inclusive; wherein M is



wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 and R_3 are hydrogen, methyl, or ethyl; wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein *s* is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl; including each of the lower trialkanoates thereof, and each of the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,096,180

FLUORODEHYDROXYLATION OF SERINE

Janos Kollonitsch, Westfield, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 586,326, Jun. 12, 1975, abandoned. This application Jan. 3, 1977, Ser. No. 756,446

Int. Cl.² C07C *101/10;* C07B *9/00*

U.S. Cl. 260—534 C **7 Claims**

1. The process for preparing the fluorodehydroxyl derivatives of organic alcohols selected from the group consisting of D-serine, 2-deutero-D-serine, D,L-serine, 2-deutero-D,L-serine, L-serine, and 2-deutero-L-serine using SF_4 in liquid hydrogen fluoride as the fluorinating agent, comprising conducting the reaction at a temperature of between about −80° C. to about +20° C. until the reaction is complete, and recovering the desired product.

4,096,181

SUBSTITUTED SULFAMIC ACID HALIDES

Gerhard Hamprecht, Mannheim, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Germany

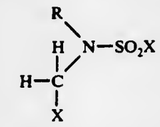
Filed Oct. 26, 1976, Ser. No. 735,897

Claims priority, application Germany, Nov. 28, 1975, 2553460

Int. Cl.² C07C *143/14, 143/70, 143/21*

U.S. Cl. 260—543 R **11 Claims**

1. Sulfamic acid halides of the formula



I

where each X is halogen and R is a cycloaliphatic radical or is an aliphatic radical which is not substituted by halogen atoms, or which is substituted by one or more halogen atoms at the carbon atom in the α-position, γ-position and/or even more remote positions relative to the nitrogen atom.

4,096,182

PROCESS FOR THE SIMULTANEOUS PREPARATION OF 2,5-DIOXO-1,2-OXA-PHOSPHOLANES AND β-HALOGENPROPIONIC ACID HALIDE

Walter Rupp, Königstein, Taunus, and Manfred Finke, Kelkheim, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

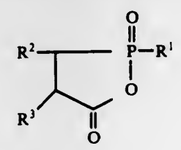
Filed Mar. 16, 1977, Ser. No. 778,052

Claims priority, application Germany, Mar. 19, 1976, 2611694

Int. Cl.² C07C *51/58;* C07F *9/02*

U.S. Cl. 260—544 Y **13 Claims**

1. A process for the preparation of 2,5-dioxo-1,2-oxa-phospholanes of the formula (I)



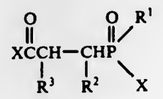
(I)

wherein

R^1 is an alkyl group with up to 18 carbon atoms which may be substituted by up to three halogen atoms, a cycloalkyl group with up to 8 carbon atoms, an alkenyl group with up to 8 carbon atoms, an aryl group with up to 14 carbon atoms, which may be substituted by lower alkyl groups with up to 4 carbon atoms, lower alkoxy groups with up to 4 carbon atoms, halogen or with amino groups alkylated or dialkylated by lower alkyl radicals with up to 4 carbon atoms or an aralkyl group with up to 15 carbon atoms, which may be substituted in analogous manner to the aryl group,

R^2 is an alkyl group with up to 4 carbon atoms, or hydrogen and

R^3 is an alkyl group with up to 6 carbon atoms, a phenyl radical, which may be substituted up to three times by halogen or by lower alkyl groups with up to 4 carbon atoms, a benzyl radical or hydrogen, with simultaneous preparation of about equimolar quantities of a β-halopropionic acid halide, which comprises reacting a 2-haloformylethyl-phosphinic acid halide of the formula (II)



(II)

wherein R^1, R^2 and R^3 are defined as in formula (I) and X stands for chlorine or bromine with an approximately equimolar quantity of acrylic acid.

4,096,183

STYRYLSULFONYLAMIDINES

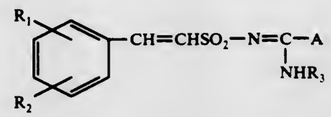
William L. Matier, and William T. Comer, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 601,563, Aug. 4, 1975, Pat. No. 4,052,455, which is a continuation-in-part of Ser. No. 459,152, Apr. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 368,547, Jun. 11, 1973, abandoned. This application Aug. 19, 1977, Ser. No. 825,996

Int. Cl.² C07C *143/38, 143/40, 123/00*

U.S. Cl. 260—556 AR **39 Claims**

1. A compound selected from the group consisting of styrylsulfonylamidines having the formula



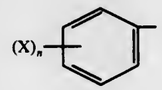
wherein

R_1 is selected from lower alkyl of 1 to 4 carbon atoms inclusive, hydrogen, nitro, amino, halogen, cyclohexyl, carbamoyl, lower alkylsulfonyl from 1 to 4 carbon atoms inclusive, sulfamoyl or lower alkanoylamido of from 2 to 4 carbon atoms inclusive;

R_2 is selected from hydrogen or halogen with the proviso that when R_1 is halogen R_2 can represent up to two additional halogen;

R_3 is hydrogen, cyclopropyl or lower alkyl of 1 to 4 carbon atoms inclusive;

A is selected from lower alkyl of from 1 to 8 carbon atoms inclusive, di(lower)alkylaminophenyl, phenyl, benzyl, β-naphthyl, styryl, phenylbutadienyl, cycloalkyl of 3 to 6 carbon atoms inclusive, or a substituted phenyl radical represented by the symbol



wherein

X is selected from (lower) alkoxy from 1 to 4 carbon atoms inclusive, halogen, nitro, amino, lower alkanoylamido of from 2 to 4 carbon atoms inclusive, and

n represents the integer 1 or 2.

4,096,184

PROCESS FOR PREPARING ACID AMIDES

Shinji Nakamura; Shun Inokuma, both of Takatsuki; Shin Tanaka, Sonehigashi; Kenichi Hirose, and Takashi Deguchi, both of Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 29, 1976, Ser. No. 755,138

Claims priority, application Japan, Jan. 19, 1976, 51-5289; Jan. 21, 1976, 51-6252; Mar. 22, 1976, 51-31681; May 17, 1976, 51-57082

Int. Cl.² C07C *103/08*

U.S. Cl. 260—561 N **16 Claims**

1. A process for preparing acid amides by hydration of the corresponding nitrile compounds with water in the presence of a catalyst, characterized in that the catalyst is prepared by treating a vanadate with a cuprous salt or with at least two members selected from the group consisting of metallic copper, a cuprous salt and a cupric salt.

4,096,185

PREPARATION OF P-AMINOBENZOTRIFLUORIDE

Linda P. Selwell, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 647,495, Jan. 8, 1976, abandoned. This application Feb. 23, 1977, Ser. No. 771,067
Int. Cl.[2] C07C *85/04*
U.S. Cl. 260—581 23 Claims

1. The process of reacting p-chlorobenzotrifluoride with ammonia in an essentially nonaqueous solvent in the presence of a catalytically effective amount of a catalyst combination comprising one or more compounds selected from the group consisting of cuprous chloride, cuprous bromide, cupric chloride, cupric bromide, copper sulfate and copper acetate and one or more additional compounds selected from the group consisting of potassium fluoride, potassium chloride, potassium bromide, potassium iodide, calcium fluoride, magnesium fluoride, ammonium fluoride and potassium acetate at a pressure in the range of 30 to 400 atmospheres, at a temperature range of about 150°-240° C for a period of about 1 to 10 hours to produce p-aminobenzotrifluoride.

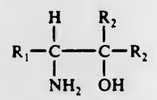
4,096,186

PROCESS FOR RACEMIZING OPTICALLY ACTIVE AMINO COMPOUNDS

Yataro Ichikawa; Koji Nakagawa, and Eishin Yoshisato, all of Iwakuni, Japan, assignors to Teijin Limited, Japan

Filed Jun. 27, 1975, Ser. No. 590,944
Claims priority, application Japan, Jun. 29, 1974, 49-73843
Int. Cl.[2] C07C *91/04, 91/14, 91/16*
U.S. Cl. 260—584 R 8 Claims

1. A process for racemizing optically active amino compounds, which comprises contacting an optically active compound of the formula



wherein R_1 is an alkyl containing not more than 10 carbon atoms and R_2 is hydrogen or an alkyl containing not more than 10 carbon atoms,

with ammonia and hydrogen in the presence of a Co or Co-iron oxide catalyst which has activity in hydrogenation.

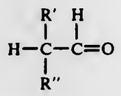
4,096,187

PROCESS FOR HALOGENATION OF ALDEHYDES AND PRODUCTION OF OXIMES THEREFROM

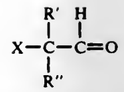
John Henry Bonfield, Basking Ridge; Andiappan Kumaresa Murthy, Lake Hiawatha, and Donald Pickens, Mendham, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Aug. 4, 1977, Ser. No. 821,898
Int. Cl.[2] C07C *47/14, 131/00*
U.S. Cl. 260—601 H 10 Claims

1. In a process for the halogenation under reflux conditions of an aldehyde of the formula



with a halogenating agent selected from the group consisting of Cl_2 Br_2 and I_2 to form an α-haloaldehyde of the formula



where X is Cl, Br or I and R′ and R″ independently are alkyl of 1 to 4 carbons, the improvement which comprises continuously feeding the aldehyde and halogenating agent into a reactor at a molar ratio of halogenating agent to aldehyde of between about 0.8:1 and about 1.1:1 and continuously feeding water into the reactor at a rate of between about 1% and about 20%, by weight of aldehyde fed.

4,096,188

PREPARATION OF STRAIGHT CHAIN ALDEHYDES

John B. Wilkes, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 20, 1976, Ser. No. 752,582
Int. Cl.[2] C07C *45/08*
U.S. Cl. 260—604 HF 7 Claims

1. In the catalytic hydroformylation process of preparing straight chain aldehydes from straight chain olefins by the reaction of straight chain olefins of about 3 to 20 carbon atoms with carbon monoxide and hydrogen under hydroformylation conditions in the presence of a cobalt catalyst at a temperature of about 75° to 200° C and a pressure of about 500 to 5000 pounds per square inch, the improvement which comprises carrying out the reaction in the presence of a monoamine modifier consisting essentially of methylamine, dimethylamine, trimethylamine, diethylamine, n-butylamine, benzyl amine, allyl amine, or piperidine, said modifier being present in amounts from about 0.05 to 1.0 mols of amine per mol of cobalt.

4,096,189

PRODUCTION OF TERTIARY PHOSPHINE OXIDES

Horst Staendeke, Bruhl, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jun. 17, 1976, Ser. No. 696,921
Claims priority, application Germany, Jun. 21, 1975, 2527796
Int. Cl.[2] C07F *9/53*
U.S. Cl. 260—606.5 P 5 Claims

1. A process for making tertiary phosphine oxides of the general formula

$$R^1R^2R^3P(O)$$

in which R^1, R^2 and R^3 each stand for identical or different, alkyl, aryl or aralkyl groups, which comprises oxidizing at temperatures higher than 200° C quaternary phosphonium halides of the general formula

$$[R^1R^2R^3R^4P]\ X$$

in which R^1 through R^3 have the meanings given above, R^4 has the same meaning as R^1 through R^3, and X stands for a halogon atom, and condensing or absorbing in a liquid the vaporous reaction products thus obtained.

4,096,190

OXIDATIVE COUPLING OF ALKYLPHENOLS CATALYZED BY METAL AMMONIA COMPLEXES

Thomas F. Rutledge, Wilmington, Del., assignor to ICI Americas Inc., Wilmington, Del.

Filed Nov. 26, 1976, Ser. No. 745,208
The portion of the term of this patent subsequent to Jul. 11, 1995, has been disclaimed.
Int. Cl.[2] C07C *27/00, 37/00, 41/00, 45/00*
U.S. Cl. 568—730 16 Claims

1. A method of preparing a condensation product of an "alkylphenol", an "alkoxyphenol" or a "1-naphthol", by an oxidative coupling reaction said method comprising contacting an aqueous mixture of the phenol or naphthol with oxygen or oxygen containing gas in the presence of sufficient amount of alkaline material to sustain pH in the range of about 6–9.5 during the oxidative coupling reaction and a catalyst system comprising an ammonia complex of monovalent copper; divalent copper, cobalt, nickel or manganese; or trivalent chromium or iron.

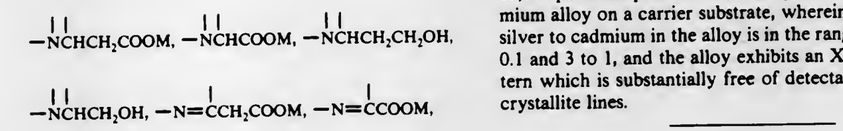
4,096,191

HYDROFORMYLATION OF OLEFINS USING AZOXY-DENTATED LIGANDS

John B. Wilkes, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 150,862, Jun. 1, 1971, abandoned, which is a division of Ser. No. 857,547, Sep. 12, 1969, Pat. No. 3,647,845. This application Jun. 14, 1974, Ser. No. 479,345
Int. Cl.[2] C07C *27/22*
U.S. Cl. 568-909 4 Claims

1. Process for the addition of a $—CH_2OH$ group to a hydroformylatable organic compound containing olefinic unsaturation which comprises reacting said compound with carbon monoxide and hydrogen at a temperature in the range from about 100° C to 225° C in the presence of a hydroformylation catalyst consisting essentially of a cobalt carbonyl complex compound wherein said catalyst is stabilized by the presence of an ethylenediamine carboxylic acid, salt, or ester containing from 1 to 5 azoxy-dentate functional groups selected from a class consisting of



wherein M is hydrogen or an alkali metal, alkaline earth metal or ammonium cation and wherein the open valences of the functional groups are satisfied by bonds to hydrogen or hydrocarbon radicals; and werein the ethylenediamine carboxylic acid, salt, or ester is present in an amount from 0.10 mol to 0.25 mol per mol of cobalt.

4,096,192

PROCESS FOR THE PREPARATION OF 2-METHYL-1,3-PROPANEDIOL

Kamlesh Kumar Bhatia, Newark, and Charles Carmen Cumbo, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 30, 1976, Ser. No. 672,033
The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.
Int. Cl.[2] C07C *29/00*
U.S. Cl. 568—866 11 Claims

1. A continuous process for the preparation of 2-methyl-1,3-propanediol which comprises

(a) reacting acrolein with a 1,3-aliphatic diol with 3 to 7 carbon atoms other than 2-methyl-1,3-propanediol under conventional conditions to prepare a cyclic acetal;

(b) hydroformylating the cyclic acetal in the presence of a rhodium complex catalyst comprising rhodium carbonyl and a phosphite ligand of the formula

wherein R_1, R_2 and R_3 are the same or different phenyl, substituted phenyl or alkyl groups having 1 to 12 carbon atoms under conventional conditions to prepare the aldehyde of the cyclic acetal;

(c) hydrogenating and hydrolyzing the aldehyde of the cyclic acetal in the presence of a hydrogenation catalyst and an ion exchange catalyst to prepare 1,4-butanediol and a mixture of diols;

(d) separating the mixture of diols from 1,4-butanediol;

(e) recycling said mixture back to step (a) to react with acrolein in place of the diol of (a) for a number of cycles until a product consisting of 1,4-butanediol and essentially 2-methyl-1,3-propanediol; and

(f) separating and recovering the 2-methyl-1,3-propanediol.

4,096,193

PRODUCTION OF ALPHA BETA OLEFINICALLY UNSATURATED ALCOHOLS

Thomas H. Vanderspurt, Gillette, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Aug. 2, 1976, Ser. No. 710,947
Int. Cl.[2] C07C *29/14*
U.S. Cl. 568—881 10 Claims

1. An improved hydrogenation process for converting a α,β-olefinically unsaturated carbonylic compound into the corresponding allylic alcohol derivative which comprises reacting an α,β-olefinically unsaturated carbonylic compound with hydrogen in the vapor phase at a temperature between about 0° and 300° C and a pressure between about 15 and 15,000 psi in the presence of a catalyst comprising a silver-cadmium alloy on a carrier substrate, wherein the atomic ratio of silver to cadmium in the alloy is in the range of between about 0.1 and 3 to 1, and the alloy exhibits an X-ray diffraction pattern which is substantially free of detectable unalloyed metal crystallite lines.

4,096,194

HIGH PURITY ISO-BUTYLENE RECOVERY

David Moy, and Marvin S. Rakow, both of East Brunswick, N.J., assignors to Cities Service Company, Tulsa, Okla.

Filed Aug. 2, 1976, Ser. No. 710,982
Int. Cl.[2] C07C *29/04*
U.S. Cl. 568—899 5 Claims

1. An improved process for hydrating, with liquid water over a solid catalyst and with a liquid solvent, isobutylene to form tertiary butyl alcohol in the liquid state, wherein the improvement comprises

using a solvent selected from the group consisting of glycols, glycol ethers, and glycol diethers, and

maintaining a solvent-to-water weight ratio of from about 5:1 to about 20:1, thus maintaining a single liquid phase for the reaction mixture and increasing the conversion percentage of the isobutylene to the corresponding alcohol.

4,096,195

CYCLIC TWO-STAGE NITRATION PROCESS FOR PREPARING 4-CHLORO-3,5-DINITROBENZOTRIFLUORIDE FROM 4-CHLOROBENZOTRIFLUORIDE

Louis Schneider, Elizabeth, and David E. Graham, Westfield, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed May 13, 1977, Ser. No. 796,519
Int. Cl.[2] C07C *79/12*
U.S. Cl. 260—646 14 Claims

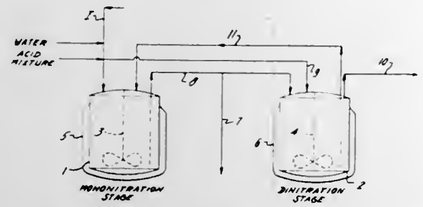
1. A cyclic, two-stage nitration process for preparing 4-chloro-3,5-dinitrobenzotrifluoride from 4-chlorobenzotrifluoride in high yield which comprises:

(a) mononitrating 4-chlorobenzotrifluoride substantially completely to 4-chloro-3-nitrobenzotrifluoride with acid mixture of nitric acid, sulfur trioxide and sulfuric acid,

(b) diluting the used acid mixture with water to form a dilute used acid layer and 4-chloro-3-nitrobenzotrifluoride organic layer,

(c) separating said dilute used acid layer from said organic layer,

(d) dinitrating said 4-chloro-3-nitrobenzotrifluoride organic layer with a fresh acid mixture of nitric acid, sulfur trioxide, and sulfuric acid to form 4-chloro-3,5-dinitrobenzotrifluoride product, and a partially spent acid mixture containing a portion of said product dissolved therein, said



fresh acid mixture containing sufficient nitric acid to effect said nitration and to provide for said mononitration upon recycling of said partially spent acid mixture back to step (a),

(e) separating said 4-chloro-3,5-dinitrobenzotrifluoride product from said partially spent acid mixture, and,

(f) recycling said partially spent acid mixture back to step (a).

4,096,196

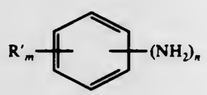
DIAZOTIZATION-FLUORINATION IN A MEDIUM OF HYDROGEN FLUORIDE CONTAINING TERTIARY AMINE COMPOUNDS

Max M. Boudakian, Pittsford, N.Y., assignor to Olin Corporation, New Haven, Conn.

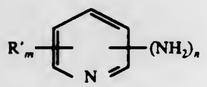
Continuation-in-part of Ser. No. 627,834, Oct. 31, 1975, abandoned. This application Aug. 12, 1976, Ser. No. 713,753
Int. Cl.² C07D *213/02*; C07C *25/13*; C07D *213/04*
U.S. Cl. 260—650 F **24 Claims**

1. In a process for preparing a fluorobenzene or a fluoropyridine by (1) diazotizing a corresponding aminobenzene or aminopyridine substrate in the presence of hydrogen fluoride and a diazotization agent selected from the group consisting of sodium nitrite, potassium nitrite, nitrous anhydride, nitrous acid, a nitrosyl halide, and a complex of a nitrosyl halide with hydrogen fluoride to produce a corresponding diazonium fluoride and (2) decomposing said diazonium fluoride; wherein said aminobenzene and aminopyridine substrates have either formula (I) or (II):

(I)



(II)



wherein R′ is a ring substituent selected from the group consisting of halogen; alkyl; nitro; carboxyl; hydroxy; alkoxy; and combinations thereof; m is an integer having a value of 0–3; and *n* is an integer having a value of 1–2, the improvement which comprises:

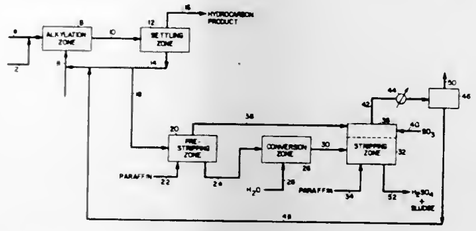
conducting said diazotization and decomposition steps in a solution of hydrogen fluoride containing tertiary amine compounds selected from the group consisting of unsaturated heterocyclic tertiary amines, aromatic tertiary amines, alkyl tertiary amines, saturated heterocyclic amines, nitriles, tertiary amine oxides and combinations thereof.

4,096,197

PROCESS FOR REGENERATING FLUOROSULFURIC ACID CATALYST

Ivan Mayer, Summit, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 28, 1977, Ser. No. 772,641
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.47 **17 Claims**



1. In an alkylation process which comprises:

(a) contacting an olefin with a paraffin in an alkylation zone under alkylation conditions and with a catalyst comprising fluorosulfuric acid which includes a moderator in an amount of 5 to 100 mole %, based on acid, of (1) water, (2) a C_1–C_7 saturated aliphatic monohydroxy alcohol, or (3) a mixture of water and said alcohol to form a reaction mixture of an acid catalyst phase containing fluorosulfuric acid, hydrogen fluoride, sulfuric acid and an organic sludge formed during said process and a hydrocarbon phase containing alkylate product;

(b) separating said hydrocarbon phase containing alkylate product from said acid catalyst phase, the improvement which comprises regenerating said acid catalyst phase according to the following steps:

(c) stripping a portion of the fluorosulfuric acid from the acid catalyst phase separated in step (b) with a paraffin to form a stripped acid phase containing fluorosulfuric acid, sulfuric acid and said organic sludge and a gaseous phase containing paraffin, fluorosulfuric acid and hydrogen fluoride;

(d) contacting said stripped acid phase formed in step (c) with water to form an acid-water mixture, thereby converting at least a portion of the fluorosurfuric acid contained therein to hydrogen fluoride and sulfuric acid;

(e) stripping at least a portion of the hydrogen fluoride from said acid-water mixture formed step (d) with a paraffin to form a gaseous phase comprising hydrogen fluoride and paraffin and a liquid phase comprising sulfuric acid and organic sludge;

(f) treating the gaseous phases formed in step (c) and step (e) with sulfur trioxide to convert the hydrogen fluoride present therein into fluorosulfuric acid.

4,096,198

INTEGRATED PROCESS FOR REGENERATING FLUOROSULFURIC ACID CATALYST

Albert J. Mariconda, Highland Lakes; Kenneth J. Reinman, Budd Lake, and Ivan Mayer, Summit, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 28, 1977, Ser. No. 772,637
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.47 **22 Claims**

1. In an alkylation process which comprises:

(a) contacting an olefin with a paraffin in an alkylation zone under alkylation conditions and with a catalyst comprising fluorosulfuric acid to form a reaction mixture of fluorosulfuric acid catalyst phase containing an organic sludge formed during said process and a hydrocarbon phase containing alkylate product;

(b) separating said hydrocarbon phase containing alkylate product from said fluorosulfuric acid catalyst phase, the

improvement which comprises regenerating said acid catalyst phase according to the following steps:

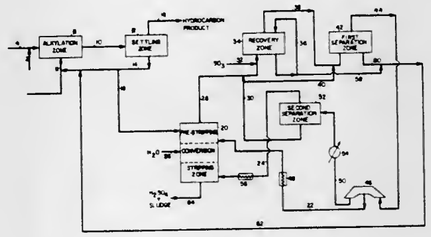
(c) stripping a portion of the fluorosulfuric acid from the acid catalyst phase separated in step (b) with a paraffin to form a stripped acid phase containing fluorosulfuric acid and said organic sludge and a gaseous phase containing paraffin and fluorosulfuric acid;

(d) contacting said stripped acid phase formed in step (c) with water to form an acid-water mixture, thereby converting at least a portion of the fluorosulfuric acid contained therein to hydrogen fluoride and sulfuric acid;

(e) stripping at least a portion of the hydrogen fluoride from said acid-water mixture formed in step (d) with a paraffin to form a gaseous phase comprising hydrogen fluoride and paraffin and a liquid phase comprising sulfuric acid and organic sludge;

(f) cooling the gaseous phases formed in step (c) and step (e) with liquid paraffin to a temperature between the freezing point and the boiling point of sulfur trioxide to form a first liquid-vapor mixture which comprises a liquid phase containing fluorosulfuric acid and hydrogen fluoride and a vapor phase containing hydrogen fluoride, fluorosulfuric acid and paraffin;

(g) treating the liquid-vapor mixture formed in step (f) with at least a stoichiometric amount of liquid sulfur trioxide



based on hydrogen fluoride to convert the hydrogen fluoride present therein to fluorosulfuric acid, thereby forming a second liquid-vapor mixture which comprises a liquid phase containing regenerated fluorosulfuric acid and a gas phase containing fluorosulfuric acid and paraffin;

(h) passing the liquid-vapor mixture formed in step (g) into a first separation zone which is maintained at a temperature sufficient to form a liquid phase of regenerated fluorosulfuric acid and a gaseous phase containing paraffin and less than 1000 ppm fluorosulfuric acid;

(i) compressing the gaseous phase formed in step (h) to a pressure ranging between atmospheric and 170 psia to form a compressed gaseous paraffin;

(j) using a portion of the compressed gaseous paraffin formed in step (i) as the paraffin in step (c);

(k) passing that portion of the compressed gaseous paraffin not used in step (j) into a second separation zone which is maintained at a temperature between 45° and 100° F, thereby forming a liquid phase of substantially pure paraffin and a vapor phase of paraffin containing less than 100 ppm of fluoride-containing compounds;

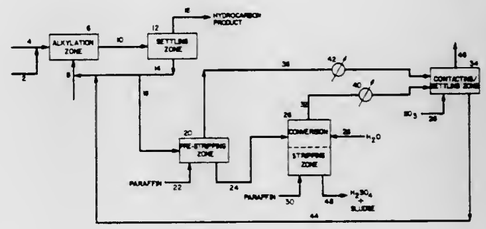
(l) using the vapor phase formed in step (k) as the paraffin in step (e) and the liquid phase formed in step (k) as the liquid paraffin in step (f).

4,096,199

PROCESS FOR REGENERATING FLUOROSULFURIC ACID CATALYST

Donald L. Green; William C. Behrmann, and David E. Allan, all of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 28, 1977, Ser. No. 772,636
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.47 **22 Claims**



1. In an alkylation process which comprises:

(a) contacting an olefin with a paraffin in an alkylation zone under alkylation conditions and with a catalyst comprising fluorosulfuric acid to form a reaction mixture of fluorosulfuric acid catalyst phase containing an organic sludge formed during said process and a hydrocarbon phase containing alkylate product;

(b) separating said hydrocarbon phase containing alkylate product from said fluorosulfuric acid catalyst phase, the improvement which comprises regenerating said acid catalyst phase according to the following steps:

(c) stripping a portion of the fluorosulfuric acid from the acid catalyst phase separated in step (b) with a paraffin to form a stripped acid phase containing fluorosulfuric acid and said organic sludge and a gaseous phase containing paraffin and fluorosulfuric acid;

(d) contacting said stripped acid phase formed in step (c) with water to form an acid-water mixture, thereby converting at least a portion of the fluorosulfuric acid contained therein to hydrogen fluoride and sulfuric acid;

(e) stripping at least a portion of the hydrogen fluoride from said acid-water mixture formed in step (d) with a paraffin to form a gaseous phase comprising hydrogen fluoride and paraffin and a liquid phase comprising sulfuric acid and organic sludge, the stripping of step (c) and step (e) being effected at a temperature between from above 120° to about 250° F;

(f) cooling the gaseous phases formed in step (c) and step (e) to a temperature ranging from about the normal boiling point of said paraffin to less than 110° F to form a liquid-vapor mixture comprising a liquid phase containing fluorosulfuric acid and hydrogen fluoride and a vapor phase containing paraffin;

(g) treating the liquid-vapor mixture formed in step (f) in a contacting zone with at least a stoichiometric amount of sulfur trioxide based on hydrogen fluoride, at a temperature ranging from about the normal boiling point of said paraffin to less than 110° F, to convert the hydrogen fluoride present therein to fluorosulfuric acid, thereby forming a liquid phase of regenerated fluorosulfuric acid and a gas phase containing predominantly paraffin.

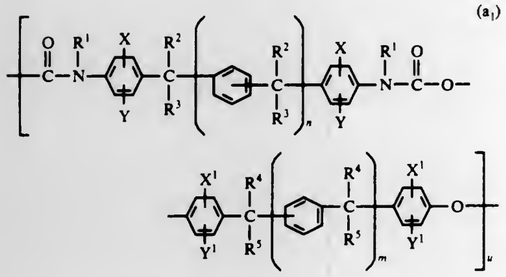
4,096,200
N-ALKYL POLYURETHANE/VINYL POLYMER MIXTURES

Günther Lenz, Krefeld; Josef Merten, Korschenbroich; Heinrich Krimm, Krefeld; Horst-Günter Kassahn, Krefeld, and Hermann Schnell, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation of Ser. No. 561,552, Mar. 24, 1975, abandoned.
This application Aug. 25, 1976, Ser. No. 717,553
Claims priority, application Germany, Mar. 28, 1974, 2415057
Int. Cl.[2] C08L 75/04
U.S. Cl. 260—859 R 5 Claims

1. A moulding composition comprising:

(a) at least one aromatic N-alkyl polyurethane corresponding to the following general formula:



(a_1)

wherein

R^1 represents methyl or ethyl;

R^2, R^3, R^4 and R^5, which may be the same or different, each represents an alkyl radical having such a number of carbon atoms that the total number of carbon atoms in each of the alkylene bridges formed by R^2, R^3 and an intervening carbon atom, and by R^4, R^5 and an intervening carbon atom, is from 3 to 6;

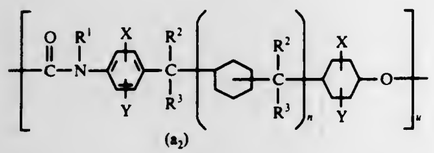
X, Y, X^1 and Y^1, which may be the same or different, each represents hydrogen, methyl, chlorine or bromine;

n = 0 or 1;

m = 0 or 1; and

u is such that the average molecular weight of the polyurethane is from 10,000 to 100,000;

or corresponding to the following general formula:



(a_2)

wherein

R^1, R^2, R^3, X, Y, n and u are as defined in connection with general formula (a_1) above; and

(b) at least one elastomeric polymer based on butadiene and/or a alkyl acrylate which may be graft-polymerised with at least one radically polymersible monomer; and, optionally,

(c) a homo- or co-polymer of the monomers of component (*b*);

component (*a*) constituting from 80 to 20%, by weight, of the composition, and the sum of components (*b*) and (*c*) constitutes from 20 to 80%, by weight, of the composition, the sum of components (*b*) and (*c*) being made up of from 25 to 100%, by weight, of component (*b*) and from 75 to 0% by weight, of component (*c*).

4,096,201
ADHESIVE COMPOSITION

Ikuji Kishi; Tatsuo Nakano, and Hiroshi Okai, all of Machida, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 6, 1977, Ser. No. 757,281
Claims priority, application Japan, Jun. 29, 1976, 51-76718
Int. Cl.[2] C08F 279/02
U.S. Cl. 260—879 14 Claims

1. An adhesive composition which comprises a redox system comprising a reducing system containing a reducing agent and an oxidizing system comprising

a. 5 to 30 wt. parts of an elastomer of a copolymer of butadiene and acrylonitrile or a copolymer of butadiene and acrylonitrile and less than 5 wt. % of a functional monomer or a graft copolymer of butadiene and at least one of acrylonitrile, styrene and methacrylic acid ester and

b. 70 to 95 wt. parts of a monomer mixture comprising 30 to 80 wt. % of 2-hydroxy ethyl methacrylate or 2-hydroxy propyl methacrylate and 20 to 70 wt. % of a C_{1-4} alkyl methacrylate to total monomers having ethylenically unsaturated double bond and

c. 0.1 to 10 wt. % of an organic hydroperoxide to total monomers having ethylenically unsaturated double bond.

4,096,202
IMPACT MODIFIED POLY(ALKYLENE TEREPHTHALATES)

Sutton B. Farnham, Levittown, and Theodore D. Goldman, Cornwell Heights, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Jun. 9, 1976, Ser. No. 694,509
Int. Cl.[2] C08L 67/06; C08G 39/10
U.S. Cl. 260—873 9 Claims

1. A composition comprising a blend of about 99 to 60% by weight of a poly(C_1–C_6 alkylene terephthalate) and about 1 to 40% by weight of a multi-phase composite interpolymer comprising:

(A) about 25 to 95 weight percent of a first elastomeric phase polymerized from a monomer system comprising about 75 to 99.8% by weight C_1 to C_6 alkyl acrylate, 0.1 to 5% by weight crosslinking member, 0.1 to 5% by weight graftlinking monomer, said crosslinking monomer being a polyethylenically unsaturated monomer having a plurality of addition polymerizable reactive groups all of which polymerize at substantially the same rate of reaction, and said graftlinking monomer being a polyethylenically unsaturated monomer having a plurality of addition polymerizable reactive groups, at least one of which polymerizes at a substantially different rate of polymerization from at least one other of said reactive groups; and,

(B) about 75 to 5 weight percent of a final, rigid thermoplastic phase polymerized in the presence of said elastomeric phase and is free of epoxy groups.

4,096,203
PROCESS TO CONTROL COHESIVE STRENGTH OF BLOCK COPOLYMER COMPOSITION

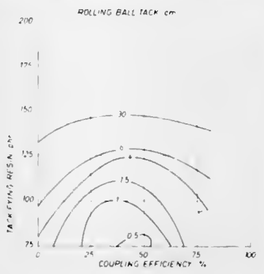
David J. St. Clair, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jul. 30, 1976, Ser. No. 710,042
Int. Cl.[2] C08L 51/00, 53/00
U.S. Cl. 260—876 B 12 Claims

1. An adhesive composition which fails cohesively at ambient temperatures comprising as a minimum a block copolymer component and a tackifying resin component, wherein said block copolymer component is prepared by the process comprising:

(a) reacting an organomonolithium compound with a monoalkenyl arene in the presence of an inert diluent, said organomonolithium compound having the structure RLi where R contains from 2 to 20 carbon atoms per molecule and is an aliphatic radical, cycloaliphatic radical, aromatic radical, or combination thereof;

(b) reacting the product mixture from step (a) with a conjugated diene having 4 to 5 carbon atoms per molecule; and



(c) reacting the product mixture from step (b) with a coupling agent in such an amount and under such conditions as to vary the coupling efficiency of the process within the range of about 20% to about 80% therein controlling the cohesive strength of the adhesive composition.

4,096,204
HALOGENATED THERMOPLASTIC/BLOCK COPOLYMER BLEND

William P. Gergen, and Sol Davison, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 693,463, Jun. 7, 1976, abandoned. This application May 5, 1977, Ser. No. 794,161
Int. Cl.[2] C08L 51/00, 53/00
U.S. Cl. 260—876 B 11 Claims

1. A composition consisting essentially of the admixture obtained by intimately mixing about 4 to about 96 parts by weight of a block copolymer and about 96 to about 4 parts of an engineering thermoplastic resin under essentially isoviscous blending conditions so as to form at least partial continuous interlocking networks wherein:

(a) said block copolymer comprises at least two monoalkenyl arene polymer end blocks A and at least one substantially completely hydrogenated conjugated diene mid block B, said block copolymer having an 8 to 55 percent by weight monoalkenyl arene polymer block content, each polymer block A having an average molecular weight of between about 5,000 and about 125,000, and each polymer block B having an average molecular weight of between about 10,000 and about 300,000; and

(b) said engineering thermoplastic resin is a fluorinated thermoplastic polymer, having a generally crystalline structure and a melting point over about 120° C.

4,096,205
METHOD TO PRODUCE IMPROVED RUBBER-MODIFIED STYRENE POLYMER

Robert A. Reith, Glen Ellyn, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Aug. 29, 1975, Ser. No. 609,003
Int. Cl.[2] C08F 279/02
U.S. Cl. 260—880 R 8 Claims

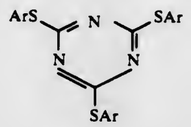
1. In a process for producing rubber-modified styrene polymer, wherein (a) a polymerization feedstock is formed comprising an effective amount up to 30 weight percent of a rubber in styrene monomer in the substantial absence of inert solvent, (b) such feedstock is polymerized with agitation under free radical conditions and (c) the resulting polymer is devolatilized, the improvement wherein said rubber comprises a styrene-butadiene copolymer rubber having a solution viscosity ranging from 20 to 60 cps and containing from 8 to 12 weight percent bound styrene with at least 2 percent, by weight of the rubber, of such styrene in block segments and about equal amounts of styrene in block and random segments, whereby the resulting rubber-modified styrene polymer has an Izod value of at least 4 ft.-lbs./inch of notch and a melt flow rate of at least 3 grams/10 minutes.

4,096,206
FLAME-RETARDANT TRIAZINES

Nicodemus E. Boyer, Parkersburg, W. Va., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Feb. 9, 1976, Ser. No. 656,469
Int. Cl.[2] C08K 5/34
U.S. Cl. 260—880 R 13 Claims

1. A compound having the structural formula:



where Ar is the same or different polybromoaryl carbocyclic radical.

4,096,207
ELASTOMER COMPOSITIONS WITH IMPROVED ABRASION RESISTANCE

Robert Saxon, Princeton, and Jack Horstmann Thelin, Somerville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 3, 1977, Ser. No. 756,296
Int. Cl.[2] C08L 9/02, 13/00, 31/04, 63/10
U.S. Cl. 260—900 8 Claims

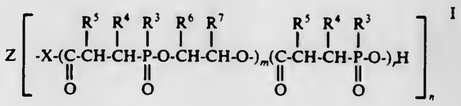
4. A method for improving the abrasion resistance of vulcanizable elastomer as in claim 1, which comprises incorporating into said elastomer from about 1 to 5 parts, per hundred parts thereof, of particulate non-fibrous polytetrafluoroethylene and subjecting said elastomer and polytetrafluoroethylene to conditions of high shear, such that the resulting elastomer composition contains said polytetrafluoroethylene in fibrous form.

4,096,208
POLYPHOSPHINITES AND A PROCESS FOR THEIR PREPARATION

Walter Dursch; Fritz Linke, both of Konigstein, Taunus, and Manfred Finke, Fischbach, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 13, 1976, Ser. No. 749,792
Claims priority, application Germany, Dec. 16, 1975, 2556482; Oct. 9, 1976, 2645786; Oct. 22, 1976, 2647745
Int. Cl.[2] C07F 9/32
U.S. Cl. 260—931 4 Claims

1. Compounds of the general formula



(I)

in which

X is oxygen

R^3 is a (C_1–C_4)-alkyl group which may be substituted, preferably monosubstituted, by halogen, especially chlorine, a cylcoalkyl group having up to 8 carbon atoms, especially cyclopentyl, cyclohexyl, an alkenyl group having up to 4 carbon atoms, especially vinyl and allyl, a phenyl or benzyl group optionally substituted by halogen, preferably chlorine and/or bromine, and preferably carrying 1 to 3 substituents,

R^4 is hydrogen or a (C_1–C_4)-alkyl group, preferably methyl,

R^5 is hydrogen or a (C_1–C_2)-alkyl group, preferably methyl,

with at least one of the radicals R^4 and R^5 preferably being hydrogen,

R^6 is hydrogen, methyl, chloromethyl,

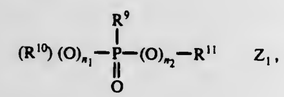
R^7 is hydrogen, methyl or ethyl, preferably hydrogen,

m stands for numbers in the range of from 1 to 20, preferably from 2 to 20, especially 20 to 6,

n stands for numbers in the range of from 1 to 6, preferably from 2 to 6,

r is 0 or 1, preferably 0,

Z is a *n*-valent radical of the group consisting of: straight-chain or branched hydrocarbon radicals having from 1 to 18, preferably from 1 to 12, carbon atoms which may be interrupted by up to 8 —O-atoms, generally up to $(q/2 - 1)$ —O-atoms, if *q* is the number of carbon atoms in Z, and/or by up to 3 —S-atoms and/or NR^2 radicals with R^2 being (C_1-C_4)-alkyl, especially methyl, and/or may be substituted by fluorine, chlorine, bromine atoms, preferably Cl and Br, while carrying preferably substituents in a number of up to half the H-atoms contained in Z, especially from 1 to 4; cyclohexyl radicals which may be substituted by from 1 to 3, preferably one straight-chain or branched and/or unsaturated alkyl radical having from 1 to 4 carbon atoms, or by a (C_1-C_4)-alkyl radical carrying preferably up to 4 F, Cl, or Br-atoms; aromatic or araliphatic radicals which are derived from benzene, alkyl benzenes having up to 18 carbon atoms, from naphthalene, diphenyl, diphenylmethane, diphenylethane or 2,2-diphenylpropane, and which may be substituted in the nucleus by 1 or 2 methoxy and/or ethoxy groups, and which may be substituted in the nucleus and/or the lateral chains by F, Cl or Br-atoms, preferably carrying up to 5 substituents, or phosphate-containing radicals of the general formula

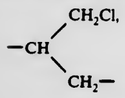


in which

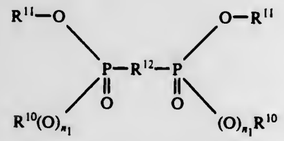
n_1, n_2 are independently from each other 0 and 1 and

R^9 stands for alkyl, hydroxyalkyl, optionally (C_1-C_2)-alkylated and/or -dialkylated aminoalkyl, halogeno- (preferably choloro-)alkyl having 1 to 3 carbon atoms, alkenyl having 2 or 3 carbon atoms or phenyl optionally substituted by 1 or 2 halogen atoms, preferably Cl or Br,

R^{10}, R^{11} may be defined as R^9 — if the pertinent n_1 and/or n_2 equals 0 — with the restriction that for $n_1 = n_2 = 0$ at least one of the radicals R^{10}, R^{11} is an (C_1-C_3)-alkylene radical or, if the pertinent n_1 and/or n_2 equals 1, is a straight-chain or branched alkylene radical having from 2 to 5 carbon atoms or is the radical

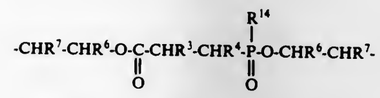


or represent phosphorous-containing radicals of the general formula



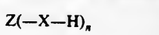
with n_1, R^{16}, R^{11} being defined as in Z_1 and R^{12} being a straight-chain or branched (C_1-C_6)-alkylene, phenylene, xylylene radical or a radical

with Y = OH, NH_2 and R^{13} = (C_1-C_3)-alkyl, or phosphorus-containing radicals of the general formula



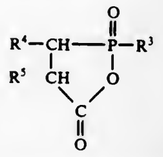
in which R^4, R^5, R^6, R^7 are defined as in formula I above and R^{14} is defined as R^3 or represents the group —O—CHR^6—CHR^7.

3. Process for the preparation of compounds of formula I, which comprises mixing a compound of the formula

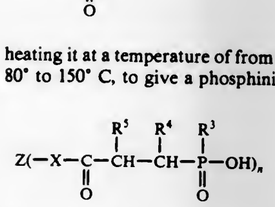


II

(a_1) with the about *n* times molar amount of a phospholane of the formula



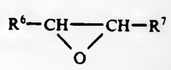
heating it at a temperature of from 0° to 180° C, preferably 80° to 150° C, to give a phosphinic acid of the formula



IIa

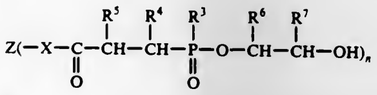
and, when this reaction has been completed, which can be seen from the disappearing of the phospholane peak at 5 500 mμ,

(a_2)mixing the product thus obtained with the about *n* times molar amount of an alkylene oxide of the formula



IV

reacting it at a temperature of from 80° to 180° C, preferably from 100° to 150° C, to give a phosphinic acid(hydroxyalkyl)-ester of the formula



IIa_2

and, when this reaction has been completed, which can be seen from the acid number being 0 at the above reaction temperatures, i.e. from 80° to 180° C, preferably from 100° to 150° C, repeating the operation a_1 $(m-1+r)$ times and following every operation a_1, repeating the operation a_2 — $(m-1)$ times altogether —, or, preferably,

(b_1) mixing a compound of the formula II with the about $n(m+r)$ times molar amount of a phospholane of the formula III at a temperature of from 80° to 180° C, preferably from 100° to 150° C and, after the reaction heat has cooled off,

(b_2) mixing the product with the about $n \cdot m$ times molar amount of an alkylene oxide of the formula IV and further maintaining the mixture, preferably while stirring, at the reaction temperature, until the reaction has been completed, which can be seen from the disappearing of the phospholane peak and/or when *r* equals 0, also of the acid number.

4,096,209

PHOSPHORYLATED SECONDARY BUTYLATED PHENOL/PHENOL ESTER MIXTURES

Donald Richard Randell, and Wilfred Pickles, both of Stockport, England, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 696,702, Jun. 16, 1976, abandoned, which is a division of Ser. No. 586,756, Jun. 13, 1975, abandoned, which is a division of Ser. No. 370,455, Jun. 15, 1973, Pat. No. 3,919,158, which is a continuation-in-part of Ser. No. 74,909, Sep. 23, 1970, abandoned, which is a division of Ser. No. 645,888, Jun. 14, 1967, Pat. No. 3,576,923. This application May 31, 1977, Ser. No. 802,191

Claims priority, application United Kingdom, Jun. 18, 1966, 27316/66

The portion of the term of this patent subsequent to Mar. 2, 1988, has been disclaimed.

Int. Cl.[2] C07F 9/12

U.S. Cl. 260—966 **4 Claims**

1. A phosphate ester composition consisting essentially of a phosphorylated secondary butylated phenol/phenol ester mixture wherein the weight ratio of the secondary butyl moiety to phenol moiety ranges from 0.05 to about 0.65, which ester is prepared by steps comprising:

(a) alkylating at a temperature of about 15° C to 250° C in the presence of a Lewis acid or a Bronsted acid as a catalyst, phenol with butene to obtain a secondary butylated phenol reaction mixture, and

(b) reacting said secondary butylated phenol reaction mixture with a phosphorylating agent.

4,096,210

PROCESS FOR PREPARING PHOSPHOROTHIOATES AND PHENYLPHOSPHONOTHIOATES

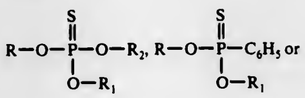
Harold H. Freedman, Newton Center, Mass.; Stanley D. McGregor; Masao Yoshimine, both of Midland, Mich., and Lorraine M. Kroposki, Walnut Creek, Calif., assignors to The Dow Chemical Company, Midland, Mich.

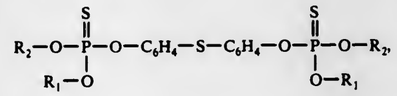
Division of Ser. No. 585,554, Jun. 10, 1975, Pat. No. 4,007,197. This application Nov. 15, 1976, Ser. No. 742,144

Int. Cl.[2] C07F 9/165, 9/40

U.S. Cl. 260—973 **12 Claims**

1. In the process of preparing a compound corresponding to the formula

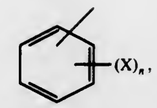




wherein:

R_1 and R_2 are each independently lower alkyl; and

R is



wherein:

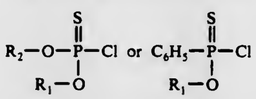
n is 0, 1, 2 or 3; and

X is nitro, cyano, halo, lower alkyl, lower alkoxy, lower alkylthio or lower alkylsulfinyl,

with the proviso that R does not bear more than one nitro group, lower alkylthio group or lower alkylsulfinyl group; by reacting in an inert liquid reaction medium under alkaline conditions (a) a compound corresponding to the formula

$$R—O^{\ominus}M^{\oplus} \text{ or } M^{\oplus}O^{\ominus}—C_6H_4—S—C_6H_4—O^{\ominus}M^{\oplus}$$

with (b) a compound corresponding to the formula



wherein M is an alkali metal and R, R_1 and R_2 have the aforesaid meaning;

the improvement consisting of conducting the process in the presence of a small but catalytic amount of (1) a quaternary ammonium or phosphonium salt having a minimum solubility of at least 1 weight percent in the liquid reaction medium at 25° C and (2) an organic, sterically unhindered, nucleophilic tertiary amine, with the proviso that said amine is not 1,4-diazabicyclo[2.2.2]octane or an N-substituted diazole when (1) is a quaternary ammonium salt.

4,096,211

VARIABLE FLOW ELASTIC NOZZLE

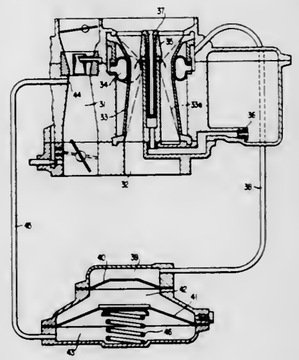
Jean Rameau, Sannois, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed Oct. 1, 1976, Ser. No. 728,713

Claims priority, application France, Oct. 1, 1975, 75 30041

Int. Cl.[2] F02M 9/10

U.S. Cl. 261—23 A **3 Claims**



1. A device for preparing a carburized mixture for an internal combustion engine comprising:

means defining a venturi throat in a fluid conduit;

at least one wall element in the zone of the throat of the venturi being constituted by at least one flexibly deformable chamber member under the action of pressure from a regulating fluid;

said flexibly deformable chamber member being sheathed locally by at least one deformable nozzle member subjected to the pressure of at least one regulating fluid assuring local, controlled deformation of the nozzle member to

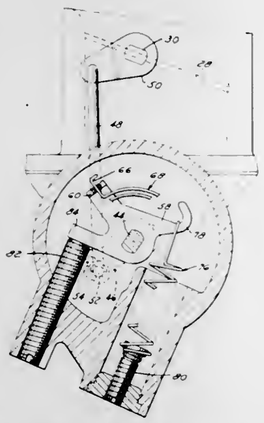
be regulated wherein said venturi throat has an inlet duct for liquid or gaseous fuel, located in the body of a double down-draft carburetor, said carburetor including a first and second barrel member with said deformable nozzle member being disposed in said second barrel member so as to permit a variation in the annular section between the inlet duct and itself in response to a pressure condition in said first chamber and further comprising a hollow, cylindrical element disposed along the axis of said deformable nozzle member including radial passages for feeding said fuel into said venturi throat at a position located above said throat.

4,096,212

CARBURETOR CHOKE VALVE POSITIONER

Jerry B. Rogerson, Northville, and Robert S. Harrison, Grosse Ile, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 26, 1977, Ser. No. 762,708
Int. Cl.² F02M *1/10*
U.S. Cl. 261—39 B **8 Claims**



1. A choke valve positioner for use with a carburetor having an air/fuel induction passage open at one end and adapted to be connected to an engine intake manifold at the other end,

an air movable choke valve unbalance mounted to fall by gravity from a closed position across the passage to a wide open position to control air flow through the passage,

movable lever means operatively connected to the choke valve for positioning the same,

first thermostatic spring means operably connected to the lever means biasing the lever means and choke valve towards the closed position with a force increasing as a function of decreases in the temperature of the spring means from a predetermined level,

second spring means biasing the lever means and the choke valve towards an open position in opposition to the first spring means,

adjustable stop means in the path of movement of the lever means in a choke valve closing direction to stop movement of the choke valve by the lever means in the choke closing direction,

lost motion means connecting the choke valve and lever means permitting relative movement therebetween whereby the choke valve can be moved to a first position less open than a second position attained by movement of the choke valve by the lever means and whereby the choke valve can fall by gravity from the less open first position to the second position dictated by the position of the lever means, and,

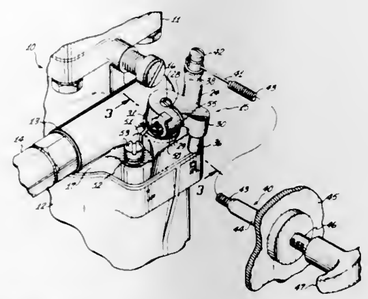
actuation means to move the choke valve to the less open position.

4,096,213

FAIL-SAFE CARBURETOR MIXTURE CONTROL

Jack N. Danger, 10628 N. 80th Dr., Peoria, Ariz. 85345

Filed Aug. 29, 1977, Ser. No. 828,832
Int. Cl.² F02M *7/14*
U.S. Cl. 261—71 **8 Claims**



1. A fail-safe mixture control mechanism for use on an updraft carburetor of a normally aspirated aircraft engine, said carburetor having a fuel mixture control valve rotatably movable between lean and rich fuel-air mixture positions and including a rotatable shaft in and extending from the fuel bowl of the carburetor with a crank lever on the extending end of said shaft, said fail-safe mixture control mechanism comprising:

(a) a positive locking control cable means having one end attachable to the crank lever of the carburetor's mixture control valve for lockingly holding the mixture control valve in selected positions when attached to the crank lever thereof; and

(b) biasing means having one end attachable to the carburetor and the other end attachable to the mixture control valve of the carburetor for biasingly urging the mixture control valve toward the rich fuel-air mixture position thereof.

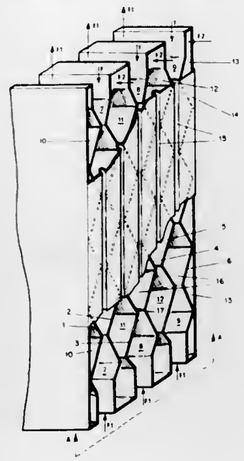
4,096,214

MULTICELLULAR REACTOR WITH LIQUID/GAS PHASE CONTACTS

Emile Henri Gabriel Percevaut, rue de Longjumeau, Chilly Mazarin (Essonne), and Christian Belin, 15 Chemin des Aulnaies Residence les Aulnaies, Saint Arnoult en Yvelines (Yvelines), both of France

Continuation-in-part of Ser. No. 590,304, Jun. 25, 1975, abandoned. This application Mar. 1, 1977, Ser. No. 773,412
Claims priority, application France, Jun. 25, 1974, 74 22117
Int. Cl.² B05B *17/00*
U.S. Cl. 261—79 A **17 Claims**

1. A reactor for contacting a liquid with a gas comprising panels forming a flow passageway through which the gas and the liquid may flow in generally opposite directions, said panels forming a plurality of restrictions called a pattern spaced along the passageway to create narrow zones separated by enlarged zones to form reaction cells, aerodynamic means in the passageway for directing a portion of the flow of gas against patterns to pell off the film of liquid from the passageway walls, for reversing the direction of flow of gas in a cell and creating turbulence to product droplets and liquid/gas emulsion, and for creating an aerodynamic swirling between the gas and the liquid to cause internal recycling of a predetermined portion of the liquid in each cell and a pattern stabilizing means for stabilizing the reversing of the direction of flow of gas in a portion of the enlarged zone thereby achieving intimate mixing of the gas and the liquid while permitting the



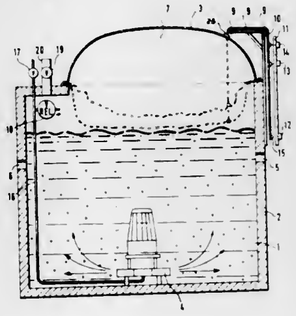
recycling of a predetermined portion of the liquid in each of the cells.

4,096,215

DEVICE FOR APPLYING GAS TO A LIQUID

Erhard Albrecht, Dusseldorf, Germany, assignor to Messer Griesheim GmbH, Frankfurt am Main, Germany

Filed Aug. 26, 1976, Ser. No. 717,881
Claims priority, application Germany, Sep. 13, 1975, 2540845
Int. Cl.² B01F *3/04*
U.S. Cl. 261—121 R **5 Claims**



1. A device for introducing a gas into a liquid, especially water containing waste products,

comprising, in combination,

a tank having a relatively large surface for receiving and holding the liquid;

a tank closure means operable to effect a substantially gas-tight closure of the tank and operative to define with the liquid level an enclosed space above the level;

first valve means including gas introducing means extending to a point below the normal liquid level for introducing gaseous substances into the liquid, said tank closure means comprising a sheet of flexible inflatable material being operable to form a bubble so as to collect gaseous substances which pass upwardly out of the liquid, to adjust the volume of said enclosed space above the level and thereby to adjust to the amount of gaseous substances held in said enclosed space,

second valve means including means operable for removing at least some of the gaseous substances accumulated in said space to supply them to said gas introducing means,

third valve means including an exhaust valve communicating with said space and operable for venting said space; and

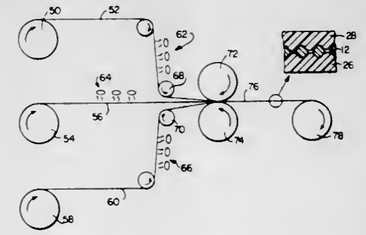
switch means to control at least some of said valve means in response to the inflation and deflation respectively, of said bubble.

4,096,216

METHOD OF MAKING MICROFICHE LAMINATE HAVING APERTURES WITH DOUBLET LENSES

George J. Yevick, Leonia, N.J., assignor to Izon Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 622,827, Oct. 16, 1975, Pat. No. 4,049,756, which is a division of Ser. No. 539,458, Jan. 8, 1975.
This application May 12, 1977, Ser. No. 796,224
Int. Cl.² B29D *3/00, 9/10, 11/00;* B29F *5/00*
U.S. Cl. 264—1 **3 Claims**



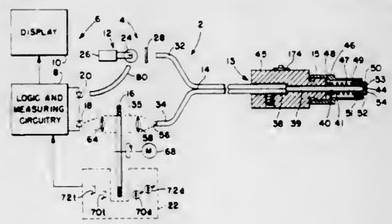
1. In a process for producing a laminate adapted for use as a microfiche in an optical apparatus, the step of pressing a sheet of a transparent material againt an opaque and apertured web under conditions of temperature and pressure such that said transparent substance locally deforms and partially flows into the apertures of said web to thereafter form permanent convex portions extending into said apertures, the convex portions each defining an optical surface of refraction, said transparent sheet material being at least initially thermoplastic and heat softened, to thereby permit said local deformation, the convex portions of said transparent material flowing into said web apertures an amount less than half of the aperture height.

4,096,217

METHOD OF USING A PARTICULAR TRISTIMULUS COLORIMETER IN MAKING ARTIFICIAL TEETH

Kenneth A. Roll, Canton, Ohio, assignor to Sterndent Corporation, Old Greenwich, Conn.

Division of Ser. No. 499,479, Aug. 22, 1974, Pat. No. 3,986,777.
This application Apr. 21, 1976, Ser. No. 678,922
Int. Cl.² B29C *11/00;* B29F *5/00*
U.S. Cl. 264—20 **12 Claims**



1. A method of fabricating an artifical tooth, comprising:

(1) measuring at the gingival and incisal portions of a reference tooth the respective red, blue and green optical density values thereof, each of said measuring steps including illuminating respective portions of such reference

tooth, using a light sensitive means producing electrical output signals respectively proportionally representative of the intensities of plural colors of light received thereby from such an illuminated reference tooth, respectively integrating in one direction first signals represenative of such electrical output signals for each respective color for a timed duration to provide respective integrated signal level outputs and then a reference signal in an opposite direction, and converting the respective times required to integrate such reference signal from such integrated signal level outputs to a predetermined level output into respective red, blue and green optical density values;

(2) selecting a first porcelain material for the gingival portion of such artifical tooth having optical density values corresponding to the those measured for the gingival portion of such reference tooth;

(3) determining a second porcelain material for combination with such first porcelain material substantially to match the optical density values corresponding to those measured for the incisal portion of such reference tooth; and

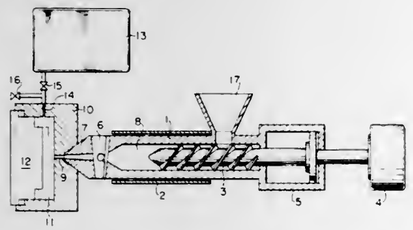
(4) combining such first and second porcelain materials to form an artifical tooth having optical density values substantially matching those of such reference tooth.

4,096,218

METHOD OF PRODUCING FOAMED THERMOPLASTIC RESIN ARTICLES HAVING SMOOTH AND GLOSSY SURFACES FREE FROM SWIRL MARKS AND HAIR CRACKS

Akio Yasuike, Tokyo; Tsutomu Odagiri, Hiratsuka, both of Japan, and Toshiba Machine Co. Limited, both of Tokyo, Japan, assignors to Asahi-Dow Limited

Continuation-in-part of Ser. No. 379,309, Jul. 19, 1973, abandoned. This application Jul. 27, 1976, Ser. No. 709,108
Int. Cl.² B29D *27/00*
U.S. Cl. 264—45.5 **4 Claims**



1. A method of producing a foamed thermoplastic resin article having a smooth and glossy surface free from swirl marks and haircracks thereon, said method comprising the steps of:

(1) melting a thermoplastic resin composition containing, per 100 parts by weight of said resin, 0.5 to 8 parts by weight of a condensable blowing agent having a boiling point of −10° to 70° C. at atmospheric pressure,

in combination with from 0.05 to 0.5 parts by weight of an organic chemical blowing agent, and

from 0.5 to 2 parts by weight of an inert nucleating agent;

(2) applying into a mold cavity a pressurized gas at a pressure of 2 to 10 kg/cm² to prevent foaming of said molten resin when it is injected;

(3) injecting under a higher pressure, in full shot, the molten resin composition into said gas pressurized mold cavity whereby said pressurized gas is discharged from said mold cavity by said injected resin composition;

(4) terminating the application of gas under pressure to said mold cavity when said injecting is substantially complete and the mold is filled with the molten resin composition in an unfoamed state;

(5) permitting the molten resin composition in the mold cavity to form a solid skin layer around the surfaces thereof in contact with the mold wall while maintaining the resin composition within said solid skin layer in the molten state;

(6) within a period of 10 seconds after injection step (3) above, enlarging the volume of said mold cavity and foaming and expanding, within a period of 10 seconds thereafter, the molten resin composition contained within the solid skin layer, and thereafter;

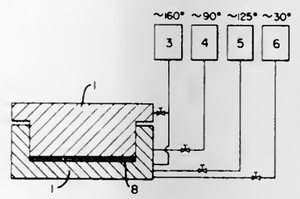
(7) cooling and solidifying the thus-formed resin to form the foamed article having a smooth and glossy surface free from swirl marks and haircracks therein.

4,096,219

PROCESS FOR PRODUCTION OF FOAMED SHAPED PIECES WITH PORELESS SURFACE MADE BY THE MOLDING PROCESS

Wilhelm Mollenbruck, and Werner Bollmann, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Germany

Filed Jul. 9, 1976, Ser. No. 704,083
Claims priority, application Germany, Jul. 9, 1975, 2530511
Int. Cl.² B29D *27/08*; B29F *5/00*
U.S. Cl. 264—46.5 **11 Claims**



1. A process for production of foamed shaped pieces with poreless surface, from particles of an expandable styrene polymer material, wherein the expandable particles are heated at elevated pressure to temperatures above the softening point of the styrene polymer material, cooled with maintenance of the pressure, and foamed after reduction of the pressure, which comprises the steps of, in a single closing mold that is not gas-tight and that has a variable capacity, melting particles of expandable styrene polymer material which are not prefoamed, at pressures between 3 to 30 bar and temperatures between 100° and 170° C., cooling the melted material to temperatures about 10 to 40° C. above the softening point of the styrene polymer material, then enlarging the capacity of the mold, and expanding the polymer material without supplementary external delivery of heat, and finally after further cooling of the mold to about ambient temperature, removing the shaped piece from the mold.

4,096,220

PROCESS FOR THE PRODUCTION OF SLABS OR BLOCKS OF PLASTIC FOAM

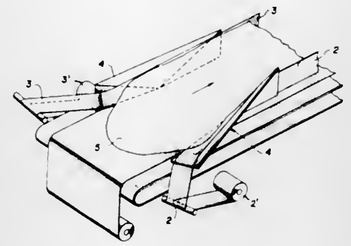
Laader Berg, Remvik, 6010 Spjelkavik, Norway

Filed Nov. 14, 1975, Ser. No. 632,075
Claims priority, application Norway, May 30, 1975, 751918
Int. Cl.² B29D *27/04*
U.S. Cl. 264—51 **3 Claims**

1. A process for the production of foam plastic, having as right-angled a cross-section as possible, by means of formation in a channel-shaped moving conveyor having a final channel configuration with a bottom web and vertical side walls having a predetermined breadth therebetween, comprising:

pouring a mixture of liquid foamable reactants onto a portion of the moving conveyor upstream of said final channel configuration in which said mixture is allowed to flow out beyond said predetermined breadth of said final channel configuration; and

during the expansion period, guiding the mixture back to said breadth of said final channel configuration by bringing side portions from an outwardly flattened horizontal



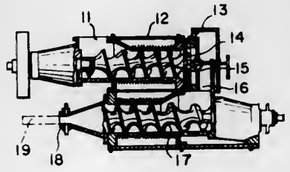
position to the vertical position of said vertical side walls of said final channel configuration, before the mixture has finished expanding.

4,096,221

STRIATED SOAP BAR FORMING

Charles F. Fischer, Jersey City, and Hargovind H. Joshi, Piscataway, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 521,070, Nov. 5, 1974, abandoned. This application Aug. 4, 1976, Ser. No. 711,452
Int. Cl.² B29F *3/12*
U.S. Cl. 264—75 **6 Claims**



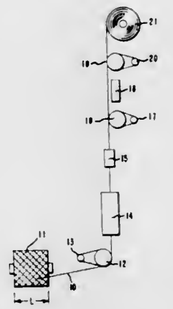
1. A method for producing a soap bar having a marbled appearance on a major face and a length and width dimension defining said major face and a thickness dimension less than either of said length and width dimensions, comprising the steps of supplying a base soap component to the vacuum chamber of a soap plodder, adding a secondary component having a color contrasting with the color of said base component to said vacuum chamber along with said base component, said base soap descending from above onto and being worked by a generally horizontal rotating worm in the plodder and said secondary component being a liquid dye discharged from above to be introduced into the base component being worked by the worm, working said base component and secondary component longitudinally through said soap plodder by rotation of said worm to form a soap mass while mixing said mass so as to provide a marbled pattern across the transverse cross section prior to extrusion, extruding said mass through an extrusion die to form a billet, said extrusion die having an extrusion opening of a size and shape corresponding to the major face of said soap bar thereby imparting an extrusion grain to said billet generally perpendicular to said major face, cutting said extruded billet into blanks at an interval less than the length and width dimensions of said major face whereby to provide opposed sooth major faces having distinct color patterns without shaving the surfaces of said major faces, and pressing the opposed major faces of said blanks, said pressing forces being directed in a generally parallel direction to said extrusion grain.

4,096,222

PROCESS OF TREATING POLYESTER YARN TO PROVIDE A PATTERN OF PORTIONS THAT DIFFER IN DYEABILITY

David Emerson Bosley, Grifton, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 19, 1976, Ser. No. 677,990
Int. Cl.² D01D *5/20*
U.S. Cl. 264—78 **7 Claims**



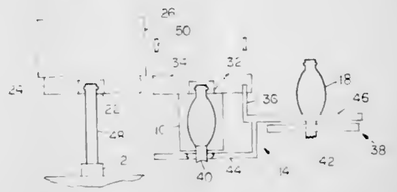
1. In a process for producing polyester yarn having alternating thick and thin portions along the yarn that differ in dyeability, wherein the yarn is drawn at a lower draw ratio than would be used to produce a fully-drawn yarn, the improvement which comprises treating as-spun spin-oriented polyester yarn by contacting the yarn at intervals along its length with a fluid to induce crystallization in the contacted portions of the yarn, the treatment being sufficient to provide in the contacted portions a force-to-draw value of at least 1.12 times the value for untreated portions and a density difference of more than 0.005, and then drawing the yarn to have 4 to 20 percent greater denier in the contacted portions than in the untreated portions.

4,096,223

THERMOPLASTIC CONTAINER FORMING METHOD

Thomas J. Krall, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed May 2, 1977, Ser. No. 792,828
Int. Cl.² B29C *17/07*
U.S. Cl. 264—89 **10 Claims**



1. A method for making a plastic container, wherein fluid, plasticized, thermoplastic material is supplied by a plasticizer-extruder, which comprises the steps of:

(a) injection molding a finish portion of a plastic container by injecting thermoplastic material from an orifice into an openable neckring carried by a first neckring holder;

(b) moving said orifice and said neckring and neckring holder relative to one another while continuing to supply thermoplastic material to thereby form a tubular parison;

(c) grasping said tubular parison and said neckring holder;

(d) moving said tubular parison and said neckring and neckring holder away from said orifice into registry with a blow molding station;

(e) closing a blow mold about said tubular parison at said blow molding station;
(f) blowing said parison, while in said blow mold, into a final shape, finished plastic container;
(g) moving a second neckring carried by a second neckring holder into registry with said orifice;
(h) injection molding a finish portion of a second plastic container by injecting thermoplastic material from said orifice into said second neckring;
(i) moving said orifice and said second neckring and neckring holder relative to one another while continuing to supply thermoplastic material to thereby form a second tubular parison, steps (g), (h), and (i) being carried out substantially simultaneously with steps (e) and (f);
(j) opening said blow mold;
(k) moving said first mentioned neckring and neckring holder away from said blow molding station while carrying said finished plastic container in said neckring;
(l) substantially simultaneously, grasping said second tubular parison and said second neckring holder and grasping said finished plastic container with a removal mechanism as said first mentioned neckring is opened;
(m) substantially simultaneously, moving said second tubular parison and said second neckring holder away from said orifice into registry with said blow molding station and moving said finished plastic container to a removal station;
(n) closing said blow mold about said second tubular parison;
(o) blowing said second tubular parison, while in said blow mold, into a final shape, finished plastic container;
(p) moving said first mentioned neckring and neckring holder back into registry with said orifice; and
(q) repeating steps (a) through (p) in overlapping cycle.

4,096,224

MOLDED STYRENE POLYMER ARTICLES FROM VACUUM-FORMED OR THERMOFORMED S-B-S BLOCK COPOLYMER SHEETS

Günter Simon; Walter Widmaier, both of Marl, and Karl-Ulrich Reichert, Lippramsdorf, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed May 5, 1976, Ser. No. 683,637
Claims priority, application Germany, May 17, 1975, 2522190
Int. Cl.[2] B29C *23/00*
U.S. Cl. 264—92 **10 Claims**

1. In the method of manufacturing molded articles comprising thermoforming extruded polystyrene sheets, the improvement comprising the use of sheets having a thickness of about 0.2 to 2.0 mm produced by extruding a mixture of about 85–95 percent by weight of polystyrene and about 5–15 percent by weight of a diene-styrene block copolymer having the structure S-B-S wherein S represents styrene and B represents butadiene or isoprene said block copolymer having a molecular weight of about 60,000 to 130,000; an RSV value in toluene of between 0.80 and 1.30 and a diene content of between 50 and 85 percent.

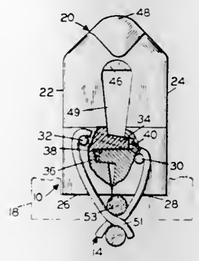
4,096,225

METHOD OF MAKING A FASTENER ELEMENT

John A. Kowalski, Erie, Pa., assignor to Textron, Inc., Providence, R.I.

Division of Ser. No. 583,700, Jun. 4, 1975. This application Dec. 7, 1976, Ser. No. 748,343
Int. Cl.[2] B29C *17/02;* B29D *3/00, 5/00*
U.S. Cl. 264—167 **6 Claims**

1. A method of forming a continuous train of fastener elements comprising the steps of
forming a train of transverse elongated fastener elements having end portions of each elongated fastener element molded around respective filaments of a pair of spaced continuous parallel filaments,
said forming including the formation of an opening in one surface of each elongated fastener element at one end portion thereof adjacent to a respective one of the filaments,
said forming also including the formation of a projection on the same one surface at the other end portion of each elongated fastener element adjacent the other filament, and



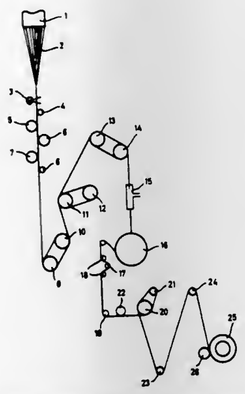
folding the train of elongated fastener elements longitudinally to bring ends of the one surface of each fastener element together and to insert each projection into the corresponding opening to secure the end portions of the fastening elements together and to reinforce the union of the filaments with the fastening elements.

4,096,226

INTEGRATED SPIN-DRAW-TEXTURIZING PROCESS FOR MANUFACTURE OF TEXTURIZED POLYAMIDE FILAMENTS

Wolfgang Martin, Ludwigshafen; Dieter Herion, Frankenthal; Dimiter Bayew, Mannheim, and Wolfgang Bauer, Heidelberg, all of Germany, assignors to BASF Aktiengesellschaft, Rheinland, Pfalz, Germany

Continuation-in-part of Ser. No. 320,481, Jan. 2, 1973, abandoned. This application May 12, 1977, Ser. No. 796,169
Claims priority, application Germany, Jan. 3, 1972, 2200064
Int. Cl.[2] D01D *5/22, 5/12*
U.S. Cl. 264—168 **7 Claims**



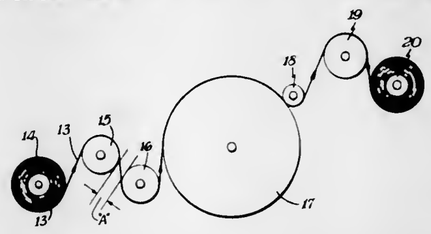
1. In an integrated process for the manufacture of a texturized yarn by a continuous melt-spinning, drawing and texturizing of a fiber-forming synthetic linear high molecular weight polymer selected from the group consisting of poly-ε-caprolactam and polyhexamethylene adipamide wherein the steps of spinning, drawing and texturizing are combined in immediate succession, the improvement which comprises:
a. melt-spinning filaments of said fiber-forming polymer at a temperature of between 260° C and 295° C and at a spin-draw melt attenuation ratio of between 1:10 and 1:60;
b. drawing the spun filaments only on forwarding elements for the development of a uniform tensile strength and modulus of elasticity, said spun filaments being collected as a bundle leaving the melt-spinning stage and directly wound on at least two forwarding elements, of which the initial elements have a surface temperature of between 50° C and 120° C and the final element has a surface temperature of between 80° C and 350° C at a draw ratio such that the drawn filaments on leaving the drawing stage, have an extensibility of between 10 and 50%; and
c. air-texturizing said filaments as a collected yarn leaving the drawing stage at a velocity of between 800 and 3,000 m/min, the overfeed in the texturizing stage being from 10 to 50% at a filament temperature, prior to texturization, of between 50° C and 180° C, the spinning, drawing and texturizing yielding a yarn with a total final denier of from 100 to 3,600 dtex and an individual filament denier of from 3 to 30 dtex.

4,096,227

PROCESS FOR PRODUCING FILLED POROUS PTFE PRODUCTS

Robert W. Gore, Newark, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Division of Ser. No. 376,188, Jul. 3, 1973, Pat. No. 3,953,566, which is a continuation of Ser. No. 39,753, May 21, 1970, abandoned. This application Dec. 3, 1975, Ser. No. 637,219
The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.
Int. Cl.[2] B29D *7/24*
U.S. Cl. 264—210 R **14 Claims**



1. A process for the production of a porous article of manufacture of a polymer of tetrafluoroethylene containing a filler, which process comprises:
(a) blending a powder consisting essentially of highly crystalline poly(tetrafluoroethylene) with a filler;
(b) extruding said polymer powder and filler using a conventional lubricated extrusion technique to form an extrudate;
(c) removing the lubricant from said extrudate by conventional methods; and
(d) stretching said extrudate containing unsintered poly(tetrafluoroethylene) and filler at a rate exceeding about 10% per second, said stretching being performed while said extrudate is held at a temperature of about 35° C to 327° C.

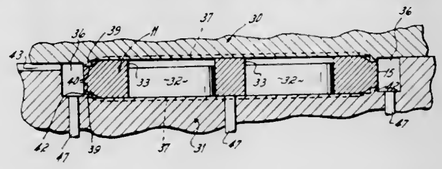
4,096,228

METHOD OF MAKING A TWO-COMPONENT GASKET

John W. Decker, Stockbridge, Mich., assignor to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Division of Ser. No. 603,021, Aug. 8, 1975, Pat. No. 3,986,721. This application Apr. 5, 1976, Ser. No. 673,661
Int. Cl.[2] B29F *1/06, 1/10*
U.S. Cl. 264—271 **6 Claims**

1. In the manufacture of a two-piece gasket comprising a thinner rigid component and a thicker preformed compressible component wherein the thicker component has two flat opposite major faces which are generally parallel to one another and a side surface between said major faces, and the thinner component is bonded to the side surface of the thicker component, a method of forming a reproducible, durable edge where the thinner component adjoins the thicker component,
said method comprising,
compressing said compressible component between mating mold halves which engage the major faces thereof,
forming said thinner component in situ by an injection molding process wherein a flowable, hardenable resin is injected into a die cavity formed by said mold halves so that the resin contacts said side surface of said compressible component,
providing an elongated narrow rib on at least one said mold half, said rib positioned adjacent the edge of said side surface of said compressible component, said rib defining



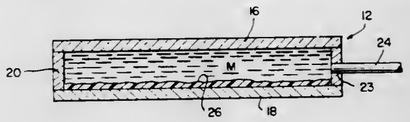
a side edge of the cavity into which said resin is injected so that the resin flows up to and against said rib,
applying pressure to said mold halves during said molding so that said rib locally deforms said compressible component beyond its elastic limit to a thickness less than that of the thinner component,
said rib forming a dam preventing flow of said resin past it onto the major face of said compressible component thereby demarcating said edge,
and causing said resin to rigidify within said cavity thereby to form said rigid component in situ, bonded to the side surface of the compressible component, and bounded by a groove formed by said rib.

4,096,229

METHOD OF MAKING A MOLDED ARTICLE WITH A TEXTURED SURFACE

Yossef Maivar, Stirling, N.J., assignor to Glasflex Corporation, Stirling, N.J.

Filed Sep. 4, 1975, Ser. No. 610,287
Int. Cl.[2] B29C *5/00;* B29D *23/08*
U.S. Cl. 264—316 **5 Claims**



1. In the method for forming castings made from a polymerizable hydrophobic monomeric material wherein a liquid hydrophobic polymerizable plastic monomer material is pumped into a cavity, which is defined by a pair of spaced apart smooth surfaces plates that are sealed about the outer perimeter, and polymerized therein under conditions of elevated temperature and thereafter cooled to a solid, self-supporting casting, the improvement comprising the preliminary step of applying a generally flat, undistorted and relatively thin heat stretchable thermoplastic sheet of polyolefinic material having a thickness of about 0.00025 to about 0.02 inch across at least a portion of at least one of the spaced apart smooth surfaces, causing said thermoplastic sheet to stretch when in contact with the liquid polymerizable monomer material during polymerization of said material and during cooling of said polymerized material, shrinking and distorting the sheet differentially relative to said material in random fashion so as to produce a randomly textured surface on at least the corresponding adjacent portion of the polymerized casting.

4,096,230

METHOD OF FABRICATING A MOISTURE-EXPANDABLE PROSTHESIS

Raymond H. Haerr, Cincinnati, Ohio, assignor to Xomed Inc., Cincinnati, Ohio

Division of Ser. No. 608,148, Aug. 27, 1975, Pat. No. 4,034,759.
This application Mar. 3, 1977, Ser. No. 774,128
Int. Cl.² B29D *27/00*
U.S. Cl. 264—321 6 Claims

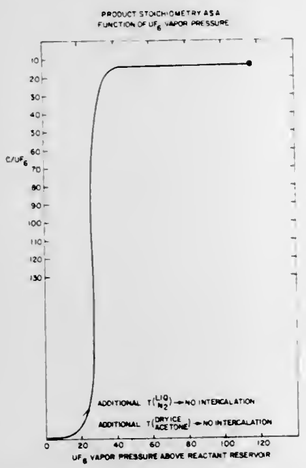
1. A method of fabricating an elongate, dehydrated, moisture-expandable prosthesis from a length of expanded, dehydrated, regenerated, cellulose sponge material, which comprises: forming the expanded, dehydrated, regenerated, cellulose sponge material into a hollow cylinder, the ends of which are connected together by the open bore extending axially through the hollow cylinder; applying radial compressive forces to the outer surface of the hollow cylinder to compact same and to reduce the diameter thereof without substantially altering its overall length; and substantially closing said open bore when said radial compressive forces are applied to said cylinder so that upon expansion, said cylinder will reassume a hollow configuration.

4,096,231

SEPARATION OF URANIUM HEXAFLUORIDE FROM PLUTONIUM HEXAFLUORIDE BY MEANS OF SELECTIVE INTERCALATION IN GRAPHITE

Lawrence B. Ebert, and John P. DeLuca, both of New Providence, N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Nov. 18, 1976, Ser. No. 743,073
Int. Cl.² C01G *42/06, 56/00*
U.S. Cl. 423—19 5 Claims



1. A method for selectively separating and sequestering plutonium from uranium comprising contacting a uranium hexafluoride and plutonium hexafluoride mixture with graphite at a UF_6 partial pressure of 26 torr or less whereby PuF_6 is selectively intercalated into the graphite while the graphite is resistant to UF_6 intercalation at such UF_6 partial pressure.

4. A method for selectively separating and sequestering plutonium from uranium comprising contacting a mixture of uranium hexafluoride and plutonium hexafluoride with graphite that has been pretreated with a oxidant rendering said graphite more resistant to UF_6 intercalation, at a UF_6 partial pressure of greater than 26 torr, whereby PuF_6 is selectively intercalated into said graphite, said graphite being resistant to UF_6 intercalation at such UF_6 partial pressure.

4,096,232

EXTRACTION OF ANTIMONY FROM ANTIMONY SULFIDES BEARING SOLIDS

John William Vogt, Chagrin Falls, Ohio, assignor to The Harshaw Chemical Company, Cleveland, Ohio

Filed Mar. 24, 1977, Ser. No. 780,736
Int. Cl.² C01B *29/02*
U.S. Cl. 423—87 33 Claims

17. In a method of extracting antimony from antimony sulfide bearing solids by oxidation of an aqueous mixture of the solids and an acid, and recovering trivalent antimony resulting from said oxidation, the improvement comprising conducting the oxidation in the presence of a catalyst comprising a water-soluble copper salt, a quinone, a hydroquinone, or mixtures of one or more of these.

30. In a method of extracting antimony from antimony sulfide bearing ores by oxidation of a leaching liquor obtained by leaching the antimony from the solids with an aqueous basic solution and recovering pentavalent antimony resulting from said oxidation, the improvement comprising conducting the oxidation in the presence of a catalyst comprising a water-soluble copper salt, a quinone, a hydroquinone, or mixtures of one or more of these.

4,096,233

PROCESS FOR THE REMOVAL OF IMPURITIES CONTAINED IN A ZINC AND CADMIUM SULFATE SOLUTION

Fernand Jacques Joseph Bodson, Angleur, Belgium, assignor to Societe des Mines et Fonderies de Zinc de la Vieille Montagne, S.A., Angleur, Belgium

Filed Jun. 7, 1976, Ser. No. 693,620
Claims priority, application Belgium, Jun. 19, 1975, 830450
Int. Cl.² C01G *9/06, 11/00*
U.S. Cl. 423—101 3 Claims

1. A process for the substantial removal of the impurities manganese, cobalt and nickel from a zinc or cadmium sulfate solution which comprises substantially simultaneously precipitating said impurities by adding to said zinc or cadmium sulfate solution a member selected from the group consisting of a solution of $H_2S_2O_8$, an ammonium or an alkali metal salt thereof, which has been hydrolyzed to provide the maximum content of H_2SO_5, the ammonium or an alkali metal salt thereof, while maintaining the pH of said zinc or cadmium sulfate solution between 1.5 and 4.5.

4,096,234

PRODUCTION OF ANHYDROUS ALUMINUM CHLORIDE FROM CLAY USING CATALYST AND RECYCLING OF SILICON CHLORIDE

Edward S. Martin, and David A. Wohleber, both of Lower Burrell, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Mar. 23, 1977, Ser. No. 780,534
Int. Cl.² C01F *7/56, 7/58*
U.S. Cl. 423—135 11 Claims

1. A process for the production of aluminum chloride from clay containing aluminum oxide and silicon oxide which comprises:

(a) chlorinating the clay by contacting it with a mixture consisting essentially of:

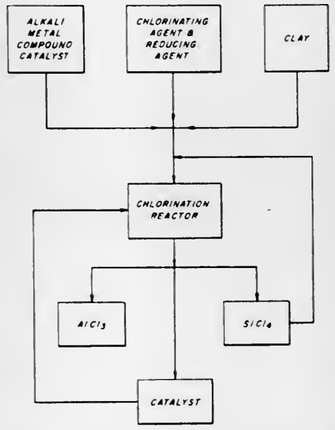
(1) a chlorinating agent;

(2) a reducing agent;

(3) an alkali metal compound capable of reacting with the aluminum oxide and the chlorinating agent to form an alkali metal aluminum halide catalyst; and

(4) $SiCl_4$;

(b) separating the reaction products from said chlorination step; and



(c) recycling back to the chlorination step substantially all of the $SiCl_4$ separated from the reaction products

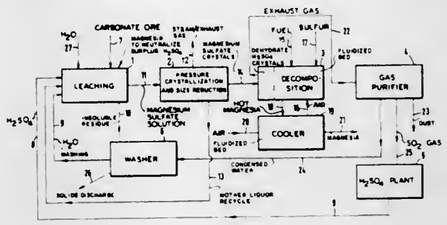
to thereby promote the chlorination of the alumium oxide in the clay while suppressing net chlorination of the silicon oxide to thereby produce substantially no additional $SiCl_4$.

4,096,235

PROCESS OF PRODUCING MAGNESIA WITH SULFURIC ACID RECYCLE

Harry Edward Cross, Johannesburg, South Africa; Wolfgang Krieger, Oberursel, Germany; Eberhard Anschutz, Frankfurt am Main, Germany; Lothar Reh, Bergen-Enkheim, Germany, and Martin Hirsch, Frankfurt am Main, Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 545,660, Jan. 30, 1975, abandoned. This application Oct. 13, 1976, Ser. No. 731,890
Claims priority, application Germany, Feb. 21, 1974, 2408308
Int. Cl.² C01F *5/12*
U.S. Cl. 423—166 5 Claims



1. Process for producing magnesia from magnesium-containing carbonate ores which comprises:

(a) leaching said ore with sulfuric acid;

(b) neutralizing the solution from (a) with magnesia and separating undissolved impurities;

(c) crystallizing magnesium sulfate from the solution from (b) under superatmospheric pressure and at temperatures above 150° C;

(d) separating and cooling the magnesium sulfate crystals so that they contain 1.5–4 mols of water of crystallization and thereby have a crystal fineness suitable for decomposition in the fluidized bed reaction zone of step (f);

(e) dehydrating and/or heating the crystals from (d) in a suspension-type heat-exchanger with exhaust gases from the fluidized-bed reaction zone of step (f);

(f) feeding the crystals from (e) after separation to a fluidized bed reaction zone where they are decomposed to form magnesia and sulfur dioxide, the heat required for the decomposition reaction being generated by approximately a stoichiometric combustion of fuel charged into the fluidized bed reaction zone;

(g) removing magnesia from the fluidized bed reaction zone and feeding same to a multi-stage fluidized-bed cooler operated with air as a fluidized gas;

(h) feeding fluidized air from the fluidized bed cooler to the fluidized bed reaction zone of step (f);

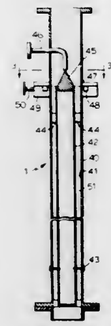
(i) converting the sulfur dioxide produced in step (f) into sulfuric acid and recycling same to leaching step (a).

4,096,236

GAS SCRUBBING METHOD

Richard J. Brooks, Seattle, and Burton Brooks, Bellevue, both of Wash., assignors to The Chemithon Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 393,192, Aug. 30, 1973, abandoned. This application Dec. 2, 1976, Ser. No. 746,681
Int. Cl.² B01D *53/34*
U.S. Cl. 423—210 15 Claims



1. A method for removing pollutants from effluent gases by a scrubbing operation, said method comprising the steps of:

providing a pair of separate, discrete, descending, horizontally spaced, facing films of scrubbing liquid defining therebetween an unobstructed, vertically extending flow path substantially devoid of directional change;

backing each of said films with a rigid surface at least vertically and horizontally coextensive with its respective film;

the disposition of said facing films of scrubbing liquid along a horizontal cross-section of said flow path being substantially parallel;

the disposition of said facing films along a vertical cross-section of the flow path being substantially parallel;

flowing said effluent gases downwardly from above said scrubbing liquid and along said flow path between said pair of vertically descending films;

maintaining said effluent gases in intimate concurrent flow with said pair of films of scrubbing liquid along said flow path;

removing said pollutants from said effluent gases to said liquid films during said intimate concurrent flow;

discharging scrubbed gases and scrubbing liquid from the downstream end of said flow path;

separating said scrubbed gases from said scrubbing liquid downstream of said flow path;

and conducting substantially the entirety of the scrubbing operation along said unobstructed flow path defined by said facing films.

4,096,237

IMMUNOASSAY FOR β-ENDORPHIN

Choh Hao Li, Berkeley, Calif., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 14, 1977, Ser. No. 777,262
Int. Cl.² A61K *43/00*; G01N *33/16*
U.S. Cl. 424—1 **12 Claims**

8. A radioimmunoassay for β-endorphin or a fragment thereof containing the (6–15) residue sequence which assay comprises incubating a mixture comprising the test sample containing an unknown amount of said β-endorphin or a fragment thereof containing the (6–15) residue sequence, a radiolabelled β-endorphin tracer compound and an antibody having the property of specifically binding β-endorphin or fragments thereof containing the (6–15) residue sequence; separating the free and the bound β-endorphin; counting the radioactivity from either the free or bound β-endorphin and determining the concentration of β-endorphin or fragment thereof in the test sample by reference to a standard curve.

4,096,238

METHOD FOR ADMINISTERING DRUG TO THE GASTROINTESTINAL TRACT

Alejandro Zaffaroni; Alan S. Michaels, both of Atherton, and Felix Theeuwes, Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 536,006, Dec. 23, 1974, Pat. No. 4,036,227, which is a continuation-in-part of Ser. No. 354,344, Apr. 25, 1973, abandoned. This application Mar. 9, 1977, Ser. No. 775,774
Int. Cl.² A61K *9/22*
U.S. Cl. 424—15 **1 Claim**

1. A method for orally administering an active agent at a controlled rate to the gastrointestinal tract of a warm blooded animal comprising,

A. admitting into the gastrointestinal tract a device comprising;

(1) a shaped wall formed of a semipermeable material that is permeable to the passage of gastrointestinal fluid and substantially impermeable to active agent, said wall surrounding and forming;

(2) a compartment containing the active agent that is soluble in fluid that enters the compartment and which agent exhibits an osmotic pressure gradient across the wall against the gastrointestinal fluid;

(3) a layer formed of an erodible enteric material on the exterior surface of the semi-premeable wall;

(4) a passageway in the wall for releasing said agent from said device, said passageway having a maximum cross-sectional area A_p of

$$\frac{L}{F} \times \frac{Q_p}{t} \times \frac{1}{DS}$$

wherein L is the length of passageway, Q_p/t is the mass of agent released per unit time, D is the diffusion coefficient of agent in the released solution, S is the solubility of agent in the fluid and F has a value of approximately 2 to 1000, said passageway having a minimum area, A_s defined by

$$\left[\frac{Lv}{t} \times 8 \times \frac{\pi\eta}{\Delta P}\right]^{\frac{1}{4}}$$

wherein L is the length of the passageway, t is the volume of agent released per unit time, π is 3.14, η is the viscosity of the solution being released, and ΔP is the hydrostatic pressure differences between the inside and the outside of the compartment and having a value of up to about 20 atmospheres;

B. bioeroding the enteric layer in the gastro-intestinal fluids in the environment of use at a controlled rate to regulate the amount of fluid available to the wall for imbibition, with fluid imbibed through the wall into the compartment in a tendency towards osmotic equilibrium at a rate determined by the permeability of the wall and the osmotic pressure gradient across the wall thereby continuously dissolving said active agent and, thereby

C. dispensing said active agent from the device to the gastrointestinal tract through the passageway at a controlled rate over a prolonged period of time.

4,096,239

INERT CORE IMPLANT PELLET

Martin Katz, Los Altos Hills, and John S. Kent, Palo Alto, both of Calif., assignors to Syntex Corporation, Panama

Continuation-in-part of Ser. No. 572,031, Apr. 28, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,727
Int. Cl.² A61K *9/22, 31/565*
U.S. Cl. 424—21 **12 Claims**

1. A solid, spherical, subcutaneously implantable pellet for producing a greater than normal weight gain in ruminants, which implantable pellet exhibits a substantially constant rate of release of active agents over a given time period and an abrupt termination of drug release at the end of said time period, said pellet comprising

(a) a biocompatible, inert, spherical core having a diameter of about 2 to about 10 mm and

(b) at least one biocompatible, biosoluble coating having a substantially uniform thickness of about 0.05 to about 1.0 mm intimately adhering to and completely covering said inert core, the composition of said coating comprising a substantially homogeneous mixture of (i) about 5 to about 90% weight of estradiol, estradiol benzoate, or mixtures thereof as the sole active agent(s), and (ii) about 10 to about 95% weight of a pharmaceutically suitable carrier, said inert, spherical core being at least half the diameter of said spherical, implantable pellet.

4,096,240

SKIN LIGHTENING COMPOSITION AND METHOD

Girish Prasad Mathur, Bombay, India, assignor to Lever Brothers Company, New York, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,570
Claims priority, application United Kingdom, Apr. 10, 1975, 14825/75
Int. Cl.² A61K *7/42*
U.S. Cl. 424—59 **18 Claims**

1. A cosmetic composition for application to the skin, comprising:

(a) from about 0.5 percent to about 5 percent by weight of niacinamide, or a precursor thereof;

(b) from about 0.1 to about 10 percent by weight of an ultraviolet absorbing sunscreen; and

(c) a cosmetically acceptable vehicle.

4,096,241

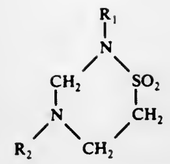
TOOTH PREPARATIONS.

Peter Geistlich, Stansstadt, and Rolf Pfirrmann, Lucerne, both of Switzerland, assignors to Ed. Geistlich Sohne A.G. fur Chemische Industrie, Lucerne, Switzerland

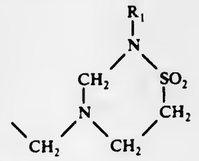
Filed Jun. 24, 1976, Ser. No. 699,328
Claims priority, application United Kingdom, Jun. 24, 1975, 26767/75
Int. Cl.² A61K *7/22*
U.S. Cl. 424—54 **6 Claims**

1. A method of treatment or prophylaxis of parodontosis comprising applying to the teeth and gums of the subject an effective amount of at least one compound of formula

I



wherein R_1 represents a hydrogen atom or a straight or branched alkyl group having from 1 to 6 carbon atoms, and R_2 represents a hydrogen atom or a group of formula



wherein R_1 is as defined above.

4,096,242

STABILIZED PRODUCT OF MANUFACTURE CONTAINING A BRANCHED CHAIN DODECYL ISOMERIC MIXTURE OF (DODECYL-HYDROXYPHENYL)-BENZO-TRIAZOLE AND A HEAT OR LIGHT SENSITIVE MATERIAL

Albert F. Strobel, Delmar, N.Y., assignor to GAF Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 500,083, Aug. 23, 1974, Pat. No. 3,983,132. This application Jun. 24, 1976, Ser. No. 699,243
Int. Cl.² A61K *7/42*; C08K *5/34*; C09G *1/08*; C09F *7/00*
U.S. Cl. 424—59 **20 Claims**

1. A composition comprising a light or heat sensitive material and between about 0.01 and about 15 weight percent of a normally liquid stabilizing composition comprising a liquid mixture of branched chain dodecyl isomers of dodecyl-hydroxyphenyl benzotriazole, said mixture having a melting point below 0° C.

4,096,243

COMPOSITION FOR LIGHTENING HAIR CONTAINING AN OXIDIZING AGENT AND CERTAIN QUATERNARY AMINES

Raymond Feinland, Stamford, Conn.; Stanley Pohl, New Rochelle, and Michael Hnatchenko, Bronx, both of N.Y., assignors to Clairol Incorporated, New York, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,503
Int. Cl.² A61K *7/135*
U.S. Cl. 424—62 **11 Claims**

1. A composition suitable for lightening hair comprising an aqueous vehicle containing an effective amount of an oxidizing agent and from about 0.05 to 5% by weight of a quaternary amine compound of the formula:

(I)

in which:

R^1 and R^2 are long chain aliphatic hydrocarbon radicals having about 10 to 26 carbons;

R^3 and R^4 are lower alkyl radicals having about 1 to 5 carbons; and

X is an anion said composition containing sufficient alkalizing agent to give said composition a pH in the range of from 8 to 11.

4,096,244

IMMUNOGLOBULINS FOR ADMINISTRATION TO PIGLETS

Freeman Oswald Newson, Toronto, and Michael Charles Attwell, Islington, both of Canada, assignors to Canada Packers Limited, Toronto, Canada

Filed Jun. 16, 1976, Ser. No. 696,869
Claims priority, application Canada, Jun. 20, 1975, 229842
Int. Cl.² A61K *39/00, 35/16*
U.S. Cl. 424—85 **8 Claims**

1. A dried particulate porcine or bovine blood serum, said serum containing active immunoglobulins and having a sodium chloride content of less than about 3% by weight, and being acceptable to and palatable to newborn piglets for oral administration thereto as a feed stuff component, so as to confer on the piglets increased protection against infection.

4,096,245

PROPHYLACTIC PREPARATION FOR TREATING MINK INFECTION CAUSED BY *PSEUDOMONAS AERUGINOSA*

Yuzuru Homma, Tokyo; Takeshi Shimizu, Kodaira, and Kazuo Okada, Tokyo, all of Japan, assignors to President of The University of Tokyo, Tokyo, Japan

Filed Mar. 8, 1976, Ser. No. 664,835
Claims priority, application Japan, Mar. 12, 1975, 50-29105
Int. Cl.² A61K *39/02*
U.S. Cl. 424—92 **4 Claims**

1. A method of preventing mink infection by Pseudomonas aeruginosa by immunizing said mink with a dose of 50 - 4,000 μg/kg of a prophylactic preparation (on the basis of OEP) in the form of a vaccine whose effective component consists mainly of protein and a small amount of lipid and sugar derived from Pseudomonas aeruginosa.

4,096,246

ZINC BACITRACIN COMPOSITION FOR USE AS A FEED SUPPLEMENT AND METHOD FOR MAKING THE SAME

Brigt Oystese, Haslum, Norway, assignor to A/S Apothekernes Laboratorium for Specialpraeparater, Oslo, Norway

Filed Oct. 6, 1976, Ser. No. 730,092
Int. Cl.² A61K *37/00*
U.S. Cl. 424—177 **16 Claims**

1. A process for the production of a zinc bacitracin composition with enhanced stability suitable for use in animal feeds which includes precipitating zinc bacitracin from a fermentation broth, adjusting the pH of the fermentation broth with alkali to within the range of 6.0 to 7.0, removing water by evaporation from the fermentation broth without filtration to yield a slurry containing between about 25 to 35 weight percent dry matter, adding about 50 to 100 weight percent based on the dry matter of the slurry of a finely divided carrier in which 80 weight percent of the particles making up the carrier have a dimension of below 40 microns, blending the mixture to uniformly disperse the carrier particles, spray drying such uniform dispersion at a temperature of between about 300° to 450° C. so that the water is rapidly removed to produce finely divided substantially spherical particles containing the zinc bacitracin in intimate contact with the carrier.

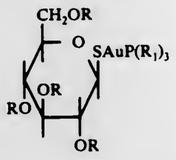
4,096,247

GOLD THIO GLUCOPYRANOSIDE COMPOUNDS AND METHOD OF USE

Ivan Lantos, Blackwood, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Feb. 16, 1977, Ser. No. 769,146
Int. Cl.[2] A61K *31/70*; C07H *11/04*
U.S. Cl. 424—180 **7 Claims**

1. A chemical compound of the formula:



in which:

R and R_1 are each respectively lower alkyl of 1–4 carbons.

5. A method of producing anti-arthritic activity which comprises administering internally to a subject in need of treatment an effective amount of a compound of claim 1.

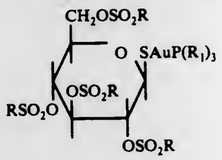
4,096,248

SULFONYL CONTAINING ORGANIC GOLD GLYCOSIDE COMPOUNDS AND METHOD OF USE

Ivan Lantos, Blackwood, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Feb. 16, 1977, Ser. No. 769,145
Int. Cl.[2] A61K *31/70*; C07H *5/10*
U.S. Cl. 424—180 **7 Claims**

1. A chemical compound of the formula:



in which:

R and R_1 are each respectively lower alkyl of 1–4 carbons.

5. A method of producing anti-arthritic activity which comprises administering internally to a subject in need of treatment an effective amount of a compound of claim 1.

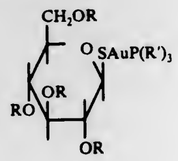
4,096,249

TRIALKYLPHOSPHINEGOLD(I)-LOWER ALKYL CARBAMOYL GLUCOPYRANOSIDES

Ivan Lantos, Blackwood, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Feb. 16, 1977, Ser. No. 769,147
Int. Cl.[2] A61K *31/70*; C07H *11/04*
U.S. Cl. 424—180 **6 Claims**

1. A compound of the formula:



in which:

R is CO—NH-lower alkyl and

R′ is straight or branched lower alkyl.

6. A method of producing antiarthritic activity which comprises administering internally to an animal a compound of claim 1.

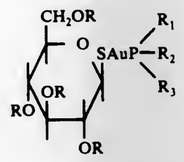
4,096,250

TRI-SUBSTITUTED PHOSPHINEGOLD(I) 1-THIO-β-D-GLUCOPYRANOSIDES

David T. Hill, North Wales, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Feb. 25, 1977, Ser. No. 772,035
Int. Cl.[2] A61K *31/70*; C07H *11/04, 13/12*
U.S. Cl. 424—180 **7 Claims**

1. A compound of the formula:



in which:

R is hydrogen, acetyl, lower alkyl-NHCO, lower alkyl-SO_2 or lower alkyl;

R_1 is phenyl optionally substituted by halogen or lower alkoxy and

R_2 and R_3 are lower alkyl or lower alkoxy.

7. A method of producing antiarthritic activity which comprises administering internally to an animal a compound of claim 1.

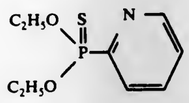
4,096,251

DIETHYL 2-PYRIDINE THIONOPHOSPHONATE AS AN INSECTICIDE ACTIVATOR

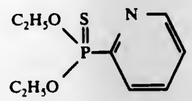
Leland S. Pitt, San Jose; George B. Large, Orinda, and Alan MacDonald, Albany, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 30, 1976, Ser. No. 719,033
Int. Cl.[2] A01N *9/36*; C07D *213/04*
U.S. Cl. 424—200 **9 Claims**

1. A compound having the formula



2. An insecticidal composition comprising N-(mercaptomethyl)phthalimide S-(O,O-dimethyl phosphorodithioate) and an activating amount of



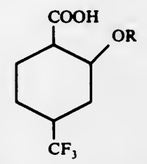
4,096,252

4-TRIFLUOROMETHYLBENZOIC ACID DERIVATIVES AS THROMBOEMBOLIC AGENTS

Emilia Francia Barra, and Antonio Carmelo Marin Moga, both of Barcelona, Spain, assignors to J. Uriach & Cia S.A., Barcelona, Spain

Filed Jun. 10, 1976, Ser. No. 694,523
Int. Cl.[2] A61K *31/60*
U.S. Cl. 424—230 **2 Claims**

1. A method for the treatment and prophylaxis of cardiovascular conditions due to an abnormal platelet aggregation, coagulation and fibrinolysis comprising administering to a patient by oral administration a compound of the formula



wherein R is hydrogen or lower alkanoyl as active agent, together with a carrier therefor, at a dosage of about 1 to 6 unit doses of about 200 to 300 mg each of said active agent or about 1 to 6 units at about 5 ml each of the active agent when in the form of a syrup.

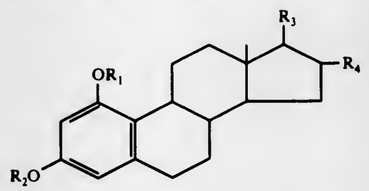
4,096,253

1-OXYGENATED STEROIDS

Michael P. Wachter, Bloomsbury, N.J., and Joseph A. Settepani, Vienna, Va., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Jul. 6, 1976, Ser. No. 703,049
Int. Cl.[2] C07J *17/00, 1/00*
U.S. Cl. 424—238 **11 Claims**

1. A compound of the formula:



wherein R_1 is lower alkanoyl wherein the alkyl group has 2–6 carbon atoms; lower alkyl wherein the alkyl group has 1–5 carbon atoms and trialkylaminosulfoxy wherein the alkyl group has 1–3 carbon atoms; R_2 is lower alkyl wherein the alkyl group has 1–5 carbon atoms and trialkylaminosulfoxy wherein the alkyl group has 1–3 carbon atoms; R_3 is oxo, cyanoethoxy and trifluoroalkanoyloxy wherein the alkanoyloxy group has 2–5 carbon atoms; and R_4 is halo, hydrogen, lower alkanoyloxy wherein the alkanoyloxy group has 2–5 carbon atoms and hydroxy; provided that when R_3 is oxo, one of R_1 or R_2 is trialkylaminosulfoxy.

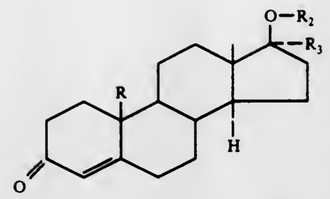
4,096,254

METHOD OF TREATING THE SYMPTOMS OF MENOPAUSE AND OSTEOPOROSIS

Harvey D. Benson, Cincinnati; Joyce Francis Grunwell, Hamilton; John O'Neal Johnston, Cincinnati, all of Ohio, and Vladimir Petrow, Chapel Hill, N.C., assignors to Richardson-Merrell Inc., Wilton, Conn.

Continuation-in-part of Ser. No. 684,949, May 10, 1976, abandoned. This application Feb. 22, 1977, Ser. No. 770,400
Int. Cl.[2] C07J *1/00*; A61K *31/56*
U.S. Cl. 424—242 **18 Claims**

1. A method of treating the syptoms of menopause in a patient in need thereof which comprises administering to said patient a compound of the formula in an amount effective to treat the symptoms of menopause:



wherein R is —CHO or $—CH_2OR_1$; each of R_1 and R_2 is hydrogen, alkylcarbonyl wherein the alkyl moiety has from 1 to 20 carbon atoms and is straight or branched, benzoyl, phenylalkylcarbonyl wherein the alkyl moiety has from 1 to 6 carbon atoms and is straight or branched or cycloalkylcarbonyl wherein the cycloalkyl moiety has from 5 to 10 carbon atoms; R_3 is hydrogen; or R_2 and R_3 together form a double bond between the 17- position carbon atom and the oxygen atom.

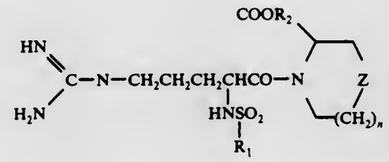
4,096,255

N^2-NAPHTHALENESULFONYL-L-ARGININAMIDES, AND PHARMACEUTICAL SALTS, COMPOSITIONS AND METHODS

Ryoji Kikumoto, Machida; Yoshikuni Tamao, Yokohama; Kazuo Ohkubo, Machido; Tohru Tezuka, Yokohama; Shinji Tonomura, Tokyo, all of Japan; Shosuke Okamoto, 15-18, Asahigaoka 3-chome, Tarumi-ku, Kobe-shi, Hyogo, Japan, and Akiko Hijikata, Kobe, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo and Shosuke Okamoto, both of, Japan

Continuation-in-part of Ser. No. 671,436, Mar. 29, 1976, and Ser. No. 671,568, Mar. 29, 1976, Pat. No. 4,049,645, each is a division of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Sep. 14, 1976, Ser. No. 723,474
Int. Cl.[2] A61K *31/54*; C07D *279/12*
U.S. Cl. 424—246 **9 Claims**

1. N^2-naphthalenesulfonyl-L-argininamides having the formula



and the pharmaceutically acceptable salts thereof, wherein R_1 is selected from the group consisting of naphthyl, 5,6,7,8-tetrahydronaphth-1-yl, 5,6,7,8-tetrahydronaphth-2-yl and naphthyl substituted with one or two substituents selected from the group consisting of halo, nitro, cyano, hydroxy, C_1-C_{10} alkyl, C_1-C_{10} alkoxy, and di(C_1-C_{10}) alkylamino; R_2 is selected from the group consisting of hydrogen, C_1-C_{10} alkyl, phenyl, naphthyl, phenyl-C_1-C_6-alkyl, and naphthyl-C_1-C_2 alkyl; Z is oxy, thio, or sulfinyl; and *n* is an integer of 0 or 1.

8. A pharmaceutical composition for inhibiting activity and suppressing activation of thrombin in vivo, which comprises an amount effective to inhibit activity and suppress activation of thrombin in vivo, of a compound of claim 1 and a pharmaceutically acceptable carrier.

9. A method of inhibiting activity and suppressing activation of thrombin in vivo, which comprises administering to a patient an amount effective to inhibit activity and suppress activation of thrombin in vivo, of the N^2-naphthalenesulfonyl-L-argininamide of claim 1.

4,096,256

7-ACYL-3-(UREIDOALKYL SUBSTITUTED TETRAZOLYLTHIOMETHYL) CEPHALOSPORINS, ANTIBACTERIAL COMPOSITIONS CONTAINING THEM, AND METHODS OF TREATING BACTERIAL INFECTIONS USING THEM

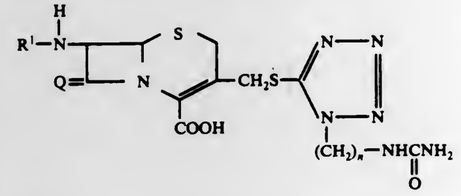
David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 639,033, Dec. 9, 1975, Pat. No. 4,025,626. This application Dec. 22, 1976, Ser. No. 753,245

Int. Cl.[2] A61K *31/545;* **C07D** *501/50, 501/56, 257/04*

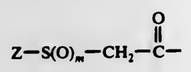
U.S. Cl. 424—246 **11 Claims**

1. A compound of the formula:



in which:

R^1 is an acyl group of the formula:



where:

Z is methyl, trifluoromethyl, trifluoroethyl, pyridyl or cyanomethyl;

m is zero to two; and

n is two to five,

or a non-toxic pharmaceutically acceptable salt thereof.

6. An antibacterial pharmaceutical composition comprising a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

8. A method of treating bacterial infections comprising administering internally by injection to an infected or susceptible warm-blooded animal an antibacterially effective but non-toxic dose of a compound as claimed in claim 1.

4,096,257

SUBSTITUTED IMIDAZO [1,2-d]-AS-TRIAZINES

Judith Menschik, Tappan, N.Y., and Rolf Paul, River Vale, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 23, 1977, Ser. No. 799,837

Int. Cl.[2] A61K *31/53;* **C07D** *471/04*

U.S. Cl. 424—249 **5 Claims**

1. 5-n-Propyl-imidazo[1,2-d]-as-triazin-8(7H)-one.

4. A therapeutic composition in dosage unit form useful for meliorating asthma in mammals comprising from about one milligram to about one hundred milligrams per kilogram of body weight per daily dosage unit, in association with a pharmaceutical carrier, of 5-n-propyl-imidazo[1,2-d]-as-triazin-8(7H)-one.

4,096,258

METHOD FOR PREPARING A STABLE CLEAR LIQUID RELEASE AGENT

Harold Wayne Hanson, Los Angeles, Calif., assignor to Par-Way Mfg. Co., Los Angeles, Calif.

Continuation-in-part of Ser. No. 532,850, Dec. 16, 1974, abandoned, and a continuation of Ser. No. 621,309, Oct. 10, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 772,929

Int. Cl.[2] A23D *5/00*

U.S. Cl. 426—250 **9 Claims**

1. A method for preparing a stable clear liquid release agent comprising a liquid blend of fatty oils the method comprising the steps of blending about 57 percent by weight of soybean oil, about 38 percent by weight of coconut oil and about 5 percent by weight of lecithin at a temperature of at least 65° C. to form a substantially uniform blend, chilling said blend uniformly to a temperature between about 20° to 25° C. to form a chilled blend, and working said chilled blend by agitation to provide a clear liquid release agent.

4,096,259

NON-AMPHETAMINIC PSYCHOSTIMULATING COMPOSITIONS OF 1,4-DISUBSTITUTED PIPERAZINES

André Buzas, 25 Route de Versailles, Bievres, Essonne, and Jean-Marie Melon, 158 rue de Courcelles, Paris 17eme, both of France

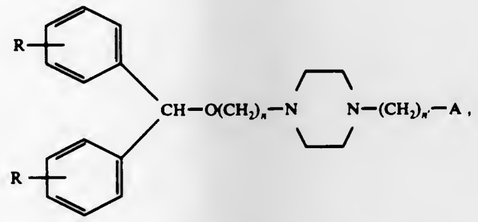
Filed May 10, 1976, Ser. No. 684,846

Claims priority, application France, May 13, 1975, 75 14804

Int. Cl.[2] A61K *31/495*

U.S. Cl. 424—250 **4 Claims**

1. A pharmaceutical composition of nonamphetaminic psychostimulating activity comprising as active substance a 1,4-disubstituted piperazine of the formula:



wherein R and R′ are identical or different and are hydrogen or fluorine, *n* being equal to 2, *n′* being equal to 2 or 3 and A being selected from the group consisting of COOH, COONa, $COOCH_3$ and $COOC_2H_5$, in a pharmaceutically acceptable carrier.

4,096,260

NOVEL INDOLES

Andre Allais, Gagny; Jean Meier, La Varenne Saint-Hilaire, and Roger Deraedt, Pavillons-sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

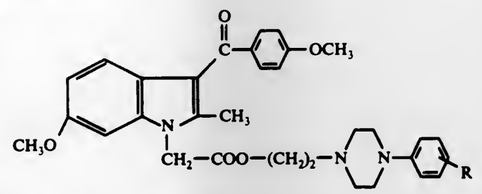
Filed Jan. 17, 1977, Ser. No. 760,107

Claims priority, application France, Jan. 21, 1976, 76 01561

Int. Cl.[2] A61K *31/495;* **C07D** *295/14*

U.S. Cl. 424—250 **12 Claims**

1. A compound selected from the group consisting of indoles of the formula



wherein R is in the 2-, 3- or 4-position and is selected from the group consisting of hydrogen, halogen, $-CF_3$, $-SCF_3$, $-OCF_3$ and alkyl and alkoxy of 1 to 8 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

6. An analgesic composition comprising an analgesically effective amount of at least one compound of claim 1 and an inert pharmaceutical carrier.

4,096,261

DIBENZODIAZEPINES

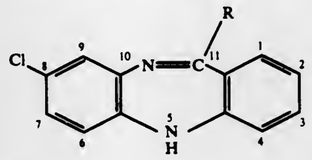
Bruce Wayne Horrom, and William Douglas Barta, both of Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Feb. 23, 1977, Ser. No. 771,215

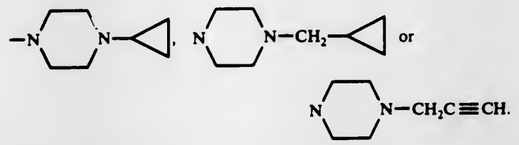
Int. Cl.[2] C07D *403/04;* **A61K** *31/55*

U.S. Cl. 424—250 **8 Claims**

1. A compound of the structure

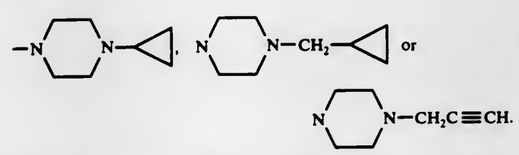


wherein R is



5. A composition of long lasting activity in the treatment of schizophrenic comprising as the active component a compound of the formula

wherein R is



and a pharmaceutically acceptable carrier.

4,096,262

POUR-ON ANTHELMINTICS

Peter Andrews; Hubert Dorn; Manfred Federmann, all of Wuppertal, and Herbert Voege, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 3, 1977, Ser. No. 783,035

Claims priority, application Germany, Apr. 6, 1976, 2614841

Int. Cl.[2] A61K *31/495, 31/425, 31/055*

U.S. Cl. 424—250 **36 Claims**

1. An anthelmintic composition suitable for pour-on application to animals for the treatment of helminthic infections which comprises 5 to 20 percent by weight of an anthelmintic agent which is capable of penetrating the skin of the animal to be treated, 1 to 30 percent by weight of one or more spreading oils, selected from the group consisting of isopropyl myristate isopropyl palmitate, caprylic/caproic acid triglyceride, saturated triglycerides of natural fatty acids and waxy fatty acid esters which correspond to synthetic duck uropygial gland fat and 60 to 90 percent by weight of one or more solvents selected from the group consisting of isopropanol, amyl alcohol, methyl ethyl ketone, glycol ethers and methylene chloride, and 0 to 10 percent by weight of one or more auxiliaries.

4,096,263

1,2,3,4-TETRAHYDROISOQUINOLINES AND THE PREPARATION THEREOF

Teiji Kishimoto, Kawanishi; Ikuo Ueda, Yao, and Masayuki Kato, Ikeda, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

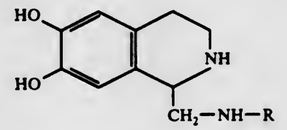
Filed Jul. 21, 1976, Ser. No. 707,271

Claims priority, application United Kingdom, Jul. 28, 1975, 31570/75

Int. Cl.[2] A61K *31/47, 31/505;* **C07D** *239/42*

U.S. Cl. 424—251 **20 Claims**

1. 1,2,3,4-Tetrahydroisoquinolines of the formula:



wherein R is tetrazolyl,

pyridyl,

pyrimidinyl,

thiadiazolyl or

benzimidazolyl, each of which may be substituted by C_{1-6} alkyl, phenyl or alkylphenyl group having 7–10 carbon atoms; or pharmaceutically acceptable salts thereof.

19. A pharmaceutical composition, comprising: an amount of a compound of claim 1 effective for relaxing smooth muscles in association with a pharmaceutically acceptable, substantially non-toxic carrier or excipient.

4,096,264

CERTAIN SUBSTITUTED IMIDAZO [1.2-a] PYRIDINES

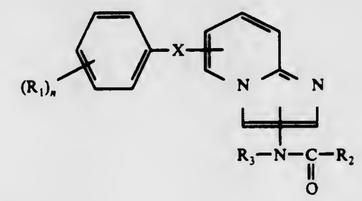
Richard J. Bochis, East Brunswick, and Peter Kulsa, Plainfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 639,034, Dec. 9, 1975, abandoned. This application Aug. 26, 1976, Ser. No. 718,652

Int. Cl.[2] A61K *31/44;* **C07D** *401/02*

U.S. Cl. 424—256 **28 Claims**

1. A compound having the formula:



(I)

wherein

X is thio, sulfinyl or sulfonyl;

R_1 is halogen, trifluoromethyl, loweralkyl, loweralkoxy, loweralkoxycarbonyl, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl, loweralkanoyl, hydroxy, sulfonamido, mono- or di-loweralkylsulfonamido, amino, mono- or di-loweralkylamino, carboxy, carboxamido, mono- and di-loweralkylcarboxamido, loweralkanoyloxy, loweralkoxycarbonylamino, loweralkanoylamino, cyano or nitro;

n is 0, 1 or 2, such that when *n* is 2, the two R_1 groups need not be identical;

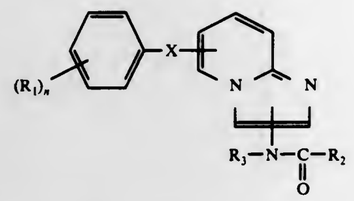
R_2 is loweralkyl or loweralkoxy; and

R_3 is hydrogen, loweralkyl, loweralkenyl, or loweralkyl substituted with loweralkoxy, loweralkoxycarbonyl, carboxy, loweralkylthio, loweralkylsulfinyl, loweralkylsulfo-

nyl, amino and mono- or di-loweralkylamino, phenyl, halophenyl, or loweralkoxyphenyl.

28. An anthelmintic composition which comprises an inert carrier and a compound having the formula:

(I)



wherein

X is thio, sulfinyl or sulfonyl;

R_1 is halogen, trifluoromethyl, loweralkyl, loweralkoxy, loweralkoxycarbonyl, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl, loweralkanoyl, hydroxy, sulfonamido, mono- or di-loweralkylsulfonamido, amino, mono- or di-loweralkylamino, carboxy, carboxamido, mono- and di-loweralkylcarboxamido, loweralkanoyloxy, loweralkoxycarbonylamino, loweralkanoylamino, cyano or nitro;

n is 0, 1 or 2, such that when *n* is 2, the two R_1 groups need not be identical;

R_2 is loweralkyl or loweralkoxy; and

R_3 is hydrogen, loweralkyl, loweralkenyl, or loweralkyl substituted with loweralkoxy, loweralkoxy carbonyl, carboxy, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl, amino and mono- or di-loweralkylamino, phenyl, halophenyl, or loweralkoxyphenyl.

4,096,265

BENZOPYRANO[3,4-d]PYRIDINE-2-CYANO, CARBOXAMIDOXIMES AND CARBOXIMIDATES

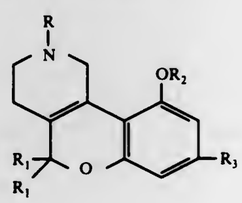
Anil Chandra Ghosh, Lexington, and Raj Kumar Razdan, Belmont, both of Mass., assignors to Sharps Associates, Cambridge, Mass.

Filed Nov. 8, 1976, Ser. No. 739,546

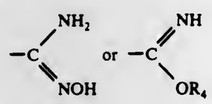
Int. Cl.² C07D *491/04;* A61K *31/44*

U.S. Cl. 424—256 **18 Claims**

1. A compound of the formula



wherein R represents —C≡N,



R_1 is lower alkyl, R_2 is hydrogen or lower alkyl and R_3 is straight or branched alkyl of 1 to 20 carbons, cycloalkyl-lower alkyl in which the cycloalkyl has 3 to 8 carbons or it is phenylalkyl in which the alkyl has 1 to 10 carbons and R_4 is lower alkyl, and nontoxic acid addition salts thereof.

18. A method of lowering blood pressure in an animal which comprises administering a safe but effective amount of a compound of claim 1 to the animal.

4,096,266

LISURIDE IN ALCOHOLISM

Turan M. Itil, Tarrytown, N.Y., assignor to HZI Research Center, Tarrytown, N.Y.

Filed Apr. 6, 1976, Ser. No. 674,217

Int. Cl.² A61K *31/48*

U.S. Cl. 424—261 **10 Claims**

1. A method for blocking and for delaying alcohol induced computer EEG changes which comprises administering orally to a subject prior to the ingestion by that subject of alcohol, an amount of Lisuride effective to block the behavioral and physiological effects of the alcohol and thereafter administering orally to that subject said alcohol.

8. A method for blocking and for delaying alcohol induced computer EEG changes which comprises administering orally to a subject alcohol and subsequent to the ingestion by that subject of alcohol, administering orally an amount of Lisuride effective to block the behavioral and physiological effects of the alcohol.

4,096,267

(1-OXO-2-ARYL OR THIENYL-2-SUBSTITUTED-5-INDANYLOXY (OR THIO) ALKANOIC ACIDS, AND DERIVATIVES THEREOF

Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

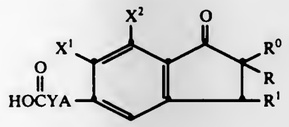
Continuation-in-part of Ser. No. 492,651, Jul. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 405,736, Oct. 11, 1973, abandoned. This application Jun. 10, 1975, Ser. No. 585,434

The portion of the term of this patent subsequent to Oct. 5, 1993, has been disclaimed.

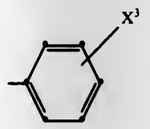
Int. Cl.² A61K *31/475, 31/19;* C07C *65/14, 69/71*

U.S. Cl. 424—262 **27 Claims**

1. A compound of the formula:



wherein R^0 is



A is oxygen or sulphur;

R is lower alkyl, lower alkenyl, phenyl lower alkyl, phenyl lower alkenyl, phenyl, cycloalkyl, or cycloalkyl lower alkyl;

R^1 is hydrogen, lower alkyl, or phenyl; or

R^1 and R may be joined together to form a cycloalkylene;

Y is alkylene or haloalkylene containing from 1 to about 4 carbon atoms;

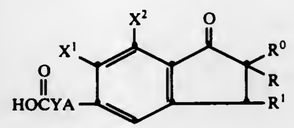
X^3 is hydrogen, nitro, hydroxy, lower alkyl, lower alkoxy, cycloalkyl, halo, amino, cyano, sulfamoyl, methanesulfonyl, chlorosulfonyl, aminomethyl, acylamino or acylaminomethyl;

X^1 is hydrogen, halo or methyl;

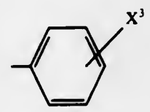
X^2 is halo, methyl or trihalomethyl; or

X^1 and X^2 may be joined together to form a hydrocarbylene chain containing from 3 to about 4 carbon atoms; and the non-toxic, pharmacologically acceptable salt, amide, anhydride and ester derivatives thereof.

20. A pharmaceutical composition useful in the treatment of edema and hypertension which also maintains uric acid levels at pretreatment levels or causes a decrease in uric acid levels which comprises a therapeutically effective amount of a compound of the formula:



wherein R^0 is



A is oxygen or sulphur;

R is lower alkyl, lower alkenyl, phenyl lower alkyl, phenyl lower alkenyl, phenyl, cycloalkyl or cycloalkyl lower alkyl;

R^1 is hydrogen, lower alkyl or phenyl; or

R^1 and R may be joined together to form a cycloalkylene;

Y is alkylene or haloalkylene containing from 1 to about 5 carbon atoms;

X^3 is hydrogen, nitro, hydroxy, lower alkyl, lower alkoxy, cycloalkyl, halo, amino, cyano, sulfamoyl, methanesulfonyl, chlorosulfonyl or aminomethyl;

X^1 is hydrogen, halo or methyl;

X^2 is halo, methyl or trihalomethyl; or

X^1 and X^2 may be joined together to form a hydrocarbylene chain containing from 3 to about 4 carbon atoms;

and the non-toxic, pharmacologically acceptable salt, amide, anhydride and ester derivatives thereof and an effective antihypertensive agent along with a pharmaceutically acceptable carrier.

4,096,268

1-METHYL-1,2,5,6-TETRAHYDROPYRIDINE-3-CARBOXYLIC ACID ESTERS AND A METHOD OF USE FOR COMBATING INSECTS OR ACARIDS

Saburo Tamura; Junichi Saito; Akio Kudamatsu; Yoji Ishino, and Toshio Goto, all of Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 628,878, Nov. 5, 1975, abandoned. This application Aug. 9, 1976, Ser. No. 712,579

Claims priority, application Japan, Nov. 14, 1974, 49-130513

Int. Cl.² A01N *9/22;* C07D *213/55*

U.S. Cl. 424—266 **1 Claim**

1. A method of combating insect or acarid pests which comprises applying to the pests or a habitat thereof an insecticidally or acaricidally effective amount of 1-methyl-3-2'-butenyloxycarbonyl-1,2,5,6-tetrahydropyridine or an acid addition salt thereof.

4,096,269

N-HALOALKANE-SULFENYLCARBAMOYL OXIME PESTICIDES

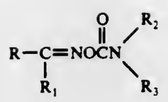
Themistocles Damasceno Joaquim D'Silva, S. Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 483,882, Jun. 27, 1974, Pat. No. 4,029,688. This application May 20, 1976, Ser. No. 688,233

Int. Cl.² C07C *131/00;* A61K *31/095*

U.S. Cl. 424—226 **16 Claims**

1. A compound of the formula:



wherein:

R is lower alkyl or lower alkyl substituted with one or more lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl, phenylthio, phenylsulfinyl, phenylsulfonyl or $R_4CON(R_5)$— all of which may be substituted with one or more nitro, azido, chloro, bromo, or fluoro substituents;

R_1 is hydrogen, chloro, bromo, fluoro or substituted or unsubstituted lower alkyl having from 1 to 4 carbon atoms, lower alkylthio, lower alkoxy, lower carboalkoxyalkylthio or lower alkylthioalkyl wherein the substituents may be one or more chloro, bromo, fluoro or nitro groups;

R_2 is lower alkyl, lower alkyl substituted with one or more chloro, bromo, fluoro or nitro groups, lower alkenyl or substituted or unsubstituted phenyl naphthyl or benzyl wherein the substituents may be one or more chloro, bromo, fluoro, nitro, lower alkoxy or lower alkyl groups;

R_3 is perhalomethanesulfenyl or perhaloethanesulfenyl wherein the halogen substituents are chloro, bromo or fluoro, and

R_4 and R_5 are individually hydrogen or lower alkyl;

with the proviso that when R is alkyl, R_1 is other than hydrogen, chloro, bromo, fluoro, unsubstituted lower alkyl, or unsubstituted lower alkylthio, and with the further proviso that when R_1 is hydrogen, R is other than unsubstituted lower alkylthioalkyl.

4,096,270

4-(2-CHLORO- OR METHYLTHIOPYRID-3-yl)-3,5-DICARBALKOXY-2,6-DIMETHYL-1,4-DIHYDROPYRIDINE

Jean-Marie Teulon, La Celle Saint-Cloud; Bernard Schweisguth, Meudon, and Jean-Claude Cognacq, Bourg La Reine, all of France, assignors to Societe Anonyme Dite : Hexachimie, Rueil-Malmaison, France

Filed Aug. 5, 1976, Ser. No. 711,862

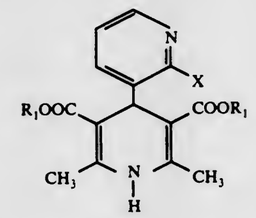
Claims priority, application United Kingdom, Aug. 12, 1975, 33501/75; Oct. 31, 1975, 45188/75

Int. Cl.² C07D *213/55;* A61K *31/455*

U.S. Cl. 424—266 **7 Claims**

1. A compound of the formula

(I)



wherein X is selected from the group consisting of a chlorine atom and a CH_3S group, and each of the groups R_1 is the same and represents a methyl or ethyl group, or a physiologically acceptable acid addition salt thereof.

7. A method for treating a human suffering from hypertension comprising administering orally or parenterally an effective amount of a compound as claimed in claim 1.

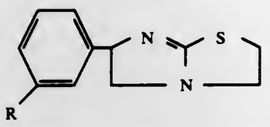
4,096,271

SLOW RELEASE INJECTABLE FORMULATIONS OF TETRAMISOLE AND DERIVATIVES IN BENZYL BENZOATE

Fleur de lis Masilungan, Trenton, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Aug. 3, 1977, Ser. No. 821,258
Int. Cl.[2] A61K *31/425, 47/00*
U.S. Cl. 424—270 **20 Claims**

1. A liquid anthelmintic composition for injection comprising an effective amount of a solution of a compound of formula:



wherein R is hydrogen, amino, i-butyrylamino, trimethylacetylamino or benzoylamino and the racemic mixtures and the optical isomers thereof in benzyl benzoate.

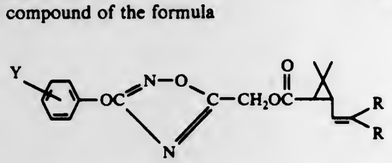
4,096,272

PHENOXYOXADIAZOLE CYCLOPROPANE CARBOXYLATES AS INSECTICIDES

Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

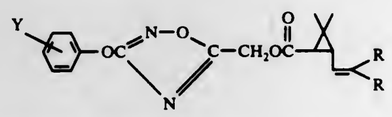
Filed May 13, 1977, Ser. No. 796,775
Int. Cl.[2] C07D *271/06;* A01N *9/22*
U.S. Cl. 424—272 **15 Claims**

1. A compound of the formula



in which each R is methyl or each R is chlorine and Y is hydrogen or 3-methyl.

11. A method of controlling insects comprising applying to the habitat thereof an insecticidally effective amount of a compound of the formula



in which each R is methyl or each R is chlorine and Y is hydrogen or 3-methyl.

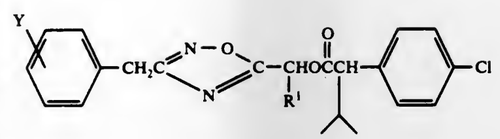
4,096,273

3-BENZYL-5-[2-(4-CHLOROPHENYL)3-METHYL BUTYRYLOXY ALKYL] OXADIAZOLE INSECTICIDES

Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

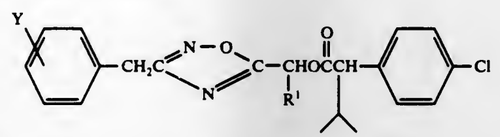
Filed May 13, 1977, Ser. No. 796,776
Int. Cl.[2] A01N *9/22;* C07D *271/06*
U.S. Cl. 424—272 **15 Claims**

1. A compound of the formula



in which R^1 is hydrogen and Y is hydrogen, 2-chloro or 3-chloro, or R^1 is methyl and Y is hydrogen.

11. A method of controlling insects comprising applying to the habitat thereof an insecticidally effective amount of a compound of the formula



in which R^1 is hydrogen and Y is hydrogen, 2-chloro or 3-chloro, or R^1 is methyl and Y is hydrogen.

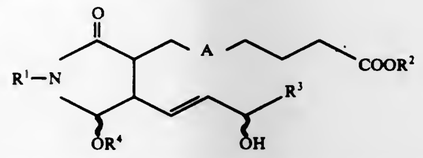
4,096,274

PYRROLIDONES AND PROCESS FOR THEIR MANUFACTURE

Dieter-Bernd Reuschling, Butzbach; Klaus Kühlein, Kelkheim, Taunus; Adolf Linkies, Frankfurt am Main; Rudolf Kunstmann, Breckenheim, Taunus, and Josef Musil, Konigstein, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 16, 1976, Ser. No. 751,165
Claims priority, application Germany, Dec. 20, 1975, 2557748
Int. Cl.[2] C07D *207/26*
U.S. Cl. 424—274 **8 Claims**

1. A compound of the formula



or a physiologically tolerable metal or amine salt of the free acid form thereof, wherein

R^1 is α-branched alkyl having 3 to 6 carbon atoms or cycloalkyl having 3 to 7 carbon atoms in the ring;

R^2 is hydrogen, lower alkyl, or cycloalkyl or aralkyl having 3 to 8 carbon atoms;

R^3 is straight-chain or branched alkyl having 1 to 10 carbon atoms, or such alkyl substituted by O-alkyl havng 1 to 5 carbon atoms, by phenyl, by phenoxy, by cycloalkyl, by cycloalkyl in turn substituted by alkyl having 1 to 3 carbon atoms, or phenyl or phenoxy each in turn substituted by halogen, alkyl having 1 to 3 carbon atoms, or haloalkyl having 1 to 3 carbon atoms;

R^4 is alkyl having 1 to 4 carbon atoms; and

A is —C≡C—, —CH=CH—(cis), or $—CH_2—CH_2—$, in which compound or salt the chains in the 3- and 4- positions of the pyrrolidone ring are in trans-position with respect to each other.

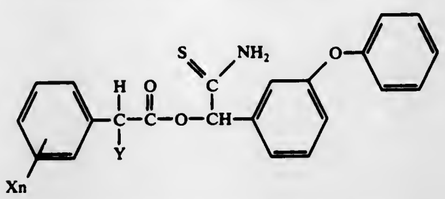
4,096,275

THIOAMIDE PESTICIDES

Robert J. G. Searle, Sittingbourne, and Clive B. C. Boyce, Herne Bay, both of England, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 665,220, Mar. 9, 1976, Pat. No. 4,045,575. This application May 19, 1977, Ser. No. 798,534
Claims priority, application United Kingdom, Mar. 11, 1975, 10070/75
Int. Cl.[2] C07C *153/067;* A01N *9/12*
U.S. Cl. 424—308 **8 Claims**

1. A thioamide derivative of the formula



wherein X represents a halogen atom of atomic number 9 to 35; *n* represents 0, 1, 2 or 3; and Y represents an alkyl group of up to 6 carbon atoms.

4. A pesticidal composition comprising a pesticidally effective amount of a thioamide as claimed in claim 1 and at least one carrier or surface-active agent.

5. A method of combatting insect or acarid pests at a locus which comprises applying to the locus a pesticidally effective amount of a thioamide as claimed in claim 1 or a composition thereof.

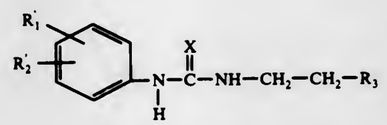
4,096,276

THIOUREA DERIVATIVES FOR TREATING HYPERTENSION

Michael Robert Cohen, West Orange; Richard Wightman Kierstead, and Jefferson Wright Tilley, both of North Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 677,106, Apr. 15, 1976, abandoned. This application Jan. 27, 1977, Ser. No. 763,172
Int. Cl.[2] A61K *31/17*
U.S. Cl. 424—322 **3 Claims**

1. A method of reducing blood pressure which comprises administering to a host requiring such treatment an effective amount of a compound of the formula



wherein R_1' and R_2', independently, are hydrogen, halogen or lower alkyl; X is sulfur; and R_3 is amino, or an addition salt thereof with a pharmaceutically acceptable acid.

4,096,277

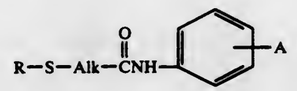
MUCOLYTIC MERCAPTOACYLAMIDOBENZAMIDES AND PROCESS OF USING SAME

Tellis Alexander Martin, and William Timmey Comer, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 579,650, May 21, 1975, Pat. No. 4,005,222. This application Oct. 18, 1976, Ser. No. 733,598
Int. Cl.[2] A61K *31/165;* C07C *103/20*
U.S. Cl. 424—324 **5 Claims**

1. A process for liquefaction of mucus which comprises contacting said mucus with a mucolytically effective amount of a member selected from the group consisting of compounds having Formula I

Formula I



wherein

A is meta or para $CONHCH_2CH_2OH$;

Alk is a straight or branched divalent alkylene radical of from 1 to 3 carbon atoms inclusive; and

R is hydrogen.

5. N-(2-Hydroxyethyl)-4-(2-mercaptoacetamido)benzamide.

4,096,278

ORGANIC DERIVATIVES OF MONTMORILLONITE FOR TREATING LIPID DISTURBANCES

André Queuille, 93, rue Deafert-Rochereau, 93130 Noisy-le-Sec, France

Filed Jun. 27, 1977, Ser. No. 810,678
Claims priority, application France, Jul. 1, 1976, 76 20143
Int. Cl.[2] A61K *31/14*
U.S. Cl. 424—329 **4 Claims**

1. A method of treating and preventing lipid disturbances comprising administering to the patient a hypocholesterolemically and hypolipemically effective amount of dimethyl-dialkylammonium montmorillonite.

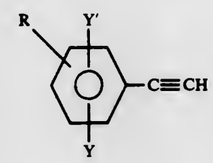
4,096,279

ETHYNYLBENZENE COMPOUNDS AND DERIVATIVES THEREOF IN THE TREATMENT OF PAIN FEVER AND INFLAMMATION

Julius Diamond, Lafayette Hill, Pa., assignor to William H. Rorer, Inc., Fort Washington, Pa.

Division of Ser. No. 574,837, May 14, 1975, continuation of Ser. No. 431,254, Jan. 7, 1974, Pat. No. 3,923,910, division of Ser. No. 268,419, Jul. 3, 1972, Pat. No. 3,852,364. This application Jan. 11, 1977, Ser. No. 758,457
Int. Cl.[2] A61K *31/135;* C07C *87/28, 87/50*
U.S. Cl. 424—330 **10 Claims**

1. A method of treating inflammation, pain or fever in a warm blooded animal which comprises administering to the animal an effective amount of an active agent which is a compound of the formula:



where

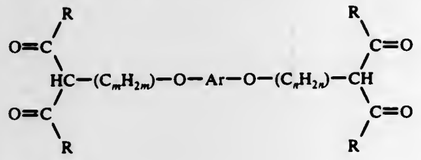
R is hydrogen,
alkyl of 1 to 7 carbon atoms,
cycloalkyl of 5 to 7 carbon atoms,
1 to 7 carbon atoms alkyl substituted cycloalkyl of 5 to 7 carbon atoms,
cycloalkenyl of 5 to 7 atoms, phenyl or
substituted phenyl where the substituent is Y";
Y and Y' are each selected from the group consisting of hydrogen,
amino, and
mono and diloweralkylamino;
Y" is selected from the group consisting of Y,
lower alkyl of 1 to 7 carbon atoms,
trifluoromethyl and halo,
with the proviso that at least one of Y and Y' is other than hydrogen.

4,096,280
ARYLENEDIOXY-BIS-DIKETONES

Guy Dominic Diana, Stephentown, and Philip Michael Carabateas, Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Jan. 24, 1977, Ser. No. 761,944
Int. Cl.² C07C *49/84;* A01N *9/24*
U.S. Cl. 424—331 **16 Claims**

1. A compound of the formula



wherein:

R is alkyl of 1–4 carbon atoms;

Ar is 1,3- or 1,4-phenylene in which the phenyl ring can be further substituted by one or two methyl, ethyl or halo groups;

m and *n* are integers from 3 to 7, the sum of *m* and *n* ranging from 7 to 14.

4,096,281
METHOD AND COMPOSITION FOR PRODUCING FLAVORED POPCORN

Robert W. Young, 10 Gracie Sq., New York, N.Y. 10028; Samuel B. Prussin, 2126 Banyan Dr., Los Angeles, Calif. 90049; John L. Caccavale, 1812 Baxter St., and Victor J. Pierce, 2040 Vestal Ave., both of Los Angeles, Calif. 90026

Filed Jun. 13, 1973, Ser. No. 369,516
Int. Cl.² A23L *1/182*
U.S. Cl. 426—89 **9 Claims**

1. The method of producing flavored popcorn consisting essentially of:

(a) combining popcorn kernels, a cooking medium for said popcorn kernels selected from the group consisting of oils, semi-solid fats or solid fats and encapsulated flavoring substance particles and introducing same into a cooking vessel; and,

(b) heating said combined materials to pop said popcorn kernels.

4,096,282
COLLAGEN COMPOSITIONS

Thomas Engel Higgins, Brookfield, and Camilla Brems Ross, Hinsdale, both of Ill., assignors to Union Carbide, New York, N.Y.

Filed Jan. 3, 1977, Ser. No. 756,248
Int. Cl.² A23C *13/00*
U.S. Cl. 426—140 **11 Claims**

11. A method of preparing a formable collagen composition suitable for use in preparing a shaped collagen structure including the steps of:

(a) preparing a viscous aqueous dispersion of non-collagenous fibers;

(b) preparing a comminuted acid-swollen collagen mass; and then

(c) admixing said aqueous fiber-dispersion and a propylene glycol alginate with said acid-swollen collagen mass so that from about 0.2% to about 5% by weight of the propylene glycol alginate based on the solids content of said collagen admixture is incorporated in the collagen composition and then thoroughly mixing until a uniform admixture is obtained.

4,096,283
METHOD OF COMPACTING FREEZE-DRIED PARTICULATE FOODS

Abdul R. Rahman, Natick, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 8, 1976, Ser. No. 740,261
Int. Cl.² A23B *4/06;* A23L *1/31*
U.S. Cl. 426—242 **7 Claims**

1. A process for making a dehydrated, compacted food mass selected from the group consisting of vegetables and meats characterized by having a density of from about 0.7 to about 1.2 grams per cc and being capable of rehydration to produce distinct particles of rehydrated food which have substantially the same size, shape, and cellular structure characteristics as the particles of food from which said dehydrated, compacted food mass is prepared and which are acceptable in accordance with scale testing, which comprises the steps of:

a. partially freeze-vacuum-dehydrating particles of a food selected from the group consisting of vegetables and meats to a moisture content of from about 10 percent to about 35 percent by weight;

b. irradiating said partially freeze-vacuum-dehydrated particles of food with microwave radiations, the core portions of said particles being frozen at the beginning of said microwave irradiation, said irradiation being carried out at a frequency and intensity of said microwave radiations and for a time sufficient to produce redistribution of said moisture remaining in said particles substantially uniformly throughout said particles so as to plasticize said particles substantially uniformly throughout the same;

c. comprising said plasticized particles at a pressure of from about 200 psi to about 4000 psi for a period of time sufficient to cause said particles to adhere together forming a compacted food mass while maintaining the moisture content of said particles and said compacted food mass at from about 10 to about 35 percent by weight; and

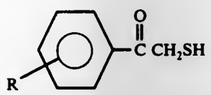
d. redehydrating said compacted food mass to form a redehydrated, compacted food mass having a moisture content of from about 1 percent to about 5 percent by weight.

4,096,284
FLAVORING WITH α-MERCAPTOACETOPHENONE AND DERIVATIVES

Michael J. Greenberg, Chicago, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Jun. 13, 1977, Ser. No. 805,896
Int. Cl.² A23L *1/231*
U.S. Cl. 426—535 **12 Claims**

1. A process for altering the flavor of a foodstuff comprising adding to the foodstuff an amount of at least one flavorant selected from the group consisting of α-mercaptoacetophenone and derivatives thereof effective to impart a meat-like flavor and represented by the formula:



wherein R is an alkyl group containing from 1–4 carbon atoms, hydrogen, an alkoxy group containing from 1–4 carbon atoms, a hydroxyl group, an acetyl group, a phenacyl group, or a benzyl group.

4,096,285
SWEETENING COMPOSITIONS CONTAINING ALDOHEXURONIC ACIDS

Malcolm Leonard Ernest Burge, Thatcham, and Zdenek Nechutny, Reading, both of England, assignors to Tate & Lyle Limited, London, England

Filed Jul. 2, 1976, Ser. No. 702,200
Claims priority, application United Kingdom, Jul. 4, 1975, 28233/75; Jul. 4, 1975, 28229/75
Int. Cl.² A23L *1/236*
U.S. Cl. 426—548 **25 Claims**

1. A sweetener composition containing at least one sweetener selected from the group consisting of the protein sweetener thaumatin, the protein sweetener monellin and saccharin, together with a modifier selected from the group consisting of aldohexuronic acids and salts, amides and lactones thereof in an amount sufficient to reduce the sweet aftertaste of the protein sweeteners or the bitter aftertaste of the saccharin.

4,096,286
STABLE PRECURSOR FOR MAKING AN EDIBLE GEL, AND METHOD OF MAKING AND USING THE SAME

Sakuichi Sakakibara, Kobe; Ko Sugisawa; Yasushi Matsumura, both of Nara, and Hidefumi Okamoto, Sakai, all of Japan, assignors to House Food Industrial Company Limited, Osaka, Japan

Filed Apr. 26, 1977, Ser. No. 791,012
Claims priority, application Japan, Jun. 10, 1976, 51-67137
Int. Cl.² A23L *1/04*
U.S. Cl. 426—577 **10 Claims**

1. A method of preparing a precursor for an edible gel which comprises:

(a) mixing pectin, an edible saccharide, an edible organic acid, an edible salt of an organic acid, and at least one member of the group consisting of fruit pulp, fruit juice, syrup, flavoring agents, coloring agents, and water,

(1) the amounts of the mixed pectin, saccharide, acid, salt, and at least one member being such that the resulting mixture contains, per gram of said pectin, 2.5 to 30 g saccharide, 0.15 to 0.75 g organic acid, and 22.5 to 85 g water, and

(2) the weight ratio of said acid to said salt is between 1:1 and 1:1.5 and sufficient to make the ph value of said mixture 3.8 to 4.3,

(3) 25 to 40% of the carboxyl groups in said pectin being esterified with methanol;

(b) sterilizing said mixture; and

(c) maintaining the sterilized mixture under sterile conditions.

4,096,287
PREPARATION OF A POWDERED SKIM MILK ADDITIVE

Albert R. Kemp, Ashton, Ill., assignor to Crest Foods Co., Inc., Ashton, Ill.

Continuation of Ser. No. 650,252, Jan. 19, 1976, abandoned. This application Jul. 5, 1977, Ser. No. 812,665
Int. Cl.² A23C *9/00, 1/04*
U.S. Cl. 426—588 **1 Claim**

1. The method of producing a fluid milk product modified to improve flavor, texture and eye appeal, which includes:

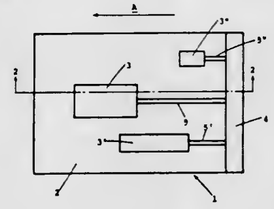
A. producing a powdered skim milk additive, of an affectiveness for yielding detectable improvement of skim milk as to flavor, texture and eye appeal when added in the proportion of 0.1 to 0.15%, by a continuous process including the steps of heating skim milk, by non-dilutive heating through pasteurization and to a temperature of about 185° to 190° F., thereafter further heating the milk by steam injection to a temperature of about 200° F. to 212° F., and holding it in this temperature range for a time, in the range of about five to thirty minutes, inversely correlated to temperature on the basis of about 212° F., if the holding time is 5 minutes, to about 200° F., if the holding time is thirty minutes; condensing the heated skim milk to a solids content of about 39% to 45%; heating the condensed milk first by a nondiluting heater to a temperature of about 175° F. and then, while avoiding coagulation, further heating the condensed skim milk by direct steam heating to a temperature of at least about 185° F. and holding at such temperature for a time in the range of about two to five minutes inversely correlated to temperature; and then spray-drying it to form said powdered skim milk additive suitable for improving the flavor, texture and eye appeal of a fluid milk product and

B. adding said powdered skim milk additive to a fluid milk product in an amount in the range of 0.2 to 0.3%.

4,096,288
METHOD OF PARTIAL REPRODUCTION OF A PATTERN FROM A MASTER

Hiroshi Saito, Omiya, Japan, assignor to Kyodo Printing Co., Ltd., Bunkyo, Japan

Division of Ser. No. 524,941, Nov. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 279,808, Aug. 11, 1972, abandoned. This application Jul. 29, 1976, Ser. No. 709,729
Claims priority, application Japan, Jun. 10, 1972, 47-68560[U]; Aug. 17, 1971, 46-73683[U]; Jul. 4, 1972, 47-66880; Jul. 4, 1972, 47-66881
Int. Cl.² G03G *13/16*
U.S. Cl. 427—24 **1 Claim**



1. A method of reproducing in an electrostatic copying apparatus a portion of an entire master pattern comprised of toner deposited on an electrostatic latent image onto a reproducing medium comprised of:

insulative sheet material having a copying surface on which the selected portions are to be reproduced;

at least one first transparent conductive film deposited on the back side of the copying surface of said sheet material in the area corresponding to the portion of the master pattern which is not to be reproduced;

at least one second transparent conductive film deposited along at least one edge of the sheet material on the same side of the material as said first conductive film; and

at least one third transparent conductive film connecting said first and second films to each other; said method comprising;

feeding the end of said sheet material opposite said second conductive film into the electrostatic copier;

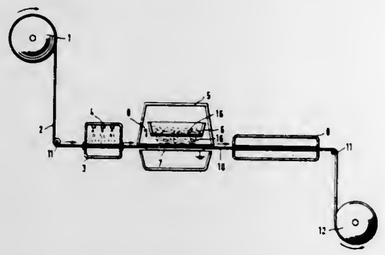
contacting the entire toner-coated electrostatic latent image against the copying surface of said insulated sheet material; and

electrostatically transferring the toner to the copying surface of the insulative sheet material, whereby the toner does not transfer to the surface of said sheet material corresponding to the position of the conductive film on the backside thereof.

4,096,289
ELECTROSTATIC DEPOSITION OF SWELLABLE, MODIFIED CELLULOSE ETHER ON WATER WET HYDROPHILIC SUBSTRATE

Ehrenfried Nischwitz, Schmitten; Klaus Uhl, Neuenhain, and Helmut Lask, Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Dec. 14, 1976, Ser. No. 750,433
Claims priority, application Germany, Dec. 17, 1975, 2556723
Int. Cl.[2] B05D *1/06, 3/00, 5/04*
U.S. Cl. 427—32 **3 Claims**



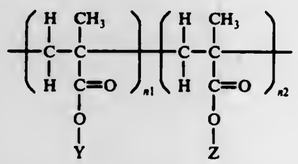
1. A process for the transformation of comminuted cellulose ether, which has been rendered at least largely water-insoluble by modification but has remained highly swellable with water, into an easily usable material, a process in which the modified cellulose ether is attached to at least one surface of a web-shaped hydrophilic support that has been wetted with water and the support is dried, the process comprising the modified cellulose ether attached to the support by electrostatic flocking.

4,096,290
RESIST MASK FORMATION PROCESS WITH HALOALKYL METHACRYLATE COPOLYMERS

Edward Carmine Fredericks, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,246
Int. Cl.[2] B05P *3/06*
U.S. Cl. 427—43 **6 Claims**

1. A process for producing a positive relief image comprising coating a substrate with a layer consisting essentially of a copolymer containing about 90 to 98 mole percent of polymerized lower alkyl methacrylate units and about 2 to 10 mole percent of polymerized lower haloalkyl methacrylate units, wherein the copolymer has the general formula:



where *n*1 and *n*2 are integers equal to one or more; where Y is a lower alkyl having 1–6 carbons; where Z is CH_2X, C_2H_4X, $C_2H_3X_2$, C_3H_6X, $C_3H_5X_2$, C_4H_8X, $C_4H_7X_2$ and where X is CL, Br, I or a mixture, heating the layer to cause cross-linking between polymer chains with removal of hydrogen halide, patternwise exposing the layer with high energy radiation, and removing the exposed portion of the layer with a solvent developer.

4,096,291
MELT COATING COMPOSITION AND COATING PROCESS

Willi Dunwald, Leverkusen; Jurgen Lewalter, Cologne; Wilfried Zecher, and Wolf-Dieter Last, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 28, 1975, Ser. No. 544,620
Claims priority, application Germany, Feb. 1, 1974, 2404740
Int. Cl.[2] B05D *5/12;* **B32B** *27/06*
U.S. Cl. 427—120 **17 Claims**

1. Process of coating a heat resistant substrate comprising applying a solvent-free melt coating composition comprising blocked polyisocyanates and compounds which contain hydroxyl groups which are reactive with isocyanate groups, followed by cross-linking of the resulting coating by heating wherein

a. at least 40 equivalent percent of the blocked polyisocyanates consist of alkanol or cycloalkanol blocked polyisocyanates,

b. the blocked polyisocyanates and compounds which contain hydroxyl groups reactive with isocyanate groups form a composition with a melting point or range below 200° C and the proportion of reactants is so chosen that the equivalent ratio of blocked isocyanate groups to hydroxyl groups is between 1:2 and 9:1,

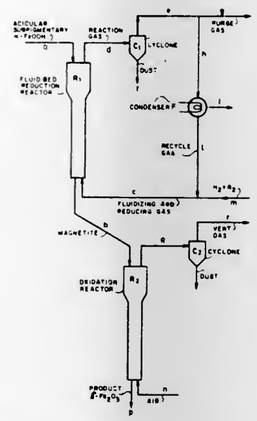
c. coating of the substrate is carried out at a temperature within the range of 20° to 250° C at which temperature the coating composition has a substantially constant viscosity of not more than 40,000 cP, and

d. the coated substrate is subsequently heated to a temperature at which the blocking agent is split off and final cross-linking takes place.

4,096,292
PROCESS FOR PREPARING FERRIMAGNETIC ACICULAR FERRIC OXIDE

Giuliano Fagherazzi; Francesco Ferrero; Giuseppe Sironi, and Bruno Viviani, all of Novara, Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 648,367, Jan. 12, 1976, abandoned. This application Sep. 14, 1976, Ser. No. 723,303
Claims priority, application Italy, Jan. 14, 1975, 19238 A/75
Int. Cl.[2] B05D *5/12*
U.S. Cl. 427—127 **6 Claims**



1. In a process for preparing γ-Fe_2O_3 in the form of acicular particles, wherein an aqueous solution of $FeSO_4 . 7\ H_2O$, kept at 25°–35° C in the presence of air, is treated with alkali until 45–55% by weight of the iron is precipitated in the form of α-FeOOH crystallization nuclei and the resulting suspension, at 65°–75° C in the presence of air, is treated with alkali in order to complete the precipitation of iron, thus forming acicular α-FeOOH, which is then treated with sodium silicate, dehydrated, reduced to Fe_3O_4 in a fluid bed reactor and oxidized to γ-Fe_2O_3 at 200°–350° C in a fluid bed reactor, the improvement wherein:

(a) the formation of the acicular α-FeOOH in aqueous suspension is carried out with a feeding flow-rate of $FeSO_4 . 7\ H_2O$ of 2.48–12.41 Kg per hour per m^3 of reactor;

(b) the α-FeOOH particles are coated with 0.2–2% by weight of SiO_2, by bringing the α-FeOOH in aqueous suspension obtained as defined in (a) to a temperature ranging from 50° to 90° C, adding Na_2SiO_3, and adjusting the final pH to 5.5–6.5; and

(c) the α-FeOOH coated with SiO_2 is dehydrated and simultaneously reduced to Fe_3O_4 at a temperature between 480° and 550° C with a reducing gaseous mixture.

4,096,293
MOLD AND CORE WASH

Michael J. Skubon, Columbus; John J. Spiwak, Worthington, and Richard F. Hanesworth, Delaware, all of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Sep. 6, 1977, Ser. No. 830,725
Int. Cl.[2] E04H *7/16;* **B28B** *7/36*
U.S. Cl. 427—134 **10 Claims**

1. A core and mold wash comprising:

(a) an organic liquid solvent in an amount of approximately 5% to 90% by weight of composition;

(b) a suspending agent in an amount of 0.1% to 2% by weight of composition;

(c) a wetting agent in an amount of between 0.01 and 2% by weight of composition;

(d) calcium aluminate particles in an amount of between 5% and 80% by weight of composition, having an average particle size of 20 to 25 microns and no particles larger than 70 microns;

(e) a hard resin which is the reaction product of fumaric acid, gum rosin, and pentaerythritol, said resin is within the ratio by weight between about .5 and about 5 parts per 100 parts of composition.

4,096,294
PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND CRYSTALLIZED THERMOPLASTIC BLOCKS

Thomas J. Pacansky, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 4, 1977, Ser. No. 784,183
Int. Cl.[2] B05D *5/04, 1/06*
U.S. Cl. 427—197 **20 Claims**

1. A process of preparing an ink releasing waterless printing master capable of being imaged with an ink accepting particulate imaging material comprising:

(a) providing a self-supporting master substrate;

(b) providing a film forming ink releasing block copolymer comprising elastomeric ink releasing siloxane blocks and isothermally crystallizable thermoplastic organic blocks;

(c) coating said substrate with said copolymer;

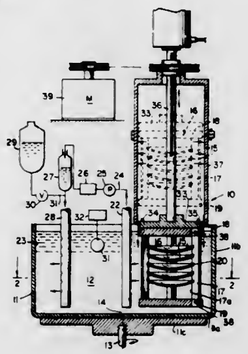
(d) isothermally crystallizing said organic blocks, whereby the crystallized organic blocks may be softened by heating said copolymer coating and then hardened so as to bond said particulate imaging material thereto; and

(e) allowing said copolymer coated substrate to cool to room temperature.

4,096,295
METHOD FOR MULTIPLE COATINGS

Alvin M. Marks, 153-16 Tenth Ave., Whitestone, N.Y. 11357

Continuation-in-part of Ser. No. 501,843, Aug. 29, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 673,760
Int. Cl.[2] B05C *11/12;* **C23C** *13/08*
U.S. Cl. 427—209 **3 Claims**



1. A method for simultaneously coating both surfaces of a plurality of spaced sheet-like members with a bubble-free and dust-free coating material comprising the steps of providing a bubble-free coating material dissolved to form a fluid and imparting a velocity to said fluid, dipping the said sheet-like members into the said fluid, said velocity being substantially parallel to said surfaces of said sheet-like members to wash away any bubbles which may be introduced by said dipping, maintaining the said sheet-like members within said fluid until all surfaces are wetted and washed by the said bubble-free fluid, withdrawing the said sheet-like members from the said bubble-free fluid, a quantity of said fluid being retained in the said spaces between said sheet-like members, spinning the said sheet-like members about a vertical axis, the said surfaces of which are maintained in a horizontal plane, until the excess fluid is centrifugally expelled, and thereafter drying the said coating material remaining on the said surfaces of the said sheet-like members, said spacing between the said surfaces of said sheet-like members being relatively small compared to the width of said sheet-like members, whereby the said bubble-free coating on said sheet-like members is dried while protected from the deposition of atmospheric dust particles thereon.

4,096,296
PROCESS FOR FORMING SURFACE DIFFUSION ALLOY LAYERS ON REFRACTORY METALLIC ARTICLES

Philippe M. Galmiche, Clamart; André R. Hivert, Pontoise, and André M. Walder, L'Hay-les-Roses, all of France, assignors to Office National d'Etudes et de Recherches Aerospatiales, France

Filed Mar. 5, 1976, Ser. No. 664,392
Claims priority, application France, Mar. 7, 1975, 75 07238; Aug. 8, 1975, 75 24846
Int. Cl.[2] C23C *9/02*
U.S. Cl. 427—247 **14 Claims**

1. In a thermochemical process for the formation of surface diffusion alloy layers on refractory metallic articles having perforations therein whose transverse cross-sectional dimension is less than 0.4 mm, said process comprising submerging the treated articles in a reagent containing a mixture of a first powder of metal or alloy for supplying at least one metal to the treated articles, and a second powder of an inert diluent, said first and second powders having a particle size ranging between 1 and 50 microns, and thereafter subjecting the reagent and the article to a thermal treatment in a halogen-hydrogen atmosphere at a temperature between 750° and 1200° C, the

improvement wherein prior to submerging the metallic article to be treated in the said reagent, the said article is individually covered, on at least the part of the external surface thereof having said perforations therein, with a metallic felt coated with a film of stable refractory oxide, said metallic felt being previously cut into a thin sheet of a thickness of a few tenths of a millimeter to a few millimeters, and preshaped so that one of the faces thereof adapts itself closely to the external surface of the article to be treated, the other face of the said metallic felt sheet being in intimate contact with the reagent when the article and the metallic felt sheet associated therewith is submerged in the said reagent, the said metallic felt sheet coated with a film of stable refractory oxide being obtained from a sheet of a refractory metallic felt, having a thickness of 0.3 to 1 mm., containing chromium in proportion by weight between 10% to 60% and having been subjected to selective oxidation to produce chromium oxide, said film of stable refractory oxide being produced by action of a reducer of the chromium oxide, and said selective oxidation being effected so that the fibers constituting the metallic felt sheet are covered with a layer of chromium oxide that represents at least 5% of the weight of the metallic felt sheet.

4,096,297

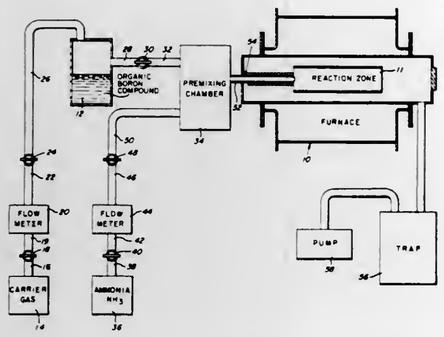
ISOTROPIC BORON NITRIDE AND METHOD OF MAKING SAME

James Pappis, Westwood, Mass.; Lawrence M. Hagen, Reed's Ferry, N.H., and Pei-Ching Li, Northbrook, Ill., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 417,020, Nov. 19, 1973, abandoned, which is a continuation of Ser. No. 196,843, Nov. 8, 1971, abandoned, which is a continuation of Ser. No. 878,966, Dec. 4, 1969, abandoned, which is a continuation of Ser. No. 582,686, Sep. 28, 1966, abandoned. This application Oct. 2, 1975, Ser. No. 618,879

Int. Cl.[2] C23C *11/08, 11/00*

U.S. Cl. 427—248 C **10 Claims**



1. The method of forming a solid body of substantially isotropic boron nitride comprising vapor deposition of boron nitride upon a substrate resulting from the reaction of ammonia and an organic boron compound at a temperature in the range of 1200°–2300° C and a pressure of less than about 100 torr, said organic boron compound being selected from the group consisting of dimethyl boronic acid, trimethyl triborine trioxane, and compounds of the form $B(OR)_3$, $B_2(OR)_4$, $HB_2(OR)_3$, $H_2B_2(OR)_2$, or $B(OR)_2X$, where R is an aromatic or aliphatic hydrocarbon and X is a halogen.

4,096,298

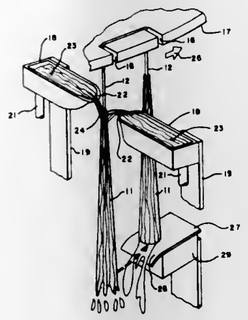
TAPER CANDLE, FABRICATION METHOD

John B. Menig, 283 Hart La., Ben Lomond, Calif. 95005

Filed Jun. 14, 1976, Ser. No. 695,430

Int. Cl.[2] B05D *5/00, 1/36*

U.S. Cl. 427—262 **4 Claims**



1. A method of fabricating a wax taper candle of predetermined length having a centrally disposed wick comprising the steps of suspending the wick at an upper portion to hang below the point of suspension, pouring a liquid wax flow having at least two streams with opposing flow components, cycling the suspended wick to pass through the liquid wax flow repeatedly, so that the liquid wax impinges on the suspended wick at a predetermined point thereon and flows down the wick to form a solidified layer thereon as the wick passes from the liquid wax flow, thereby accumulating a layered solidified wax mass on the wick over a plurality of cycles, and heating the lower end of the wax mass to a liquid phase so that it flows away below the lower end, whereby a multiple wax layer taper candle having a predetermined length from the point of impingement of the liquid wax flow on the suspended wick to the heated lower end is obtained.

4,096,299

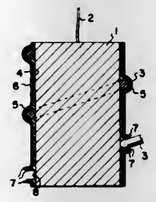
METHOD OF MAKING DECORATIVE CANDLES

William E. Stewart, 2375 Williamson Rd., Saginaw, Mich. 48601

Filed Feb. 2, 1976, Ser. No. 654,927

Int. Cl.[2] B05D *3/12, 5/06*

U.S. Cl. 427—264 **1 Claim**



1. A method of making a multicolored candle comprising (a) forming a candle wax core; (b) applying to the side surface of said core a removable solid member projecting outwardly from said surface, said member having a melting temperature higher than that of said candle wax, and said member being removable from said surface in subsequent step (e); (c) completely coating said surface and said applied member successively with a plurality of superimposed different colored coatings of candle wax, each of said superimposed coatings having a color different from that of the immediately underlying coating; (d) cutting a slit extending through said coatings to said member, said slit having a width permitting formation, in subsequent step (e), of projections upon removal of said member through said slit; (e) removing said member through said slit, removal of said member deflecting the superimposed coatings on opposite sides of said slit outwardly of said surface to form, on each said opposite side, a projection consisting of the said superimposed coatings, whereby the free end of each said projection forms a multicolored design; (f) thereafter applying at least one additional coating of candle wax to the thus treated core to completely coat said coated surface and projections and to fill the space between said projections formerly occupied by said solid member, each said additional coating having a color different from that of the coating immediately adjacent thereto; and (g) removing a sufficient amount of the said additional coatings overlying said projections to expose the free ends of the projections and to form said multicolored design outlined by the exposed colors of each said additional coating.

4,096,300

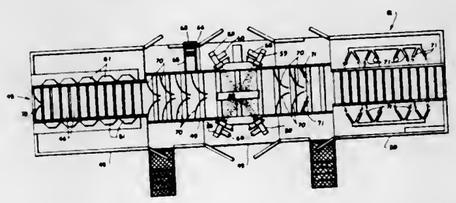
PROCESS OF COATING A SERIES OF METAL MEMBERS

Virgil R. William, 2055 Webb Gin House Rd., Snellville, Ga. 30278, and James M. Williams, Jr., 2996 Payton Rd., Atlanta, Ga. 30329

Filed May 24, 1976, Ser. No. 689,587

Int. Cl.[2] B44D *1/46*; B05D *1/02, 3/12*

U.S. Cl. 427—292 **6 Claims**



1. A continuous method of treating a series of metal members comprising progressively moving the members along a rectilinear path on a continuous surface conveyor through a series of juxtaposed enclosed work sections substantially without exposure to the environment outside said work stations, and as the members move separately along the rectilinear path, progressively heating the members as the members are moved along the path into a cleaning section toward a shot blast machine, progressively cleaning the members with shot as the members are moved along the path through the cleaning section while the members are hot from the previous step of heating the members, coating the members when the members have moved along the path from the cleaning section into a coating section, and drying the coating when the members have moved out of the coating section into a drying section by first circulating air at a first temperature about the members while the members are still in the rectilinear path and then moving the members laterally out of the path and circulating air at a second temperature higher than the first temperature about the members.

4,096,301

APPARATUS AND METHOD FOR AUTOMATICALLY MAINTAINING AN ELECTROLESS COPPER PLATING BATH

Leo J. Slominski, Bristol, and Thomas A. Rau, Wolcott, both of Conn., assignors to MacDermid Incorporated, Waterbury, Conn.

Filed Feb. 19, 1976, Ser. No. 659,475

Int. Cl.[2] B05D *1/40, 3/12*

U.S. Cl. 427—430 A **10 Claims**

1. Apparatus for maintaining the consumable components of an electroless copper plating solution at pre-determined concentration in a plating tank containing said plating solution while workpieces are being processed in the tank, said plating solution being an aqueous solution of copper ion, an aqueous metal hydroxide, a complexing agent for maintaining the copper ions in solution, and formaldehyde or formaldehyde derivatives as a reducing agent for the copper, said copper ion, hydroxide and formaldehyde being the said consumable components of said solution, said apparatus comprising in combination:

means withdrawing a sample stream of plating solution at a pre-determined constant rate from the plating tank and passing it through a sequence of analyzing stations to a point of discharge;

a source of acid of standardized normality and means introducing this acid into said sample stream at a predetermined constant rate ahead of the sequence of test stations;

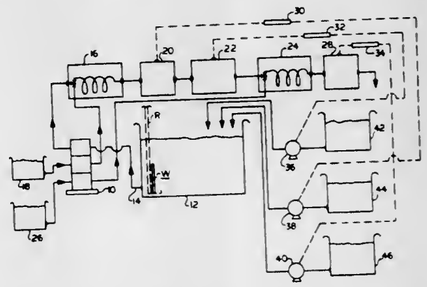
a first pH analyzing station having means for measuring the pH of the acidified sample stream, and controller means actuated by said first pH measuring means;

a source of aqueous alkali metal hydroxide replenisher solution, and means actuated by said first pH controller means for feeding said hydroxide replenisher solution to the plating tank whenever said first pH measuring means indicates a reading below a selected level;

a source of aqueous sulfite solution of standardized molar concentration, and means for mixing said sulfite solution into said acidified sample stream, at a constant predetermined rate, downstream of said first pH analyzing station;

a second pH analyzing station having means for measuring the pH of the sample stream downstream of the point of introduction of the sulfite solution, and controller means actuated by said second pH measuring means;

a source of aqueous formaldehyde replenisher solution, and



means actuated by said second pH controller for feeding said formaldehyde replenisher solution to the plating tank whenever said second pH measuring means indicates a reading below a selected level;

means analyzing the copper ion concentration of the acidified sample stream, and controller means operatively connected to and actuated by said copper analyzing means;

and a source of aqueous copper ion replenisher solution, and means actuated by said copper analyzing controller means for feeding copper replenisher solution to the plating tank whenever said copper analyzing means indicates a reading below a selected level.

6. A method for automatically maintaining consumable components of an electroless metal plating solution at predetermined concentration in a plating tank while workpieces are being processed in the tank, wherein said solution is required to be highly alkaline to be effective for plating purposes, the steps which comprise:

withdrawing a sample stream of the plating solution from the tank at a predetermined constant rate and passing this sample stream through a sequence of analyzing stations to a point of discharge;

introducing an acid of standardized normality into the sample stream at predetermined constant feed rate to reduce the alkalinity of the sample stream to a level where it is no longer effective for producing electroless deposition of the metal therein;

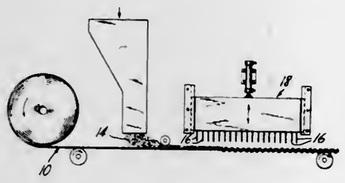
and then subjecting the acidified stream to analysis of the consumable components of the plating solution.

4,096,302

BACKING FOR TUFTED CARPET OF A THERMOPLASTIC NET AND PLURALITY OF FIBERS

Raymond Jon Thibodeau, Wayzata, and Edward V. Burchell, New Brighton, both of Minn., assignors to Conwed Corporation, St. Paul, Minn.

Filed Sep. 2, 1976, Ser. No. 719,853
Int. Cl.² D03D 27/00; D04H 11/00
U.S. Cl. 428—95 10 Claims



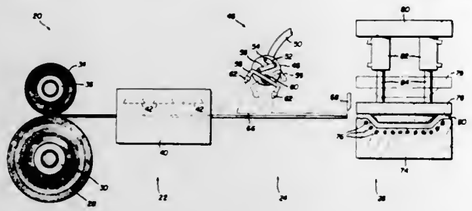
1. Carpet backing for tufted carpets comprising a plurality of fibers and a thermoplastic net, said fibers being essentially aligned in the woof direction and being secured to said net by being punched therethrough said fiber having a fiber length of from about 1 inch to about 6 inches, said fiber being present on each side of said net at a rate of from about 3 oz/yd² to about 10 oz/yd², said net comprising at least two sets of strands, said strands being extruded and having integral intersections and said net having a strand count of from about 4 × 4 to about 12 × 12 per square inch and a weight of from about 2 pounds per thousand square feet to about 10 pounds per thousand square feet.

4,096,303

COMPOSITE CARPET AND FOAM LAMINATE AND METHOD

Ralph G. Doerfling, Southfield, Mich., assignor to Detroit Gasket and Manufacturing Company, Detroit, Mich.

Continuation-in-part of Ser. No. 518,652, Oct. 29, 1974. This application Jan. 12, 1976, Ser. No. 648,616
Int. Cl.² D03D 27/00
U.S. Cl. 428—91 8 Claims



1. An integral carpet-foam laminate, comprising: a resilient flexible carpet having a napped side and a relatively smooth backing, a relatively rigid polyurethane foam layer permanently affixed to said carpet backing and a grid-like porous flexible relatively nonresilient skrim located within said polyurethane foam layer with the polyurethane foam continuous through said skrim and located between and spaced from the carpet-polyurethane foam interface and the outer skin of said polyurethane foam layer.

4,096,304

REINFORCED FLEXIBLE PANELS

Michael Greengrass, Norwich, England, assignor to Flexipane Limited, Norwich, England

Filed May 2, 1977, Ser. No. 792,803
Int. Cl.² B32B 15/08, 15/12, 15/14, 17/06
U.S. Cl. 428—138 11 Claims

1. A fire-retardant sheet comprising, as four superposed layers, a fire-retardant paper sheet, coated on one surface with a plastic material and on the other surface with a metal foil and having a scrim of glass reinforced fibre between the foil and paper, said sheet additionally comprising a further plastic sheet or layer laminated thereto, a mesh being interposed between said paper sheet and said plastic sheet or layer.

4,096,305

RIGID-WHEN-WET PAPERBOARD CONTAINERS AND THEIR MANUFACTURE

Robert M. Wilkinson, Florissant, Mo., and James R. Lyon, Godfrey, Ill., assignors to Alton Box Board Company, Alton, Ill.

Division of Ser. No. 277,646, Aug. 3, 1972, Pat. No. 3,886,019, which is a continuation-in-part of Ser. No. 39,086, May 20, 1970, abandoned. This application Apr. 14, 1975, Ser. No. 567,637
Int. Cl.² B32B 3/28
U.S. Cl. 428—182 1 Claim

1. Rigid-when-wet laminated paperboard consisting of at least three plies, each having two faces, aromatic-alcohol-containing adhesive means securing said plies together to provide two exposed faces and at least four concealed faces, two of said concealed faces forming a corrugated paperboard web, said exposed faces being water absorbent, and at least two non-contiguous ones of said concealed faces being impregnated through roller application with a printed film of a controlled amount of a phenolic resin contained within a 35 to 65 percent by weight solution of a vaporizable liquid vehicle, said plies containing multitudinous bundles of cellulose fibers surrounding a central canal, the amount of resin solution being between 3.3 to 3.9 pounds per thousand square feet per face of each ply, said resin forming a sheath about and penetrating the outer perimetrical increments of said bundles while leaving their central canals substantially devoid of resin, wherein the laminated paperboard remains absorbent of moisture but retains structural integrity due to the presence of the roller applied phenolic resin to particular of its faces.

4,096,306

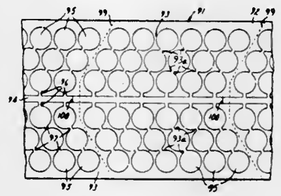
STRIP MATERIAL USED IN FORMING AIR INFLATED CUSHIONING MATERIAL

Curtis L. Larson, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 24, 1975, Ser. No. 644,050
Int. Cl.² B32B 3/02, 3/12
U.S. Cl. 428—192 6 Claims

1. An elongate strip material comprising two thin flexible films, each film comprising a heat sealable thermoplastic material forming at least one surface of the film, said films being positioned with their thermoplastic surfaces adjacent and being fused together in discrete areas to define a plurality of unsealed adjacent surface areas in a pattern providing between the films two rows of elongate inflatable chambers and a passageway extending the length of the strip between said rows of chambers with each of said chambers having an inlet opening at one end communicating with the passageway and having a plural-

ity of constricted chamber areas spaced along its length with the fused areas of the films defining the periphery of the chamber on both sides of each constricted chamber area being generally aligned and the transverse width of the chamber at each constriction being much narrower than the major transverse width of the chamber.



4,096,307

ANTI-ABRASIVE FLAME-RESISTANT NOISE-SUPPRESSANT LAMINATE

Joseph V. Lagowski, Mabscott, W. Va., assignor to Fairchild Incorporated, Raleigh, W. Va.

Filed Jun. 29, 1977, Ser. No. 811,371
Int. Cl.² B32B 15/06
U.S. Cl. 428—214 8 Claims

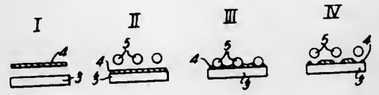
1. An anti-abrasive, flame-resistant and noise-suppressant laminate suitable for use with underground scraper conveyors or the like comprising two outer layers of ferrous material having an inner layer of styrene butadiene rubber material vulcanized therebetween, said styrene butadiene rubber material having a durometer of the order of 59 and a flame spread index of less than 25 according to ASTM-E162, one of said outer layers being of abrasive-resistant steel and having a thickness of the order of ¼ inch.

4,096,308

SCREEN PRINTING MESHES

Kenneth James Reed, 33 Carlyle Square, London, S.W.3, England

Filed Aug. 20, 1975, Ser. No. 606,051
Claims priority, application United Kingdom, Aug. 23, 1974, 37184/74
Int. Cl.² B41N 1/24
U.S. Cl. 428—247 18 Claims



1. A laminated screen printing assembly for use in making a screen printing frame comprising a flexible base sheet and a woven textile screen mesh in a tensioned state relative to the base sheet, the base sheet and screen mesh being removably laminated together by means of adhesive such that the mesh is maintained in the tensioned state on the base sheet and that, on fixing the laminated assembly to a screen printing frame and removal of the base sheet, the mesh develops tension relative to the screen frame to provide a printing screen.

16. A flexible laminated screen printing sheet for making a printing screen, said laminated sheet comprising a flexible base sheet and a woven textile mesh tensioned relative to the base sheet in the warp and weft directions of the mesh, the base sheet and the mesh being laminated together by means of an adhesive which at least partially encapsulates the warp and weft elements of the mesh and which has a shear strength sufficient to resist the shearing force applied thereto by the tensioned mesh, the base sheet and adhesive being coextensive with the mesh and the base sheet maintaining the mesh in tension by resisting the compressive force transmitted thereto through the adhesive by the tensioned mesh, the base sheet being delaminatable from the tensioned mesh so that upon fixing a screen printing frame to the mesh side of the laminated sheet the base sheet can be removed from the tensioned mesh to leave the latter in tension relative to the frame.

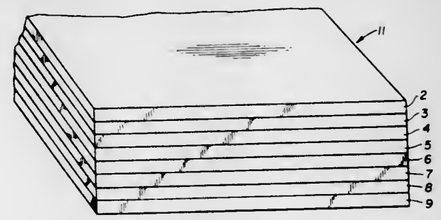
18. A method of making a flexible laminated screen printing sheet comprising tensioning in the warp and weft directions a woven textile mesh and laminating the tensioned mesh to a relatively untensioned base sheet by means of an adhesive which has a shear strength sufficient to resist the shearing force applied thereto by the tensioned mesh and which renders the base sheet subsequently removable from the mesh, the base sheet and adhesive being coextensive with the mesh and the base sheet maintaining the mesh in tension by resisting the compressive force transmitted thereto through the adhesive by the tensioned mesh.

4,096,309

LAMINATED PACKAGING MATERIAL

Nathan Stillman, Walnut Creek, Calif., assignor to Champion International Corporation, Stamford, Conn.

Filed Aug. 12, 1976, Ser. No. 713,883
Int. Cl.² B32B 7/04
U.S. Cl. 428—285 5 Claims



1. A flexible laminated packaging material comprising:
(a) a non-woven sheet of spun-bonded polymeric filament;
(b) a metallic foil affixed to said non-woven sheet;
(c) an inner surface ply of heat-sealable polyolefin affixed to said metal foil; and
(d) an outer surface ply of smooth, non-porous material, adhesively affixed to said non-woven sheet.

4,096,310

TRANSFER SHEET

Mervin R. Backwalter, and Walter T. Bulson, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed May 2, 1977, Ser. No. 792,896
Int. Cl.² B32B 7/00
U.S. Cl. 428—288 1 Claim

1. A transfer sheet capable of being printed with a sublimable dye, said sheet being:
(a) of a porous construction such that it will have an air permeability over the surface of the sheet of between 40 to 300 standard cubic feet per minute per square foot at ½ inch water,
(b) of an indeterminable length and a width of at least 3 feet

with a tear strength of at least 100 grams and a tensile strength of at least 850 psi at 450°,

(c) capable of use in a temperature range of 300° F. to 450° F. without a loss of its structural integrity and a dimensional change of more than ½%, and

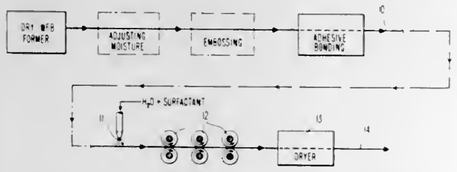
(d) capable of releasing at least 50% of the sublimable dye printed thereon during the time the transfer sheet is used in a printing operation.

4,096,311

WIPE DRY IMPROVEMENT OF NON-WOVEN, DRY-FORMED WEBS

Eugene J. Pietreniak, Chester, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Oct. 31, 1975, Ser. No. 627,657
Int. Cl.² D21H *3/44;* B22C *17/08;* C11D *1/72, 17/04*
U.S. Cl. 428—289 **22 Claims**



1. A method of improving the wipe dry characteristic of a dry-formed, adhesively bonded, web having a density less than about 0.16 grams/cubic centimeter, comprising;

wetting the web with water and with from about 0.5% to about 3% of a surfactant,

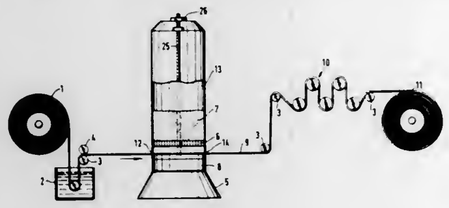
working the wet web to cause relative movement of the fibers comprising the web with respect to each other, and drying the web.

4,096,312

DEPOSITION OF SWELLABLE, MODIFIED CELLULOSE ETHER ON WATER WET HYDROPHILIC SUBSTRATE

Arno Holst, and Helmut Lask, both of Wiesbaden, Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Jul. 28, 1976, Ser. No. 709,269
Claims priority, application Germany, Aug. 1, 1975, 2534358
Int. Cl.² B05D *1/12, 5/04;* B32B *23/02, 29/02*
U.S. Cl. 428—297 **7 Claims**



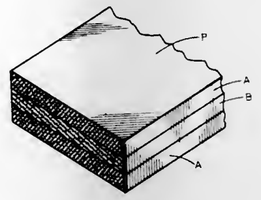
1. A process for the transformation of comminuted cellulose ether, which has been rendered at least largely water-insoluble by modification but is still highly swellable with water, into an easily workable material, comprising wetting at least one surface of a hydrophilic support web, applying the comminuted modified cellulose ether to the wetted web, and drying.

4,096,313

ELECTRICAL INSULATING PAPER AND METHOD OF MAKING SAME

Hideo Fujita, Takarazuka, and Hirotaka Itoh, Nishinomiya, both of Japan, assignors to Dainichi-Nippon Cables, Ltd., Hyogo, Japan

Filed May 4, 1977, Ser. No. 793,909
Int. Cl.² B32B *5/02*
U.S. Cl. 428—304 **10 Claims**



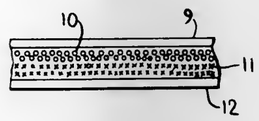
1. Electrical insulating paper comprising at least one layer (A) which is a mixture of polypropylene fibers and kraft pulp and contains 3 to 35% by weight of the polypropylene fibers based on the combined amount of polypropylene fibers and kraft pulp, and at least one layer (B) of polypropylene fibers laminated to the layer (A) by fiber-to-fiber bonding of the polypropylene fibers, the amount of the layer (B) being 3 to 80% by weight based on the combined amount of the layers (A) and (B).

4,096,314

PRESSURE-SENSITIVE TRANSFER SHEET

Manuel Cespon, Vienna, Austria, assignor to Kores Holding Zug AG, Zug, Switzerland

Filed Jun. 1, 1976, Ser. No. 691,730
Claims priority, application Austria, Jun. 6, 1975, 4333/75
Int. Cl.² B32B *3/26;* B41M *5/16*
U.S. Cl. 428—307 **7 Claims**



1. A pressure-sensitive transfer sheet which can be handled in clean manner, consisting essentially of: (1) a carrier sheet; (2) a color-changing substrate on one side thereof comprising an acid component and, separated therefrom but in juxtaposition thereto, an acid activable dye component, and (3) a wax coating overlying said substrate, said wax being selected from the group consisting of carnauba wax, amide wax, polyethylene wax, hard wax, micro-wax, ceresine wax, ozocerite, and mixtures thereof.

4,096,315

PROCESS FOR PRODUCING A WELL-ADHERED DURABLE OPTICAL COATING ON AN OPTICAL PLASTIC SUBSTRATE

Ronald M. Kubacki, Cupertino, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 15, 1976, Ser. No. 750,655
Int. Cl.² B32B *27/36*
U.S. Cl. 428—412 **22 Claims**

1. A method of coating an optical plastic substrate with an abrasion resistant coating comprising the sequential steps of:

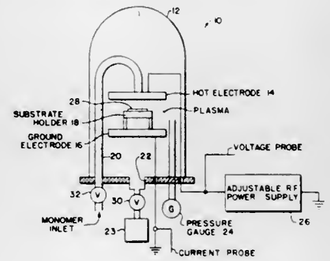
a. exposing the substrate in an evacuated plasma polymerization reactor chamber to a first plasma that forms hydroxyl groups on said substrate surface,

b. evacuating the reactor chamber,

c. exposing the substrate in the reactor chamber to a second plasma, said second plasma being a polymerizable monomer to produce a coating of the monomer on the substrate, the coating being less than 3000 nm thick and wherein the monomer contains silicon,

d. evacuating the reaction chamber,

e. exposing the substrate to a third plasma for a predetermined time at a predetermined pressure, said third plasma being selected from the group consisting of noble gases, oxygen, nitrogen, and air, and



f. removing the substrate from the reactor chamber.

21. An optical plastic substrate having an abrasion resistant coating comprising:

a. an optical plastic substrate selected from the group consisting of polymethylmethacrylate, a polycarbonate, a polystyrene, and a polystyrene-polymethylmethacrylate copolymer,

b. an interlayer hydroxyl group coating on at least one surface of the substrate, and

c. an outer, plasma polymerized monomer coating over the hydroxyl interlayer, the monomer being selected from the group consisting of vinyltrimethylsilane, vinyltrimethylethoxysilane, vinyldimethylethoxysilane, hexamethyldisilizane and mixtures thereof.

4,096,316

METHOD OF PRODUCING MAGNETIC MATERIAL WITH ALKALINE BOROHYDRIDES

Yasuo Tamai, and Masashi Aonuma, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 498,338, Aug. 19, 1974, abandoned. This application Feb. 28, 1977, Ser. No. 772,896
Claims priority, application Japan, Aug. 18, 1973, 48-92720
Int. Cl.² H01F *1/02*
U.S. Cl. 428—457 **6 Claims**

1. A method of producing a magnetic material for a magnetic recording medium comprising:

(a) preparing a solution of a reducing agent selected from the group consisting of borane, borazane, borohydride, sodium borohydride, potassium borohydride, dimethylaminoborane and diethylaminoborane and a hydroxide compound selected from the group consisting of sodium hydroxide, potassium hydroxide, lithium hydroxide, ammonium hydroxide, barium hydroxide and calcium hydroxide; and

(b) mixing the solution of step (a) with a solution of metal salts capable of forming a ferromagnetic material mainly comprising a ferromagnetic powder selected from the group consisting of Fe, Co, Fe-Co, Fe-Ni, Fe-Co-Ni and Co-Ni, said salt being a chloride, a sulfate, a nitrate, a formate, an acetate, a pyrophosphate, or a sulfamate;

the concentration of reducing agent in the solution of step (a) being 0.002 to 10 mols per liter, the concentration of hydroxide ion in the solution of step (a) being 0.001 N to 0.6N, the concentration of the metal ions in said metal salt solution being 0.002 to 2 mols per liter and the ratio of borohydride to metal ion being 0.25:1 to 4:1;

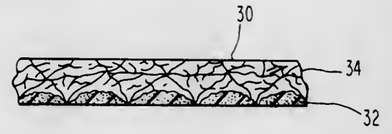
mixing step (b) being carried out at −10° C to 65° C and the particle size of the ferromagnetic powder product being 50 to 1000 A.

4,096,317

COATED ABSORBENT BARRIER PROTECTING SEPARATOR AND BATTERY EMBODYING SAME

James Herbert Annen, McFarland, Wis., assignor to ESB Incorporated, Philadelphia, Pa.

Continuation-in-part of Ser. No. 606,517, Aug. 21, 1975, abandoned. This application Feb. 11, 1977, Ser. No. 767,868
Int. Cl.² H01M *2/16;* B32B *5/28*
U.S. Cl. 429—145 **11 Claims**



1. A barrier protecting separator for use in primary galvanic cells having an alkaline electrolyte which comprises: a porous substrate and embedded in at least a portion of the pores thereof the reaction product of unneutralized carboxy polymethylene and a salt whose anion is chosen from the group that consists of oxide, hydroxide and silicate and whose cation is chosen from the group which consists of magnesium, barium and calcium.

4,096,318

RECHARGEABLE ACCUMULATOR HAVING A MANGANESE DIOXIDE ELECTRODE AND AN ACID ELECTROLYTE

Rolf Wurmb, Heidelberg; Fritz Beck, Ludwigshafen; Gerd Wunsch, Speyer; Klaus Boehlke, and Wolfram Treptow, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Continuation of Ser. No. 623,816, Oct. 20, 1975, abandoned. This application Apr. 14, 1977, Ser. No. 787,522
Claims priority, application Germany, Oct. 26, 1974, 2451017
Int. Cl.² H01M *6/04*
U.S. Cl. 429—199 **8 Claims**

1. An accumulator which can be alternately charged and discharged having two electrodes of the first kind mounted on base material, wherein in said first kind electrodes all the active material passes into solution on discharge which comprises:

(a) on the positive side, an electrode of the first kind mounted on a base material, said electrode containing manganese dioxide as active material, said base material having a coarsely porous structure with an average pore diameter of from 0.1 to 2 mm and a pore volume of from 20 to 70% and selected from the group consisting of titanium coated with titanium nitride, titanium coated with titanium carbide, and graphite;

(b) on the negative side, an electrode of the first kind mounted on a base material, said electrode selected from the group consisting of zinc, cadmium, iron, manganese and lead as the active material, and said base material consisting of powdered graphite embedded in a plastics binder which is resistant to the electrolyte whereby said base material is non-porous; and

(c) an acid electrolyte, said acid being selected from the group consisting of sulfuric acid, tetrafluoroboric acid, hexafluorosilicic acid, perchloric acid, and amidosulfonic acid, wherein said acids form soluble salts with the metals of the active materials and have oxidation resistant anions

with the proviso that when lead is used as an active material on the negative side, sulfuric acid cannot be used.

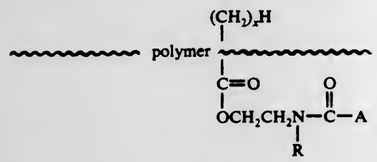
4,096,319

POLYMERS CONTAINING ANTI-OXIDANT FUNCTIONALITY

Gordon L. Willette, Doylestown, and Richard H. Hanauer, Furlong, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

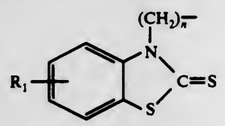
Division of Ser. No. 541,973, Jan. 17, 1975, Pat. No. 3,951,831. This application Dec. 11, 1975, Ser. No. 639,739
Int. Cl.² C08F *8/30, 8/14, 28/06*
U.S. Cl. 526—16 **7 Claims**

1. An antioxidant ester of a carboxylic acid-containing oil soluble polymer useful at high temperatures in lubricating oils for VI improving and anti-oxidant properties and having the general formula:

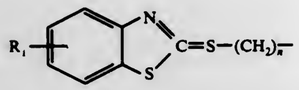


wherein x is 1 or 2, R is H or a C_1 to C_{12} straight chain or branched alkyl group, and A is an antioxidant structure of one of the following formulas, (a) or (b), or a mixture thereof:

(a)



(b)



where n is 1 or 2, and R_1 is H or a C_1 to about a C_{20} alkyl group.

4,096,320

PROCESS FOR THE PREPARATION OF BUTYL RUBBER

Luigi Verde, Busto Arsizio (Varese), and Roberto Riccardi, San L. di Parabiago (Milan), both of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Nov. 1, 1976, Ser. No. 737,874
Claims priority, application Italy, Oct. 30, 1975, 28803 A/75
Int. Cl.² C08F *2/04*
U.S. Cl. 526—72 **2 Claims**

1. In a process for the preparation of butyl rubber, wherein a mxture of isobutylene and one or more conjugated diolefins is polymerized in a liquid diluent consisting of a halogenated aliphatic hydrocarbon, in the presence of a Friedel-Crafts catalyst dissolved in said liquid diluent, and where the reaction temperature is controlled by indirect heat exchange with boiling ethylene subjected to a controlled pressure, the improvement which comprises the steps of dissolving in, or admixing with the ethylene used as heat-absorbent, a gas which is inert towards ethylene, and maintaining said pressure at a value not lower than atmospheric, wherein said gas inert towards ethylene is nitrogen, and said nitrogen is admixed, or dissolved in the ethylene in an amount of 2 to 15 moles for each 100 mols of said ethylene

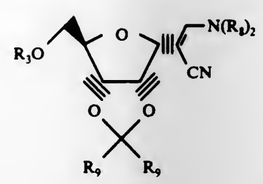
4,096,321

PROCESS TO PRODUCE OXAZINOMYCIN AND INTERMEDIATES

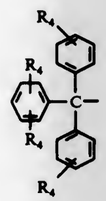
Manfred Weigele, North Caldwell, and Silvano DeBernardo, Upper Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Nov. 22, 1976, Ser. No. 743,887
Int. Cl.² C07H *15/04, 23/00*
U.S. Cl. 536—120 **18 Claims**

1. A compound of the formula

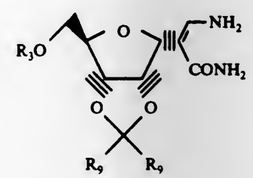


wherein R_8 is lower alkyl, R_9 is hydrogen or lower alkyl and R_3 is selected from the group consisting of

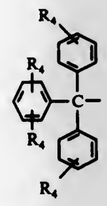


wherein R_4 is selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, halo and nitro
and

wherein R_5, R_6 and R_7 are lower alkyl.
3. A compound of the formula

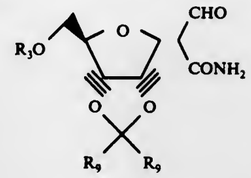


wherein R_9 is hydrogen or lower alkyl and R_3 is selected from the group consisting of

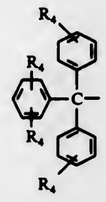


wherein R_4 is selected from the grup consisting of hydrogen, lower alkyl, lower alkoxy, halo and nitro
and

wherein R_5, R_6 and R_7 are lower alkyl.
5. A compound of the formula

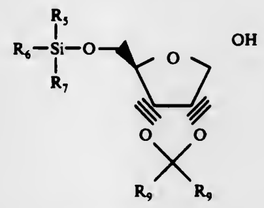


wherein R_9 is hydrogen or lower alkyl and R_3 is selected from the group consisting of

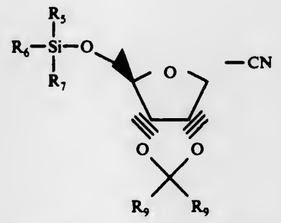


wherein R_4 is selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, halo and nitro
and

wherein R_5, R_6 and R_7 are lower alkyl.
7. A compound of the formula



wherein R_9 is hydrogen or lower alkyl and R_5, R_6 and R_7 are lower alkyl.
11. A compound of the formula



wherein R_9 is hydrogen or lower alkyl and R_5, R_6 and R_7 are lower alkyl.

4,096,322

POLYMERIZATION OF BUTADIENE

Morford C. Throckmorton, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 23, 1974, Ser. No. 535,637
Int. Cl.² C08F *4/70, 36/06*
U.S. Cl. 526—133 **7 Claims**

1. The process for the polymerization of butadiene to form polybutadiene containing a high proportion of butadiene units in the cis-1,4 configuration comprising contacting butadiene with a catalyst consisting essentially of (1) at least one organoaluminum compound, (2) at least one organonickel compound selected from the group consisting of nickel salts of carboxylic acids, organic complex compounds of nickel and nickel tetracarbonyl, (3) a boron trifluoride etherate, and (4) at least one alkyl substituted hydroxy containing aromatic compound wherein the alkyl groups leave the hydroxy groups unhindered for chemical activity in that no alkyl groups are present simultaneously on both positions ortho to the hydroxy groups and in which the mole ratio of component (1) to component (2) ranges from about 0.3/1 to about 300/1, the mole ratio of component (3) to component (2) ranges from about 0.5/1 to about 100/1, the mole ratio of component (3) to component (1) ranges from about 0.3/1 to about 10/1 and the mole ratio of component (4) to component (1) ranges from about 0.01/1 to about 2/1.

4,096,323

ANAEROBICALLY HARDENING ADHESIVES AND SEALANTS BASED ON (METH)ACRYLIC ESTERS CONTAINING REACTION PRODUCTS OF GLYCIDYL(METH)ACRYLATE AND HALF ESTERS OF DICARBOXYLIC ACIDS

Bernd Wegemund, Haan; Werner Gruber, Dusseldorf-Gerresheim, and Joachim Galinke, Langenfeld, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Germany

Filed Feb. 22, 1977, Ser. No. 770,381
Claims priority, application Germany, Feb. 27, 1976, 2607962
Int. Cl.² C08F *4/32, 2/00, 210/00, 20/06*
U.S. Cl. 526—317 **13 Claims**

1. An anaerobically setting adhesive and sealing composition comprising methacrylic- or acrylic esters, organic hydroperoxides, and optionally small amounts of additional polymerizable, unsaturated compounds, and ordinary auxiliary substances, which contain 10 to 90% by weight, based on the total weight of the polymerizable portions of the composition, of condensation reaction products of glycidyl (meth)acrylate with linear half esters of dicarboxylic acids and diols, prepared by esterification of dicarboxylic acids or dicarboxylic acid derivatives with diols in the molar ratio of 2:1, which reaction products of glycidyl (meth) acrylate with linear half esters are substantially free of epoxide groups, wherein more than 1 mole of glycidyl (meth) acrylate is reacted per mole of the linear half ester of a dicarboxylic acid and a diol.

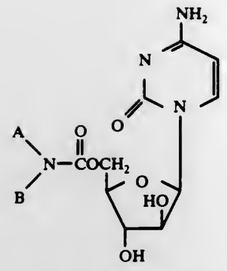
4,096,324

CYTIDINE NUCLEOSIDE COMPOUND

Robert C. Kelly, and William J. Wechter, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 593,890, Jul. 7, 1975, abandoned, which is a continuation-in-part of Ser. No. 427,183, Dec. 21, 1973, abandoned, which is a continuation of Ser. No. 11,826, Feb. 16, 1970, Pat. No. 3,847,898, which is a continuation-in-part of Ser. No. 828,380, May 27, 1969, abandoned. This application Jan. 30, 1976, Ser. No. 654,019
Int. Cl.² C07H *19/08*
U.S. Cl. 536—23 **5 Claims**

1. A compound having the following structural formula:



in which A and B are the same or different radicals selected from the group consisting of H, aliphatic of from 1 to 10 carbon atoms, monocyclic aliphatic of from 4 to 10 carbon atoms, and aromatic of from 6 to 10 carbon atoms, and further in which A and B together can make up an aliphatic chain of from 3 to 6 carbon atoms, or the pharmaceutically acceptable acid addition salts thereof.

4,096,325

METHYL HYDROXYPROPYL CELLULOSE ETHERS

James Teng; Frank Dai, both of St. Louis County, and Marcella C. Stubits, St. Louis, all of Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed Feb. 20, 1976, Ser. No. 659,746
Int. Cl.² C08B *11/193*
U.S. Cl. 536—91 **5 Claims**

1. The process which comprises treating an alkali cellulose with propylene oxide in an amount of from 1 to 8 parts by weight propylene oxide per part of cellulose at a temperature not in excess of 110° C until the propylene oxide is substantially fully reacted, and subsequently treating said cellulose with from 1 to 9 parts by weight methylating material selected from the group of methyl halides and methyl salts per part of cellulose at a temperature from 40° C to 75° C until the etherification is substantially complete, to produce a methyl hydroxypropyl cellulose ether with a degree of molar substitution of hydroxypropyl groups of 2.5 to 8 and degree of substitution of methyl groups of 1.0 to 2.4 which is able to gel an organic solvent having a solubility parameter from about 8 to about 16 or an organic solvent-water mixture in which the organic solvent has a solubility parameter from about 8 to about 16, said mixture containing less than about 60% water.

4,096,326

DIHYDROXYPROPYL CELLULOSE

Albert R. Reid, Hockessin, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Oct. 13, 1976, Ser. No. 731,952
Int. Cl.² C08B *11/08, 11/20*
U.S. Cl. 536—95 **4 Claims**

1. An ether of cellulose having at least about 1.4 dihydroxypropyl units per anhydroglucose unit, said ether of cellulose being characterized by being soluble in water and by being thermoplastic.

4,096,327

MODIFIED KAPPA-CARRAGEENAN

Kenneth B. Guiseley, Union, Me., assignor to FMC Corporation, Philadelphia, Pa.

Filed Jan. 5, 1977, Ser. No. 756,815
Int. Cl.² C07H *5/10*
U.S. Cl. 536—122 **6 Claims**

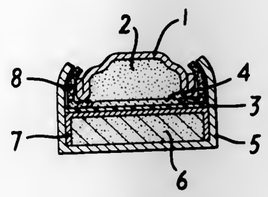
1. Kappa-carrageenan containing hydroxyalkyl groups each having 2 to 3 carbon atoms, the degree of substitution of such groups above the corresponding unmodified kappa-carrageenan being from 0.1 to 2.0 gram-milliequivalent per gram.

4,096,328

DIVALENT SILVER OXIDE CELL

Akira Kayama, and Toyoo Harada, both of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jun. 1, 1977, Ser. No. 802,470
Claims priority, application Japan, Jun. 1, 1976, 51-63694
Int. Cl.² H01M *4/34*
U.S. Cl. 429—144 **9 Claims**



1. In a divalent silver oxide cell comprising a positive metal cup, a disc shaped pellet of a positive depolarizing mixture composed mainly of divalent silver oxide in said cup, a negative metal cap sealed to and electrically insulated from positive metal cup, a negative depolarizing mixture in said negative metal cap and a separator and a layer of electrolyte-containing absorbent material between said pellet of positive depolarizing mixture and said negative depolarizing mixture, the improvement that comprises a layer of foamed silver overlying the upper face of said pellet of positive depolarizing mixture and thereby disposed between said pellet and said layer of absorbent material, said foamed silver having a porosity greater than 5%.

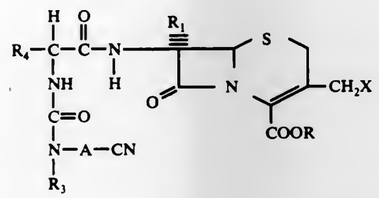
4,096,329

7-CYANOALKYLUREIDO 3 HETEROCYLIC THIO METHYL CEPHALOSPORINS

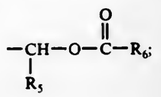
Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 664,128, Mar. 5, 1976, abandoned. This application Feb. 2, 1977, Ser. No. 765,037
Int. Cl.² C07D *501/36*
U.S. Cl. 544—21 **43 Claims**

1. A compound of the formula:

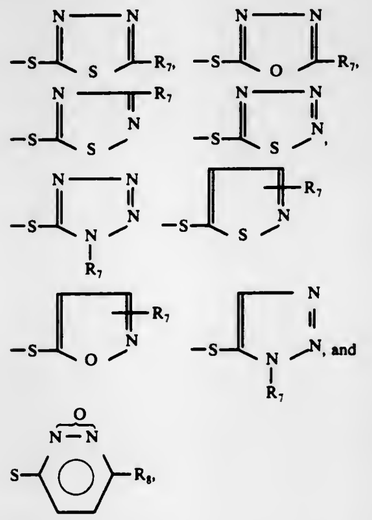


wherein R is hydrogen, straight or branched chain alkyl of 1 to 4 carbons, benzyl, phenethyl, diphenylmethyl, trimethylsilyl, 2,2,2-trichloroethyl, an alkali metal ion, an alkaline earth metal ion, dibenzylamine, N,N-dibenzylethylenediamine, methylamine, triethylamine, N-ethylpiperidine, or



R_1 is in the d-configuration and is hydrogen or methoxy; A is straight or branched alkylene of 1 to 8 carbons or

R_2 is phenyl, 2-thienyl, or 3-thienyl; R_3 is hydrogen or lower alkyl wherein lower alkyl is straight or branched chain of 1 to 8 carbons; R_4 is phenyl, benzyl, phenethyl, substituted phenyl, benzyl or phenethyl wherein said substituent is on the phenyl ring and is one or two members selected from the group consisting of chloro, bromo, methyl, ethyl, methoxy, ethoxy and hydroxy, or R_4 is a mono-substituted or unsubstituted heterocyclic selected from the group consisting of 2-thienyl, 3-thienyl, 2-furyl, and 3-furyl wherein said heterocyclic substituent is attached at an available carbon atom and is chloro, bromo, methyl, or ethyl; R_5 is hydrogen or straight or branched chain alkyl of 1 to 4 carbons; R_6 is straight or branched chain alkyl of 1 to 4 carbons; and X is a heterothio selected from the group consisting of



wherein R_7 is hydrogen, methyl or ethyl and R_8 is hydrogen, methyl, ethyl, methoxy, hydroxy, or chlorine.

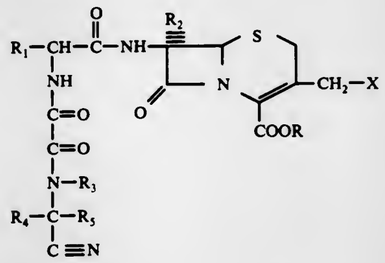
4,096,330

7β-[[[(2-CYANOMETHYL)AMINO]-1,2-DIOXOETHYL]-AMINO]ACYL CEPHALOSPORINS

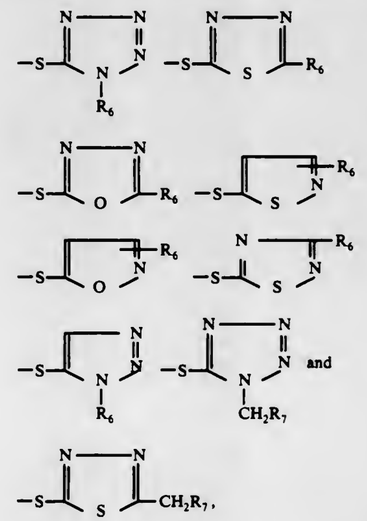
Uwe D. Treuner, and Hermann Breuer, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Apr. 21, 1977, Ser. No. 789,467
Int. Cl.² C07D *501/36*
U.S. Cl. 544—26 **13 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, tri(lower alkyl)silyl, tri(lower alkyl)stannyl, trihaloethyl, aluminum, alkali metal, alkaline earth metal phenyl-lower alkyl amine, N, N-dibenzylethylene-diamine, lower, alkylemine, triethyamine, or N-lower alkyl piperdine; R_1 is phenyl, phenyl-lower alkyl, substituted phenyl wherein said phenyl substituent is one or two members selected from the group consisting of halogen, lower alkyl, lower alkoxy, and hydroxy, or a heterocyclic selected from the group consisting of 2-thienyl, 3-thienyl, 2-furyl and 3-furyl; R_2 is hydrogen or methoxy; R_3 is hydrogen, lower alkyl, phenyl-lower alkyl or cycloalkyl; R_4 and R_5 each is hydrogen or lower alkyl; and X is a heterothio group selected from the group consisting of



R_6 is hydrogen or lower alkyl; and R_7 is carboxy, $COO^{\ominus}$ ion $\oplus$, —COO-lower alkyl, SO_3H, $—SO_2$-lower alkyl or cyano.

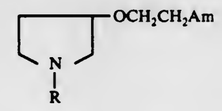
4,096,331

1-SUBSTITUTED-3-AMINOETHOXYPYRROLIDINES

Robert Frederick Boswell, Jr., and Robert Louis Duncan, Jr., both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Filed Dec. 28, 1976, Ser. No. 754,928
Int. Cl.² C07D *413/12*
U.S. Cl. 544—141 **7 Claims**

1. A compound selected from 1-substituted-3-pyrrolidines having the formula:



wherein;

R represents 2-ethoxyphenoxylower-alkyl, 2-methoxy-4-acetylphenoxylower-alkyl, 4-fluorophenoxylower-alkyl, 3,4,5-trimethoxybenzoyl, 2-methoxyphenoxylower-alkyl or 3,4,5-trimethoxyphenylacetyl and

Am is morpholino and pharmaceutically acceptable salts thereof.

4,096,332

CATIONIC SURFACE-ACTIVE AGENTS

Grégoire Kalopissis, Paris, and Guy Vanlerberghe, Mitry-Mory (Seine et Marne), both of France, assignors to L'Oreal, Paris, France

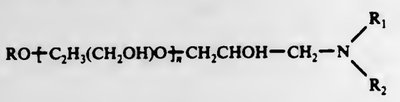
Division of Ser. No. 547,465, Feb. 6, 1975, Pat. No. 4,009,255, which is a division of Ser. No. 187,151, Oct. 6, 1971, Pat. No. 3,879,464, which is a continuation-in-part of Ser. No. 655,336, Jul. 24, 1967, abandoned. This application Nov. 17, 1976, Ser. No. 742,671

Claims priority, application Luxembourg, Jul. 26, 1966, 51645; May 12, 1967, 53667

Int. Cl.[2] C07D *295/10*

U.S. Cl. 544—174 14 Claims

2. A cationic surface-active agent comprising a mixture of compounds having the formula



wherein R is selected from the group consisting of alkyl having 8–22 carbon atoms, alkenyl having 8–22 carbon atoms and alkyl phenyl having 8–22 carbon atoms, R_1 and R_2 together with the nitrogen atom to which they are attached form a morpholine ring and n has a statistical average value of 0.5–10.

4,096,333

PROCESS FOR THE PREPARATION OF SUBSTITUTED INDAZOLES

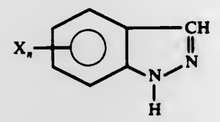
Eugene P. Di Billa, Piscataway, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Division of Ser. No. 541,673, Jan. 16, 1975, Pat. No. 3,988,347, which is a continuation-in-part of Ser. No. 504,400, Sep. 9, 1974, abandoned. This application Jun. 1, 1976, Ser. No. 691,693

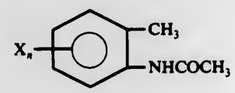
Int. Cl.[2] C07D *231/56*

U.S. Cl. 548—371 9 Claims

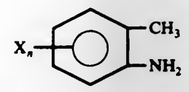
1. In the process for the production of substituted indazoles having the structural formula



wherein X represents chlorine or nitro and *n* represents a number in the range of 1 to 4, by the reaction of a substituted o-toluidine with sodium nitrite to form a substituted N-nitroso-o-toluidine and the cyclization of said N-nitroso-o-toluidine wherein sodium nitrite is added to a reaction mixture that consists essentially of at least one acetanilide having the structural formula



wherein X and *n* have the aforementioned significance, acetic acid, and acetic anhydride, said reaction mixture containing from 1 part to 20 parts by weight of acetic acid per part by weight of said acetanilide and from 1.0 mole to 1.5 moles of acetic anhydride per mole of said acetanilide, until from 1.0 mole to 1.5 moles of sodium nitrite has been added per mole of said acetanilide while maintaining the reaction mixture at a temperature between 50° C. and its reflux temperature, thereby forming a reaction product containing a substituted indazole, and thereafter separating the substituted indazole from the reaction product, the improvement wherein the reaction mixture to which sodium nitrite is added is formed by contacting a o-toluidine having the structural formula



wherein X and *n* have the aforementioned significance, with a stoichiometric excess of glacial acetic acid and acetic anhydride.

4,096,334

PROCESS FOR THE MANUFACTURE OF CARBODIIMIDES

Günter Keil, Hofheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 15, 1976, Ser. No. 750,584

Claims priority, application Germany, Dec. 17, 1975, 2556760

Int. Cl.[2] C07C *119/055, 169/76*

U.S. Cl. 560—35 2 Claims

1. In a process for the preparation of organic carbodiimides by heating an organic isocyanate or diisocyanate, the improvement which comprises heating said organic isocyanate or diisocyanate to an elevated temperature of approximately 50° to 250° C in the presence of 2-methyl-2,5-dioxo-1-oxa-2-phospholane.

4,096,335

16-PHENOXY PROSTAGLANDIN B_2 ANALOGS

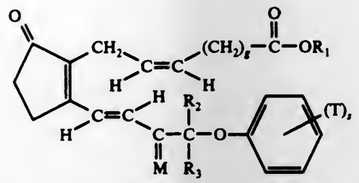
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 426,058, Dec. 19, 1973, which is a division of Ser. No. 252,030, May 10, 1972. This application Feb. 7, 1977, Ser. No. 765,919

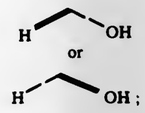
Int. Cl.[2] C07C *69/76, 177/00*

U.S. Cl. 560—53 10 Claims

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein g is an integer from 2 to 5, inclusive; wherein M is



wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 and R_3 are hydrogen, methyl, or ethyl; wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl; including each of the lower monoalkanoates thereof, and each of the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,096,336

5,6-BENZO ANALOGUES OR PROSTAGLANDIN E

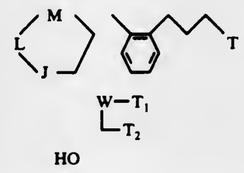
Robert Thomas Buckler, Edwardsburg, Mich., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Division of Ser. No. 671,425, Mar. 29, 1976. This application Apr. 20, 1977, Ser. No. 789,133

Int. Cl.[2] C07C *177/00*

U.S. Cl. 560—53 15 Claims

1. A compound of the formula,



in which:

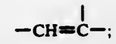
T is selected from the group consisting of carboxyl or alkoxycarbonyl;

M is carbonyl;

L is methylene;

J is selected from the group consisting of methylene, R-hydroxymethylene, or S-hydroxymethylene;

W is trans



T_1 and T_2 are attached to adjacent carbon atoms;

T_1 is hydrogen only if T_2 is loweralkyl; and

T_2 is selected from the group consisting of loweralkyl having 1–5 carbon atoms or a polymethylene radical having 1–3 carbon atoms;

provided, however, that T_2 is the polymethylene radical only when it is joined with W to form a cycloalkylidene radical having 5–9 carbon atoms.

4,096,337

PROSTANE DERIVATIVES

Peter Robert Marsham, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

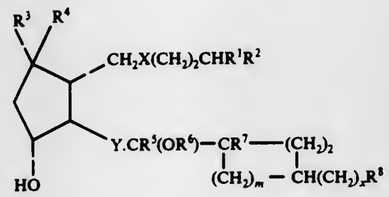
Filed Jun. 1, 1976, Ser. No. 691,297

Claims priority, application United Kingdom, Jun. 13, 1975, 25378/75

Int. Cl.[2] C07C *69/76*

U.S. Cl. 424—308 9 Claims

1. A prostane derivative of the formula:-



wherein R^1 is carboxy or C_{2-5} alkoxycarbonyl, R^2, R^5 and R^6 are each hydrogen, R^3 is hydroxy and R^4 is hydrogen, X is ethylene or cis-vinylene, Y is ethylene or trans-vinylene, R^7 is hydrogen or C_{1-4} alkyl, R^8 is phenyl or naphthyl which is unsubstituted or is substituted by halogen, nitro, phenyl, or C_{1-4} alkyl, halogenoalkyl or alkoxy, *m* and *n*, which may be the same or different, are each 1 or 2, and *x* is 0 or 1, and for those compounds wherein R^1 is carboxy, the pharmaceutically or veterinarily acceptable salts thereof.

4,096,338

BUTENOIC AND PYRUVIC ACID DERIVATIVES

Katsura Kogure, Kawagoe; Noriyoshi Sueda, Tokyo; Sizuo Himoto, Kawagoe; Youziro Yoshino, Tokyo, and Kunio Nakagawa, Kawagoe, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

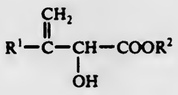
Division of Ser. No. 599,775, Jul. 28, 1975, Pat. No. 4,016,196. This application Nov. 18, 1976, Ser. No. 743,062

Claims priority, application Japan, Jul. 27, 1974, 49-85622; Jul. 29, 1974, 49-86001

Int. Cl.[2] C07C *69/76*

U.S. Cl. 560—59 1 Claim

1. A hydroxy-butenoic acid compound of the general formula:



wherein R^1 is 4-biphenylyl, 4-cyclohexylphenyl, 3-phenoxyphenyl, 4'-fluoro-4-biphenylyl, 2-fluoro-4-biphenylyl, 3-benzoylphenyl or 6-methoxynaphthyl, and R^2 is a lower alkyl group.

4,096,339

3,7-INTER-PHENYLENE-9-DEOXY-PGF-COMPOUND

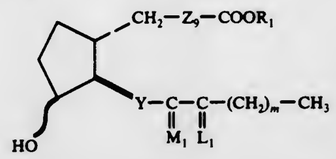
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,243, Sep. 17, 1975, Pat. No. 4,033,989. This application Apr. 11, 1977, Ser. No. 786,717

Int. Cl.[2] C07C *177/00*

U.S. Cl. 560—61 33 Claims

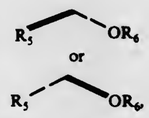
1. A prostaglandin analog of the formula



wherein Y is cis-CH=CH— or trans-CH=CH—;

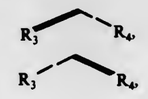
wherein *m* is one to 5, inclusive;

wherein M_1 is

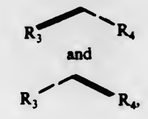


wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



or a mixture of

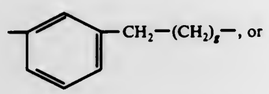


wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

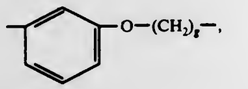
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and

wherein Z_9 is

(1)



(2)



wherein *g* is one, 2, or 3.

4,096,340

PROCESS FOR THE PREPARATION OF DIMETHYL TEREPHTHALATE

Takao Fujii; Shinichi Takeda; Satoshi Takahashi, and Koshi Namie, all of Matsuyama, Japan, assignors to Teijin Hercules Chemical Co., Ltd., Tokyo, Japan

Filed Jun. 3, 1975, Ser. No. 583,399
Int. Cl.[2] C07C *69/82*
U.S. Cl. 560—77 **8 Claims**

1. The process for preparing dimethyl terephthalate which comprises the steps of:

(a) oxidizing p-xylene and/or methyl p-toluate with molecular oxygen or a molecular oxygen-containing gas in the presence of a heavy metal catalyst;

(b) esterifying the resulting oxidation reaction mixture with methanol;

(c) subjecting the resulting esterification reaction mixture to distillation to separate dimethyl terephthalate and fractions having boiling points lower than that of dimethyl terephthalate, leaving a distillation residue (A);

(d)

(i) contacting said distillation residue (A) with at least 0.02 part by weight per part by weight of said distillation residue (A) of methanol at a temperature of 100° to 450° C. and then subjecting it to a heavy metal catalyst extraction treatment to obtain the extract portion (C) containing said heavy metal catalyst, or

(ii) subjecting said distillation residue (A) to a heavy metal catalyst extraction treatment to obtain an extract portion (B) and then contacting the extract portion (B) with at least 0.02 part by weight per part by weight of said extract portion (B) of methanol at a temperature of 100° to 450° C; and thereafter,

(e) recycling the thus contacted extract portion (B), or the extract portion (C) to said oxidation step (a).

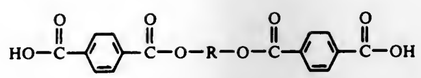
4,096,341

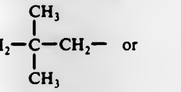
THERMALLY STABLE, RIGID DIBASIC ACIDS

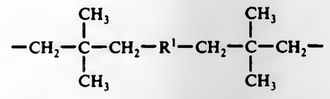
August Henry Frazer, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 751,086, Dec. 16, 1976. This application Aug. 26, 1977, Ser. No. 828,143
Int. Cl.[2] C07C *69/76*
U.S. Cl. 560—85 **4 Claims**

1. Thermally stable, rigid, dibasic acids of the formula



where R is  or



where R^1 is an arylene selected from the group consisting of 1,4-phenylenes, 4,4'-biphenylenes and 2,6-naphthylenes, said arylene being unsubstituted or substituted with halo, lower alkyl or phenyl.

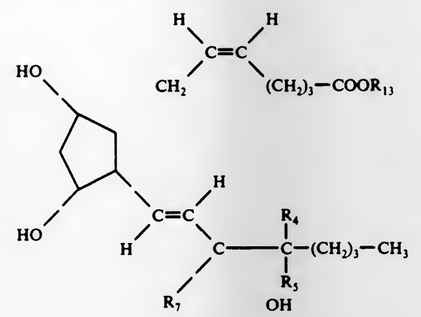
4,096,342

8β,12α,15β-PGE$_2$ COMPOUNDS

Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 518,645, Oct. 29, 1974, abandoned, and a continuation-in-part of Ser. No. 289,317, Sep. 15, 1972, abandoned. This application Feb. 23, 1976, Ser. No. 660,754
Int. Cl.[2] C07C *177/00*
U.S. Cl. 560—121 **9 Claims**

1. An optically active compound of the formula



wherein R_4, R_5, and R_7 are hydrogen or methyl, being the same or different;

wherein R_{13} is hydrogen, alkyl of one to 10 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof wherein R_{13} is hydrogen.

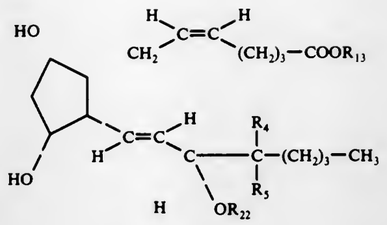
4,096,343

8β,12α-PGF$_{2\beta}$15-ETHERS

Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 518,694, Oct. 19, 1974, abandoned, which is a division of Ser. No. 374,405, Jun. 28, 1973, which is a continuation-in-part of Ser. No. 289,317, Sep. 15, 1972, abandoned. This application Feb. 23, 1976, Ser. No. 660,301
Int. Cl.[2] C07C *177/00*
U.S. Cl. 560—121 **1 Claim**

1. An optically active compound of the formula



wherein R_4, R_5, and R_7 are hydrogen or methyl, being the same or different;

wherein R_{13} is hydrogen, alkyl of one to 10 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive;

wherein R_{22} is alkyl of one to 4 carbon atoms, inclusive;

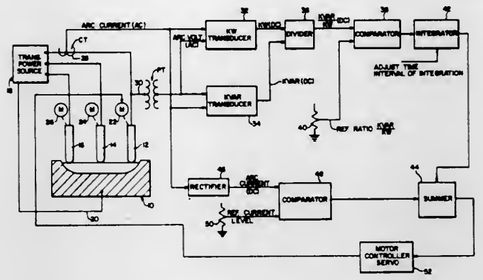
including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof wherein R_{13} is hydrogen.

4,096,344

ELECTRIC ARC FURNACE CONTROL SYSTEM

William A. Munson, Williamsville, N.Y., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 30, 1976, Ser. No. 728,106
Int. Cl.[2] H05B *7/148*
U.S. Cl. 13—13 **5 Claims**



2. An electric arc furnace control system for controlling displacement of at least one furnace electrode comprising:

(a) means for deriving a signal which is a function of the arc current of said electrode;

(b) means for deriving a signal which is a function of the arc voltage across said electrode;

(c) means for comparing said arc current signal with a reference arc current level, and for deriving a compared arc current output;

(d) means for receiving said arc current and arc voltage signals and for providing watt and var signal outputs;

(e) means for dividing said var signal by said watt signal to provide the ratio: VARS to WATTS;

(f) means for comparing said ratio VARS to WATTS with a desired reference ratio: VARS to WATTS and for delivering a compared ratio VARS to WATTS output signal;

(g) means for integrating said VARS to WATTS output signal and for delivering an integrated output;

(h) means for algebraic summation for receiving said compared arc current output and said integrated output, and for delivering a control signal; and

(i) means coupled to said electrode for receiving said control signal for rectilinear displacement of said electrode.

4,096,345

VERTICALLY ALIGNED GAS INSULATED TRANSMISSION LINE

George A. Kemeny, Sudbury, Mass., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 29, 1977, Ser. No. 782,477
Int. Cl.[2] H01B *9/04*
U.S. Cl. 174—14 R **21 Claims**

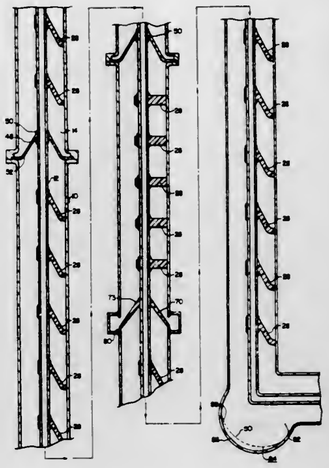
1. A vertically aligned gas insulated transmission line comprising:

an elongated, cylindrical outer sheath;

an elongated, cylindrical inner conductor disposed within said outer sheath;

an insulating gas disposed within said outer sheath and electrically insulating said inner conductor from said outer sheath; and

support means for supporting said inner conductor within said outer sheath, said support means comprising a central member having a bore therethrough and a leg member extending radially outwardly from said central member and contacting said outer sheath, said inner conductor



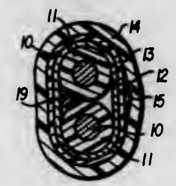
extending through said bore, said leg member having an aspect ratio greater than one.

4,096,346

WIRE AND CABLE

Clifford R. Stine, Solon; William J. Herbert, Mantua, and Bruce E. Klipec, Aurora, all of Ohio, assignors to Samuel Moore and Company, Mantua, Ohio

Continuation-in-part of Ser. No. 328,366, Jan. 31, 1973, Pat. No. 3,911,202, and Ser. No. 498,716, Aug. 19, 1974, abandoned. This application Jan. 24, 1975, Ser. No. 543,797
Int. Cl.[2] H01B *3/28, 9/06*
U.S. Cl. 174—36 **9 Claims**



1. An electrically insulated conductor comprising an electrical conductor, an inner electrically-insulating layer disposed about the electrical conductor comprising an electron-cured elastomeric composition selected from the group consisting of halosulfonated polyethylene, poly(ethylene-propylene-hexadiene)polymer, poly(ethylene-propylene-dicyclopentadiene)-polymer, poly(ethylene-propylene-ethylidene-norbornene)-polymer and poly(ethylene-propylene-methylene-norbornene)polymer, and an outer layer of electron-cured chlorinated polyethylene composition disposed about the said inner layer.

4,096,347

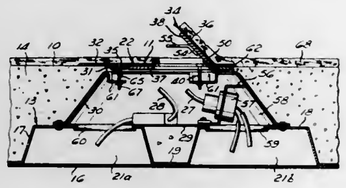
OUTLET BOX ACCESS COVER

John P. Penczak, Euclid, and Richard A. Chokenea, Sheffield Lake, both of Ohio, assignors to Bargar Metal Fabricating Company, Cleveland, Ohio

Filed Aug. 16, 1976, Ser. No. 714,742
Int. Cl.[2] H02G *3/12*
U.S. Cl. 174—48 **19 Claims**

1. A preset access housing for underfloor electrical distribution systems having raceway cells extending below the surface

of a concrete or the like floor, comprising a base wall proportion to bridge between at least two separate raceway cells and formed with separate openings adapted to connect with the interior of each associated raceway cell, a sidewall extending upwardly from said base wall and terminating at an upper open end, said sidewall being proportioned to locate said open end adjacent to but below the surface of a floor, and closure means



secured to and closing said open end, said closure means comprising support and frame assembly means, said assembly means comprising a support ring fixed to the upper open end of said sidewall and a finish frame fixed to said support ring and defining an access opening therethrough, a stationary cover covering a portion of said access opening and being fixed to said assembly means, and a movable cover pivotally connected to said assembly means.

4,096,348

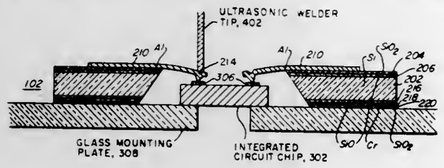
INTEGRATED TEST AND ASSEMBLY DEVICE

David R. Robillard, Westboro, and Robert L. Michals, Marlboro, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 583,739, Jun. 4, 1975, Pat. No. 3,984,620. This application Mar. 15, 1976, Ser. No. 666,826

Int. Cl.[2] H05K *5/02, 1/02*

U.S. Cl. 174—52 FP **10 Claims**



1. An interconnection device for use with an integrated circuit device for coupling an active integrated circuit chip to external lead means within a package frame comprising in combination:

a substantially planar wafer of semiconductor material, said wafer having one or more apertures therein, at least some of said apertures being adapted for receiving an integrated circuit chip;

one or more insulating layers upon at least a portion of a surface of said wafer; and

a plurality of conductive lead means disposed upon said insulating layers, one end of each of said lead means extending into the region of said apertures for making connection to said integrated circuit chips, said ends having a substantially pointed tip thereon projecting into said apertures in a direction substantially normal to said surface of said wafer.

4,096,349

FLEXIBLE CONNECTOR FOR TRACK LIGHTING SYSTEMS

Anthony C. Donato, Westfield, N.J., assignor to Lightolier Incorporated, Jersey City, N.J.

Filed Apr. 4, 1977, Ser. No. 784,136

Int. Cl.[2] H02G *3/04, 3/06*

U.S. Cl. 174—68 R **3 Claims**

1. A flexible spanner junction for electrically connecting the distal ends of diverging current-carrying light track conduits, comprising first and second rigid spaced junction segments, each said junction segment including an outer end portion having a tap portion adapted to be mechanically and electrically connected to a distal end of a light track section, and an inner end portion, a bendable section interposed between said junction segments, said bendable section including spaced end portions, each said end portion of said bendable section being fixed to an inner end portion of one of such junction segments, said bendable section being formed of yieldable elastic insulating material and including an axially extending internal passage and at least two electrical conductor members disposed within said passage and electrically connecting said tap portions of said junction segments, said conductor members being formed of stiff, bendable conductive material whereby said bendable section may be bent to any of a series of desired configurations in directions normal to the longitudinal axis thereof and will be maintained in said orientation by said bent conductors.

4,096,350

CONNECTION STRUCTURE FOR COAXIAL CABLE

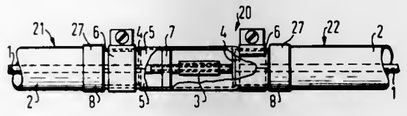
Ernst Mayr, Starnberg, and Egid Kraus, Deisenhofen, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 25, 1977, Ser. No. 781,285

Claims priority, application Germany, Jan. 27, 1977, 2703406

Int. Cl.[2] H02G *15/08*

U.S. Cl. 174—88 C **5 Claims**



1. A connection structure for coaxial cable comprising

(A) a pair of coaxial cable members, each said cable member having an outer conductor in radially spaced, circumferentially extending relationship to at least one inner conductor, said cable members being in axially aligned, adjacent relationship with one another,

(B) an elongated connective sleeve member for said pair of inner conductors, said connective sleeve member having an internal diameter adapted to correspond to the outer diameter of said pair of inner conductors, said connective sleeve member being internally continuously threaded,

(C) the terminal adjacent circumferentially outer surface portions of each one of said inner conductors having threads matable with said continuous internal threads of said connective sleeve member, with the threads on one said inner conductor extending an axial distance therealong at least about equal to the axial length of said connective sleeve member,

(D) each one of said pair of inner conductors being threadably associated about equally with said associated sleeve member, thereby to provide electrical interconnection therebetween,

(E) a pair of supporting sleeve members, each one of said supporting sleeve members having an outer circumferential surface whose diameter supports radially an inner adjacent surface of the terminal portion of a different one of said outer conductors, and further having an axial aperture therein larger in internal diameter than the outside diameter of said inner conductors,

(F) a longitudinally mating, elongated pair of hemi-cylindrical shell members mounted circumferentially about circumferentially outer surface portions of adjacent terminal ends of each one of said pair of outer conductors, and

(G) a pair of radially contractable contracted clamping means, each one thereof being mounted circumferentially about a different opposed end portion of said mounted pair of hemi-cylindrical shell members, each said clamping means being in radially adjacent, compressed relationship to a different one of said supporting sleeve members.

4,096,351

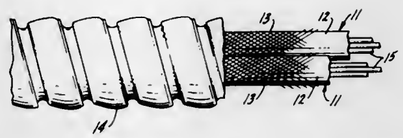
INSULATED AND BRAID COVERED ELECTRICAL CONDUCTOR FOR USE IN GASSY OIL WELLS

Robert V. Wargin, Darien, Ill., and Clinton A. Boyd, Tulsa, Okla., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 24, 1976, Ser. No. 717,437

Int. Cl.[2] H01B *7/18, 3/28*

U.S. Cl. 174—102 R **4 Claims**



1. A multi-component electrical conductor comprising an electrical conductor, an oil-and brine-resistant insulating material surrounding said conductor formed of a cured composition comprising EPDM (ethylene-propylenediene monomer terpolymer), hydrocarbon oil and polybutadiene; and a braid layer formed from a fiber selected from the group consisting of nylon fiber, polyethylene terephthalate fiber, glass fiber, polyamide fiber, and fluropolymer fiber surrounding and confining said insulating material.

4,096,352

ELECTRICAL FEEDTHROUGH

Heimart von Zweck, 221 Mount Auburn St., Cambridge, Mass. 02138

Filed Nov. 18, 1976, Ser. No. 742,780

Int. Cl.[2] H01B *17/30*

U.S. Cl. 174—153 R **4 Claims**

1. An electrical feedthrough for use in transporting current across a gastight barrier wall resistant to high vacuum conditions of from 10^{-4} to 10^{-7} mm of Hg, said feedthrough comprising

an insulation housing defining a cylindrical threaded body having a central axis with an enlarged outer head of larger diameter than said body, said housing further defining an inner end,

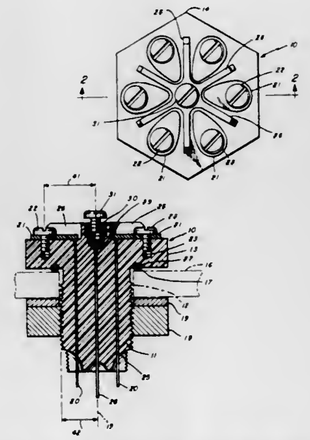
a plurality of elongated conductors extending through said body and embedded therein with individual inner ends thereof extending out of said body inner end at corresponding individual recessed areas defined by said body,

said insulation being an epoxy material molded about and sealed to said conductors along the entire length of said conductors in said body,

a plurality of mechanical contact means electrically joined to said conductors at said outer head,

said plurality of contact means being radially spaced from said body axis by a distance at least as great as the radius of said cylindrical body portion,

said head having an outer surface and an inner surface with a sealing ring of flexible material positioned adjacent said inner surface and encircling said body portion,



a threaded nut threaded on said body and being screwable up said body toward said inner surface so as to insure, in conjunction with the sealing ring, a gastight seal between the feedthrough and an encircling barrier wall when mounted in said wall with said gastight seal and said feedthrough being hermetically sealed at vacuum conditions of from 10^{-4} to 10^{-7} mm of Hg.

4,096,353

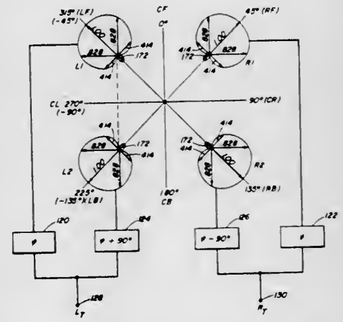
MICROPHONE SYSTEM FOR PRODUCING SIGNALS FOR QUADRAPHONIC REPRODUCTION

Benjamin B. Bauer, Stamford, Conn., assignor to CBS Inc., New York, N.Y.

Filed Nov. 2, 1976, Ser. No. 737,760

Int. Cl.[2] H04R *5/00*

U.S. Cl. 179—1 GQ **6 Claims**



6. Apparatus for producing composite signals L_T and R_T for use in a matrix quadraphonic sound system wherein first and second channels carry the composite signals L_T and R_T respectively, and wherein each composite signal contains predetermined amplitude portions of three or more directional input signals representative of corresponding acoustical signals, to the extent they are present, in predetermined phase relationships, the composite signals when decoded by a decoder appropriate to the matrix system producing three or more output signals each containing a different directional signal as its

predominant component, the apparatus for producing the said composite signals comprising, in combination:

an array of microphones comprising a cluster of four microphones supported in close proximity to each other each having a limacon sensitivity pattern substantially according to the equation $E + 0.414 + 0.586 \cos \theta$, where θ is the angular direction measured from the direction of maximum sensitivity, whose directions of maximum sensitivity are azimuthally displaced one from the next by about 90°, and the direction of maximum sensitivity of a first of which is displaced by about +45° from said reference direction and each operative to produce when disposed within a sound field a respective signal the amplitude of which is a measure of the direction of incidence of a sound signal relative to said reference direction,

means for relatively shifting by about 90° the phase of the signals produced by the two microphones whose maximum sensitivity directions are oriented at −45° and −135°, respectively, relative to said reference direction and for combining said relatively phase-shifted signals for producing the L_T signal, and

means for relatively shifting by about 90° the phase of the signals produced by the two microphones whose maximum sensitivity directions are oriented at +45° and +135°, respectively, relative to said reference direction and for combining said relatively phase-shifted signals for producing the R_T signal.

4,096,354

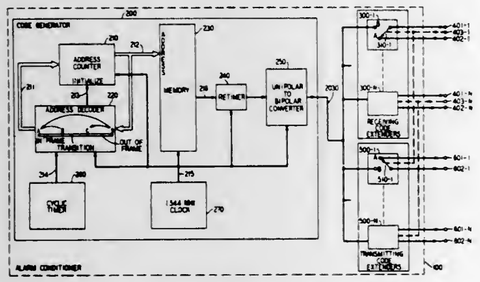
APPARATUS FOR DISTINGUISHING BETWEEN FAILURES IN A DIGITAL TRANSMISSION NETWORK

Werner Heinrich Bleickardt, Middletown, and Virgil Ivancich Johannes, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 11, 1977, Ser. No. 776,544

Int. Cl.² H04J 3/14

U.S. Cl. 179—15 BF **8 Claims**



1. Apparatus for signaling a failure in a digital transmission network, said apparatus comprising:

an output terminal adapted to transmit a digital signal to a first signal level of the digital hierarchy of said network,

a failure signal terminal adapted to receive a failure signal from a signal level,

an input terminal adapted to receive a digital signal from a second signal level,

means responsive to said failure signal for distinguishing between failures in said network,

said distinguishing means including code extender means for selectively coupling said input terminal to said outpt terminal and

means for extending a predetermined code signal through said code extender means to said output terminal.

4,096,355

COMMON CHANNEL ACCESS METHOD FOR A PLURALITY OF DATA STATIONS IN A DATA TRANSMISSION SYSTEM AND CIRCUIT FOR IMPLEMENTING THE METHOD

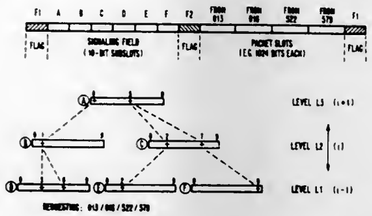
Ernst Hans Rothauser, Reichenburg, and Daniel Wild, Kilchberg, both of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 13, 1977, Ser. No. 841,763

Claims priority, application Switzerland, Nov. 12, 1976, 14261/76

Int. Cl.² H04J 3/08

U.S. Cl. 179—15 AL **8 Claims**



1. A method by which a plurality of data stations in a data transmission system can access a common transmission channel in a predetermined sequence thereby eliminating any possibility of contention, said stations each being provided with a plural character address selected from an ordered set of plural character addresses and comprising the steps of:

at each said station requiring transmission capacity, transmitting a unique indicia of its first address character in a first fixed length time slot immediately following receipt of a first unique multi-bit flag character;

thereafter each said station requiring transmission capacity transmitting a unique indicia of its second address character in one time slot of a second group of fixed length time slots as a function of the total number of unique indicias transmitted and received in the said first fixed length time slot and the order position of its first address characters;

following transmission and receipt of said second group of fixed length time slots each station requiring transmission capacity transmitting a unique indicia of its third address character in one time slot of a third group of fixed length time slots as a function of the total number of unique indicia transmitted and received in each of the time slots of the second group of fixed length time slots and the order position of its said second address character, the above described sequence continuing for as many times as the stations have address characters until all stations requiring transmission capacity have transmitted a unique indicia for each character in the station address whereby the indicia transmitted in the first fixed length time slot and in the succeeding groups of time slots identify the stations requiring transmission capacity; and,

thereafter at each station requiring transmission capacity transmitting a data packet in an ordered sequence indicated by the unique address indicia.

4,096,356

CALL RESTRICTION ARRANGEMENT

Richard Duane Burtness, Boulder, Colo., and Louis Emanuel Thelemaque, Tehran, Iran, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 26, 1977, Ser. No. 819,111

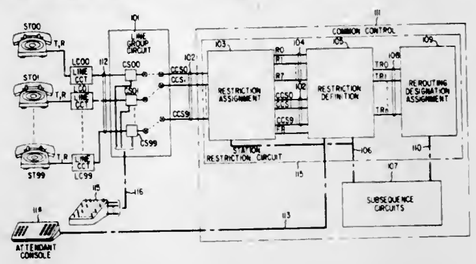
Int. Cl.² H04M 1/66, 3/54

U.S. Cl. 179—18 DA **17 Claims**

1. In a telephone switching system having a plurality of telephone stations, a call restriction arrangement comprising:

means responsive to the initiation of a call in said telephone switching system for generating a distinctive signal indicative of the type of call that has been initiated;

means for defining the types of calls prohibited to each station of said plurality of telephone stations, wherein said defining means are responsive to said initiated call for generating a distinctive signal indicative of the types of calls prohibited to the one of said plurality of telephone stations associated with said initiated call;



rerouting means responsive to the concurrent generation of distinctive signals by said generating means and said defining means indicative that said initiated call is one of said types of calls prohibited to the one of said plurality of telephone stations associated with said initiated call for rerouting said initiated call to one of a plurality of alternate destinations.

4,096,357

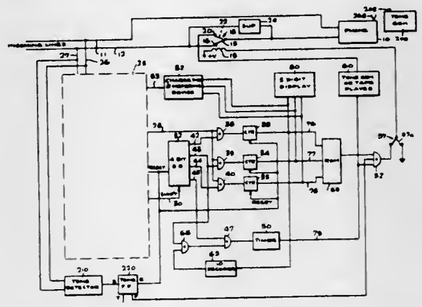
TOLL-CALL RESTRICTION SYSTEM

Charles S. Mogtader, 619 N. Camden Dr., Beverly Hills, Calif. 90210

Filed Nov. 18, 1976, Ser. No. 742,896

Int. Cl.² H04M 1/66

U.S. Cl. 179—18 DA **4 Claims**



1. In a toll-call restriction system useful with a telephone unit and a pair of telephone lines for restricting the telephone exchanges which can be reached from said telephone unit, said system including normally closed switch means connecting said telephone unit to said telephone lines and interrupt means for opening said switch means to interrupt said connecton, the improvement comprising:

manually actuatable means for generating a sound wave having predetermined characteristics;

detector means connected to said telephone lines for sensing the generation of said sound wave; and

means responsive to said detector means sensing the generation of said sound wave for disabling said interrupt means.

4,096,358

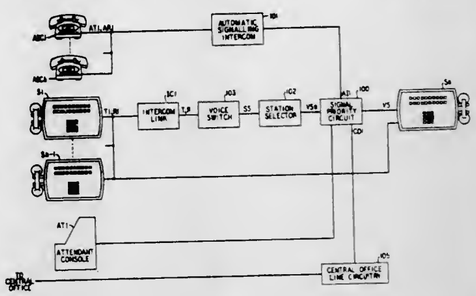
KEY TELEPHONE SYSTEM SIGNAL PRIORITY ARRANGEMENT

Richard Henry Bidlack, Boonton; Wayne Jay Egan, Eatontown, and Steven Gary Miller, Freehold Township, Monmouth County, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 24, 1976, Ser. No. 689,379

Int. Cl.² H04M 1/00

U.S. Cl. 179—99 **9 Claims**



1. In a key telephone system having a plurality of key telephone station sets wherein a plurality of types of calls can be received by each of said key telephone station sets, a signal priority arrangement comprising:

means for assigning a priority to every call in said key telephone system wherein said priority is solely an indication of the type of call,

means responsive to the receipt of an incoming call at a called one of said key telephone station sets already engaged in an existing call for determining whether said priority assigned to said incoming call is higher than the priority assigned to said existing call,

means responsive to a determination that said incoming call has a higher priority than does ssid existing call for placing said existing call in an active noncommunicating condition, and for concurrently completing said incoming call to said called key telephone station set,

means responsive to said determining means indicating that said incoming call has a higher priority than said existing call for generating a distinctive audible tone burst signal, and

means responsive to said generating means for applying said generated audible tone burst signal to the communicating leads of said existing call.

4,096,359

KEY TELEPHONE SYSTEM INTERCONNECTION APPARATUS

John Anthony Barsellotti, Guelph, Canada, assignor to International Standard Electric Corporation, New York, N.Y.

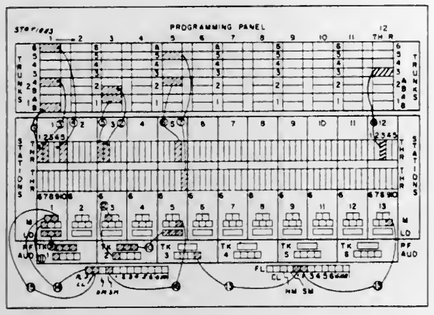
Filed Oct. 12, 1976, Ser. No. 731,710

Int. Cl.² H04Q 1/02

U.S. Cl. 179—99 **4 Claims**

1. A key telephone system comprising a plurality of stations and a plurality of lines, a switching network having a plurality of input and output paths, each station having a station set with at least one alignment of manually operable keys in which each of said keys is representative of an individual one of said lines, each of said keys respectively coupled to one of said input paths to said network, said output paths comprising paths to lines of said system, the invention comprising manually replaceable distributing means for connecting input paths to output paths, said distributing means comprising a panel adjacent said switching network and including multiple conductor connector positions for each of said lines and multiple connector positions for each key of said station sets, means for selectively enabling the connection of said lines to said key positions in a manner allowing ready re-association of lines and station

keys, said connecting means comprising conductors having plug-in members for joining respective selected lines to selected stations within the respective station key connector position and wherein for each of said station positions, there is an alignment of connectors for each line which could be associated with the station represented by said position and each of said station positions include a first and a second set of connectors, said first set comprising connectors for providing a predetermined class of service appearances and said second set comprising connectors without class of service restriction.



4,096,360

MULTICHANNEL RECORD DISC REPRODUCING SYSTEM

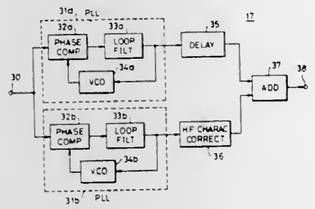
Nobuaki Takahashi, Yamato; Fujio Suzuki, Yokohama, and Katsuhiro Ohba, Toyohashi, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Sep. 22, 1976, Ser. No. 725,569

Claims priority, application Japan, Sep. 27, 1975, 50-116605; Oct. 8, 1975, 50-121567; Oct. 8, 1975, 50-121568; Oct. 30, 1975, 50-127733

Int. Cl.[2] G11B *3/74;* H03D *3/00*

U.S. Cl. 179—100.4 ST **7 Claims**



1. A multichannel record disc reproducing system comprising:

a first phase-locked loop including a phase comparator and a voltage controlled oscillator for demodulating an angle-modulated signal separated from a signal picked up from a multichannel record disc on which a direct wave signal and an angle-modulated signal are recorded in a multiplexed state, said first phase-locked loop having a lock range of a first width;

a second phase-locked loop including a phase comparator and a voltage-controlled oscillator for demodulating said angle-modulated signal separated from the picked up signal, said second phase-locked loop having a lock range of a second width which is less than the width of said first lock range; and

addition means for adding the demodulated output signal of said first phase-locked loop and the demodulated output signal of said second phase-locked loop.

4,096,361

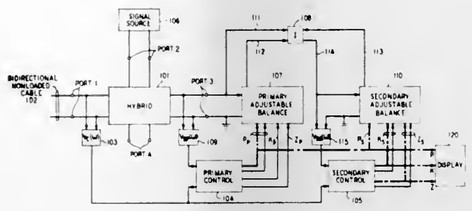
TEST APPARATUS FOR OBTAINING IMPEDANCE SETTINGS FOR HYBRID BALANCE NETWORKS

Charles David Crawford, Burlington, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jun. 20, 1977, Ser. No. 808,092

Int. Cl.[2] H04B *1/52*

U.S. Cl. 179—170 D **11 Claims**



1. Apparatus for automatically obtaining settings to adjust manually controllable impedance elements for obtaining an optimum driving point impedance to match substantially an unknown impedance comprising:

a hybrid network having four signal ports, a first port of said hybrid network being adapted to be connected to the unknown impedance to be matched;

a signal source for generating a test signal having at least one frequency component in a predetermined frequency band and being connected to a second port of said hybrid network;

a first adjustable impedance balance network having a plurality of controllably adjustable impedance elements and being connected to a third port of said hybrid network;

a first control circuit connected in circuit relationship with said first hybrid port and said third hybrid port and being responsive to first and second signals developed at said first and third ports, respectively, in response to said test signal, said unknown impedance and said first balance network impedance for generating a plurality of first control signals for adjusting corresponding ones of said impedance elements of said first balance network for yielding at said third port a driving point impedance to match substantially said unknown impedance;

at least a second adjustable impedance balance network having a plurality of controllably adjustable impedance elements and an input, said input being in circuit relationship with said third hybrid port and being supplied with a signal representative of the current input to said first balance network and with a rounded off value of a predetermined one of said first control signals to adjust a corresponding one of said impedance elements in said at least second balance network; and

at least a second control circuit responsive to said first signal developed at said first hybrid port and to a third signal developed at the input to said at least second balance network in response to the current supplied thereto and the impedance of said at least second balance network for generating second control signals to adjust the remaining ones of said at least second balance network controllably adjustable impedance elements for yielding at said at least second balance network input an otpimum compromise driving point impedance to match substantially said unknown impedance, wherein rounded off values of said predetermined one of said first control signals and said second control signals represent discrete impedance values for adjusting a corresponding manually adjustable balance network to yield an impedance to match substantially said unknown impedance.

4,096,362

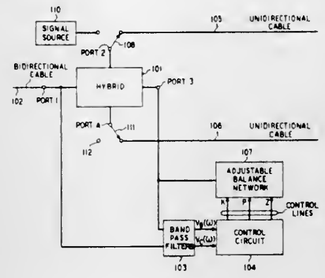
AUTOMATIC CABLE BALANCING NETWORK

Charles David Crawford, Burlington, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jun. 20, 1977, Ser. No. 808,091

Int. Cl.[2] H04B *1/52*

U.S. Cl. 179—170 D **17 Claims**



1. In a transmission network of a type including a 4-port hybrid network adapted for being connected to a transmission path exhibiting a complex impedance at a first port and to an adjustable impedance balance network having a plurality of controllable impedance elements for yielding a driving point impedance at a second port, wherein the improvement comprises:

a signal source for generating a test signal having a plurality of frequency components within a predetermined frequency band and having a first prescribed output impedance, said signal source being adapted to be connected to a third port of said hybrid;

a second prescribed impedance being adapted to be connected to a fourth port of said hybrid; and

a control circuit connected in circuit relationship with said first and second hybrid ports and being responsive to first and second signals developed at said first and second hybrid ports, respectively, in response to said test signal, said complex impedance of the transmission path and said balance network impedance for generating a plurality of control signals for adjusting said controllable impedance elements of said balance network to yield a driving point impedance to match substantially the complex impedance of said transmission path over said frequency band.

13. In a transmission network of a type including a 4-port hybrid network adapted for being connected to a transmission path exhibiting a complex impedance at a first port and to an adjustable impedance balance network having a plurality of controllable impedance elements for yielding a driving point impedance at a second port, wherein the improvement comprises:

a signal source for generating a test signal having at least one frequency component within a predetermined frequency band; and

a control circuit connected in circuit relationship with said first and second hybrid ports and being responsive to first and second signals developed at said first and second hybrid ports, respectively, in response to said test signal, said complex impedance of the transmission path and said balance network impedance for generating a plurality of control signals for adapting said controllable impedance elements of said balance network to yield a driving point impedance to match substantially the complex impedance of said transmission path, said control circuit including means for generating a magnitude control signal and means for generating at least a first singularity control signal, said at least first singularity control signal generating means generates a signal representative of the integral of the difference between a magnitude component equal to the difference between the absolute magnitudes of said first and second signals modified by a first prescribed weighting function, and a phase component proportionately equal to the difference between the phase of said first signal and said second signal modified by a second prescribed weighting function.

4,096,363

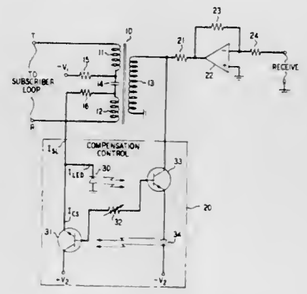
TRANSMISSION NETWORK INCLUDING FLUX COMPENSATION

Ronald Lee Earp, Burlington, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 24, 1977, Ser. No. 800,047

Int. Cl.[2] H04Q *1/28;* H04B *15/00*

U.S. Cl. 179—170 R **6 Claims**



1. A transmission network which comprises:

transformer means including a core and at least a primary winding and a secondary winding for coupling alternating current signals from a first transmission path to a second transmission path;

first current sensing means in circuit with said primary winding for generating a first representation of the magnitude of a direct current flowing in said first transmission path;

first controllable current source means in circuit with said second winding of said transformer means and being responsive to said first representation for supplying a compensation direct current of predetermined polarity to said second winding having a magnitude to cancel effectively a magnetic flux generated in said core because of the direct current flowing in said primary winding; and

feedback means responsive to said compensation current for controlling the current flowing through said first current sensing means in accordance with a prescribed relationship.

4,096,364

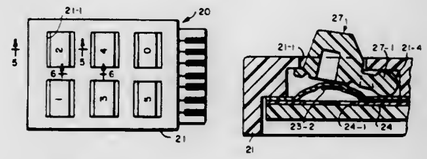
KEYBOARD SWITCH ASSEMBLY HAVING FLEXIBLE CONTACT LAYER WITH SNAP INITIATOR DOME

William Joseph Lynn, Groveland, and Richard E. Seeger, Topsfield, both of Mass., assignors to Chomerics, Inc., Woburn, Mass.

Filed Feb. 22, 1977, Ser. No. 770,519

Int. Cl.[2] H01H *13/70, 1/00*

U.S. Cl. 200—5 A **10 Claims**



1. A keyboard assembly comprising an insulator support member, a first circuit pattern supported by said support member means, said first circuit pattern having contactors and circuit lines selectively coupled to said contactors, an insulator material snap through spacer over said support member and

first circuit pattern, said spacer having a plurality of openings therethrough each in register with different ones of said contacts, a sheet of flexible and resilient insulator plastic having a plurality of snappable domes formed therein, said domes in register with different ones of said spacer openings, a second circuit pattern adhered to the flexible and resilient sheet, said second circuit pattern having contactors and circuit lines selectively coupled to said contactors, said contactors being supported on the under surface of said domes, at least some of said domes having a snap initiator formed in the dome at the top thereof, said initiator in the shape of a bar having a width less than its length at its base, the bar being concave with respect to the under surface of the dome.

4,096,365

ROTARY WAFER SWITCH

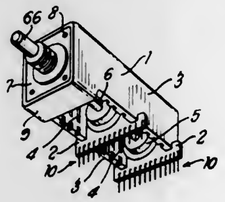
James Anthony Hodell, Lovedean, England, assignor to Wessex Advanced Switching Products Limited, Hayling Island, England

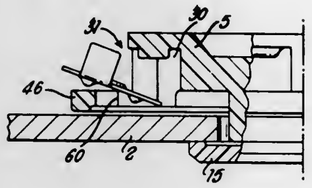
Filed Jan. 7, 1976, Ser. No. 647,203

Claims priority, application United Kingdom, Jan. 15, 1975, 1841/75

Int. Cl.[2] H01H *19/58, 9/00*

U.S. Cl. 200—11 DA **6 Claims**





1. A rotary wafer switch comprising a wafer housing, at least one wafer positioned in a predetermined operative position in the housing, said wafer carrying fixed switch contacts, a rotatable contact carrier, at least one movable switch contact carried by the carrier to co-operate with said fixed switch contacts, and co-operating means on the wafer and on the housing for automatically retaining and positively locating the wafer in said predetermined operative position when the wafer reaches said position in the housing when the wafer is assembled into the housing, the wafer comprising terminals along an edge portion thereof, the wafer being adapted to be positioned in the housing with said edge portion exposed from the housing selectively in either of two mutually opposite directions, the housing having two substantially parallel opposed wall portions, the wafer extending transversely between said two opposed wall portions and having two notches on at least one side thereof, at least one said wall portion having a part that snaps into a said notch to retain the wafer, said two notches being equally spaced from a plane through the axis of rotation of the contact carrier perpendicular to said opposed wall portions, whereby when the wafer is positioned with said edge portion exposed in one direction one of the notches engages with said wall portion part and when the wafer is positioned with said edge portion exposed in the opposite direction the other of the notches engages with said wall portion part.

4,096,366

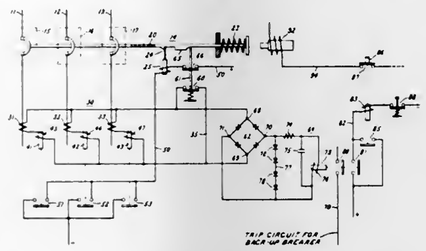
MEANS FOR DETECTING A LOSS OF VACUUM IN VACUUM-TYPE CIRCUIT INTERRUPTERS USED IN POLYPHASE A.C. VACUUM CIRCUIT BREAKER

Charles Hoff Titus, Newtown Square, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Nov. 1, 1976, Ser. No. 737,923

Int. Cl.[2] H01H *33/66*

U.S. Cl. 200—144 B **9 Claims**



1. Loss-of-vacuum detecting means for any one of the three vacuum-type circuit interrupters of switchgear comprising a three-phase vacuum circuit breaker, said switchgear including: (i) three current transformer secondary windings respectively coupled to the three phase conductors of the power circuit extending through the breaker, (ii) a shorting conductor, (iii) means connecting said secondary windings in parallel with each other and in series with said shorting conductor, and (iv) three overcurrent relays, one for each phase, each relay having an input circuit connected in series with an associated current transformer secondary winding and with said shorting conductor; said detecting means comprising the aforesaid components (i), (ii), (iii), and:

(a) a switch connected in said shorting conductor and in series with the parallel combination of said three current transformer secondary windings, said switch being closed when said circuit breaker is closed,

(b) means for opening said switch when said circuit breaker is opened,

(c) rectifying means connected across said switch and across the parallel combination of said current transformer secondary windings for developing a d.c. voltage when said switch is opened and one of said secondary windings is energized,

(d) and time-delay relay means arranged to be energized by said d.c. voltage, said time-delay relay means being operable when the voltage thereacross exceeds a predetermined level for a predetermined minimum period following opening of said switch.

4,096,367

GAS INSULATED CIRCUIT BREAKER INCORPORATING COMPLETE MODULAR INTERRUPTER STRUCTURE AND OPERATING MECHANISM

Henry L. Peek, Brandon; Maurice J. Taylor, Florence; John J. Abdou, and Amrut R. Patel, both of Brandon, all of Miss., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 24, 1975, Ser. No. 635,161

Int. Cl.[2] H01H *33/82*

U.S. Cl. 200—148 B **3 Claims**

1. In a gas insulated circuit breaker;

a gas tight enclosure having insulating gas therein at a relatively low pressure;

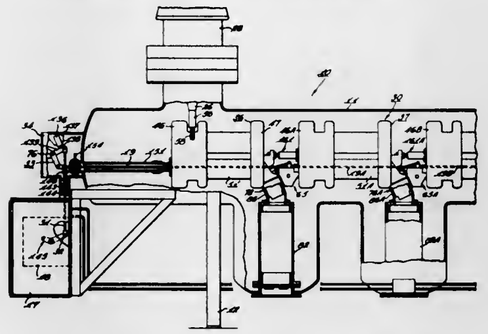
a pair of spaced apart circular corona shield members supported within said enclosure;

an elongated cylindrical housing of an insulating material secured to and between said shield members, said shield having its ends surrounded by said circular corona shields;

current interrupting means supported within said cylindrical housing;

a source of insulating gas at a relatively high pressure;

gas blast means associated with said current interrupting means and operable when actuated to direct a blast of insulating gas at a relatively high pressure from said source to said current interrupting means;



a single actuating pull-rod means extending through said corona shield members and said elongated cylindrical housing in close adjacency to said interrupting means, said actuating means being connected to operate said current interrupting means in a current interrupting operation and said gas blast means in synchronism; and,

operating means connected to move said actuating means for operating said current interrupting means and said gas blast means in synchronism.

4,096,368

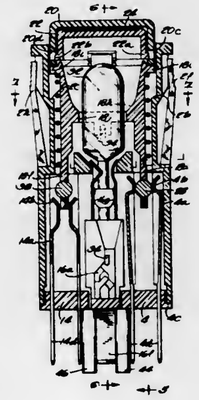
PUSHBUTTON SWITCH

Stuart W. Grebner, Cleveland, Ohio, assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Jul. 8, 1976, Ser. No. 703,572

Int. Cl.[2] H01H *9/16, 13/60*

U.S. Cl. 200—314 **17 Claims**



1. An electric switch comprising:

an elongated housing;

an insulating actuator received at one end of said housing for limited linearly reciprocal movement longitudinally therein and having a plurality of legs in lateral peripheral arrangement thereon and extending longitudinally into said housing;

means biasing said actuator outwardly of said housing;

a plurality of movable contact members, each carried by a respective leg; and

a plurality of pairs of laterally spaced stationary leaf spring contacts mounted at the other end of said housing in lateral peripheral arrangement and extending longitudinally into said housing, each pair being slidingly bridged by a respective contact member driven therebetween by a respective leg in response to movement of said actuator;

wherein said legs have bifurcated notched inner ends and said contact members comprise complementally notched pins retained by said bifurcated ends of said legs in snap-in relation.

4,096,369

MICROWAVE OVEN

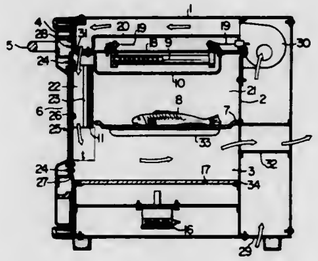
Junzo Tanaka, Fujiidera; Chikao Urashima, Nara, and Toshio Kai, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 15, 1976, Ser. No. 742,122

Claims priority, application Japan, Dec. 2, 1975, 50-144467; Dec. 8, 1975, 50-146551; Nov. 20, 1975, 50-158273[U]

Int. Cl.[2] H05B *11/00*

U.S. Cl. 219—10.55 D **6 Claims**



1. A microwave oven comprising

a heating cavity within a main body of said oven,

a door for closing and opening an opening of said heating cavity,

a microwave generator radiating microwave energy into said heating cavity,

a resistive heater within said heating cavity for scorching the surface of an article to be cooked,

a cooling device supplying cooling air to said oven,

an isolation chamber formed by a first portion of said heating cavity separated from a second portion by means of a removable tray for supporting the article to be cooked,

said isolation chamber being adjacent said resistive heater, and

a shielding plate for blocking an opening of said isolation chamber, said shielding plate being mounted on said door with an air gap therebetween so that said air gap communicates with said second portion of said heating cavity to permit the cooling air to flow through said air gap and said second portion of said heating cavity.

4,096,370

MICROWAVE OVEN DOOR INTERLOCK SWITCH SYSTEM

Eliot R. Duncan, Iowa City, Iowa, assignor to Litton Systems, Inc., Beverly Hills, Calif.

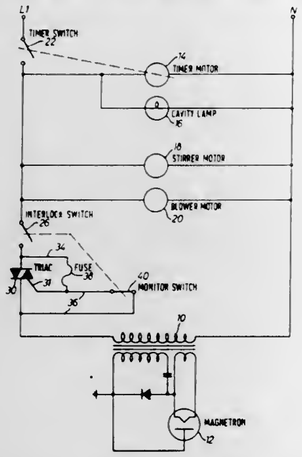
Filed Jun. 15, 1977, Ser. No. 806,617

Int. Cl.[2] H05B *9/06;* **H02H** *3/00*

U.S. Cl. 219—10.55 C **2 Claims**

1. A power supply circuit for a microwave heating oven, comprising, a power line and a neutral line, a transformer between said lines for operating a magnetron tube, an oven door interlock power switch in said power line adapted to

normally open and close with the respective opening and closing of the oven door, a gate operated AC switch having a gate in said power line, first and second branch lines extending respectively from the power and neutral sides of said AC switch to said gate, a fuse in said first branch line having suit-



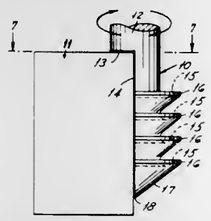
able minimum and maximum ratings respectively relative to normal gate current in said first branch line and normal line current in said power line, and an oven door interlock monitor switch in said second branch line adapted to normally close and open with the respective opening and closing of the oven door.

4,096,371

METHOD OF AND APPARATUS FOR ELECTRICAL DISCHARGE MACHINING

Garnet W. Lozon, 4287 S. River Rd., St. Clair, Mich. 48079

Filed Jul. 6, 1976, Ser. No. 702,913
Int. Cl.[2] B23P *1/08*
U.S. Cl. 219—69 E **20 Claims**



1. An electrical discharge machining method of machining a cavity having an arcuate outer periphery in a workpiece, including the steps of:

a. forming a segmental tool electrode rotatable about its longitudinal axis with an arcuate outer periphery and a longitudinal cutting face having a longitudinal cross section shape commensurate with the longitudinal cross section shape of a cavity to be cut in a workpiece, and with the tool electrode having at least one peripheral undercutting cutting tooth;

b. placing the tool electrode with its longitudinal cutting face in an operative position adjacent a workpiece; and,

c. providing relative rotation between the tool electrode and the workpiece about the longitudinal axis of the tool electrode to move the tool electrode into the workpiece to cut a cavity with longitudinally extended undercut serrations through the workpiece, and which cavity has a longitudinal cross section that is the same as the longitudinal cross section shape of the tool electrode cutting face.

5. A tool electrode for electrical discharge machining a cavity in a workpiece by relative rotation between the tool electrode and the workpiece, comprising:

a. a body having an arcuate periphery, and an axially extended shaft on one end thereof for attachment to an electrical discharge machining apparatus, and at least one peripheral undercutting cutting tooth; and,

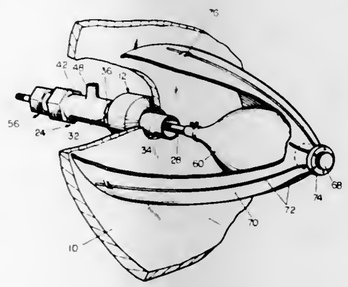
b. said body being provided with a longitudinal cutting face having a longitudinal cross section shape commensurate with the longitudinal cross section shape of a cavity to be cut in a workpiece when relative rotation between the tool electrode and the workpiece is effected for moving said cutting face and tool electrode into the workpiece.

4,096,372

PURGE UNIT

Emerson J. Hallenbeck, 2934 Shoreland Ave., Toledo, Ohio 43611

Filed Nov. 24, 1976, Ser. No. 744,761
Int. Cl.[2] B23K *9/16*
U.S. Cl. 219—72 **12 Claims**



1. A purge unit for establishing an enclosed zone around a weld area, said unit comprising an elongate member, a flexible, expandable member having an edge portion adapted to engage the surface of a workpiece around the weld area to establish the enclosed zone, and means connected to said elongate member and said expandable member and forming an expandable chamber within said expandable member to urge said expandable member outwardly to form the enclosed zone with said expandable chamber-forming means being within said enclosed zone and shaped from the weld area.

4,096,373

WELDING DEVICE AND METHOD

Heinz Roith, Munich, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Jun. 29, 1976, Ser. No. 700,776
Claims priority, application Germany, Jul. 3, 1975, 2529674
Int. Cl.[2] B23K *9/18*
U.S. Cl. 219—73 **5 Claims**

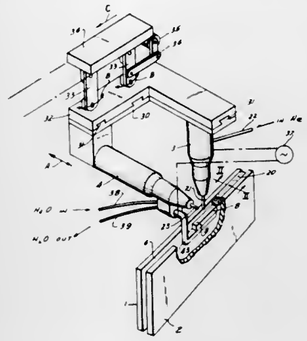
1. A device for welding horizontal edges of a pair of workpieces together across a horizontal welding gap to form a horizontal seam comprising:

a burner unit above said gap for depositing a weldment in a molten pool in said gap;

means for displacing said unit horizontally along said gap;

a pool-support member composed disposed in said gap and juxtaposed with said burner unit for forming a bottom for said pool, at least the pool contacting surface of said member being composed of tungsten, and

a holder rigidly fixed to said unit and reaching downwardly into said gap ahead of said pool in the direction of dis-



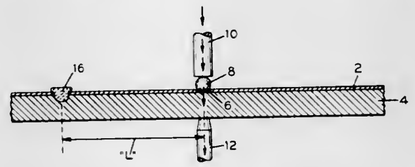
placement of said unit said member being rigidly connected to said holder.

4,096,374

METHOD OF JOINING SURFACES USING A BALL WELDABLE MATERIAL

C. Robert Gasparrini, Rye, N.Y., assignor to Baldwin-Gegenheimer Corporation, Stamford, Conn.

Filed May 9, 1977, Ser. No. 794,992
Int. Cl.[2] B23K *19/00*
U.S. Cl. 219—94 **4 Claims**



1. A method of joining a first and second layer of material at least said second layer being made of weldable material comprising:

(a) placing said first and second layers in face-to-face relationship;

(b) selecting a ball of weldable material having a diameter in the range of 2T to 5T where T is the thickness of said first layer;

(c) said first layer having at least one opening therein with a diameter in the range of 94% to 96% the diameter of said ball;

(d) positioning said ball in said opening so that the ball is in contact with an adjacent surface of said second layer;

(e) applying electrical current and pressure to said ball and said adjacent surface of said second layer in amounts sufficient to weld said ball to said second layer and to deform said ball so that said first and said second layers are joined.

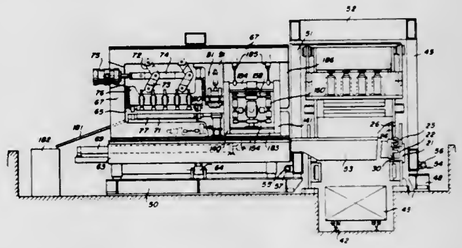
4,096,375

FLASH WELDING APPARATUS

Yoshiharu Fujino, Yokohama; Iwane Chiba, Soka; Toshimi Chiyonobu, Fukuyama; Tomihisa Takahata, Fukuyama, and Yasuhiko Kachi, Fukuyama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1976, Ser. No. 670,561
Claims priority, application Japan, Nov. 14, 1975, 50-136845
Int. Cl.[2] B23K *11/04*
U.S. Cl. 219—97 **20 Claims**

1. A flash welding apparatus for strip material movable along a path of travel, comprising a first strip clamp mounting frame movable forwardly or backwardly of the strip path, a first strip clamp means mounted on said frame, a second strip clamp mounting frame immovable forwardly or backwardly of the strip path, a second strip clamp means mounted on said second frame, entrance and discharge side electrode mounting frames movable forwardly or backwardly of the strip path, welding electrode means mounted on said electrode mounting frames, said last mentioned frames being releasably engageable with said first and second strip clamp mounting frames, a shear unit, a flash trimmer unit, first and second gantry-shaped frames arranged transversely outwardly of said entrance and



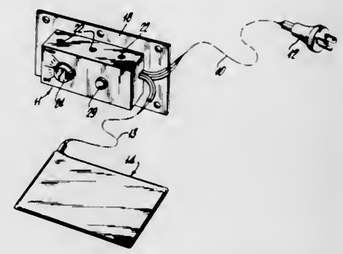
discharge electrode mounting frames, respectively, for movement forwardly or backwardly of the strip path, said first and second gantry-shaped frames being interconnected with upper and lower guide beams extended transversely of the strip path between said gantry-shaped frames, a carriage disposed transversely outwardly of one of said gantry-shaped frames, for movement transversely of the strip path, said shear unit and said flash trimmer unit being mounted on said carriage for movement transversely of said strip material so that either said shear unit or said flash trimmer unit may be retractably displaced into the space defined between the upper and lower transverse guide beams.

4,096,376

TEMPERATURE CONTROL DEVICE

F. Sutherland Macklem, New Canaan, Conn., assignor to Equipment Development Corporation, New Canaan, Conn.

Division of Ser. No. 648,038, Jan. 12, 1976, Pat. No. 3,973,102.
This application May 24, 1976, Ser. No. 689,204
Int. Cl.[2] F24H *1/00;* **H05B** *1/00*
U.S. Cl. 219—328 **10 Claims**



1. A bath-liquid temperature control device for maintaining a preselected liquid temperature that is above the temperature of ambient air, said control device comprising a thermally conductive metal panel including means adapting one side of said panel for direct thermal response to a body of liquid, and a thermostat enclosure carried by the other side of said panel such that said panel forms part of at least one wall of the inner space otherwise defined by said enclosure, said enclosure having at least one vent to ambient air, whereby the air temperature of space within said enclosure is a composite reflection of both ambient-air temperature and the temperature of liquid to

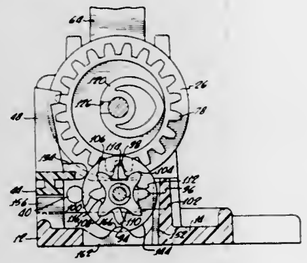
which said panel is thermally exposed, an electrical-heater element within said space, a power-input connection to said enclosure, thermostatic-switch means within said space and set to effectively disconnect said power-input connection from said heater element upon achievement of a predetermined upper limit of heating of said space above ambient temperature, the setting of said thermostatic-switch means being also such as to connect said heater element to said power-input connection for a detected temperature of said space below a lower limit above ambient temperature, and power-output connection means so connected to said thermostatic-switch means that output power is deliverable via said power-output connection means coincidentally with connection of said heater element to said power-input connection, whereby a bath-liquid heater connected to said power-output connection means may be effectively on-off regulated by said thermostatic-switch means in accordance with its composite response to the temperature of ambient air and of bath liquid.

4,096,377

COUNTER MECHANISM

James A. Prentice, Orange, and John George Mitchell, Fountain Valley, both of Calif., assignors to California Injection Molding Co., Inc., Costa Mesa, Calif.

Filed Jul. 22, 1976, Ser. No. 707,837
Int. Cl.² G06C *15/42*
U.S. Cl. 235—144 HC **11 Claims**



1. In a counter having a housing, a plurality of number wheels rotatably mounted in the housing, a plurality of transfer pinions interposed between and engaged with the number wheels and shiftable out of engagement therewith during resetting of the wheels, and a reset mechanism for resetting the number wheels and shifting the transfer wheels out of engagement with the number wheels, the improvement comprising

a pair of mutually spaced side arms forming part of said housing,

a plurality of indexing bosses formed integrally with and extending between both said side arms of said housing, said bosses being configured and positoned to mate with and to reset respective transfer pinions as the pinions are shifted to a position out of engagement with said number wheels, said bosses strengthening and rigidifying said housing.

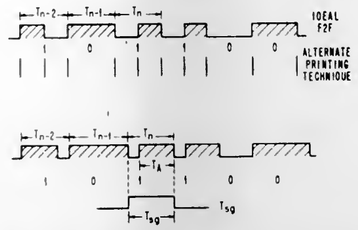
4,096,378

DISTORTED TWO FREQUENCY CODED DATA INTERPRETING METHOD AND APPARATUS

Albert Watson Vinal, Cary, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 522,210, Nov. 8, 1974, abandoned. This application Feb. 5, 1976, Ser. No. 655,337
Int. Cl.² G06K *7/00*
U.S. Cl. 235—466 **72 Claims**

1. A method of initiating correct decoding of spread or acceleration distorted F2F encoded data messages which are received in a distorted form at decoding apparatus from a communications channel or from record media scanning apparatus, each said F2F encoded data message comprising one or more bits of data and at least one preamble symbol, each said preamble symbol being composed of two 1F frequency machine sensible optic, magnetic or electrical signal transitions and one 2F frequency machine sensible optic, magnetic or electric signal transition located between said two 1F frequency signal transitions, said preamble symbol having an undistortable characteristic with respect to spreading distortion and a separate, distortable characteristic with respect to



spreading distortion, said initiating method comprising the steps of:

measuring said undistortable characteristics of said received preamble symbol signals by measuring the interval between said two 1F frequency signal transitions, and;

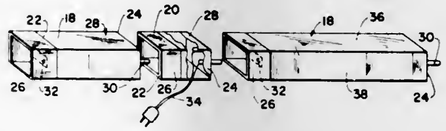
controlling the duration of searching for a 2F frequency signal in the succeeding data message bit cells in proportion to the results of said measurement of said preamble symbol.

4,096,379

MODULAR ILLUMINATION DEVICE

Albert Taylor, 486 Kell Pl., Seaford, N.Y. 11738

Filed Aug. 24, 1976, Ser. No. 717,236
Int. Cl.² A47G *33/16*; F21P *1/02*
U.S. Cl. 362—235 **7 Claims**



1. A modular illumination device comprising:

a plurality of rigid hollow illumination housings each forming a chamber therein and having at least one surface thereof permitting the transmission of light therethrough, each of said plurality of said housings having a uniform cross section throughout the length thereof;

affixment means disposed on a first free end of each of said illumination housings, said affixment means for separably joining to a second free end of an adjacent illumination housing, said affixment means having exterior surfaces extending parallel to and contiguous with the exterior surfaces of said illumination housings;

a plurality of incandescent lamps, at least one of said plurality of lamps disposed in each of said chambers of each of said plurality of illumination housings;

electrical coupling means for electrically coupling said plurality of lamps when said plurality of illumination housings are joined, wherein a portion of said electrical coupling means is disposed secured to and housed within said affixment means, the remaining portions of said electrical coupling means located on said second free end of said adjacent illumination housing being disposed within said affixment means when said illumination housing is joined to said adjacent housing; and

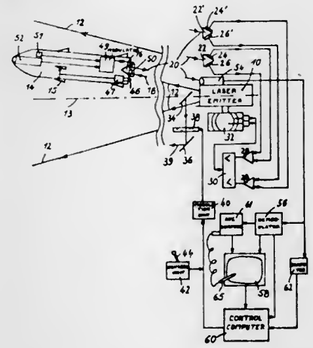
power coupling means for coupling a power source to said plurality of lamps, said power coupling means having a power coupling housing, said power coupling housing devoid of any illumination source, said power coupling housing having a crosssection along the entire length thereof equivalently dimensioned to said uniform cross-section.

4,096,380

SYSTEM FOR TRANSMITTING LIGHT SIGNALS BETWEEN A MISSILE AND A MISSILE CONTROL STATION

Kurt Eichweber, Holsteiner Chaussee 379/81, Hamburg-Schnelsen, Germany

Filed Jul. 9, 1976, Ser. No. 704,029
Claims priority, application Germany, Jul. 28, 1976, 2533697
Int. Cl.² H04B *9/00*
U.S. Cl. 250—199 **13 Claims**



1. A system for transmitting control and/or information signals between a missile and a missile control station without physical connection therebetween comprising means at said control station for producing a transmission path for modulated light signals between said station and said missile during the flight of the missile, said transmission path consisting of an emitted laser beam, means for continuously aiming said laser beam on said missile from the control station, reflector means carried by said missile for reflecting part of said beam back to said control station said reflector means including at least one triple mirror reflector for reflecting the laser beam, said missile being equipped with a signal producing device and an optical modulator connected with the triple mirror reflector, the optical modulator being controllable by said signal producing device for modulation of at least one of said emitted and reflected laser beams to provide said signals, said missile being provided with a target detection device, said signal producing device being controlled by said target detecting device.

4,096,381

ELECTRON IMAGE DETECTION SYSTEM

Robert L. Brown, Sr., 4805 Rutledge Dr. NW., Huntsville, Ala. 35805

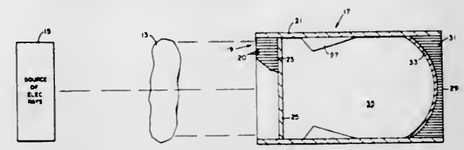
Continuation-in-part of Ser. No. 582,546, May 30, 1975, abandoned. This application Jul. 19, 1976, Ser. No. 706,706
Int. Cl.² H01J *31/50*
U.S. Cl. 250—213 VT **6 Claims**

1. An image detection system including a position for support of a subject comprising:

a source of electromagnetic rays for traversing at least a portion of the subject; a photointensifier with focusing electrodes, a display surface and a phosphor coated device for transmitting a light image to be displayed as an image on said display surface, and

a converter device disposed for direct conversion of said traversing rays to light rays including reflective light tubes of fiber optic structure, contiguously disposed relative to each other and each light tube consisting of a core material that is the same material as that of each of the other light tubes and said core material consisting of a phosphoric substance enclosed with a reflecting cladding glass for emission of light rays therefrom responsive to said traversing rays and a cathode face disposed for impingement thereon of said light rays from said light tubes to provide an electron image of said traversing rays;

said phosphor coated device being disposed for directly receiving intensified projection of said electron image from said cathode face to provide a positive and vivid definitive image of said traversing rays on said display surface.

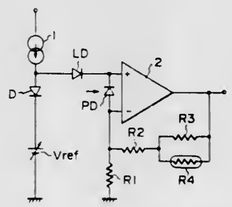


4,096,382

PHOTO-CURRENT LOG-COMPRESSION CIRCUIT

Saburo Numata, and Shinichiro Okazaki, both of Urawa, Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Feb. 9, 1977, Ser. No. 767,073
Claims priority, application Japan, Feb. 9, 1976, 51-13748[U]
Int. Cl.² H01J *39/12*
U.S. Cl. 250—214 A **3 Claims**

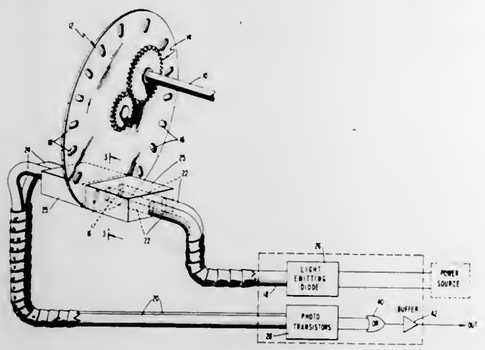


1. A photoelectric current log-compression circuit comprising: a reference voltage source and a constant current source, an operational amplifier, a log-conversion diode connected to a non-inversion input terminal of said operational amplifier, a photodetector connected between the non-inversion input terminal and an inversion input terminal of the operational amplifier, a temperature compensating element which changes the resistance thereof inserted in a negative feedback circuit of the operational amplifier to control the amplification degree, and a temperature compensating diode connected between said sources and biased with a predetermined current therefrom, said log-conversion diode being connected between the operational amplifier and a connecting point between said constant current source and said temperature compensating diode whereby a forward voltage of the temperature compensating diode is applied to the operational amplifier.

4,096,383
PULSE-GENERATING APPARATUS RESPONSIVE TO SHAFT ROTATION

Ronald Alfred Mancini, Ridgeway, Va., and Douglas Kile Thomson, Greensboro, N.C., assignors to Gilbert & Barker Manufacturing Company, Greensboro, N.C.

Filed Nov. 8, 1976, Ser. No. 739,792
Int. Cl.² G01D *5/34*
U.S. Cl. 250—231 SE **14 Claims**

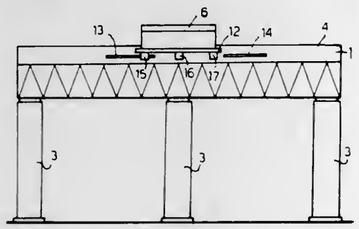


1. In apparatus utilizing a pair of light paths for sensing the revolutions of a shaft, the improvement comprising:
(a) a disc coupled to the shaft for revolving therewith;
(b) means radially spaced around the periphery of said disc for completing and interrupting the light paths at discrete intervals proportional to the revolutions of the shaft;
(c) a light-transmitting fiber optic cable having a portion split into a pair of ends, and a pair of light-receiving fiber optic cables, said split pair of light-transmitting ends and said pair of light-receiving ends being shaped and precisely aligned with said radially spaced means for completing the whole light paths by means of said radially spaced means, the aligned ends of said cables being spaced apart less than the radial spacing of said radially spaced means;
(d) energy means for providing light at one end of the light paths; and
(e) means positioned at the other end of the light paths for sensing the completions of the light paths.

4,096,384
POSITION TRANSDUCER FOR MACHINE TOOLS AND MEASURING MACHINES

Franco Sartorio, Turin; Giorgio Minucciani, Moncalieri (Turin), and Francesco Germano, Turin, all of Italy, assignors to Dea Digital Electronic Automation S.p.A., Moncalieri, Turin, Italy

Filed Mar. 29, 1977, Ser. No. 782,476
Claims priority, application Italy, Apr. 2, 1976, 67764 A/76
Int. Cl.² H01J *3/14*
U.S. Cl. 250—237 G **11 Claims**

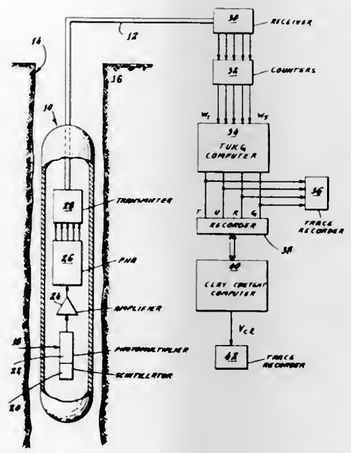


1. Position transducer for machine tools and measuring machines, arranged to measure relative displacements of a first part with respect to a second part, wherein said transducer is obtained by means of the optical coupling of at least two photoelectric readers fixed on said first part and at least two optical photoengraved rules rigidly connected to said second part, and wherein selection means are provided which are arranged to present in output the signals from one of said photoelectric readers.

4,096,385
CLAY CONTENT DETERMINATION BY NATURAL GAMMA RAY SPECTROMETRY

Graham Marett, Paris, France, assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Feb. 14, 1977, Ser. No. 768,132
Claims priority, application United Kingdom, Feb. 25, 1976, 7388/76
Int. Cl.² G01V *5/00*
U.S. Cl. 250—262 **30 Claims**



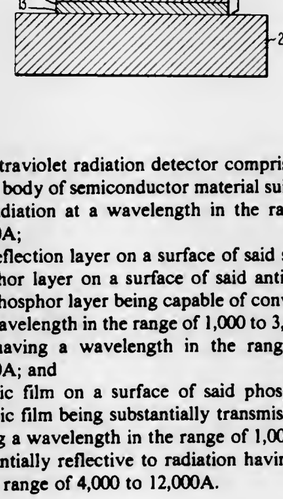
1. A method for automatically processing measurements of the total natural gamma radioactivity and the contents of three natural radioactive elements of a formation surrounding a borehole to obtain a representation of the clay content of said formation in a zone of the borehole where the presence of one of said elements, called a disturbing element, is not related to clay, comprising the steps of:
determining reference values of said measurements in said zone; and
combining at least two of said measurements in accordance with a function determined from said reference values to produce a representation of the clay content of the formation corrected for the effect of said disturbing element.

4,096,386
LIGHT REFLECTING ELECTROSTATIC ELECTRON LENS

Gertrude F. Rempfer, Forest Grove; George H. Lesch, and Osbie Hayes Griffith, both of Eugene, all of Oreg., assignors to Taylor-Kincaid Company, Eugene, Oreg.

Filed Apr. 4, 1977, Ser. No. 784,037
Int. Cl.² G01M *23/00*
U.S. Cl. 250—365 **8 Claims**

1. An electrostatic electron lens apparatus comprising:
a plurality of electrically conductive electrodes including an entrance electrode, an exit electrode and an intermediate electrode disposed between said entrance and exit electrodes;
insulative support means for mounting said electrodes with their apertures in alignment and for spacing and insulating said intermediate electrode from said entrance electrode and said exit electrode; and

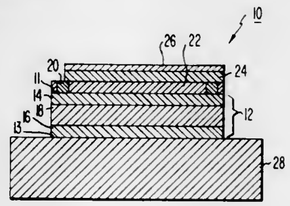


said entrance electrode having a substantially planar, front surface with a mirror finish for reflection of light away from the lens to a specimen positioned in front of said lens.

4,096,387
ULTRAVIOLET RADIATION DETECTOR

Robert Harling Buckley, Quebec, Canada, assignor to RCA Corporation, New York, N.Y.

Filed Dec. 9, 1976, Ser. No. 749,180
Int. Cl.² G01T *1/24*
U.S. Cl. 250—372 **5 Claims**

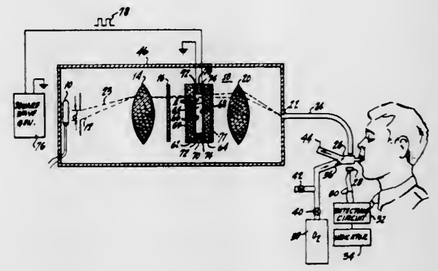


1. An ultraviolet radiation detector comprising:
a silicon body of semiconductor material suitable for detecting radiation at a wavelength in the range of 4,000 to 12,000A;
an anitreflection layer on a surface of said silicon body;
a phosphor layer on a surface of said antireflection layer, said phosphor layer being capable of converting radiation at a wavelength in the range of 1,000 to 3,999A into radiation having a wavelength in the range of 4,000 l to 12,000A; and
a metallic film on a surface of said phosphor layer, said metallic film being substantially transmissive to radiation having a wavelength in the range of 1,000 to 3,999A and substantially reflective to radiation having a wavelength in the range of 4,000 to 12,000A.

4,096,388
MEASURING GASEOUS OXYGEN WITH U.V. ABSORPTION

Jacob Y. Wong, Framingham, Mass., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 10, 1977, Ser. No. 805,551
Int. Cl.² G01J *1/42*
U.S. Cl. 250—373 **11 Claims**

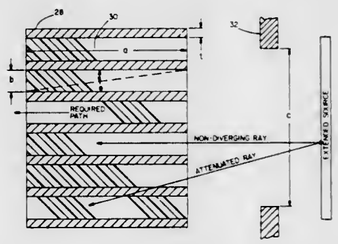


1. An instrument for measuring the concentration of oxygen in a sample containing water vapor and other interfering gases comprising,
means providing ultraviolet light of at least two different wavelengths, one of said wavelengths being in a band that is strongly absorbed by oxygen, the other of said wavelengths being in a band that is less strongly absorbed by oxygen, both of said wavelengths being absorbed by water vapor and other interfering gases in nearly equal degree,
a sample chamber through which the sample to be examined can be passed,
means for alternately directing light of said first and second wavelengths from said means through said chamber,
means for developing electrical signals proportional to the amount of light impinging on it, said means being mounted so as to intercept a portion of the light that passes through said chamber, and
a narrow band interference filter passing said two different wavelengths of ultraviolet light and rejecting other wavelengths of ultraviolet light that are less than and greater than the two different wavelengths, said filter being in the optical path between said source and said sample chamber.

4,096,389
APPARATUS FOR MINIMIZING RADIATION EXPOSURE AND IMPROVING RESOLUTION IN RADIATION IMAGING DEVICES

John B. Ashe; Gwilym H. Williams, both of Palatine, and Kenneth L. Sypal, Glen Ellyn, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed May 10, 1976, Ser. No. 684,641
Int. Cl.² G01N *23/00*
U.S. Cl. 250—445 T **9 Claims**



1. In a tomographic patient imaging apparatus of the type

wherein photons emitted by a radiation source through an aperture means, the dimensions of which define a boundary of the desired beam to be projected, are caused to pass in a beam at different angles and directions through a thin slice or section of the patient and be at least partially attenuated and absorbed thereby, with the intensity of the emerging beam being detected and measured in a detector means so as to obtain signals representative of the absorption coefficients and density of the slice, said signals being manipulated by a computer whereat the image of said slice is reconstructed, said reconstructed image thereafter being displayed, the improvement of a collimating apparatus disposed adjacent the radiation source and defining means for projecting towards the patient a penetrating beam of radiation which is substantially non-diverging from said defined boundary in at least one direction to minimize radiation exposure to the patient outside the area of the selected thin slice, said collimating apparatus comprising an elongated sandwich assembly of a plurality of layers of material exhibiting relatively high radiation attenuation characteristics, said attenuating layers being spaced apart and separated from one another by interleaved layers of material exhibiting relatively low radiation attenuation characteristics, said sandwich assembly being disposed in a lengthwise manner adjacent the aperture means in the path and throughout the defined boundary of the radiation emitted through the aperture means, such that said attenuating layers are parallel to the desired direction of the projected beam with said interleaved spacing layers providing multiple direct paths for the radiation comprising the projected beam.

4,096,390

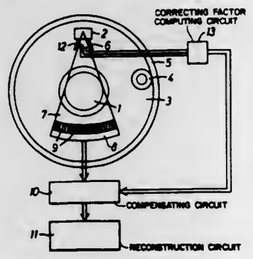
APPARATUS FOR EXAMINING OBJECTS BY MEANS OF PENETRATING RADIATION

Godfrey Newbold Hounsfield, Newark, England, assignor to EMI Limited, Hayes, England

Continuation of Ser. No. 659,155, Feb. 18, 1976, which is a division of Ser. No. 474,767, May 30, 1974, Pat. No. 3,940,625. This application Jul. 27, 1977, Ser. No. 819,543

Int. Cl.² G01N *23/04*

U.S. Cl. 250—445 T **7 Claims**



1. A medical diagnostic X-ray machine for examining a patient and for building up and displaying a two-dimensional picture of the X-ray response coefficients of the elements into which a slice of the patient extending along a planar section to the patient is divided by a finite Cartesian matrix notionally superimposed on the slice, comprising:

means for passing X-radiation along each beam path of fan-shaped distributions of beam paths of finite lengths, each fan-shaped distribution being made up of beam paths which substantially coincide with said section and have one of their ends at a common apex on one side of the patient and their other ends spaced from each other along the section at the opposite side of the patient, said apices being circumferentially spaced from each other along an orbit which extends at least half way around the patient and substantially coincides with said section, at least the central beam paths of each of said fan-shaped distributions of beam paths passing through the patient along said section, and means for deriving first output signals each of which is a measure of a response encountered by the X-radiation in passing from one end to the other of a corresponding one of said beam paths, means for deriving second output signals each of which is a measure of a response encountered by the X-radiation in passing along at least a portion of selected ones of said beam paths, which portion does not pass through the patient, each one of said fan-shaped distributions of beam paths including at least two of said selected beam paths angularly spaced from each other within the fan-shaped distribution by intermediate beam paths of the same distribution which pass through the patient, and means for deriving correcting factors for each fan-shaped distribution from said second output signals derived for selected beam paths of the distributions, which correcting factors are related to differences in the X-radiation passing along said intermediate beam paths of the distribution; and

means for building up said picture based on said output signals and on said correcting factors and for displaying said picture of the slice of the patient examined with the X-ray machine.

4,096,391

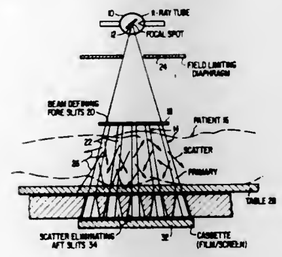
METHOD AND APPARATUS FOR REDUCTION OF SCATTER IN DIAGNOSTIC RADIOLOGY

Gary T. Barnes, Birmingham, Ala., assignor to The Board of Trustees of the University of Alabama, Birmingham, Ala.

Continuation-in-part of Ser. No. 732,858, Oct. 15, 1976, abandoned, which is a continuation of Ser. No. 591,701, Jun. 30, 1975, abandoned. This application May 31, 1977, Ser. No. 801,808

Int. Cl.² G01N *23/00*

U.S. Cl. 250—505 **22 Claims**



1. A method of improving image contrast in diagnostic radiology comprising the steps of:

producing an X-ray beam using a conventional X-ray source having a focal spot of a predetermined size,

creating a plurality of regularly arranged beam segments, each having a minimum dimension at least two times greater than said focal spot size; and,

scanning said beam segments in unison across an object to be irradiated, for producing X-ray images of improved contrast.

4,096,392

RACK FOR STORING SPENT NUCLEAR FUEL ELEMENTS

Herbert J. Rubinstein, Los Gatos; Philip M. Clark, and James D. Gilcrest, both of San Jose, all of Calif., assignors to Nuclear Services Corporation, Campbell, Calif.

Filed Jul. 11, 1975, Ser. No. 595,444

Int. Cl. G21f *5/00*

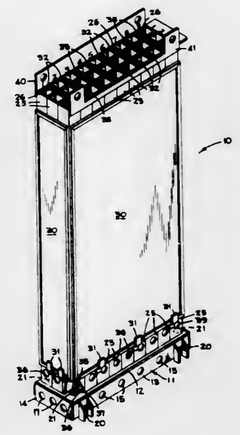
U.S. Cl. 250—507 **17 Claims**

1. A rack for spent nuclear fuel elements comprising:

(a) a base;

(b) a plurality of upstanding enclosures supported by said base for containing respectively a spent nuclear fuel element, adjacent enclosures being spaced apart to form vertically disposed pockets;

(c) neutron absorbers disposed in said pockets for controlling nuclear reactivity; and



(d) upstanding neutron absorber panels disposed exteriorly of said enclosures and along the outer limits of the rack for controlling nuclear reactivity from spent nuclear fuel elements stored in said enclosures.

4,096,393

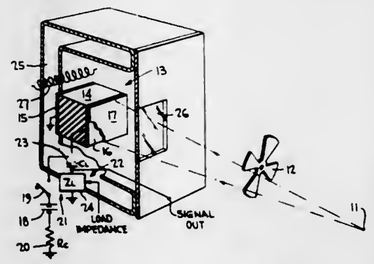
SOLAR ENERGY CONVERTER

Arden Sher, 108 Charles River Landing Rd., Williamsburg, Va. 23185

Continuation-in-part of Ser. No. 631,689, Nov. 13, 1975, Pat. No. 4,084,101. This application Jul. 7, 1976, Ser. No. 703,199

Int. Cl.² H02N *3/00*

U.S. Cl. 290—1 R **27 Claims**



1. Apparatus for converting radiant energy into electric energy comprising a capacitor including an ionic dielectric and a pair of electrodes, means responsive to the radiant energy for periodically heating and cooling said dielectric at a predetermined frequency, said dielectric having a dipole layer only on or near its surface, the capacitance of the capacitor being modulated in response to the cyclic heating and cooling, and circuit means resonant to current derived from the capacitor in response to the capacitor modulation for connecting a load to be responsive to said current.

4,096,394

APPARATUS FOR SUPPLYING ELECTRICAL ENERGY TO A LOAD

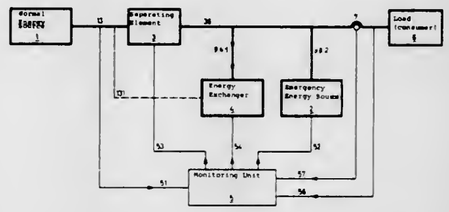
Werner Ullmann, Locarno, and Renato Derighetti, Losone, both of Switzerland, assignors to A.G. fur industrielle Elektronic AGIE, Locarno, Switzerland

Filed Jan. 21, 1976, Ser. No. 650,970

Claims priority, application Switzerland, Mar. 25, 1975, 3828/75

Int. Cl.² H02J *3/32, 3/34*

U.S. Cl. 307—46 **10 Claims**



1. Apparatus for supply pulsed, or alternating electrical energy of a desired predetermined, wave shape to a load (6) comprising

energy supply means (1, 2, 36) which includes

a main energy supply device (1),

an auxiliary energy supply device (2);

an output conductor portion (36) connected to said energy supply devices (1, 2) and to the load (6),

said main energy supply device (1) supplying energy to said output conductor portion (36) to supply energy to the load under normal condition;

said auxiliary energy supply device (2) supplying energy to said output conductor portion to supply energy to the load during interruption of the main energy supply respectively;

and means correcting for departures from, or distortion of the wave shape from said desired predetermined wave shape including

energy exchange and storage means (4) connected to the main energy supply device (1) to receive and store energy from said main supply device (1) and to make such stored energy instantantaneously available to said load for bridging brief disturbances in the supply of energy to the load from said energy supply means resulting in departure from or distortion of the wave shape with respect to the said desired wave shape;

and control means (5) which are connected to said energy exchange and storage means (4) comprising

reference means (504) generating a reference signal having a characteristic representative of the desired wave shape of energy to be supplied to said load (6);

actual energy supply monitoring means including an output voltage monitor (502) and an output current monitor (503) evaluating the instantaneous levels of energy being supplied to the load;

comparator means (502) connected to said energy supply monitoring means and comparing the instantaneous level of the half wave current level and the flow direction of the energy actually supplied to the load and the instantaneous level of said reference signal,

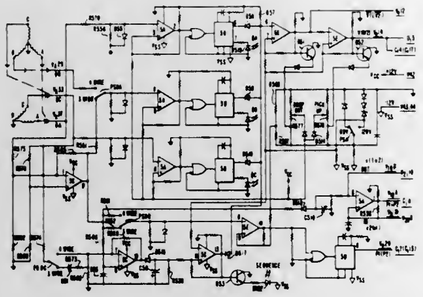
and control logic means (501) connected to said comparator means (502) and controlling said energy exchange and storage means (4) in dependence on the instantaneous energy level and the flow direction of said supplied energy to instantaneously supply energy stored from said energy exchange and storage means to the output conductor portion (36) and hence the load (6).

4,096,395

AUTOMATIC TRANSFER CONTROL DEVICE AND VOLTAGE SENSOR

George F. Bogel, Pittsburgh, and Robert M. Oates, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 19, 1976, Ser. No. 706,422
Int. Cl.² H02J *9/00*
U.S. Cl. 307—64 **11 Claims**



1. Automatic transfer control apparatus for selectively energizing an electrical distribution network from a pair of electrical power sources through associated circuit interrupters, comprising:

means for generating output control signals to cause associated circuit interrupters to selectively connect and disconnect said electrical power sources to said distribution network in response to activating signals; and

means for sensing the voltage of said electrical power sources and supplying activating signals to said output control signal generating means when voltage upon said sources rises or falls beyond predetermined limits, said voltage sensing means comprising means for connecting said apparatus to ether three-wire, three-phase systems or four-wife, three-phase systems.

4,096,396

CHRONOMETRIC SYSTEM WITH SEVERAL SYNCHRONIZED TIME-BASE UNITS

Piero Belforte, and Flavio Melindo, both of Turin, Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni, Turin, Italy

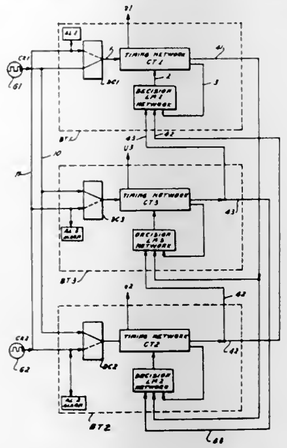
Filed Dec. 8, 1976, Ser. No. 748,774
Claims priority, application Italy, Dec. 9, 1975, 70005 A/75
Int. Cl.² H03K *1/02*
U.S. Cl. 307—219 **16 Claims**

1. A chronometric system for generating separate but synchronized trains of timing signals, comprising:

at least three substantially identical time-base units each including a timing network and an associated decision network; and

a source of clock pulses common to said time-base units;

each timing network having a stepping input connected to said source, a resetting input connected to said associated decision network, a main output for the emission of timing signals at a rate harmonically related to the cadence of said clock pulses, and a plurality of ancillary outputs for the concurrent transmission of synchronizing signals to the decision networks of all time-base units a predetermined number of clock-pulse cycles after reception of a coincidence signal from the associated decision network, each decision network including logical circuitry with input connections to respective ancillary outputs of all timing networks to generate said coincidence signal in



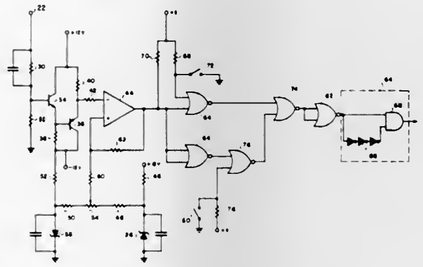
response to concurrent synchronizing signals from at least a majority of said time-base units.

4,096,397

OSCILLOGRAPHIC APPARATUS

James A. Dreiling, Denver, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 29, 1977, Ser. No. 782,517
Int. Cl.² H03K *5/153*
U.S. Cl. 307—231 **4 Claims**



1. A trigger circuit comprising:

means for producing a stable reference signal;

comparator means for comparing a repetitive wave form input signal with said reference signal;

said comparator means being responsive to such comparison to produce a comparator output signal which changes state in a first direction whenever the value of said input signal crosses the value of said reference signal on a positive slope of said input signal and in an opposite direction whenever the value of said input signal crosses the value of said reference signal on a negative slope of said input signal;

a pulse generator means for producing an output trigger pulse;

a first selectively enabled gating means responsive to said change of state of said comparator output signal in said first direction;

a second selectively enabled gating means responsive to said change of state of said comparator output signal in said opposite direction; and

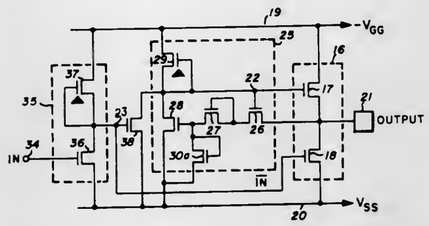
means connecting the output of a selected one of said selectively enabled gating means to the input of said pulse generator means to initiate the operation thereof.

4,096,398

MOS OUTPUT BUFFER CIRCUIT WITH FEEDBACK

Basant K. Khaitan, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 23, 1977, Ser. No. 771,145
Int. Cl.² H03K *5/08, 17/60;* H03F *3/16, 3/26*
U.S. Cl. 307—237 **6 Claims**



1. An MOS transistor universal output circuit capable of operating with both positive and negative power supplies connected thereto and driving directly coupled logic gates that are adapted to operate using only a positive power supply, said circuit comprising:

an output stage including a pair of MOS output transistors one coupled to act as a current source and one coupled to act as a current sink to an output terminal;

means for driving said pair of output transistors with complementary logic signals; and

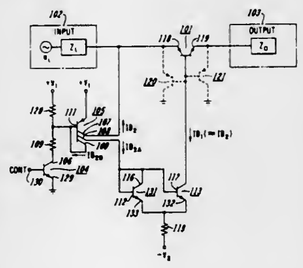
means for limiting current flow in said output transistor coupled to act as a current sink, said means for limiting including amplifier means having an input terminal coupled to said output stage output terminal and an output terminal coupled to said driving means, and switching means operable to disable said amplifier means when said current sink transistor is turned off and to enable said amplifier means when said current sink transistor is turned on.

4,096,399

CROSSPOINT BIAS CIRCUIT ARRANGEMENT

James Alvin Davis, Glen Ellyn, and William Jay Ooms, Schaumburg, both of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 28, 1977, Ser. No. 781,789
Int. Cl.² H03K *17/00*
U.S. Cl. 307—249 **8 Claims**



1. A semiconductor transmission circuit arrangement comprising:

a symmetrical transmission switching transistor comprising first and second emitter/collector transmission terminals and a base terminal; and

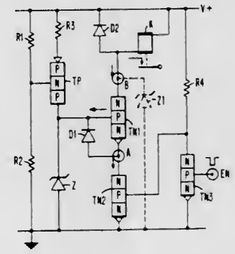
a high impedance bias circuit arrangement connected to one of said emitter/collector transmission terminals and to said base terminal and comprising regulating means for selectively maintaining direct currents of equal amplitude in said base and in the circuit including said connected one pf said emitter/collector terminals.

4,096,400

INDUCTIVE LOAD DRIVING AMPLIFIER

Michel Francois M. S. Ferry, Vallauris, and Daniel Francois Reynes, Villeneuve-Loubet, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 15, 1977, Ser. No. 788,094
Claims priority, application France, May 21, 1976, 76 16128
Int. Cl.² H03K *17/60*
U.S. Cl. 307—254 **1 Claim**



1. A transistorized power amplifier intended to drive an inductive load, comprising:

a first and a second series-connected NPN type transistor in the feeding path of said load;

a current generator driving the base of said first transistor,

means for driving the base of said second transistor so as to control the "on" and "off" turning operations of the series-mounted circuit intended to feed said load;

means for creating a low-impedance reference voltage source which short-circuits the base current of said first transistor when said second transistor is turned off;

a Zener diode between the collector of said first transistor and ground;

whereby an inductive load may be driven without suffering avalanche breakdown.

4,096,401

SENSE CIRCUIT FOR AN MNOS ARRAY USING A PAIR OF CMOS INVERTERS CROSS-COUPLED VIA CMOS GATES WHICH ARE RESPONSIVE TO THE INPUT SENSE SIGNALS

Richard James Hollingsworth, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 12, 1977, Ser. No. 796,335
Int. Cl.² H03K *5/20, 3/286;* G11C *7/00, 11/34*
U.S. Cl. 307—355 **10 Claims**

1. The combination comprising:

first and second nodes;

means for applying a first signal to said first node, and means for applying a second signal, to be compared with said first signal, to said second node;

first and second inverters; each inverter having an input and an output;

means connecting said input of said first inverter to said first node and means connecting said input of said second inverter to said second node;

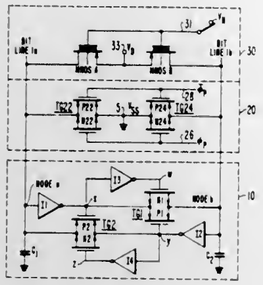
first and second transmission gates, each transmission gate having a conduction path and a control electrode means for controlling the conductivity of the conduction path;

means connecting the conduction path of said first transmission gate between the output of said first inverter and said second node;

means connecting the conduction path of said second trans-

mission gate between the output of said second inverter and said first node; and

means connected between said first and second nodes and



said control electrode means of said transmission gates for enabling and disabling said first and second transmission gates in response to the voltage levels at said first and second nodes.

4,096,402

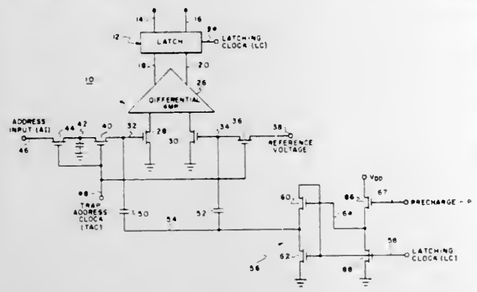
MOSFET BUFFER FOR TTL LOGIC INPUT AND METHOD OF OPERATION

Paul R. Schroeder, and Robert J. Proebsting, both of Dallas, Tex., assignors to Mostek Corporation, Carrollton, Tex.

Filed Dec. 29, 1975, Ser. No. 644,856

Int. Cl.² H03K *5/20, 5/18;* G11C *8/00*

U.S. Cl. 307—362 **6 Claims**



1. In an MOSFET integrated circuit chip, the data input system comprising:

a data input terminal for receiving an input voltage signal from circuitry off the chip;

a capacitive data input storage node;

a capacitive isolation node; first circuit means including first and second transistors which are connected such that the data input terminal is connected through the channel of the first transistor to the capacitive isolation node and the capacitive isolation node is connected through the channel of the second transistor to the capacitive data input storage node;

second circuit means coupled to the gates of the first and second transistors for momentarily turning the first and second transistors "on" then "off", substantially in synchronism, to charge the input storage node substantially to the voltage level of the input terminal and then trap the voltage level on the data input storage node; and

third circuit means for comparing the trapped voltage level to a reference voltage level and producing a logic signal defining whether the trapped voltage level was greater than or less than a voltage level which has a predetermined relationship with the reference voltage level.

4,096,403

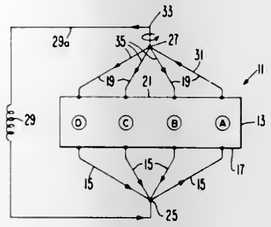
SUPERCONDUCTING HYBRID MAGNETIC FLUX PUMP

Mario Rabinowitz, Menlo Park, and Thomas J. Rodenbaugh, Cupertino, both of Calif., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Jun. 28, 1976, Ser. No. 700,282

Int. Cl.² H02K *9/00*

U.S. Cl. 310—10 **28 Claims**



1. A magnetic flux pump comprising: a rotor having a plurality of circumferentially spaced superconducting gates mounted thereon, and a superconducting wire means electrically coupling the gates together, each gate being of a material having a relatively low critical field characteristic, each gate further having an upstream end and a downstream end and a current path extending between said ends, the current paths of said gates extending axially of the central axis of said rotor, said wire means being of a material having a relatively high critical field characteristic, said wire means further having wire portions connecting the downstream end of each gate to the upstream end of the next adjacent gate to permit current flow through the gates in substantially one direction; means coupled with said rotor for mounting the same for rotation about its central axis; a source of magnetic field adjacent to said rotor and disposed to cause the gates to intersect the magnetci field thereof as the rotor rotates about its central axis, whereby an electrical current is induced normally in the gates; a coil adjacent to said rotor and coupled with said wire means to form a circuit with the wire means and said gates; and means coupled with said rotor for rotating the same about said central axis.

4,096,404

HOISTING MECHANISM

Donat Konstantinovich Sukhanov, ulitsa Vavilova, 56, korpus 1, kv. 75; Sergei Ivanovich Blinov, 1 Monetchikovy pereulok, 5, kv. 1; Leonid Leonidovich Bogoljubov, ulitsa Rusakovskaya, 6, kv. 59; Sergei Andreevich Kascheev, ulitsa Chusovskaya, 11, korpus 8, kv. 2, and Evgenia Nikolaevna Popova, Volokolamskoe shosse, 1, kv. 177, all of Moscow, U.S.S.R.

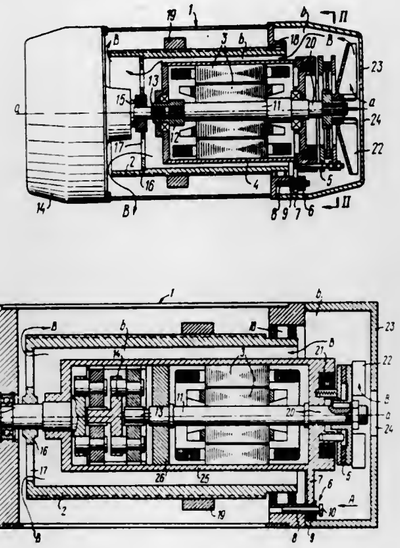
Filed Feb. 3, 1977, Ser. No. 765,287

Int. Cl.² H02K *7/10*

U.S. Cl. 310—67 R **5 Claims**

1. A hoisting mechanism comprising: a casing; a rope-winding drum enclosed within said casing; a driving unit mounted coaxially with said drum and adapted to effect rotation of said drum to lift a load; a motor of said driving unit, accommodated within said drum and having a housing; a reducing gear of said driving unit, operatively connected with said motor and having an input shaft and an output shaft; the shafts of said reducing gear being axially aligned; a brake of said driving unit, operatively connected with said motor; the housing of said motor at the side of said brake being accommodated in supports mounted on said casing and permitting angular displacement of the output shaft of said driving unit relative to the axis of symmetry of the mechanism and adapted to transmit the reaction torque to said casing; one end of said drum being

mounted in another support arranged between the external surface of said drum and said casing; a flange made on the



other end of said drum and pivotally supported by the output shaft of said reducing gear.

4,096,405

ELONGATED ELECTRIC INCANDESCENT LAMP

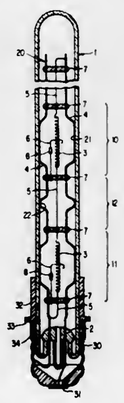
Eizo Goto, Chigasakishi, Japan, assignor to Tokyo Shibaura Electric Company, Limited, Japan

Filed Mar. 1, 1977, Ser. No. 773,289

Claims priority, application Japan, Mar. 1, 1976, 51-22015; Apr. 30, 1976, 51-49712

Int. Cl.² H01K *1/50*

U.S. Cl. 313—174 **3 Claims**



1. An elongated electric incandescent lamp comprising:

an envelope having an inner diameter of less than 16 mm containing an inert filling gas;

a plurality of filaments arranged serially in the envelope; and

a plurality of getters, one getter disposed in the vicinity of each filament, to permit operation in any position without envelope blackening.

4,096,406

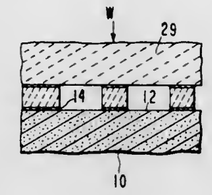
THERMIONIC ELECTRON SOURCE WITH BONDED CONTROL GRID

George Valentine Miram, Atherton, and Erling Louis Lien, Los Altos, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed May 10, 1976, Ser. No. 684,689

Int. Cl.² H01J *1/46, 1/52, 17/04, 19/38*

U.S. Cl. 313—348 **10 Claims**



1. A method for fabricating a grid-controlled electron source comprising the steps of:

forming a continuous sheet laminate by bonding a barrier layer and a metallic layer to opposite sides of a sheet of insulating material,

removing separated areas of said laminate to form an array of holes extending through the entire thickness of said laminate, said holes being separated by web members consisting of the original thickness of said web members,

bonding the barrier layer side of said web members to the emissive surface of a thermionic cathode, and said removing step being performed prior to said bonding of said laiminate to said emissive surface.

4,096,407

TELEVISION CAMERA TUBE COMPRISING MOSAIC OF CONDUCTIVE REGIONS SEPARATED BY INSULATOR FROM SEMICONDUCTOR PLATE

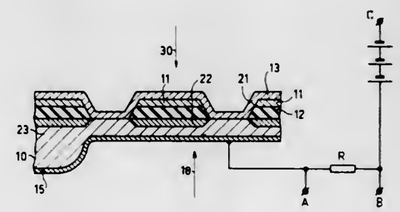
Arthur Marie Eugene Hoeberechts, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 24, 1977, Ser. No. 771,698

Claims priority, application Netherlands, Feb. 27, 1976, 7602013

Int. Cl.² H01J *29/45, 31/38*

U.S. Cl. 313—367 **7 Claims**



1. A camera tube having an electron source and a radiation-sensitive target to be scanned by an electron beam emanating from said source, said target comprising a semiconductor plate which on the side to be scanned by the electron beam comprises a mosaic of electrically conductive regions each determining a picture element and separated from the semiconductor plate by an electrically insulating layer, and a resistive layer extending across the mosaic and the insulating layer, said resistive layer making a rectifying contact with the semiconductor surface via an aperture in the insulating layer present in each picture element so as to obtain exchange of charge between the conductive regions and the respective parts of the targer present below the regions, the RC time of the capacitor formed by a conductive region, the insulating layer and the

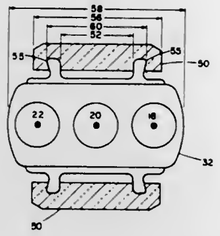
underlying part of the semiconductor surface, and the part of the resistive layer situated between a conductive region and the semiconductor surface being shorter than the scanning time of the whole side to be scanned.

4,096,408

UNITIZED IN-LINE ELECTRON GUN HAVING STRESS-ABSORBING ELECTRODE SUPPORTS

Lajos T. Bozzay, Chicago, and Norman F. Gioia, Lombard, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 28, 1976, Ser. No. 653,050
Int. Cl.[2] H01J *29/02, 29/46, 29/82*
U.S. Cl. 313—417 **6 Claims**



1. For use in a color television cathode ray tube, a unitized, in-line electron gun; that is, a gun generating three coplanar electron beams and having beam-forming and beam-shaping electrodes common to the three beams, said electrodes being supported as a coherent unit in spaced tandem succession along the gun's central axis by electrode support tabs extending from each electrode and embedded in two elongated, axially oriented solid structural beads positioned on opposite sides of the electrodes; that is, on opposite sides of the beam plane, at least one of said electrodes having on each side thereof at least one pair of widely spaced, relatively narrow tabs integrally formed with the electrode, and lying respectively in planes transverse to the gun axis, with said tabs embedded at widely spaced points on the glass bead to enhance the lateral stability of the electrodes, once embedded in the beads, to promote the establishment and maintenance of parallelism, precise spacing, and aperture concentricity of adjacent ones of said electrodes, said gun being characterized by each of said support tabs in said pair of tabs having a distal end and a stress-absorbing section, said distal end of each of said tabs being embedded in one of said structural beads, with said stress-absorbing section at most partially embedded in said structural bead, and with said stress-absorbing section being of such composition, shape and dimension as to deflect beyond its elastic limit during its embedment in said structural bead and to thereby yield and set permanently in a deformed but supportive attitude substantially free of any residual stress upon said electrode and said structural bead which would tend to fracture said bead or displace said electrode relative to said bead and thus to others of said electrodes.

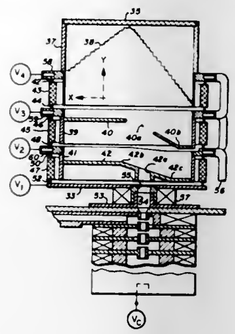
4,096,409

MULTISTAGE DEPRESSED COLLECTOR

Johann Richard Hechtel, Redwood City, Calif., assignor to Litton Systems, Inc., San Carlos, Calif.

Filed Oct. 4, 1976, Ser. No. 729,488
Int. Cl.[2] H01J *23/02*
U.S. Cl. 315—5.38 **15 Claims**

1. In combination with an electron tube of the type containing an interaction region and means, including a cathode, for generating and directing electrons through said interaction region, a collector located beyond an end of said interaction region for collecting electrons, the improvement wherein said collector comprises: a metal wall containing a circular electron from said wall along said entrance axis, and a final metal electrode member electrically insulated from and spaced from said metal members and wall; each of said intermediate members having passage openings along said entrance axis to permit electrons to move toward said final member; said final metal member having a surface concavely curved along two dimensions and extending straight along the third dimension as viewed from said entrance, said curved surface of said final metal member having an apex and said apex being laterally spaced from said entrance axis, wherein said entrance is located asymmetrically with respect to said final metal member;



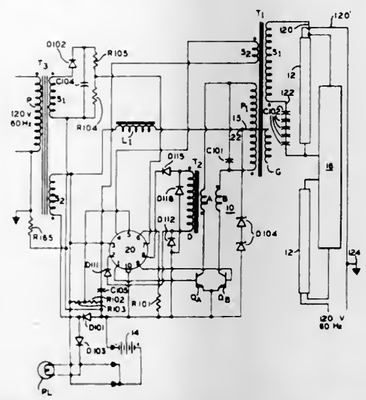
each of said intermediate electrodes being concavely curved along two dimensions as viewed from said beam entrance and extending essentially straight along the third dimension, and means for applying different voltages to each of said metal members and said wall, said voltages being progressively smaller in level with respect to the voltage of said tube cathode, commencing with said metal wall for defining concave-shaped electrostatic equipotentials as viewed from said beam entrance, whereby a substantial majority of electrons entering said collector through said entrance, are decelerated, and then reverse in direction of travel, and then strike the backside of at least one of said intermediate metal electrode members.

4,096,410

INVERTER CIRCUIT PROTECTION

Robert P. Alley, Manlius, N.Y., assignor to General Electric Company, Carmel, Ind.

Filed Jul. 14, 1976, Ser. No. 705,072
Int. Cl.[2] H05B *37/00*
U.S. Cl. 315—86 **8 Claims**



from the DC source to high frequency alternating current and including means for connection to the at least one lamp;

control means for controlling operation of the inverter; and

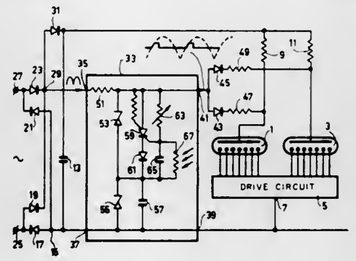
means for protecting the control means from capacitive displacement currents flowing in the circuit.

4,096,411

GAS DISCHARGE TUBE AND MEANS FOR MAINTAINING AN INVISIBLE GAS DISCHARGE THEREIN

Willem Aling, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 16, 1976, Ser. No. 742,342
Claims priority, application Netherlands, Nov. 21, 1975, 7513608
Int. Cl.[2] H05B *37/02, 41/392*
U.S. Cl. 315—158 **13 Claims**



8. A gas discharge display system comprising, a gas discharge display tube having an anode and a plurality of cathodes coupled to a drive circuit for selectively applying first and second voltage levels to the cathodes, means for supplying a pulse-shaped voltage having a controllable duty cycle and at a voltage level to produce a visible glow at those cathodes which are at the first voltage level but which is insufficient to produce a visible glow at the cathodes which are at the second voltage level, a first current path including a unidirectional conducting element for coupling the tube anode to the output of said pulse-shaped voltage supplying means, a direct current path exclusive of the unidirectional conducting element for coupling the tube anode to a source of DC supply voltage so that an uninterrupted DC current flows from the DC voltage source to said anode at a level insufficient to cause a visible cathode glow but able to continuously maintain a substantially invisible gas discharge in the display tube.

4,096,412

DRIVER CIRCUIT FOR ELECTROCHROMIC DISPLAY DEVICE

Fukuo Sekiya; Heihachiro Ebihara; Misao Uchino; Katsuo Nishimura, and Takanori Nanya, all of Tokorozawa, Japan, assignors to Citizen Watch Company, Limited, Tokyo, Japan

Filed Jul. 27, 1976, Ser. No. 709,111
Claims priority, application Japan, Aug. 1, 1975, 50-94005; Oct. 31, 1975, 50-131002; Nov. 5, 1975, 50-132674
Int. Cl.[2] H05B *37/2*
U.S. Cl. 315—169 R **21 Claims**

1. A driver circuit for an electrochromic display device having segment electrodes and a common electrode adapted to display information in response to a display information signal, comprising:

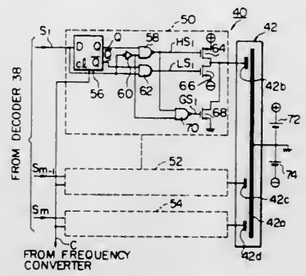
storage means for storing said display information signal and generating first and second output signals delayed in phase from said display information signal;

means for generating a coloration signal in response to said second output signal and said display information signal;

first switching means coupled to each of said segment electrodes and conductive in response to said bleaching signal to cause an electric current to flow through said each of said segment electrodes in a direction to induce bleaching;

second switching means coupled to said each of said segment electrodes and conductive in response to said coloration signal to cause an electric current to flow through said each of said segment electrodes in a direction to induce coloration; and

means for generating an auxiliary signal to cause a display segment corresponding to said each of said segment electrodes to remain in its previously activated state for an extended period of time.

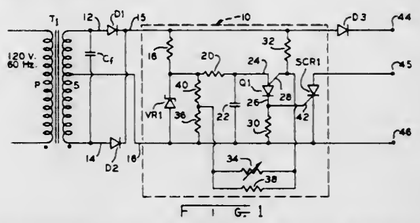


4,096,413

FLICKER ELIMINATING INTENSITY CONTROLLER FOR DISCHARGE LAMP DIMMING CIRCUIT

Robert P. Alley, Manlius, N.Y., assignor to General Electric Company, Carmel, Ind.

Filed Feb. 20, 1976, Ser. No. 659,665
Int. Cl.[2] H05B *41/392*
U.S. Cl. 315—276 **8 Claims**



5. An intensity control circuit for a gaseous discharge lamp dimming system, comprising:

a transformer including a primary winding for connection to a line source of AC electrical energy, and

a secondary winding having output means including a pair of end leads and a center tap and rectifier means for producing a pulsating DC potential;

voltage regulating means connected to the output means of the secondary winding for producing a regulated DC potential across the regulating means;

charging means connected across the regulating means;

a programmable unijunction transistor having an anode terminal, a cathode terminal and a gate terminal, the anode terminal being connected to the charging means for providing anode voltage for the transistor;

a voltage divider connected across the output means of the secondary winding and including means for providing a selectively variable gate voltage for the transistor;

at least one solid-state switch having a control terminal connected to the transistor cathode terminal for turning on the switch upon conduction of the transistor; and

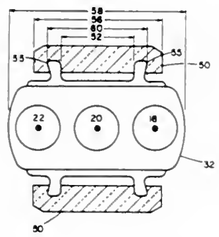
underlying part of the semiconductor surface, and the part of the resistive layer situated between a conductive region and the semiconductor surface being shorter than the scanning time of the whole side to be scanned.

4,096,408

UNITIZED IN-LINE ELECTRON GUN HAVING STRESS-ABSORBING ELECTRODE SUPPORTS

Lajos T. Bozzay, Chicago, and Norman F. Gioia, Lombard, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 28, 1976, Ser. No. 653,050
Int. Cl.² H01J *29/02, 29/46, 29/82*
U.S. Cl. 313—417 **6 Claims**



1. For use in a color television cathode ray tube, a unitized, in-line electron gun; that is, a gun generating three coplanar electron beams and having beam-forming and beam-shaping electrodes common to the three beams, said electrodes being supported as a coherent unit in spaced tandem succession along the gun's central axis by electrode support tabs extending from each electrode and embedded in two elongated, axially oriented solid structural beads positioned on opposite sides of the electrodes; that is, on opposite sides of the beam plane, at least one of said electrodes having on each side thereof at least one pair of widely spaced, relatively narrow tabs integrally formed with the electrode, and lying respectively in planes transverse to the gun axis, with said tabs embedded at widely spaced points on the glass bead to enhance the lateral stability of the electrodes, once embedded in the beads, to promote the establishment and maintenance of parallelism, precise spacing, and aperture concentricity of adjacent ones of said electrodes, said gun being characterized by each of said support tabs in said pair of tabs having a distal end and a stress-absorbing section, said distal end of each of said tabs being embedded in one of said structural beads, with said stress-absorbing section at most partially embedded in said structural bead, and with said stress-absorbing section being of such composition, shape and dimension as to deflect beyond its elastic limit during its embedment in said structural bead and to thereby yield and set permanently in a deformed but supportive attitude substantially free of any residual stress upon said electrode and said structural bead which would tend to fracture said bead or displace said electrode relative to said bead and thus to others of said electrodes.

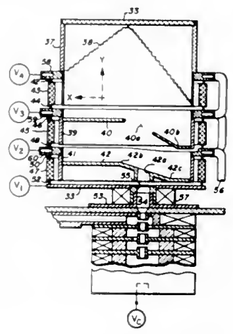
4,096,409

MULTISTAGE DEPRESSED COLLECTOR

Johann Richard Hechtel, Redwood City, Calif., assignor to Litton Systems, Inc., San Carlos, Calif.

Filed Oct. 4, 1976, Ser. No. 729,488
Int. Cl.² H01J *23/02*
U.S. Cl. 315—5.38 **15 Claims**

1. In combination with an electron tube of the type containing an interaction region and means, including a cathode, for generating and directing electrons through said interaction region, a collector located beyond an end of said interaction region for collecting electrons, the improvement wherein said collector comprises: a metal wall containing a circular electron entrance for permitting electrons to enter, said entrance having an axis, a plurality of metal intermediate electrode members electrically insulated from and spaced from one another and from said wall along said entrance axis, and a final metal electrode member electrically insulated from and spaced from said metal members and wall; each of said intermediate members having passage openings along said entrance axis to permit electrons to move toward said final member; said final metal member having a surface concavely curved along two dimensions and extending straight along the third dimension as viewed from said entrance, said curved surface of said final metal member having an apex and said apex being laterally spaced from said entrance axis, wherein said entrance is located asymmetrically with respect to said final metal member;



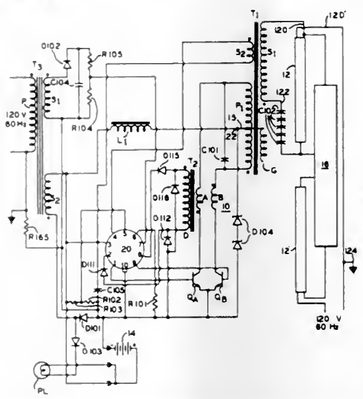
each of said intermediate electrodes being concavely curved along two dimensions as viewed from said beam entrance and extending essentially straight along the third dimension, and means for applying different voltages to each of said metal members and said wall, said voltages being progressively smaller in level with respect to the voltage of said tube cathode, commencing with said metal wall for defining concave-shaped electrostatic equipotentials as viewed from said beam entrance, whereby a substantial majority of electrons entering said collector through said entrance, are decelerated, and then reverse in direction of travel, and then strike the backside of at least one of said intermediate metal electrode members.

4,096,410

INVERTER CIRCUIT PROTECTION

Robert P. Alley, Manlius, N.Y., assignor to General Electric Company, Carmel, Ind.

Filed Jul. 14, 1976, Ser. No. 705,072
Int. Cl.² H05B *37/00*
U.S. Cl. 315—86 **8 Claims**



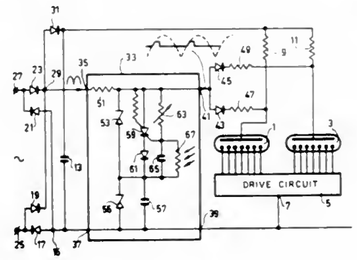
1. A circuit for operating at least one gaseous discharge lamp from a DC electrical energy source, comprising:
a switching transistor inverter for converting direct current from the DC source to high frequency alternating current and including means for connection to the at least one lamp;
control means for controlling operation of the inverter; and
means for protecting the control means from capacitive displacement currents flowing in the circuit.

4,096,411

GAS DISCHARGE TUBE AND MEANS FOR MAINTAINING AN INVISIBLE GAS DISCHARGE THEREIN

Willem Aling, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 16, 1976, Ser. No. 742,342
Claims priority, application Netherlands, Nov. 21, 1975, 7513608
Int. Cl.² H05B *37/02, 41/392*
U.S. Cl. 315—158 **13 Claims**



8. A gas discharge display system comprising, a gas discharge display tube having an anode and a plurality of cathodes coupled to a drive circuit for selectively applying first and second voltage levels to the cathodes, means for supplying a pulse-shaped voltage having a controllable duty cycle and at a voltage level to produce a visible glow at those cathodes which are at the first voltage level but which is insufficient to produce a visible glow at the cathodes which are at the second voltage level, a first current path including a unidirectional conducting element for coupling the tube anode to the output of said pulse-shaped voltage supplying means, a direct current path exclusive of the unidirectional conducting element for coupling the tube anode to a source of DC supply voltage so that an uninterrupted DC current flows from the DC voltage source to said anode at a level insufficient to cause a visible cathode glow but able to continuously maintain a substantially invisible gas discharge in the display tube.

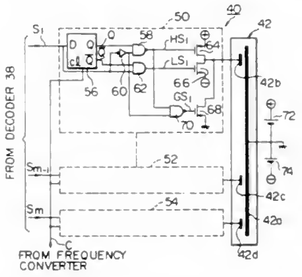
4,096,412

DRIVER CIRCUIT FOR ELECTROCHROMIC DISPLAY DEVICE

Fukuo Sekiya; Heihachiro Ebihara; Misao Uchino; Katsuo Nishimura, and Takanori Nanya, all of Tokorozawa, Japan, assignors to Citizen Watch Company, Limited, Tokyo, Japan

Filed Jul. 27, 1976, Ser. No. 709,111
Claims priority, application Japan, Aug. 1, 1975, 50-94005; Oct. 31, 1975, 50-131002; Nov. 5, 1975, 50-132674
Int. Cl.² H05B *37/2*
U.S. Cl. 315—169 R **21 Claims**

1. A driver circuit for an electrochromic display device having segment electrodes and a common electrode adapted to display information in response to a display information signal, comprising:
storage means for storing said display information signal and generating first and second output signals delayed in phase from said display information signal;
means for generating a bleaching signal in response to said first output signal and said display information signal;
means for generating a coloration signal in response to said second output signal and said display information signal;
first switching means coupled to each of said segment electrodes and conductive in response to said bleaching signal to cause an electric current to flow through said each of said segment electrodes in a direction to induce bleaching;
second switching means coupled to said each of said segment electrodes and conductive in response to said coloration signal to cause an electric current to flow through said each of said segment electrodes in a direction to induce coloration; and
means for generating an auxiliary signal to cause a display segment corresponding to said each of said segment electrodes to remain in its previously activated state for an extended period of time.

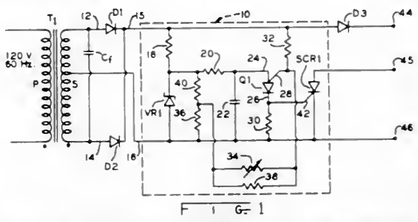


4,096,413

FLICKER ELIMINATING INTENSITY CONTROLLER FOR DISCHARGE LAMP DIMMING CIRCUIT

Robert P. Alley, Manlius, N.Y., assignor to General Electric Company, Carmel, Ind.

Filed Feb. 20, 1976, Ser. No. 659,665
Int. Cl.² H05B *41/392*
U.S. Cl. 315—276 **8 Claims**



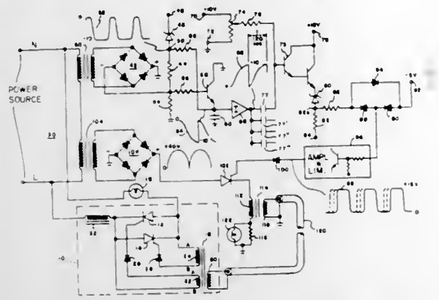
5. An intensity control circuit for a gaseous discharge lamp dimming system, comprising:
a transformer including a primary winding for connection to a line source of AC electrical energy, and
a secondary winding having output means including a pair of end leads and a center tap and rectifier means for producing a pulsating DC potential;
voltage regulating means connected to the output means of the secondary winding for producing a regulated DC potential across the regulating means;
charging means connected across the regulating means;
a programmable unijunction transistor having an anode terminal, a cathode terminal and a gate terminal, the anode terminal being connected to the charging means for providing anode voltage for the transistor;
a voltage divider connected across the output means of the secondary winding and including means for providing a selectively variable gate voltage for the transistor;
at least one solid-state switch having a control terminal connected to the transistor cathode terminal for turning on the switch upon conduction of the transistor; and
means for eliminating the visual effects of non-synchronous, high frequency line perturbations.

4,096,414

DIMMER CONTROL CIRCUIT

Sabert N. Howell, Huntington, N.Y., assignor to CBS Inc., New York, N.Y.

Filed May 24, 1977, Ser. No. 800,142
Int. Cl.[2] G05F *1/00*; H05B *37/02, 39/04, 41/36*
U.S. Cl. 315—291 **9 Claims**



1. In a lighting system for television studios and the like including an AC voltage source for supplying voltage to one or more lamps and a dimmer unit connected to each of said one or more lamps for controlling the effective voltage applied to a respective lamp and consisting essentially of a pair of gate-controlled rectifiers having anode, cathode and gate electrodes connected with their anode-to-cathode paths in inverse parallel arrangement between one terminal of said AC voltage source and one terminal of the association lamp, and first pulse transformer means for applying drive pulses to the gate electrodes of said rectifiers for rendering said rectifiers alternately conductive in successively occurring half-cycles of said AC voltage source, apparatus for producing drive pulses individual to each of said one or more dimmer units, said apparatus comprising, in combination:

first circuit means for deriving waveform signals of predetermined shape and amplitude and of a duration corresponding to the period of a half-cycle of the voltage from said AC source and having a fixed phase-relationship thereto;

a dimmer control channel for each of said one or more lamps, each including

second circuit means connected to receive an adjustable DC control voltage and said shaped wave-form signals and operative to produce rectangular pulses the time of occurrence of the leading edge of which is determined by the combined potential of said DC control voltage and said shaped waveform, and the trailing edges of which are in time coincidence with the zero crossing of said AC voltage source;

third circuit means connected to receive said rectangular pulses and operative in response thereto to generate drive pulses in time coincidence with the leading edge of each of said rectangular pulses; and

means for coupling said drive pulses to the first pulse transformer means of a respective one of said dimmer units.

4,096,415

SWITCHED VERTICAL DEFLECTION CIRCUIT

Peter Eduard Haferl, Adliswil, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Mar. 31, 1977, Ser. No. 783,217
Claims priority, application United Kingdom, Apr. 26, 1976, 16869/76
Int. Cl.[2] H01J *29/72*
U.S. Cl. 315—393 **10 Claims**

1. A switched vertical deflection system comprising:

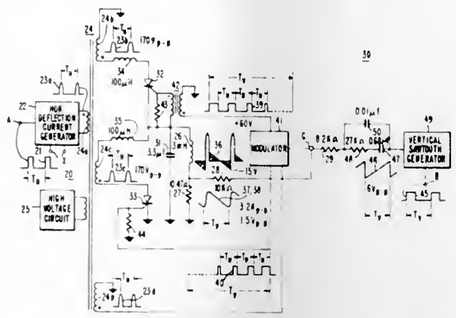
a horizontal deflection circuit including first means for generating horizontal rate energy signals;

a vertical deflection winding;

energy storage capacitance means coupled to said vertical deflection winding;

first and second switching means coupled to said first means and said energy storage capacitance means; and

second means coupled to said first and second switching means for switching conductive states of both of said switching means for coupling successively smaller portions of said horizontal rate energy signals to said energy storage capacitance means during a first part of a vertical trace interval and successively larger portions of said



horizontal rate energy signals during a second part of said vertical trace interval for developing a vertical deflection current in said vertical deflection winding during said vertical trace interval,

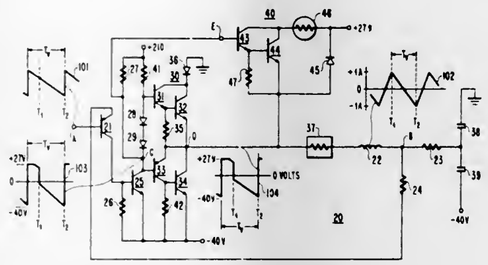
said second means causing said first switching means to conduct during a vertical retrace interval for coupling substantial portions of said horizontal rate energy signals to said energy storage capacitance means during said vertical retrace interval for preventing undesired oscillations within said horizontal deflection circuit.

4,096,416

VERTICAL DEFLECTION CIRCUIT WITH RETRACE SWITCH PROTECTION

Michael Lee Henley, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 19, 1976, Ser. No. 743,312
Int. Cl.[2] H01J *29/70*
U.S. Cl. 315—401 **7 Claims**



1. A vertical deflection circuit comprising:

a deflection winding;

a deflection amplifier with an input terminal and having an output terminal coupled to said deflection winding for generating a trace current in said deflection winding during a trace interval in each deflection cycle in response to drive signals coupled to said input terminal;

a first voltage source coupled to said amplifier for providing an operating voltage to said amplifier;

a second voltage source;

bidirectional switching means coupled between said output terminal and said second voltage source for providing a

voltage of greater magnitude than said first voltage source for generating a retrace current in said deflection winding during a retrace interval in each deflection cycle, said bidirectional switching means including a controlled semiconductor comprising a control terminal coupled to a first terminal at which there is developed a deflection rate signal and a main conductive path coupled to said second voltage souce and one of said output terminal and said deflection winding, said control terminal responsive to said drive signals for biasing said main conductive path from one conduction state to another for providing said voltage of greater magnitude during at least a portion of said retrace interval; and

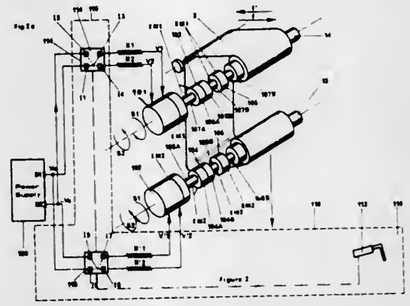
variable resistance means coupled in series with said main conductive path, said variable resistance means providing a relatively large resistance to the current in said main conductive path when said drive signals bias said main conductive path into conduction during a substantial portion of said trace interval for limiting the current in said main conductive path, and said variable resistance means otherwise providing a relatively small resistance during said retrace interval.

4,096,417

APPARATUS FOR DRIVING AND TENSIONING A PRINTING RIBBON FOR A PRINTER

Jacques André Chambolle, Danjoutin, France, assignor to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme), Paris, France

Filed Oct. 28, 1976, Ser. No. 736,307
Claims priority, application France, Nov. 3, 1975, 75 33579
Int. Cl.[2] H02P *1/42*
U.S. Cl. 318—7 **10 Claims**



1. Apparatus for driving ar.d tensioning a printing ribbon between a first roller and a second roller supported on respective first and second rotatable shafts, comprising:

a. first bi-directional rotary drive means having a driving shaft coupled to said first rotatable shaft for driving the first roller in a normal direction of rotation to wind the ribbon on said first roller,

b. second bi-directional rotary drive means having a driving shaft coupled to said second rotatable shaft for driving the second roller in a normal direction of rotation to wind the ribbon on said second roller,

c. first friction clutch means mounted between said driving shaft of said first rotary drive means and said first rotatable shaft, and adapted to slip only when said driving shaft of said first drive means is driven in the reverse of its normal direction of rotation, at a speed higher than that of said rotatable shaft,

d. second friction clutch means mounted between said driving shaft of said second rotatable drive means and said second rotatable shaft, and adapted to slip only when said driving shaft of said second drive means is driven in the reverse of its normal direction of rotation at a speed higher than that of said second rotatable shaft,

e. first permanent brake means mounted on said first rotatable shaft for resisting rotation thereof,

f. second permanent brake means mounted on said second rotatable shaft for resisting rotation thereof,

g. an electric power source, and

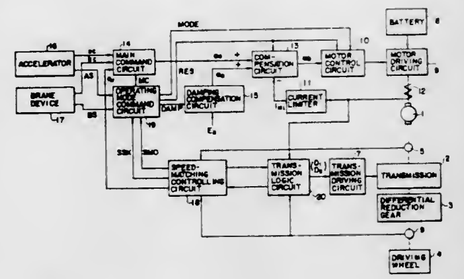
h. switching means connected between said power source and said first and second rotary drive means to supply a current to one of said drive means to cause the rotatable shaft associated therewith to be driven in its normal direction of rotation, and simultaneously to supply a current of higher strength to the other drive means to cause the driving shaft of the latter to be driven in the reverse of its normal direction of rotation at a speed higher than that of the rotatable shaft coupled to it.

4,096,418

AUTOMATIC CHANGE-GEAR CONTROL DEVICE FOR USE IN ELECTROMOBILE

Katsuji Marumoto; Tsutomu Omae; Toshio Suzuki; Takanori Shibata, all of Hitachi, and Hirohisa Yamamura, Naka, all of Japan, assignors to The Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 30, 1977, Ser. No. 782,937
Claims priority, application Japan, Jun. 18, 1976, 51-71229
Int. Cl.[2] H02P *5/06*
U.S. Cl. 318—12 **1 Claim**



1. An automatic change-gear control device for use in an electromobile, comprising:

a driving electric motor;

a motor driving circuit connected between said driving electric motor and a d.c. power source or battery;

a transmission disposed between said driving motor and a driving wheel, and including a clutch and change gears;

a main command circuit for controlling a motor current according to command signals from an accelerator and brake means;

a motor control circuit for feeding a control signal to said motor driving circuit by receiving an output of said main command circuit;

means for detecting a motor current;

a transmission logic circuit for generating a signal adapted to change over and control said clutch and gears in said transmission according to a predetermined given pattern by using as an input a detected motor current and a vehicle speed, said logic circuit driving said clutch so as to bring said gears in engagement with said motor, after said gears have been selected, upon completion of speed matching;

speed matching control means for adjusting the r.p.m. of a motor commensurate with a gear ratio after gear-change, with said clutch maintained in a disengaged condition, at the time of gear change;

a deviation-signal compensating circuit disposed between said motor control circuit and said main command circuit for stabilizing a control system; and

a damping compensating circuit for detecting the time when the speed matching is completed, and generating a com-

pensating signal for increasing a motor current for a given time duration after the completion of the speed matching; whereby the build-up duration of a motor current immediately after gear change may be accelerated so as to shorten a gear changing time.

4,096,419

ELECTRIC MOTORS

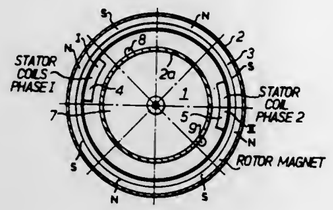
John Pelham Wren, and Michael Keith Steventon, both of Swindon, England, assignors to Plessey Handel Und Investments AG., Zug, Switzerland

Filed Sep. 10, 1976, Ser. No. 722,269

Claims priority, application United Kingdom, Sep. 12, 1975, 37506/75; Sep. 23, 1975, 38898/75

Int. Cl.[2] H02K *29/00*

U.S. Cl. 318—138 **13 Claims**



1. A motor arrangement comprising a rotor having an even number of permanent magnet rotor poles arranged on the circumference of a circle centered at the motor shaft, a stator having at least one air cored stator winding per phase wherein the number of stator windings per phase is less than the number of rotor pole pairs, and commutator means for controlling current to be fed to said stator windings so that said stator windings react with the rotor poles to produce rotation of the rotor so that the sum, for all phases, of the product of magnetic flux and current for each phase at any angular position of the motor shaft is substantially constant thereby to provide substantially constant torque at the motor shaft.

4,096,420

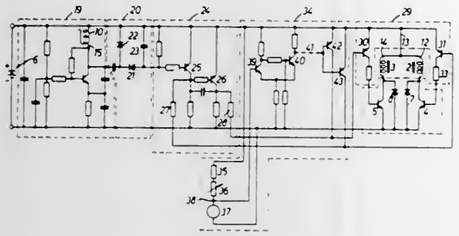
CONTROL CIRCUIT FOR A BRUSHLESS D.C. MOTOR

Alexander Benett Gosling, and Barrie Ewart Mealing, both of Cambridge, England, assignors to Danfoss A/S, Nordborg, Denmark

Filed Jul. 6, 1976, Ser. No. 702,494

Int. Cl.[2] H02K *29/02*

U.S. Cl. 318—254 **8 Claims**



1. A control circuit for a brushless self-starting D.C. motor of the type comprising a D.C. source, a permanent magnet rotor and a cooperating stator coil, a saturatable core sensing coil subjected to the rotor field of said rotor to vary the inductance of said sensing coil and thereby determine the rotary position of said rotor, a controllable electronic switch element lying in series with said stator coil and said D.C. source, said switch element controlling the current through said stator coil in dependence on the rotary position of said rotor, said circuit including an oscillator having integral LC oscillation activating elements of which said L element is formed by said sensing coil, modulating means for modulating the oscillation of said oscillator in response to the change in inductance of said sensing coil induced by said rotor field, means for deriving a control signal for said switch element from the modulated oscillator oscillation.

4,096,421

PRESSING MACHINE, PARTICULARLY HOUSEHOLD REFUSE COMPACTOR AND CONTROL CIRCUIT THEREFOR

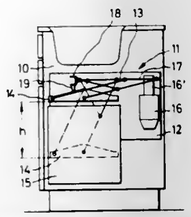
Karl-Heinz Farber, and Rolf Mayer, both of Giengen, Germany, assignors to Bosch-Siemens Hausgerate GmbH, Munich, Germany

Filed Jun. 18, 1975, Ser. No. 587,954

Claims priority, application Germany, Jun. 27, 1974, 2430903; Jun. 27, 1974, 2430902; Jun. 28, 1974, 2431109

Int. Cl.[2] H02P *7/28*

U.S. Cl. 318—282 **26 Claims**



1. A pressing machine, particularly a household refuse compactor or the like, comprising, in combination, a pressing ram; drive means for moving said ram from a starting position to an end-of-stroke position and back to said starting position and including an electric drive motor; and control means for establishing the end-of-stroke position of said ram, including a direction-reversing circuit connected to said drive means for reversing the direction in which said drive means moves said ram and comprising a direction-reversing arrangement having a curren path for activating current, a controllable electronic switch connected to said current path for controlling the activation of said direction-reversing arrangement, and control-signal-generating means connected to said drive motor and operative for controlling the conductivity of said switch by generating and applying to the control input of said electronic switch a control signal dependent upon the current flowing through said drive motor, and including compensating means operative for establishing a predetermined relationship between the pressing force exerted by said pressing ram and the drive motor current by automatically varying the relationship between said control signal and said drive motor current.

4,096,422

MOTOR CONTROL SYSTEM

John Augustus Fleming, and Frank James Allen, both of Newtown, Conn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 3, 1975, Ser. No. 637,540

Int. Cl.[2] H02P *5/00*

U.S. Cl. 318—314 **4 Claims**

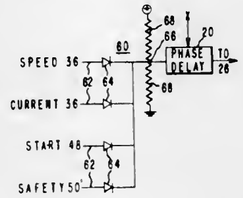
1. In a motor control system for controlling speed of a variable speed motor, using switching means for selectively varying the duty cycle of an alternating current signal supplied to said motor, in accordance with different operating conditions, the combination comprising:

a first signal level generator for generating a first signal level that varies in the presence of a first operating condition, said first signal level generator including: an integrator responsive to the presence of said first operating condition

for integrating in a first sense and in a second sense opposite said first sense at all other times, thereby to vary said first signal level,

a second signal level generator for generating a second signal level that varies according to a second operating condition,

a zero-crossover detector responsive to said alternating current signal for producing zero-crossover pulses corre-



sponding to the zero-crossover times of said signal for controlling said switching means, and

time delay means responsive to the greater deviation of said first and second signal levels from a predetermined level for delaying said zero-crossover pulses for a time period proportional to the amplitude of said greater deviation, thereby to vary said duty cycle of said alternating current signal in accordance with said first or second levels having the greater deviation from said predetermined level.

4,096,423

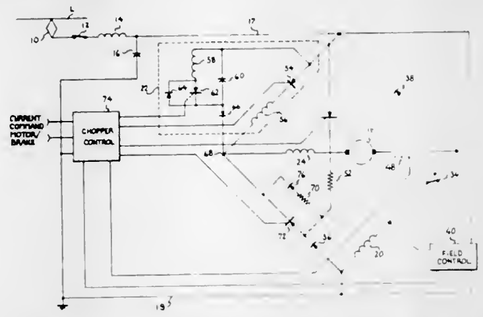
DIRECT CURRENT MOTOR CHOPPER PROPULSION SYSTEM

Ronald Barry Bailey; Thomas Detlor Stitt, and Dennis Francis Williamson, all of Erie, Pa., assignors to General Electric Company, Erie, Pa.

Continuation-in-part of Ser. No. 662,885, Mar. 1, 1976, abandoned. This application Feb. 7, 1977, Ser. No. 766,297

Int. Cl.[2] H02P *3/14*

U.S. Cl. 318—370 **18 Claims**



1. A d-c electric traction motor propulsion system comprising:

a. a bridge circuit having first, second, third and fourth sides, said first and third sides being opposite each other;

b. a d-c power source having a first terminal connected to a junction intermediate said first and second sides and having a second terminal connected to a junction intermediate said third and fourth sides;

c. a d-c electric traction motor including an armature, said armature having one terminal thereof connected to a junction intermediate said second and third sides;

d. a chopper circuit including a main thyristor and a commutating circuit, said main thyristor being connected in said first side for metering power to said armature;

e. first conduction means connected in said third side for providing an armature current path only during electrical propulsion of said motor;

f. second conduction means connected in said fourth said for providing an armature current path when said chopper circuit is non-conductive;

g. third conduction means connected in said second side for providing an armature current path only during electrical braking of said motor; and

h. continuously variable impedance means serially connected between said second conduction means and another terminal of said armature, an output terminal of said commutating circuit being connected to a junction intermediate said variable impedance means and said armature.

4,096,424

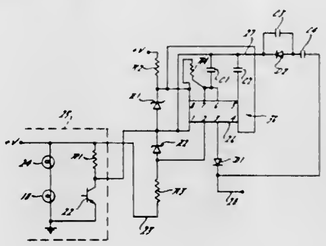
ELECTRICAL CIRCUIT FOR CONTROLLING THE FEED RATE OF PARTS

George J. Hysler, St. Clair Shores, Mich., assignor to N.D.T. Laboratories, Inc., Warren, Mich.

Filed Jul. 12, 1976, Ser. No. 704,165

Int. Cl.[2] G01D *5/34*

U.S. Cl. 318—480 **15 Claims**



1. In an electronic circuit for automatically controlling the feed rate of parts including:

motive means for causing movement of said parts along a passageway; and

detector means for detecting the passage of parts past a given point and producing a detector signal in response thereto; the improvement comprising

circuit means connected to said detector means for producing a rate signal related to said detector signal, including capacitance means adapted to be charged by a voltage source of varying magnitude and first switching means for controlling the charge on said capacitance means in accordance with said detector signal;

control means connected to said circuit means for controlling the operation of said motive means in accordance with said rate signal, including second switching means connected in circuit with said motive means for changing the operative state of said motive means whenever the charge on said capacitance means exceeds a predetermined level; and

reset means connected to said capacitance means for rapidly discharging said capacitance means whenever the magnitude of the signal from said voltage source decreases below said predetermined level.

4,096,425

SERVO SYSTEMS

Ian Francis Brown, and Colin Keith Sharp, both of Edinburgh, Scotland, assignors to Ferranti Limited, Hollinwood, England

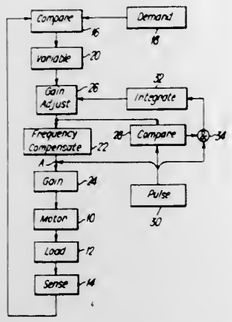
Continuation of Ser. No. 507,420, Sep. 19, 1974, abandoned. This application Apr. 27, 1976, Ser. No. 680,779

Int. Cl.[2] G05B *13/00*

U.S. Cl. 318—561 **9 Claims**

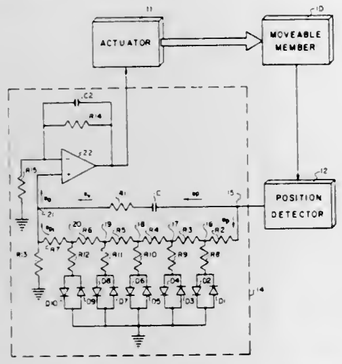
1. A servo control system comprising a feedback loop including means for supplying an error signal representing the difference between actual and desired conditions of a con-

trolled system, means responsive to the error signal to produce a control signal for said controlled system, means for applying to the feedback loop discrete signals each comprising a first excursion of one polarity providing a disturbance signal and a second excursion of opposite polarity to substantially cancel



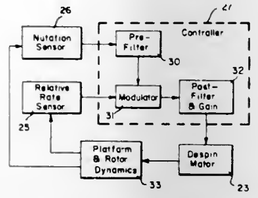
the effects of the disturbance signal on the system, means for extracting from the loop a loop response signal, comparison means for comparing the disturbance signal and the loop response signal and means responsive to the output of the comparison means to vary the gain in the feedback loop.

4,096,426
NON-LINEAR ERROR SIGNAL ATTENUATOR FOR SERVO SYSTEM
Brian P. Tremaine, and Charles E. Mendenhall, both of San Jose, Calif., assignors to Sperry Rand Corporation, New York, N.Y.
Filed Aug. 9, 1976, Ser. No. 712,717
Int. Cl.² G05B *5/01*
U.S. Cl. 318—611 **4 Claims**



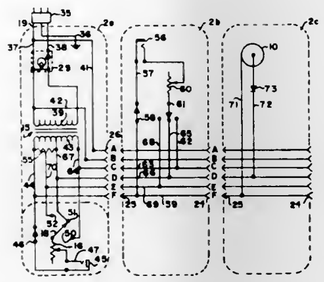
1. A servo system for controlling the energization of an actuator employed to move a member in response to an energizing signal, said system comprising in combination:
position sensing means for generating an error signal responsive to the present position of said member;
a first circuit for generating a first signal responsive to the velocity of said member;
a second circuit for receiving and attenuating said error signal by an amount proportional to the magnitude of the error signal to generate a second signal;
means for subtracting said first signal from the second signal to generate a differential signal for energization of said actuator.

4,096,427
NUTATION DAMPING IN DUAL-SPIN STABILIZED DEVICES
Harold A. Rosen, Santa Monica, and Jeremiah O. Salvatore, Redondo Beach, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.
Filed Oct. 21, 1975, Ser. No. 624,342
Int. Cl.² B64C *17/02*
U.S. Cl. 318—648 **4 Claims**



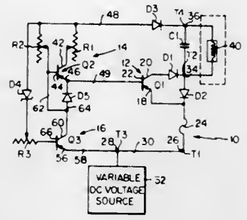
1. A nutation control system for a dual-spin stabilized device having a rotor, a platform, a despin motor, a relative rate sensor and a nutation sensor, in which the invention comprises a modulator coupled to the output of said relative rate sensor and to the output of said nutation sensor for modulating the signal from said nutation sensor with the signal from said relative rate sensor, the output of said modulator being coupled to said despin motor to cause said motor to apply a torque to said device to reduce the amount of nutation.

4,096,428
INSTRUMENT SUPPORTING TRANSFORMER UNIT
Larry E. Hanson; Raymond F. Schober, Jr., both of Topeka, Kans., and Merwin K. Alexander, St. Louis, Mo., assignors to Optical Associates, Inc., St. Louis, Mo.
Filed Oct. 7, 1976, Ser. No. 730,635
Int. Cl.² A61B *19/02*; A61C *19/02*; H01M *10/46*
U.S. Cl. 320—2 **19 Claims**



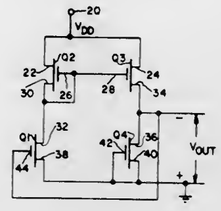
1. A transformer unit for use in furnishing voltage to one or more electrically operated medical instruments comprising a mounting means, a transformer means incorporating both primary and secondary windings supported by said mounting means, a series of instrument supports held by the mounting means and electrically coupled with the transformer for furnishing an electrical charge to each support for selective energization of certain of its respective instruments, said transformer capable of electrically coupling to a source of energy for energizing the unit, at least one of said supports including one of charging means and wiring means for respective selective recharging and electrical wiring its supported instrument, and a plurality of electrical connecting means provided upon each instrument support for their electrical coupling together and to the transformer means for furnishing selected variable voltages to each support for providing recharging or energization of its respectively held medical instrument.

4,096,429
VOLTAGE AND CURRENT REGULATOR FOR GENERATING SYSTEMS
Lonnie S. Carter, P.O. Box 544, Ashland, Kans. 67831
Filed Sep. 10, 1976, Ser. No. 722,046
Int. Cl.² H02P *9/30*
U.S. Cl. 322—28 **9 Claims**



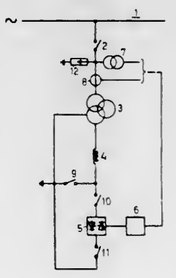
4. In a generating system including a generating device having a field coil energized by a field current and operative to generate current, and a regulator for monitoring the generator voltage and for developing the field current when the generator voltage is less than a predetermined value, an improved regulator comprising:
a first pair of terminals including a first terminal connectable to one side of the generator, and a second terminal;
a second pair of terminals including a third terminal and a fourth terminal connectable to the other side of said generator;
a connecting strap connected across one pair of said first and second pairs of terminals, the other of said pairs of terminals being connectable across the field coil of the generating device;
sensing means responsive to the voltage developed between said first and fourth terminals and operative to develop a first control signal when said voltage is below a predetermined value, and operative to develop a second control signal when said voltage exceeds said predetermined value;
a first resistor;
a first switching means having a first electrode coupled to said first terminal by said first resistor, a second electrode coupled to said sensing means to receive said first and second control signals, and a third electrode, said first switching means being responsive to said first control signal and operative to switch to a first state in which a first current having a magnitude set by said first resistor is developed at said third electrode, and responsive to said second control signal and operative to switch to a second state in which current flow through said first resistor is substantially prevented and as a result any second current developed at said third terminal is of no substantial value; and
second switching means having a fourth electrode coupled to said second terminal, a fifth electrode coupled to said third terminal, and a sixth electrode coupled to said third electrode, said second switching means being responsive to said first current and operative to switch to a first state wherein said second terminal is effectively connected to said third terminal so as to cause said field coil to be energized, and responsive to said second current and operative to switch to a second state wherein said field coil is energized.

4,096,430
METAL-OXIDE-SEMICONDUCTOR VOLTAGE REFERENCE
Wesley K. Waldron, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Filed Apr. 4, 1977, Ser. No. 783,965
Int. Cl.² G05F *1/60*; H03K *5/20*
U.S. Cl. 323—22 R **16 Claims**



1. A voltage reference circuit including essentially only metal-oxide-semiconductor (MOS) transistors comprising:
a first MOS transistor having gate, source and drain electrodes;
a second MOS transistor having gate, source and drain electrodes, the gate and source electrodes of said second MOS transistor connected together and further connected to said drain of said first MOS transistor;
a third MOS transistor having gate, source and drain electrodes, said gate electrode of said third MOS transistor connected to said gate and source of said second MOS transistor and said drain electrode connected to said drain electrode of said second MOS transistor and said source electrode connected to said gate electrode of said first MOS transistor;
a fourth MOS transistor having gate source and drain electrodes, said gate and source electrodes connected to said source electrode of said first MOS transistor and said drain electrode connected to said source electrode of said third MOS transistor;
said first and second MOS transistors characterized by first and second device channel width to length ratios which are essentially equal.

4,096,431
DISCONNECTING THYRISTORS FROM THYRISTOR CONTROLLED REACTANCE
Bertil Hammarlund, Ludvika, Sweden, assignor to ASEA Aktiebolag, Vesteras, Sweden
Filed Mar. 21, 1977, Ser. No. 779,460
Claims priority, application Sweden, Mar. 29, 1976, 7603736
Int. Cl.² H02J *3/18*
U.S. Cl. 323—119 **4 Claims**



1. Apparatus for phase compensation in an AC network including reactance means and thyristor control means cou-

pled to said network by transformer means in which the improvement comprises

switching means coupling said thyristor control means, said reactance means and said transformer means for disconnecting said thyristor control means from said reactance means and said transformer means and leaving said reactance means connected in circuit with said transformer means.

4,096,432

METAL DETECTORS FOR DISCRIMINATORY DETECTION OF BURIED METAL OBJECTS

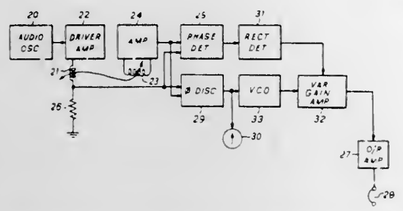
Paul Anthony Spencer, London, England, assignor to Arado Electronics, London, England

Filed Dec. 1, 1976, Ser. No. 746,586

Claims priority, application United Kingdom, Jul. 14, 1976, 29379/76

Int. Cl.² G01V *3/10*

U.S. Cl. 324—3 **11 Claims**



1. A metal detector comprising a coil arrangement having input and output terminals, an energizing audio frequency oscillator connected to the input terminals, the coil arrangement being balanced to provide a null signal at the output terminals in the absence of proximate conductive objects, means connected to the output terminals for separately detecting in-phase and quadrature components of the said signal created by proximate conductive objects which absorb energy and which influence the sense of the quadrature component in dependence upon whether the objects are non-ferromagnetic or ferromagnetic, a continuously variable frequency audio oscillator having a frequency control terminal responsive to the quadrature component to vary the frequency of the oscillator above and below a base frequency in dependence upon the sense of the quadrature component, a transducer for providing an audible tone from the output of the oscillator, and means responsive to the in-phase component to vary continuously the amplitude of the signal applied to the transducer in dependence on the strength of the in-phase component.

4,096,433

AUTOMATIC INSPECTION FOR THE DEPOSITION OF CONDUCTIVE LIQUIDS

Louis F. Marino, Teaneck; Paul P. Monteleone, Sparta, and James Remer, Matawan, all of N.J., assignors to The United States of America as represented by the Scretary of the Army, Washington, D.C.

Filed Sep. 1, 1976, Ser. No. 719,553

Int. Cl.² G01N *27/42*

U.S. Cl. 324—30 R **2 Claims**

1. An apparatus for inspecting for the deposition of a conductive liquid to a surface comprising:

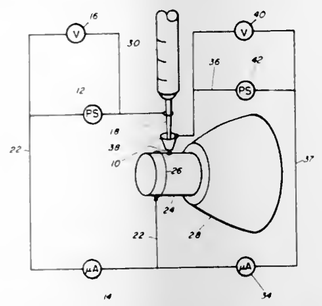
a reservoir containing said conductive liquid;

a dispensing means, positioned above said surface, for applying said conductive liquid to said surface;

a first electric circuit arranged between said dispensing means and said surface including a power source and means for measuring current flow through said circuit; whereby current can flow through said circuit only when the conductive liquid stream between said dispensing means and said surface is unbroken;

a probe means positioned above said surface for sensing the level of liquid deposited on said surface; and

a second electric circuit arranged between said probe means and said surface including a power source and means for



measuring current flow through said circuit, whereby current can flow through said second circuit only when the liquid deposited on said surface contacts said probe means.

4,096,434

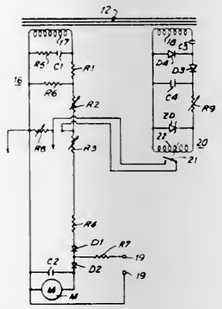
AUTOMATIC RANGE SELECTOR FOR VOLT-AMMETER INSTRUMENT

William J. Meyer, Laurelton, N.Y., assignor to A.W. Sperry Instruments, Inc., Hauppauge, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,292

Int. Cl.² G01R *15/08, 1/22*

U.S. Cl. 324—115 **8 Claims**



1. An automatic ranging clamp-on ammeter comprising a clamp-on magnetic core including a section movable between the core open and closed positions, a measuring coil encircling said core, means for measuring the voltage across said measuring coil including a meter and rectifier and a resistor connected in series across said measuring coil and means responsive to the varying magnetic flux in said core for varying the sensitivity of said voltage measuring means including a sensing coil encircling said magnetic core, a shunt resistor and means including a relay having a control input responsive to the output of said sensing coil and having a switch output connected in series with said shunt resistor across said meter whereby variation of said sensing coil output above and below a predetermined level alternatively opens or closes said switch to correspondingly vary said sensitivity.

4,096,435

LEVEL INDICATING DEVICE

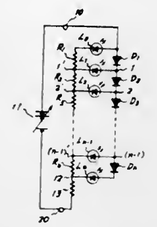
Ichiro Sabe, Yao, Japan, assignor to Sanyei Electronics, Corporation, Japan

Filed Dec. 6, 1976, Ser. No. 748,066

Claims priority, application Japan, Jun. 21, 1976, 51-73529

Int. Cl.² G01R *13/02, 19/04*

U.S. Cl. 324—122 **4 Claims**



1. A level indicating device comprising first and second terminals for receiving a signal having a level to be indicated, a first plurality of similarly poled serially connected diode devices having junctions therebetween and first and second ends, a second plurality of serially connected resistive devices of the same number as said diodes having junctions therebetween and first and second ends, a plurality of light emitting diodes each connected between corresponding junctions of said first and second sets of series connected devices and between the first and second ends of both said sets of series connected devices, whereby said light emitting diodes bridge both of said sets of series connected devices to form a ladder-like configuration, and said first end of said first set of series connected devices and said second end of said second set of series connected devices are connected respectively to said first and second terminals.

4,096,436

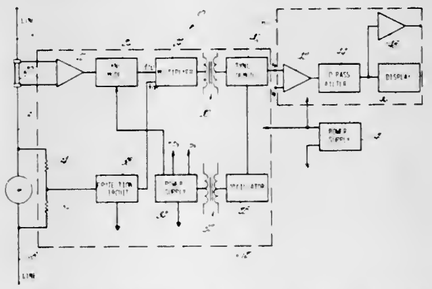
POWER MONITOR

Kenneth J. Cook, Oak Park, and Robert C. Murray, Troy, both of Mich., assignors to The Valeron Corporation, Oak Park, Mich.

Filed May 23, 1977, Ser. No. 799,375

Int. Cl.² G01R *21/00*

U.S. Cl. 324—142 **21 Claims**



8. In a power monitor of the type which calculates the instantaneous power drawn by an electrical load as the product of the voltage drop across the load and electrical current flowing through the load, and having sensible output means electrically connected thereto, at least one wattmeter module comprising:

input means operative to detect the voltage drop across and current through an electrical load and to generate separate corresponding electrical signals in proportion thereto;

multiplier means operative to read the signals associated with the load current and voltage and to electronically generate a product signal proportional to the product thereof;

and isolation means operative to read said product signal and to generate an electrical output signal which is proportional thereto and electrically isolated therefrom.

4,096,437

MAGNETIC TESTING DEVICE FOR DETECTING LOSS OF METALLIC AREA AND INTERNAL AND EXTERNAL DEFECTS IN ELONGATED OBJECTS

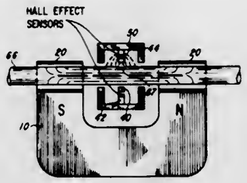
Frank Kitzinger, Montreal, and Gregory A. Wint, Pierrefonds, both of Canada, assignors to Noranda Mines Limited, Toronto, Canada

Filed Sep. 30, 1976, Ser. No. 728,061

Claims priority, application Canada, May 6, 1976, 251932

Int. Cl.² G01R *33/12*

U.S. Cl. 324—227 **14 Claims**



1. A magnetic testing device for detecting loss of metallic area and internal and external defects in elongated magnetically permeable objects such as wire ropes and the like, the device comprising:

(a) a permanent magnet assembly having poles adapted to be spaced apart in the longitudinal direction of an elongated object for inducing a longitudinal magnetic flux in a section of said object between the poles of the magnet assembly which is strong enough to saturate said section of the object;

(b) a tubular pole piece adapted to surround said elongated object adjacent each pole of said permanent magnet assembly for directing said magnetic flux radially into the object at one pole and out of the object at the other pole;

(c) Hall effect devices spaced around at least one pole piece in the path of said magnetic flux for sensing the reduction of the radial flux entering said elongated object due to any reduction of the cross-sectional area of the elongated object between said pole pieces caused by loss of metallic area in said elongated object; and

(d) a leakage flux sensor secured to said magnet between the pole pieces for detecting external and internal defects in said object.

4,096,438

WALL THICKNESS GAUGE AND METHOD UTILIZING A REED SWITCH AND MAGNET MEANS ON OPPOSITE SIDES OF THE WALL

Frederick H. Humphrey, 7 Orchard St., Markham, Ontario, L3P2S9, Canada

Filed Nov. 18, 1976, Ser. No. 742,844

Int. Cl.² G01R *33/12*

U.S. Cl. 324—229 **9 Claims**

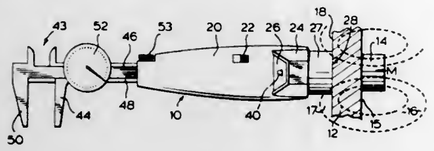
1. A method of determining the thickness of a wall of non-magnetic material, comprising the steps of:

positioning magnetic means on one side of the wall to set up a magnetic field of which a portion extends beyond the other side of the wall,

positioning on the other side of the wall a magnetic reed switch within a solenoid,

energizing the solenoid with a pulsed DC signal of unvarying frequency to alternately open and close the reed

switch and thereby to achieve in the reeds of the reed switch a substantially steady level of residual magnetism, and causing the flux density component of said magnetic field at the reeds of the reed switch to increase until the reed switch ceases to open and close alternately, by causing the reed switch and solenoid to approach said other



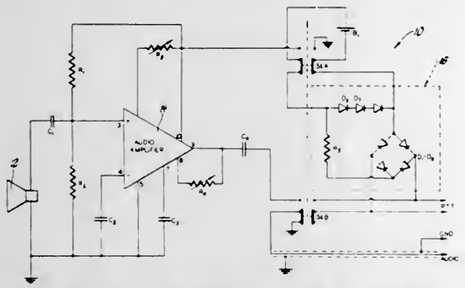
side of the wall, the method including stopping the approach when the magnetic reed switch ceases to open and close alternately, noting a distance-related measurement governed by the separation between the wall and the magnetic reed switch, and deriving from said measurement the thickness of the wall by virtue of a prior calibration of the scale of such measurement.

4,096,439

AMPLIFIED MICROPHONE ASSEMBLY

Peter A. Hochstein, 14020 15 Mile Rd., Sterling Heights, Mich. 48077

Filed Dec. 27, 1976, Ser. No. 754,249
Int. Cl.[2] H04B *1/40*
U.S. Cl. 325—21 **12 Claims**



11. A microphone assembly comprising; transducer means for converting an audio signal to an electrical signal during a transmit mode, amplifying means for amplifying said electrical signal from said transducer means during said transmit mode, rechargeable power supply means for supplying power to said amplifying means during said transmit mode, charging means for charging said power supply means during a receive mode, and switching means for placing said assembly in one of said transmit mode and said receive mode.

4,096,440

CONTROL SYSTEM FOR MOBILE RADIO COMMUNICATION

Sadaatsu Okasaka, Yokohama, Japan, assignor to Nippon Telegraph and Telephone Public Corporation, Japan

Filed Apr. 22, 1977, Ser. No. 790,044
Claims priority, application Japan, Apr. 26, 1976, 51-47384
Int. Cl.[2] H04B *1/00*
U.S. Cl. 325—53 **3 Claims**

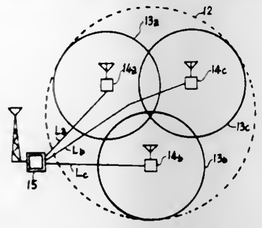
1. A control system for mobile radio communication comprising:

a number of mobile stations, each transmitting a control signal indicative of transmission by a first common radio frequency wave;

a plurality of base stations, each disposed in one of a plurality of small radio service zones respectively having an area in which communication can be sufficiently achieved with a radio transmission power of each mobile station, each base station having means for receiving the control signal from the mobile station in the corresponding one of the small radio service zones and means for regenerating the control signal in the form of a binary code;

a plurality of fixed transmission lines, each transmitting the binary code regenerated by each of the plurality of base stations; and

a control station connected to each of the plurality of fixed transmission lines for transmitting, in response to the binary code, an idle channel indication signal to each of the mobile stations in the whole service area including all of the plurality of small radio service zones at a second common radio frequency wave, the idle channel indication signal having first and second states indicative of busy



and idle states of the first common radio frequency wave, respectively,

each of said base stations including means for applying to the control station information indicative of the detection of transmission from one of the mobile stations in the small radio service zone of the base station by reversing the state of the binary code transmitted therefrom over the corresponding one of the fixed transmission lines, and

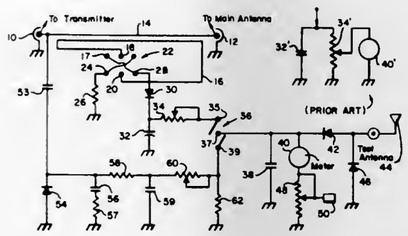
said control station including means for establishing the idle channel indication signal to the first state in accordance with the reversal of the earliest one of the binary codes arriving from the base stations, and means for detecting initiation of restoration of the binary code control signal to its normal state, and means for changing the idle channel indication signal into the second state upon completion of reception of said control signal.

4,096,441

TEST INSTRUMENT FOR TRANSMITTERS

Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.

Filed Oct. 12, 1976, Ser. No. 731,812
Int. Cl.[2] H04B *1/04, 17/00*
U.S. Cl. 325—133 **4 Claims**



1. A test instrument for selectively measuring the standing wave ratio between a transmitter and an associated antenna, transmitter output power, and antenna radiated power, comprising:

a printed circuit board having a first conductive path thereon, means adapted for connecting said conductive path in series with the energy flow between the transmitter and antenna, and a second conductive path contiguous to at least a portion of said first conductive path whereby energy is electromagnetically coupled from said first to said second conductive paths;

circuit means for sequentially measuring the energy flowing in opposite directions along said second conductive path and for selectively providing a first signal indicative of said standing wave ratio;

means for selectively providing a second signal indicative of the transmitter's output power;

means for monitoring antenna radiated power and for selectively providing a third signal indicative of said radiated power; and

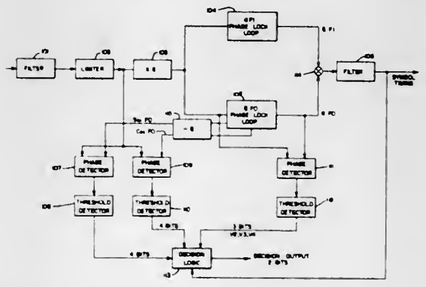
meter means for selectively displaying an indication of said first, second or third signals.

4,096,442

CROSSTALK CORRECTOR AND DECISION DEVICE FOR FSK

Daniel Dix McRae, and Earl Ford Smith, both of Melbourne, Fla., assignors to Harris Corporation, Cleveland, Ohio

Filed Apr. 26, 1977, Ser. No. 790,940
Int. Cl.[2] H03D *3/02*
U.S. Cl. 329—112 **14 Claims**



1. A method of demodulating a coherent frequency shift keyed (FSK) signal having a modulation index h, wherein data symbols are represented by discrete frequencies, and the difference in phase between symbol transition times is representative of symbol frequency, comprising the steps of:

(a) measuring the phase of the FSK signal relative to the phase of one of the frequency components which may be contained in said FSK signal at instants in time corresponding to transition times between successive symbols;

(b) identifying respective pairs of phase nodes $n2\pi h$ and $(n+1)2\pi h$, where n is an integer, which correspond to those legitimate phases by which the FSK signal may be defined and near which nodes the respective phases measured in step (a) lie;

(c) estimating, for each symbol transition time, the phase distortion introduced into said FSK signal and resulting in a shift of the phase of the FSK signal at said transition times to values other than those of legitimate phase nodes;

(d) selecting, for each symbol transition time, one of the phase node values $n2\pi h$ and $(n+1)2\pi h$ identified for each respective symbol transition time in step (b) in the basis of the phase distortion estimates obtained in step (c); and

(e) deriving a sequence of frequencies by determining the differences between successive ones of the phase node values selected in step (d).

4,096,443

BALANCED SOURCE FOLLOWER AMPLIFIER

Warren E. Gilson, 4 Franklin Ave., Madison, Wis. 53705

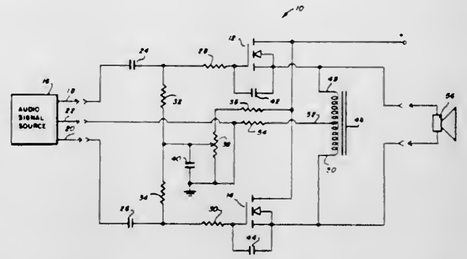
Filed Feb. 16, 1977, Ser. No. 769,005
Int. Cl.[2] H03F *3/26*
U.S. Cl. 330—267 **10 Claims**

1. An amplifier usable for powering a load and operable in conjunction with an alternating current signal source and a direct current source having first and second terminals having a potential difference therebetween, comprising:

first and second transistors each having a source electrode, a gate electrode and a drain electrode;

means for establishing a direct current connection between each of said drain electrodes and the first terminal of said direct current source;

means for electrically coupling said first gate electrode to said first source electrode and for electrically coupling said second gate electrode to said second source electrode, said electrical coupling means including means for coupling at least one of said gate electrodes to said alternating current signal source;



a center tapped autotransformer having two end taps and a center tap;

means for providing a direct current connection between the source of said first transistor and one of said end taps and between the source of said second transistor and the other one of said end taps;

means for providing a direct current connection between said center tap and the second terminal of said direct current source; and

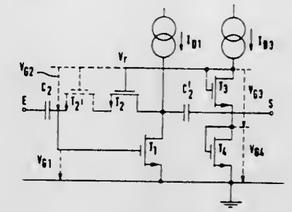
means for connecting the load between said end taps.

4,096,444

ACTIVE INTEGRATED CIRCUIT

Jean Fellrath, Neuchatel, Switzerland, assignor to Centre Electronique Horloger S.A., Neuchatel, Switzerland

Filed Aug. 9, 1976, Ser. No. 712,876
Claims priority, application Switzerland, Aug. 12, 1975, 10456/75
Int. Cl.[2] H03F *3/16;* H03B *5/36, 5/20*
U.S. Cl. 330—277 **14 Claims**



1. An active circuit comprising an integrated circuit constructed of insulated gate field effect transistors, and including at least one amplifier stage, input and output circuits for said amplifier stage, said amplifier stage including an amplifying transistor whose source constitutes a common point for the input and output circuits of the amplifier stage, and including capacitors coupling the gate and drain of said amplifying transistor to said input and output circuits, a first current source furnishing a current I_{D1}, the drain of said amplifying transistor being connected to said first current source, said amplifier stage including at least one negative feedback transistor of the same conductive type as said amplifying transistor, the drain-

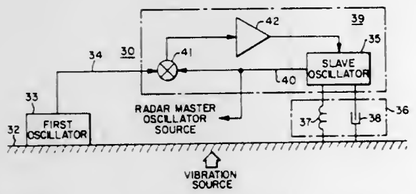
to-source path of said feedback transistor placed in series between the drain and gate of said amplifying transistor, a biasing circuit comprising two biasing transistors of the same conductive type as said amplifying transistor, one of said biasing transistors having its source coupled to the same potential as the source of said amplifying transistor and its gate coupled to the same average potential as its drain, the other biasing transistor having its source connected to the drain of said one biasing transistor and its gate and drain connected to each other and to the gate of said at least one negative feedback transistor, a second current source furnishing a current I_{D3} having a given ratio of magnitude to the supply current I_{D1} of said amplifying transistor, and the drain of said other biasing transistor being connected to said second current source.

4,096,445

ELECTROMECHANICAL VIBRATION FILTER FOR RADAR MASTER OSCILLATORS

Francis W. Hopwood, Severna Park; John P. Muhlbaier, Joppa, and Herman Rossman, Randallstown, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 21, 1977, Ser. No. 789,487
Int. Cl.² H03B 3/04
U.S. Cl. 331—17 **9 Claims**



1. A system for providing a phase stable output oscillatory signal while affected by vibration noise encompassing a wide range frequency spectrum transmitted thereto by a vibration source, said system comprising:

a first oscillator structurally coupled to the vibration source, for generating a first oscillatory signal having a modulation component being a function of the vibration noise transmitted thereto by the vibration source;

a second oscillator for generating an output oscillatory signal;

a vibration isolation system, structurally coupled between the vibration source and the second oscillator, for supporting the second oscillator while reducing the transmissibility of a first range of vibration noise frequencies from the vibration source to the second oscillator, said isolation system also effecting an amplification of vibration noise in a second range of vibration frequencies as transmitted to the second oscillator therethrough;

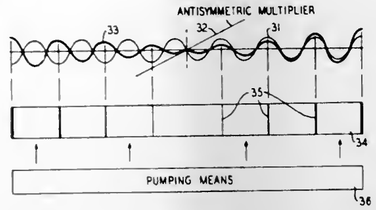
means, responsive to the first oscillatory signal, for controlling the second oscillator to render the output oscillatory signal generated thereby phase-locked with the frequency modulated first oscillatory signal, said controlling means being unresponsive in phase-locking the output oscillatory signal to the frequencies of the modulation component of the first oscillatory signal which are greater than a third predetermined frequency range, said first and second range of vibration noise frequencies being substantially within said third predetermined frequency range, whereby vibration induced modulation frequencies greater than the third predetermined frequency range are substantially filtered from the output oscillatory signal.

4,096,446

DISTRIBUTED FEEDBACK DEVICES WITH PERTURBATIONS DEVIATING FROM UNIFORMITY FOR REMOVING MODE DEGENERACY

Herman Anton Haus, Lexington, Mass., and Charles Vernon Shank, Holmdel, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 2, 1976, Ser. No. 654,339
Int. Cl.² H01S 3/00
U.S. Cl. 331—94.5 C **3 Claims**



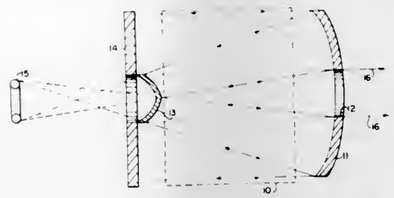
1. An optical frequency device for the stimulated emission of radiation comprising an active medium and a feedback mechanism, means for creating a population inversion in said active medium, said feedback mechanism comprising perturbations in the transmission characteristics of the medium substantially continuously along the length thereof, said perturbations having a feedback parameter, κ, and a spatial periodicity of $\lambda_o/2$ where λ_o is the wavelength in the medium of an optical wave at the Bragg frequency, said perturbations departing from uniformity in a step-wise change about the midpoint of the length of the medium sufficiently to produce an antisymmetric variation in the feedback parameter, κ, said step-wise change in perturbations including an extra quarter-wavelength space between two central perturbations, where the wavelength is the wavelength of the optical wave, thereby promoting the amplification of a single mode at λ_o over the amplification of the adjacent modes.

4,096,447

UNSTABLE RESONATOR LASER SYSTEM

Frederick R. Fluhr, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 24, 1976, Ser. No. 744,476
Int. Cl.² H01S 3/081
U.S. Cl. 331—94.5 C **3 Claims**



1. An unstable resonator laser system which comprises:

an active laser medium;

an annular, aspheric, primary concave mirror opposite one end of said active laser medium and positioned with its focal ring centered on the axis of said active laser medium, said mirror being formed with a circular aperture through the center thereof;

an annular, flat feedback mirror positioned on the opposite side of said active laser medium in axial alignment with said primary concave mirror and perpendicular to the axis; and

an, aspheric secondary mirror encircled by said flat mirror so that it is concentric therewith and acting to reflect light to said primary concave mirror, said secondary mirror having its focal ring centered on the axis of said active laser medium,

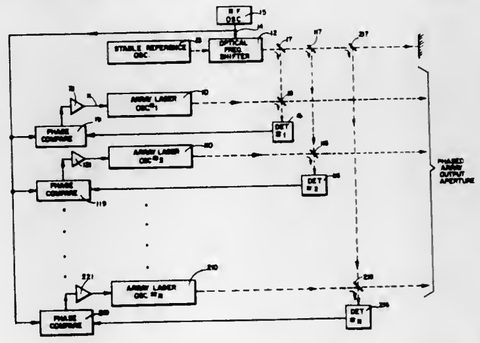
whereby said flat feedback mirror provides the resonant feedback for said system and said secondary mirror reflects the output through the aperture in the annular, aspheric, primary concave mirror.

4,096,448

PHASE-LOCKING OF INDEPENDENT LASER OSCILLATORS

Cecil L. Hayes, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 12, 1977, Ser. No. 758,626
Int. Cl.² H01S 3/098
U.S. Cl. 331—94.5 ML **7 Claims**



1. Apparatus for phase and frequency locking a first laser oscillator, comprising

an intermediate radio frequency (ω_o) oscillator;

an electronically controlled light-beam frequency shifter interposed in the optical path of the output path of a reference laser and having a control input responsively coupled to the output of said radio frequency oscillator for providing a local oscillator output having a frequency ω_{LO} indicative of the sum ($\omega_r + \omega_o$) of the output frequencies of said reference oscillator (ω_r) and of an output of said radio frequency oscillator (ω_o);

photoelectric detector means responsive to both said local oscillator output and an output ω_1 of said first laser oscillator for providing an electric signal output having a frequency ($(\omega_r - \omega_1) + \omega_o$) indicative of the frequency difference between said inputs to said detector,

synchronous comparator means having a first and second input a respective one of said output of said detector ($(\omega_r - \omega_1) + \omega_o$) and said radio frequency oscillator ω_o for providing an output signal indicative of the phase and frequency difference between the inputs applied to said comparator, a control input of said first laser oscillator being responsive to said output signal of said synchronous comparator.

4,096,449

APPARATUS FOR PRODUCING AN ELECTRIC GLOW DISCHARGE IN A FLOWING GAS

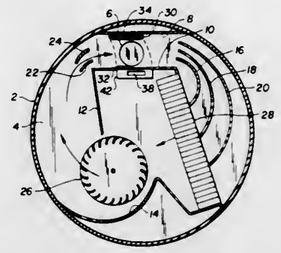
Jack D. Foster, Los Altos, Calif., assignor to Universal Laser Corp., Los Altos, Calif.

Filed Jan. 14, 1977, Ser. No. 759,461
Int. Cl.² H01S 3/097
U.S. Cl. 331—94.5 PE **9 Claims**

1. In a flowing gas high power glow discharge device in which a gas is moved in a predetermined direction along a channel where an electric glow discharge is maintained, apparatus for producing an electric glow discharge in said flowing gas in a direction generally transverse to said flow direction, comprising

a first electrode disposed adjacent a first wall of said flow channel and extending in a direction generally transverse to said flow and generally transverse to the direction of said electric discharge,

a generally planar second electrode disposed adjacent a



second wall of said flow channel opposed to said first wall, said second electrode being formed of a material having a resistivity in the range of 10^2 to 10^6 ohm-centimeters and extending along said second wall generally opposite said first electrode, and

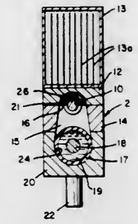
means for electrically energizing said first and second electrodes to establish a glow discharge through said flowing gas between said first and second electrodes.

4,096,450

CONDUCTIVELY COOLED FLASHLAMP

Lowell W. Hill, Playa del Rey; Robert L. Cassiero, Mar Vista; Peter F. Taylor, Agoura, and Harold J. Tuchyner, Pacific Palisades, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 22, 1977, Ser. No. 789,894
Int. Cl.² H01S 3/09
U.S. Cl. 331—94.5 P **14 Claims**



1. A laser energizing arrangement in a laser pump cavity which is formed by a housing means, said pump cavity having an elongated channel comprising:

a flashlamp positioned within said channel, and

a packed powder positioned between the flashlamp and said elongated channel, the packed powder having thermal conductivity characteristics which allow the heat developed by the flashlamp to be conducted from the flashlamp through the elongated channel to said housing means.

13. A method of forming a flashlamp cooling system in a laser having a housing structure with a pump cavity having an elongated channel machined in at one surface portion of said cavity comprising the steps of:

a. fixedly mounting said flashlamp in said channel so as to create a gap between said flashlamp and said channel,

b. packing a powder in said gap created by said flashlamp surface and the housing means, said powder being selected with characteristics of high spectral reflectivity, thermal conductivity that allows heat to be conducted from said flashlamp to said housing means, and the ability to withstand ultraviolet light,

c. creating a paste from a material that has the characteristics

of withstanding high temperature and vibration without breaking down under exposure to ultraviolet light emitted by said flashlamp, and

d. painting the paste thinly on at least a portion of the edges of the packed powder in order to maintain said packed powder in position.

4,096,451

HIGH SIGNAL-TO-NOISE RATIO NEGATIVE RESISTANCE CRYSTAL OSCILLATOR

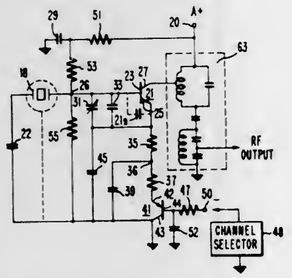
Bortolo Mario Pradal, Pittsburgh, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 26, 1977, Ser. No. 790,865

Claims priority, application United Kingdom, Nov. 8, 1976, 46463/76

Int. Cl.² H03B 5/36

U.S. Cl. 331—116 R **6 Claims**



1. A high signal-to-noise ratio negative resistance oscillator comprising:

a current conducting device having input, output and control electrodes,

means coupled to said electrodes for applying D.C. biasing potentials to electrodes of said current conducting device, said D.C. biasing means including an impedance coupled between the input electrode and a point of reference potential,

a frequency determining circuit including a resonant element coupled between said control electrode and said point of reference potential, said frequency determining circuit further including capacitors connected in series between said control electrode and said point of reference potential,

means for connecting the input electrode of said current conducting device to the junction point of said series connected capacitors for providing feedback to sustain oscillations,

the ratio of the total capacitance between the input electrode and reference potential to the total capacitance between the control and input electrodes is from 5.4 to 1 to 3.9 to 1.

4,096,452

TEMPERATURE COMPENSATED CRYSTAL OSCILLATOR

Toshihiko Waku, and Hiroshi Shinohara, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 2, 1977, Ser. No. 793,128

Claims priority, application Japan, May 13, 1976, 51-59526[U]

Int. Cl.² H03B 5/36

U.S. Cl. 331—116 R **11 Claims**

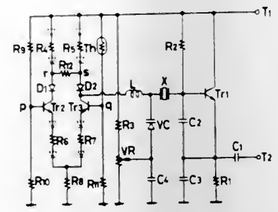
1. A temperature-compensated crystal oscillator, comprising:

an oscillator circuit having a crystal and a variable capacitance;

a differential amplifier comprising first and second transistors establishing a current sink path;

connecting means for connecting said differential amplifier to said oscillator;

bridge circuit means connected to said differential amplifier so as to supply a biasing voltage to said first and second transistors, said bridge circuit means including a first temperature sensitive element; and



compensation means connected to said current sink path of said differential amplifier having a temperature characteristic which compensates a temperature characteristic of said variable capacitance.

4,096,453

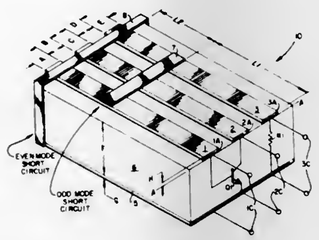
DOUBLE-MODE TUNED MICROWAVE OSCILLATOR

Robert G. Rogers, Los Altos, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed May 19, 1977, Ser. No. 798,280

Int. Cl.² H03B 5/18

U.S. Cl. 331—117 D **26 Claims**



1. A microwave oscillator comprising:

first transmission line means comprising ground reference surface means and at least three parallel conductors supported in a parallel spaced apart relation with respect to each other and said ground means so as to be capable of supporting both even and odd mode fields;

second transmission line means comprising said ground reference surface means and at least three conductors, which may be at least portions of associated conductors of said first transmission line means, supported in a parallel spaced apart relationship with respect to each other and said ground means so as to be capable of supporting both even and odd mode fields;

first means short-circuiting conductors of said first transmission line means together and to said ground means at first points on these conductors;

second means short-circuiting conductors of said second transmission line means together at second points thereon which are insulated from said ground means;

first amplifier means electrically connected to said first and second transmission line means such that said first and second short-circuited transmission line means form an external feedback path type embedding network for said first amplifier means for causing the latter to oscillate; and

means coupling an output signal from one of said amplifying means and said first and second transmission line means.

4,096,454

AMPLITUDE AND DELAY EQUALIZATION OF SURFACE ACOUSTIC WAVE FILTERS IN AMPLITUDE MODULATION SYSTEM

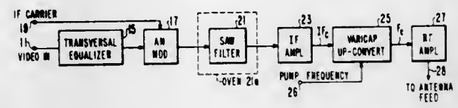
William Louis Behrend, Pittsburgh, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 21, 1977, Ser. No. 779,677

Claims priority, application United Kingdom, Apr. 6, 1976, 13906/76

Int. Cl.² H03C 1/06, 1/60

U.S. Cl. 332—37 R **20 Claims**



1. In an amplitude modulation system of the type including an amplitude modulator responsive to carrier waves and intelligence signals for providing amplitude modulated carrier signals, the improvement therein comprising: a band pass filter for passing signals with low attenuation over a desired carrier frequency band coupled to said amplitude modulator,

said filter being a surface acoustic wave filter having an amplitude response being a selected one of maximum or minimum amplitude at a carrier frequency of said modulation system and said filter inherently producing amplitude ripples over the passband, and

means responsive to said intelligence signals for distorting the intelligence signals to have an inverse amplitude ripple with resepct to that produced by the surface acoustic wave filter.

4,096,455

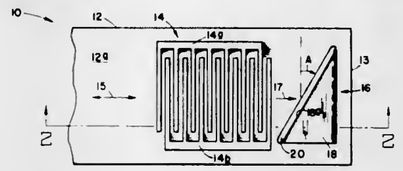
SURFACE WAVE TERMINATION FOR SAW DEVICE

William Seth Drummond, Cornelius, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Feb. 23, 1977, Ser. No. 771,234

Int. Cl.² H03H 9/06, 9/26, 9/30, 9/32

U.S. Cl. 333—30 R **10 Claims**



1. In a surface acoustic wave device comprising a substrate of material capable of propagating acoustic waves along a surface of the substrate, and transducer means including an interdigitated electrode disposed on said surface and responsive to acoustic waves propagated along a path on said surface,

surface wave termination means associated with said electrode for absorbing surface waves propagated along said path toward said means, comprising

a wafer of an acoustically lossy polymeric material spanning said path and coupled to said substrate surface, and

a band of elastomeric material secured to said surface along an edge of said wafer that generally faces said electrode.

4,096,456

SURFACE ELASTIC WAVE FILTER

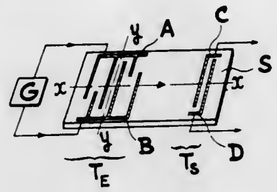
Gerard Coussot, and Olivier Menager, both of Paris, France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 597,574, Jul. 21, 1975, abandoned. This application Dec. 21, 1976, Ser. No. 753,351

Claims priority, application France, Jul. 24, 1974, 74 25663

Int. Cl.² H03H 9/04, 9/26, 9/32; H01L 41/10

U.S. Cl. 333—72 **5 Claims**



1. A surface elastic wave filter comprising a piezoelectric substrate upon the surface of which there are arranged at least one input transducer and one output transducer, one of said transducers at least being constituted by two metal electrodes taking the form of two interdigitated comb structures having parallel teeth of predetermined lengths, two consecutive teeth, belonging respectively to one and the other comb, overlapping over a given length for obtaining an overlapping portion defining a radiation element; said two interdigitated comb structures determining a central radiating element and a set of non-central radiating elements which are located at either side of said central radiating element; said radiating elements having predetermined lengths; each of said non-central radiating elements which is located on one side of said central radiating element being symmetrical, in relation to a centre of symmetry M situated at the centre of said central radiating element, with one of said non central radiating elements located on the other side of said central radiating element, said centre of symmetry M being located upon an axis xx which is the propagation axis of said elastic wave.

4,096,457

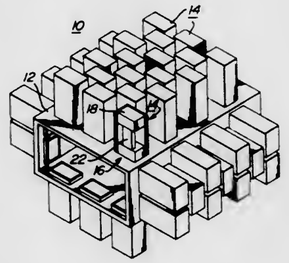
LOW PASS HARMONIC ABSORBER

Richard V. Snyder, Lincroft, N.J., assignor to Harvard Industries, Inc., Farmingdale, N.J.

Filed Oct. 29, 1976, Ser. No. 737,092

Int. Cl.² H01P 1/20, 1/26, 5/12

U.S. Cl. 333—73 W **9 Claims**



1. A microwave low-pass harmonic absorber comprising:

a main waveguide for passing a desired fundamental frequency, and

a plurality of shunt waveguides disposed on at least one wall of said main waveguide, each of said shunt waveguides including at least one ridge for lowering the cut-off frequency of said shunt waveguide and substantially increas-

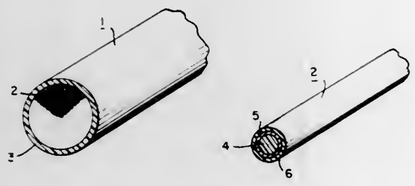
ing the bandwidth of said shunt waveguide by lowering the standing wave ratio for the higher order harmonics.

4,096,458

HIGH FREQUENCY TRANSMISSION CABLE

Helmut Martin, Hanover, and Otto Breitenbach, Nuremberg, both of Germany, assignors to Kabel-und Metallwerke Gutehoffnungshuette AG, Germany

Filed Oct. 18, 1976, Ser. No. 733,198
Claims priority, application Germany, Oct. 25, 1975, 2547806
Int. Cl.² H01P *5/00, 3/06, 3/00*
U.S. Cl. 333—96 **11 Claims**



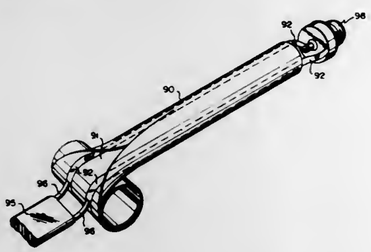
1. In electric cable for the transmission of high frequency signals which includes a plurality of individual signal conveying conductors forming a cable core and an outer sheath surrounding said cable core; the improvement comprising each of said plurality of individual signal conveying conductors being formed of a central core of insulating material having an electrically conductive layer disposed thereon, the thickness of said electrically conductive layer being such that within a predetermined frequency range current penetration is independent of frequency.

4,096,459

TWO WIRE TRANSMISSION LINE USING TUBULAR EXTENDIBLE STRUCTURES

Herman Lowenhar, 422 Hudson St., New York, N.Y. 10014

Division of Ser. No. 400,201, Sep. 24, 1973, Pat. No. 3,975,581.
This application Aug. 11, 1976, Ser. No. 713,289
Int. Cl.² H01P *3/02*
U.S. Cl. 333—96 **17 Claims**



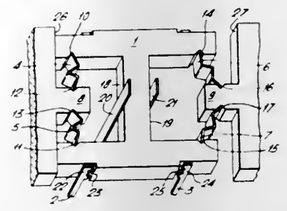
1. A two wire radio frequency energy transmission line comprising a first tubular extendible element formed of a rolled elongated web of material which curls when unrolled into a generally tubular shape, and a second rolled extendible means formed on at least one surface of said first element and having a pair of laterally spaced elongated means capable of propagating radio frequency energy independent of said first element when unrolled forming said two wire transmission line, and means for coupling radio frequency energy to said pair of elongated means in the area at or after where said pair of elongated means goes from a rolled to an extended condition.

4,096,460

RELAY

Herald Gessinger, Bernhardsthal; Manfred Baumruck, Vienna, and Dietrich Kral, Wordern, all of Austria, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Nov. 2, 1976, Ser. No. 737,970
Claims priority, application Austria, Nov. 14, 1975, 8684/75
Int. Cl.² H01H *50/64*
U.S. Cl. 335—136 **16 Claims**



1. A relay having contact springs operated by a shifting member which is mechanically held in either one or the other of two end positions, comprising:

a shifting member;

a pair of magnetic drive systems each of said magnetic drive systems including an armature for shifting said shifting member from one of said end positions to the other of said end positions;

a pair of overcenter springs coupled to said shifting member at each end thereof such that said overcenter springs bear at one end on said movable shifting member and at the other end on a fixed surface which is connected to said relay;

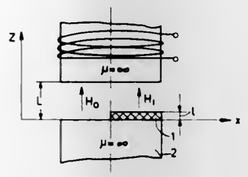
abutment bearing means on said shifting member and on said fixed surface arranged such that one end of said overcenter springs bear on the abutment bearing means on said shifting member and the other end of said overcenter springs bear on the abutment bearing means on said fixed surface, said abutment bearing means further arranged such that the difference between the distance between the abutment bearing on said shifting member and the distance between said fixed abutment bearings is between zero and substantially the length of the shifting movement of said shifting member.

4,096,461

MAGNET SYSTEM FOR TUNABLE YIG OSCILLATOR AND TUNABLE YIG FILTER

Peter Roschmann, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 601,641, Aug. 4, 1975, abandoned. This application Jan. 28, 1977, Ser. No. 763,625
Claims priority, application Germany, Aug. 23, 1974, 2440484
Int. Cl.² H01F *1/00*
U.S. Cl. 335—209 **5 Claims**



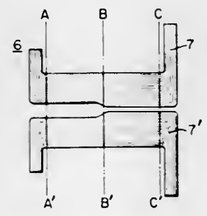
1. A magnet system for tuning the combination of a tunable YIG filter having a center frequency f_{mi} and a tunable YIG oscillator having a frequency f_o comprising a pair of spaced pole-pieces having opposing surfaces forming a magnetic field therebetween, one of said surfaces having portion which is raised above the other portion a distance at which the frequency difference $f_o - f_{mi}$ is independent of f_o, and a plate of magnetic material on one said surfaces having a saturation magnetization which is smaller than the smallest magnetic field strength required.

4,096,462

DEFLECTION YOKE DEVICE FOR USE IN COLOR TELEVISION RECEIVER SETS

Mitsuharu Akatsu; Ichiro Niitsu; Masao Obara; Ryoichi Hirota; Shuzo Matsumoto, and Takesuke Maruyama, all of Yokohama, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 7, 1977, Ser. No. 785,523
Claims priority, application Japan, Apr. 9, 1976, 51-39339
Int. Cl.² H01F *5/00*
U.S. Cl. 335—213 **1 Claim**



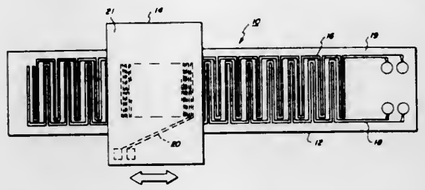
1. A deflection yoke device comprising a core, a vertical deflection coil and a horizontal deflection coil, in combination with an in-line type color picture tube; said vertical deflection coil having a winding distribution for producing a barrel type magnetic field distribution and said horizontal deflection coil having a whole winding distribution for producing a pincushion type magnetic field distribution sufficient to make the convergence of side electron beams over the entirety of a picture screen of said color picture tube and further having a first winding distribution, at the funnel side portion of the horizontal deflection coil, for producing a sharp pincushion type magnetic field distribution as well as a second winding distribution, at the neck side portion of the horizontal deflection coil, for producing a sharp barrel type magnetic field sufficient to permit the central electron beam to land outside the side electron beams converged with each other at the right and left sides of the picture screen.

4,096,463

INDUCTIVE TRANSDUCER

Louis G. Gitzendanner, Pleasanton, and Francis V. Thiemann, San Jose, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 2, 1976, Ser. No. 747,116
Int. Cl.² H01F *21/04*
U.S. Cl. 336—129 **14 Claims**



1. An inductive transducer comprising:

first and second relatively movable members, said first relatively movable member having a plurality of windings and said second relatively movable member having a winding;

each of the windings of said first relatively movable member having a pair of terminals and being arranged in a pattern comprised of a first section coupled to one of said terminals and a second section coupled to the other terminal and to said first section, each section including a plurality of conductors oriented substantially parallel to one another wherein immediately adjacent conductors of such section are capable of conducting current in opposite directions and are coupled to one another by an end-segment arranged substantially perpendicular to said conductors, each end-segment of said first section being spaced closely adjacent and substantially parallel to an end-segment of said second section, and each conductor of said first section being spaced closely adjacent and substantially parallel to a conductor of said second section adapted to conduct current in the opposite direction as such conductor of said first section; and

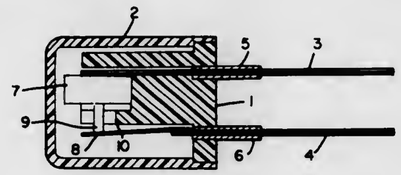
the winding of said second relatively movable member having a pair of terminals and being arranged in a pattern comprised of a first section coupled to one of said terminals and a second section coupled to the other terminal and to said first section, each section including a plurality of conductors oriented substantially parallel to one another wherein immediately adjacent conductors are adapted to conduct current in opposite directions and are coupled to one another by an end-segment arranged substantially perpendicular to said conductors, said first section having alternate end-segments thereof spaced closely adjacent and substantially parallel to alternate end-segments of said second section, and each conductor of said first section being substantially aligned longitudinally with a conductor of said second section adapted to conduct current in the same direction as such conductor of said first section.

4,096,464

THERMISTOR ASSEMBLY HAVING OVERLOAD PROTECTION

Philip J. Dennis, Cape Elizabeth, and George H. Simpson, Windham, both of Me., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 13, 1976, Ser. No. 750,063
Int. Cl.² H01H *85/00*
U.S. Cl. 337—5 **2 Claims**



1. A thermistor assembly comprising a base, a disc thermistor supported on said base, a lead-in wire electrically connected to one surface of the thermistor, an electrical connection from the second thermistor surface to a second lead-in wire comprising a low melting point metal rod placed in compressive electrical contact with the second surface by a flat metal spring connected to the second lead-in wire, and a stop on the base to prevent the spring from contacting the thermistor when the rod has melted, the thermistor providing normal electrical protection and the low melting point metal rod providing thermal overload protection, the melting temperature of the low melting point metal rod being higher than the temperature at which the thermistor undergoes sudden increase in resistance.

4,096,465

ELECTRICAL OVERLOAD SWITCHING RELAY

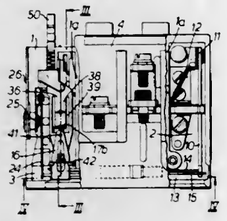
Paul Chalfont Fryer, Bedford, England, assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Jan. 17, 1977, Ser. No. 760,174

Claims priority, application United Kingdom, Feb. 25, 1976, 7466/76

Int. Cl.[2] H01H *71/16*

U.S. Cl. 337—49 12 Claims



1. An overload switching relay for a multi-phase electric supply, comprising:

(a) a plurality of pairs of terminals connectable in series in respective phases of the electric supply;

(b) a plurality of conductive paths, one for each pair of terminals, the conductive paths being connected in series between their respective terminals;

(c) a plurality of current responsive means, one for each conductive path, responsive to respective phase currents flowing in the respective conductive paths;

(d) a threshold means coupled to the plurality of current responsive means, said threshold means being responsive to a mean value of the currents on all phases exceeding a first threshold and being also responsive to any differential, above a second, differential threshold, between the currents of any two phases;

(e) said threshold means including means to increase said second, differential threshold with an increase in the mean value of the currents of all phases; and

(f) a contact-breaking switch coupled to said threshold means to be actuated when said threshold means responds to either of the mean value of all currents on all phases exceeding the first threshold and to any differential, above said second threshold, between the currents of any two phases.

4,096,466

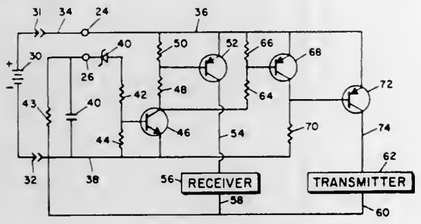
UNDERWATER SWITCHING

Dennis J. Johnson, 2382 Bayfarm Pl., Santa Ana, Calif. 92707

Filed Apr. 20, 1977, Ser. No. 789,184

Int. Cl.[2] H04B *11/00*; H01H *29/00*

U.S. Cl. 340—5 T 3 Claims



1. In a submersible unit housed in an enclosure part of which is exposed to water when submersed:

power connections for electrical connection to an electric battery;

a pair of electrical electrodes carried by said part of said enclosure such that an electrical current path is formed between said pair of electrodes when said enclosure is immersed in water;

a circuit extending between said power connection and comprising said pair of contacts and an element exhibiting impedance;

switch means responsive to a change in electrical flow in said element; said submersible unit comprising an underwater, sonic, communications system comprising a transmitter and a receiver; and

means responsive to actuation of said switch from one state to another to render said receiver operative and disable said transmitter and responsive to actuation of said switch from said other state to said one state to render said transmitter operative and to disable said receiver.

4,096,467

ULTRASONIC IMAGE CONVERSION

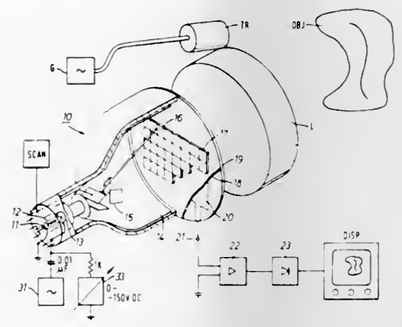
Patrick Harold Brown, Hillingdon, England, assignor to E M I Limited, Hayes, England

Filed Dec. 15, 1976, Ser. No. 750,980

Claims priority, application United Kingdom, Dec. 17, 1975, 51724/75

Int. Cl.[2] G01S *9/66*; H01J *31/495*

U.S. Cl. 340—5 MP 12 Claims



1. An ultrasonic image converter tube arrangement including a pick-up tube having, in an envelope, anode and cathode electrodes, an electron beam source and a scannable surface of a sensor plate with a capacitively coupled signal plate having an output terminal connected thereto, means to scan a beam from said source over said scannable surface, means to modulate the current in said scanned beam and, connected to said terminal, means selectively responsive to a frequency component resultant from the mixing of the beam current modulation signal and the signals representing an image in ultrasonic radiation scanned off the sensor plate which image, in operation of the arrangement, is incident on said sensor plate in ultrasonic radiation, the selectively responsive means rejecting components at the frequency of said ultrasonic radiation.

4,096,468

SOLID STATE SEQUENCE LOGIC CIRCUIT

Joseph J. Kopera, Jr., Trenton, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jul. 31, 1972, Ser. No. 276,635

Int. Cl.[2] B60R *21/10*

U.S. Cl. 340—52 E 10 Claims

1. A solid state sequence logic circuit for generating an electrical signal whenever a plurality of independent events do not occur in a predetermined sequence, said circuit comprising:

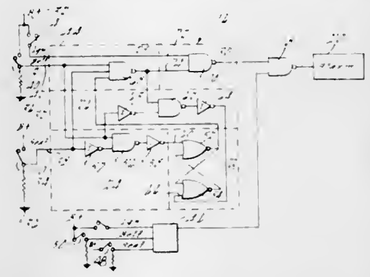
a first means for receiving an electrical signal responsive to a first event;

a first NOR gate having first and second input terminals and an output terminal, wherein its said first input terminal is electrically connected to said first means;

a second NOR gate having first and second input terminals and an output terminals, wherein its said first input terminal is electrically connected to the output terminal of said first NOR gate and its said output terminal is electrically connected to the second input terminal of said first NOR gate;

a third NOR gate having first and second input terminals and an output terminal, wherein its said first input terminal is electrically connected to the output terminal of said second NOR gate;

a fourth NOR gate having first and second input terminals and an output terminal, wherein its said first input terminal



is electrically connected to said first means and its said second input terminal is electrically connected to the output terminal of said third NOR gate; and

a second means for receiving another electrical signal responsive to a second event electrically connected to said second input terminal of each of said second and third NOR gates where in the normal state all the electrical signals on said output terminals are electrically disabling and the output signal from said fourth NOR gate is electrically enabling whenever said first event is not succeeded by said second event.

4,096,469

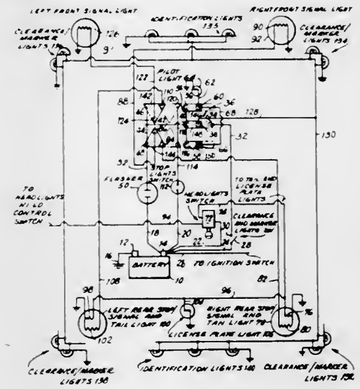
HAZARD WARNING SYSTEM FOR CERTAIN TYPES OF MOTOR VEHICLES

Jesse R. Hollins, 40 Stoner Ave., Great Neck, N.Y. 11021

Continuation-in-part of Ser. No. 580,562, May 27, 1975, abandoned. This application Feb. 23, 1976, Ser. No. 660,380

Int. Cl.[2] B60Q *1/46*

U.S. Cl. 340—81 R 1 Claim



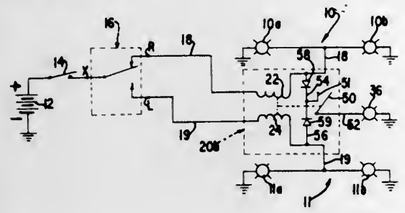
1. An improved hazard warning system for a commercial motor vehicle comprising a storage battery, said storage battery having a negative post and a positive post, said negative post being electrically connected to ground, said positive post being electrically connected to the ignition switch of said commercial motor vehicle, the switch lever of a clearance/marker and identification light control switch of said commercial motor vehicle, one terminal of a stop light switch of said commercial motor vehicle, a headlight switch of said commercial motor vehicle, and one terminal of a flasher of said commerical motor vehicle, said switch lever cooperating with a first contact terminal, said first contact terminal being electrically connected to a second contact terminal, said second contact terminal being electrically connected to said clearance/marker and identification light control switch, a third contact terminal, said third contact terminal being part of said clearance/marker and identification light control switch, said third contact terminal cooperating with said second contact terminal, a fourth contact terminal, said fourth contact terminal cooperating with said third contact terminal and being electrically connected to a fifth contact terminal and a sixth contact terminal, the other terminal of said flasher being electrically connected to said sixth contact terminal, said fourth contact terminal being electrically connected to a seventh contact terminal and an eighth contact terminal, a ninth contact terminal, said ninth contact terminal cooperating with said seventh contact terminal and being electrically connected to one terminal of a pilot light bulb of said commercial motor vehicle, the other terminal of said pilot light bulb being grounded, a tenth contact terminal, said tenth contact terminal cooperating with said eithth contact terminal and being electrically connected to said ninth contact terminal, said headlight switch being electrically connected to said ninth contact terminal, said headlight switch being electrically connected to the low wattage filament of a rear lamp housing of said commercial motor vehicle, said rear lamp housing also having a high wattage filament, said low and high wattage filaments being grounded, said high wattage filament being electrically connected to an eleventh contact terminal, a twelfth contact terminal, said twelfth contact terminal cooperating with said eleventh contact terminal and being electrically connected to a filament in a front lamp housing, said front lamp housing filament being grounded, said headlight switch being electrically connected to a high/low beam control switch of said commercial motor vehicle, said high wattage filament being electrically connected to said twelfth contact terminal, the other terminal of said stop light switch being electrically connected to a thirteenth contact terminal, said thirteenth contact terminal being electrically connected to a fourteenth contact terminal, a fifteenth contact terminal, said fifteenth contact terminal being electrically connected to a filament of a front lamp housing, said filament being grounded, said third contact terminal being electrically connected to the filaments of the clearance/marker and identification lights of said commercial motor vehicle, said filaments of the clearance/marker and identification lights being grounded, a first two-position switch bridge, said first switch bridge being triangularly shaped and spanning in one position said fifth, twelfth and fifteenth contact terminals and spanning in the other position said fourteenth and twelfth contact terminals, a second two-position switch bridge, said second switch bridge being triangularly shaped and spanning in one position said sixth, twelfth and eleventh contact terminals and spanning in the other position said eleventh and thirteenth contact terminals, a third two-position switch bridge, said third switch bridge spanning in one position said seventh and ninth contact terminals and spanning in the other position said ninth contact terminal, a fourth two-position switch bridge, said fourth switch bridge spanning in one position said third and fourth contact terminals and spanning in the other position said third and second contact terminals, and a fifth two-position switch bridge, said fifth switch bridge spanning in one position said eighth and tenth contact terminals and spanning in the other position said tenth contact terminal, all of said switch bridges moving in unison and being controlled by a hazard warning switch, so that in one position of said hazard warning switch said clearance/marker and identification lights can burn steady on, and in the other position of said hazard warning switch said clearance/marker and identification lights can be intermittently flashed together with at least one other light of said commercial motor vehicle, said clearance/marker and identification lights being mounted at an elevated position on said commercial motor vehicle.

4,096,470

ALTERNATING LAMP FLASHING SYSTEM WITH LAMP FAILURE INDICATOR

Samuel Kimmelman, Cranford, N.J., assignor to Ideal Corporation, Brooklyn, N.Y.

Filed Apr. 21, 1977, Ser. No. 789,494
Int. Cl.[2] B60Q *1/38, 1/46*
U.S. Cl. 340—83 4 Claims



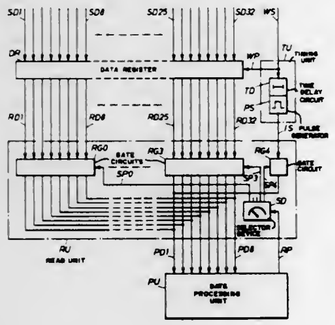
1. For a vehicle lamp circuit including two groups of signal lamps each of which comprises at least one lamp, a d.c. source, means including an alternating flasher switch and respective current load lines from said flasher switch to said lamp groups for repetitively flashing said lamp groups alternately by current from said source, and a pilot lamp for indicating circuit conditions, the combination which comprises two separate relay coils for connection respectively in said load lines as conducting parts thereof, said coils having a contactor associated therewith in common and each said coil being operative to displace said contactor in response only to a flow of current through the coil at least as great as that which exists when every lamp of the lamp group to be energized through the coil is functioning, and a pilot circuit containing said contactor for energizing said pilot lamp upon each current-responsive displacement of said contactor, whereby said pilot lamp will appear to be illuminated steadily when all the signal lamps of the alternately flashed lamp groups are functional and will be illuminated periodically so as to indicate a lamp outage when any signal lamp of either lamp group does not function.

4,096,471

METHOD AND APPARATUS FOR TRANSFER OF ASYNCHRONOUSLY CHANGING DATA WORDS

Kurt Roland Agerhall, Handen, and Yngve Allan Sundblad, Norsborg, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Nov. 26, 1976, Ser. No. 745,109
Claims priority, application Sweden, Dec. 22, 1975, 7514508
Int. Cl.[2] G06F *11/00*
U.S. Cl. 340—146.1 R 5 Claims



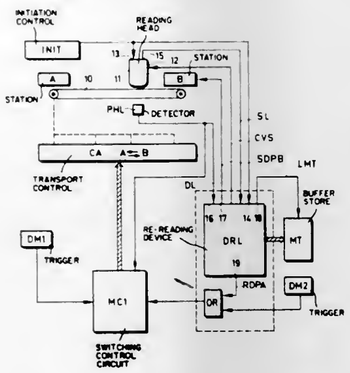
1. In apparatus where data words which change asynchronously are transferred during transfer intervals to a data word receiver, each of said transfer intervals having a sampling instant associated therewith during which the data word receiver operates to determine whether a data word changes during the associated transfer interval, the method of indicating to the data word receiver whether a data word changes during a transfer interval comprising the steps of generating a first signal for each data word change, said first signal having a duration at least as long as a transfer interval, timing the generation of said first signal relative to the time of occurrence of a data word change is in accordance with the occurrence of the sampling instant relative to its transfer interval, and sampling for the presence of said first signal at a particular instant predetermined with respect to the transfer intervals to give a signal whenever a data word changes during the then occurring transfer interval.

4,096,472

SYSTEMS FOR RECOGNIZING PRINTED CHARACTERS

Denis Louis Mercier, St. Georges, France, assignor to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme), Paris, France

Filed Apr. 25, 1977, Ser. No. 790,803
Claims priority, application France, Apr. 26, 1976, 76 12302
Int. Cl.[2] G06K *9/00*
U.S. Cl. 340—146.3 ED 11 Claims



1. In a system for recognizing printed characters including a reading device having at least one amplitude discriminating circuit adapted to have various threshold levels applied to it, the threshold level being adjusted when a document is read for the first time to a first average value which is set to allow a reference character whose mean inking is known to be recognized, means connected to the reading device for generating, for each character read, items of binary coded information and an associated binary-coded error code obtained by checking the corresponding items of coded information, means for locating the point at which the reading of the document commences, reading means associated with the reading device for reading the document and being adapted to generate a read signal during the whole period when the document is being read, and a buffer store connected to said reading means for temporary storage of read characters which are satisfactory for use, the improvement comprising means for repeat reading, said repeat reading means being connected to said reading means and to the buffer store and said repeat reading means including storage means having a plurality of memory zones for storing items of information and associated error codes resulting from the first reading operation one by one in a first memory zone and storing items of information and associated error codes resulting from each subsequent reading operation in different memory zones as long as at least one erroneous character is detected in the course of a reading operation, means to check whether an examination of all the error codes stored in the first zone does not result in at least one character being recognized as erroneous; and means for generating a central signal applied to said reading means to initiate a repeat of the operation of reading the document with the threshold at

different respective values which are respectively ascending and descending on one or the other side of the first value; the total number of reading operations with the threshold applied to the reading device at different levels not exceeding a given number N, and

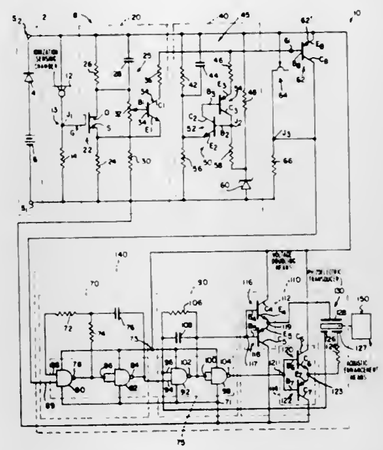
means to read and transfer to the buffer store the content of a memory zone which is written into in the course of the most recent reading operation performed, if no erroneous character has been detected by the end of its reading operation.

4,096,473

HIGH OUTPUT SMOKE AND HEAT DETECTOR ALARM SYSTEM UTILIZING A PIEZOELECTRIC TRANSDUCER AND A VOLTAGE DOUBLING MEANS

Louis P. Sweany, Carmel, and Michael T. Burk, Indianapolis, both of Ind., assignors to P.R. Mallory & Co. Inc., Indianapolis, Ind.

Filed Dec. 9, 1976, Ser. No. 749,024
Int. Cl.[2] G08B *17/10*
U.S. Cl. 340—237.5 20 Claims



1. In a smoke and heat detector comprising a low voltage power supply source, an ambient temperature detecting means electrically coupled to said power supply source, at least one ionization sensing chamber electrically coupled to said power supply source in parallel with said temperature detecting means, and a voltage amplitude comparing means electrically coupled to said ionization sensing chamber and said power supply source, the improvement wherein said voltage amplitude comparing means includes a field effect transistor and a bipolar transistor which in combination comprise a schmitt trigger.

4,096,474

APPARATUS FOR DETECTING PERSONS HIDDEN IN VEHICLES

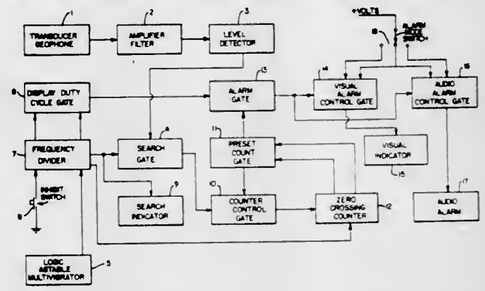
Charles B. Greer, Clifton; Nathan Alter, Alexandria, and David E. Locke, Manassas Park, all of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 12, 1976, Ser. No. 676,011
Int. Cl.[2] G08B *13/00*
U.S. Cl. 340—261 10 Claims

1. A detector unit for detecting the presence of animate bodies in the immediate vicinity of a mobile inanimate structure in a relatively low noise environment comprising:

a seismic transducer adapted to respond to low frequency signals in the single digit Hertz frequency range having at least a selected magnitude and adapted to produce an output signal representative of the frequency and magnitude of said low frequency signal, said low frequency signal being of the substantially continuous pulsating variety produced by heart and lung function in an animate body;

magnitude and frequency discriminator means connected to the output of said seismic transducer, said discriminator means adapted to discriminate between signals of continuous duration for a selected period of time and signals of other than continuous duration for said selected period of time, said discriminator means also adapted to discriminate between signals having a magnitude of at least a



selected value and signals of lesser magnitude, said discrimination means having an output responsive to signals having a magnitude of at least said selected value and continuous for a selected period of time;

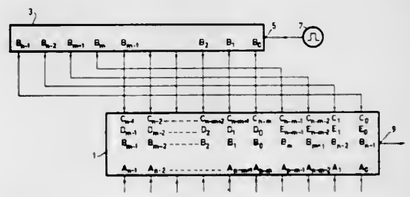
and alarm signal means connected to the output of said discriminator means and adapted to produce an alarm signal in response to an output signal therefrom representative of a detected signal of continuous duration for a selected period of time and further characterized by having at least a selected magnitude.

4,096,475

CIRCUIT FOR THE CONVERSION OF A DIGITAL SIGNAL TO AN ANALOG SIGNAL

Kian Kie Ong, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 579,868, May 22, 1975, abandoned. This application Jun. 30, 1976, Ser. No. 701,309
Claims priority, application Netherlands, Apr. 8, 1975, 7504147
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 DA 2 Claims



1. A tuning system comprising

a circuit for the conversion of a digital signal to an analog signal comprising a comparator and a generator, said comparator having inputs for comparing the value of the digital signal which corresponds to a digital number ($A = A_{n-1} \ldots A_0$) to be converted, to the value of a digital comparison signal which corresponds to a periodically occurring series of n-digit comparison numbers ($C = C_{n-1} \ldots C_0$) produced by said generator, and an output; said generator being connected to said comparator and adapted for the generation of a signal that corresponds to a series of digital comparison numbers of which for each subsequent comparison number ($C = C_{n-1} \ldots C_0$) the

most significant first m digits ($C_{n-1} \ldots C_{n-m}$) count through a series of numbers ($D = D_{m-1} \ldots D_O$) each of which numbers monotonically increases or decreases each time in value by one and corresponds to the m-counter digits of a number ($B_{m-1} \ldots B_O$), the least significant $(n-m)$ digits of said comparison number forming a digital number ($E = E_{n-m-1} \ldots E_O$) whose digits form an inverted order of the digits of a number ($B_{n-1} \ldots B_m$) of $(n-m)$ digits, which each time increases or decreases respectively by one when the number series ($C_{n-1} \ldots C_{n-m}$) of the first m figures, reckoned in sequence of decreasing significance of the comparison number (C), has been counted through, with the condition that $n \geqq 3$, $m \neq 1$, $m \neq n$, n and m be positive integers;

a low pass filter having an input connected to said output of said comparator and an output; and

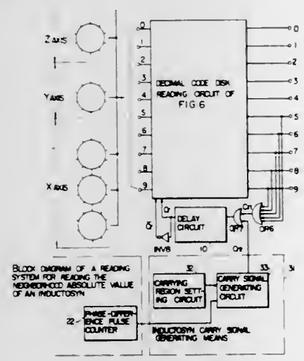
a tuning unit connected to the output of said low pass filter.

4,096,476

READING SYSTEM FOR A CODE DISK ANALOG-TO-DIGITAL CONVERTER AND AN ABSOLUTE VALUE DETECTOR

Ryuji Toida, Nagoya, Japan, assignor to Okuma Machinery Works Ltd., Nagoya, Japan

Filed Sep. 3, 1976, Ser. No. 720,139
Claims priority, application Japan, May 13, 1976, 51-54618
Int. Cl.² G08C *9/04*; H03K *13/02*
U.S. Cl. 340—347 P **4 Claims**



BLOCK DIAGRAM OF A READING SYSTEM FOR READING THE NEIGHBORHOOD ABSOLUTE VALUE OF AN INDUCTOSYN

1. A reading system for a hybrid A-D converter including at least two n-digits code disks, n being equal to or larger than three, and n logical circuits; any successive two of n output signals 0, 1, 2, . . . n-1 from one of said n-digits code disks being generated so as to be overlapped with each other with respect to the rotation angle of said n-digits code disk; each of said n logical circuits performing the following logical operation,

$$L = l \cdot (Cr \cdot \overline{l-1} + \overline{Cr} \cdot \overline{l+1})$$

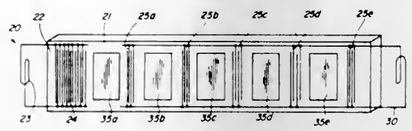
where, $l-1$, l, $l+1$ are any successive three of the n output signals from one of successive two code disks of said at least two n-digits code disks; $Cr(1)$ being a carry signal generated when one signal included in a group of larger numerical values of output signals from the lower order disk of said successive two code disks appear, and $\overline{Cr}(1)$, whereby each of said n logical circuits provides a signal representative of one digit, and a precise n-digits signal is obtained by said n logical circuits; said reading system comprises a neighborhood absolute value detector which is different from said n-digits code disks at low position, and a means which generates a carry signal $Cr(2)$ when a neighborhood absolute value from said neighborhood absolute value detector is employed instead of said output signals from the lower order code disk and one signal included in the group of larger numerical values of the neighborhood absolute value appears; said carry signal $Cr(2)$ and the inverted signal $\overline{Cr}(2)$ of said carry signal $Cr(2)$ being adaped to be supplied to said logical circuit in time-sharing relation to said carry signal $\overline{Cr(1)}$ and the inverted signal $Cr(1)$ of said carry signal $Cr(1)$.

4,096,477

IDENTIFICATION SYSTEM USING CODED PASSIVE TRANSPONDERS

Max Epstein, Highland Park, and Bernard W. Jordan, Jr., Evanston, both of Ill., assignors to Northwestern University, Evanston, Ill.

Continuation-in-part of Ser. No. 725,195, Sep. 21, 1976, and Ser. No. 617,251, Sep. 29, 1975, Pat. No. 4,059,831. This application Apr. 22, 1977, Ser. No. 789,952
Int. Cl.² G01S *9/56*
U.S. Cl. 343—6.5 SS **13 Claims**



1. An identification system comprising

transmitter means for transmitting an electromagnetic signal;

a passive surface acoustic wave identifier adapted to produce a coded electronic reply in response to an electromagnetic signal, comprising a piezoelectric substrate, an input transducer carried by the piezoelectric substrate, a plurality of output transducers carried by the substrate and spaced from said input transducer at preselected intervals, and programming means for programming said output transducers to emit an electronic reply having a preselected sequential time order in response to a surface acoustic wave propogated by said input transducer, said programming means comprising pad means overlying said substrate in a zone intermediate said input transducer and an output transducer, whereby pressure applied to said substrate through said pad means renders said substrate non-conductive to a surface acoustic wave in said zone, thereby rendering any output transducer spaced distally of said pad means unresponsive to a surface acoustic wave propagated by said input transducer, and producing a preselectable variation in the coded electronic reply of said output transducers responsive to an electromagnetic signal;

receiver means for receiving said coded electronic reply; and

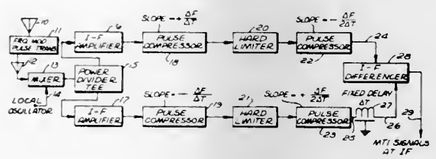
decoder means for matching the coded electronic reply of said identifier with stored coded pulse patterns.

4,096,478

INTRA-PULSE MTI SYSTEM WITH RANGE AMBIGUITY SUPPRESSION

Joe D. Chavez, Tarzana, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 159,751, Jul. 6, 1971, abandoned. This application Oct. 12, 1973, Ser. No. 408,967
Int. Cl.² G01S *9/42, 9/233*
U.S. Cl. 343—7.7 **7 Claims**



1. An MTI Radar System comprising:

first means for transmitting a pair of consecutive pulses of electromagnetic energy, one of said pulses being frequency modulated in a first sense and the other being frequency modulated in the opposite sense;

second means for receiving reflected energy pulses resulting from illumination of targets by said first means, said second means comprising a pair of parallel fed channels each including pulse compression means, the frequency versus delay characteristic of said pulse compression means in each of said channels corresponding to the sense of said frequency modulation in a corresponding one of said transmitted pulses;

time aligning means connected to delay the output of the one of said channels corresponding to the first in time of the compressed signal outputs of said channels by the time of one pulse duration;

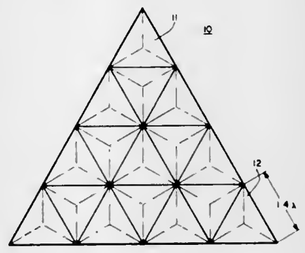
and pulse differencing means responsive to said delay means and the output of the other of said channels, the output of said differencing means containing primarily signals corresponding to moving targets.

4,096,479

RADAR SIGNIFICANT TARGET

Lyman F. Van Buskirk, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 14, 1977, Ser. No. 787,732
Int. Cl.² H01Q *15/18*
U.S. Cl. 343—18 C **6 Claims**



1. A radar reflective target comprising:

at least one panel having inner and outer faces;

a plurality of radar reflective corner reflectors formed in the outer face of the panel;

each of said plurality of corner reflectors being comprised of intersecting surfaces;

a radar reflective coating on the surfaces of said plurality of corner reflectors;

said at least one panel comprising the outer surface of a tetrahedron; and

the inner portion of said tetrahedron abutting the inner face of said at least one panel being comprised of a buoyant material.

4,096,480

AIR TARGET FUZE TIME-GATED DECISION CIRCUIT

Mark S. Miner, Washington, D.C., and Charles W. Crickman, Glen Echo Heights, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 10, 1968, Ser. No. 738,714
Int. Cl.² G01S *3/06*; F42C *13/02*
U.S. Cl. 343—100 LE **5 Claims**

1. A decision circuit for a proximity fuze comprising:

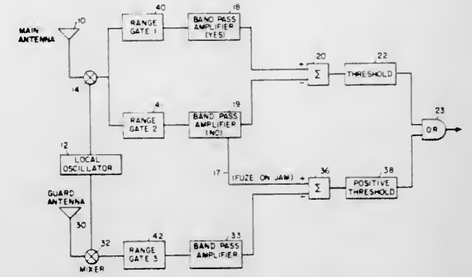
(a) a first antenna connected to a first receiver channel, said first antenna having a pattern having a main beam and a plurality of side lobes;

(b) a second antenna connected to a second receiver channel, said second antenna having a pattern having a broad beam and a gain of less than said main beam but greater than the gain of said side lobes of said first antenna;

(c) a first range gated means in said first receiver channel to detect and amplify a valid target return signal;

(d) a second range gated means in said first receiver channel to detect and amplify target signals arriving at time other than said valid target return signal, said second means having a higher gain than said first means;

(e) a first comparison means for producing a signal when the output of said first means exceeds the output of said second means;



(f) a third range gated means in said second receiver channel to detect and amplify signals arriving in the same time period as signals received by said second range gated means; and

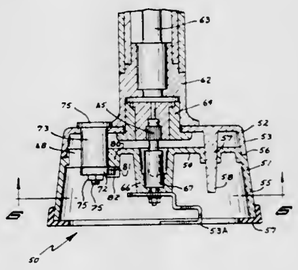
(g) a second comparison means for producing a signal when an output from said second range gated means taken at a lower gain point than said output compared with the output of said first range gated means exceeds the output from said third range gated means by a predetermined difference.

4,096,481

QUICK DISCONNECT C.B. ANTENNA WITH A KEY LOCKING MEANS

Stanley W. Widmer, Coon Rapids, and Bernard C. Salchow, St. Paul, both of Minn., assignors to Stanley Widmer Associates, Inc., Minneapolis, Minn.

Filed Sep. 27, 1976, Ser. No. 727,008
Int. Cl.² H01Q *1/32*
U.S. Cl. 343—715 **7 Claims**



1. An antenna connector assembly for antennas of mobile vehicles such as C.B. antennas including a base member mountable on a mobile vehicle, a cover member adapted to be mounted on said base member, an antenna mounted on said cover member, an antenna lead mounted on said base member, means to electrically connect said antenna lead and said antenna when the cover member is mounted on said base member, said base and cover members including cooperating interlocking twist lock lugs movable from a released to a latched position upon relative motion of said base member and cover member, a locking finger mounted on one of said members and protruding into the other of said members when the twist lock lugs are in a latched position and the cover member is mounted

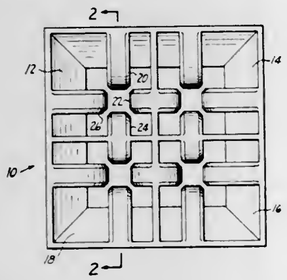
on the base member, and means to lockably connect said base member and said cover member including a key operated lock mounted on said other member and having a cam movable between a locked and an unlocked position, said cam intercepting said locking finger and preventing movement of said cover member relative to said base member by interfering with movement of said locking finger and preventing the relative movement of said base and cover members which moves the twist lock members from latched to released position when said cam is in its locked position with the cover member mounted on said base member, and permitting movement of said locking finger and separating movement of said cover member and base member when the cam is moved to an unlocked position.

4,096,482

WIDE BAND MONOPULSE ANTENNAS WITH CONTROL CIRCUITRY

Glenn A. Walters, San Diego, Calif., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Apr. 21, 1977, Ser. No. 789,399
Int. Cl.² H01Q *13/00*
U.S. Cl. 343—778 **5 Claims**



1. A monopulse antenna system comprising, in combination: at least four quad-ridged horns, each having a square horn aperture and a waveguide section, each horn having four side walls extending between said waveguide section and said horn aperture, each side wall having a flared ridge having a maximum height from the respective side wall adjacent said waveguide section and flaring to a minimum height at said horn aperture, each horn having a bandwidth in excess of one octave, said horns being arranged in a geometric array and being so disposed and arranged that the horn aperture of each horn is contiguous to the horn aperture of at least one other horn; dielectric means at the horn aperture of each of said horns for matching the impedance between the respective horn and free space; electronic circuit means for processing signals in each of said horns; and coupling means connected to each of said horns at the respective waveguide sections and to said circuit means for transmitting electrical energy between said horns and said circuit means.

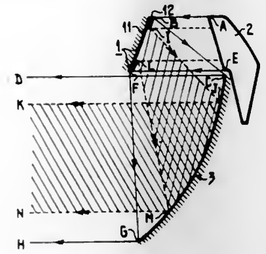
4,096,483

REFLECTOR WITH FREQUENCY SELECTIVE RING OF ABSORPTIVE MATERIAL FOR APERTURE CONTROL

Nhu Bui Hai, and Philippe Magne, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Mar. 9, 1976, Ser. No. 665,445
Claims priority, application France, Mar. 14, 1975, 75 08072
Int. Cl.² H01Q *9/12*
U.S. Cl. 343—781 CA **2 Claims**

1. An antenna for working in two frequency bands, ΔF_B and ΔF_H (with ΔF_H higher than ΔF_B) and comprising n (n : positive integer) radiating elements having respective active surfaces, an active surface of at least one of said elements being in part covered by a strip of frequency selective absorber having two faces and two edges, one of said two edges following the periphery of the active surface which said strip partially covers and one of said two faces being totally in contact with the active surface which said strip partially covers, said frequency



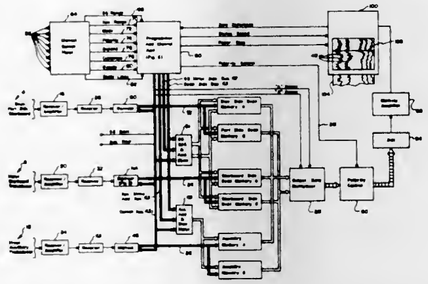
selective absorber imparting an important attenuation in the band ΔF_H and an attenuation which is substantially zero in the band ΔF_B.

4,096,484

GRAPHIC RECORDING SYSTEM

Radford G. Ferre, and Brent Rudy Miller, both of Sandy, Utah, assignors to Edo Western Corporation, Salt Lake City, Utah

Filed Oct. 26, 1976, Ser. No. 735,265
Int. Cl.² G01D *9/00*; G01S *9/66*
U.S. Cl. 346—33 EC **17 Claims**



1. A graphic recorder system for use in recording sonar information and the like received over one or more information channels, said system comprising

first memory means for storing information received over an information channel and including two storage areas dedicated to such channel,

means for applying information received over such channel alternately to one storage area and then to the other storage area,

means for recording on a recording medium a graphic representation of sequentially supplied information, said recording means being adapted to record the graphic representation of the supplied information as the information is received to thereby produce a representation having distance scale factors dependent upon the rate at which information is supplied to the recording means, and

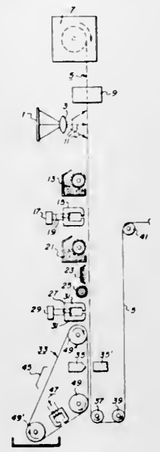
means for reading information alternately from one of said storage areas while information is being applied to the other storage area, and then from the other of said storage areas while information is being applied to the one storage area, and for applying the information sequentially to said recording means at selectable and variable rates.

4,096,485

SUCCESSIVE DEVELOPMENT MAGNETIC IMAGING APPARATUS

Edward C. Sellers, Buffalo, and Chander Malkani, Tonawanda, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 537,230, Dec. 30, 1974. This application Oct. 26, 1976, Ser. No. 735,474
Int. Cl.² G03G *19/00*
U.S. Cl. 346—74.1 **8 Claims**



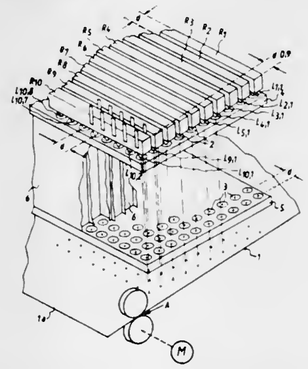
1. An apparatus comprising a first image forming means whereby an optical image is converted by development with magnetically attractable material to a magnetizable graphic image, means to magnetize said graphic image, means to redevelop said magnetized graphic image with additional magnetically attractable material, means to magnetize said redeveloped image and means to produce a latent magnetic image on a magnetic substrate wherein said magnetized redeveloped image is brought into intimate contact with said magnetic substrate.

4,096,486

RECORDER

Josef Pfeifer, Unterhaching; Rudolf Paulus, Munich; Walter Gutmann, Lochhofen, and Michael Resch, Munich, all of Germany, assignors to AGFA-Gevaert AG, Leverkusen, Germany

Filed Jul. 13, 1977, Ser. No. 815,415
Claims priority, application Germany, Jul. 15, 1976, 2631849
Int. Cl.² G01D *9/42*; G03B *41/00*; B41B *13/00*
U.S. Cl. 346—107 R **7 Claims**



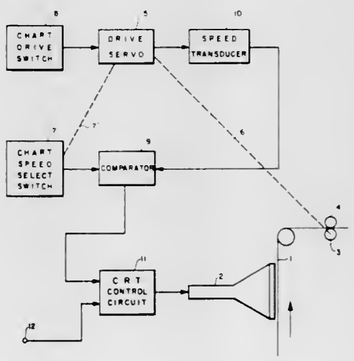
1. A recorder operative for forming an image on a recording medium by illuminating a multitude of points on the surface of the recording medium to form lines of image points, the recorder comprising, in combination, a plurality of light-emitting elements; transport means for effecting relative movement between the light-emitting elements and a recording medium in a predetermined transport direction at a predetermined rate, the light-emitting elements being arranged in a plurality of rows, the rows being arranged successively in the transport direction, the rows extending at an angle relative to the transport direction, the elements of each single row being offset relative to the elements of the other rows in a direction transverse to the transport direction, the offsets among the elements of the individual rows being equal to $j \times d/N$, wherein j is an integer including unity, d is the distance between adjoining elements of a single row, and N is the number of rows; optical means operative for receiving the light emitted by the individual light-emitting elements and projecting onto the recording medium a corresponding plurality of individual reduced-scale light points arranged in light point rows corresponding to the rows of light-emitting elements; and electrical control means operative for applying to the individual light-emitting elements electrical control signals determining the illumination of points on the recording-medium surface, and comprising means for effecting the formation of each line of image points by applyng to the rows of light-emitting elements respective groups of control signals all corresponding to the line of image points but delayed by respective time-delay intervals dependent upon the rate of transport and corresponding to the different distances among the light point rows as measured in the transport direction.

4,096,487

RECORDING APPARATUS

Donald E. Shafer, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 19, 1976, Ser. No. 743,481
Int. Cl.² G01D *15/24*
U.S. Cl. 346—110 R **4 Claims**



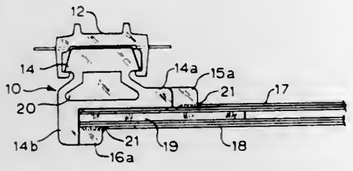
1. Recording apparatus having a light sensitive record receiving member, marking means including a cathode ray tube, and motive means to move said record receiving member relatively to said marking means, means to produce a first signal the magnitude of which is indicative of a desired rate of movement of said record receiving member relatively to said marking means, means to produce a second signal the magnitude of which is indicative of the actual rate of said relative movement, and comparator means jointly responsive to said signals and operative upon start-up of said motive means to inhibit the operation of said marking means until a characteristic of said second signal bears a predetermined relationship to a characteristic of said first signal.

4,096,488

MODULAR STYLUS ASSEMBLY

Paul Angerame, 88-47 198th St., New York, N.Y. 11423

Filed Feb. 22, 1977, Ser. No. 770,288
Int. Cl.² G01G *15/06*
U.S. Cl. 346—139 C **11 Claims**



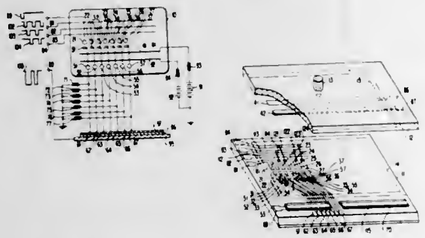
1. A modular stylus assembly for printing alphanumeric or pictorial patterns on electrosensitive sheets comprising, in combination, a print-head module having a first wall, a pair of spaced second walls extending from said first wall and defining a channel therebetween, and a multiplicity of stylus wires extending rectilinearly and in parallel alignment through said second walls and within said channel alongside said first wall, and a connector module receivable in said channel and comprising a multiplicity of alternating electrically conductive and electrically insulating wafers respectively disposed in planes extending through said pair of spaced second walls, said electrically conductive wafers being spaced from one another by said electrically insulating wafers a distance corresponding substantially to the spacing between said parallel stylus wires whereby the electrically insulating wafers of a connector module received in said channel are respectively in electrically conductive engagement with said stylus wires, said connector module having means for selectively electrically energizing said electrically conductive wafers and said stylus wires.

4,096,489

ELECTROSTATIC-RECORDING GAS DISCHARGE DEVICE WITH IMPROVED SCANNING STABILITY

Yoshizumi Terazawa; Takashi Kitagawa; Takanori Tanaka, and Kouji Aono, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Aug. 23, 1976, Ser. No. 716,745
Claims priority, application Japan, Aug. 26, 1975, 50-103290
Int. Cl.² G03G *19/00*
U.S. Cl. 346—158 **6 Claims**



1. An electrostatic-recording gas discharge device comprising:

a plurality of scanning electrodes arranged at a given spacing;

a plurality of voltage inducing electrodes arranged in opposing relation to said scanning electrodes;

at least one first opposing electrode arranged in opposing relation to said scanning-electrodes;

a hermetically sealed envelope housing all of said voltage inducing electrodes, said scanning electrodes and said first opposing electrode and having one or more kinds of gases filled therein;

a plurality of recording stylus electrodes located outside said envelope and electrically connected to said voltage inducing electrode;

a plurality of auxiliary discharge electrodes which are electrically connected to said voltage inducing electrodes; and

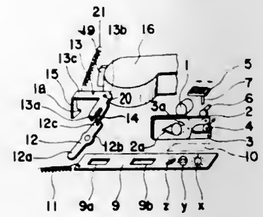
at least one second opposing electrode arranged in opposing relation to said auxiliary discharge electrodes, said second opposing electrode and said auxiliary discharge electrodes permitting a discharge between said auxiliary discharge electrodes and said second opposing electrode in a position spaced apart from said voltage inducing electrodes and said first opposing electrode before a discharge takes place between said voltage inducing electrodes and said first opposing electrode due to a variation in potentials of said recording stylus electrodes.

4,096,490

EXPOSURE ADJUSTING MECHANISM IN CAMERAS

Susumu Fujita, Kobe, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 2, 1976, Ser. No. 746,777
Claims priority, application Japan, Dec. 2, 1975, 50-144366
Int. Cl.² G03B *7/00*
U.S. Cl. 354—21 **2 Claims**



1. In a compact photographic camera utilizing at least two types of film cartridge which contain therein respective roll films of different sensitivity, at least one of said types of film cartridge being provided with an actuator which represents a given sensitivity of the roll film contained in one of said types of film cartridge, and an exposure adjusting mechanism, said exposure adjusting mechanism comprising:

means for defining a controllable exposure aperture for controlling the amount of rays of light to be exposed onto a frame of the film within the cartridge when loaded in the camera;

an aperture setting slide supported in position for movement between first and second positions, said aperture setting slide being operatively coupled with said aperture defining means such that, when said slide is moved to the first position, the controllable exposure aperture is adjusted to a maximum opening and, when said slide is moved to the second position, said controllable exposure aperture is adjusted to a minimum opening, said setting slide having intermediate positions between said first and second positions; and

an adjustably positioned, movable aperture scale means mounted on said camera for movement relative to a viewing window and having one surface bearing a plurality of indicia equal in number to the number of the positions of the aperture setting slide for display within said window; and

linkage means responsive to presence or absence of the actuator in the film cartridge then loaded in the camera for adjusting the position of said aperture scale means indicia relative to the viewing window for displaying given indicia indicative of the type of film cartridge carrying said film, the improvement wherein:

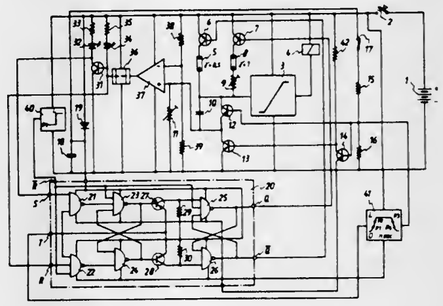
said aperture scale means comprises an aperature scale bar mounted for sliding movement in a direction parallel to the direction of movement of the aperture setting slide and having a surface bearing a plurality of said indicia equal in number to the number of positions of the aperture setting slide, with said surface underlying said viewing window and movable with respect thereto, first spring means for biasing said slidingly supported aperture scale bar to a position such that the whole number of said indicia on the scale are displayed to the photographer's view through said window, and said linkage means further includes a transmission lever mounted for pivoting intermediate of its ends about an axis at right angles to the plane of sliding movement of said aperture scale bar, to one side of said bar with said transmission lever having one end overlying the end of the aperture scale bar for contact therewith, and L-shaped detecting lever having right angle arms in a plane parallel to the plane of the transmission lever and being pivotably mounted for pivoting about an axis parallel to the pivot axis of said transmission lever and to the side of the transmission lever opposite that of said aperture scale bar, said L-shaped detecting lever having one of said right angle arms being forked and overlying the other end of said transmission lever, a pin carried by said transmission lever fixed to said other end and being received within said forked arm, and wherein the other arm of said L-shaped detecting lever terminating at a point remote from the pivot axis of said L-shaped detecting lever in a feeler which detects the presence of the actuator in the cartridge loaded in the camera such that upon loading of a cartridge within said camera having an actuator, contact with said feeler causes said L-shaped detecting lever to pivot said transmission lever into contact with said one end of said aperture scale bar and to displace said aperture scale bar against the bias of said first spring such that only some of the indicia on the scale bar is displayed through said window to thereby visually represent limited available f-stop numbers to the photographer.

4,096,491

PHOTOGRAPHIC CAMERA WITH AN AUTOMATIC EXPOSURE-CONTROL CIRCUIT INTO WHICH ONE OF TWO DIFFERENT LIGHT-SENSITIVE ELEMENTS IS SWITCHED DEPENDING UPON SCENE BRIGHTNESS

Eduard Wagensonner, Aschheim; Peter Lermann, Narring, and Günter Fauth, Unterhaching, all of Germany, assignors to AGFA-Gevaert AG, Leverkusen, Germany

Filed Mar. 9, 1977, Ser. No. 775,985
Int. Cl.² G03B *7/08*
U.S. Cl. 354—31 **7 Claims**



1. In a photographic camera of the type provided with a shutter release, a shutter, means responsive to the activation of the release for performing a retarded opening of the shutter and means operative when activated for causing the shutter to close, in combination, exposure control means operative when the scene brightness level is within a first range for automatically selecting exposure durations so short that during a substantial part of the exposure the shutter is in the process of opening, and operative when the scene brightness level is within a second range for automatically selecting exposure durations so long that during a substantial part of the exposure the shutter will already be in the fully open setting thereof, the exposure control means comprising a light-integrating circuit including first and second light-sensitive elements to be used alternatively for scene brightness levels in respective ones of the brightness ranges, and first and second controllable electronic switches connected to the respective light-sensitive elements for switching one or the other of the light-sensitive elements into the light-integrating circuit; a bistable circuit provided with at least one information-signal input, two mutually complementary outputs, a clock input, and gating means operative for keeping the signals at the complementary outputs independent of signals applied to the information-signal input except in response to the application of a clock pulse to the clock input, the two controllable electronic switches each having a control input connected to a respective one of the complementary outputs of the bistable circuit; a brightness-measuring circuit operative for determining whether the scene brightness level is within the first or the second range and correspondingly applying to the information-signal input of the bistable circuit one or the other of two information signals, the brightness-measuring circuit including setting means operative for switching into the brightness-measuring circuit a predetermined one of the two light-sensitive elements by setting the bistable circuit to a predetermined one of its two stages irrespective of the signal applied to the information-signal input by the brightness-measuring circuit, so that the preliminary brightness level measurement will always be performed using the predetermined one of the two light-sensitive elements; and clocking means operative after completion of the preliminary brightness-measuring operation for applying a brief clock pulse to the clock input of the bistable circuit to briefly enable the gating means of the latter, thereby causing the signals appearing at the mutually complementary outputs to be dependent upon the signal applied to the information-signal input by the brightness-measuring circuit, whereby to switch the appropriate light-sensitive element into the light-integrating circuit and thereby ready the latter for the performance of an exposure control operation.

4,096,492

CAMERA WITH DETACHABLE ELECTRONIC FLASH UNIT AND EXPOSURE CONTROL SYSTEM THEREFOR

Edwin H. Land, Cambridge, and Richard C. Kee, Chestnut Hill, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 569,762, Apr. 21, 1975, abandoned.
This application Jun. 22, 1976, Ser. No. 698,715
Int. Cl.² G03B *7/16*
U.S. Cl. 354—33 **5 Claims**

1. An electronic flash unit for use with a camera and a supply of electrical power, the camera having selectively operative means for producing a film exposure, means responsive to an inhibit signal for precluding operation of said selectively operative means, and means for producing a flash trigger signal, said flash unit comprising:

flash means for storing an electrical charge and, in response to said flash trigger signal, for subsequently producing a flash of light;

actuatable means for producing a first signal;

a first switch device settable from a first to a second state responsive to said first signal and resettable to its said first state responsive to said flash trigger signal;

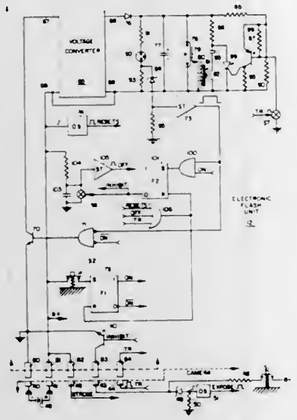
means responsive to said first switch device being in its said second state for coupling said flash means to said power supply so as to store said electrical charge and responsive to said first switch device being in its said first state for decoupling said flash means from said power supply;

charge sensing means for producing a second signal responsive to said flash means being charged to a given level;

means responsive to said second signal and said switch de-

vice being in its said second state for producing a third signal; and

a second switch device settable from a first to a second state responsive to said third signal and resettable to its said first state responsive to said flash trigger signal, said second switch device providing said inhibit signal when said



second switch device is in its said first state and terminating said inhibit signal when said second switch device is in its said second state whereby in response to said trigger signal, both said switch devices are reset to their said first states so as to automatically prevent further storing of said charge and operation of said selectively operative means when said flash of light is produced.

4,096,493

PHOTOGRAPHIC CAMERA HAVING ELECTROMAGNETIC DIAPHRAGM CONTROL

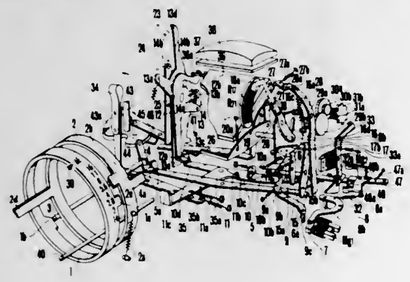
Akio Sunouchi, Tokyo; Yoshiaki Watanabe, Fujisawa; Fumio Ito, Yokohama; Yukio Mashimo, Tokyo; Nobuaki Date, Kawasaki, and Tadashi Ito, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 13, 1976, Ser. No. 731,939

Claims priority, application Japan, Oct. 21, 1975, 50/126558

Int. Cl.[2] G03B *7/08*

U.S. Cl. 354—38 **17 Claims**



1. In a photographic camera having automatic diaphragm control, the combination comprises:

(a) lens aperture means with a diaphragm ring accessible from the outside of said camera;

(b) an automatic exposure value computer;

(c) a diaphragm scanning mechanism having a scanning member and a driving member for said scanning member;

(d) a diaphragm presetting member cooperative with either of said diaphragm ring and said scanning mechanism for presetting said lens aperture means;

(e) electromagnetically operated arresting means for arresting said scanning mechanism at a time when the output of said scanning mechanism has reached a lever dependent upon the output of said exposure value computer;

(f) a release device for releasing positive connection between said driving member and said scanning member;

(g) shutter means;

(h) actuating means responsive to the termination of actuation of said shutter means for actuating said release device;

(i) automatic diaphragm closing down means cooperative with said lens aperture means; and

(j) pre-viewing means operatively connectable with said automatic diaphragm closing down means upon connection to permit checking of the depth of field in dependence on the manually adjusted setting of the diaphragm aperture by said diaphragm presetting member; whereby after the camera shutter is closed, the interlocking connection between said lens aperture means and said diaphragm scanning mechanism is released by said actuating means, enabling manipulation of said diaphragm ring followed by said pre-viewing means to check the depth of object field to be photographed regardless of whether or not said camera is in the cocked position.

4,096,494

SHUTTER SPEED INDICATOR DEVICE

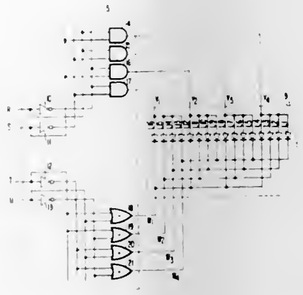
Masahiro Kawasaki, Tokyo, and Eiichi Tano, Asaka, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 3, 1976, Ser. No. 682,868

Claims priority, application Japan, May 2, 1975, 50-53984

Int. Cl.[2] G03B *17/20*

U.S. Cl. 354—53 **2 Claims**



1. In a shutter speed indicator for a camera, said shutter speed indicator being of the type having an array of light emitting elements for illuminating a plurality of shutter speed indicating numerals, respectively, to cause the illuminated numeral to be visible through the camera view finder, the improvement comprising; each said light emitting element having an anode and a cathode, the anodes of said array of elements being grouped into a plurality of groups, each anode being in only one anode group, and the anodes in each group being connected together to form an anode external terminal, the cathodes of said array of elements being grouped into an equal plurality of groups to form an equal plurality of cathode external terminals, the group connections are arranged so that the combination of any one anode external terminal and any one cathode external terminal has in common only a single light emitting element, and energizing means for providing a unique multibit digital signal responsive to a shutter speed value, each unique multibit digital signal causing energization of a corresponding unique pair of said anode and cathode external terminals, thereby only the light emitting element common to said energized terminals is illuminated and the corresponding shutter speed indicating numeral becomes visible.

4,096,495

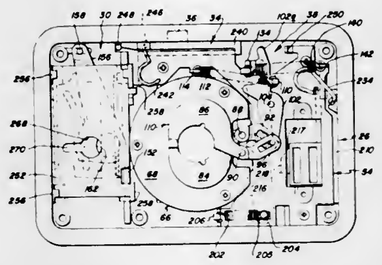
IRIS CONTROL

Israel Nesson, Fair Lawn; Edwin E. Faris, Wyckoff, and Robert G. Palmer, Wayne, all of N.J., assignors to Berkey Photo, Inc., Paramus, N.J.

Division of Ser. No. 296,591, Oct. 11, 1972, abandoned. This application Jun. 16, 1975, Ser. No. 587,036

Int. Cl.[2] G03B *7/00, 9/04*

U.S. Cl. 354—59 **5 Claims**



1. Mechanism for controlling the brightness of an image passing through an aperture and along a predetermined axis, comprising a first vane member movably mounted for reciprocating movement along a predetermined substantially linear path, said member having an elongated opening located to move longitudinally over said aperture as said first member is reciprocated along said linear path, a movable second vane member having an opening therethrough, and means for moving said second vane member along another path transverse to said linear path in response to the reciprocal movement of said first vane member, thereby effecting movement of said opening defined by said second vane member across said aperture in a direction transverse of said elongated opening in said first vane member as said first vane member and its associated elongated opening moves longitudinally over said aperture.

4,096,496

EXPOSURE CONTROL CIRCUIT FOR CAMERA

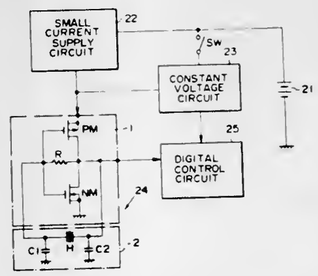
Saburo Numata, and Shinichiro Okazaki, both of Urawa, Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed May 24, 1977, Ser. No. 800,067

Claims priority, application Japan, May 26, 1976, 51-60823

Int. Cl.[2] G03B *7/00*

U.S. Cl. 354—60 A **9 Claims**



1. An exposure control circuit for a camera comprising a power source, a crystal oscillator having an input and an output, a small current supply circuit connected between said power source and the input of said crystal oscillator for constantly supplying a small current to the crystal oscillator, a digital control circuit connected with the output of said crystal oscillator for controlling an exposure factor, a normally opened switch connected between the power source and the digital control circuit and also between the power source and the input of the crystal oscillator, said normally open switch being closed upon the first stage of depression of a shutter release button of the camera.

4,096,497

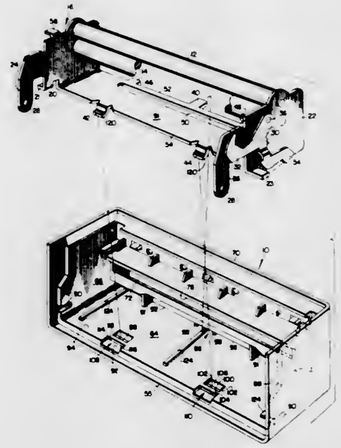
MOUNTING APPARATUS HAVING SHOCK STABILIZING MEANS

Bruce K. Johnson, Andover, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 6, 1976, Ser. No. 748,118

Int. Cl.[2] G03B *17/50*

U.S. Cl. 354—86 **7 Claims**



1. Photographic apparatus for use with a camera of the self-developing type comprising:

a housing section for receiving and locating a mounting bracket therein at a predetermined location, said housing section including a wall having means for defining an elongated opening through which a film unit may be advanced and means for guiding the mounting bracket to said predetermined location;

a pair of elongated pressure-applying members adapted to be mounted in juxtaposed relation for spreading a processing fluid across a layer of an exposed film unit; and

a mounting bracket for coupling said pressure-applying members to said housing section with said pressure-applying members mounted in juxtaposed relation and in operative relation with said elongated opening in said wall, said mounting bracket including a base section having opposing ends and means, located substantially intermediate said opposing ends, projecting therefrom and receivable by said guiding means in said wall for locating said mounting bracket at said predetermined location and means for dampening a shock imparted to said mounting bracket via said wall and said projecting means whereby said opposing ends of said base section may flex about said projecting means and toward said wall.

4,096,498

EXPOSURE PROPRIETY INDICATING DEVICE FOR FLASH-PHOTOGRAPHY

Keno Okuno, and Masumi Osumi, both of Kawasaki, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Mar. 30, 1976, Ser. No. 672,065

Claims priority, application Japan, Apr. 14, 1975, 50-44213

Int. Cl.[2] G03B *15/02*

U.S. Cl. 354—127 **5 Claims**

1. An exposure propriety indicating device for flash-photography of an object located a given distance therefrom comprising:

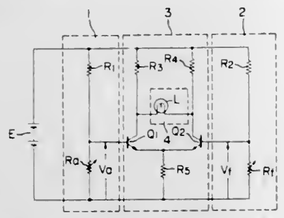
a. a film sensitivity signal generating circuit for generating a

first output signal in accordance with the sensitivity of a selected film;

b. an aperture value signal generating circuit for generating a second output signal in accordance with an aperture value;

c. a comparison circuit for comparing said first and second output signals, said comparison circuit generating an actuation signal when a difference between said first output signal and said second output signal falls outside of a range of be determined by the maximum and the minimum amounts of flash light from an automatic control electronic flash; and

d. an indicator circuit for actuation by said actuation signal from said comparison circuit.

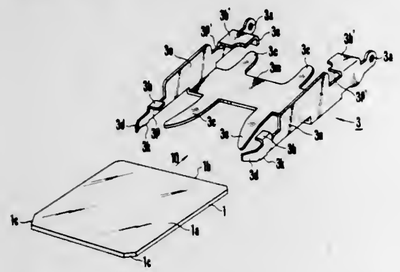


4,096,499

MIRROR SUPPORTING BODY AT A SINGLE LENS REFLEX CAMERA

Tatsuya Taguchi, Tokyo, and Nobuaki Date, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 16, 1976, Ser. No. 714,563
Claims priority, application Japan, Aug. 22, 1975, 50-101861
Int. Cl.[2] G03B *19/12*
U.S. Cl. 354—152 **3 Claims**



1. In a single lens reflex camera having a reflex lens system including a rotatable mirror and a support therefor angularly positioned in the light path in said camera, said rotatable mirror support arranged for positively maintaining said angular position and comprising:

(a) a support base having a plurality of individual resilient support members for supporting the mirror when placed thereon,

(b) arms on opposite sides of said base having flexible end portions for positioning said mirror on said base in a predetermined position relative to said light path at one extremity of said arm and stop means at the other extremity for limiting the travel of said mirror when positioned on said support,

(c) axle support means carried by said arms at one of said extremities and forming an integral part thereof for maintaining the fixed rotational position of said support base and mirror in the reflective plane of said mirror,

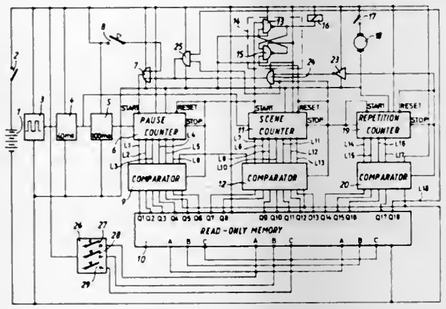
(d) adhesive means attached to said support members for adhering said mirror when placed thereon for movement with said resilient members, said support base and flexible arms being disposed to carry said mirror in fixed angular relation for said light path and being disposed to flexibly position said mirror on said support base for maintaining the fixed angular light path in response to the deterioration of support parts and wear and tear of camera parts related to use and environmental conditions.

4,096,500

STILL- OR MOTION-PICTURE CAMERA OR REPRODUCING APPARATUS

Peter Lermann, Narring, and Eduard Wagensonner, Aschheim, both of Germany, assignors to AGFA-Gevaert AG, Leverkusen, Germany

Filed May 23, 1977, Ser. No. 799,325
Claims priority, application Germany, May 26, 1976, 2623690
Int. Cl.[2] G03B *1/18, 19/18, 21/32*
U.S. Cl. 354—173 **8 Claims**



1. In a photographic apparatus, a circuit operative for controlling the number of times, the durations, and the sequences in which scene-pause operations, scene-production operations, scene-pause-and-production repetition operations, and the like, are performed, the circuit comprising, in combination,

pulse-generating means operative for generating pulse trains;

frequency-dividing means for receiving the pulse trains and producing frequency-divided pulse trains whose pulse-repetition frequency and period determine the minimum duration for each of the different operations;

a series of digital counters, one for each of the different operations,

each counter having a counting input connected to receive one of the frequency-divided pulse trains,

each counter having a start input and a stop-and-reset input,

each counter having a plurality of outputs on which to furnish digital count signals;

an addressable read-only memory having a plurality of addressing-signal inputs and plural sets of desired-value-signal outputs;

program-selecting means operative for causing different desired-value signals to appear on the desired-value-signal outputs of the memory by applying to the addressing-signal inputs thereof different addressing signals;

a series of digital comparators, one for each counter,

each comparator having a plurality of actual-value-signal inputs connected to the outputs of the associated counter,

each comparator having a plurality of desired-value-signal inputs connected to a respective one of the sets of desired-value-signal outputs of the memory,

each comparator having an output connected to the stop-and-reset input of the associated counter,

each comparator except for the last in the series having its comparator output also connected to the start input of the next counter in the series,

whereby when the desired-value and actual-value signals of any one of the comparators coincide the resultant comparator output signal stops and resets the respective counter for terminating the operation associated with that counter,

and whereby the comparator output signal of any comparator except the last comparator in the series additionally causes the next counter in the series to start counting for initiating the operation associated with such counter;

electromechanical activating means controllable for effecting the performance of the different operations; and

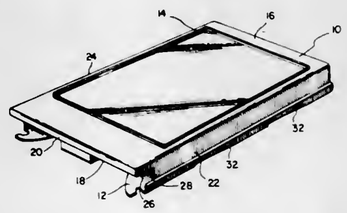
a logic circuit connecting the output of the last comparator to the start input of the first counter and operative for applying signals to the start input of the first counter in dependence upon at least the signals at the output of the last comparator, and also connecting the output of at least one of the comparators to the electromechanical activating means for controlling the latter in dependence upon the signals at the former.

4,096,501

PHOTOGRAPHIC CASSETTE WITH FORWARD CUTOUT PORTIONS TO ELIMINATE LOCALIZED UNWANTED IMAGE AREAS

Robert C. Beals, Wilmington, and John B. Millard, Cohasset, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Sep. 2, 1976, Ser. No. 719,809
Int. Cl.[2] G03B *19/10;* G03C *1/48*
U.S. Cl. 354—179 **2 Claims**



1. In a photographic film pack comprising:

a cassette for retaining diffusion transfer photographic film units in stacked relationship, said cassette comprising a forward wall having a light transmitting aperture therein; two side walls, an edge of each being coincident with respective opposed edges of said forward wall; a generally rectangular top wall, opposed edges of which are coincident with respective edges of said side walls; another edge of said top wall defining, in conjunction with said side walls, a withdrawal opening through which film units may be withdrawn from the cassette; and

a plurality of diffusion transfer film units in stacked relationship, each of said film units comprising a photosensitive and an image-receiving sheet connected together by a leader, said photosensitive sheet being oriented for exposure through said light transmitting aperture and being associated with a rupturable container retaining a processing composition and means for superposing said photosensitive and image-receiving sheets after exposure of said photosensitive sheet;

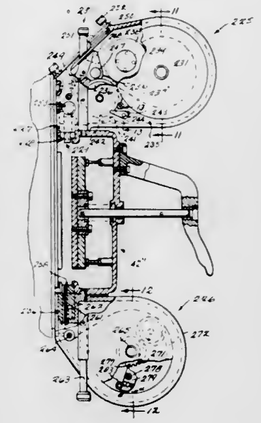
the improvement wherein cut out portions of said side walls define said withdrawal opening with said top wall; said cut out portions comprising opposed edges of said side walls substantially normal to said top wall and edges of said side walls substantially parallel to said top wall and located back from the plane of said top wall; whereby said withdrawal opening comprises the sole exit means for withdrawing exposed film units from said cassette.

4,096,502

STEREOMETRIC CAMERA SYSTEM

Joseph O. Danko, Jr., Baltimore, Md., and Jaime R. Cuzzi, Houston, Tex., assignors to Danko Arlington, Inc., Baltimore, Md.

Continuation-in-part of Ser. No. 621,785, Oct. 14, 1975, Pat. No. 4,010,481. This application Jun. 4, 1976, Ser. No. 692,873
Int. Cl.[2] G03B *17/00*
U.S. Cl. 354—203 **10 Claims**



1. A camera for a stereophotogrammetric assembly, comprising:

a. a camera housing,

b. a flat transparent plate in said camera housing,

c. a lens associated with said housing, said lens being adjustable with respect to said flat plate,

d. means for adjusting the distance of said lens from said flat plate,

e. means for holding a film length flatly against said flat transparent plate during exposure of said film, said means comprising (i) a film engaging member, (ii) a shaft operatively connected at one end thereof to said film engaging member, (iii) means for biasing said film engaging member into engagement with said flat plate, for flatly pressing a film length located between said flat plate and said member against said flat plate, and (iv) means located exteriorly of said housing attached to said shaft for moving said film engaging member from a position pressing said member into engagement with said film to a position wherein said member is spaced from said flat plate and film disposed between said flat plate and said member may be removed therefrom, and

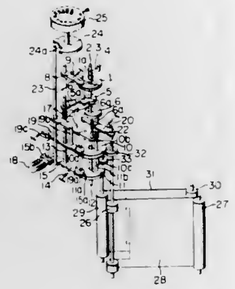
f. means for positioning a length of film adjacent said flat plate to be held thereagainst by said holding means, said film positioning means comprising an upper reel assembly and a lower reel assembly; said upper reel assembly including a housing distinct and separable from said camera housing, and said lower reel assembly including a housing distinct and separable from said camera housing, and a vertical through-extending passageway being provided in said camera housing adjacent said film engaging member and said flat plate; and said film positioning means further comprising means for releasably connecting said upper and lower housings to said camera housing in light-sealing relationship therewith and in cooperation with said through-extending passageway in said camera housing.

4,096,503

SAFETY DEVICE FOR THE ELECTRIC SHUTTER OF A CAMERA

Akihiko Sato, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Jun. 16, 1976, Ser. No. 696,492
Claims priority, application Japan, Jun. 21, 1975, 50-75066
Int. Cl.² G03B *9/00, 17/38*
U.S. Cl. 354—234 **9 Claims**



1. A safety device in a camera's focal plane shutter device which comprises shutter moving means (**10, 11, 32, 33**) having a forward curtain interlocking portion interlocked with a forward shutter curtain biased in the direction of movement predetermined for shutter release and a rearward curtain interlocking portion interlocked with a rearward shutter curtain biased in the same direction as said forward curtain and said shutter curtains being simultaneously chargeable and separately releasable, forward curtain restraining means (**19, 190**) disposed for displacement between a first position to restrain said forward curtain interlocking portion and a second position to release said restraint, rearward curtain restraining means (**13 - 17, 150**) disposed for displacement between a first position to restrain said rearward curtain interlocking portion and a second position to release said restraint, rearward curtain control means (**18**) for restraining said rearward curtain restraining means in said first position thereof until a predetermined time for providing proper exposure elapses from the start of shutter release operation, and anticipatory actuation means (**1 - 6**) disposed engageably with said rearward curtain restraining means, said anticipatory actuation means displacing said rearward curtain restraining means to its first position in response to shutter charge operation, and rendering said rearward curtain restraining means displaceable to its second position in response to shutter release operation; and

forward curtain control means disposed between said anticipatory actuation means and said forward curtain restraining means engageably with both of them and with said rearward curtain restraining means,

said forward curtain control means being effective during shutter charge operation to displace said forward curtain restraining means to said first position in coordination with said anticipatory actuation means,

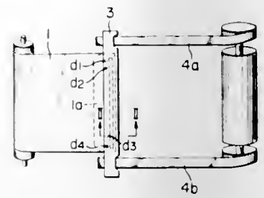
said forward curtain control means, when said rearward curtain restraining means is restrained in the first position by said rearward curtain control means, being effective to transmit the movement of said anticipatory actuation means to said forward curtain restraining means during shutter release operation to thereby displace the forward curtain restraining means to said second position, and when said rearward curtain restraining means is in said second position, to render impossible said transmission.

4,096,504

SHUTTER CURTAIN HOLDER DEVICE

Keisuke Mochizuki, and Yoshiyuki Nakano, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Feb. 5, 1976, Ser. No. 655,410
Claims priority, application Japan, Feb. 18, 1975, 50-22384[U]
Int. Cl.² G03B *9/28*
U.S. Cl. 354—241 **3 Claims**



1. A shutter curtain holder device for use in a camera, comprising:

(a) a shutter curtain folded adjacent to one end thereof to provide a reverse flap;

(b) a stem disposed inside the folded portion of said shutter curtain and comprising at least two short elements disposed adjacent to the upper and lower edges of said shutter curtain, respectively;

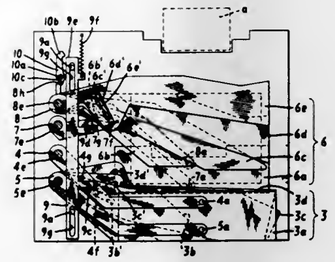
(c) a shutter beam surrounding said folded portion of said shutter curtain, said shutter beam having indented portions formed adjacent to the ends thereof, each of said indented portions lying between said one end of said shutter curtain and said stem to render the spacing between the opposed portions of said shutter curtain smaller than the transverse dimension of said stem taken in a plane perpendicular to the plane of a major surface of said flap, each of said indented portions of said beam including two dimples, one of said indented portions being disposed adjacent respective of said two elements.

4,096,505

FOCAL PLANE SHUTTER FOR CAMERAS

Eiichi Onda, Yotsukaido, and Masanori Watanabe, Narashino, both of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 686,501, May 14, 1976, abandoned. This application Aug. 11, 1976, Ser. No. 713,591
Claims priority, application Japan, May 14, 1975, 50-57100; May 14, 1975, 50-57102
Int. Cl.² G03B *9/36*
U.S. Cl. 354—246 **8 Claims**



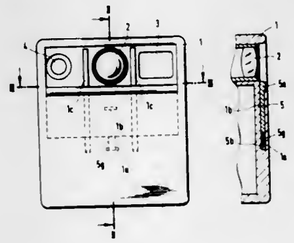
1. A camera shutter mechanism for opening and closing a shutter aperture to effect an exposure comprising: a group of opening blades movable, when released, from a closed position in which they cover the shutter aperture to an open position in which they do not cover the shutter aperture to initiate an exposure; a group of closing blades movable, when released, from an open position in which they do not cover the shutter aperture to a closed position in with they cover the shutter aperture to terminate the exposure; release means for releasing the opening blades thereby enabling them to move to the open position for initiating the exposure, and for subsequently releasing the closing blades thereby enabling them to move to the closed position for terminating the exposure; and means including a driving member automatically operable immediately after completion of the exposure for moving the group of opening blades back towards the closed position so that the aperture is at least partially covered thereby.

4,096,506

COVER PLATE FOR OPTICAL ELEMENTS OF A CAMERA

Karl-Heinz Lange, Bunde, Germany, assignor to Balda-Werke, Bunde, Germany

Filed Oct. 5, 1976, Ser. No. 729,872
Claims priority, application Germany, Jul. 29, 1976, 7623866[U]
Int. Cl.² G03B *17/02*
U.S. Cl. 354—288 **10 Claims**



1. A slidable protective cover for the optometric elements of a camera of the type having the optometric elements thereof contiguously transversely aligned on the front panel of the camera housing thereof comprising, a substantially planar panel overfitting said front panel of said camera, first means mounted on said planar panel, said front panel of said camera housing including a second means corresponding to said first means and complementary thereto, said first and second complementary means being cooperatively connectable for sliding said panel thereon between first and second positions, said first position of said planar panel corresponding to a position of said planar panel overlying said optometric elements, said second position of said planar panel corresponding to a position of said planar panel longitudinally distal to said optometric elements, said camera housing having an interior slot in which said planar panel is reasonably housed in said second position thereof, and cooperating corresponding complementary means on said planar panel and in said camera housing for releasably securing said planar panel in said first and second positions, respectively, on said housing.

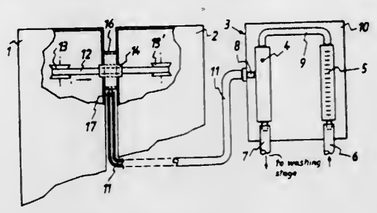
4,096,507

CONTINUOUSLY OPERATING DEVELOPING MACHINE WITH MEANS FOR REMOVING BLEACHING FLUID VAPORS

Jürgen Leuchter, Tutzing, Germany, assignor to AGFA-Gevaert AG, Leverkusen, Germany

Filed Jun. 18, 1976, Ser. No. 697,572
Claims priority, application Germany, Jun. 28, 1975, 2529008
Int. Cl.² G03D *17/00*
U.S. Cl. 354—307 **9 Claims**

1. In a film-developing machine of the daylight type comprised of a plurality of processing stages, including a bleaching stage comprised of a bath of bleaching fluid and a washing stage, arranged one after the other in the direction of film transport through the processing stages, and means for supplying washing water to the washing stage, said means including a water supply conduit, in combination therewith, sucking means powered by flow of water through the water supply conduit and operative for sucking out of the bleaching stage vapors forming in the bleaching stage, the sucking means including a water-jet pump connected in the water supply conduit and having a suction port at which develops a suction pumping force when water is transmitted through the water



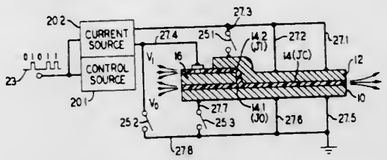
supply conduit and through the water-jet pump, and means pneumatically connecting the suction port of the water-jet pump to the interior of the bleaching stage and operative for transmitting said suction pumping force to the space above the bleaching fluid in the bleaching stage, whereby to cause vapors developing in the bleaching stage to be drawn off into the suction port of the water-jet pump.

4,096,508

MULTIPLE JUNCTION SUPERCURRENT MEMORY DEVICE UTILIZING FLUX VORTICES

Theodore Alan Fulton, Warren Township, Somerset County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 14, 1975, Ser. No. 631,922
Int. Cl.² H01L *39/22*
U.S. Cl. 357—5 **6 Claims**



1. A supercurrent device comprising a plurality of extended Josephson junctions stacked on top of one another and capable of supporting the propagation of mobile flux vortices, each of said junctions having a pair of superconductive layers and a weak-link layer separating said pair,

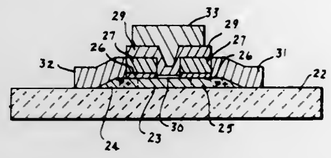
a common extended Josephson junction having a weak-link layer in contact with each of the weak-link layers of said stacked junctions so that vortices corresponding to one logic state occupy one of said stacked junctions and said common junction and vortices corresponding to a different logic state occupy another of said stacked junctions and said common junction, the mutual magnetic repulsion of vortices in said common junction being effective to maintain their ordering.

4,096,509

MNOS MEMORY TRANSISTOR HAVING A REDEPOSITED SILICON NITRIDE GATE DIELECTRIC

Franklyn C. Blaha, Glen Burnie, and James R. Cricchi, Catonsville, both of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 22, 1976, Ser. No. 707,574
Int. Cl.² H01L *29/78, 29/34, 27/02*
U.S. Cl. 357—23 **3 Claims**



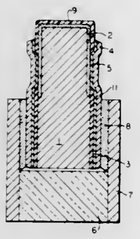
1. A radiation hardened MNOS memory transistor comprising
a substrate of electrically insulating material,
a mesa of semiconductor material deposited on the surface thereof,
a source region formed by P+ diffusions into a portion of said mesa adjacent one edge thereof,
a drain region formed by P+ diffusions into a portion of said mesa adjacent the edge thereof opposite said source region, said source and drain regions in part defining a substrate gate region therebetween,
a layer of silicon dioxide covering said substrate gate region and portions of said source and drain regions, a portion of said silicon dioxide layer in the vicinity of said substrate gate region being removed to define a gate window,
a layer of tunneling oxide covering said gate window,
a layer of non-memory silicon nitride covering said silicon dioxide layer,
a layer of memory silicon nitride covering said non-memory silicon nitride layer and said tunneling oxide layer,
a source electrode,
a drain electrode, and
a gate electrode.

4,096,510

THERMAL PRINTING HEAD

Shoji Arai; Shige Kuninobu, both of Kyoto, and Sumio Maekawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadomi, Japan

Continuation of Ser. No. 605,922, Aug. 19, 1975, abandoned. This application Aug. 3, 1977, Ser. No. 821,928
Claims priority, application Japan, Aug. 19, 1974, 49-95300; May 19, 1975, 50-59826
Int. Cl.² H01L *23/56, 29/66, 23/48*
U.S. Cl. 357—28 **2 Claims**



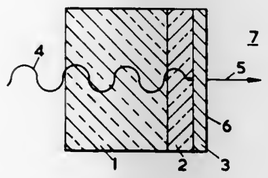
1. A thermal printing head comprising:
a semiconductor silicon substrate;
a low resistance heating layer formed by diffusion on a portion of the surface of said substrate;
a silicon oxide film formed on the surface of said substrate, including said portion having said heating layer formed thereon;
a polycrystalline silicon layer covering said silicon oxide film;
a wear resistant layer formed of silicon carbide provided on a first portion of said silicon layer having therebeneath a first portion of said heating layer; and
a multilayered electrode provided on a second portion of said silicon layer, said electrode having a contact part extending through said silicon layer and said silicon oxide film into contact with a second portion of said heating layer, said electrode comprising a first layer formed of Mo or Ti in contact with said silicon layer, a second layer formed of Ni in contact with said first layer, and a third layer in contact with said second layer and formed of a material selected from the group consisting of Cu, Pt, Pd and Rh.

4,096,511

PHOTOCATHODES

Philip Gurnell, Letchworth, and Michael Charles Rowland, Steeple Morden, both of England

Filed Nov. 28, 1972, Ser. No. 309,043
Claims priority, application United Kingdom, Nov. 29, 1971, 55355/71
Int. Cl.² H01L *27/14*
U.S. Cl. 357—30 **6 Claims**



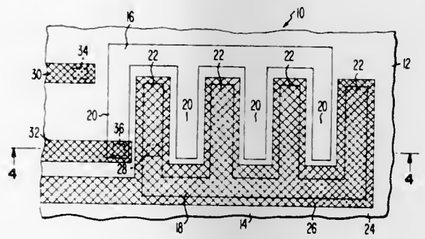
1. A transmission photocathode comprising:
a crystalline substrate transparent to the radiation to be detected,
at least one epitaxial intermediate layer comprising $(Ga_{1-x}Al_x)_{1-y}In_yAs$, and
an epitaxial detector layer comprising p-type $Ga_{1-y}In_yAs$ wherein $0<x\leqq 1$ and $0<y<1$.

4,096,512

MONOLITHIC LIGHT DETECTOR

Murray Arthur Polinsky, Somerville, N.J., assignor to RCA Corp., New York, N.Y.

Filed Mar. 9, 1977, Ser. No. 775,896
Int. Cl.² H01L *27/14*
U.S. Cl. 357—30 **10 Claims**



1. A monolithic light detector comprising:
(a) a substrate of semiconductor material predominantly of one conductivity type, said substrate having a surface;

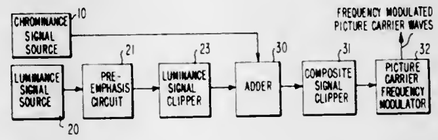
(b) a pair of identically shaped regions having a conductivity type opposite that of said substrate which extend into said surface of said substrate and form PN junctions with said substrate, each of said regions comprising a plurality of fingers, the fingers of one of said regions being interdigitated with the fingers of the other of said regions;
(c) an opaque covering extending over one of said regions and its associated PN junction; and
(d) means for making electrical contact to said substrate and to each of said regions.

4,096,513

COLOR VIDEO SIGNAL PROCESSING CIRCUITS

Michael David Ross, Somerdale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jun. 20, 1977, Ser. No. 808,293
Claims priority, application United Kingdom, Aug. 9, 1976, 33119/76
Int. Cl.² H04N *5/78, 9/02*
U.S. Cl. 358—4 **4 Claims**



1. In color picture information signal processing apparatus wherein carrier frequency waves are subject to frequency modulation in accordance with the amplitude of composite color video signals, inclusive of a luminance signal component, and a chrominance signal component in the form of modulated color subcarrier waves; modulating signal forming apparatus comprising:
pre-emphasis circuit means for subjecting luminance signals to high frequency pre-emphasis;
first signal clipping means, coupled to the output of said pre-emphasis circuit means, for confining the pre-emphasized luminance signal to signal excursions within a first selected range of amplitudes;
means for combining the output of said first signal clipping means with chrominance signals to form a composite color video signal; and
second signal clipping means, coupled to the output of said signal combining means, for confining the composite color video signal formed by said combining means to signal excursions within a second selected range of amplitudes.

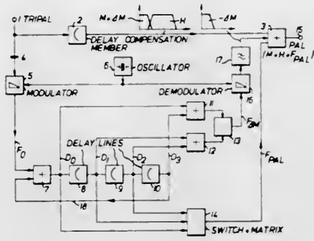
4,096,514

PLAYBACK CIRCUIT FOR A RECORDED THREE-LINE SEQUENTIAL COLOR TELEVISION SIGNAL

Werner Scholz, Gebrden, Germany, assignor to Ted Bildplatten Aktiengesellschaft, Zug, Switzerland

Filed Sep. 10, 1976, Ser. No. 722,338
Claims priority, application Germany, Sep. 17, 1975, 2541348
Int. Cl.² H04N *9/42*
U.S. Cl. 358—11 **4 Claims**

1. In a playback circuit for a three-line sequential color television signal, which circuit includes memory means composed of three delay lines connected together in series, each delay line producing a signal time delay equal to one horizontal picture line scanning period, means connecting one end of the resulting series arrangement of the memory means to receive the color television signal, means connected to the one end of the series arrangement and to the output of each delay line to present four outputs providing, the undelayed sequential signal and the sequential signal delayed by one, two and three horizontal picture lines, respectively, means connected to the four outputs to combine the signals thereat into a difference signal, and means connected for adding the difference signal to the three-line sequential signal, the improvement wherein: said memory means are constructed for causing the signals at said four outputs to have identical amplitudes; and means connected to combine the signals comprise four electrically identical combining components each connected to a respective one



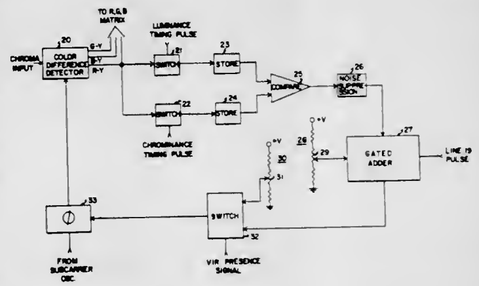
of said outputs and means connected for reversing the polarity of the undelayed signal and the signal delayed by three picture lines relative to the signals delayed by one and two picture lines.

4,096,515

VIR AUTOMATIC HUE CONTROL WITH PREFERENCE CAPABILITY

Charles T. Brown, Jr., and Harry T. Freestone, both of Portsmouth, Va., assignors to General Electric Company, Portsmouth, Va.

Continuation of Ser. No. 663,483, Mar. 3, 1976, abandoned. This application Aug. 1, 1977, Ser. No. 821,062
Int. Cl.² H04N *9/46*
U.S. Cl. 358—28 **11 Claims**

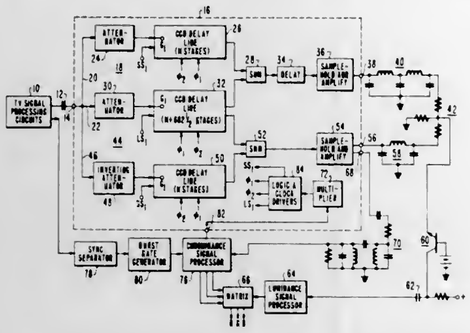


1. In a color television receiver, an automatic hue control circuit responsive to the VIR signal when present on a predetermined line of the received video wave, said automatic hue control circuit comprising:
chrominance signal processing means,
control means coupled to said chrominance signal processing means and responsive to said VIR signal when present to develop a control signal,
means generating a hue preference signal,
means generating a timing signal the period of which includes said predetermined line,
and gate means coupling said control signal and said hue preference signal to said chrominance signal processing means under control of said timing signal so that a reference hue setting is established by said control signal during the timing signal period and a preference offset to said reference hue setting is established by said hue preference signal at times other than said timing signal period.

4,096,516
ELECTRONIC SIGNAL PROCESSING APPARATUS

Dalton Harold Pritchard, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 25, 1977, Ser. No. 781,303
Int. Cl.² H04N *9/535*
U.S. Cl. 358—31 **13 Claims**



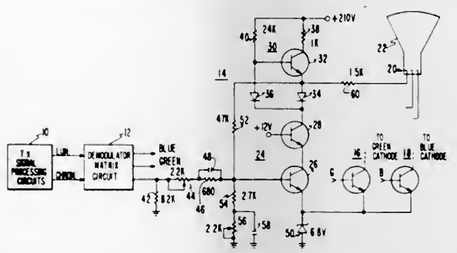
1. Apparatus for processing electrical signals comprising:
means for supplying an input signal containing at least a first information component, at least a portion of the frequency spectrum of said component being characterized by signal energy concentrated in the vicinity of each of a plurality of frequencies spaced apart by a difference which is equal to a first frequency;
clock signal generating means for supplying clock signals at a frequency proportional to said first frequency;
at least first and second signal processing paths, each having a signal input port coupled to said input signal supplying means and a delayed signal output port, said first and second paths including unequal numbers of signal delaying stages coupled to said clock signal generating means and responsive to said clock signals for transferring signals representative of said input signal between said input and said output ports, said first and second paths providing a difference in time delay of said input signal which is inversely proportional to said clock signal frequency and is directly proportional to the difference in the number of stages in said paths;
signal combining means coupled to said delayed signal output ports of each of said paths for combining signals delayed by different time intervals to produce at least one combined signal having a comb type frequency spectrum with relative signal maximums spaced apart by said first frequency; and
filtering means coupled to said signal combining means for passing a band of frequencies including those associated with said first information component.

4,096,517
VIDEO AMPLIFIER

Werner Hinn, Zollikerberg, Switzerland, assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 688,408, May 20, 1976. This application Apr. 21, 1977, Ser. No. 789,656
Claims priority, application United Kingdom, Nov. 25, 1975, 48352/75
Int. Cl.² H04N *9/537*
U.S. Cl. 358—40 **6 Claims**

1. A video amplifier adapted to drive a color image reproducing device comprising:
first and second semiconductor devices arranged in a cascode amplifier configuration, said cascode amplifier having a signal current input terminal associated with said first device and a signal current output terminal associated with said second device, said first device being arranged in a current amplifying configuration and exhibiting a relatively high current amplification factor for video signal frequencies;
a source of video signal current coupled to said input terminal;
a source of direct operating voltage having first and second terminals;
a load impedance comprising a first diode and a third semiconductor device having a control electrode and a main current conduction path, said current conduction path and said diode being coupled in series relation between said first and said output terminals;
voltage dependent current feedback means direct current

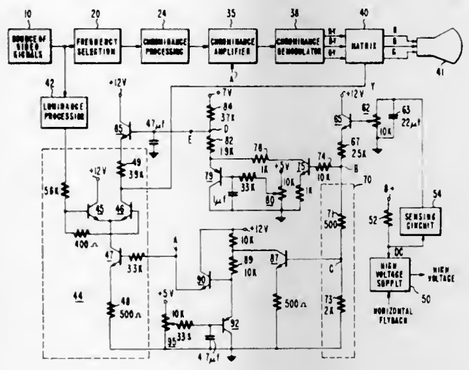


coupled between said output terminal and said current input terminal of said current amplifying device for providing degenerative feedback for said cascode amplifier; and
biasing means comprising at least a first direct current path coupled between said first terminal and said control electrode for supplying bias current to said control electrode and direct current coupling means coupled between said control electrode and said output terminal for coupling quiescent current to said cascode amplifier, said biasing means being arranged such that said first diode is based to a substantially non-conductive condition in the quiescent mode.

4,096,518
AVERAGE BEAM CURRENT LIMITER

Alois Vaclav Tuma, Schlieren, Switzerland; Leopold Albert Harwood, Bridgewater, N.J., and Willem Hendrik Groeneweg, Ottenbach, Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed May 5, 1977, Ser. No. 794,127
Int. Cl.² H04N *9/16*
U.S. Cl. 358—74 **10 Claims**



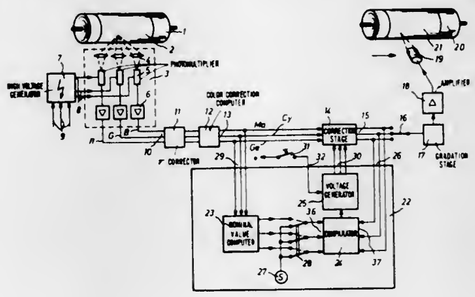
10. In a system for processing a color image representative television signal, said system including a chrominance channel for processing a chrominance component of said television signal, a luminance channel for processing a luminance component of said television signal, and a kinescope for reproducing

a color image in response to television signals coupled via said chrominance and luminance channels, a kinescope beam current limiter comprising:
means for deriving a control signal representative of the magnitude of average current drawn by said kinescope;
first means for coupling said control signal to said luminance channel when said current exceeds a predetermined threshold level by an amount within a first range of current, for varying a D.C. level of said luminance component in a direction to limit said current above said threshold level; and
second means for coupling said control signal to said luminance channel and to said chrominance channel when said current exceeds said threshold level by a relatively greater amount within a second range of current, for varying the gain of said luminance and chrominance channels, and thereby peak amplitudes of said luminance and chrominance components, in a direction to limit said current above said threshold level.

4,096,519
CIRCUIT ARRANGEMENT FOR RESETTING THE SIGNAL LEVEL OF A DARKEST AREA OF A COLOR OR MONOCHROME IMAGE REPRODUCTION APPARATUS

Ingo Hoffrichter, Kiel, and Hans-Georg Knop, Heikendorf, both of Germany, assignors to Dr.-Ing. Rudolf Hell GmbH, Kiel, Germany

Filed Dec. 6, 1976, Ser. No. 747,550
Claims priority, application Germany, Dec. 9, 1975, 2555293
Int. Cl.² G03F *3/00*
U.S. Cl. 358—75 **8 Claims**

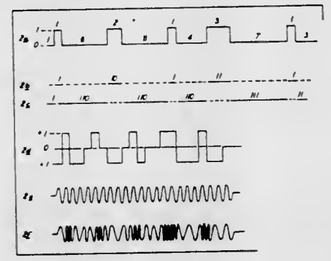


1. A circuit arrangement for resetting a lowest brightness level of a color signal having a plurality of colors variable in brightness from a black level to a white level for use in an apparatus including scanning and recording means for the point-by-point and line-by-line reproduction of a colored image, photo-electrical transducer means connected to said scanning means for obtaining color signal voltages from the corresponding colors, at least one of said lowest brightness levels being a minimal brightness level, comprising in combination for each of said colors:
adjustment means having an input and an output, and connectable between said photo-electric transducer means and said recording means for resetting one of said minimal brightness and lowest levels to a level having a predetermined relationship to said black level,
voltage generator means for producing and feeding a control signal having selectable first and second waveforms of respective predetermined voltage values to the input of said adjustment means, comparator means having an output, a reference input and an actual value input, said actual-value input being connected to the output of said adjustment means for receiving an actual value of the corresponding one of said color signal voltages,
reference means for providing a color signal voltage reference value to said reference input of said comparator means, said voltage generator means being connected to the output of said comparator means and providing at dissimilar values of said reference and actual values of the corresponding one of said color signal voltages the first waveform of said control signal to said adjustment means, said first waveform varying as a function of time, and
waveform shaping means connected to the input of said adjustment means, said first waveform being controlled by said waveform shaping means for the control to diminish in a direction from said black level to said white level, said voltage generator means providing the second waveform of said control signal upon said reference and actual values of said one of said color signal voltages coinciding, and then retaining the instantaneous voltage values produced by said voltage generator means at the coincidence of said reference and actual values for a predetermined time.

4,096,520
RUN LENGTH ENCODING AND DECODING METHODS AND MEANS

Eiichiro Furuta, Ebina, Japan, assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 27, 1976, Ser. No. 726,863
Claims priority, application Japan, Sep. 29, 1975, 50-117396
The portion of the term of this patent subsequent to Nov. 1, 1994, has been disclaimed.
Int. Cl.² H04M *7/12*
U.S. Cl. 358—133 **7 Claims**



1. In a limited bandwidth raster scanned imaging system including run length encoding means for converting a binary video signal having a raster scan format into binary black and white message codes, the improvement comprising:
ternary encoding means for selectively level shifting said binary message codes to provide a series of ternary black and white run length message codes having distinctive amplitude transitions at any intra-scan line code boundaries, and
modulating means for frequency modulating a carrier signal in accordance with said ternary codes to provide a passband signal having distinctive frequency transitions at said code boundaries.

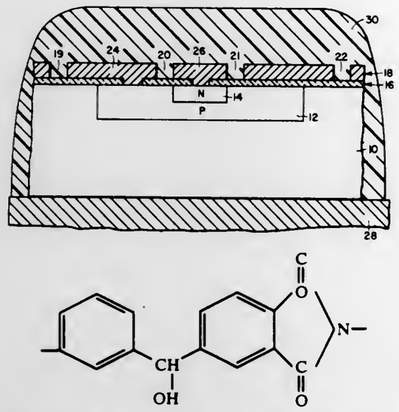
4,096,521
PROTECTIVE COATING FOR HIGH VOLTAGE DEVICES

Keith Gordon Spanjer, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed Jul. 8, 1976, Ser. No. 703,487
Int. Cl.² H01L *23/30*
U.S. Cl. 357—54 **2 Claims**

1. An encapsulated semiconductor substrate comprising:
(a) at least one semiconductor device disposed in said substrate;
(b) a coating disposed over said semiconductor device; and

(c) said coating comprising a polyimide of the following chemical formulation,



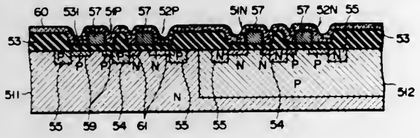
and ferric oxide for depleting excess electron charge and for stabilizing ionic contaminants during operation of said semiconductor device.

4,096,522

MONOLITHIC SEMICONDUCTOR MASK PROGRAMMABLE ROM AND A METHOD FOR MANUFACTURING THE SAME

Yasoji Suzuki, Kanagawa, and Kenshi Manabe, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Continuation of Ser. No. 616,626, Sep. 25, 1975, abandoned. This application Aug. 8, 1977, Ser. No. 822,657
Claims priority, application Japan, Sep. 26, 1974, 49-110032
Int. Cl.² H01L *29/78*
U.S. Cl. 357—45 **4 Claims**



1. A monolithic semiconductor mask programmable ROM conprising a matrix array of field effect transistors of insulated gate enhancement type, characterized in that the respective field effect transistors include a semiconductor substrate of one conductivity type, a plurality of strip-like source and drain diffusion regions formed at predetermined intervals in said substrate and having the opposite conductivity type, a plurality of strip-like electroconductive metal layers formed at predetermined intervals through a first relatively thick insulation layer on said substrate so as to intersect said source and drain diffusion regions, and a plurality of gate electrode foils, each gate electrode foil formed through a second insulation layer thinner than said first insulation layer on that portion of said substrate which is situated between the corresponding ones of said respective source and drain diffusion regions so that said gate electrode foil extends integrally with the corresponding one of said electroconductive metal layers with at least one side thereof spaced for a predetermined distance from one of said corresponding source and drain diffusion regions,

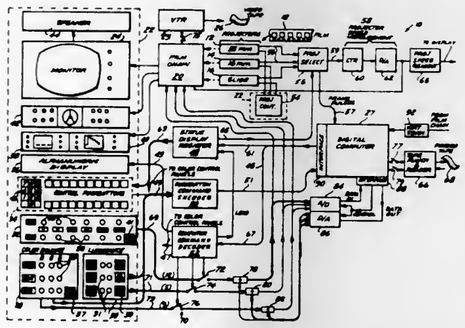
wherein said field effect transistors are divided into first and second groups, the transistor of the first group being arranged at specific positions corresponding to the information written therein and the transistors of the second group being arranged at specific positions other than those occupied by the first field transistors, and each of said field effect transistors includes an ion implantated region formed beneath said second insulation layer between each gate electrode foil and at least one of the source and drain diffusion regions which are facing the gate electrode foil, the ion implantated regions of the first field effect transistors of the first group having the same conductivity type as said source and drain diffusion regions and the ion implantation regions of the field effect transistors of the second group having the conductivity type opposite to that of the source and drain diffusion regions.

4,096,523

COLOR CORRECTION SYSTEM

Armand Belmares-Sarabia, 161 Millpond Rd., St. James, N.Y. 11780; Stanley J. Chayka, 16 Dunnellen Rd., Parsippany, N.J. 07054, and Robert M. Lund, 5 MacDougal Alley, New York, N.Y. 10011

Filed Jun. 29, 1976, Ser. No. 700,852
Int. Cl.² H04N *9/535*
U.S. Cl. 358—80 **41 Claims**



1. A color correction system comprising, in combination, means for converting images recorded on an image record medium to video color component signals, means for setting standard correction signal levels for said component signals, adjusting means for adjusting said color component signals for different ones of said images and developing incremental values of said correction signals over said standard values, storage means, and means for storing signals corresponding to said incremental values in said storage means.

4,096,524

TELEVISION RECEIVERS

Donald Gordon Scott, London, England, assignor to The General Electric Company Limited, London, England

Filed Oct. 29, 1976, Ser. No. 737,046
Claims priority, application United Kingdom, Nov. 13, 1975, 46892/75
Int. Cl.² H04N *7/14*
U.S. Cl. 358—85 **6 Claims**

1. A combined carrier television receiver and data receiving apparatus comprising:

(A) television receiver means for deriving video signals from received television carrier signals,

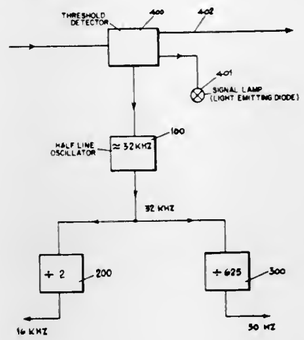
(B) display means for displaying television picture information contained in said video signals,

(C) first means for deriving digitally coded data carried by a received television carrier signal during periods when said television carrier signal carries no picture information,

(D) second means for deriving digitally coded data received over a telephone line,

(E) means for deriving display signals from said digitally coded data for display of data information on said display means,

(F) apparatus for generating synchronization signals for said display means, and



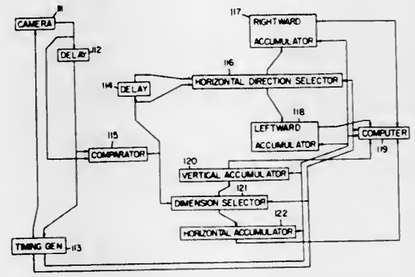
(G) means responsive to the absence of a received television synchronization signal for energizing said synchronization signal generating apparatus.

4,096,525

VIDEO SCANNING CHANGE DISCRIMINATOR

William James Lathan, P. O. Box 2785, Grand Junction, Colo. 81501

Continuation-in-part of Ser. No. 665,155, Mar. 8, 1976, abandoned, and Ser. No. 434,014, Jan. 17, 1974, abandoned, said Ser. No. 665,155, is a continuation of Ser. No. 509,003, Sep. 25, 1974, abandoned. This application Jul. 6, 1976, Ser. No. 702,390
Int. Cl.² H04N *7/18*
U.S. Cl. 358—107 **7 Claims**



1. A system for analyzing video signals representing a field of view, comprising, in combination:

means for supplying video signal data representing sequentially occurring video frames, each said frame including a plurality of horizontal scan signals;

comparison means for synchronously comparing horizontal scan signals from a first video frame with horizontal scan signals representing like-positioned scan lines from a later-occurring video frame to generate a sequence of differential signals representing changes in said video data occurring along the scan-line positions of said horizontal scan signals, said changes indicating movement of an object in said field of view;

storage means for storing said differential signals; and

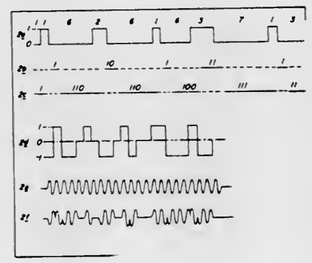
direction sensing means synchronously responsive to a first differential signal prior to storage representing changes occurring along a given scan line position and to a second previously generated differential signal, received from said storage means, representing changes previously occurring along the same scan line position, said direction sensing means including means for detecting the relative time of occurrence of change-representative data in said two differential signals, means for providing an indication of rightward movement of said object when the first-detected change-representative data occurs in said second differential signal, and means for providing an indication of leftward movement of said object when the first-detected change-representative data occurs in said first differential signal.

4,096,526

RUN LENGTH ENCODING AND DECODING METHODS AND MEANS

Eiichiro Furuta, Ebina, Japan, assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 27, 1976, Ser. No. 726,864
Claims priority, application Japan, Sep. 29, 1975, 50-117395
The portion of the term of this patent subsequent to Nov. 1, 1994, has been disclaimed.
Int. Cl.² H04N *7/12*
U.S. Cl. 358—133 **7 Claims**



1. In a limited bandwidth raster scanned imaging system including run length encoding means for converting a binary video signal having a raster scan format into binary black and white message codes, the improvement comprising

ternary encoding means for selectively level shifting said binary message codes to provide a series of ternary black and white run length message codes having one polarity corresponding to initial bits of black message codes, another polarity corresponding to initial bits of white message codes, and a reference level corresponding to other bits of black and white run length message codes; and

amplitude sensitive means for phase modulating a carrier signal in response to ternary codes of said one and said other polarity and the interrupting said carrier signal in response to ternary codes of said reference level, thereby generating a phase modulated, interrupted carrier passband signal.

4,096,527

RUN LENGTH ENCODING AND DECODING METHODS AND MEANS

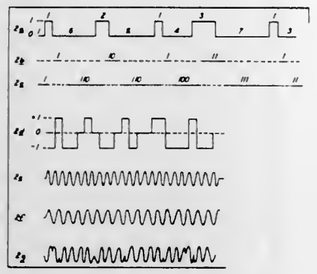
Eiichiro Furuta, Ebina, Japan, assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 27, 1976, Ser. No. 726,866
Claims priority, application Japan, Sep. 29, 1975, 50-117397
The portion of the term of this patent subsequent to Nov. 1, 1994, has been disclaimed.
Int. Cl.² H04N *7/12*
U.S. Cl. 358—133 **7 Claims**

1. In a limited bandwidth raster scanned imaging system including run length encoding means for converting a binary video signal having a raster scan format into binary black and white message codes, the improvement comprising

ternary encoding means for selectively level shifting said binary message codes to provide a series of ternary black and white run length message codes having one polarity corresponding to initial bits of black message codes, another polarity corresponding to initial bits of white mes-

sage codes, and a reference level corresponding to other bits of black and white run length message codes; and



modulating means for supplying a passband signal which is frequency and phase modulated in accordance with said ternary codes.

4,096,528

STANDARD/NONSTANDARD INTERNAL VERTICAL SYNC PRODUCING APPARATUS

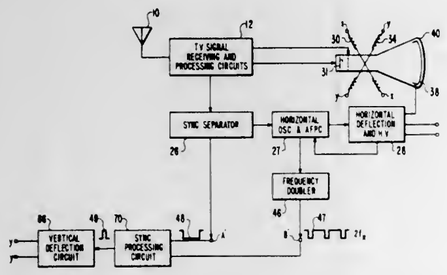
Alois Václav Tůma, Schlieren, and Willem Hendrik Groeneweg, Ottenbach, both of Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed Jun. 25, 1976, Ser. No. 699,848

Claims priority, application United Kingdom, Dec. 23, 1975, 52565/75

Int. Cl.² H04N *5/04*

U.S. Cl. 358—148 **6 Claims**



1. Apparatus for producing internal vertical sync signals at an output terminal in response to standard and nonstandard rate external vertical signals, comprising:

first resettable counting means responsive to said external vertical signals, the count of said first counting means being incremented in response to a source of incrementing signals repeating at a frequency integrally related to the frequency of said standard rate external vertical signals, said first resettable counting means being reset in the presence of said external vertical signals;

coincidence means coupled to said first counting means and responsive to said external vertical signals for providing a coincidence signal when said external vertical signals are repeating at a standard rate;

detection means responsive to said external vertical signals for providing after the elapse of a predetermined time interval a detection signal indicative of the presence of said nonstandard rate external vertical signals;

second resettable counting means responsive to said source of incrementing signals for providing only a standard rate internal signal;

first signaling means coupled to said second resettable counting means and responsive to said detection signal and said external vertical signals for providing in place of said standard rate internal signal a nonstandard internal signal repeating at a nonstandard rate; and

sync producing means responsive to said coincidence signal, said standard rate internal signal and said nonstandard internal signal for producing said internal vertical sync signals upon the occurrence of one of said coincidence signal, said standard rate internal signal and said nonstandard internal signal, said second counting means being reset upon such occurrence.

4,096,529

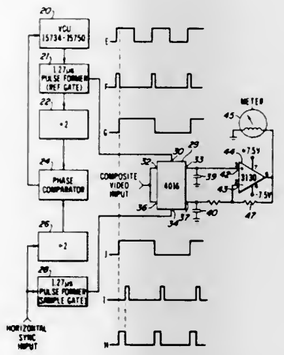
CIRCUIT FOR DETECTING GHOSTS IN TV ANTENNA SYSTEMS

Robert E. Baum, Dell Rapids, and Robert A. Winter, Sioux Falls, both of S. Dak., assignors to Sencore, Inc., Sioux Falls, S. Dak.

Filed Mar. 25, 1977, Ser. No. 781,209

Int. Cl.² H04N *5/21, 7/02*

U.S. Cl. 358—167 **5 Claims**



1. A method of indicating the presence of a ghost in a television signal, comprising the steps of

deriving a first signal having an amplitude proportional to a voltage level on the front porch of the horizontal sync portion of said television signal,

deriving a second signal having an amplitude proportional to a voltage level on the back porch of the horizontal sync portion of said television signal,

comparing said first and second signals, and

providing an indication reponsive to the difference in the amplitude of said first and second signals.

4,096,530

METHOD AND APPARATUS FOR OBSCURING THE RASTER LINES IN A PHOTOGRAPH OF A VIDEO MONITOR SCREEN

Jay S. Plugge, Brookfield; William H. Wesbey, and James E. Blake, both of New Berlin, all of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 17, 1976, Ser. No. 696,880

Int. Cl.² H04N *5/04, 5/84*

U.S. Cl. 358—244 **13 Claims**

1. A method of vertically shifting a television monitor picture tube raster by a total amount substantially equal to the distance between a pair of horizontal scan lines where said raster is produced by scanning an electron beam horizontally in response to occurrence of horizontal sync pulses and vertically in response to occurrence of vertical sync pulses and wherein video information signals for modulating said beam to produce picture information for a static picture are obtained from a composite video waveform which includes horizontal and vertical sync pulses, said method comprising the steps of:

separating horizontal and vertical sync pulses from said composite waveform,

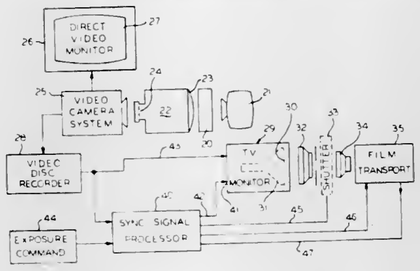
supplying signals corresponding with said horizontal sync pulses for each field to said monitor in the time relationship in which said horizontal pulses normally occur in said composite waveform to thereby effect horizontal deflections of said beam for each field,

generating a predetermined number of signals corresponding with said vertical sync pulses which generated signals are increasingly delayed relative to the sync pulses in the composite signal with which they correspond, and

using said delayed vertical signals to control the vertical positions of successive rasters in place of said vertical sync pulses in said composite signal.

3. Means for vertically shifting a predetermined number of fields representing a picture on the display tube of a television monitor to obscure the horizontal lines ordinarily visible on the face of the display tube in a photographic film that has been exposed to a sequence of said television fields, said means comprising:

sync pulse stripper and separator means responsive to being



supplied with a composite video waveform by producing uniformly timed trains of horizontal and vertical sync pulses corresponding with the sync pulses of said waveform,

means for using said horizontal sync pulse trains for each field to control production of said fields correspondingly with occurrence of said horizontal sync pulses in said composite waveform,

means responding to occurrence of a sequence of vertical sync pulses in said waveform by producing a corresponding sequence of vertical sync signals that are equal in number to the number of shifts desired and are respectively increasingly delayed relative to the vertical sync pulses with which they correspond, and

means for supplying said delayed vertical sync signals for each field which is displayed to said monitor in the order in which their undelayed corresponding vertical sync pulses occurred in said composite waveform to thereby effect said shifting.

4,096,531

DEFLECTION YOKE

Yukio Yamada; Yoji Ishikawa, both of Yokohama, and Koichi Sakai, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

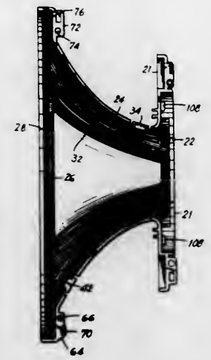
Filed May 25, 1977, Ser. No. 800,576

Claims priority, application Japan, Jun. 1, 1976, 51-62893

Int. Cl.² H01C *5/02*

U.S. Cl. 358—248 **9 Claims**

3. A deflection yoke for use on a cathode ray tube comprising a pair of identical separator halves joined together in a planar mating surface of engagement, each said separator half comprising a front portion, a rear portion and a gradually widening segment interconnecting said front and rear portions, said front and rear portions including outwardly facing flat bearing surfaces to receive and support the bending portion of a saddle wound deflection coil supported within said separator



half and means on each said separator half to locate and support said deflection coil.

4,096,532

MAGNETIC TAPE COPYING METHOD AND APPARATUS

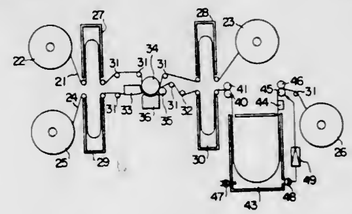
Mitsuaki Ono; Masahiko Yatsugake; Norio Miyatake, all of Katano, and Yukihiro Fukushima, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 14, 1976, Ser. No. 676,814

Claims priority, application Japan, Apr. 18, 1975, 50-47752; Jul. 16, 1975, 50-87737; Aug. 9, 1975, 50-110246[U]; Dec. 1, 1975, 50-162507[U]; Jan. 20, 1976, 51-5301[U]

Int. Cl.² G11B *5/86*

U.S. Cl. 360—16 **6 Claims**



1. A magnetic tape copying apparatus comprising

supply means for retaining a recorded master tape and a non-recorded slave tape, each of said master and slave tapes having a magnetic coating surface and a base side,

means for heating said slave tape to a temperature near the Curie point thereof,

means for pressing the magnetic coating surfaces of said heated slave tape and said master tape together and for moving said tapes together in press contact with each other, said slave tape being under a first predetermined amount of tension,

a heating oven,

means for introducing said slave tape into said oven after being removed from press contact with said master tape, said slave tape being slack within said oven,

means for controlling the tension of said slave tape within said oven at a second predetermined amount, said second predetermined amount of tension being finite and less than said first predetermined amount of tension, and

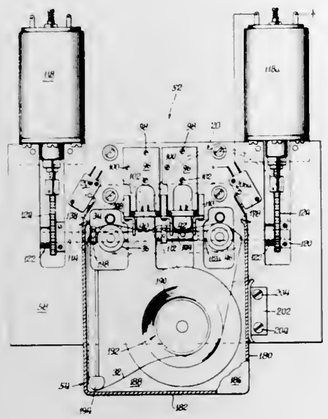
takeup means for separately taking up said master and slave tapes.

4,096,533

CARTRIDGE TAPE TRANSPORT WHICH ACCOMMODATES SINGLE OR DUAL CAPSTAN CARTRIDGES

John P. Jenkins, Towanda, Ill., assignor to International Tapetronics Corporation, Bloomington, Ill.

Filed Apr. 28, 1977, Ser. No. 791,707
Int. Cl.[2] G11B *15/18*
U.S. Cl. 360—94 **6 Claims**



1. In a tape transport mechanism:
a frame;
a cartridge-supporting table on said frame;
means for training a magnetic tape along a path on said table, an upstream capstan, head means, and a downstream capstan located along the path of movement of the tape;
upstream and downstream shafts pivotably journaled in said frame for independent pivotal movement about their respective axes and having upstream and downstream pressure rollers respectively mounted thereon for independent swinging movements between off positions beneath said table to play positions above said table, said pressure rollers in said play positions being effective to press said tape against said upstream and downstream capstans respectively;
first actuating means for pivoting said downstream shaft to swing said downstream pressure roller to its said play position independently of the other shaft and pressure roller, to thereby play a single capstan type cartridge when placed in play position over said downstream capstan and pressure roller;
a second actuating means for pivoting both of said shafts simultaneously to move both of said pressure rollers to their said play positions, to thereby play a dual capstan type cartridge when placed in play position on said table over both said upstream and downstream capstans and pressure rollers; and
control means selectively operable to actuate said first or second actuating means.

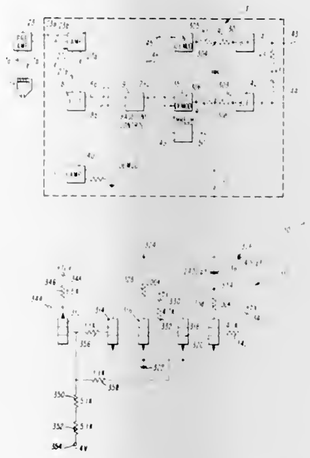
4,096,534

TRACK ACCESSING CIRCUITRY FOR A DISK FILE WITH SWITCHABLE FILTER

Dewey Earl Brownback; Calvin Shizuo Nomura; Dennis Patrick Sheehan, and Michael M. Siverling, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 12, 1977, Ser. No. 786,917
Int. Cl.[2] G11B *21/08, 5/55*
U.S. Cl. 360—78 **13 Claims**

1. Data storage apparatus comprising:
a moveable storage medium having a number of information carrying tracks thereon,
a transducer moveable across said tracks,
an electrical actuator for so moving said transducer,
circuitry connected with said transducer and providing a transducer movement responsive signal the frequency of which is proportional to the velocity at which said transducer crosses said tracks,
means developing a control velocity signal for a track accessing movement of said transducer from an initial track to a target track which gradually decreases in magnitude toward the target track,
velocity indicative circuitry connected with said first named circuitry and responsive to the frequency of said transducer movement responsive signal for providing a velocity signal indicative of the actual velocity of said transducer across said tracks,



means for comparing said two velocity signals,
control circuitry connected with said actuator and with said comparing means to cause said transducer to move at approximately the same velocity as is indicated by said control velocity signal as the transducer approaches said target track,
a switchable filter in said first named circuitry having relative signal attentuating and non-attenuating switched conditions for high frequency noise signals transmitted through said first named circuitry, and
control means for said switchable filter for switching said switchable filter from its said non-attenuating condition to its said attenuating condition when the frequency of said transducer movement responsive signal drops below a predetermined frequency.

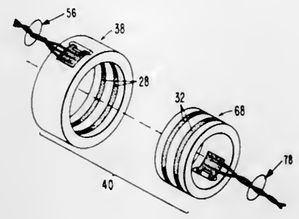
4,096,535

ROTARY TRANSFORMER WITH UNIQUE PHYSICAL AND ELECTRICAL CHARACTERISTICS

Jerry Lee Highnote, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,232
Int. Cl.[2] G11B *5/52*
U.S. Cl. 360—84 **15 Claims**

1. A concentric rotary transformer, for transmitting electrical signals between a stationary member and a rotary member comprising, in combination:
an inner core assembly for mounting to the rotary member, and
an outer core assembly for mounting to the stationary member and positioned concentrically with the inner core assembly;
said inner core assembly including a core piece with a pair of displaced circumferential grooves machined about its outer surface;
a first coil, having two terminals and two legs, fabricated from a continuous conductor is positioned within said grooves;
said outer assembly including a core piece with a pair of



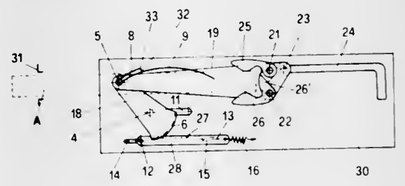
displaced circumferential grooves machined about its inner surface; and
a second coil, with two terminals and two legs, fabricated from a continuous conductor is positioned within the grooves of said outer core whereby the electrical signals are transferred as the inner core assembly rotates relative to the outer core assembly.

4,096,536

DEVICE FOR GRIPPING AND TRANSLATING A CASSETTE IN TAPE

Rodolfo Cicatelli, Lugano, Switzerland, assignor to Autovox S.p.A., Rome, Italy

Filed Feb. 24, 1977, Ser. No. 771,487
Claims priority, application Italy, Feb. 25, 1976, 48269 A/76
Int. Cl.[2] G11B *23/04, 23/68, 23/24*
U.S. Cl. 360—96 **8 Claims**



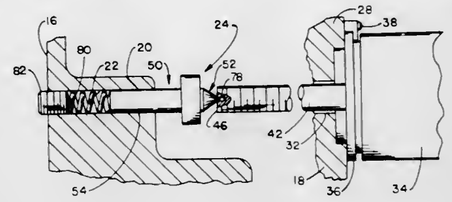
1. A device for gripping and translating a cassette in tape recorders, comprising:
plate means with a first slot;
link means having first and second ends;
a first pin fixed at said first end of said link means and slidable in said first slot;
rocker means having a first end pivoted at said second end of said link means;
a pair of expandable jaws for gripping and holding a cassette inserted therein, the jaws pivotally mounted to said link means;
a second pin on said rocker means about which said rocker means is pivotal; and
a servomechanism acting on said second pin to move the rocker means and pivot the rocker means about said second pin thereby moving the link means and jaws upon insertion of a cassette into the tape recorder, whereby said servomechanism implements a relatively large movement of said cassette gripping jaws.

4,096,537

LEAD SCREW SUPPORT FOR A DISC RECORDER

Otto R. Butsch, Ann Arbor, Mich., assignor to Sycor, Inc., Ann Arbor, Mich.

Filed Mar. 16, 1977, Ser. No. 778,144
Int. Cl.[2] G11B *21/08;* G01N *1/00;* G01B *5/30, 7/16*
U.S. Cl. 360—106 **11 Claims**



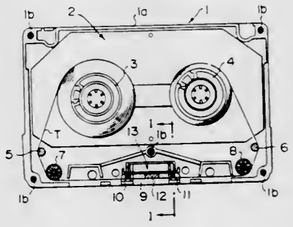
1. An improved lead screw drive for a disc recorder comprising:
a rigid frame having a pair of mutually spaced and oppositely-disposed rigid frame members, one of said frame members defining a first mount and the other of said frame members defining a second mount facing said first mount, said mounts being coaxially aligned with each other;
a motor secured to said one of said mounts and having an output shaft;
a lead screw secured rigidly to and extending coaxially from said motor output shaft towards said second mount, said lead screw having a free end and defining a seat at such end of the screw;
support means disposed at said second mount and having portions extending therefrom to contact the free end of said lead screw opposite said motor, for supporting said lead screw at said free end, said support means including a bearing support hub;
a bearing disposed within said support hub;
a convergingly tapered member rotatably supported upon a fixed axis of rotation by said bearing and bearing support hub, said tapered member extending cantilevered from said other frame member and toward the free end of said lead screw along the axis of the lead screw, said tapered member having an apex contacting the seat of said lead screw; and
biasing means for biasing said tapered member into engagement with said lead screw seat to rotatably support the free end of the lead screw from said other frame member.

4,096,538

TAPE SUPPORT PINS IN MAGNETIC TAPE CASSETTE

Kengo Oishi, Odawara, Japan, assignor to Fuji Photo Film Co., Ltd., Japan

Filed May 12, 1977, Ser. No. 796,389
Claims priority, application Japan, May 18, 1976, 51-63280[U]
Int. Cl.[2] G11B *23/10*
U.S. Cl. 360—132 **1 Claim**



1. In magnetic tape cassette including a hollow casing hav-

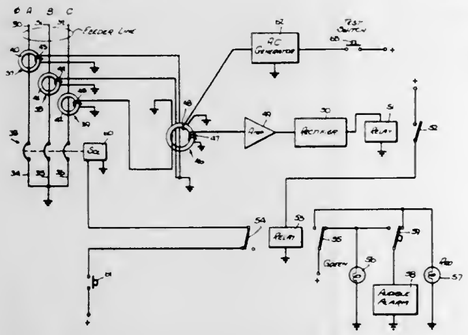
ing an opening on the front face thereof through which a recording or reproducing magnetic head of a tape recorder is inserted, a pair of cores rotatably mounted within said hollow casing, a magnetic tape wound on said cores and fed from one core to the other, a pair of rotatable guide rollers for guiding the tape from one core to the other by way of the opening, a spring plate having a length which is a small fraction of the length of said casing disposed to face the opening, and a pad provided on the front face of the spring plate to contact the tape passing over the opening of the casing, the improvement comprising a pair of tape support pins disposed at a distance from each other which is less than the length of said plate so as to be closely spaced, said pins being located on opposite sides of the opening for holding the spring plate at the rear face thereof and supporting and guiding the tape passing over the opening at the front face thereof, each of said support pins being provided with a concave guide surface on the front face thereof which is adapted to matingly engage the flexible tape and thus provides means for self-centering said tape and in conjunction with the close spacing of the pins to increase the stiffness of the tape by bending the same along its transverse axis and to guide the tape along a predetermined passage in contact with a magnetic head which is inserted into the casing.

4,096,539

DETECTOR OF BACKFEED ELECTRICAL CURRENTS

Angelo J. Scaturro, 6437 79th St., Middle Village, N.Y. 11379

Filed Aug. 31, 1976, Ser. No. 719,131
Int. Cl.[2] H02H *3/08*
U.S. Cl. 361—93 **13 Claims**



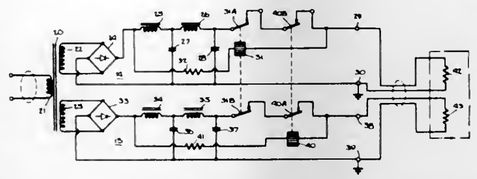
1. Apparatus for detecting, in a three wire, alternating current electrical system having three lines which normally are at different voltages at any given instant but having the three lines connected together by short-circuiting means of negligible impedance, the current flow in any one of said lines adjacent to said short-circuiting means, said apparatus comprising:
coupling means including three transformers which may be magnetically each coupled to a respective one of said lines adjacent said short-circuiting means for providing an alternating current output whenever alternating current flows in any of said lines;
combining means having an input and an output and having its input connected to said transformers for combining the alternating current output of the latter and providing an alternating voltage at its output whenever there is alternating current flowing in any of said lines; and
indicating means connected to said output of said combining means and responsive to an alternating voltage at said output.

4,096,540

PROTECTIVE RELAY CIRCUIT FOR REGULATED POWER SUPPLY

Kay G. Sears, Keyport, N.J., assignor to Entron, Inc., Morganville, N.J.

Filed Dec. 28, 1976, Ser. No. 755,011
Int. Cl.[2] H02H *3/08*
U.S. Cl. 361—93 **6 Claims**



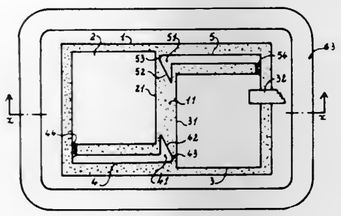
1. A protective relay circuit for a regulated direct-current power supply in which the output of a rectifier is connected through the choke of a filter network to an output terminal coupled to a load, said circuit comprising a relay having a set of normally-closed main contacts and an excitation coil, said coil being connected between the input of said choke and said output terminal, said main contacts being interposed between the output of said choke and said output terminal, said coil having a D-C impedance which is high relative to that of said choke whereby in the absence of a short the coil has virtually no influence on the operating characteristics of the supply, said relay being activated by the rectifier output voltage when a short or an equivalent excessive load is imposed on said output terminal, said relay being de-activated to restore the supply when the short is lifted and the current produced by said load is insufficient to sustain said relay in the activated state.

4,096,541

MINIATURE LIGHTNING PROTECTOR

Jean A. Bohin, Lannion, and Max Goldman, Gif-sur-Yvette, both of France, assignors to Etat Francaise, Issy les Moulineaux and Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, both of, France, part interest to each

Filed Feb. 7, 1977, Ser. No. 766,543
Claims priority, application France, Feb. 13, 1976, 76 04005; Dec. 15, 1976, 76 37698
Int. Cl.[2] H02H *3/22*
U.S. Cl. 361—120 **16 Claims**



1. Miniature lightning protector device comprising:
a metal case formed of a metal base, a cover, a plate of insulating material and an electrical circuit supported and secured to said base on its side opposite to the components of said circuit;
said case enclosing an atmosphere;
said electrical circuit including components formed of metal strips which are secured in flat relationship on the same side of said insulating plate; and
said circuit containing the following components:
(a) a first discharge electrode including a first means of connection connected to the case;

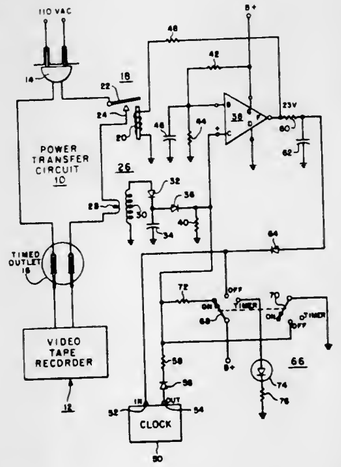
(b) a second discharge electrode including a second means of connection connected across the case to said cover;
(c) said first and second discharge electrodes being separated by a discharge gap;
(d) at least one discharge ignition electrode penetrating into the discharge gap; and
(e) at least one electrical resistor coupling said ignition electrode to one of said discharge electrodes.

4,096,542

CONTROLLER FOR VIDEO TAPE RECORDER

Frank Pappas, and John L. Rennick, both of Elmwood Park, Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Mar. 28, 1977, Ser. No. 781,611
Int. Cl.[2] H02H *3/12;* **H04N** *7/00*
U.S. Cl. 361—196 **5 Claims**



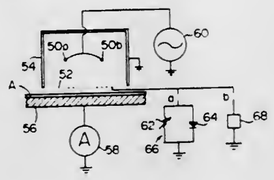
1. A controller for initiating operation of an electrically energized apparatus and for terminating operation of that apparatus, in response to a reduction in its power consumption to a predetermined level, said controller comprising:
a source of enabling signal;
a power transfer circuit for coupling said apparatus to a source of energizing potential;
normally-open switch means included in said power transfer circuit and responsive to an actuating signal for closing said switch to activate said power transfer circuit and thereby energize said apparatus;
a current transformer comprising a primary winding included in said power transfer circuit and a secondary winding;
means coupled to said secondary winding for developing a control signal having an amplitude proportional to the current drawn by said apparatus;
a signal comparator having a first input circuit coupled to said source of enabling signal and to said control signal developing means, and also having a fixed bias second input circuit,
said comparator further having an output circuit, coupled to said switch means, for establishing a switch actuating signal upon receipt by said first input circuit of an enabling signal having an amplitude sufficient to overcome the fixed bias on said second input circuit, for maintaining said actuating signal during application of said control signal to said first input circuit and for terminating said actuating signal when said control signal drops below the value of fixed bias on said second input circuit.

4,096,543

CORONA DISCHARGE DEVICE WITH GRID GROUNDED VIA NON-LINEAR BIAS ELEMENT

Nobuhiko Kozuka, Suita; Shoji Matsumoto, Neyagawa; Tetsuya Okada, Takatsuki; Katsuhiko Gotoda, and Tatsuo Aizawa, both of Osaka, all of Japan, assignors to Mita Industrial Company, Ltd., Osaka, Japan

Filed Oct. 26, 1976, Ser. No. 735,505
Claims priority, application Japan, Oct. 25, 1975, 50-127886
Int. Cl.[2] H01T *19/00*
U.S. Cl. 361—230 **9 Claims**



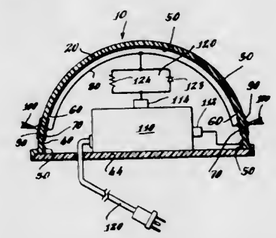
1. A corona discharge device comprising a corona discharge electrode, an opposing electrode disposed opposite to the corona discharge electrode, a high voltage alternate current source electically connected between the two electrodes, and a grid disposed in a corona discharge current flow path between the two electrodes and grounded through a nonlinear bias element, said nonlinear bias element being composed of an AC impedance element and a rectifier which are connected in parallel with each other.

4,096,544

AIR IONIZER

Vladimir Ignatjev, 39 Ledgewood Dr., Norwalk, Conn. 06850

Filed Dec. 9, 1976, Ser. No. 749,173
Int. Cl.[2] H05F *3/06*
U.S. Cl. 361—231 **15 Claims**



1. An air ionizer comprising
a dome-shaped housing including a center shell of insulating material having an inner surface and an outer surface,
a conductive layer on the inner surface of said shell having a plurality of apertures which expose said shell of insulating material,
a plurality of first conductive plates seated on said insulating shell within said apertures but insulated from said conductive layer,
a plurality of second conductive plates on said outer surface of said housing aligned with said holes in said conductive layer, and carrying a plurality of conductive filaments which extend into the atmosphere surrounding said housing, and
a source of voltage within said housing having one output coupled to said first plates and thus to said conductive filaments whereby the air at said filaments is ionized, said voltage source having a second output coupled to said conductive layer.

4,096,545

ELECTRICAL APPLIANCE WITH ADAPTER SEATABLE UPON A BASE UNIT

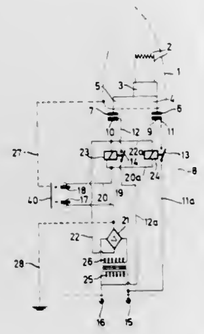
Emmy Helwig, Gladbacher Strasse 224, D-5151 Esch, Germany

Filed Feb. 4, 1977, Ser. No. 765,822

Claims priority, application Germany, Feb. 5, 1976, 2605129

Int. Cl.² H02B *1/16*

U.S. Cl. 361—380 **12 Claims**



1. A combination comprising a cordless electrical appliance; an adapter unit provided on the appliance; and a base unit, supply-voltage-connection contacts on the base unit for connection to a supply voltage, two appliance-current-path contacts on the base unit, means in the base unit defining an appliance-current path connected between the supply-voltage-connection contacts and the appliance-current-path contacts, a step-down transformer in the base unit having a primary winding connected across the supply-voltage-connection contacts and having a secondary winding, means in the base unit defining an auxiliary current path connected across the secondary winding, two auxiliary-current-path contacts provided on the base unit connected in the auxiliary current path and serving to close the auxiliary current path when electrically connected together, a relay device in the base unit connected in the auxiliary current path and including a relay switch in the base unit connected in the appliance-current path, the relay device closing the relay switch when the auxiliary current path is closed, grounding means in the base unit for connection to ground, two appliance-current-path contacts on the adapter unit electrically connected to the internal circuitry of the electrical appliance, connecting means on the adapter unit for electrically connecting together the two auxiliary-current-path contacts of the base unit, grounding means in the adapter unit for grounding the electrical appliance, the base unit and the adapter being so configured, and the contacts and grounding means of the base unit and the contacts, grounding means and connecting means of the adapter unit being so located on the base unit and the adapter unit, respectively, that when the adapter unit is placed upon the base unit in a single predetermined position relative thereto, the appliance-current-path contacts of the adapter unit engage those of the base unit, the connecting means of the adapter unit electrically connects together the auxiliary-current-path contacts of the base unit, and the grounding means of the adapter unit becomes electrically connected to the grounding means of the base unit.

4,096,546

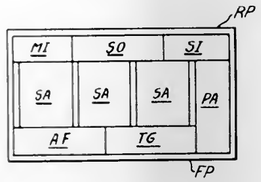
HEAT SINK ASSEMBLY MOUNTING ELECTRIC CIRCUIT BOARDS

Saad Zaghloul Mohamed Gabr, Canterbury, England, assignor to A.R.D. Anstalt, Vaduz, Liechtenstein

Continuation of Ser. No. 492,976, Jul. 26, 1974, abandoned. This application Jun. 14, 1976, Ser. No. 695,569

Int. Cl.² H05K *7/20*

U.S. Cl. 361—383 **8 Claims**



1. A heat sink assembly for mounting electric circuit boards, comprising at least a pair of spaced parallel vertical metal plates (**2, 4** in FIG. **2**; **60, 70** in FIG. **5**), a pair of spaced horizontal top and bottom metal plates (**10, 30** in FIG. **2**; **90, 80** in FIG. **5**) in good thermal contact with at least one of said vertical plates, a horizontal circuit board (**B** in FIG. **2**; **78** in FIG. **5**) supported by said assembly and spaced from and disposed between said top and bottom plates, and a heat generating electrical circuit element (**A** in FIG. **2**; **68** in FIG. **5**) spaced between said vertical plates and disposed above said horizontal circuit board, said verticl and horizontal metal plates providing a heat sink for said element, said top plate and said horizontal circuit board and said at least a pair of spaced parallel vertical metal plates defining between them a channel whose upper side is closed by said top plate and which contains said circuit element, there being a second channel between said horizontal circuit board and said bottom plate, said bottom plate closing the lower side of said second channel, whereby said vertical and horizontal metal plates provide electrostatic shielding for said circuit element and said horizontal circuit board.

4,096,547

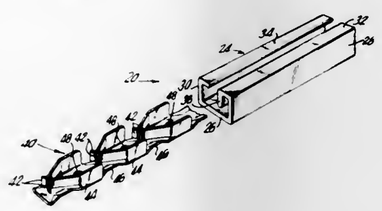
HEAT TRANSFER MOUNTING DEVICE FOR METALLIC PRINTED CIRCUIT BOARDS

Anthony D. Calabro, 8738 W. Chester Pike, Upper Darby, Pa. 19082

Filed Dec. 17, 1976, Ser. No. 751,272

Int. Cl.² H02B *1/04;* **H05K** *1/00;* **H01R** *13/20*

U.S. Cl. 361—388 **13 Claims**



1. A mounting device for printed circuit boards having improved heat transfer capabilities comprising:

an elongated generally U-shaped heat transfer support member made of a metallic material and being of generally uniform thickness, said support member including a base and two upstanding arm portions, each of said arm portions including an inwardly directed flange disposed generally parallel to said base, said flanges being spaced a sufficient distance to enable the passage therethrough of the edge of the printed circuit board, and with one of said flanges having a heat conductive element extending therefrom for directly engaging the printed circuit board to facilitate the conductive transfer of heat from said printed circuit board; and

printed circuit board engaging means wholly disposed in said U-shaped heat transfer support member for resiliently engaging and holding said printed circuit board.

4,096,548

MOUNTING STRUCTURE FOR A PRINTED BOARD

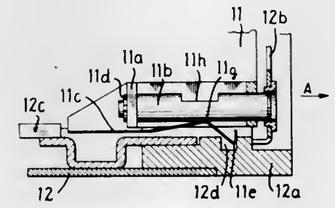
Shigemi Misono, and Yukio Fujimi, both of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed May 18, 1977, Ser. No. 798,083

Claims priority, application Japan, May 18, 1976, 51-63049[U]

Int. Cl.² H02B *1/02*

U.S. Cl. 361—399 **6 Claims**



1. A mounting structure for a printed circuit board, comprising a rack frame having guide rails to receive the circuit board, leaf spring mounted flexibly on said circuit board and having a detent portion engageable in a recess in said rack frame to retain said circuit board in fixed position in said rack frame, and a rod member cooperating with said leaf spring and operable to disengage said detent portion from said recess to release said circuit board for removal from said rack frame.

4,096,549

MULTILAMP PHOTOFLASH ASSEMBLY

Lester F. Anderson, deceased, late of San Diego, Calif. (by Emma M. Anderson, administratix); John J. Vetere, Danvers, Mass., and William J. Harvey, Montoursville, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Nov. 9, 1976, Ser. No. 740,278

Int. Cl.² G03B *15/02*

U.S. Cl. 362—11 **12 Claims**

1. A multilamp photoflash assembly comprising:

an elongated housing defining first and second separate regions therein, said housing including a first mounting structure thereon located adjacent said first region and a second mounting structure thereon located adjacent said second region;

a plurality of percussively-ignitable flashlamps positioned within each of said first and second regions;

a plurality of pre-energized striking mechanisms positioned within each of said first and second regions, each of said striking mechanisms associated with a respective one of said flashlamps for firing said flashlamp upon actuation thereof; and

actuation means movably positioned within said housing and extending through said first and second regions for actuating said striking mechanisms in said first region in response to a mechanical actuation input from said second mounting structure and for actuating said striking mechanisms in said second region in response to a mechanical actuation input from said first mounting structure.

4,096,550

ILLUMINATING ARRANGEMENT FOR A FIELD-EFFECT LIQUID-CRYSTAL DISPLAY AS WELL AS FABRICATION AND APPLICATION OF THE ILLUMINATING ARRANGEMENT

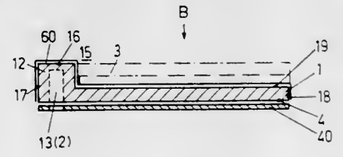
Walter Boller; Marco Donati, both of Zurich; Jürg Fingerle, Boniswil, and Peter Wild, Wettingen, all of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 15, 1976, Ser. No. 732,752

Claims priority, application Switzerland, Jun. 24, 1976, 8067/76

Int. Cl.² F21V *7/04*

U.S. Cl. 362—31 **9 Claims**



1. An illuminating arrangement for a field-effect-liquid-crystal display comprising:

a transparent plate of homogeneous constitution, which acts as a light distributor, being disposed on the reverse side of the liquid-crystal display, said plate having a thickened portion at one side thereof in which a recess is formed, said recess being accessible from the surface of said plate on the side away from the liquid-crystal display, and said surface of said plate on the side away from the said liquid-crystal display being smooth;

a light source disposed in said recess of said thickened portion of said plate; and

a continuous reflecting film of low transparency and not a roughened surface surface comprising mixtures of transparent pigments and transparent binding agents having different indices of refraction being provided on the surface of said plate next to said liquid-crystal-display, on the surface of said thickened portion thereof and on the end surfaces of said plate to function as a background for daylight operation, the film having a thickness yielding a transmission of white light less than 20% to return sufficient incident light in daylight operation to produce a high contrast readout from the liquid-crystal display.

4,096,551

LAMP MOUNTING SYSTEM

Lorrain Wilbert Prester, Dorchester, Nebr., assignor to Plexi-Lite Mfg., Inc., Lincoln, Nebr.

Filed Sep. 10, 1976, Ser. No. 721,963

Int. Cl.² B60Q *1/32*

U.S. Cl. 362—83 **6 Claims**

1. A lighting assembly comprising:

seven straight sections;

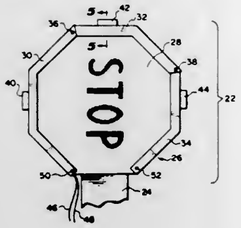
each of said sections being substantially U-shaped and having two legs and a connecting member;

certain of said seven sections being integrally formed with

other of said seven sections and forming a 135° angle therewith;

at least two of said seven sections being hinged together, whereby said seven sections may be formed into a figure encompassing seven sides of an octagon or opened a distance greater than any diameter of the aforesaid octagon;

at least one lamp mounted to the connecting member of at least one of said sections so as to extend therefrom;



said lamp being electrically connected to conductors mounted within the legs of said U-shaped members of said seven sections;

said lamp including an incandescent lamp member and a clear plastic housing;

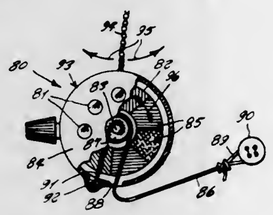
said incandescent lamp member being embedded in said clear plastic housing, whereby said assembly is shock resistant.

4,096,552

ELECTRIC JEWELS

Josef Ben-Porat, 3014 Brighton 8th St., Brooklyn, N.Y. 11235

Filed Dec. 2, 1975, Ser. No. 636,928
Int. Cl.² F21V *33/00*
U.S. Cl. 362—104 **1 Claim**



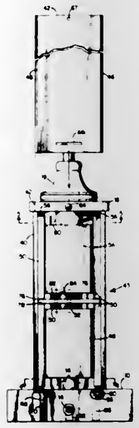
1. An ornament with a flashing light adapted to be worn by a person comprising a case having a front wall with apertures therethrough wherein over each aperture a colored lens is mounted externally on said wall, in combination a lamp provided with a flasher unit mounted internally in said case in alignment with said lamp, including a battery and a switch in said case electrically connected with the lamp and a flasher unit, including external means on said case for actuating the switch to cause emission of flashing light through said lens, including means for mounting the ornament on a person, wherein the ornament is a cylindrical pendant with a circumferented side wall and the first said means comprises a push button mounted on said side wall and the second said means comprises a necklace secured to the case, or wherein the second said means comprises a hat with the case mounted on said hat, including a plurality of similar spaced lamps, apertures and lamps with flasher units combined in an electrical circuit within the case, in combination with a movable light transmitting disc mounted in said case between said apertures and said lamps, said disc having sectors of different colors, including means secured to the disc and extending externally through the case for moving the disc in a desired manner.

4,096,553

EMERGENCY TABLE LAMP

Thomas F. Roche, 21 W. Main St., Merrimac, Mass. 01860

Filed Sep. 13, 1976, Ser. No. 723,045
Int. Cl.² F21L *11/00*
U.S. Cl. 362—183 **5 Claims**



1. An emergency table lamp comprising:

a hollow, elongate lamp body;

at least one AC line voltage socket for holding a line voltage bulb;

at least one low voltage socket for holding a low voltage bulb;

an independently-removable, rechargeable battery having a pair of spring terminals on one end thereof;

an independently-removable charger assembly within a housing having a pair of spring terminals on one end thereof;

means for applying line voltage to said AC socket and to said charger assembly;

an insulating contact plate having a first pair of electrically conductive buses on the upper surface thereof and a corresponding second pair of electrically conductive buses on the lower surface thereof located directly beneath said first pair of buses, each of said first pair of buses being electrically connected to a respective one of said second pair of buses;

means for securing said contact plate within the lamp body for dividing the interior thereof into upper and lower compartments;

the charger assembly and the battery being located in said upper and lower compartments so that the spring terminals of each are compressed and in contact with the buses of said contact plate to provide electrical interconnection between respective terminals of the charger assembly and battery, and to hold the charger assembly and battery in place by means of the forces exerted by said spring terminals;

means in said charger assembly operative in response to AC line voltage to provide a current to the charger assembly terminals for charging the battery through said buses; and

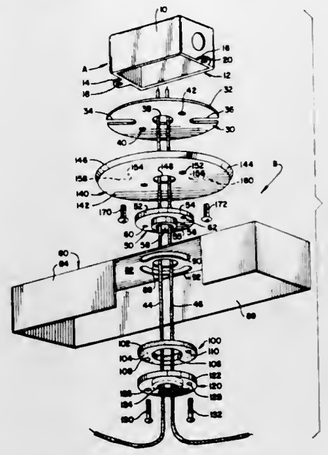
means in said charger assembly operative in response to a loss of AC line voltage to the charger assembly for connecting said battery terminals through said buses to the low voltage bulb.

4,096,554

ROTATIONAL COLLAR ALIGNMENT DEVICE

Albert Alfonso Greene, Cleveland, Ohio, assignor to Conserve-A-Watt Corporation, North Canton, Ohio

Filed Oct. 19, 1976, Ser. No. 734,019
Int. Cl.² F21S *3/00;* **F21V** *19/02*
U.S. Cl. 362—220 **16 Claims**



1. A self-contained fluorescent lamp fixture comprising in combination:

a cover plate for mounting said fixture to an electrical outlet box;

a fixture body cover in operative association with said cover plate and which is adapted to receive and support a fluorescent light tube and its operative components, said fixture body cover including means for locating said body cover relative to said cover plate while permitting said body cover to be selectively rotated relative thereto about an axis disposed generally normal to the plane of said fixture body cover;

force means for continuously exerting a biasing force against said fixture body cover to urge said fixture body cover toward engagement with said cover plate to retain said fixture body cover in a desired position relative thereto, said force means allowing forced rotational movement of said fixture body cover relative to said cover plate for alignment purposes; and

a cover plate shield interposed between said cover plate and fixture body cover for disguising the interconnection between said cover plate and outlet box.

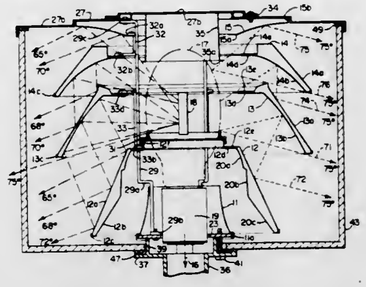
4,096,555

LIGHTING FIXTURES

Martin L. Lasker, Edison, N.J., assignor to Wylain, Inc., Dallas, Tex.

Filed Oct. 28, 1976, Ser. No. 736,317
Int. Cl.² F21V *13/04*
U.S. Cl. 362—302 **40 Claims**

1. A light fixture comprising a light source, a reflector system surrounding said light source shaped and arranged to concentrate light in a first angular range measured from downward vertical and provide progressively decreasing intensity of projected light with changes in the angle of projection from said range to downward vertical, said reflector system including an upper, middle and lower nested reflectors generally frustoconical in shape having a common vertical axis passing through said source, the upper one of said reflectors having an inner reflecting surface facing inwardly and downwardly, the lower one of said reflectors having an outer reflecting surface facing outwardly and upwardly and the middle one of said reflectors having an inner reflecting surface facing inwardly and downwardly and an outer reflecting surface facing upwardly and outwardly, said reflectors being shaped and arranged so that light radiated by said source is reflected by the reflecting surface of said upper reflector to the outer reflecting surface of said middle reflector and then re-reflected in said first angular range, light radiated by said source is reflected



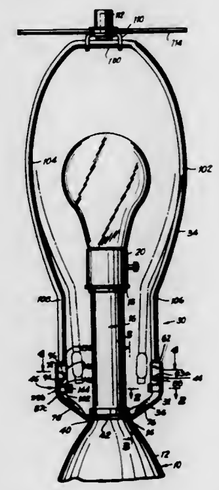
from the inner reflecting surface of said middle reflector and then re-reflected by the reflecting surface of said lower reflector in said first angular range, and light radiated by said source will pass without reflection between said middle and lower reflectors and be projected in a second angular range measured from downward vertical extending below said first range.

4,096,556

LAMP HARP

Sidney Berger, Great Neck, and Salvatore Buda, East Hills, both of N.Y., assignors to Berger Industries, Inc., Maspeth, N.Y.

Filed Nov. 4, 1976, Ser. No. 739,024
Int. Cl.² F21V *17/00*
U.S. Cl. 362—417 **5 Claims**



1. A lamp harp comprising:

(a) a bracket having a base portion and a pair of upwardly directed bracket arms having hollow interiors on diametrically opposite ends of said base portion;

(b) a channel portion on each of said bracket arms formed by a pair of opposed parallel side walls and a base wall, said side walls directed toward the other of said channels and terminating in free longitudinal inner side edges and free top edges;

(c) a generally U-shaped portion joining said channels to said base having outwardly flaring, diverging side walls;

(d) a resilient wire bail having a pair of opposed legs respec-

tively terminating in elongated free end portions, each of said end portions having an end face;

(e) each of said pair of opposed parallel side walls constructed and arranged to slidingly receive one of said pair of end portions; and

(f) means on said bracket arms and said elongated free end portions for selectively securing each of said pair of end portions in its associated bracket arm constructed and arranged to permit lateral outward movement of said end portions into said bracket arms to a first position therein and lateral inward movement of said end portions from said bracket arms when said end portions are in said first position, said means further constructed and arranged to selectively secure said end portions in said bracket arms to prevent lateral inward movement of said end portions from said bracket arms when said end portions are slidingly displaced longitudinally downwardly to a second position with respect to said bracket arms, said means permitting limited upward and downward longitudinal movement of said end portions in said bracket arms between said first and said second positions.

4,096,557

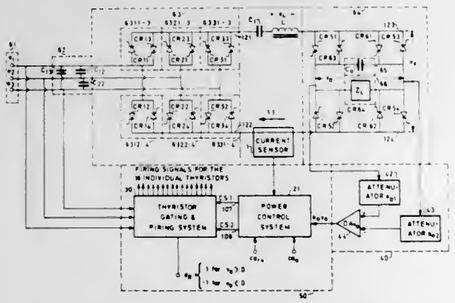
CONTROLLABLE FOUR QUADRANT A.C. TO A.C. AND D.C. CONVERTER EMPLOYING AN INTERNAL HIGH FREQUENCY SERIES RESONANT LINK

Francisc C. Schwarz, Round Hill Rd., Lincoln, Mass. 01773

Continuation-in-part of Ser. No. 474,788, May 30, 1974, Pat. No. 3,953,779. This application Dec. 29, 1975, Ser. No. 645,208

Int. Cl.[2] H02M *5/45*

U.S. Cl. 363—9 **17 Claims**



1. A high frequency link converter for transferring electrical power between a first power system and a second power system with each of the power systems operating with at lest two power system connectors, comprising in combination:

capacitor means;

inductor means connected to said capacitor means forming a series resonant circuit with said capacitor means;

a first and a second set of controllable switch means connecting said series resonant circuit between the first and second power system connectors;

said first and second set of controllable switch means capable of controlling supply and return current between the first and second power systems connectors:

control means connected for selectively energizing at least two switch means of each of said first and second sets of controllable switch means in accordance with the available potential between one of said first and second power system connectors to transfer electrical power between the first and the second power systems through successive alternate directional current flows into and out of either side of said series resonant circuit and into and out of the first and second power system connectors;

said control means including current sensor means for providing a current sensor output in accordance with the current flow relative to said capacitor means;

a current reference output;

means providing an algebraic summing output of said current sensor output and said current reference output;

integrator means for integrating said summing output; and

means receiving the output of said integrator means for activating conduction of said switch means to substantially control the average current for each half cycle of oscillation of operation of said resonant circuit.

4,096,558

METHOD OF CONTROLLING A THREE-PHASE INVERTED RECTIFIER AND EQUIPMENT FOR CARRYING OUT THIS METHOD

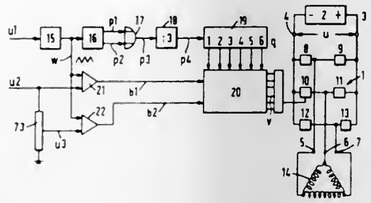
Arne Jensen, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed Dec. 1, 1976, Ser. No. 746,390

Claims priority, application Germany, Dec. 3, 1975, 2554222

Int. Cl.[2] H02M *1/12*

U.S. Cl. 363—41 **15 Claims**



1. A method of controlling a three-phase inverted rectifier with a constant DC voltage supply and adjustable frequency and amplitude of the fundamental oscillation of the interlinked output voltage, particularly for feeding an AC motor, wherein the output voltage is formed alternately by the one and the other potential of the DC voltage supply and each half-wave of the phase voltages leads the associated potential continuously in first zones and in the form of impulses of variable width in second zones, comprising the steps of dividing each half-wave into six intervals of 30° each, forming a first zone with a constant voltage level in said third and fourth intervals, forming a second zone with n pulses in the second and fifth intervals of the width 2B, and forming a third zone with n pulses in the first and sixth intervals of the width X·2B, wherein $0.5 < X < 1$, $n \geqq 1.5$ and B is variable.

4,096,559

POWER SUPPLY CIRCUIT

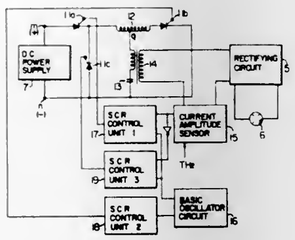
Hiroshi Sakurada, and Toshihiko Tojo, both of Mobara, Japan, assignors to Hitachi, Ltd., Japan

Filed Jun. 7, 1977, Ser. No. 804,385

Claims priority, application Japan, Jul. 23, 1976, 51-87265

Int. Cl.[2] H02M *7/515*

U.S. Cl. 363—96 **9 Claims**



1. A power supply circuit comprising:

an inverter circuit including first and second switching elements adapted to be alternately turned on, a commutating reactor connected in series with said switching elements, and at least one commutating capacitor connected to a center tap of said commutating reactor;

a transformer having a primary winding connected to an output of said inverter circuit and a secondary winding;

a third switching element connected in parallel with a series circuit including said commutating capacitor, said primary winding and a portion of said commutating reactor; and

control means for controlling the operation of said first, second and third switching elements;

said third switching element being energized by said control means to establish a discharging loop for said commutating capacitor through said series circuit, whereby an amplitude of a current supplied to said transformer is limited below a predetermined level.

4,096,560

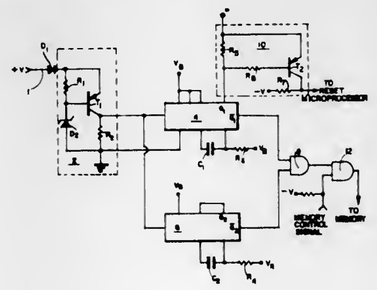
PROTECTION CIRCUIT TO MINIMIZE THE EFFECTS OF POWER LINE INTERRUPTIONS ON THE CONTENTS OF A VOLATILE ELECTRONIC MEMORY

John W. Footh, Orange, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 28, 1977, Ser. No. 846,480

Int. Cl.[2] G06F *1/00*; G11C *13/00*

U.S. Cl. 364—200 **7 Claims**



1. In a system including an electronic memory and a microprocessor to control the reading or writing of data into said memory, a protection circuit to prevent the loss or alteration of memory data as a result of power line interruptions, said protection circuit comprising:

power level detecting means having input and output terminal means, said level detecting means sampling the line power at said input terminal means thereof,

first and second multivibrator devices connected to said output terminal means of said level detecting means, said first multivibrator device responsive to increasing power levels and said second multivibrator device responsive to decreasing power levels, and

microprocessor and memory control gates connected to said first and second multivibrator devices in order to receive output signals therefrom that are indicative of either an out of tolerance power line interruption or in tolerance power line stabilization,

said microprocessor and memory control gates adapted to selectively apply respective control signals to said microprocessor and to said memory to, thereby, inhibit the reading or writing of data into said memory and to maintain said microprocessor in a reset mode of operation during the occurrence of undesirable power line interruptions.

4,096,561

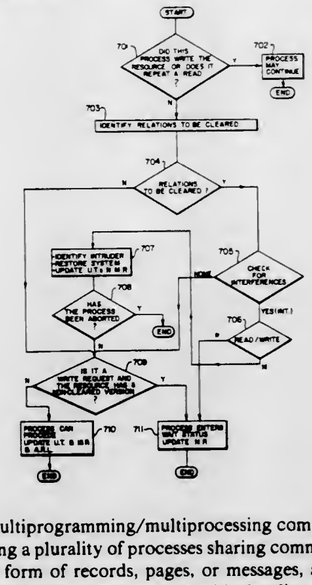
APPARATUS FOR THE MULTIPLE DETECTION OF INTERFERENCES

Mario G. Trinchieri, Weston, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Oct. 4, 1976, Ser. No. 729,536

Int. Cl.[2] G06F *15/16*

U.S. Cl. 364—200 **17 Claims**



1. In a multiprogramming/multiprocessing computer system for executing a plurality of processes sharing common information in the form of records, pages, or messages, an apparatus for identifying those processes of said plurality of processes which would interfere with a first predetermined process executing on said computer system when said first predetermined process accesses the common information, said apparatus comprising:

(a) first means for storing coded signals indicating the history of utilization of the common information by any one of said plurality of processes; and

(b) second means coupled to be responsive to said first means for identifying those processes of said plurality of processes whose history of utilization of common information causes interference with said first predetermined process.

4,096,562

CLOSED LOOP CONTROL SYSTEMS AND CONTROL DEVICES FOR SUCH SYSTEMS

Hans Linz, Kriens-Luzern, Switzerland, assignor to Viscosuisse S.A., Emmenbrucke, Switzerland

Filed Apr. 13, 1977, Ser. No. 787,138

Claims priority, application United Kingdom, Apr. 14, 1976, 15418/76

Int. Cl.[2] G05B *13/02*

U.S. Cl. 364—105 **2 Claims**

1. A process for the automatic control of a variable x comprising:

generating a preselected signal Uk,

generating a reference signal Ui substantially linearly with time t such that

$$Ui = c + K \cdot Uk \cdot t$$

where c and K are constants,

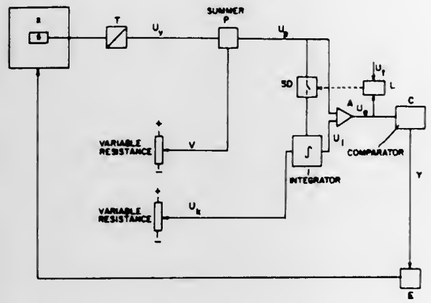
limiting the range of the reference signal Ui between preselected limits + UL and − UL such that

$$-UL \leqq Ui \leqq +UL,$$

generating a set point signal V which represents a set point value *xd* of a controlled variable *x*,

generating a signal U*p*, which is correlated to the value of said controlled variable *x* and which is dependent on said set point signal V such that

$$Up = a + b \cdot x + V,$$



wherein *a* and *b* are constants and said signal U*p* equals one of said limits ± UL when the controlled variable *x* reaches said set point value *xd*,

generating an error signal U*e* which is proportional to the difference between said U*p* and U*i* signals,

generating a threshold signal U*t* comparing the error signal U*e* with the preselected threshold signal U*t*, and

automatically setting the reference signal U*i* to the value of the signal U*p* when the modulus of the error signal U*e* exceeds the threshold signal U*t*.

4,096,563

MACHINE TOOL CONTROL SYSTEM AND METHOD

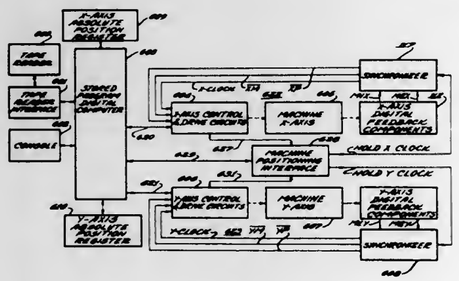
Kenneth Leonard Slawson, Clarence, N.Y., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Continuation of Ser. No. 421,103, Dec. 3, 1973, and Ser. No. 426,602, Dec. 20, 1973, abandoned, which is a division of Ser. No. 150,637, Jun. 7, 1971, Pat. No. 3,816,723, which is a continuation of Ser. No. 744,392, Jul. 12, 1968, Pat. No. 3,634,662, which is a continuation-in-part of Ser. No. 652,968, Jul. 12, 1967, abandoned. This application Jul. 29, 1975, Ser. No. 600,185

The portion of the term of this patent subsequent to Jan. 11, 1989, has been disclaimed.

Int. Cl.[2] **G06F** *15/46;* **B23Q** *21/00*

U.S. Cl. 364—107 **61 Claims**



1. A unitized machine tool control system for a single machine tool, operable both for generating new machine tool control instructions for the machine tool and for controlling movement of parts of the machine tool relative to respective machine tool axes in accordane with a previously established sequence of machine tool control instructions, said utilized machine tool control system comprising:

(a) manually controlled input means operable to produce coded input signals as manually selected by an operator,

(b) source means for supplying successive machine tool control instructions of a previously established sequence,

(c) stored program digital computer means operable to receive said coded input signals and said previously established sequence of machine tool control instructions, including computer memory means providing for the storage therein and retrieval therefrom of machine tool control instructions, and computer output means, and said stored program digital computer means being operable in a first mode to transmit to said computer memory means machine tool control instructions in accordance with coded input signals from said manually controlled input means and being operable in a second mode to transmit to said computer memory means machine tool instructions in accordance with a previously established sequence supplied from said source means and being operable in a third mode to transmit to said computer output means digital command signals in accordance with a previously established sequence of machine tool control instructions,

(d) plural axis closed loop machine tool control means operatively connectable to the respective parts of the machine tool and responsive to said digital command signals to control movements of the parts of the machine tool relative to the respective machine tool axes in accordance therewith, and

(e) on-line connection means interconnecting said manually controlled input means, said source means and said stored program digital computer means and including multiconductor computer bus cable means extending from said computer output means of said stored program digital computer means to said closed loop machine tool control means for interconnecting said stored program digital computer means and said plural axis closed loop machine tool control means, thereby to form one complete unitized device providing for on-line manual generation of machine tool control instructions, on-line editing of a previously established sequence of machine tool control instructions, and on-line operation of the machine tool in accordance with a previously established sequence of machine tool control instructions.

4,096,564

DATA PROCESSING SYSTEM WITH INTERRUPT FUNCTIONS

Fumiyuki Inose, and Yuzo Kita, both of Kokubunji, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 14, 1974, Ser. No. 432,871

Claims priority, application Japan, Dec. 1, 1973, 48-5941

Int. Cl.[2] **G06F** *15/16, 9/18*

U.S. Cl. 364—200 **8 Claims**

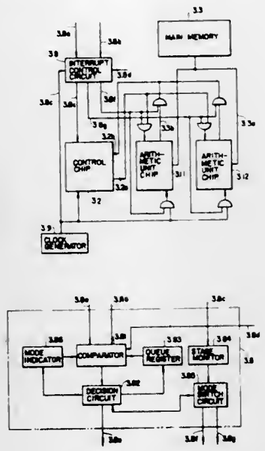
1. A data processing interrupt system comprising:

first and second arithmetic units for processing emergent tasks and non-emergent tasks respectively with only one arithmetic unit operating at a time;

memory means, connected to said first and second arithmetic units for storing data from said first and second arithmetic units;

means for requesting an interrupt of a task; and

control means, connected to said first and second arithmetic units and said requesting means, for selecting one of either an interrupt task requested by said requesting means and a task being processed by one of said first and second arithmetic units in response to the priority levels of both tasks and for operating the first or second arithmetic unit in



dependence upon whether a selected task is an emergent task or a non-emergent task.

4,096,565

INTEGRATED CIRCUIT DATA HANDLING APPARATUS FOR A DATA PROCESSING SYSTEM, HAVING A PLURALITY OF MODES OF OPERATION

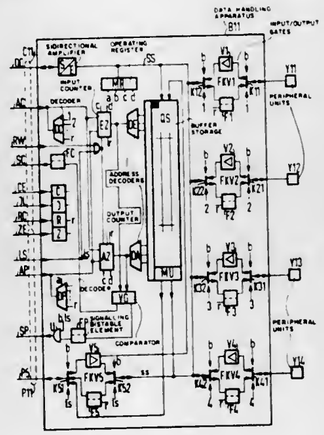
Hermann Ruckdeschel, Gauting, and Thomas Rambold, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 20, 1976, Ser. No. 678,622

Claims priority, application Germany, Apr. 21, 1975, 2517565

Int. Cl.[2] **G06F** *3/04, 13/00*

U.S. Cl. 364—200 **4 Claims**



1. Data handling apparatus constructed as an integrated circuit on a single substrate for use in a data processing system including at least two control units and said data handling apparatus comprising:

a plurality of input/output gates for connecting peripheral units in said data processing system to said data handling apparatus for receiving data from said system in said data handling apparatus and for supplying the data to said data processing system,

storage means having storage locations for, at least temporarily, storing data to be processed, said storage locations forming a part of a data path between portions of said data processing system through said input/output gates,

input counter means for generating addresses indicating storage locations in said storage means to which data from said input/output gates is to be coupled,

output counter means for generating addresses indicating storage locations in said storage means from which data is to be coupled to said input/output gates,

mode switching means in said input and output counter means for selecting, respectively, one of a plurality of modes of operation for said input and output counter means, said modes including one in which data is stored in and emitted from individual storage locations, another in which blocks of data are stored in and emitted from groups of said storage locations, and a third in which said input and output counter means receive and register externally supplied addresses for selecting said storage locations and

operational register means for receiving and storing control data supplied by a control unit of said data processing system for operating said mode switching means to select and operate according to one of said modes of operation, said input/output gates comprising

an input amplifier, an output bistable circuit connected in parallel therewith and electronic coupling means for making operative the amplifier or the bistable circuit, responsive to the content of said operational register means,

said input/output gates each being operable upon receipt of appropriate control data to connect said storage means in the data path between control units of the data processing system.

4,096,566

MODULAR SIGNAL PROCESSOR HAVING A HIERARCHICAL STRUCTURE

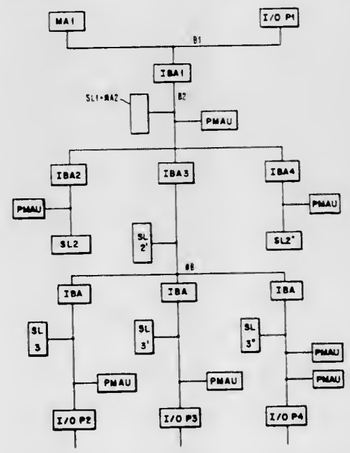
Jean-Claude Borie, Antibes; Alain Couder, LaGaude; Alain Dauby, Nice; Michel Demange, St. Jeannet; Gerald Lebizay, and Michel Lechaczynski, both of Nice, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 16, 1975, Ser. No. 641,202

Claims priority, application France, Dec. 27, 1974, 74 43561

Int. Cl.[2] **G06F** *3/05, 7/38;* **H04J** *3/12*

U.S. Cl. 364—200 **6 Claims**



1. A digital signal processing system for modifying time-varying input signals by performing one of a number of predetermined series of mathematical functions on samples of said time-varying input signals to provide samples of time-varying output signals of said system, said system including:

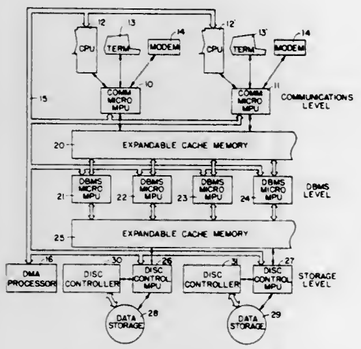
an input means receiving samples in digital form of signals to be processed;
an output means to supply samples of processed signals;
a plurality of subsytems connecting said input and output means, each subsystem including:
at least one input/output port for interconnection with one or more of said input means or said output means;
a bidirectional bus for interconnection with said at least one input/output port,
a control unit connected to said bidirectional bus to receive samples of said time-varying input signals from said port and to generate control words in response thereto;
at least one arithmetic unit connected to said bidirectional bus to receive data and control words from said control unit for performing mathematical operations on said data, said mathematical operations comprising multiplications of data terms and summations of the products of said multiplications to represent samples of said time-varying output signals; and
interbus adapting means for coupling said busses of said subsystems in a tree type structure of a plurality of levels having master-slave relationships between subsystems of different levels for increasing the processing power of the digital signal processing system.

4,096,567

INFORMATION STORAGE FACILITY WITH MULTIPLE LEVEL PROCESSORS

William H. Millard, 2816 Darius Way, San Leandro, Calif. 94577; Allan J. Killian, 427 Boynton, Berkeley, Calif. 94707, and Bruce A. Van Natta, 14860 Wicks Blvd., San Leandro, Calif. 94577

Filed Aug. 13, 1976, Ser. No. 714,212
Int. Cl.[2] G06F *15/16, 15/40, 13/00*
U.S. Cl. 364—200 **8 Claims**



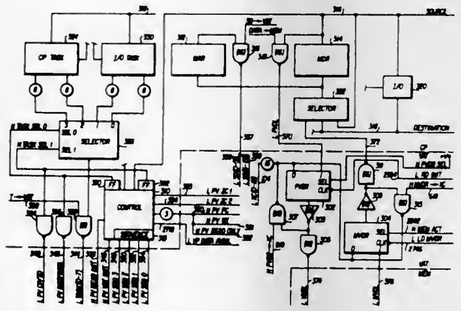
1. A multi-level information storage facility for storing data base information in digital form and for enabling symbolic access to such information in response to information request signals from an external processing device, said facility comprising:
a communications level processor means having an input-/output port means for receiving said information request signals from said external processing device, said communications level processor means including means for initiating internal processing of said request signals and means for generating acknowledgment signals for transmission to said external processing device via said input/output port means;
an intermediate level processor means for providing intermediate level processing of said request signals;
first shared memory means coupled to said communications level and said intermediate level processor means for enabling data communication therebetween, said first shared memory means including a first cache memory device for storing initiating request signals generated by said communications level processor means and for storing resultant task signals generated by said intermediate level processor means;
said intermediate level processor means including seek means for interrogating said first cache memory device in a predetermined sequence for said initiating request signals, means for generating intermediate level instruction signals in response to the detection of said initiating request signals, and means for storing said resultant task signals in said first cache memory device;
storage level processor means having an input/output port means adapted to be coupled to a data storage device for controlling operation thereof; and
second shared memory means coupled to said intermediate level and said storage level processor means for enabling data communication therebetween, said second shared memory means including a second cache memory device for storing said intermediate level instruction signals from said intermediate level processor means and for storing data received from said storage level processor means;
said storage level processor means including means for interrogating said second cache memory device for said intermediate level instruction signals, means for generating storage level instruction signals in response to the detection of said intermediate level instruction signals for controlling storage and retrieval of portions of said data base information from said storage device, and means for storing said data received from said storage device in said second cache memory device.

4,096,568

VIRTUAL ADDRESS TRANSLATOR

Donald Bruce Bennett, Burnsville; Leo John Slechta, Jr., Minneapolis, and Thomas Ormond Wolff, Fridley, all of Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sep. 24, 1976, Ser. No. 726,371
Int. Cl.[2] G06F *9/20, 13/00*
U.S. Cl. 364—200 **6 Claims**



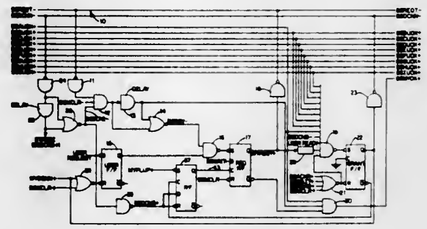
1. In a virtual addressing system including a central processor, a main memory having addressable word locations, a virtual address translator responsive to virtual addresses from said central processor for accessing a word location in said main memory, and means for transferring a word between an accessed location in said main memory and said central processor, the improvement comprising:
means in said central processor for storing first and second task names defining instruction storage space and operand storage space, respectively,
means in said central processor for generating subsegment and deflection field portions of a virtual address each time said memory is to be accessed; and,
means in said central processor for selecting said first or said second task name as a portion of the virtual address depending upon whether said virtual address, after translation, is for accessing said main memory for instruction or operand purposes, respectively.

4,096,569

DATA PROCESSING SYSTEM HAVING DISTRIBUTED PRIORITY NETWORK WITH LOGIC FOR DEACTIVATING INFORMATION TRANSFER REQUESTS

George J. Barlow, Tewksbury, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 27, 1976, Ser. No. 754,480
Int. Cl.[2] G06F *3/04*
U.S. Cl. 364—200 **13 Claims**



1. In a data processing system having a plurality of units coupled to transfer information over a common electrical bus, each of said units capable of either or both transferring or receiving information, a distributed priority network, said network including priority logic in each of said units, said priority logic comprising:
A. first bistable means for asynchronously indicating that a representative unit is ready to transfer information over said bus;
B. second bistable means, responsive to said first bistable means indicating that said representative unit is ready to transfer information over said bus, for generating a first signal on said bus indicating to each of said units that said representative unit is ready to transfer information over said bus;
C. means, responsive to the absence of a said first signal from said second bistable means in each of said units having a higher priority than said representative unit, for indicating that said representative unit is the highest priority unit;
D. third bistable means, responsive to said first signal generated by said second bistable means and an indication that there is no other higher priority unit ready to transfer information over said bus, for generating a second signal on said bus;
E. means, responsive to the receipt of said second signal from said bus, for generating a strobe signal for enabling the receipt of information from said representative unit;
F. first means, responsive to an acknowledgement that said information has been received, for disabling said third bistable means of said representative units; and
G. second means, responsive to the disabling of said third bistable means, for disabling said second bistable means of said representative unit.

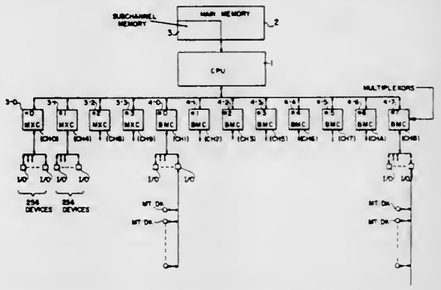
4,096,570

SUBCHANNEL MEMORY ACCESS CONTROL SYSTEM

Masamichi Ishibashi, and Shigeru Miyajima, both of Tokyo, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 29, 1975, Ser. No. 644,508
Claims priority, application Japan, Dec. 29, 1974, 50-777
Int. Cl.[2] G06F *3/04, 13/00*
U.S. Cl. 364—200 **10 Claims**

1. In a data processing system comprising:
a central processor,
a plurality of input/output devices having corresponding device numbers and being of at least first and second types having corresponding first and second type data transfer characteristics,
at least one channel of a first type adapted for transfer of data between said central processor and said first type input-/output devices, and
at least one channel of a second type adapted for transfer of data between said central processor and said second type input/output devices,
input/output control means of a first type operatively associated with said at least one channel of said first type for controlling the transfer of data between said central processor and said plurality of input/outut devices on a time-sharing basis, and
input/output control means of a second type operatively associated with said at least one channel of said second type for controlling the transfer of data between said central processor and said plurality of input/output devices on a non-time-sharing basis;
a subchannel memory access control system comprising:
subchannel memory means for storing unit control words used for enabling said data transfer to and from corresponding ones of said input/output devices, said subchannel memory means including a plurality of first addressable unit control word memory domains each assigned to hold unit control words which indicate the corresponding ones of said first type devices to or from which data is to be transferred, and a plurality of second addressable unit control word memory domains each assigned to hold unit control words which indicate the corresponding said second type input/output control means through which data is to be transferred, and
subchannel memory addressing means for holding address information and responsive to any given device number corresponding to a given one of said first type devices or to a given one of said second type devices for accessing corresponding said first unit control word memory domain according to the device number of said given one of said first type devices, and for accessing corresponding said second unit control word memory domain according to the device number of said given one of said second type devices.



4,096,571

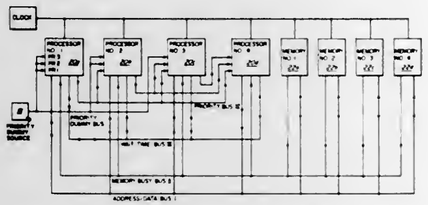
SYSTEM FOR RESOLVING MEMORY ACCESS CONFLICTS AMONG PROCESSORS AND MINIMIZING PROCESSOR WAITING TIMES FOR ACCESS TO MEMORY BY COMPARING WAITING TIMES AND BREAKING TIES BY AN ARBITRARY PRIORITY RANKING

James E. Vander Mey, Newtonville, Mass., assignor to Codex Corporation, Newton, Mass.

Filed Sep. 8, 1976, Ser. No. 721,375
Int. Cl.[2] G06F *13/00*
U.S. Cl. 364—200 **32 Claims**

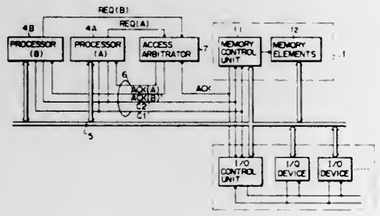
1. In combination,
a plurality of processors,
a corresponding plurality of logic circuits,
at least one memory device,
a bus connecting each of said processors with said memory device,
a request line from each of said processors to one of said

corresponding plurality of logic circuits for making thereover a memory device use request,
a memory status bus connecting said memory device with each of said logic circuits for simultaneous signalling thereto whether said memory device is available,
waiting time measuring means within each of said corresponding plurality of logic circuits for signalling the length of time a respective processor has been waiting,
a waiting time bus for applying to all said logic circuits the longest available processor waiting time,
comparator means in each said logic circuit to compare the waiting time of its respective processor with that on said waiting time bus,
means in each said logic circuit to provide a rank signal different from that in each other logic circuit to break ties, and



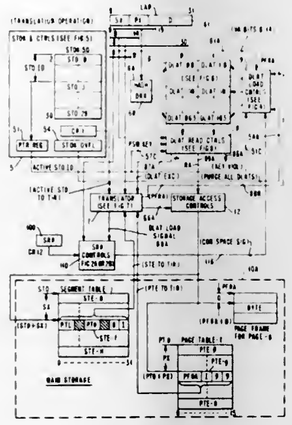
means to cause functioning of said logic circuits within coincident periods of time,
each logic circuit being adapted to connect its respective processor to said memory device when there is coincidence of a request for said memory device by said respective processor over a respective request line, an availability signal over said memory bus, and its waiting time line signal is equal to the signal of said waiting time bus and one of greater than any other waiting time line signal or equal to the largest other waiting time line signal and of higher rank signal, whereby no processor can reach said memory device twice before another that interveningly has requested it reaches it once, to minimize maximum waiting time.

4,096,572
COMPUTER SYSTEM WITH A MEMORY ACCESS ARBITRATOR
Keiji Namimoto, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan
Filed Sep. 28, 1976, Ser. No. 727,356
Claims priority, application Japan, Sep. 30, 1975, 50-117912
Int. Cl.² G06F *9/18, 13/00*
U.S. Cl. 364—200 **1 Claim**



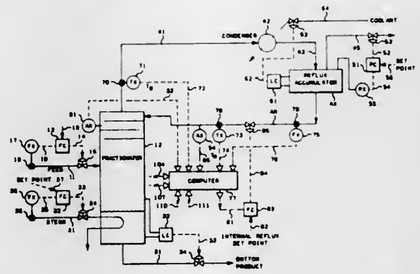
1. A computer system comprising:
memory means having first and second terminals for reception of address transfer and read/write control information and a third terminal, and means for switching the voltage level at the third terminal from a first voltage level to a second voltage level representative of access acknowledge during the time from reception of address information to issuance of read data or reception of write data;
first and second memory utilization devices each having first, second, third and fourth terminals and each having a memory access acknowledged by variation of voltage level at its third terminal from the first voltage level to the second voltage level, each memory utilization device being responsive to the first voltage level at its third terminal after issuance of a memory request signal on its fourth terminal to cause its first and second terminals to assume voltage levels representative of address transfer and responsive to the second voltage level at its third terminal to cause its first and second terminals to assume voltage levels representative of data request or data issuance;
bus means connected between the memory means and the first and second memory utilization devices for address and data transfer;
means coupling the first and second terminals of each memory utilization device to the first and second terminals of the memory means, respectively; and
means connected to the third and fourth terminals of each memory utilization device and the third terminal of the memory means for retaining the third terminal of one of the first and second memory utilization devices at the second voltage level for the time during which the other memory utilization device is acquiring access to the memory means.

4,096,573
DLAT SYNONYM CONTROL MEANS FOR COMMON PORTIONS OF ALL ADDRESS SPACES
Andrew Robert Heller, Mohegan Lake, N.Y., and Richard Lee Sites, San Diego, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 25, 1977, Ser. No. 790,731
Int. Cl.² G06F *13/00*
U.S. Cl. 364—200 **10 Claims**



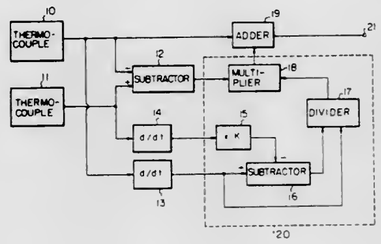
6. Synonym prevention control for a translation lookaside buffer (DLAT) in a data processing system, which addresses pages for multiple address spaces, each address space using the same virtual addresses, the address spaces being defined by respective segment tables, a control register identifying an active segment table in a processor of the system, and a virtual address register in the processor for containing a requesting virtual address to be accessed in the address space defined by the active segment table, comprising
a space portion store for recording status fields that divide each of the address spaces in the system into corresponding portions, each status field being settabe to indicate whether a corresponding address space portion is either private in each address space or shareable among all address spaces,
the DLAT having a plurality of DLAT entries, each DLAT entry having fields for containing a virtual and a real address for a translated page, and also having a field for identifying an address space associated with the translated page in the DLAT entry
address translation means being actuated by a DLAT exception signal indicating no DLAT entry is found to contain a translation of a page containing the requesting virtual address,
DLAT loading means for loading the fields in a DLAT entry selected in response to no DLAT entry containing the translation of the page containing the requested address,
space portion selection means associated with and activated by the address translation means for selecting a status field in the space portion store by means of a high order part of the requesting virtual address in the virtual address register to signal whether a corresponding address space portion has shareable or private status,
means for transferring a common portion identifier into the selected DLAT entry in response to a signal from the space portion selection means indicating a shareable status, and
means for transmitting an address space identifier to the selected DLAT entry in response to the signal from the space portion selection means indicating a private status,
whereby the common portion identifier in any DLAT entry indicates that the translated page loaded into the DLAT entry is to be shared among the address spaces, and whereby a valid address space identifier in any DLAT entry indicates that the translated page is to be restricted to the private address space identified in the DLAT.

4,096,574
FRACTIONATION CONTROL
David A. Christie, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Jul. 28, 1977, Ser. No. 819,926
Int. Cl.² B01D *3/42;* **G06G** *7/58*
U.S. Cl. 364—501 **24 Claims**



1. Apparatus comprising:
a fractionation column means;
conduit means for passing a feed mixture to be separated into said fractionation column means;
conduit means for withdrawing a bottom product from a lower portion of said fractionation column means;
conduit means for withdrawing a vapor stream from an upper portion of said fractionation column means;
condensing means for partially condensing said vapor stream;
accumulator means for phase-separating the thus partially condensed vapor stream;
conduit means for withdrawing uncondensed vapor from said accumulator means as an accumulator overhead product;
conduit means for withdrawing condensate from said accumulator means and for passing at least a portion thereof into an upper portion of said fractionation column means as external reflux therefor;
means for establishing a first signal T_0 representative of the temperature of the said vapor stream at the top portion of said fractionation column means;
means for establishing a second signal T_R representative of the temperature of the said external reflux;
means for establishing a third signal R representative of the flow rate of said external reflux;
means for establishing a fourth signal K representative of the value of the specific heat of said external reflux divided by the heat of vaporization of said external reflux;
means for establishing a fifth signal H_R/H_{Ri} representative of the value of the heat of vaporization of the said external reflux divided by the heat of vaporization of the internal reflux, said internal reflux being the reflux liquid flowing inside said fractionation column means;
means for establishing a sixth signal R_{id} representative of the desired flow rate of said internal reflux; and
means for establishing a seventh signal representative of the value +1;
means for producing, in response to said first, second, third, fourth, fifth, sixth and seventh signals, an eighth signal and for utilizing said eighth signal to manipulate the flow rate of said external reflux.

4,096,575
DELAY TIME COMPENSATION INCORPORATING TWO SENSING DEVICES
Takane Itoh, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan
Filed Apr. 5, 1977, Ser. No. 784,854
Claims priority, application Japan, Apr. 8, 1976, 51-40062
Int. Cl.² G01D *18/00*
U.S. Cl. 364—571 **5 Claims**



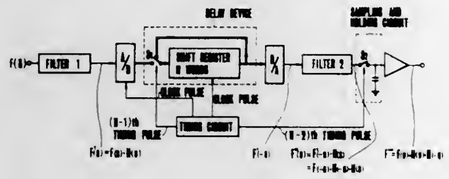
1. A delay compensation circuit comprising:
first and second sensing devices each having a different time constant value of the first order time lag;
first and second differentiators connected to said first and second sensing devices, respectively;
a subtractor connected to said first and second sensing devices to provide an output representing the difference between the outputs from said devices;
a processing circuit receptive of the outputs from said first and second differentiators and said subtractor for generating an output which represents the difference between a physical quantity to be measured and the output from said first sensing devices; and
a summation circuit for providing summation of the output from said first sensing device and the output from said processing circuit.

4,096,576

ANALOGUE FILTER SYSTEMS

Sakurai Takashi, Musashino; Matsuo Tadayuki, and Takahashi Koro, both of Sendai, all of Japan, assignors to Fukuda Denshi Co., Ltd., Tokyo, Japan

Filed Dec. 7, 1976, Ser. No. 748,311
Claims priority, application Japan, Dec. 11, 1975, 50-147855
Int. Cl.[2] G06J *1/00*; G06G *7/625*; H04B *15/00*
U.S. Cl. 364—602 **11 Claims**



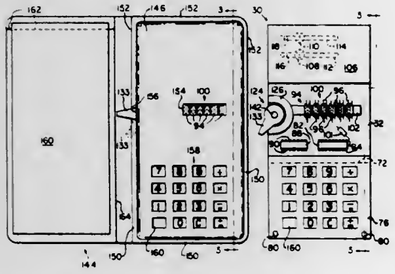
1. An analogue filter system comprising a first analogue filter connected to an input terminal for receiving an input analogue signal, a second analogue filter having similar characteristics to the first analogue filter, delay means connected between the first and second analogue filters for storing the output from said first analogue filter and for producing an output with the time axis thereof inverted under the control of a timing circuit, and means for restoring the inverted time axis of said output, whereby an output analogue signal is produced which is delayed in relation to said input analogue signal but free from any phase distortion.

4,096,577

THIN FLEXIBLE ELECTRONIC CALCULATOR

Leon A. Ferber, 48 Lake Ave., and Richard Pavelle, 3 Fieldstone Dr., both of Woburn, Mass. 01801

Continuation-in-part of Ser. No. 555,075, Mar. 3, 1975, abandoned. This application Oct. 20, 1976, Ser. No. 734,285
Int. Cl.[2] G06F *3/02*; H05K *1/08*
U.S. Cl. 364—712 **27 Claims**



1. In an electronic calculator of the type having in combination electronic computing elements with electrical conductor leads, a readout register with electrical conductor leads, number and function keys, battery, a printed circuit and an ON-OFF switch, the improvement wherein:

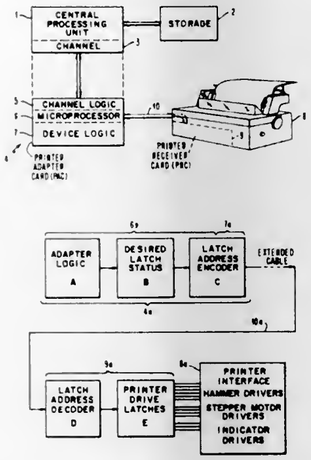
said printed circuit is comprised of a thin flexible dielectric material base carrying flexible printed circuit electrical conductors with terminals in substantially a single plane for receiving said electronic computing elements and readout register electrical conductor leads, means fixing said computing element and readout register electrical conductor leads to associated ones of said flexible printed circuit terminals in manner to make electrical engagement with said terminals and to firmly fix said computing elements and readout register to a face of said flexible dielectric material base to thereby create a flexible calculator structure whose maximum physical thickness is substantially the same at the thickness of said flexible printed circuit base plus the thickness of the thickest one of said computing elements and readout register, said number and function keys are in the form of low-profile conductive elastomer diaphram switches comprised of a flexible keying printed circuit means carrying a printed circuit coupled to said first mentioned printed circuit and carrying a keying printed circuit terminal for each of said number and function keys, a thin flexible dielectric spacer covering said last mentioned printed circuit and having an opening at each of said keying printed circuit terminals, a flexible electrically conductive elastomer covering said dielectric spacer, number and function indicia carried on said electrically conductive elastomer at each associated opening of said spacer, and means fixing said keying printed circuit, spacer, elastomer and number and function indicia together in proper alignment of keying terminals, spacer openings and indicia for effecting electrical engagment between said conductive elastomer and keying terminal when finger pressure is applied to the associated indicia.

4,096,578

DATA SYSTEM WITH MICROPROCESSOR FEATURING MULTIPLEXED DATA TRANSFER AND REPEAT CYCLE DRIVING ARRANGEMENT

Charles David Malkemes, Boca Raton, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,780
Int. Cl.[2] G06F *11/08*
U.S. Cl. 364—900 **13 Claims**



1. A data transfer arrangement for a data system, comprising:

a device controller, said controller providing data in successive controller cycles of operation representative of information to be printed;

a printer, said printer incorporating storage elements for storing data and operating elements operable in successive printer cycles to print information or perform functions, each of said printer cycles encompassing a minimum number of controller cycles numbering at least two controller cycles up to a preselected number greater than two controller cycles;

interconnection means for interconnecting said controller and said printer;

transfer means for effecting transfer of individual desired signal patterns of data from said controller to said printer, the majority of said signal patterns being transferred to said printer substantially in an errorfree form during continuing operation of said system but an individual signal pattern occasionally being transmitted erroneously; and

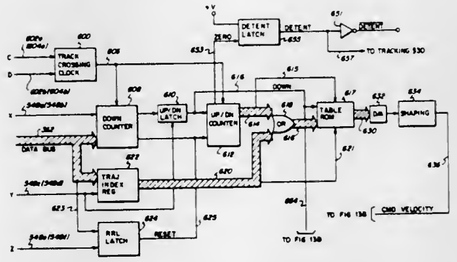
repeat cycle means in said system for repetitively transmitting each individual signal pattern of data from said controller to said printer for said minimum number of controller cycles in order to set up said printer storage means and operate said operating elements in accordance with said majority of transmitted errorfree signal patterns representing each individual data signal pattern and effectively minimizing response in said system to the occasional erroneous signal patterns.

4,096,579

VELOCITY CONTROL APPARATUS FOR DISK DRIVE

Robert J. Black, San Jose; Stipe Cizmic, San Mateo, and David L. Griffith, Pleasanton, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 28, 1977, Ser. No. 772,692
Int. Cl.[2] G11B *5/55, 21/08, 17/00*
U.S. Cl. 364—900 **10 Claims**



1. Velocity control apparatus for a disk drive of the type comprising a recording disk rotatable about its axis, an electromagnetic read/write head for reading data from and writing data onto tracks on a surface of said disk, and means coupled to said head and responsive to velocity command signals for controlling the direction and speed of movement of said head relative to the axis of rotation of said disk in order to position said head over a desired track on said disk surface, said velocity control apparatus comprising:

a memory divided into a plurality of sections respectively associated with different ranges of desired distances to be traveled by said head, each section containing a predetermined number of addressable storage locations having velocity command signals stored therein together defining an approximation of a desired velocity trajectory curve for a desired distance to be traveled included within the range associated with that section;

first means for generating a first position signal representative of a particular desired distance to be traveled and a second position signal representative of a predetermined fraction of said particular desired distance to be traveled, said first means including means responsive to said first position signal for generating a trajectory index signal identifying the section of said memory associated with the range in which said particular desired distance lies;

second means coupled to said first means and being responsive to said second position signal for generating a counting signal representative of the distance actually traveled by said head;

third means coupled to said first means and to said second means and being responsive to said trajectory index signal and to said counting signal for applying an address signal to said memory means for sequentially addressing the addressable storage locations of the associated section of said memory during movement of said head said particular desired distance to be traveled thereby providing a sequence of said velocity command signals together defining an approximation of the associated desired velocity trajectory curve; and

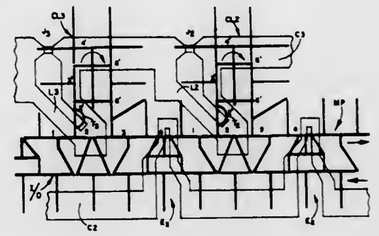
fourth means for coupling said velocity command signals to said means for controlling.

4,096,580

MULTIPLE REDUNDANCY LOOP BUBBLE DOMAIN MEMORY

Thomas T. Chen, Yorba Linda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 26, 1976, Ser. No. 708,806
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—1 **10 Claims**



1. A magnetic bubble domain system comprising,

a primary propagation path for magnetic bubble domains,

a plurality of *n* secondary propagation paths for magnetic bubble domains selectively coupled to said primary propagation path for transferring magnetic bubble domains therebetween,

said secondary propagation paths coupled to said primary propagation paths at locations which are separated by a prescribed distance,

a plurality of *m* correction loops associated with said primary path where *m* is less than or equal to *n*,

each of said correction loops having a length which is equivalent to an integral multiple of said prescribed distance between said secondary propagation paths,

said correction loops capable of propagating magnetic bubble domains, and

conductor means associated with said primary propagation path and said correction loops,

said conductor means including at least two electrically parallel portions arranged such that, in response to an applied current signal, one of said parallel portions selectively causes magnetic bubble domains in said primary path to traverse an associated correction loop only when the other of said parallel portions is selectively removed from said conductor means,

whereby said primary propagation path is effectively elongated by the addition of one or more correction loops when one or more of said secondary propagation paths is defective and the integrity of information on said primary propagation path is preserved.

4,096,581

EXTERNAL DRIVE COIL MAGNETIC BUBBLE PACKAGE

James Thomas Carlo, Richardson, and Alvis Doyle Stephenson, Jr., Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 16, 1976, Ser. No. 714,545
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—2 **12 Claims**

1. A magnetic bubble domain chip packaging assembly comprising:

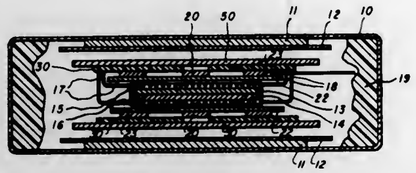
at least one magnetic bubble domain chip,

a pair of magnetic field-producing coils including a first inner coil having a plurality of turns of substantially uniform size and a second outer coil having a plurality of turns of substantially uniform size, said outer coil being

wound about said inner coil in orthogonal relationship with respect thereto and cooperating therewith to encompass a volumetric space therewithin,

said magnetic bubble domain chip being located externally with respect to said pair of magnetic field-producing coils and said volumetric space encompassed thereby,

interconnect means operably connected to said magnetic bubble domain chip and providing external electrical access to said chip for enabling selected bubble functions to occur on said chip in accomplishing data processing operations,



bias field magnetic means operably associated with said magnetic bubble domain chip for producing a magnetic bias field essentially perpendicular to said chip,

a body of insulating material encapsulating said magnetic bubble domain chip, said pair of magnetic field-producing coils, and said interconnect means, and

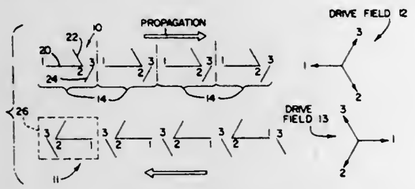
signal leads extending outwardly from said insulating body, said signal leads being electrically connected to said interconnect means and to said pair of magnetic field-producing coils for providing input and/or output signals to and/or from said magnetic bubble domain chip and excitation signals to said coils.

4,096,582

FIELD-ACCESSED MAGNETIC BUBBLE MUTUALLY EXCLUSIVE CIRCUITS WITH COMMON ELEMENTS

Paul T. Bailey, Creve Coeur; L. John Doerr, III, St. Louis, and Robert M. Sandfort, St. Charles, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed May 30, 1974, Ser. No. 474,776
Int. Cl.² G11C *19/08*
U.S. Cl. 365—13 **33 Claims**



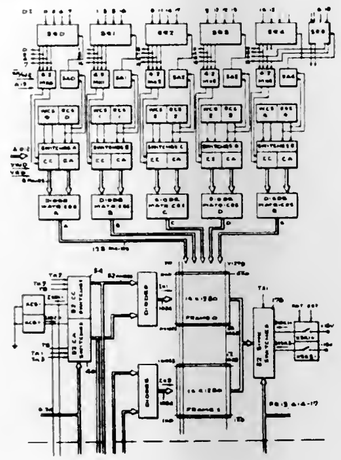
5. A bubble propagation system, comprising a sheet of bubble material, means for producing and maintaining bubbles therein, a ferromagnetic overlay pattern operatively disposed on said sheet including at least one composite circuit element containing overlapping portions which individually define mutually exclusive circuit elements defining a pair of distinct mutually exclusive bubble paths, means for generating two sets of sequential drive field orientations in the plane of said sheet, one of said portions being responsive to only one of said sets for propagating bubbles on a corresponding one of said paths, and the other of said portions being responsive only to the other one of said drive field sets for propagating bubbles on the other of said paths.

4,096,583

2½D CORE MEMORY

Kurt Wright, Burbank, and Thomas J. Gilligan, Marina del Rey, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Oct. 15, 1976, Ser. No. 732,928
Int. Cl.² G11B *14/063*
U.S. Cl. 365—130 **41 Claims**



1. A core memory comprising

a plurality of pairs of memory cores;

a plurality of pairs of Y conductors inductively coupling a plurality of pairs of memory cores;

a plurality of X conductors, each inductively coupling different pairs of memory cores that are inductively coupled by the Y conductors;

Y decoder circuitry coupled to select a pair of Y conductors in response to at least one address signal;

X decoder circuitry coupled to select at least two X conductors in response to at least one address signal;

Y current control circuitry coupled to operate during a read portion of a memory cycle to provide partial select Y read currents through the pair of Y conductors, the Y read currents coupling each pair of cores inductively coupled to the selected pair of Y conductors with first and opposite polarities relative to a given direction of current through an X conductor inductively coupled thereto;

X current control circuitry coupled to operate during a read portion of a memory cycle to sequentially provide partial select X read currents through the selected at least two X conductors;

a sense amplifier circuit coupled to sense core switching voltage signals appearing sequentially on the selected pair of Y conductors as X read currents are provided sequentially on the selected X conductors.

4,096,584

LOW POWER/HIGH SPEED STATIC RAM

William H. Owen, III, Mountain View; Kim R. Kokkonen, and Richard D. Pashley, both of Sunnyvale, all of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Jan. 31, 1977, Ser. No. 764,031
Int. Cl.² G11C *11/40*
U.S. Cl. 365—227 **10 Claims**

1. An integrated circuit, metal-oxide-semiconductor (MOS), random-access static memory comprising:

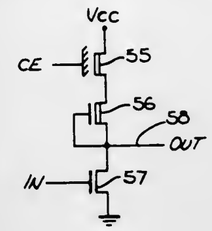
a plurality of bistable memory cells;

input and output means for communicating with said memory cells;

power-down means for reducing the power consumed by said memory when said memory is in a standby mode, coupled to said input and output means;

said memory including a plurality of enhancement mode MOS device, a first plurality of depletion mode MOS devices, a second plurality of depletion mode MOS devices, said second plurality of depletion mode MOS devices being less conductive than said first plurality, and a plurality of low threshold MOS devices, said low threshold MOS devices having a threshold voltage of approximately zero volts;

said memory cells including in series one of said enhancement mode MOS devices and one of said second plurality of depletion mode MOS devices, said depletion mode device being employed as a load;



said input and output means employing a plurality of said low threshold MOS devices coupled to receive a signal from said power-down means to reduce current flow in said input and output means during standby mode, said low threshold MOS devices coupled in series with said enhancement mode devices and said first depletion mode devices;

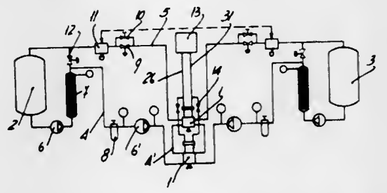
whereby said memory is a fast random-access, static memory having low power consumption.

4,096,585

APPARATUS FOR MIXING AND EJECTING INTERACTING FLUID MATERIALS

Carlo Fiorentini, Varese, Italy, assignor to AFROS S.r.l., Caronno Pertusella (Varese), Italy

Filed Nov. 22, 1976, Ser. No. 743,956
Claims priority, application Italy, May 17, 1976, 23330 A/76
Int. Cl.² B01F *15/04, 15/06*
U.S. Cl. 366—134 **5 Claims**



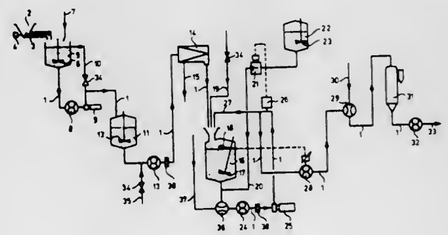
1. An apparatus for mixing and ejecting fluid materials, comprising a head defining a mixing chamber, said head including an outlet opening for ejecting the mixture at one end thereof, a plurality of inlet ports, each of said inlet ports communicating with a supply line for supplying a fluid material component, a distributing valve, each of said inlet ports communicating, through said distributing valve, with an orifice opening into the mixing chamber and with an outlet port, said outlet port connected to a return line for recycling the fluid material component at a first pressure rate through a reservoir; a pin connected to a piston and reciprocable in a first double-acting cylinder for moving said pin to and away from said outlet opening of the mixing chamber, said distributing valve being operated by a second double-acting cylinder connected in parallel with said first cylinder, whereby one side of said second cylinder is directly connected to a pressure fluid source and to one side of said first cylinder, the other side of said second cylinder is connected to a pressure fluid source and to the other side of said first cylinder through a shut off valve means operable by the piston of the first cylinder at the end of its backward stroke; and wherein said return line for the fluid material component is provided with a branched conduit having a valve defining a narrow orifice for recycling the fluid material component at a higher pressure rate than the first pressure rate.

4,096,586

SOLUBILIZATION OF CASEIN

Ernest Badertscher, Orbe; Michel Chaveron, Vevey, and Valentin Wenner, La Tour-de-Peilz, all of Switzerland, assignors to Societe D'Assistance Technique Pour Produits Nestle S.A., La Tour-de-Peilz, Switzerland

Division of Ser. No. 663,715, Mar. 4, 1976, Pat. No. 4,055,555.
This application Jun. 9, 1976, Ser. No. 694,234
Int. Cl.² A23J *3/00*
U.S. Cl. 366—136 **4 Claims**



1. An apparatus for solubilizing a suspension of powder casein in an aqueous medium which comprises

a source of casein,

a hydration tank in which water and powder form casein can be received, said hydration tank including stirring means for stirring said casein and water to form a suspension therewith,

a holding tank,

means for conveying suspension from said hydration tank to said holding tank,

a solubilizing tank,

means for conveying suspension from said holding tank to said solubilizing tank at such rate that the suspension has a residence time in said holding tank of at least 10 minutes,

a source of solubilizing agent,

means for introducing the solubilizing agent into said solubilizing tank, said solubilizing tank including a stirring device for stirring the suspension therein whereby a caseinate is formed in said solubilizing tank,

control means including a pH sensing unit operable responsive to the pH level of the caseinate in said solubilizing tank for controlling the solubilizing agent introduction means to control the rate at which said agent is introduced into said solubilizing tank,

means for withdrawing caseinate from said solubilizing tank and recycling a first portion thereof to said solubilizing tank, there further being means for conveying the remainder portion of the caseinate withdrawn from said solubilizing tank to a drying operation, and

a float control unit in said solubilizing tank connected to and operably controlling said withdrawal means responsive to variations in the level of caseinate in said solubilizing tank from a predetermined value.

4,096,587

MIXER FOR RESIN AND SAND

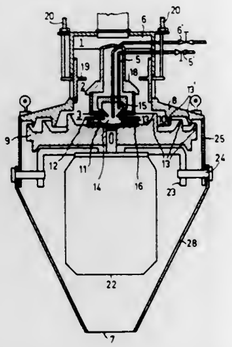
Walter Haller, Schlieren, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Mar. 22, 1977, Ser. No. 780,117

Claims priority, application Switzerland, Mar. 25, 1976, 03722/76

Int. Cl.[2] B01F *5/22, 5/26*

U.S. Cl. 366—178 **10 Claims**



1. In a foundry mixing machine for preparing a mixture of sand and a resin having at least two components and which comprises wall means defining a sand inlet chamber, a preliminary mixing chamber located below the inlet chamber, and an annular slot positioned vertically between said chambers and serving to allow sand to descend by gravity from the inlet chamber to the preliminary mixing chamber; and an annular final mixing chamber having an inlet at its inner margin which communicates with the preliminary mixing chamber and an outlet at its outer margin, the final mixing chamber being defined by a gap between two axially spaced bodies of revolution, each of which bodies carries projections which extend toward the gap and the lower one of which rotates, the improvement which comprises feeding means for delivering the resin components, in non-atomized states, to sand in the preliminary mixing chamber and which includes

a. a dished member connected to rotate with, and located centrally of, the rotatable body of revolution and having an upper surface provided with at least a portion which rises in the radially outward direction;

b. an annular disc coaxial with the dished member and spaced axially therefrom to define an interstice which, at its outer periphery, opens into the preliminary mixing chamber,

c. the annular disc having a central opening and being connected to rotate with the dished member and the rotatable body of revolution; and

d. supply means for at least one of the resin components which is arranged to deliver said component through the central opening of the annular disc and onto said rising portion of the upper surface of the dished member,

e. the dished member serving to coarsely disperse said one resin component and project it radially through said interstice and into sand in the preliminary mixing chamber.

4,096,588

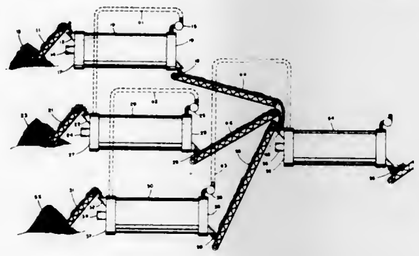
RECYCLED ASPHALT-AGGREGATE PROCESS AND APPARATUS

Robert L. Mendenhall, 1770 Industrial Rd., Las Vegas, Nev. 89102

Continuation-in-part of Ser. No. 603,357, Aug. 11, 1975, Pat. No. 3,999,743. This application Oct. 5, 1976, Ser. No. 729,705

Int. Cl.[2] B28C *5/20*

U.S. Cl. 366—7 **36 Claims**



8. A process for treating particles of asphalt and aggregate compositions comprising separating said composition particles into a plurality of portions, each portion having a different particle size range between coarse and fine, introducing said particle portions into different mixing and heating drums, and heating each drum at a temperature below that which would burn the asphalt of the particles introduced in that drum.

DESIGN PATENTS

GRANTED JUN. 20, 1978

ERRATA

For CLASS	See PATENT NO.
D48–020 C	248,254
D48–032 R	248,255

DESIGNS

JUNE 20, 1978

248,191
EAR MUFF SUPPORT FOR A SAFETY HELMET WITH EAR MUFFS

Kalman Csiki, Landskrona, and Tord Rune Lundin, Billesholm, both of Sweden, assignors to Gullfiber AB, Billesholm, Sweden

Division of Ser. No. 627,868, Oct. 31, 1975, Pat. No. Des. 244,491. This application Sep. 22, 1976, Ser. No. 725,424

Claims priority, application Sweden, May 2, 1975, 949

Term of patent 14 years

Int. Cl. D2—*03*

U.S. Cl. D2—232

248,192
SHOE

Richard L. Stevenson, 8149 Manitoba St., Apt. 5, Los Angeles, Calif. 90291

Filed Aug. 6, 1976, Ser. No. 712,273

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—309

248,193
SHOE SOLE

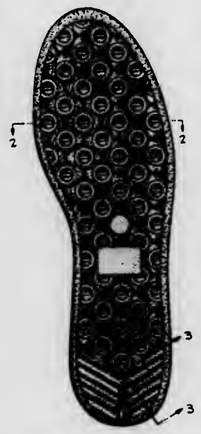
Thomas Anthony Edmonds, Abingdon, Md., assignor to Bata Shoe Co., Inc., Belcamp, Md.

Filed Nov. 11, 1976, Ser. No. 741,145

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—320



248,194
KNITTING AND SEWING EQUIPMENT HOLDER

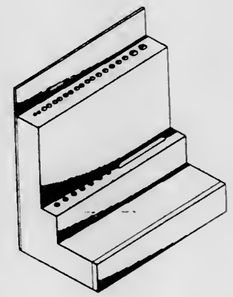
Conrad A. Urben, and Susan H. Urben, both of Rte. 1, Hwy. 106, Fort Atkinson, Wis. 53538

Filed Jul. 1, 1976, Ser. No. 701,659

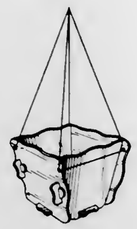
Term of patent 14 years

Int. Cl. D6—*99*

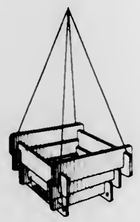
U.S. Cl. D3—19 D



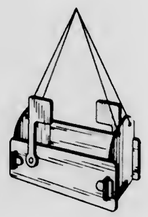
248,195
PLANTER
William Donald Gordon, Sr., Glenview, Ill., assignor to Arvey Corporation, Chicago, Ill.
Filed Jan. 7, 1977, Ser. No. 757,462
Term of patent 14 years
Int. Cl. D6—*06;* D11—*02*
U.S. Cl. D6—113



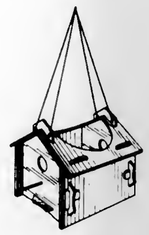
248,196
PLANTER
William Donald Gordon, Sr., Glenview, Ill., assignor to Arvey Corporation, Chicago, Ill.
Filed Jan. 7, 1977, Ser. No. 757,463
Term of patent 14 years
Int. Cl. D6—*06;* D11—*02*
U.S. Cl. D6—113



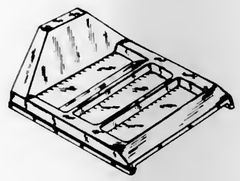
248,197
PLANTER
William Donald Gordon, Sr., Glenview, Ill., assignor to Arvey Corporation, Chicago, Ill.
Filed Jan. 7, 1977, Ser. No. 757,464
Term of patent 14 years
Int. Cl. D6—*06;* D11—*02*
U.S. Cl. D6—113



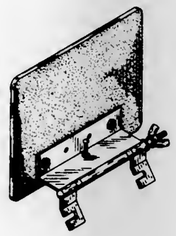
248,198
PLANTER
William Donald Gordon, Sr., Glenview, Ill., assignor to Arvey Corporation, Chicago, Ill.
Filed Jan. 7, 1977, Ser. No. 757,465
Term of patent 14 years
Int. Cl. D6—*06;* D11—*02*
U.S. Cl. D6—113



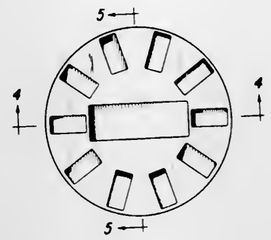
248,199
DISPLAY UNIT
Lindell Dale Watley, Rte. #2; Wallace D. Inman, 1120 Webster; Gregory L. Bell, 721 N. Hastings; Frank Jack Sandeen, 1128 N. St. Joseph, all of Hastings, Nebr. 68901; James R. O'Keeffe, 9826 Hartman, Omaha, Nebr. 68134; John P. Nepper, 68134 84th St., Omaha, Nebr. 68134, and James Huston, 2525 N. 84th St., Omaha, Nebr. 68134
Filed Nov. 17, 1976, Ser. No. 742,538
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—188



248,200
COMBINED MIRROR AND ADJUSTABLE HINGE THEREFOR
Kent E. Stratton, 2906 Coventry Ave., Fort Wayne, Ind. 46808
Filed Apr. 29, 1976, Ser. No. 681,572
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—242

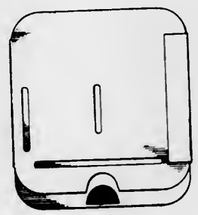


248,201
REVOLVING TRAY FOR BREAKFAST CEREAL BOXES
Ernest Kelley, 20414 Warrington Dr., Detroit, Mich. 48221
Filed Dec. 10, 1976, Ser. No. 749,460
Term of patent 14 years
Int. Cl. D7—*01, 99*
U.S. Cl. D7—2

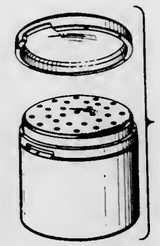


248,202
COVERED SUGAR BOWL
Don Schreckengost, East Liverpool, Ohio, assignor to The Salem China Company, Salem, Ohio
Filed Oct. 7, 1976, Ser. No. 730,152
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—17

248,203
BEVERAGE COASTER
Henry Clifton Morse, 336 W. Wellington, Chicago, Ill. 60657
Filed Sep. 24, 1976, Ser. No. 726,152
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—45

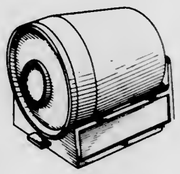


248,204
SPICE SHAKER
Robert H. C. M. Daenen, Hekelgem, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed May 20, 1976, Ser. No. 687,978
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—54



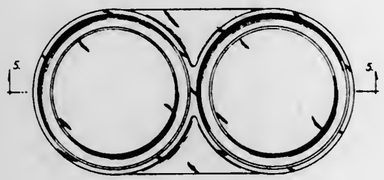
248,205
CREAMER
Don Schreckengost, East Liverpool, Ohio, assignor to The Salem China Company, Salem, Ohio
Filed Oct. 7, 1976, Ser. No. 730,151
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—64

248,206
DISPENSER FOR ICE OR SIMILAR ARTICLE
Douglas P. Montague, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.
Filed Aug. 5, 1976, Ser. No. 711,849
Term of patent 14 years
Int. Cl. D7—*01, 07*
U.S. Cl. D7—78

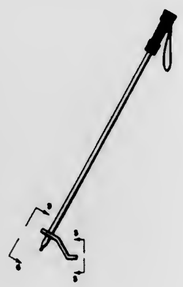


248,207
CREPE MAKER
Alfred W. Madl, Glendale, Wis., assignor to Oster Corporation, Milwaukee, Wis.
Filed Jul. 14, 1976, Ser. No. 705,002
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—87

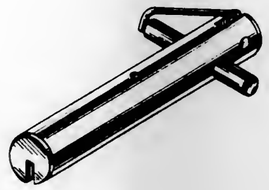
248,208
BAKING UTENSIL
William L. Miller, 26089 Pinehurst, Roseville, Mich. 48066
Filed Oct. 26, 1976, Ser. No. 735,630
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—96



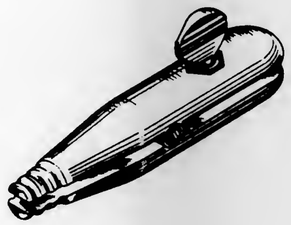
248,209
FIREPLACE POKER
Howard A. Holleman, Bay Village, Ohio, assignor to Hydro Tube Corporation, Oberlin, Ohio
Filed Aug. 16, 1976, Ser. No. 714,819
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—210



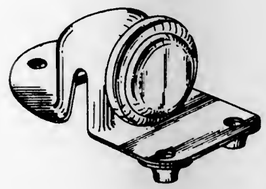
248,210
ICE SKATE SHARPENER AND LACE TIGHTENING DEVICE
Gary G. Dill, 28392 Magnolia Dr., North Olmsted, Ohio 44138
Filed Jul. 2, 1976, Ser. No. 702,083
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—91



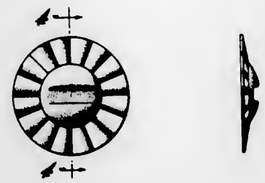
248,211
RING CLAMP AND HOLDER
Walter Dean Kirkland, 317 Conifer Ct., Walnut Creek, Calif. 94598
Filed Feb. 2, 1976, Ser. No. 654,575
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—395



248,212
DOOR STOP OR SIMILAR ARTICLE
Robert E. Miller, Jr., Bronxville, N.Y., assignor to Robert E. Miller & Co., Inc., Newark, N.J.
Filed Jun. 14, 1976, Ser. No. 696,041
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—402

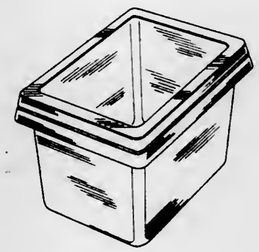


248,213
COVER FOR FASTENER
James L. Michelson, 15015 NE. 7th Ct., North Miami, Fla. 33161
Filed Sep. 23, 1976, Ser. No. 725,694
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—499



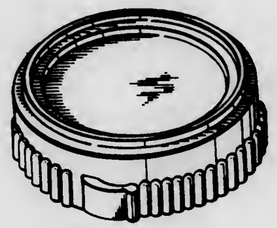
248,214
COMBINED BOTTLE AND CLOSURE
David P. DiNuccio, Brooklyn Heights, N.Y., assignor to Clairol Inc.
Filed Sep. 13, 1976, Ser. No. 722,832
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—83

248,215
COMBINED PACKAGING CONTAINER AND LID
Richard Sutton Cherry, Toronto, Canada, assignor to Phillips Plastics of North America, Inc., Toronto, Canada
Filed Nov. 3, 1975, Ser. No. 628,340
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219



248,216
COMBINED PACKAGING CONTAINER AND CLOSURE
David O. Allen, and Harry A. E. Wombold, both of Wilmington, Ohio, assignors to Buckeye Molding Company
Filed Mar. 25, 1976, Ser. No. 670,234
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—220

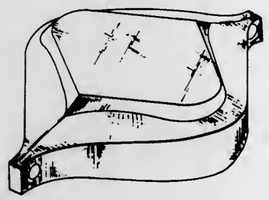
248,217
CONTAINER CLOSURE
David O. Allen, and Harry A. E. Wombold, both of Wilmington, Ohio, assignors to Buckeye Molding Company
Filed Mar. 16, 1976, Ser. No. 667,389
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—255



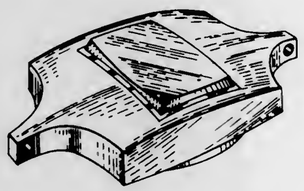
248,218
NON-DRIP LIP FOR PAINT CANS
Thomas E. Clumb, Indianapolis, Ind., assignor to Alfred T. Smith and David J. Ganasak, part interest to each
Filed Sep. 27, 1976, Ser. No. 727,571
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—290

248,219
WRIST WATCH
Ferdinand Alexander Porsche, Zell am See, Austria, assignor to Montres Orfina S.A., Grenchen, Switzerland
Filed Oct. 15, 1976, Ser. No. 732,878
Claims priority, application Switzerland, Apr. 26, 1976, 62959/76
Term of patent 7 years
Int. Cl. D10—*02*
U.S. Cl. D10—32

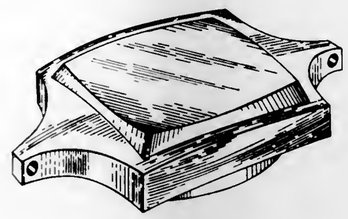
248,220
WRIST WATCH
William James Lawrence, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Oct. 12, 1976, Ser. No. 731,240
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—38



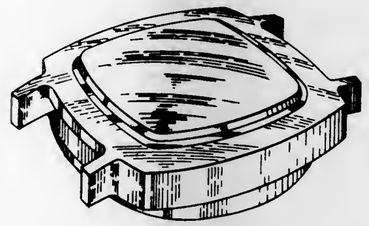
248,221
WRIST WATCH
William James Lawrence, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Oct. 12, 1976, Ser. No. 731,384
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—38



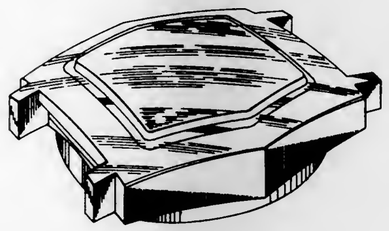
248,222
WRIST WATCH
William James Lawrence, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Oct. 12, 1976, Ser. No. 731,385
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—38



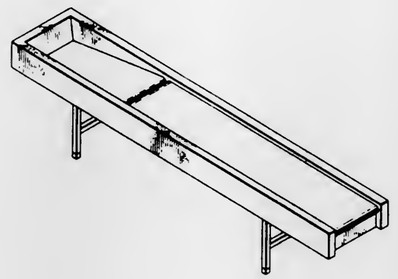
248,223
WRIST WATCH
Eugene Joseph Sulek, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Oct. 12, 1976, Ser. No. 731,395
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—38



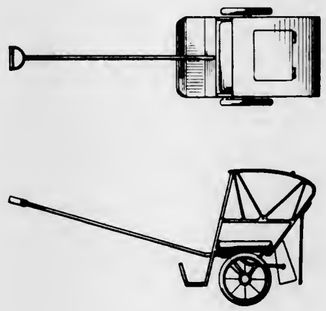
248,224
WRIST WATCH
Eugene Joseph Sulek, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Oct. 12, 1976, Ser. No. 731,396
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—38



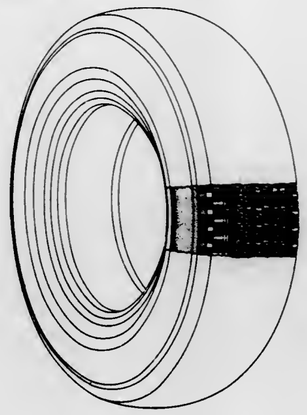
248,225
EXTENSION CONVEYOR
Joseph M. Casteel, 255 Lython Rd., Coraopolis, Pa. 15108
Filed Jun. 16, 1976, Ser. No. 696,683
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—58



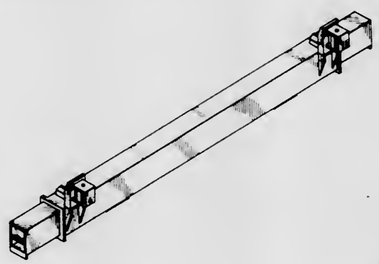
248,226
STROLLER
George J. Sailer, Sr., 6 Almira St., Bloomfield, N.J. 07003
Filed Jan. 17, 1977, Ser. No. 759,739
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—129



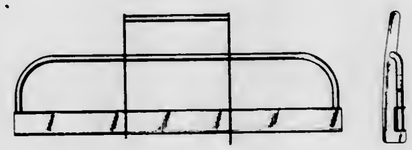
248,227
TIRE
Philippe Jamain, Chatel-Guyon, France, assignor to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France
Filed Oct. 21, 1976, Ser. No. 734,441
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



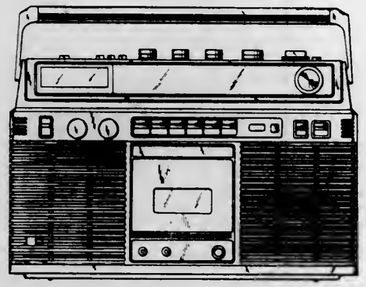
248,228
CARGO SUPPORT FOR THE BED OF A TRUCK OR THE LIKE
Donald Keir Robertson, Corner Kew & Mars Sts., Welshpool, Western Australia, Australia
Filed Sep. 3, 1976, Ser. No. 720,343
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155



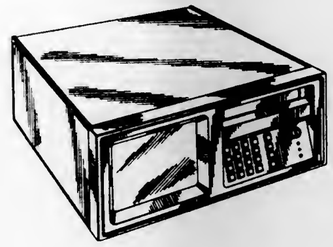
248,229
COMBINED VEHICLE BUMPER AND GRILL GUARD
Jonathan Baker, 507 E. 33rd St., Joplin, Mo. 64801
Filed Feb. 27, 1976, Ser. No. 661,955
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—169



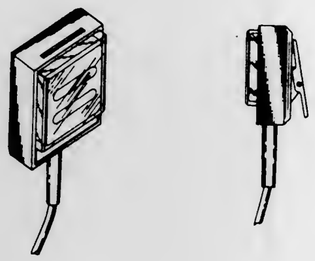
248,230
COMBINED CASSETTE RECORDER AND PLAYER AND RADIO
Akira Katoh, Chofu, Japan, assignor to Lloyd's Electronics, Inc., Compton, Calif.
Filed Aug. 4, 1976, Ser. No. 711,693
Term of patent 3½ years
Int. Cl. D14—*01, 03*
U.S. Cl. D14—5



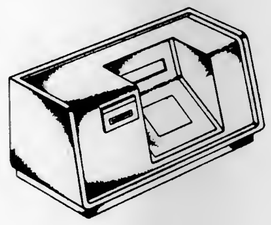
248,232
COMBINED DATA PROCESSOR ANALYZER AND DISPLAY INSTRUMENT
Jerry Lee Stamper, San Diego, Calif., assignor to Conic Corporation, San Diego, Calif.
Filed May 16, 1977, Ser. No. 797,473
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43



248,231
LAPEL SPEAKER OR SIMILAR ARTICLE
Arnold Sherwin Goldman, Plantation, and John Allie Eckmann, Pompano Beach, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 1, 1976, Ser. No. 662,648
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—12

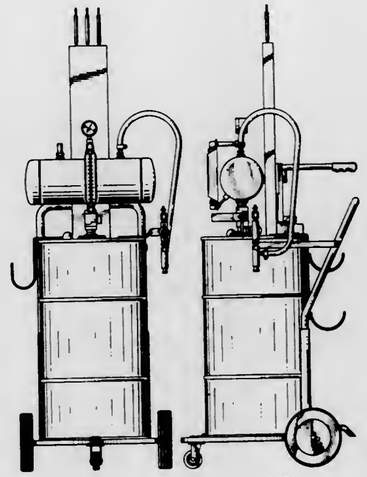


248,233
CARD READER FOR COMPUTERIZED ACCESS CONTROL SYSTEM
Luigi Dibenedetto, El Segundo, Calif., assignor to TRW Inc., Los Angeles, Calif.
Filed Jun. 23, 1976, Ser. No. 699,152
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—49



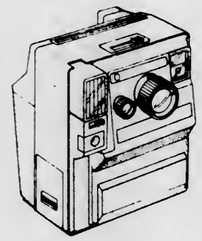
248,234
HOUSING FOR A TELEPHONE SET
Donald Michael Genaro, Haworth, N.J., and John Niel McGarvey, Drexel Hill, Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Feb. 28, 1977, Ser. No. 772,992
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53

248,236
VACUUM DRAINING UNIT FOR LUBRICANTS FROM INTERNAL COMBUSTION ENGINES
Frank J. Senese, Hickory Hills, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.
Filed Apr. 7, 1976, Ser. No. 674,344
Term of patent 14 years
Int. Cl. 15—*99*
U.S. Cl. D15—150



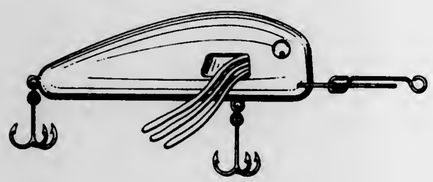
248,235
METALLURGICAL TEST SPECIMEN
Richard E. Haughtington, 2925 Cleveland Ave., Michigan City, Ind. 46360, and Donald R. Wray, 1213 W. Lincoln Hwy., Merrillville, Ind. 46410
Filed May 21, 1976, Ser. No. 688,747
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—144

248,237
PHOTOGRAPHIC CAMERA WITH BUILT-IN FLASH GUN
Hiroshi Fukuda, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Filed Jan. 21, 1977, Ser. No. 761,034
Claims priority, application Japan, Jul. 20, 1976, 51/28258
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—06

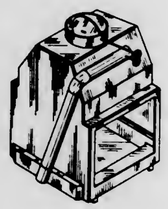


248,238
FISHING LURE
Cecil Lewis, Smilax, Ky. 41764
Filed Jul. 21, 1975, Ser. No. 595,361
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

248,239
FISHING LURE
Cecil Lewis, Smilax, Ky. 41764
Filed Aug. 1, 1975, Ser. No. 595,363
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

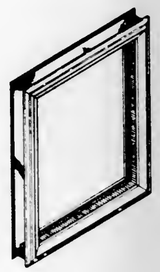


248,240
PREFABRICATED FIREPLACE
Robert S. Messer, 265 - 6th St., Windom, Minn. 56101
Filed Dec. 15, 1976, Ser. No. 750,863
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—94

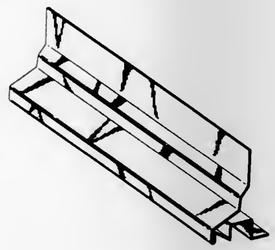


248,241
NERVOUS RESPONSIVE CHIROPRACTIC TRACING PENDULUM
James P. Woods, P.O. Box 86, Long Grove, Iowa 52756
Filed May 5, 1976, Ser. No. 683,679
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—17

248,242
WINDOW FRAME
Alfred George Huelsekopf, R.R. #1, Newmarket, Ontario, Canada
Filed Nov. 2, 1976, Ser. No. 738,082
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—52



248,243
SIDING BASE STARTER STRIP
Donald A. South, 44538 State Rte. 14, Columbiana, Ohio 44408
Filed Sep. 30, 1976, Ser. No. 728,446
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74

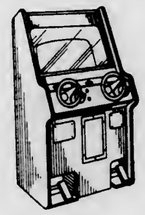


248,244
CIGARETTE LIGHTER
Vytautas Beleckis, Oakhurst, N.J., assignor to Ronson Corporation, Woodbridge, N.J.
Filed Feb. 10, 1977, Ser. No. 767,317
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

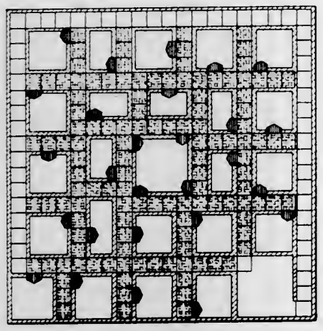
248,245
DOLL
Mable Edith Duhon, 2501 Plantation Dr., Bossier City, La. 71010
Filed Oct. 26, 1976, Ser. No. 735,672
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

248,246
DOLL
Mable Edith Duhon, 2501 Plantation Dr., Bossier City, La. 71010
Filed Oct. 26, 1976, Ser. No. 735,673
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

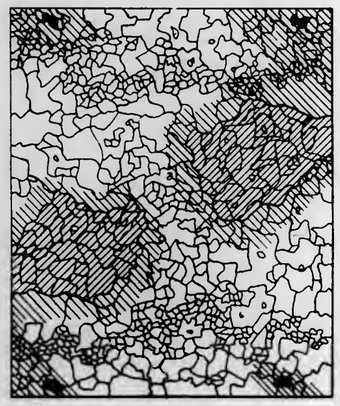
248,247
GAME CABINET
Barney H. Huang, Mountain View, Calif., assignor to Atari, Inc., Sunnyvale, Calif.
Filed Nov. 4, 1976, Ser. No. 738,827
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 L



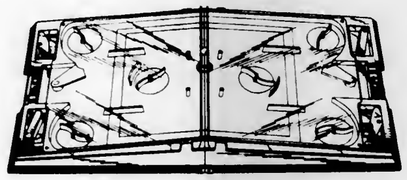
248,248
GAME BOARD
Emilio Azcarate, Oviedo 18-16, Torrimar, Guaynabo, P.R. 00657
Filed Nov. 22, 1976, Ser. No. 743,689
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



248,249
GAME BOARD
Marcos Garcia-Kuenzli, P.O. Box 2212, Hato Rey Station, San Juan, P.R. 00919
Filed Apr. 5, 1976, Ser. No. 673,468
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

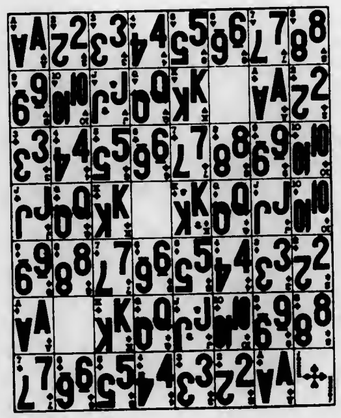


248,250
TABLE BALL GAME BOARD DEVICE
Michael Langieri, Butler, N.J., assignor to Louis Marx & Co., Inc., Stamford, Conn.
Filed Dec. 20, 1976, Ser. No. 752,339
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 JJ

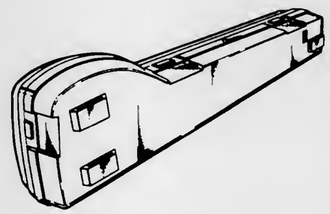


248,251
GAME CABINET
Roger D. Hector, San Jose, Calif., assignor to Atari, Inc., Sunnyvale, Calif.
Filed Nov. 4, 1976, Ser. No. 739,028
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 L

248,252
DECK OF PLAYING CARDS
Thomas M. Talley, 6570 Devonwood Ave., Cincinnati, Ohio 45224, and Walter F. Sheblessy, 625 Evening Star La., Cincinnati, Ohio 45220
Filed Nov. 9, 1976, Ser. No. 740,176
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13 R

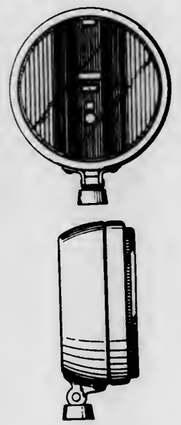


248,253
CASE FOR FISHING TACKLE
Tatsuo Sugimoto, Higashikurume, Japan, assignor to Daiwa Seiko, Inc., Higashikurume, Japan
Filed May 24, 1976, Ser. No. 689,602
Claims priority, application Japan, Mar. 22, 1976, 51/10215
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



248,254
BASE FOR A LAMP
Richard L. Miller, Petersburg, Ill. 62675
Filed Feb. 10, 1976, Ser. No. 657,102
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 C

248,255
HEADLIGHT
Pierre Cibie, Bobigny, France, assignor to Cibie Projecteurs, Bobigny, France
Filed Jul. 15, 1976, Ser. No. 705,386
Claims priority, application France, Apr. 15, 1976, 76 39136
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 R



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF JUNE, 1978

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Osakeyhtio: *See—*
Snygg, Keijo Kalevi; and Korkolainen, Aarne Johannes, 4,095,755, Cl. 242-66.000.

A.B.C.C.O. Industries, Incorporated: *See—*
Derka, Edward A., 4,095,668, Cl. 181-202.000.

A. H. Robins Company, Incorporated: *See—*
Boswell, Robert Frederick, Jr.; and Duncan, Robert Louis, Jr., 4,096,331, Cl. 544-141.000.

A.R.D. Anstalt: *See—*
Gabr, Saad Zaghloul Mohamed, 4,096,546, Cl. 361-383.000.

A/S Apothekernes Laboratorium for Specialpraeparater: *See—*
Oystese, Brigt, 4,096,246, Cl. 424-177.000.

A-T-O Inc.: *See—*
Fox, Robert J.; and Sturgis, Donald P., 4,095,739, Cl. 235-382.000.

A.W. Sperry Instruments, Inc.: *See—*
Meyer, William J., 4,096,434, Cl. 324-115.000.

Abbott, James Gardner; Berley, Jerry Wayne; Ward, Allen Edens, Jr.; and Brandi, Sr. Adolph John, to Allied Chemical Corporation. Controlled tow stretcher. 4,095,318, Cl. 28-241.000.

Abbott Laboratories: *See—*
Horrom, Bruce Wayne; and Barta, William Douglas, 4,096,261, Cl. 424-250.000.

Abdou, John J.: *See—*
Peek, Henry L.; Taylor, Maurice J.; Abdou, John J.; and Patel, Amrut R., 4,096,367, Cl. 200-148.00B.

Abernethy, Robert B.; Preti, Edmond; and Rembold, John P., to United States of America, Air Force. Augmentor outer segment lockout and fan upmatch. 4,095,420, Cl. 60-204.000.

ACF Industries, Incorporated: *See—*
Hicks, Paul E., Jr.; and Hammonds, James C., 4,095,766, Cl. 248-119.00S.
Hicks, Paul E., Jr.; and Hammonds, James C., 4,095,767, Cl. 248-119.00S.

Adachi, Tadayaki: *See—*
Moore, William T.; and Adachi, Tadayaki, 4,095,502, Cl. 84-1.130.

Adams, Guy: *See—*
Goldman, Joseph; Adams, Guy; and Goldman, Shirley, 4,095,588, Cl. 128-1.500.

Ades, Edouard Pierre Julien, to Moulinex, Societe Anonyme. Electrical household appliance equipped with a removable accessory such as a vegetable cutter. 4,095,499, Cl. 83-471.000.

Aegean Industries, Inc.: *See—*
Sanders, Stanley J.; and Fava, Vincent, 4,096,011, Cl. 156-196.000.

AFROS S.r.l.: *See—*
Fiorentini, Carlo, 4,096,585, Cl. 366-134.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Beraud, Claudius; Guigal, Robert; Lehmann, Robert; and Lyonnet, Andre, 4,095,403, Cl. 57-144.000.
Bianchin, Christian; Deneuville, Alain; and Gerard, Philippe, 4,096,087, Cl. 252-300.000.
Bohin, Jean A.; and Goldman, Max, 4,096,541, Cl. 361-120.000.
Mollard, Paul; Paris, Jacques; and Rousset, Abel, 4,096,080, Cl. 252-62.560.

Agency of Industrial Science and Technology, The: *See—*
Marumoto, Katsuji; Omae, Tsutomu; Suzuki, Toshio; Shibata, Takanori; and Yamamura, Hirohisa, 4,096,418, Cl. 318-12.000.

Agerhall, Kurt Roland; and Sundblad, Yngve Allan, to Telefonaktiebolaget L M Ericsson. Method and apparatus for transfer of asynchronously changing data words. 4,096,471, Cl. 340-146.10R.

AGFA-Gevaert AG: *See—*
Basu, Prithwis; Neumann, Gunter; and Kaiser, Gunther, 4,096,020, Cl. 156-519.000.
Lermann, Peter; and Wagensonner, Eduard, 4,096,500, Cl. 354-173.000.
Leuchter, Jurgen, 4,096,507, Cl. 354-307.000.
Pfeifer, Josef; Paulus, Rudolf; Gutmann, Walter; and Reach, Michael, 4,096,486, Cl. 346-107.00R.
Wagensonner, Eduard; Lermann, Peter; and Fauth, Gunter, 4,096,491, Cl. 354-31.000.
Wolff, Erich; and Lowski, Dieter, 4,095,983, Cl. 96-77.000.

Agins, David B. Wheel with molded tire for carts. 4,095,846, Cl. 301-37.00R.

Ahonen, Heikki; Lindroos, Jari; and Sarkkinen, Veli, to Lyijyvalkoistehdas Gronberg Oy - Blyvittfabriken Gronberg AB. Process for the recovery of lead from lead scraps. 4,096,045, Cl. 204-117.000.

Aimar, Michele, to ITW Fastex Italia, S.p.A. Adjustable cable clamp. 4,095,765, Cl. 248-56.000.

Airtek Corporation: *See—*
Roy, John R.; Roy, Stephen; Roy, Mary L.; and Mooney, Daniel T., 4,095,514, Cl. 98-58.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Ando, Masamoto; and Tachino, Tomio, 4,095,851, Cl. 303-115.000.
Ban, Hiroshi, 4,095,683, Cl. 192-70.180.
Kondo, Toshiyuki, 4,095,848, Cl. 303-2.000.

Aizawa, Tatsuo: *See—*
Kozuka, Nobuhiko; Matsumoto, Shoji; Okada, Tetsuya; Gotoda, Katsuhiko; and Aizawa, Tatsuo, 4,096,543, Cl. 361-230.000.

Akatsu, Mitsuharu; Niitsu, Ichiro; Obara, Masao; Hirota, Ryoichi; Matsumoto, Shuzo; and Maruyama, Takesuke, to Hitachi, Ltd. Deflection yoke device for use in color television receiver sets. 4,096,462, Cl. 335-213.000.

Akiyama, Nobuyuki: *See—*
Kuni, Asahiro; and Akiyama, Nobuyuki, 4,095,905, Cl. 356-200.000.

A.G. fur industrielle Elektronic AGIE: *See—*
Ullmann, Werner; and Derighetti, Renato, 4,096,394, Cl. 307-46.000.

Akzona Incorporated: *See—*
Eakridge, Brewster B.; Fink, Roger H.; Porter, William D.; and Warren, Elbert K., 4,095,317, Cl. 28-221.000.
Schurmann, Horst; Bung, Josef; and van Aalten, Hendrikus Alouisius Antonius, 4,096,127, Cl. 260-77.5AM.

Albrecht, Erhard, to Messer Griesheim GmbH. Device for applying gas to a liquid. 4,096,215, Cl. 261-121.00R.

Albright & Wilson Limited: *See—*
Price, Norman O.; Coates, Harold; and Ely, Christopher S., 4,096,131, Cl. 260-79.000.

Alexander, Merwin K.: *See—*
Hanson, Larry E.; Schober, Raymond F., Jr.; and Alexander, Merwin K., 4,096,428, Cl. 320-2.000.

Alexander, Milton: *See—*
Kissen, Abbott T.; Buehring, Willi J.; Miller, Warren G.; Alexander, Milton; Ater, James S.; and Lowe, Donald H., 4,095,289, Cl. 2-6.000.

Alexandru, Nicolae: *See—*
Chiuaru, Dumitru; and Alexandru, Nicolae, 4,095,700, Cl. 214-1.0QA.

Aling, Willem, to U.S. Philips Corporation. Gas discharge tube and means for maintaining an invisible gas discharge therein. 4,096,411, Cl. 315-158.000.

Allais, Andre; Meier, Jean; and Deraedt, Roger, to Roussel Uclaf. Novel indoles. 4,096,260, Cl. 424-250.000.

Allan, David E.: *See—*
Green, Donald L.; Behrmann, William C.; and Allan, David E., 4,096,199, Cl. 260-683.470.

Allara, Giuseppe; and Marchetti, Giorgio, to Fiat Societa per Azioni. Induction conduits of internal combustion engines. 4,095,578, Cl. 123-188.00M.

Allen, C. Tom: *See—*
Mahig, Joseph; and Allen, C. Tom, 4,095,667, Cl. 181-120.000.

Allen, Frank James: *See—*
Fleming, John Augustus; and Allen, Frank James, 4,096,422, Cl. 318-314.000.

Allen, Herbert, to Cameron Iron Works, Inc. Annular blowout preventer. 4,095,805, Cl. 277-27.000.

Alley, Robert P., to General Electric Company. Inverter circuit protection. 4,096,410, Cl. 315-86.000.

Alley, Robert P., to General Electric Company. Flicker eliminating intensity controller for discharge lamp dimming circuit. 4,096,413, Cl. 315-276.000.

Allied Chemical Corporation: *See—*
Abbott, James Gardner; Berley, Jerry Wayne; Ward, Allen Edens, Jr.; and Brandi, Sr. Adolph John, 4,095,318, Cl. 28-241.000.
Bonfield, John Henry; Murthy, Andiappan Kumaresa; and Pickens, Donald, 4,096,187, Cl. 260-601.00H.
Meyers, Bernard A., 4,096,165, Cl. 260-453.0PH.

Allis-Chalmers Corporation: *See—*
Peek, Henry L.; Taylor, Maurice J.; Abdou, John J.; and Patel, Amrut R., 4,096,367, Cl. 200-148.00B.

Allmansberger, Robert A.: *See—*
Hoey, Fred A.; and Allmansberger, Robert A., 4,095,505, Cl. 84-416.000.

Almar Enterprises, Inc.: *See—*
Michaelsen, Roy A., 4,095,717, Cl. 215-220.000.

Alter, Nathan: *See—*
Greer, Charles B.; Alter, Nathan; and Locke, David E., 4,096,474, Cl. 340-261.000.

Alton Box Board Company: *See—*
Wilkinson, Robert M.; and Lyon, James R., 4,096,305, Cl. 428-182.000.

Aluminum Company of America: *See—*
Martin, Edward S.; and Wohleber, David A., 4,096,234, Cl. 423-135.000.

Alvarez, Jose Rafael; and Fuchs, Julius Jakob, to Du Pont de Nemours,

Hetz, Heinz K., to Yarway Corporation. Modulating flow control valve assembly. 4,095,611, Cl. 137-115.000.
Hewlett-Packard Company: *See—*
Wong, Jacob Y., 4,096,388, Cl. 250-373.000.
Hicks, Paul E., Jr.; and Hammonds, James C., to ACF Industries, Incorporated. Trailer hitch having elastomer-in-shear cushioning in the diagonal strut. 4,095,766, Cl. 248-119.00S.
Hicks, Paul E., Jr.; and Hammonds, James C., to ACF Industries, Incorporated. Trailer hitch having elastomer-in-shear cushioning in the diagonal strut. 4,095,767, Cl. 248-119.00S.
Hicks, Robert E., to General Electric Company. Apparatus for manufacturing a helically finned heat exchanger. 4,095,321, Cl. 29-33.00G.
Hiersig, Heinz Max, to Mannesmann Aktiengesellschaft. Elastic shaft coupling with attenuation of torsional oscillations. 4,095,485, Cl. 74-574.000.
Higgins, Thomas Engel; and Ross, Camilla Brems, to Union Carbide. Collagen compositions. 4,096,282, Cl. 426-140.000.
Highnote, Jerry Lee, to International Business Machines Corporation. Rotary transformer with unique physical and electrical characteristics. 4,096,535, Cl. 360-84.000.
Hijikata, Akiko: *See—*
Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Okamoto, Shosuke; and Hijikata, Akiko, 4,096,255, Cl. 424-246.000.
Hildebrandt, William J., to Stanley Works, The. Method for making power boring bits. 4,095,491, Cl. 76-108.00R.
Hill, David T., to SmithKline Corporation. Tri-substituted phosphinegold(I) 1-thio-β-D-glucopyranosides. 4,096,250, Cl. 424-180.000.
Hill, Lowell W.; Cassiero, Robert L.; Taylor, Peter F.; and Tuchyner, Harold J., to Hughes Aircraft Company. Conductively cooled flashlamp. 4,096,450, Cl. 331-94.50P.
Himoto, Sizuo: *See—*
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,096,338, Cl. 560-59.000.
Hinn, Werner, to RCA Corporation. Video amplifier. 4,096,517, Cl. 358-40.000.
Hiraga, Masaharu; and Taylor, Brian J., to Sankyo Electric Co., Ltd. Multi-cylinder compressor having spaced arrays of cylinders. 4,095,921, Cl. 417-269.000.
Hirano, Hideo: *See—*
Mori, Mitsuo; Nakane, Katsumi; and Hirano, Hideo, 4,095,401, Cl. 57-81.000.
Hirose, Kenichi: *See—*
Nakamura, Shinji; Inokuma, Shun; Tanaka, Shin; Hirose, Kenichi; and Deguchi, Takashi, 4,096,184, Cl. 260-561.00N.
Hirota, Ryoichi: *See—*
Akatsu, Mitsuharu; Niitsu, Ichiro; Obara, Masao; Hirota, Ryoichi; Matsumoto, Shuzo; and Maruyama, Takesuke, 4,096,462, Cl. 335-213.000.
Hirsbrunner, Peter. Rotary valve for brass wind instruments. 4,095,504, Cl. 84-390.000.
Hirsch, James C. Height adjustment apparatus for child support. 4,095,843, Cl. 297-136.000.
Hirsch, Martin: *See—*
Cross, Harry Edward; Krieger, Wolfgang; Anschutz, Eberhard; Reh, Lothar; and Hirsch, Martin, 4,096,235, Cl. 423-166.000.
Hirschman, Shalom Z. Methods of making feminine hygienic pads. 4,095,542, Cl. 112-262.000.
Hitachi Elevator and Service Co., Ltd.: *See—*
Kido, Tadao; Satou, Yoshihiko; and Tayama, Kou, 4,095,674, Cl. 184-6.100.
Hitachi, Ltd.: *See—*
Akatsu, Mitsuharu; Niitsu, Ichiro; Obara, Masao; Hirota, Ryoichi; Matsumoto, Shuzo; and Maruyama, Takesuke, 4,096,462, Cl. 335-213.000.
Inose, Fumiyuki; and Kita, Yuzo, 4,096,564, Cl. 364-200.000.
Kasai, Masuo; Kato, Kanji; Matsumura, Yasuhide; Takeyasu, Kiyoo; and Shimomura, Raiji, 4,095,481, Cl. 74-469.000.
Kido, Tadao; Satou, Yoshihiko; and Tayama, Kou, 4,095,674, Cl. 184-6.100.
Kuni, Asahiro; and Akiyama, Nobuyuki, 4,095,905, Cl. 356-200.000.
Sakurada, Hiroshi; and Tojo, Toshihiko, 4,096,559, Cl. 363-96.000.
Hitco: *See—*
Babayan, Eduard P., 4,095,404, Cl. 57-164.000.
Colburn, Steven C.; and Black, Marion H., 4,095,937, Cl. 432-3.000.
Spain, Raymond G.; and Miller, Albert L., 4,096,104, Cl. 260-28.50B.
Hitzman, Donald O., to Phillips Petroleum Company. Microbial viscosifiers. 4,096,073, Cl. 252-8.55D.
Hivert, Andre R.: *See—*
Galmiche, Philippe M.; Hivert, Andre R.; and Walder, Andre M., 4,096,296, Cl. 427-247.000.
Hnatchenko, Michael: *See—*
Feinland, Raymond; Pohl, Stanley; and Hnatchenko, Michael, 4,096,243, Cl. 424-62.000.
Hobbs, Doreen Yvonne: *See—*
Ranby, Peter Whitten; and Hobbs, Doreen Yvonne, 4,096,088, Cl. 252-301.40R.
Hochstein, Peter A. Method and apparatus for igniting air-fuel mixture in an engine. 4,095,564, Cl. 123-211.000.
Hochstein, Peter A. Amplified microphone assembly. 4,096,439, Cl. 325-21.000.
Hodell, James Anthony, to Wessex Advanced Switching Products Limited. Rotary wafer switch. 4,096,365, Cl. 200-11.0DA.
Hodgson, Robert F., to Commercial Shearing, Inc. Control valves. 4,095,617, Cl. 137-596.130.
Hoeberechts, Arthur Marie Eugene, to U.S. Philips Corporation. Television camera tube comprising mosaic of conductive regions separated by insulator from semiconductor plate. 4,096,407, Cl. 313-367.000.
Hoechst Aktiengesellschaft: *See—*
Cuntze, Ulrich; Dollinger, Gustav; and Kleber, Rolf, 4,095,941, Cl. 8-18.00A.
Dursch, Walter; Linke, Fritz; and Finke, Manfred, 4,096,208, Cl. 260-931.000.
Freudenberger, Dieter; Wunder, Friedrich; and Fernholz, Hans, 4,096,156, Cl. 260-343.600.
Holst, Arno; and Lask, Helmut, 4,096,312, Cl. 428-297.000.
Hunger, Klaus, 4,096,157, Cl. 260-438.100.
Keil, Gunter, 4,096,334, Cl. 560-35.000.
Kraft, Kurt; and Reese, Johannes, 4,096,130, Cl. 260-77.5CH.
Nischwitz, Ehrenfried; Uhl, Klaus; and Lask, Helmut, 4,096,289, Cl. 427-32.000.
Reuschling, Dieter-Bernd; Kuhlein, Klaus; Linkies, Adolf; Kunstmann, Rudolf; and Musil, Josef, 4,096,274, Cl. 424-274.000.
Roberg, Paul; Lobbert, Bernhard; Paschke, Christof; Staehle, Hermann; Kamp, Wulf; Dicks, Manfred; and Plajer, Otto, 4,095,927, Cl. 425-525.000.
Rupp, Walter; and Finke, Manfred, 4,096,182, Cl. 260-544.00Y.
Staendeke, Horst, 4,096,189, Cl. 260-606.50P.
Weingarten, Rudolf, 4,095,940, Cl. 8-15.000.
Hoetger, Robert A.: *See—*
Cartwright, Bert W.; Cameron, Dugald; Hagaman, James A.; Hoetger, Robert A.; Kuusik, Uno; and Nortman, William, 4,095,487, Cl. 74-695.000.
Hoey, Fred A.; and Allmansberger, Robert A., to National Musical String Company. Drum snare. 4,095,505, Cl. 84-416.000.
Hoffmann-La Roche Inc.: *See—*
Cohen, Michael Robert; Kierstead, Richard Wightman; and Tilley, Jefferson Wright, 4,096,276, Cl. 424-322.000.
Gutzwiller, Juerg Albert Walter; and Uskokovic, Milan Radoje, 4,096,146, Cl. 260-284.000.
Hunziker, Paul, 4,095,948, Cl. 23-230.00B.
Li, Choh Hao, 4,096,237, Cl. 424-1.000.
Weigele, Manfred; and DeBernardo, Silvano, 4,096,321, Cl. 536-120.000.
Hoffrichter, Ingo; and Knop, Hans-Georg, to Dr.-Ing. Rudolf Hell GmbH. Circuit arrangement for resetting the signal level of a darkest area of a color or monochrome image reproduction apparatus. 4,096,519, Cl. 358-75.000.
Hohwart, George. Swimming apparatus. 4,095,657, Cl. 272-71.000.
Holland Wire Products, Inc.: *See—*
Thomas, Herbert J., Jr., 4,095,297, Cl. 5-256.000.
Holliday, Robert George, to Xerox Corporation. Microform card holder for microprinter. 4,095,894, Cl. 355-75.000.
Hollingsworth, Richard James, to RCA Corporation. Sense circuit for an MNOS array using a pair of CMOS inverters cross-coupled via CMOS gates which are responsive to the input sense signals. 4,096,401, Cl. 307-355.000.
Hollins, Jesse R. Hazard warning system for certain types of motor vehicles. 4,096,469, Cl. 340-81.00R.
Holmes Bros., Inc.: *See—*
Holmes, William H., 4,095,956, Cl. 44-13.000.
Holmes, Gordon W., to Professional Packaging Limited. Plastic coin holder. 4,095,608, Cl. 133-8.00R.
Holmes, William H., to Holmes Bros., Inc. Waste processing system. 4,095,956, Cl. 44-13.000.
Holoman Jr., Smallwood; Asperger, Robert G.; and Krawczyk, Leroy S., to Dow Chemical Company, The. Gas scrubbing system. 4,096,085, Cl. 252-189.000.
Holset Engineering Company Limited: *See—*
Palmer, Clifford Augustus, 4,095,857, Cl. 308-168.000.
Holst, Arno; and Lask, Helmut, to Hoechst Aktiengesellschaft. Deposition of swellable, modified cellulose ether on water wet hydrophilic substrate. 4,096,312, Cl. 428-297.000.
Holt, Lloyd J., to United States of America, Navy. GN_2 accumulator powered shaftless piston for dependent dual ejector bomb rack. 4,095,762, Cl. 244-137.00R.
Holte, Hans. Portable electric current supply device for building sites and the like. 4,095,871, Cl. 339-119.00C.
Homma, Yuzuru; Shimizu, Takeshi; and Okada, Kazuo, to University of Tokyo, President of The. Prophylactic preparation for treating mink infection caused by *Pseudomonas aeruginosa*. 4,096,245, Cl. 424-92.000.
Honaker, Donald E., to Monsanto. Combustion chamber with slag dam and drain trough. 4,095,777, Cl. 266-45.000.
Honda, Juntaro: *See—*
Yamamoto, Minoru; Honda, Juntaro; Nagasaki, Katsumi; and Seto, Yoshito, 4,095,433, Cl. 61-45.00C.
Honeywell Inc.: *See—*
Dreiling, James A., 4,096,397, Cl. 307-231.000.
Mott, Richard C., 4,095,741, Cl. 236-78.00C.
Shafer, Donald E., 4,096,487, Cl. 346-110.00R.
Shroff, Bansi K., 4,095,758, Cl. 242-192.000.
Honeywell Information Systems Inc.: *See—*
Barlow, George J., 4,096,569, Cl. 364-200.000.
Trinchieri, Mario G., 4,096,561, Cl. 364-200.000.
Honny Chemicals Company, Ltd.: *See—*
Yoshida, Shinichi, 4,096,009, Cl. 156-151.000.

Hood, Clifton E. Agricultural airplane loading device. 4,095,705, Cl. 214-83.180.
Hooker Chemicals & Plastics Corp.: *See—*
Weinberg, Norman Louis, 4,096,044, Cl. 204-59.00R.
Weinberg, Norman Louis, 4,096,052, Cl. 204-78.000.
Hopf, John L. Book case apparatus. 4,095,858, Cl. 312-198.000.
Hopkins, Robert E., II, to Baxter Travenol Laboratories, Inc. Limulus lysate having improved capacity to precipitate in the presence of low endotoxin concentrations, and reconstituting solutions therefor. 4,096,091, Cl. 252-408.000.
Hopwood, Francis W.; Muhlbaier, John P.; and Rossman, Herman, to Westinghouse Electric Corp. Electromechanical vibration filter for radar master oscillators. 4,096,445, Cl. 331-17.000.
Horian, James G.: *See—*
Horian, Richard C.; and Horian, James G., 4,095,802, Cl. 274-47.000.
Horian, Richard C.; and Horian, James G. Arm record cleaner. 4,095,802, Cl. 274-47.000.
Horie, Seiji: *See—*
Sato, Hideo; Horie, Seiji; Sekikawa, Nobuyoshi; and Ono, Hisatake, 4,096,143, Cl. 544-237.000.
Horrom, Bruce Wayne; and Barta, William Douglas, to Abbott Laboratories. Dibenzodiazepines. 4,096,261, Cl. 424-250.000.
Horsey, Inc.: *See—*
Ruetenik, Roger Ray, 4,095,561, Cl. 119-29.000.
Horsting, Carel Willem; and Hall, William Bernard, to RCA Corporation. Liquid crystal device and method for preparing same. 4,095,876, Cl. 350-343.000.
Horstmann, Harald: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,096,152, Cl. 260-307.00H.
Hoshino, Osamu: *See—*
Katayama, Hajime; Torigai, Akiyoshi; Suda, Masashi; and Hoshino, Osamu, 4,095,879, Cl. 355-4.000.
Hotham, Geoffrey A. Particle evaluator. 4,095,775, Cl. 356-102.000.
Houck, Frank S.: *See—*
Stieff, Lorin R.; Pruitt, Charles L.; Ulrich, Reinhard R.; and Houck, Frank S., 4,095,872, Cl. 350-96.240.
Houdaille Industries, Inc.: *See—*
Hammond, Earl J., 4,095,916, Cl. 408-1.00R.
Slawson, Kenneth Leonard, 4,096,563, Cl. 364-107.000.
Hounsfield, Godfrey Newbold, to EMI Limited. Apparatus for examining objects by means of penetrating radiation. 4,096,390, Cl. 250-445.00T.
House Food Industrial Company Limited: *See—*
Sakakibara, Sakuichi; Sugisawa, Ko; Matsumura, Yasushi; and Okamoto, Hidefumi, 4,096,286, Cl. 426-577.000.
Howe, Francis M.; and Yin, Simon, to Howe-Yin Research Co., Inc. Stored energy operation for breakers. 4,095,676, Cl. 185-40.00R.
Howe-Yin Research Co., Inc.: *See—*
Howe, Francis M.; and Yin, Simon, 4,095,676, Cl. 185-40.00R.
Howell, Sabert N., to CBS Inc. Dimmer control circuit. 4,096,414, Cl. 315-291.000.
Hudson Industries Corporation: *See—*
Konigsberg, Moses, 4,095,990, Cl. 106-136.000.
Hudson Products Corporation: *See—*
Shipes, Kelly V., 4,095,648, Cl. 165-162.000.
Huff, Robert O., to Reliance Electric Company. Cooling system for gear reducers. 4,095,644, Cl. 165-13.000.
Hughes Aircraft Company: *See—*
Burke, Roger A., 4,095,412, Cl. 58-50.00R.
Hill, Lowell W.; Cassiero, Robert L.; Taylor, Peter F.; and Tuchyner, Harold J., 4,096,450, Cl. 331-94.50P.
Rosen, Harold A.; and Salvatore, Jeremiah O., 4,096,427, Cl. 318-648.000.
Hujik, Ladislav; and Baran, Miroslav, to Bata Shoe Company, Inc. Discharge and cutting apparatus for tandem sewing machine. 4,095,536, Cl. 112-121.260.
Humphrey, Frederick H. Wall thickness gauge and method utilizing a reed switch and magnet means on opposite sides of the wall. 4,096,438, Cl. 324-229.000.
Hunger, Klaus, to Hoechst Aktiengesellschaft. Azamethine metal complex compounds. 4,096,157, Cl. 260-438.100.
Hunter, Byron A.; and Prager, Irwin A., to Uniroyal, Inc. Blowing agents-bis(hydrocarbylsulfonyl) carbohydrazides. 4,096,100, Cl. 260-2.50R.
Hunter Douglas International N.V.: *See—*
Brugman, Johannes Antonius Hendrikus, 4,095,385, Cl. 52-489.000.
Hunter, Harry E. Air partition for automobile passenger compartments. 4,095,837, Cl. 296-24.00R.
Hunter, Rodney James Anthony; and Plummer, Derek, to Coal Industry (Patents) Limited. Mine equipment. 4,095,434, Cl. 61-63.000.
Hunziker, Paul, to Hoffmann-La Roche Inc. Determination of uric acid. 4,095,948, Cl. 23-230.00B.
Hurley, Kenneth D.: *See—*
Anderson, Ardell J.; Hurley, Kenneth D.; Leckman, Richard H.; Robinson, Ronald H.; and Tinoco, Edward N., 4,095,761, Cl. 244-135.00A.
Husbands, David Roderick: *See—*
Ayers, John Stephen; and Husbands, David Roderick, 4,096,136, Cl. 260-112.00B.
Huschens, Rolf: *See—*
Milkowski, Wolfgang; Budden, Renke; Funke, Siegfried; Huschens, Rolf; Liepmann, Hans-Gunther; Stuhmer, Werner; and Zeugner, Horst, 4,096,141, Cl. 260-239.0BD.
Husted, Royce H., to Saroy Engineering. Tread for power driven ski type device. 4,095,849, Cl. 305-35.00R.
Huston, Duane A., to Olin Corporation. Fuel burning system. 4,095,930, Cl. 431-90.000.
Hutchins, Walter J., to Stanley Works, The. Coping saw with improved blade retention means. 4,095,635, Cl. 145-33.00D.
Hutchison, William S.: *See—*
Jensen, Larry F.; Hartzell, Frank D.; and Hutchison, William S., 4,095,934, Cl. 431-89.000.
Hwang, Yu-Tang, to Chemplex Company. Polymerization catalyst and method. 4,096,093, Cl. 252-430.000.
Hysler, George J., to N.D.T. Laboratories, Inc. Electrical circuit for controlling the feed rate of parts. 4,096,424, Cl. 318-480.000.
HZI Research Center: *See—*
Itil, Turan M., 4,096,266, Cl. 424-261.000.
Ichikawa, Yataro; Nakagawa, Koji; and Yoshisato, Eishin, to Teijin Limited. Process for racemizing optically active amino compounds. 4,096,186, Cl. 260-584.00R.
Ichinohe, Shoji: *See—*
Shinohara, Toshio; Arai, Masatoshi; and Ichinohe, Shoji, 4,096,161, Cl. 260-448.20P.
ICI Americas Inc.: *See—*
Rutledge, Thomas F., 4,096,190, Cl. 568-730.000.
Ide, Masataka: *See—*
Kawazu, Motoaki; Ide, Masataka; and Kawamura, Atsushi, 4,095,888, Cl. 355-4.000.
Ideal Corporation: *See—*
Kimmelman, Samuel, 4,096,470, Cl. 340-83.000.
Ignatjev, Vladimir. Air ionizer. 4,096,544, Cl. 361-231.000.
Ikawa, Katsuya; and Tanaka, Yuichi, to Riken Piston Ring Industrial Co. Ltd. High duty ductile cast iron with superplasticity and its heat treatment methods. 4,096,002, Cl. 148-138.000.
Ikehata, Yukio: *See—*
Kikuchi, Tadahiro; Ikehata, Yukio; Ikenishi, Masataka; and Kushida, Shozo, 4,095,406, Cl. 58-23.00R.
Ikenishi, Masataka: *See—*
Kikuchi, Tadahiro; Ikehata, Yukio; Ikenishi, Masataka; and Kushida, Shozo, 4,095,406, Cl. 58-23.00R.
Iles, Roger: *See—*
Brook, Greville B.; Brooks, Peter L.; and Iles, Roger, 4,095,999, Cl. 148-11.50R.
Illinois Tool Works Inc.: *See—*
Sidor, Edward Frank, 4,095,468, Cl. 73-362.00R.
Imagi, Tsutomu; Fudatsuji, Toshiharu; and Torigoe, Yasuhiko, to Fujitsu Limited. Apparatus for stacking a continuous printed paper being folded. 4,095,779, Cl. 270-61.00F.
Imperial Chemical Industries Limited: *See—*
Benzie, Robert John; and Waddan, Dhafir Yusuf, 4,096,171, Cl. 260-465.300.
Clementson, John Joseph; and Pearson, Leo, 4,096,083, Cl. 252-171.000.
Hancock, Peter; and Clifton, Terence Edward, 4,095,474, Cl. 73-579.000.
Marsham, Peter Robert, 4,096,337, Cl. 424-308.000.
IN. DA. TE. Aktiengesellschaft: *See—*
Janovtchik, Viacheslav Jansen, 4,095,517, Cl. 99-495.000.
Inaba, Shigeho: *See—*
Yamamoto, Michihiro; Koshiba, Masao; Inaba, Shigeho; and Yamamoto, Hisao, 4,096,144, Cl. 544-284.000.
Inaba, Yutaka: *See—*
Kawamata, Toshio; Inaba, Yutaka; Shiroishi, Kuniyasu; and Morishita, Shigeru, 4,096,015, Cl. 156-273.000.
Incoe Corporation: *See—*
Reitan, David M., 4,095,931, Cl. 425-564.000.
Inokuma, Shun: *See—*
Nakamura, Shinji; Inokuma, Shun; Tanaka, Shin; Hirose, Kenichi; and Deguchi, Takashi, 4,096,184, Cl. 260-561.00N.
Inose, Fumiyuki; and Kita, Yuzo, to Hitachi, Ltd. Data processing system with interrupt functions. 4,096,564, Cl. 364-200.000.
Inoue, Kouzo: *See—*
Matsuda, Osaku; Inoue, Kouzo; and Tsunematsu, Shuji, 4,095,986, Cl. 106-52.000.
Institut Electrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR: *See—*
Paton, Boris Evgenievich; Mandelberg, Simon Lvovich; Biletsky, Semen Mikhailovich; Atamanchuk, Vyacheslav Anastasievich; Knyazhinsky, Zakhar Osipovich; Osada, Yakov Efimovich; and Kotenzhi, Julian Vasilievich, 4,095,594, Cl. 228-143.000.
Institut Francais du Petrole: *See—*
Chauveteau, Guy; and Moulu, Jean-Claude, 4,095,651, Cl. 166-294.000.
Institut Textile de France: *See—*
Beraud, Claudius; Guigal, Robert; Lehmann, Robert; and Lyonnet, Andre, 4,095,403, Cl. 57-144.000.
Institutul Pentru Proiectari de Sectii si Uzine de Laminare — Iprolam: *See—*
Chiuaru, Dumitru; and Alexandru, Nicolae, 4,095,700, Cl. 214-1.0QA.
Intel Corporation: *See—*
Owen, William H., III; Kokkonen, Kim R.; and Pashley, Richard D., 4,096,584, Cl. 365-227.000.
International Business Machines Corporation: *See—*
Borie, Jean-Claude; Couder, Alain; Dauby, Alain; Demange, Michel; Lebizay, Gerald; and Lechaczynski, Michel, 4,096,566, Cl. 364-200.000.

Oggs Manufacturing Corp.: *See—*
Foldes, Peter Andrew, 4,095,353, Cl. 36-11.500.
Ohba, Katsuhiro: *See—*
Takahashi, Nobuaki; Suzuki, Fujio; and Ohba, Katsuhiro, 4,096,360, Cl. 179-100.4ST.
Ohishi, Tetsu; and Fukushima, Hiroshi, to Nippon Zeon Co. Ltd. Vulcanized product of terpolymer and process for preparation thereof. 4,096,135, Cl. 260-79.50B.
Ohkubo, Kazuo: *See—*
Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Okamoto, Shosuke; and Hijikata, Akiko, 4,096,255, Cl. 424-246.000.
Ohlsson, Olov: *See—*
Berglund, Benkt; and Ohlsson, Olov, 4,095,634, Cl. 144-317.000.
Ohno, Ietatsu. Grinding tank with one end having circular motion. 4,095,753, Cl. 241-175.000.
Ohno, Syotaro: *See—*
Koyama, Kenji; and Ohno, Syotaro, 4,096,099, Cl. 260-2.50D.
Ohnuma, Kiyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Device for controlling a lock-up clutch in an automatic transmission. 4,095,486, Cl. 74-645.000.
Ohrberg, Carl Verner. Radial piston pump. 4,095,510, Cl. 91-487.000.
Ohtake, Sadao; Hayashida, Shiyuji; Sanada, Takamasa; and Terai, Shigeki, to Kanebo, Ltd. Apparatus for mixing a cement slurry with a glass fiber. 4,095,748, Cl. 239-419.300.
Oishi, Kengo, to Fuji Photo Film Co., Ltd. Tape support pins in magnetic tape cassette. 4,096,538, Cl. 360-132.000.
Okabe, Katsuhiko, to Copal Company Limited. Printer having swingable printing rings. 4,095,686, Cl. 400-150.000.
Okada, Kazuo: *See—*
Homma, Yuzuru; Shimizu, Takeshi; and Okada, Kazuo, 4,096,245, Cl. 424-92.000.
Okada, Tetsuya: *See—*
Kozuka, Nobuhiko; Matsumoto, Shoji; Okada, Tetsuya; Gotoda, Katsuhiko; and Aizawa, Tatsuo, 4,096,543, Cl. 361-230.000.
Okai, Hiroshi: *See—*
Kishi, Ikuji; Nakano, Tatsuo; and Okai, Hiroshi, 4,096,201, Cl. 260-879.000.
Okamoto, Hidefumi: *See—*
Sakakibara, Sakuichi; Sugisawa, Ko; Matsumura, Yasushi; and Okamoto, Hidefumi, 4,096,286, Cl. 426-577.000.
Okamoto, Shosuke: *See—*
Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Okamoto, Shosuke; and Hijikata, Akiko, 4,096,255, Cl. 424-246.000.
Okamoto, Toyoo; and Kojima, Kenji, to Ricoh Company, Ltd. Exposure controlling apparatus for electrophotographic copying machine. 4,095,884, Cl. 355-3.00R.
Okasaka, Sadaatsu, to Nippon Telegraph and Telephone Public Corporation. Control system for mobile radio communication. 4,096,440, Cl. 325-53.000.
Okazaki, Shinichiro: *See—*
Numata, Saburo; and Okazaki, Shinichiro, 4,096,382, Cl. 250-214.00A.
Numata, Saburo; and Okazaki, Shinichiro, 4,096,496, Cl. 354-60.00A.
Okuma Machinery Works Ltd.: *See—*
Toida, Ryuji, 4,096,476, Cl. 340-347.00P.
Okumura, Akio: *See—*
Sueyoshi, Tohru; Furtachi, Nobuo; Okumura, Akio; and Shishido, Tadao, 4,095,984, Cl. 96-100.00N.
Okuno, Keno; and Osumi, Masumi, to Nippon Kogaku K.K. Exposure propriety indicating device for flash-photography. 4,096,498, Cl. 354-127.000.
Olin Corporation: *See—*
Boudakian, Max M., 4,096,196, Cl. 260-650.00F.
Huston, Duane A., 4,095,930, Cl. 431-90.000.
Noack, Manfred G., 4,096,090, Cl. 252-389.00R.
Specht, Steven J.; and Woodard, Kenneth E., Jr., 4,096,054, Cl. 204-263.000.
Olinkraft, Inc.: *See—*
Killy, Earl J., 4,095,693, Cl. 206-433.000.
Olson, Bruce Edgar. Attachment for an overhead door. 4,095,641, Cl. 160-209.000.
Olvey, Shelby Lewis: *See—*
Meier, Charles David; and Olvey, Shelby Lewis, 4,095,803, Cl. 277-12.000.
Omae, Tsutomu: *See—*
Marumoto, Katsuji; Omae, Tsutomu; Suzuki, Toshio; Shibata, Takanori; and Yamamura, Hirohisa, 4,096,418, Cl. 318-12.000.
Onda, Eiichi; and Watanabe, Masanori, to Seiko Koki Kabushiki Kaisha. Focal plane shutter for cameras. 4,096,505, Cl. 354-246.000.
O'Neil, James P., to Automation Designs Inc. Pick and place machine. 4,095,699, Cl. 214-1.0BB.
Ong, Kian Kie, to U.S. Philips Corporation. Circuit for the conversion of a digital signal to an analog signal. 4,096,475, Cl. 340-347.0DA.
Ono, Hisatake: *See—*
Sato, Hideo; Horie, Seiji; Sekikawa, Nobuyoshi; and Ono, Hisatake, 4,096,143, Cl. 544-237.000.
Ono, Katsutoshi; and Takagi, Yasumasa. Speedometer with an exceeding speed warning device. 4,095,553, Cl. 116-116.000.
Ono, Mitsuaki; Yatsugake, Masahiko; Miyatake, Norio; and Fukushima, Yukihiro, to Matsushita Electric Industrial Co., Ltd. Magnetic tape copying method and apparatus. 4,096,532, Cl. 360-16.000.
Onoue, Kazuo: *See—*
Iwasa, Seizo; and Onoue, Kazuo, 4,095,579, Cl. 123-192.00B.
Ooms, William Jay: *See—*
Davis, James Alvin; and Ooms, William Jay, 4,096,399, Cl. 307-249.000.
Opland, Harry; Sharpe, Ralph S.; and Zawacki, Joseph H., to Lear Siegler, Inc. Axle making method and apparatus. 4,095,450, Cl. 72-318.000.
Optical Associates, Inc.: *See—*
Hanson, Larry E.; Schober, Raymond F., Jr.; and Alexander, Merwin K., 4,096,428, Cl. 320-2.000.
Oquidam, Bernard, to Compagnie pour l'Etude et la Realisation de Combustibles Atomiques. Solar energy collector with on site storage. 4,095,585, Cl. 126-271.000.
Orbisphere Corporation, Wilmington, Succursale de Collonge-Bellerive: *See—*
Hale, John Martin; and Weber, Eugen, 4,096,047, Cl. 204-195.00P.
Orlov, Anatoly Nikolaevich: *See—*
Matveev, Felix Arkadievich; Orlov, Anatoly Nikolaevich; Rudakov, Anatoly Alexeevich; and Chikmarev, Vladimir Sergeevich, 4,095,967, Cl. 65-77.000.
Orsing, John Harry. Grilling apparatus. 4,095,516, Cl. 99-390.000.
Orsing, John Harry. Fuel element. 4,095,957, Cl. 44-40.000.
Ortho Pharmaceutical Corporation: *See—*
Wachter, Michael P.; and Settepani, Joseph A., 4,096,253, Cl. 424-238.000.
Osada, Nobuhisa; and Nakamura, Hideo, to Japanese National Railways. Spot control type automatic train stop system utilizing ground control units common to more than one block signal. 4,095,764, Cl. 246-182.00B.
Osada, Yakov Efimovich: *See—*
Paton, Boris Evgenievich; Mandelberg, Simon Lvovich; Biletsky, Semen Mikhailovich; Atamanchuk, Vyacheslav Anastasievich; Knyazhinsky, Zakhar Osipovich; Osada, Yakov Efimovich; and Kotenzhi, Julian Vasilievich, 4,095,594, Cl. 228-143.000.
Oster Corporation: *See—*
Artin, Robert Lee, 4,095,751, Cl. 241-37.500.
Osterberg, Bruce H.: *See—*
Saxton, James C.; Osterberg, Bruce H.; and Kawan, Joseph C., 4,095,795, Cl. 273-143.00R.
Ostrowski, Michael H., to Maremont Corporation. Shock absorber with improved position sensitive assembly. 4,095,682, Cl. 188-289.000.
Osumi, Masumi: *See—*
Okuno, Keno; and Osumi, Masumi, 4,096,498, Cl. 354-127.000.
Otani, Yuzo: *See—*
Watanabe, Masamichi; Nakahara, Takuo; Sakamoto, Seiji; Bizen, Kunio; Yano, Akikazu; and Otani, Yuzo, 4,096,109, Cl. 260-40.00R.
Otis Engineering Corporation: *See—*
Laky, Tibor, 4,095,424, Cl. 60-436.000.
Otsuka, Yasuhiro: *See—*
Matsumoto, Shinichi; Miura, Hirohisa; Uchida, Kiyoshi; and Otsuka, Yasuhiro, 4,096,048, Cl. 204-195.00S.
Otteson, Kenneth Melvin; and Dawson, Daniel Joseph, to Dynapol. Ethylsulfonate-alkylamine copolymers as colorant backbones. 4,096,134, Cl. 260-79.50R.
Outram, Christopher David; and Edwards, Hugh Jeremy Willis, to CCL Systems Limited. Joined concrete bodies and method of joining same. 4,095,389, Cl. 52-583.000.
Owen, William H., III; Kokkonen, Kim R.; and Pashley, Richard D., to Intel Corporation. Low power/high speed static ram. 4,096,584, Cl. 365-227.000.
Owens, Andrew Charles: *See—*
Steele, Raymond Ernest; and Owens, Andrew Charles, 4,095,910, Cl. 403-49.000.
Owens-Corning Fiberglas Corporation: *See—*
Roberts, Michael Graeg; and Bolen, Charles Edwin, 4,096,107, Cl. 260-33.6UA.
Strauss, Carl R.; Roberts, Michael G.; and Bolen, Charles E., 4,096,102, Cl. 260-22.00D.
Owens-Illinois, Inc.: *See—*
Krall, Thomas J., 4,096,223, Cl. 264-89.000.
Oystese, Brigt, to A/S Apothekernes Laboratorium for Specialpraeparater. Zinc bacitracin composition for use as a feed supplement and method for making the same. 4,096,246, Cl. 424-177.000.
P.R. Mallory & Co. Inc.: *See—*
Sweany, Louis P.; and Burk, Michael T., 4,096,473, Cl. 340-237.500.
P. X. Industries, Inc.: *See—*
MacDonald, Paul M., 4,095,853, Cl. 308-3.600.
Pacansky, Thomas J., to Xerox Corporation. Process for preparing waterless printing masters comprising copolymer of siloxane and crystallized thermoplastic blocks. 4,096,294, Cl. 427-197.000.
Pacifici, James G.; and Wang, Richard H. S., to Eastman Kodak Company. Optically brightened polyesters with 2,5-bis-(p-carboalkylstyryl)-oxadiazole. 4,095,939, Cl. 8-1.00W.
Paffoni, Camillo: *See—*
Battisti, Ruggero; and Paffoni, Camillo, 4,096,139, Cl. 260-152.000.
Palmer, Clifford Augustus, to Holset Engineering Company Limited. Oil deflector. 4,095,857, Cl. 308-168.000.
Palmer, Robert G.: *See—*
Nesson, Israel; Faris, Edwin E.; and Palmer, Robert G., 4,096,495, Cl. 354-59.000.
Palum, Barry L., to Marine Midland Bank of Rochester. Chiming mechanism. 4,095,409, Cl. 58-13.000.
Panter, Hubert Gerald: *See—*
Lonseth, Palmer; Panter, Hubert Gerald; and Moorby, Donald G., 4,095,627, Cl. 141-250.000.

Pappas, Frank; and Rennick, John L., to Zenith Radio Corporation. Controller for video tape recorder. 4,096,542, Cl. 361-196.000.
Pappis, James; Hagen, Lawrence M.; and Li, Pei-Ching, to Raytheon Company. Isotropic boron nitride and method of making same. 4,096,297, Cl. 427-248.00C.
Paquin, Patrick Joseph, to Spectra-Strip Corporation. Method and apparatus for making twisted pair multi-conductor ribbon cable with intermittent straight sections. 4,096,006, Cl. 156-55.000.
Par-Way Mfg. Co.: *See—*
Hanson, Harold Wayne, 4,096,258, Cl. 426-250.000.
Paraisten Kalkki Oy - Pargas Kalk AB: *See—*
Myreen, Bertel; and Nylund, Ulf, 4,096,062, Cl. 210-77.000.
Pardee, Robert P., to Ball Brothers Research Corporation. Protective lubricating compositions for recordings. 4,096,079, Cl. 252-51.50R.
Parham, William Lamar; and Saunders, Morton Jefferson, to Bell Telephone Laboratories, Incorporated. Method and apparatus for manufacturing optical fiber ribbons. 4,096,010, Cl. 156-179.000.
Paris, Jacques: *See—*
Mollard, Paul; Paris, Jacques; and Rousset, Abel, 4,096,080, Cl. 252-62.560.
Parker, Charles L. Heat exchanger for clothes dryer. 4,095,349, Cl. 34-86.000.
Parker, David I.: *See—*
Johnson, Virgil H.; and Parker, David I., 4,095,526, Cl. 102-8.000.
Parker, Delmer G.; and Bonham, Robert D., to Xerox Corporation. Magnetic mixing apparatus and process. 4,095,883, Cl. 355-3.0DD.
Parks, Howard L., to Bunker Ramo Corporation. Component connection system. 4,095,867, Cl. 339-92.00M.
Paschke, Christof: *See—*
Roberg, Paul; Lobbert, Bernhard; Paschke, Christof; Staehle, Hermann; Kamp, Wulf; Dicks, Manfred; and Plajer, Otto, 4,095,927, Cl. 425-525.000.
Pascoe, William Martin, Sr.; and Wilson, David Bruce, to Milliken Research Corporation. Apparatus for the application of liquids to moving materials. 4,095,444, Cl. 68-205.00R.
Pashley, Richard D.: *See—*
Owen, William H., III; Kokkonen, Kim R.; and Pashley, Richard D., 4,096,584, Cl. 365-227.000.
Patel, Amrut R.: *See—*
Peek, Henry L.; Taylor, Maurice J.; Abdou, John J.; and Patel, Amrut R., 4,096,367, Cl. 200-148.00B.
Paton, Boris Evgenievich; Mandelberg, Simon Lvovich; Biletsky, Semen Mikhailovich; Atamanchuk, Vyacheslav Anastasievich; Knyazhinsky, Zakhar Osipovich; Osada, Yakov Efimovich; and Kotenzhi, Julian Vasilievich, to Institut Electrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR. Method of manufacturing laminated shells. 4,095,594, Cl. 228-143.000.
Patzlaff, Albert W.; and Beardsley, Paul G., to Blueberry Equipment, Inc. Berry tray denesting and berry packaging. 4,095,721, Cl. 221-210.000.
Paul, Jurgen; and Kostelezky, Walter, to Daimler-Benz Aktiengesellschaft. Indicating arrangement for a distance warning installation in motor vehicles. 4,095,551, Cl. 116-35.00R.
Paul, Rolf: *See—*
Menschik, Judith; and Paul, Rolf, 4,096,257, Cl. 424-249.000.
Paul, Wray D. Apparatus for depositing dough onto pans therefor. 4,095,926, Cl. 425-307.000.
Paulus, Rudolf: *See—*
Pfeifer, Josef; Paulus, Rudolf; Gutmann, Walter; and Resch, Michael, 4,096,486, Cl. 346-107.00R.
Paurat, Friedrich-Wilhelm. Method of and apparatus for the mining of coal. 4,095,845, Cl. 299-18.000.
Pavelle, Richard: *See—*
Ferber, Leon A.; and Pavelle, Richard, 4,096,577, Cl. 364-712.000.
Payne, Roger E.: *See—*
Rongone, Ronald L.; Nicholson, David W.; and Payne, Roger E., 4,095,465, Cl. 73-159.000.
Peabody Galion Corporation: *See—*
Walker, James Donald, 4,096,068, Cl. 210-293.000.
Peachtree Doors, Inc.: *See—*
Governale, Bernard C., 4,095,310, Cl. 16-87.00R.
Pearson, Leo: *See—*
Clementson, John Joseph; and Pearson, Leo, 4,096,083, Cl. 252-171.000.
Peavey Company: *See—*
Marpe, Donald E., 4,095,625, Cl. 141-93.000.
Peek, Henry L.; Taylor, Maurice J.; Abdou, John J.; and Patel, Amrut R., to Allis-Chalmers Corporation. Gas insulated circuit breaker incorporating complete modular interrupter structure and operating mechanism. 4,096,367, Cl. 200-148.00B.
Peltret, Pierre Henri, to Lucas Industries Limited. Housing for fuel pump control assembly. 4,095,924, Cl. 417-499.000.
Penczak, John P.; and Chokenea, Richard A., to Bargar Metal Fabricating Company. Outlet box access cover. 4,096,347, Cl. 174-48.000.
PepsiCo Inc.: *See—*
Ratliff, Roger D., 4,095,704, Cl. 214-77.00P.
Percevaut, Emile Henri Gabriel; and Belin, Christian. Multicellular reactor with liquid/gas phase contacts. 4,096,214, Cl. 261-79.00A.
Perkin-Elmer Corporation, The: *See—*
Talmadge, Paul Conway, 4,095,896, Cl. 356-89.000.
PermaGrain Products, Inc.: *See—*
Breault, Homer, 4,095,388, Cl. 52-747.000.
Perrella, Emilio. Container having secondary hinged closure. 4,095,712, Cl. 220-254.000.
Persson, Per Ingemar, to Nitro Nobel AB. Metal wall provided with either external or internal cladding. 4,095,734, Cl. 228-104.000.
Perusco, Ivan, to Precision Tools Ltd. Container for holding and dispensing flowable products. 4,095,724, Cl. 222-95.000.
Peters, Gordon L.; and Smith, John R., to National Steel Corporation. Production of corrosion resistant seam-free can bodies from tinplate. 4,095,544, Cl. 113-120.00A.
Petersen, Russell H.; Weaver, Edmund A.; and Kober, Frederick P., to Chem-E-Watt Corporation. Self-contained warming pad. 4,095,583, Cl. 126-263.000.
Petrillo, Richard: *See—*
Anderberg, Thomas A.; and Petrillo, Richard, 4,095,746, Cl. 239-287.000.
Petrow, Vladimir: *See—*
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,096,254, Cl. 424-242.000.
Pettersson, Nils Ingvar; and Carlsson, Olle Gideon. Tongue and groove joint. 4,095,913, Cl. 403-364.000.
Pettit, John E. Inflated load bearing cushion for camper vehicles and the like. 4,095,836, Cl. 296-23.0MC.
Pfeifer, Josef; Paulus, Rudolf; Gutmann, Walter; and Resch, Michael, to AGFA-Gevaert AG. Recorder. 4,096,486, Cl. 346-107.00R.
Pfenninger, Hans, to BBC Brown Boveri & Company Limited. Thermal power plant. 4,095,419, Cl. 60-39.120.
Pfirrmann, Rolf: *See—*
Geistlich, Peter; and Pfirrmann, Rolf, 4,096,241, Cl. 424-54.000.
Pharr, Cecil O. Finger actuator for folded knife blade. 4,095,337, Cl. 30-158.000.
Phenicie, Ronald Eugene; and Wise, Rodney Mahlon, to Procter & Gamble Company, The. Detergent compositions containing aluminosilicate agglomerates. 4,096,081, Cl. 252-89.00R.
Phil Menard Limitee: *See—*
Janosch, Hans, 4,095,311, Cl. 16-163.000.
Phillips Petroleum Company: *See—*
Bennett, Richard J., 4,095,531, Cl. 105-182.00R.
Brady, Donnie G., 4,096,113, Cl. 260-45.8NT.
Christie, David A., 4,096,574, Cl. 364-501.000.
Edmonds, James T., Jr., 4,096,132, Cl. 260-79.100.
Hitzman, Donald O., 4,096,073, Cl. 252-8.55D.
Mowery, Richard A., Jr., 4,095,472, Cl. 73-422.0GC.
Phillips Stamping Co., Inc.: *See—*
Hannan, John I., 4,095,430, Cl. 61-45.00B.
Hannan, John I., 4,095,431, Cl. 61-45.00B.
Pickens, Donald: *See—*
Bonfield, John Henry; Murthy, Andiappan Kumaresa; and Pickens, Donald, 4,096,187, Cl. 260-601.00H.
Pickles, Wilfred: *See—*
Randell, Donald Richard; and Pickles, Wilfred, 4,096,209, Cl. 260-966.000.
Pierce, Victor J.: *See—*
Young, Robert W.; Prussin, Samuel B.; Caccavale, John L.; and Pierce, Victor J., 4,096,281, Cl. 426-89.000.
Pies, Othmar W. Solar heating system. 4,095,584, Cl. 126-270.000.
Pietreniak, Eugene J., to Scott Paper Company. Wipe dry improvement of non-woven, dry-formed webs. 4,096,311, Cl. 428-289.000.
Pigerol, Charles; Chandavoine, Marie-Madeleine; de Fillain, Paul de Cointet; and Nanthavong, Souli, to Labaz. 2-Phenyl-indole derivative stabilizers for PVC resins. 4,096,112, Cl. 260-45.80N.
Piljay, Robert E.; and Craig, Kenneth K., to H. Koch & Sons. Gas operated automatic canopy release. 4,095,313, Cl. 24-230.00A.
Pin Tek, Inc.: *See—*
Hatch, David A., 4,095,862, Cl. 339-14.00R.
Pinkerton, Harry E. Proportioning fluids. 4,096,059, Cl. 210-22.00A.
Pitman-Moore, Inc.: *See—*
Mia, Abdus Salam, 4,096,037, Cl. 195-103.50R.
Pitt, Leland S.; Large, George B.; and MacDonald, Alan, to Stauffer Chemical Company. Diethyl 2-pyridine thionophosphonate as an insecticide activator. 4,096,251, Cl. 424-200.000.
Plajer, Otto: *See—*
Roberg, Paul; Lobbert, Bernhard; Paschke, Christof; Staehle, Hermann; Kamp, Wulf; Dicks, Manfred; and Plajer, Otto, 4,095,927, Cl. 425-525.000.
Plastronics, Inc.: *See—*
Manschot, James G.; Mather, Byron L.; and Salvadori, Larry A., 4,095,589, Cl. 128-2.00F.
Plessey Handel Und Investments AG.: *See—*
Wren, John Pelham; and Steventon, Michael Keith, 4,096,419, Cl. 318-138.000.
Plexi-Lite Mfg., Inc.: *See—*
Prester, Lorrain Wilbert, 4,096,551, Cl. 362-83.000.
Plugge, Jay S.; Wesbey, William H.; and Blake, James E., to General Electric Company. Method and apparatus for obscuring the raster lines in a photograph of a video monitor screen. 4,096,530, Cl. 358-244.000.
Plummer, Derek: *See—*
Hunter, Rodney James Anthony; and Plummer, Derek, 4,095,434, Cl. 61-63.000.
Pohl, Gerhard. Process for making and using high frequency weldable material. 4,096,016, Cl. 156-274.000.
Pohl, Stanley: *See—*
Feinland, Raymond; Pohl, Stanley; and Hnatchenko, Michael, 4,096,243, Cl. 424-62.000.
Polaroid Corporation: *See—*
Beals, Robert C.; and Millard, John B., 4,096,501, Cl. 354-179.000.
Johnson, Bruce K., 4,096,497, Cl. 354-86.000.
Land, Edwin H.; and Kee, Richard C., 4,096,492, Cl. 354-33.000.
Polinsky, Murray Arthur, to RCA Corporation. Monolithic light detector. 4,096,512, Cl. 357-30.000.

Company. Nutation damping in dual-spin stabilized devices. 4,096,427, Cl. 318-648.000.

Rosenberger, Roy R., to Nalco Chemical Company. Feed forward control of dissolved solids in a countercurrent separation and washing zone. 4,096,028, Cl. 162-49.000.

Ross, Camilla Brems: *See—*
Higgins, Thomas Engel; and Ross, Camilla Brems, 4,096,282, Cl. 426-140.000.

Ross, Frederick W. Impact device with multiple connecting rods and gearing. 4,095,654, Cl. 173-118.000.

Ross, Michael David, to RCA Corporation. Color video signal processing circuits. 4,096,513, Cl. 358-4.000.

Rossman, Herman: *See—*
Hopwood, Francis W.; Muhlbaier, John P.; and Rossman, Herman, 4,096,445, Cl. 331-17.000.

Rothauser, Ernst Hans; and Wild, Daniel, to International Business Machines Corporation. Common channel access method for a plurality of data stations in a data transmission system and circuit for implementing the method. 4,096,355, Cl. 179-15.0AL.

Rothschild, Arthur Louis, III; and Baxter, Robert Olin, to International Paper Company. Bag closure having valve sleeve. 4,095,736, Cl. 229-62.500.

Rouse, William W. Angle cutting guide. 4,095,500, Cl. 83-762.000.

Roussel Uclaf: *See—*
Allais, Andre; Meier, Jean; and Deraedt, Roger, 4,096,260, Cl. 424-250.000.

Rousset, Abel: *See—*
Mollard, Paul; Paris, Jacques; and Rousset, Abel, 4,096,080, Cl. 252-62.560.

Rowe, V. Lopez. Bicycle drinking apparatus. 4,095,812, Cl. 280-289.00R.

Rowen, Harold E., to Caterpillar Tractor Co. Fluid operated clutch. 4,095,684, Cl. 192-103.0FA.

Rowland, Michael Charles: *See—*
Gurnell, Philip; and Rowland, Michael Charles, 4,096,511, Cl. 357-30.000.

Roy, John R.; Roy, Stephen; Roy, Mary L.; and Mooney, Daniel T., to Airtek Corporation. Air pollution control device. 4,095,514, Cl. 98-58.000.

Roy, Mary L.: *See—*
Roy, John R.; Roy, Stephen; Roy, Mary L.; and Mooney, Daniel T., 4,095,514, Cl. 98-58.000.

Roy, Stephen: *See—*
Roy, John R.; Roy, Stephen; Roy, Mary L.; and Mooney, Daniel T., 4,095,514, Cl. 98-58.000.

Ruben, Sol, to Rattner, Richard G., a part interest. Construction of a fitted corner for a bedcover. 4,095,300, Cl. 5-334.00R.

Rubinstein, Herbert J.; Clark, Philip M.; and Gilcrest, James D., to Nuclear Services Corporation. Rack for storing spent nuclear fuel elements. 4,096,392, Cl. 250-507.000.

Ruckdeschel, Hermann; and Rambold, Thomas, to Siemens Aktiengesellschaft. Integrated circuit data handling apparatus for a data processing system, having a plurality of modes of operation. 4,096,565, Cl. 364-200.000.

Rudakov, Anatoly Alexeevich: *See—*
Matveev, Felix Arkadievich; Orlov, Anatoly Nikolaevich; Rudakov, Anatoly Alexeevich; and Chikmarev, Vladimir Sergeevich, 4,095,967, Cl. 65-77.000.

Rudolph, Stephen Edward; and Glowaky, Raymond Charles, to Sherwin-Williams Company, The. Coatings containing starch esters. 4,095,992, Cl. 106-213.000.

Ruetenik, Roger Ray, to Horsey, Inc. Animal exercising apparatus. 4,095,561, Cl. 119-29.000.

Rupp, Walter; and Finke, Manfred, to Hoechst Aktiengesellschaft. Process for the simultaneous preparation of 2,5-dioxo-1,2-oxa-phospholanes and β-halogenpropionic acid halide. 4,096,182, Cl. 260-544.00Y.

Russell, Dennis A.: *See—*
Sargent, Charles L.; Coviello, Allan J.; and Russell, Dennis A., 4,096,067, Cl. 210-252.000.

Rutledge, Thomas F., to ICI Americas Inc. Oxidative coupling of alkylphenols catalyzed by metal ammonia complexes. 4,096,190, Cl. 568-730.000.

Rutz, Richard Frederick, to United States of America, Air Force. Fabrication of an epitaxial layer diode in aluminum nitride on sapphire. 4,095,331, Cl. 29-589.000.

Ryan, Declan Francis. Insulating screen. 4,095,639, Cl. 160-84.00R.

Rybnicka Fabryka Maszyn "Ryfama": *See—*
Rynik, Jan, 4,095,478, Cl. 74-229.000.

Rynik, Jan, to Politechnika Slaska im. Wincentego Pstrowskiego; and Rybnicka Fabryka Maszyn "Ryfama". Sprocket-wheel, especially for mining machines. 4,095,478, Cl. 74-229.000.

Ryobi, Ltd.: *See—*
Morishita, Yasomatsu, 4,095,756, Cl. 242-84.20G.

Sabe, Ichiro, to Sanyei Electronics, Corporation. Level indicating device. 4,096,435, Cl. 324-122.000.

Sackett, Marvin Elmer. Writing instrument. 4,095,906, Cl. 401-48.000.

Sadanobu, Sugimoto: *See—*
Naohiko, Hobara; Katsumi, Hori; and Sadanobu, Sugimoto, 4,095,338, Cl. 30-276.000.

Saferstein, Albert. Workout device for tennis having a variable speed control. 4,095,787, Cl. 273-29.00A.

St. Clair, David J., to Shell Oil Company. Process to control cohesive strength of block copolymer composition. 4,096,203, Cl. 260-876.00B.

Saint-Gobain Techniques Nouvelles: *See—*
Chaze, Gilbert; Cherel, Guy; Guilloteau, Rene; and Tucoulat, Daniel, 4,095,495, Cl. 83-15.000.

Saito, Hiroshi, to Kyodo Printing Co., Ltd. Method of partial reproduction of a pattern from a master. 4,096,288, Cl. 427-24.000.

Saito, Junichi: *See—*
Tamura, Saburo; Saito, Junichi; Kudamatsu, Akio; Ishino, Yoji; and Goto, Toshio, 4,096,268, Cl. 424-266.000.

Saito, Shigeru. Toy prime mover and accessories therefor. 4,095,368, Cl. 46-104.000.

Saito, Takeji: *See—*
Urai, Muneharu; Kogure, Koji; and Haraguchi, Youichiro, 4,096,014, Cl. 156-273.000.

Sakai, Koichi: *See—*
Yamada, Yukio; Ishikawa, Yoji; and Sakai, Koichi, 4,096,531, Cl. 358-248.000.

Sakakibara, Sakuichi; Sugisawa, Ko; Matsumura, Yasushi; and Okamoto, Hidefumi, to House Food Industrial Company Limited. Stable precursor for making an edible gel, and method of making and using the same. 4,096,286, Cl. 426-577.000.

Sakamoto, Seiji: *See—*
Watanabe, Masamichi; Nakahara, Takuo; Sakamoto, Seiji; Bizen, Kunio; Yano, Akikazu; and Otani, Yuzo, 4,096,109, Cl. 260-40.00R.

Sakata, Yasuo: *See—*
Nakano, Goro; Yoshida, Hidehiko; and Sakata, Yasuo, 4,095,969, Cl. 65-281.000.

Sakurada, Hiroshi; and Tojo, Toshihiko, to Hitachi, Ltd. Power supply circuit. 4,096,559, Cl. 363-96.000.

Salchow, Bernard C.: *See—*
Widmer, Stanley W.; and Salchow, Bernard C., 4,096,481, Cl. 343-715.000.

Salem Furnace Co.: *See—*
Kranz, Ray E.; Solano, William E.; and Johnson, Beverly E., 4,096,038, Cl. 201-32.000.

Salewa Sportperatefabrik mit beschrankter Haftung: *See—*
Gabriel, Gunther, 4,095,316, Cl. 24-234.000.

Salomon, Georges Pierre Joseph, to Etablissements Francois Salomon et Fils. Safety ski binding. 4,095,821, Cl. 280-628.000.

Salvadori, Larry A.: *See—*
Manschot, James G.; Mather, Byron L.; and Salvadori, Larry A., 4,095,589, Cl. 128-2.00F.

Salvatore, Jeremiah O.: *See—*
Rosen, Harold A.; and Salvatore, Jeremiah O., 4,096,427, Cl. 318-648.000.

Samuel Moore and Company: *See—*
Stine, Clifford R.; Herbert, William J.; and Klipec, Bruce E., 4,096,346, Cl. 174-36.000.

Sanada, Takamasa: *See—*
Ohtake, Sadao; Hayashida, Shiyuji; Sanada, Takamasa; and Terai, Shigeki, 4,095,748, Cl. 239-419.300.

Sanders, Stanley J.; and Fava, Vincent, to Aegean Industries, Inc. Method of manufacturing exterior siding. 4,096,011, Cl. 156-196.000.

Sandfort, Robert M.: *See—*
Bailey, Paul T.; Doerr, L. John, III; and Sandfort, Robert M., 4,096,582, Cl. 365-13.000.

Sandoz, Inc.: *See—*
Simpson, William R., 4,096,140, Cl. 260-239.0BC.

Sankyo Electric Co., Ltd.: *See—*
Hiraga, Masaharu; and Taylor, Brian J., 4,095,921, Cl. 417-269.000.

Sankyo Oilless Industries, Inc.: *See—*
Nakamura, Hajime, 4,096,075, Cl. 252-12.200.

Sanyei Electronics, Corporation: *See—*
Sabe, Ichiro, 4,096,435, Cl. 324-122.000.

Sanyo Machine Works, Ltd.: *See—*
Hashimoto, Hiroshi; and Mori, Kinya, 4,095,325, Cl. 29-407.000.

Sargeant, Archibald, to Wingard Limited. Exterior rear view mirror for vehicles. 4,095,483, Cl. 74-501.00M.

Sargent, Charles L.; Coviello, Allan J.; and Russell, Dennis A., to Thetford Corporation. Volume displacement rod and holder. 4,096,067, Cl. 210-252.000.

Sarkkinen, Veli: *See—*
Ahonen, Heikki; Lindroos, Jari; and Sarkkinen, Veli, 4,096,045, Cl. 204-117.000.

Saroy Engineering: *See—*
Husted, Royce H., 4,095,849, Cl. 305-35.00R.

Sartorio, Franco; Minucciani, Giorgio; and Germano, Francesco, to Dea Digital Electronic Automation S.p.A. Position transducer for machine tools and measuring machines. 4,096,384, Cl. 250-237.00G.

Sato, Akihiko, to Nippon Kogaku K.K. Safety device for the electric shutter of a camera. 4,096,503, Cl. 354-234.000.

Sato, Hideo; Horie, Seiji; Sekikawa, Nobuyoshi; and Ono, Hisatake, to Fuji Photo Film Co., Ltd. Process for producing phthalazinone and derivatives of the same. 4,096,143, Cl. 544-237.000.

Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Ink supply mechanism for dichromic portable labeling machine. 4,095,524, Cl. 101-103.000.

Satomi, Toyokazu, to Ricoh Company, Ltd. Drum cleaning method and apparatus for electrostatography. 4,095,980, Cl. 96-1.400.

Satou, Yoshihiko: *See—*
Kido, Tadao; Satou, Yoshihiko; and Tayama, Kou, 4,095,674, Cl. 184-6.100.

Saunders, Howard E.: *See—*
Croop, Edward J.; Saunders, Howard E.; and Westervelt, Dean C., 4,095,557, Cl. 118-301.000.

Saunders, Morton Jefferson: *See—*
Parham, William Lamar; and Saunders, Morton Jefferson, 4,096,010, Cl. 156-179.000.

Saxon, Robert; and Thelin, Jack Horstmann, to American Cyanamid Company. Elastomer compositions with improved abrasion resistance. 4,096,207, Cl. 260-900.000.

Saxton, James C.; Osterberg, Bruce H.; and Kawan, Joseph C. Amusement apparatus and method. 4,095,795, Cl. 273-143.00R.

Scarfe, Arthur, to Fletcher Sutcliffe Wild Limited. Mine roof supports. 4,095,432, Cl. 61-45.00D.

Scarpati, Thomas S.; and Ford, Robert J., to Boeing Company, The. Method of fabricating a composite aerodynamic rotorblade assembly. 4,095,322, Cl. 29-156.80P.

Scaturro, Angelo J. Detector of backfeed electrical currents. 4,096,539, Cl. 361-93.000.

Schade, Gerhard; and Melin, Hans, to Dynamit Nobel Aktiengesellschaft. Process for the production of polyesters of 1,4-butanediol. 4,096,122, Cl. 260-75.00M.

Schafer, Horst-Dieter; Loosen, Paul; Kloren, Ulrich; and Thiele, Hans-Martin, to Ringfeder G.m.b.H. Coupling unit. 4,095,908, Cl. 403-16.000.

Schaper, Dieter, to Daimler-Benz Aktiengesellschaft. Longitudinal bearer for the chassis of motor vehicles. 4,095,819, Cl. 280-784.000.

Schefczik, Ernst, to BASF Aktiengesellschaft. Naphtholactam derivatives. 4,096,145, Cl. 260-281.0GN.

Schenck, Robert C., Jr.: *See—*
Annis, Russell K., Jr.; McKinney, John W., Jr.; Schenck, Robert C., Jr.; and Sims, Delvin P., 4,096,051, Cl. 204-196.000.

Schenk, Wolfgang: *See—*
Wolf, Hans; Leitner, Heinz; and Schenk, Wolfgang, 4,095,947, Cl. 8-138.000.

Schering Aktiengesellschaft: *See—*
Redemann, Peter, 4,095,532, Cl. 108-59.000.

Scherr, George H. Immunological test procedure. 4,096,138, Cl. 260-121.000.

Schilling, Kenneth John: *See—*
Brock, John Franklin; and Schilling, Kenneth John, 4,096,072, Cl. 252-8.800.

Schilte, Hank John. Blister sealing machine plate means. 4,095,397, Cl. 53-329.000.

Schlaeppi, Fernand: *See—*
Dellian, Kurt A.; and Schlaeppi, Fernand, 4,095,942, Cl. 8-62.000.

Schloeman-Siemag Aktiengesellschaft: *See—*
Gipperich, Theodor, 4,095,448, Cl. 72-238.000.

Schloemann-Siemag Akt.: *See—*
Roberg, Paul; Lobbert, Bernhard; Paschke, Christof; Staehle, Hermann; Kamp, Wulf; Dicks, Manfred; and Plajer, Otto, 4,095,927, Cl. 425-525.000.

Schlueter, William L.: *See—*
Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., 4,095,358, Cl. 37-90.000.

Schlumberger Technology Corporation: *See—*
Marett, Graham, 4,096,385, Cl. 250-262.000.

Schmid, Frederick: *See—*
Caslavsky, Jarda L.; Schmid, Frederick; Gazzara, Charles P.; Viechnicki, Dennis J.; and McCauley, James W., 4,096,025, Cl. 156-616.00R.

Schmidlkofer, Richard: *See—*
Hechtl, Wolfgang; Wohlfahrt, Ernst; and Schmidlkofer, Richard, 4,096,159, Cl. 260-448.20E.

Schmidt Industries, Inc.: *See—*
Hasselschwert, Clifford L., 4,095,443, Cl. 68-22.00R.

Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, to Veb Jenapharm Jena. Apparatus for making (DL) pantolactone. 4,095,952, Cl. 23-260.000.

Schmidt, Paul J.: *See—*
Crounse, Nathan N.; and Schmidt, Paul J., 4,096,176, Cl. 260-517.000.

Schmidt, Robert Rudolf; Eue, Ludwig; and Rohe, Lothar, to Bayer Aktiengesellschaft. Herbicidal composition of particular triazinone and diphenyl ether. 4,095,972, Cl. 71-93.000.

Schmidt, Walter J.: *See—*
Townsend, Loren R.; Epp, Morris E.; and Schmidt, Walter J., 4,095,613, Cl. 137-344.000.

Schneider, Louis; and Graham, David E., to GAF Corporation. Cyclic two-stage nitration process for preparing 4-chloro-3,5-dinitrobenzotrifluoride from 4-chlorobenzotrifluoride. 4,096,195, Cl. 260-646.000.

Schnell, Hermann: *See—*
Lenz, Gunther; Merten, Josef; Krimm, Heinrich; Kassahn, Horst-Gunter; and Schnell, Hermann, 4,096,200, Cl. 260-859.00R.

Schober, Raymond F., Jr.: *See—*
Hanson, Larry E.; Schober, Raymond F., Jr.; and Alexander, Merwin K., 4,096,428, Cl. 320-2.000.

Scholl, Hans-Peter: *See—*
Schuh, Eduard; and Scholl, Hans-Peter, 4,095,737, Cl. 235-30.00R.

Scholtz, Robert L., to Cummins Engine Company, Inc. Fuel system for compression ignition engine. 4,095,572, Cl. 123-140.0MP.

Scholz, Werner, to Ted Bildplatten Aktiengesellschaft. Playback circuit for a recorded three-line sequential color television signal. 4,096,514, Cl. 358-11.000.

Schontzler, James G.; and Gates, Wendall C., to Manning Environmental Corporation. Quick insert flume for use in metering fluid flow. 4,095,466, Cl. 73-215.000.

Schorm, Erhard: *See—*
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,095,952, Cl. 23-260.000.

Schreck, Harold J.: *See—*
Rockerath, John L.; and Schreck, Harold J., 4,095,538, Cl. 112-147.000.

Schroeder, Paul R.; and Proebsting, Robert J., to Mostek Corporation. MOSFET buffer for TTL logic input and method of operation. 4,096,402, Cl. 307-362.000.

Schuh, Eduard; and Scholl, Hans-Peter, to Kienzle Apparate GmbH. Taximeter and mounting arrangement. 4,095,737, Cl. 235-30.00R.

Schuhmann, Reinhardt, Jr. Apparatus and method for the gasification of solid carbonaceous material. 4,095,960, Cl. 48-197.00R.

Schumacher, Ernest W., to Virginia Chemicals Inc. Balanced single port thermostatic expansion valve. 4,095,742, Cl. 236-92.00B.

Schumacher, John B., to International Commercial Enterprises, Inc. Fuel handling and combustion system. 4,095,933, Cl. 431-11.000.

Schurmann, Horst; Bung, Josef; and van Aalten, Hendrikus Alouisius Antonius, to Akzona Incorporated. Anionic polyurethanes. 4,096,127, Cl. 260-77.5AM.

Schuster, Frank C., to Little Giant Products, Inc. Load tilting attachment for an industrial truck. 4,095,714, Cl. 214-620.000.

Schutz, Karl-Heinz, to SKF Industrial Trading & Development Company B.V. Measurement sliding bearing. 4,095,852, Cl. 308-3.00R.

Schwabauer, Nile L., to Gates Rubber Company, The. Method for making power transmission belting. 4,095,480, Cl. 74-231.00P.

Schwartz, Edwin L., to Rite Autotronics Corporation. Test instrument for transmitters. 4,096,441, Cl. 325-133.000.

Schwarz, Francisc C. Controllable four quadrant a.c. to a.c. and d.c. converter employing an internal high frequency series resonant link. 4,096,557, Cl. 363-9.000.

Schweisguth, Bernard: *See—*
Teulon, Jean-Marie; Schweisguth, Bernard; and Cognacq, Jean-Claude, 4,096,270, Cl. 424-266.000.

Schweiso, Robert J. Label and method for determining mattress rotation. 4,095,299, Cl. 5-317.00R.

Schwien, Harold B.; and Schwien, Paul A., to Nichols, Farrow, Schwien and Schwien. Vertically swinging big bale handling and grasping apparatus. 4,095,706, Cl. 214-147.00G.

Schwien, Paul A.: *See—*
Schwien, Harold B.; and Schwien, Paul A., 4,095,706, Cl. 214-147.00G.

SCM Corporation: *See—*
McGinniss, Vincent Daniel, 4,096,105, Cl. 260-29.6NR.

Scorpion, Inc.: *See—*
Lundberg, John P., 4,095,479, Cl. 74-230.17E.

Scott, Donald Gordon, to General Electric Company Limited, The. Television receivers. 4,096,524, Cl. 358-85.000.

Scott Paper Company: *See—*
Pietreniak, Eugene J., 4,096,311, Cl. 428-289.000.

Scott USA, Inc.: *See—*
Robran, David T.; and French, Charles S., 4,095,356, Cl. 36-121.000.

Scribner, Albert W. Stock feeder for punch presses. 4,095,733, Cl. 226-162.000.

Scriven, Eric Thomas: *See—*
Wohrl, Josef, 4,095,463, Cl. 73-141.00R.

Searle, Robert J. G.; and Boyce, Clive B. C., to Shell Oil Company. Thioamide pesticides. 4,096,275, Cl. 424-308.000.

Sears, Kay G., to Entron, Inc. Protective relay circuit for regulated power supply. 4,096,540, Cl. 361-93.000.

Seeger, Richard E.: *See—*
Lynn, William Joseph; and Seeger, Richard E., 4,096,364, Cl. 200-5.00A.

Seelen, Franciscus J. H. M.; and Timmermans, Andreas P. H. M., to Oce-van der Grinten N.V. Method and means for preventing edge shadow effects during episcopic exposure of an original. 4,095,895, Cl. 355-77.000.

Seiko Koki Kabushiki Kaisha: *See—*
Onda, Eiichi; and Watanabe, Masanori, 4,096,505, Cl. 354-246.000.

Seiko Seiki Kabushiki Kaisha: *See—*
Sugita, Terumitsu, 4,095,377, Cl. 51-290.000.

Seiwell, Linda P., to Du Pont de Nemours, E. I., and Company. Preparation of p-aminobenzotrifluoride. 4,096,185, Cl. 260-581.000.

Seki, Shojiro: *See—*
Hagiwara, Taro; and Seki, Shojiro, 4,095,831, Cl. 293-62.000.

Sekikawa, Nobuyoshi: *See—*
Sato, Hideo; Horie, Seiji; Sekikawa, Nobuyoshi; and Ono, Hisatake, 4,096,143, Cl. 544-237.000.

Sekiya, Fukuo; Ebihara, Heihachiro; Uchino, Misao; Nishimura, Katsuo; and Nanya, Takanori, to Citizen Watch Company, Limited. Driver circuit for electrochromic display device. 4,096,412, Cl. 315-169.00R.

Sellers, Edward C.; and Malkani, Chander, to Xerox Corporation. Successive development magnetic imaging apparatus. 4,096,485, Cl. 346-74.100.

Sellstedt, John H.; and Klaubert, Dieter H., to American Home Products Corporation. Arylene-bis-tetrazole-5-carboxamides. 4,096,153, Cl. 260-308.00D.

Selva, Guy, to F.M.I.B. —Selva Papin et Eugene Selva Reunis. Bread oven. 4,095,586, Cl. 126-273.00R.

Semon, John Howard: *See—*
Haywood, Samuel Isa; and Semon, John Howard, 4,096,056, Cl. 208-4.000.

Steffan, Walter J. Sighting in apparatus for rifle mounted telescope gunsights. 4,095,347, Cl. 33-234.000.
Steidinger, Donald J., to Wallace Business Forms, Inc. Stuffed sealed envelope assembly and method of making. 4,095,695, Cl. 206-610.000.
Steiner, Peter: *See—*
Gutterman, Carl; and Steiner, Peter, 4,095,953, Cl. 23-277.00R.
Stephenson, Alvis Doyle, Jr.: *See—*
Carlo, James Thomas; and Stephenson, Alvis Doyle, Jr., 4,096,581, Cl. 365-2.000.
Sterling Drug Inc.: *See—*
Crounse, Nathan N.; and Schmidt, Paul J., 4,096,176, Cl. 260-517.000.
Diana, Guy Dominic; and Carabateas, Philip Michael, 4,096,280, Cl. 424-331.000.
Sterndent Corporation: *See—*
Roll, Kenneth A., 4,096,217, Cl. 264-20.000.
Steventon, Michael Keith: *See—*
Wren, John Pelham; and Steventon, Michael Keith, 4,096,419, Cl. 318-138.000.
Stewart, William E. Method of making decorative candles. 4,096,299, Cl. 427-264.000.
Stieff, Lorin R.; Pruitt, Charles L.; Ulrich, Reinhard R.; and Houck, Frank S., to United States of America, Army. Security sealing system using fiber optics. 4,095,872, Cl. 350-96.240.
Still, William L. Earth penetration. 4,095,655, Cl. 175-19.000.
Stillman, Nathan, to Champion International Corporation. Laminated packaging material. 4,096,309, Cl. 428-285.000.
Stine, Clifford R.; Herbert, William J.; and Klipec, Bruce E., to Samuel Moore and Company. Wire and cable. 4,096,346, Cl. 174-36.000.
Stitt, Thomas Detlor: *See—*
Bailey, Ronald Barry; Stitt, Thomas Detlor; and Williamson, Dennis Francis, 4,096,423, Cl. 318-370.000.
Stolley, Dieter: *See—*
Lemburg, Jorn-Uwe; and Stolley, Dieter, 4,095,623, Cl. 140-92.700.
Stoltman, Donald D.: *See—*
Sheffer, Timothy K.; and Stoltman, Donald D., 4,095,570, Cl. 123-119.0EC.
Stoltz, Rolf: *See—*
Heitkamp, Herbert; and Stoltz, Rolf, 4,095,436, Cl. 61-85.000.
Stone, Orison W., to Potlatch Corporation. Multi-partitioned carton. 4,095,735, Cl. 229-39.00R.
Storlie, Llewellyn O.; and Beatty, James F., to Deco Products Company. Off-center locking handle. 4,095,445, Cl. 70-215.000.
Stournas, Stamoulis, to Mobil Oil Corporation. Oil recovery by waterflooding employing cross-linked polysaccharides for mobility control. 4,096,074, Cl. 252-8.55D.
Stoy, Artur: *See—*
Stoy, Vladimir; Wichterle, Otto; and Stoy, Artur, 4,095,877, Cl. 351-160.000.
Stoy, Vladimir; Wichterle, Otto; and Stoy, Artur, to Ceskoslovenska akademie ved. Soft contact lens from a macromolecular block copolymer. 4,095,877, Cl. 351-160.000.
Strapex AG: *See—*
Lehmann, Peter, 4,096,019, Cl. 156-494.000.
Strauss, Carl R.; Roberts, Michael G.; and Bolen, Charles E., to Owens-Corning Fiberglas Corporation. Moldable compositions comprising thermosetting polyester resin and thermoplastic resin. 4,096,102, Cl. 260-22.00D.
Strauss, Richard H. Self-attaching lifting device. 4,095,834, Cl. 294-97.000.
Strehlow, Wolfgang H.: *See—*
Lee, Pui Kum; and Strehlow, Wolfgang H., 4,095,875, Cl. 350-320.000.
Stringer, Claude A. Corporate ladder game. 4,095,799, Cl. 273-241.000.
Strobel, Albert F., to GAF Corporation. Stabilized product of manufacture containing a branched chain dodecyl isomeric mixture of (dodecyl-hydroxyphenyl)-benzo-triazole and a heat or light sensitive material. 4,096,242, Cl. 424-59.000.
Strobl, Horst, to Neumann & Co. AG. Roof-sheeting element with integral lath structure. 4,095,383, Cl. 52-309.700.
Stropkay, Edward J., to Design & Manufacturing Corporation. Linear actuator linkage. 4,095,427, Cl. 60-530.000.
Stubits, Marcella C.: *See—*
Teng, James; Dai, Frank; and Stubits, Marcella C., 4,096,325, Cl. 536-91.000.
Stuhmer, Werner: *See—*
Milkowski, Wolfgang; Budden, Renke; Funke, Siegfried; Huschens, Rolf; Liepmann, Hans-Gunther; Stuhmer, Werner; and Zeugner, Horst, 4,096,141, Cl. 260-239.0BD.
Sturges, James R., to Caterpillar Tractor Co. Walking work vehicle. 4,095,661, Cl. 180-8.00E.
Sturgis, Donald P.: *See—*
Fox, Robert J.; and Sturgis, Donald P., 4,095,739, Cl. 235-382.000.
Sturmer, David M.: *See—*
Goffe, Charles A., deceased; Jenkins, Philip W.; and Sturmer, David M., 4,095,981, Cl. 96-48.0PD.
Suda, Masashi: *See—*
Katayama, Hajime; Torigai, Akiyoshi; Suda, Masashi; and Hoshino, Osamu, 4,095,879, Cl. 355-4.000.
Sueda, Noriyoshi: *See—*
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,096,338, Cl. 560-59.000.
Sueyoshi, Tohru; Furtachi, Nobuo; Okumura, Akio; and Shishido, Tadao, to Fuji Photo Film Co., Ltd. Development inhibitor releasing coupler and photographic element containing same. 4,095,984, Cl. 96-100.00N.
Sugerman, Gerald: *See—*
Monte, Salvatore J.; and Sugerman, Gerald, 4,096,110, Cl. 260-40.00R.
Sugibuchi, Kazuo: *See—*
Minagawa, Motonobu; Kubota, Naohiro; Shibata, Toshihiro; and Sugibuchi, Kazuo, 4,096,114, Cl. 260-45.8NZ.
Sugimoto, Tetsuya: *See—*
Nishikawa, Yasuo; Watanabe, Akira; Sugimoto, Tetsuya; Mizuta, Yasutoshi; and Hatayama, Yoshio, 4,096,096, Cl. 252-466.00J.
Sugisawa, Ko: *See—*
Sakakibara, Sakuichi; Sugisawa, Ko; Matsumura, Yasushi; and Okamoto, Hidefumi, 4,096,286, Cl. 426-577.000.
Sugita, Terumitsu, to Seiko Seiki Kabushiki Kaisha. Method to compensate infeed for the error caused by the outer diameter error of a workpiece in a centerless internal grinder. 4,095,377, Cl. 51-290.000.
Suido Kiko Kabushiki Kaisha: *See—*
Hashimoto, Katsuhiro; and Hasegawa, Takao, 4,096,063, Cl. 210-84.000.
Sukhanov, Donat Konstantinovich; Blinov, Sergei Ivanovich; Bogoljubov, Leonid Leonidovich; Kascheev, Sergei Andreevich; and Popova, Evgenia Nikolaevna. Hoisting mechanism. 4,096,404, Cl. 310-67.00R.
Sumitomo Chemical Company, Limited: *See—*
Nakamura, Shinji; Inokuma, Shun; Tanaka, Shin; Hirose, Kenichi; and Deguchi, Takashi, 4,096,184, Cl. 260-561.00N.
Tsukada, Norishige; Hagihara, Kazuo; Tsuji, Kozo; Fujimoto, Masanori; and Nagase, Tsuneyuki, 4,095,525, Cl. 101-465.000.
Sumiyoshi, Masaharu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,095,565, Cl. 123-/32.0SP.
Sundblad, Yngve Allan: *See—*
Agerhall, Kurt Roland; and Sundblad, Yngve Allan, 4,096,471, Cl. 340-146.10R.
Sundheim, John J., to John J. Sundheim Family Estate. Apparatus for cleaning a carpet. 4,095,309, Cl. 15-320.000.
Sunouchi, Akio; Watanabe, Yoshiaki; Ito, Fumio; Mashimo, Yukio; Date, Nobuaki; and Ito, Tadashi, to Canon Kabushiki Kaisha. Photographic camera having electromagnetic diaphragm control. 4,096,493, Cl. 354-38.000.
Surkov, Viktor Georgievich: *See—*
Zabava, Jury Grigorievich; Kogan, Rem Naumovich; Barabash, Ivan Mikhailovich; Svidnitsky, Tadeush Valentinovich; Lurie, Dzhan Alievich; Bratslavskaya, Elvira Alexeevna; Lomazov, Mark Abramovich; Rodnyansky, Ilya Grigorievich; Skorikov, Viktor Fedorovich; and Surkov, Viktor Georgievich, 4,095,446, Cl. 72-88.000.
Sutherland, Joel P.: *See—*
Farlow, Carl P.; Sutherland, Joel P.; and Snow, William E., 4,095,643, Cl. 164-301.000.
Suzuki, Fujio: *See—*
Takahashi, Nobuaki; Suzuki, Fujio; and Ohba, Katsuhiro, 4,096,360, Cl. 179-100.4ST.
Suzuki, Toshio: *See—*
Marumoto, Katsuji; Omae, Tsutomu; Suzuki, Toshio; Shibata, Takanori; and Yamamura, Hirohisa, 4,096,418, Cl. 318-12.000.
Suzuki, Yasoji; and Manabe, Kenshi, to Tokyo Shibaura Electric Co., Ltd. Monolithic semiconductor mask programmable ROM and a method for manufacturing the same. 4,096,522, Cl. 357-45.000.
Svenska A.B. Elphiac: *See—*
Berglund, Benkt; and Ohlsson, Olov, 4,095,634, Cl. 144-317.000.
Svensson, Lennart: *See—*
Elmgren, Staffan; and Svensson, Lennart, 4,095,804, Cl. 277-12.000.
Svidnitsky, Tadeush Valentinovich: *See—*
Zabava, Jury Grigorievich; Kogan, Rem Naumovich; Barabash, Ivan Mikhailovich; Svidnitsky, Tadeush Valentinovich; Lurie, Dzhan Alievich; Bratslavskaya, Elvira Alexeevna; Lomazov, Mark Abramovich; Rodnyansky, Ilya Grigorievich; Skorikov, Viktor Fedorovich; and Surkov, Viktor Georgievich, 4,095,446, Cl. 72-88.000.
Svoboda, Josef: *See—*
Weigl, Erwin; and Svoboda, Josef, 4,095,814, Cl. 280-618.000.
Swakon, Edward Antone, to Standard Oil Company (Indiana). Wear-inhibiting composition and process. 4,096,077, Cl. 252-33.600.
Sweany, Louis P.; and Burk, Michael T., to P.R. Mallory & Co. Inc. High output smoke and heat detector alarm system utilizing a piezoelectric transducer and a voltage doubling means. 4,096,473, Cl. 340-237.500.
Swiecicki, Bronislaw. Tennis racket with tensioned one-piece ball-striking friction imparting grid. 4,095,790, Cl. 273-73.00D.
Swift, Harold E.: *See—*
Lakshmanan, Pallavoor R.; Swift, Harold E.; and Wu, Ching Yong, 4,096,103, Cl. 260-27.0BB.
Swik, Rolf: *See—*
Woitschella, Heinz; Reuter, Wolfgang; and Swik, Rolf, 4,095,759, Cl. 244-17.170.
Sybron Corporation: *See—*
Shibe, William J., Jr.; and Wood, William, 4,096,089, Cl. 252-310.000.
Sycor, Inc.: *See—*
Butsch, Otto R., 4,096,537, Cl. 360-106.000.
Syntex Corporation: *See—*
Katz, Martin; and Kent, John S., 4,096,239, Cl. 424-21.000.
Sypal, Kenneth L.: *See—*
Ashe, John B.; Williams, Gwilym H.; and Sypal, Kenneth L., 4,096,389, Cl. 250-445.00T.

Systron-Donner Corporation: *See—*
Morris, Harold D.; and Asmar, Romeal F., 4,095,477, Cl. 74-5.60D.
T & F Industries, Inc.: *See—*
Frandsen, Warren E., 4,095,606, Cl. 131-140.00R.
Tachino, Tomio: *See—*
Ando, Masamoto; and Tachino, Tomio, 4,095,851, Cl. 303-115.000.
Tadayuki, Matsuo: *See—*
Takashi, Sakurai; Tadayuki, Matsuo; and Koro, Takahashi, 4,096,576, Cl. 364-602.000.
Taguchi, Tatsuya; and Date, Nobuaki, to Canon Kabushiki Kaisha. Mirror supporting body at a single lens reflex camera. 4,096,499, Cl. 354-152.000.
Takagi, Yasumasa: *See—*
Ono, Katsutoshi; and Takagi, Yasumasa, 4,095,553, Cl. 116-116.000.
Takahama, Yuichi: *See—*
Shinozaki, Mamoru; Takahama, Yuichi; Tubaki, Hachiro; Nagasawa, Kazuo; and Mikami, Yasao, 4,095,304, Cl. 15-48.000.
Takahashi, Nobuaki; Suzuki, Fujio; and Ohba, Katsuhiro, to Victor Company of Japan, Ltd. Multichannel record disc reproducing system. 4,096,360, Cl. 179-100.4ST.
Takahashi, Satoshi: *See—*
Fujii, Takao; Takeda, Shinichi; Takahashi, Satoshi; and Namie, Koshi, 4,096,340, Cl. 560-77.000.
Takahata, Tomihisa: *See—*
Fujino, Yoshiharu; Chiba, Iwane; Chiyonobu, Toshimi; Takahata, Tomihisa; and Kachi, Yasuhiko, 4,096,375, Cl. 219-97.000.
Takahiro, Sugiyama, to Asahi Kogaku Kogyo Kabushiki Kaisha. Miniature and large aperture retrofocus wide-angle photographic lens. 4,095,873, Cl. 350-195.000.
Takara Co., Ltd.: *See—*
Ogawa, Iwakichi, 4,095,367, Cl. 46-105.000.
Takashi, Sakurai; Tadayuki, Matsuo; and Koro, Takahashi, to Fukuda Denshi Co., Ltd. Analogue filter systems. 4,096,576, Cl. 364-602.000.
Takata, Toshihiko: *See—*
Wada, Toshiya; and Takata, Toshihiko, 4,096,000, Cl. 148-27.000.
Takeda, Shinichi: *See—*
Fujii, Takao; Takeda, Shinichi; Takahashi, Satoshi; and Namie, Koshi, 4,096,340, Cl. 560-77.000.
Takeno, Tsuneyuki: *See—*
Maeda, Seiichi; Mori, Kan; and Takeno, Tsuneyuki, 4,095,973, Cl. 71-103.000.
Takeuchi, Shigeo, to Beaty Hanbai Kabushiki Kaisha. Oil changer. 4,095,673, Cl. 184-1.500.
Takeuchi, Susumu, to Toppan Printing Co., Ltd. Method of manufacturing a chromium oxide film. 4,096,026, Cl. 156-656.000.
Takeyasu, Kiyoo: *See—*
Kasai, Masuo; Kato, Kanji; Matsumura, Yasuhide; Takeyasu, Kiyoo; and Shimomura, Raiji, 4,095,481, Cl. 74-469.000.
Talesfore, Nicholas F.: *See—*
Smith, Ronald A.; and Talesfore, Nicholas F., 4,095,791, Cl. 273-85.00G.
Talmadge, Paul Conway, to Perkin-Elmer Corporation, The. Adaptive grating rate control. 4,095,896, Cl. 356-89.000.
Tamai, Yasuo; and Aonuma, Masashi, to Fuji Photo Film Co., Ltd. Method of producing magnetic material with alkaline borohydrides. 4,096,316, Cl. 428-457.000.
Tamao, Yoshikuni: *See—*
Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Okamoto, Shosuke; and Hijikata, Akiko, 4,096,255, Cl. 424-246.000.
Tamura, Saburo; Saito, Junichi; Kudamatsu, Akio; Ishino, Yoji; and Goto, Toshio, to Bayer Aktiengesellschaft. 1-Methyl-1,2,5,6-tetrahydropyridine-3-carboxylic acid esters and a method of use for combating insects or acarids. 4,096,268, Cl. 424-266.000.
Tanaka, Chiaki; Nakajima, Shinobu; and Morikawa, Masanobu, to Toray Industries, Inc. Thermoplastic copolyester elastomer. 4,096,126, Cl. 260-75.00R.
Tanaka, Junzo; Urashima, Chikao; and Kai, Toshio, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 4,096,369, Cl. 219-10.55D.
Tanaka, Kojiro, to Kabushiki Kaisha Daini Seikosha. Electronic watch. 4,095,405, Cl. 58-4.00A.
Tanaka, Kojiro: *See—*
Asano, Kazuhiro; and Tanaka, Kojiro, 4,095,407, Cl. 58-23.00R.
Tanaka, Shin: *See—*
Nakamura, Shinji; Inokuma, Shun; Tanaka, Shin; Hirose, Kenichi; and Deguchi, Takashi, 4,096,184, Cl. 260-561.00N.
Tanaka, Takanori: *See—*
Terazawa, Yoshizumi; Kitagawa, Takashi; Tanaka, Takanori; and Aono, Kouji, 4,096,489, Cl. 346-158.000.
Tanaka, Taro: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,095,565, Cl. 123-/32.0SP.
Tanaka, Yuichi: *See—*
Ikawa, Katsuya; and Tanaka, Yuichi, 4,096,002, Cl. 148-138.000.
Tanaka, Yukiyasu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,095,565, Cl. 123-/32.0SP.
Tano, Eiichi: *See—*
Kawasaki, Masahiro; and Tano, Eiichi, 4,096,494, Cl. 354-53.000.
Tarburton, Robert Baxter: *See—*
Gaspar, Richard Allen; and Tarburton, Robert Baxter, 4,095,780, Cl. 270-73.000.
Tarkinson, Edward G.: *See—*
Armstrong, John L.; and Tarkinson, Edward G., 4,095,303, Cl. 15-1.50R.
Tate & Lyle Limited: *See—*
Burge, Malcolm Leonard Ernest; and Nechutny, Zdenek, 4,096,285, Cl. 426-548.000.
Tateoka, Kiyoshi; and Azuma, Tomizo, to Tokico Ltd. Vacuum degree augmentation device. 4,095,509, Cl. 91-369.00B.
Tatro, Clement A.: *See—*
Murray, Ian; and Tatro, Clement A., 4,095,580, Cl. 123-32.0SJ.
Tayama, Kou: *See—*
Kido, Tadao; Satou, Yoshihiko; and Tayama, Kou, 4,095,674, Cl. 184-6.100.
Taylor, Albert. Modular illumination device. 4,096,379, Cl. 362-235.000.
Taylor, Brian J.: *See—*
Hiraga, Masaharu; and Taylor, Brian J., 4,095,921, Cl. 417-269.000.
Taylor, Don A., to Buehrle, Victor E., a part interest. Method of manufacture and retreading of tires. 4,096,008, Cl. 156-96.000.
Taylor-Kincaid Company: *See—*
Rempfer, Gertrude F.; Lesch, George H.; and Griffith, Osbie Hayes, 4,096,386, Cl. 250-365.000.
Taylor, Maurice J.: *See—*
Peek, Henry L.; Taylor, Maurice J.; Abdou, John J.; and Patel, Amrut R., 4,096,367, Cl. 200-148.00B.
Taylor, Peter F.: *See—*
Hill, Lowell W.; Cassiero, Robert L.; Taylor, Peter F.; and Tuchyner, Harold J., 4,096,450, Cl. 331-94.50P.
TDK Electronics Co., Ltd.: *See—*
Ishikawa, Mutsuo, 4,095,587, Cl. 128-1.300.
Umeya, Kazumasa; and Yonezuka, Kazunari, 4,096,098, Cl. 252-520.000.
Tecumseh Products Company: *See—*
Farr, James B., 4,095,922, Cl. 417-313.000.
Ted Bildplatten Aktiengesellschaft: *See—*
Scholz, Werner, 4,096,514, Cl. 358-11.000.
Teijin Hercules Chemical Co., Ltd.: *See—*
Fujii, Takao; Takeda, Shinichi; Takahashi, Satoshi; and Namie, Koshi, 4,096,340, Cl. 560-77.000.
Teijin Limited: *See—*
Ichikawa, Yataro; Nakagawa, Koji; and Yoshisato, Eishin, 4,096,186, Cl. 260-584.00R.
Tektronix, Inc.: *See—*
Drummond, William Seth, 4,096,455, Cl. 333-30.00R.
Teledyne Industries, Inc.: *See—*
Isley, Walter F., 4,095,966, Cl. 55-394.000.
Teledyne Ryan Aeronautical Division of Teledyne Industries, Inc.: *See—*
Post, Donald McChesney, 4,095,528, Cl. 102-49.800.
Teleflex Incorporated: *See—*
Tschanz, August E.; and Geiger, Robert W., 4,095,598, Cl. 128-214.400.
Telefonaktiebolaget L M Ericsson: *See—*
Agerhall, Kurt Roland; and Sundblad, Yngve Allan, 4,096,471, Cl. 340-146.10R.
Teng, James; Dai, Frank; and Stubits, Marcella C., to Anheuser-Busch, Incorporated. Methyl hydroxypropyl cellulose ethers. 4,096,325, Cl. 536-91.000.
Tennant Company: *See—*
Thomsen, Donald L.; and Herpers, Ferdinand J., Jr., 4,096,084, Cl. 252-173.000.
Tenneco Chemicals, Inc.: *See—*
Di Billa, Eugene P., 4,096,333, Cl. 548-371.000.
Terai, Shigeki: *See—*
Ohtake, Sadao; Hayashida, Shiyuji; Sanada, Takamasa; and Terai, Shigeki, 4,095,748, Cl. 239-419.300.
Teramachi, Hiroshi. Bearing assembly for a sliding rectilinear motion. 4,095,854, Cl. 308-6.00C.
Terazawa, Yoshizumi; Kitagawa, Takashi; Tanaka, Takanori; and Aono, Kouji, to Nippon Electric Company, Ltd. Electrostatic-recording gas discharge device with improved scanning stability. 4,096,489, Cl. 346-158.000.
Teulon, Jean-Marie; Schweisguth, Bernard; and Cognacq, Jean-Claude, to Societe Anonyme Dite : Hexachimie. 4-(2-Chloro- or methylthiopyrid-3-yl)-3,5-dicarbalkoxy-2,6-dimethyl-1,4-dihydropyridine. 4,096,270, Cl. 424-266.000.
Texaco Development Corporation: *See—*
Klein, Howard P., 4,096,119, Cl. 260-47.00C.
Naylor, Carter G.; and Burns, Simon P., 4,096,175, Cl. 260-512.00R.
Texaco Inc.: *See—*
Walker, Thad O., 4,095,987, Cl. 106-92.000.
Yaffe, Roberta, 4,096,078, Cl. 252-46.700.
Texas Instruments Incorporated: *See—*
Carlo, James Thomas; and Stephenson, Alvis Doyle, Jr., 4,096,581, Cl. 365-2.000.
Textron, Inc.: *See—*
Builta, Kenneth E., 4,095,763, Cl. 244-194.000.
Kowalski, John A., 4,096,225, Cl. 264-167.000.
Tezuka, Tohru: *See—*
Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Okamoto, Shosuke; and Hijikata, Akiko, 4,096,255, Cl. 424-246.000.
Thagard Technology Company: *See—*
Matovich, Edwin, 4,095,974, Cl. 75-0.50B.
Theeuwes, Felix: *See—*
Zaffaroni, Alejandro; Michaels, Alan S.; and Theeuwes, Felix, 4,096,238, Cl. 424-15.000.
Thelemaque, Louis Emanuel: *See—*
Burtness, Richard Duane; and Thelemaque, Louis Emanuel, 4,096,356, Cl. 179-18.0DA.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF JUNE, 1978

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

LIST OF PLANT PATENTEES

LIST OF DESIGN PATENTEES

DiNuccio, David P., to Clairol Inc. Combined bottle and closure. 248,214, 6-20-78, Cl. D9-83.000.
Duhon, Mable Edith. Doll. 248,245, 6-20-78, Cl. D34-4.00R.
Duhon, Mable Edith. Doll. 248,246, 6-20-78, Cl. D34-4.00R.
Eckmann, John Allie: *See—*
Goldman, Arnold Sherwin; and Eckmann, John Allie, 248,231, Cl. D14-12.000.
Edmonds, Thomas Anthony, to Bata Shoe Co., Inc. Shoe sole. 248,193, 6-20-78, Cl. D2-320.000.
Fuji Photo Film Co., Ltd.: *See—*
Fukuda, Hiroshi, 248,237, Cl. D16-06.000.
Fukuda, Hiroshi, to Fuji Photo Film Co., Ltd. Photographic camera with built-in flash gun. 248,237, 6-20-78, Cl. D16-06.000.
Ganasak, David J.: *See—*
Clumb, Thomas E., 248,218, Cl. D9-290.000.
Garcia-Kuenzli, Marcos. Game board. 248,249, 6-20-78, Cl. D34-5.0SS.
Genaro, Donald Michael; and McGarvey, John Niel, to Bell Telephone Laboratories, Incorporated. Housing for a telephone set. 248,234, 6-20-78, Cl. D14-53.000.
Goldman, Arnold Sherwin; and Eckmann, John Allie, to Motorola, Inc. Lapel speaker or similar article. 248,231, 6-20-78, Cl. D14-12.000.
Gordon, William Donald, Sr., to Arvey Corporation. Planter. 248,195, 6-20-78, Cl. D6-113.000.
Gordon, William Donald, Sr., to Arvey Corporation. Planter. 248,196, 6-20-78, Cl. D6-113.000.
Gordon, William Donald, Sr., to Arvey Corporation. Planter. 248,197, 6-20-78, Cl. D6-113.000.
Gordon, William Donald, Sr., to Arvey Corporation. Planter. 248,198, 6-20-78, Cl. D6-113.000.
Gullfiber AB: *See—*
Csiki, Kalman; and Lundin, Tord Rune, 248,191, Cl. D2-232.000.
Haughtington, Richard E.; and Wray, Donald R. Metallurgical test specimen. 248,235, 6-20-78, Cl. D15-144.000.
Hector, Roger D., to Atari, Inc. Game cabinet. 248,251, 6-20-78, Cl. D34-5.00L.
Holleman, Howard A., to Hydro Tube Corporation. Fireplace poker. 248,209, 6-20-78, Cl. D7-210.000.
Huang, Barney H., to Atari, Inc. Game cabinet. 248,247, 6-20-78, Cl. D34-5.00L.
Huelsekopf, Alfred George. Window frame. 248,242, 6-20-78, Cl. D25-52.000.
Huston, James: *See—*
Watley, Lindell Dale; Inman, Wallace D.; Bell, Gregory L.; Sandeen, Frank Jack; O'Keeffe, James R.; Nepper, John P.; and Huston, James, 248,199, Cl. D6-188.000.
Hydro Tube Corporation: *See—*
Holleman, Howard A., 248,209, Cl. D7-210.000.
Inman, Wallace D.: *See—*
Watley, Lindell Dale; Inman, Wallace D.; Bell, Gregory L.; Sandeen, Frank Jack; O'Keeffe, James R.; Nepper, John P.; and Huston, James, 248,199, Cl. D6-188.000.
Jamain, Philippe, to Compagnie Generale des Etablissements Michelin. Tire. 248,227, 6-20-78, Cl. D12-146.000.
Katoh, Akira, to Lloyd's Electronics, Inc. Combined cassette recorder and player and radio. 248,230, 6-20-78, Cl. D14-5.000.
Kelley, Ernest. Revolving tray for breakfast cereal boxes. 248,201, 6-20-78, Cl. D7-2.000.
Kirkland, Walter Dean. Ring clamp and holder. 248,211, 6-20-78, Cl. D8-395.000.
Langieri, Michael, to Louis Marx & Co., Inc. Table ball game board device. 248,250, 6-20-78, Cl. D34-5.0JJ.
Lawrence, William James, to Texas Instruments Incorporated. Wrist watch. 248,220, 6-20-78, Cl. D10-38.000.
Lawrence, William James, to Texas Instruments Incorporated. Wrist watch. 248,221, 6-20-78, Cl. D10-38.000.
Lawrence, William James, to Texas Instruments Incorporated. Wrist watch. 248,222, 6-20-78, Cl. D10-38.000.
Lewis, Cecil. Fishing lure. 248,238, 6-20-78, Cl. D22-28.000.
Lewis, Cecil. Fishing lure. 248,239, 6-20-78, Cl. D22-28.000.
Lloyd's Electronics, Inc.: *See—*
Katoh, Akira, 248,230, Cl. D14-5.000.
Louis Marx & Co., Inc.: *See—*
Langieri, Michael, 248,250, Cl. D34-5.0JJ.
Lundin, Tord Rune: *See—*
Csiki, Kalman; and Lundin, Tord Rune, 248,191, Cl. D2-232.000.
Madl, Alfred W., to Oster Corporation. Crepe maker. 248,207, 6-20-78, Cl. D7-87.000.
Marvin Glass & Associates: *See—*
Montague, Douglas P., 248,206, Cl. D7-78.000.
McGarvey, John Niel: *See—*
Genaro, Donald Michael; and McGarvey, John Niel, 248,234, Cl. D14-53.000.
Messer, Robert S. Prefabricated fireplace. 248,240, 6-20-78, Cl. D23-94.000.
Michelson, James L. Cover for fastener. 248,213, 6-20-78, Cl. D8-499.000.
Miller, Richard L. Base for a lamp. 248,254, 6-20-78, Cl. D48-20.00C.
Miller, Robert E., Jr., to Robert E. Miller & Co., Inc. Door stop or similar article. 248,212, 6-20-78, Cl. D8-402.000.
Miller, William L. Baking utensil. 248,208, 6-20-78, Cl. D7-96.000.
Montague, Douglas P., to Marvin Glass & Associates. Dispenser for ice or similar article. 248,206, 6-20-78, Cl. D7-78.000.
Montres Orfina S.A.: *See—*
Porsche, Ferdinand Alexander, 248,219, Cl. D10-32.000.
Morse, Henry Clifton. Computer-type coaster for beer glasses. 248,203, 6-20-78, Cl. D7-45.000.
Motorola, Inc.: *See—*
Goldman, Arnold Sherwin; and Eckmann, John Allie, 248,231, Cl. D14-12.000.
Nepper, John P.: *See—*
Watley, Lindell Dale; Inman, Wallace D.; Bell, Gregory L.; Sandeen, Frank Jack; O'Keeffe, James R.; Nepper, John P.; and Huston, James, 248,199, Cl. D6-188.000.
O'Keeffe, James R.: *See—*
Watley, Lindell Dale; Inman, Wallace D.; Bell, Gregory L.; Sandeen, Frank Jack; O'Keeffe, James R.; Nepper, John P.; and Huston, James, 248,199, Cl. D6-188.000.
Oster Corporation: *See—*
Madl, Alfred W., 248,207, Cl. D7-87.000.
Phillips Plastics of North America, Inc.: *See—*
Cherry, Richard Sutton, 248,215, Cl. D9-219.000.
Porsche, Ferdinand Alexander, to Montres Orfina S.A. Wrist watch. 248,219, 6-20-78, Cl. D10-32.000.
Robert E. Miller & Co., Inc.: *See—*
Miller, Robert E., Jr., 248,212, Cl. D8-402.000.
Robertson, Donald Keir. Cargo support for the bed of a truck or the like. 248,228, 6-20-78, Cl. D12-155.000.
Ronson Corporation: *See—*
Beleckis, Vytautas, 248,244, Cl. D27-42.000.
Sailer, George J., Sr. Stroller. 248,226, 6-20-78, Cl. D12-129.000.
Salem China Company, The: *See—*
Schreckengost, Don, 248,202, Cl. D7-17.000.
Schreckengost, Don, 248,205, Cl. D7-64.000.
Sandeen, Frank Jack: *See—*
Watley, Lindell Dale; Inman, Wallace D.; Bell, Gregory L.; Sandeen, Frank Jack; O'Keeffe, James R.; Nepper, John P.; and Huston, James, 248,199, Cl. D6-188.000.
Schreckengost, Don, to Salem China Company, The. Covered sugar bowl. 248,202, 6-20-78, Cl. D7-17.000.
Schreckengost, Don, to Salem China Company, The. Creamer. 248,205, 6-20-78, Cl. D7-64.000.
Senese, Frank J., to Atlantic Richfield Company. Vacuum draining unit for lubricants from internal combustion engines. 248,236, 6-20-78, Cl. D15-150.000.
Sheblessy, Walter F.: *See—*
Talley, Thomas M.; and Sheblessy, Walter F., 248,252, Cl. D34-13.00R.
Smith, Alfred T.: *See—*
Clumb, Thomas E., 248,218, Cl. D9-290.000.
South, Donald A. Siding base starter strip. 248,243, 6-20-78, Cl. D25-74.000.
Stamper, Jerry Lee, to Conic Corporation. Combined data processor analyzer and display instrument. 248,232, 6-20-78, Cl. D14-43.000.
Stevenson, Richard L. Shoe sole. 248,192, 6-20-78, Cl. D2-309.000.
Stratton, Kent E. Combined mirror and adjustable hinge therefor. 248,200, 6-20-78, Cl. D6-242.000.
Sugimoto, Tatsuo, to Daiwa Seiko, Inc. Case for fishing tackle. 248,253, 6-20-78, Cl. D87-1.00R.
Sulek, Eugene Joseph, to Texas Instruments Incorporated. Wrist watch. 248,223, 6-20-78, Cl. D10-38.000.
Sulek, Eugene Joseph, to Texas Instruments Incorporated. Wrist watch. 248,224, 6-20-78, Cl. D10-38.000.
Talley, Thomas M.; and Sheblessy, Walter F. Deck of playing cards. 248,252, 6-20-78, Cl. D34-13.00R.
Texas Instruments Incorporated: *See—*
Lawrence, William James, 248,220, Cl. D10-38.000.
Lawrence, William James, 248,221, Cl. D10-38.000.
Lawrence, William James, 248,222, Cl. D10-38.000.
Sulek, Eugene Joseph, 248,223, Cl. D10-38.000.
Sulek, Eugene Joseph, 248,224, Cl. D10-38.000.
TRW Inc.: *See—*
Dibenedetto, Luigi, 248,233, Cl. D14-49.000.
Urben, Conrad A.; and Urben, Susan H. Knitting and sewing equipment holder. 248,194, 6-20-78, Cl. D3-19.00D.
Urben, Susan H.: *See—*
Urben, Conrad A.; and Urben, Susan H., 248,194, Cl. D3-19.00D.
Watley, Lindell Dale; Inman, Wallace D.; Bell, Gregory L.; Sandeen, Frank Jack; O'Keeffe, James R.; Nepper, John P.; and Huston, James. Display unit. 248,199, 6-20-78, Cl. D6-188.000.
Wombold, Harry A. E.: *See—*
Allen, David O.; and Wombold, Harry A. E., 248,216, Cl. D9-220.000.
Allen, David O.; and Wombold, Harry A. E., 248,217, Cl. D9-255.000.
Woods, James P. Nervous response chiropractic tracing pendulum. 248,241, 6-20-78, Cl. D24-17.000.
Wray, Donald R.: *See—*
Haughtington, Richard E.; and Wray, Donald R., 248,235, Cl. D15-144.000.

CLASSIFICATION OF PATENTS

ISSUED JUNE 20, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2
6 4,095,289
9 4,095,290
67 4,095,291
161 A 4,095,292
168 4,095,293
424 4,095,294

CLASS 3
36 4,095,295

CLASS 5
69 4,095,296
256 4,095,297
263 4,095,298
317 R 4,095,299
334 R 4,095,300

CLASS 8
1 W 4,095,939
15 4,095,940
18 A 4,095,941
62 4,095,942
92 4,095,943
115.7 4,095,944
4,095,945
137 4,095,946
138 4,095,947

CLASS 9
6 R 4,095,301

CLASS 12
8.1 4,095,302

CLASS 13
13 4,096,344

CLASS 15
1.5 R 4,095,303
48 4,095,304
104.07 4,095,306
104.1 R 4,095,305
246.5 4,095,307
250.42 4,095,308
320 4,095,309

CLASS 16
87 R 4,095,310
163 4,095,311

CLASS 19
308 4,095,312

CLASS 23
230 B 4,095,948
230 PC 4,095,949
230.3 4,095,950
253 PC 4,095,951
260 4,095,952
277 R 4,095,953

CLASS 24
230 A 4,095,313
4,095,314
231 4,095,315
234 4,095,316

CLASS 28
221 4,095,317
241 4,095,318
273 4,095,319
4,095,320

CLASS 29
33 G 4,095,321
156.8 P 4,095,322
159.2 4,095,323
249 4,095,324
407 4,095,325
417 4,095,326
509 4,095,327
515 4,095,328
572 4,095,329
580 4,095,330
589 4,095,331
598 4,095,332
4,095,333
627 4,095,334
726 4,095,335
749 4,095,336

CLASS 30
158 4,095,337
276 4,095,338
279 R 4,095,339
287 4,095,340
4,095,341

CLASS 33
1 LE 4,095,343
1 SD 4,095,342
18 R 4,095,344
80 4,095,345
113 4,095,346
234 4,095,347
363 K 4,095,348

CLASS 34
86 4,095,349

CLASS 35
10.2 4,095,351
16 4,095,350
17 4,095,352

CLASS 36
11.5 4,095,353
50 4,095,354
118 4,095,355
121 4,095,356

CLASS 37
2 R 4,095,357
90 4,095,358

CLASS 40
152 4,095,361
446 4,095,359
603 4,095,360
617 4,095,362

CLASS 42
23 4,095,363

CLASS 43
21.2 4,095,364
55 4,095,365

CLASS 44
1 B 4,095,954
1 R 4,095,955
13 4,095,956
40 4,095,957

CLASS 46
1 R 4,095,366
104 4,095,368
105 4,095,367

CLASS 47
26 4,095,369

CLASS 48
73 4,095,959
111 4,095,958
197 R 4,095,960

CLASS 49
352 4,095,370
4,095,371
460 4,095,372

CLASS 51
130 4,095,373
165 R 4,095,374
170 MT 4,095,375
218 R 4,095,376
281 R 4,095,961
290 4,095,377
425 4,095,378

CLASS 52
29 4,095,379
79.13 4,095,380
234 4,095,382
295 4,095,381
309.7 4,095,383
408 4,095,384
489 4,095,385
575 4,095,386
583 4,095,389
645 4,095,387
747 4,095,388

CLASS 53
39 4,095,390
123 4,095,391
159 4,095,392
183 4,095,393
198 R 4,095,394
4,095,395
234 4,095,396
329 4,095,397

CLASS 55
10 4,095,962
54 4,095,963
241 4,095,964
270 4,095,965
394 4,095,966

CLASS 56
202 4,095,398
336 4,095,399

CLASS 57
37 4,095,400
81 4,095,401
124 4,095,402
144 4,095,403
164 4,095,404

CLASS 58
4 A 4,095,405
13 4,095,409
23 R 4,095,406
4,095,407
4,095,408
38 R 4,095,410
50 R 4,095,412
4,095,413
4,095,414
57.5 4,095,411

CLASS 59
35 R 4,095,415
86 4,095,416

CLASS 60
39.09 F 4,095,418
39.12 4,095,419
39.5 4,095,417
204 4,095,420
398 4,095,421
4,095,422
4,095,423
436 4,095,424
445 Re.29,671
Re.29,672
Re.29,673
484 4,095,425
496 4,095,426
530 4,095,427
641 4,095,428
675 4,095,429

CLASS 61
45 B 4,095,430
4,095,431
45 C 4,095,433
45 D 4,095,432
63 4,095,434
84 4,095,435
85 4,095,436
109 4,095,437

CLASS 62
278 4,095,438
344 4,095,439
450 4,095,440

CLASS 65
77 4,095,967
104 4,095,968
281 4,095,969

CLASS 66
176 4,095,441

CLASS 68
18 C 4,095,442
22 R 4,095,443
205 R 4,095,444

CLASS 70
215 4,095,445

CLASS 71
72 4,095,970
78 4,095,971
93 4,095,972
103 4,095,973

CLASS 72
88 4,095,446
208 4,095,447
238 4,095,448
273 4,095,449
318 4,095,450
340 4,095,451
344 4,095,452

CLASS 73
15 A 4,095,454
15 B 4,095,453
23.1 4,095,455
37.6 4,095,456
53 4,095,457
73 4,095,458
76 4,095,459
101 4,095,461
116 4,095,462
141 R 4,095,463
146 4,095,464
159 4,095,465
215 4,095,466
362 AR 4,095,467
362 R 4,095,468
4,095,469
368 4,095,470
421 B 4,095,471
422 GC 4,095,472
433 4,095,473
579 4,095,474
628 4,095,475
747 4,095,476

CLASS 74
5.6 D 4,095,477
84 S 4,095,460
229 4,095,478
230.17 E 4,095,479
231 P 4,095,480
469 4,095,481
498 4,095,482
501 M 4,095,483
573 R 4,095,484
574 4,095,485
645 4,095,486
695 4,095,487
801 4,095,488
820 4,095,489

CLASS 75
0.5 B 4,095,974
108 4,095,975
122 4,095,976
234 4,095,977
238 4,095,978

CLASS 76
108 R 4,095,491
112 4,095,490

CLASS 81
3.43 4,095,492
57.15 4,095,493
63.2 4,095,494

CLASS 83
15 4,095,495
104 4,095,496
157 4,095,497
346 4,095,498
471 4,095,499
762 4,095,500

CLASS 84
1.03 4,095,501
1.13 4,095,502
173 4,095,503
390 4,095,504
416 4,095,505
485 R 4,095,506

CLASS 89
1.814 4,095,508
129 B 4,095,507

CLASS 91
369 B 4,095,509
487 4,095,510

CLASS 92
187 4,095,513

CLASS 93
58.2 R 4,095,511
81 R 4,095,512

CLASS 96
1.4 4,095,979
4,095,980
48 PD 4,095,981
50 PT 4,095,982
77 4,095,983
100 N 4,095,984

CLASS 98
58 4,095,514

CLASS 99
337 4,095,515
390 4,095,516
495 4,095,517
538 4,095,518

CLASS 100
35 4,095,519
43 4,095,520
214 4,095,522
219 4,095,521
282 4,095,523

CLASS 101
103 4,095,524
465 4,095,525

CLASS 102
8 4,095,526
19.2 4,095,527
49.8 4,095,528
200 4,095,529

CLASS 105
131 4,095,530
182 R 4,095,531

CLASS 106
15 FP 4,095,985
52 4,095,986
92 4,095,987
97 4,095,988
104 4,095,989
136 4,095,990
208 4,095,991
213 4,095,992
300 4,095,993
308 B 4,095,994
308 Q 4,095,995

CLASS 108
59 4,095,532
90 4,095,533

CLASS 110
263 4,095,534

CLASS 111
6 4,095,535

CLASS 112
121.26 4,095,536
121.29 4,095,537
147 4,095,538
184 4,095,539
210 4,095,540
256 4,095,541
262 4,095,542
417 4,095,543

CLASS 113
120 A 4,095,544

CLASS 114
26 4,095,545
74 R 4,095,546
122 4,095,547
230 4,095,548
283 4,095,549
295 4,095,550

CLASS 116
35 R 4,095,551
114 Q 4,095,552
116 4,095,553

CLASS 118
3 4,095,554
208 4,095,555
230 4,095,556
301 4,095,557
420 4,095,558

CLASS 119
1 4,095,559
3 4,095,560
29 4,095,561
95 4,095,562

CLASS 122
235 R 4,095,563

CLASS 123
32 SJ 4,095,580
41.49 4,095,566
/32 SP 4,095,565
103 R 4,095,567
117 A 4,095,568
119 A 4,095,569
119 EC 4,095,570
136 4,095,571
140 MP 4,095,572
4,095,573
140 R 4,095,574
142.5 R 4,095,575
148 CC 4,095,577
148 E 4,095,576
188 M 4,095,578
192 B 4,095,579
211 4,095,564

CLASS 126
121 4,095,581
140 4,095,582
263 4,095,583
270 4,095,584
271 4,095,585
273 R 4,095,586

CLASS 128
1.3 4,095,587
1.5 4,095,588
2 F 4,095,589
24 R 4,095,590
92 BB 4,095,591
142 R 4,095,592
142.7 4,095,593
156 4,095,595
198 4,095,596
205 Z 4,095,597
214.4 4,095,598
283 4,095,599
335.5 4,095,600
405 4,095,601
413 4,095,602
419 PT 4,095,603

CLASS 131
21 A 4,095,604
134 4,095,605
140 R 4,095,606

CLASS 133
1 A 4,095,607
8 R 4,095,608

CLASS 134
1 4,095,996

CLASS 136
89 HY 4,095,997
208 4,095,998

CLASS 137
43 4,095,609
100 4,095,610
115 4,095,611
246.22 4,095,612
344 4,095,613
414 4,095,614
527.8 4,095,615
596 4,095,616
596.13 4,095,617

CLASS 138
103 4,095,618

CLASS 139
22 4,095,619
196.2 4,095,620
370.2 4,095,621
383 A 4,095,622

CLASS 140
92.7 4,095,623

CLASS 141

18 4,095,624
93 4,095,625
206 4,095,626
250 4,095,627
367 4,095,628
392 4,095,629

CLASS 142

56 4,095,630

CLASS 144

34 E 4,095,631
136 C 4,095,632
144 R 4,095,633
317 4,095,634

CLASS 145

33 D 4,095,635

CLASS 148

11.5 R 4,095,999
27 4,096,000
113 4,096,001
138 4,096,002

CLASS 149

2 4,096,003
18 4,096,004
4,096,005

CLASS 150

52 A 4,095,636

CLASS 152

323 4,095,637
349 4,095,638

CLASS 156

55 4,096,006
4,096,007
96 4,096,008
151 4,096,009
179 4,096,010
196 4,096,011
214 4,096,012
272 4,096,013
273 4,096,014
4,096,015
274 4,096,016
275 4,096,017
381 4,096,018
494 4,096,019
519 4,096,020
527 4,096,021
577 4,096,022
580 4,096,023
601 4,096,024
616 R 4,096,025
656 4,096,026

CLASS 160

84 R 4,095,639
92 4,095,640
209 4,095,641
332 4,095,642

CLASS 162

18 4,096,027
49 4,096,028
89 4,096,029

CLASS 164

301 4,095,643

CLASS 165

13 4,095,644
4,095,645
77 4,095,646
105 4,095,647
162 4,095,648

CLASS 166

0.5 4,095,649
256 4,095,650
294 4,095,651

CLASS 172

47 4,095,652
177 4,095,653

CLASS 173

118 4,095,654

CLASS 174

14 R 4,096,345
36 4,096,346
48 4,096,347
52 FP 4,096,348
68 R 4,096,349
88 C 4,096,350
102 R 4,096,351
153 R 4,096,352

CLASS 175

19 4,095,655
53 4,095,656

CLASS 176

20 R 4,096,030
32 4,096,031
38 4,096,032
78 4,096,033
87 4,096,034

CLASS 177

118 4,095,658
136 4,095,659
4,095,660

CLASS 179

1 GQ 4,096,353
15 AL 4,096,355
15 BF 4,096,354
18 DA 4,096,356
4,096,357
99 4,096,358
4,096,359
100.4 ST 4,096,360
170 D 4,096,361
4,096,362
170 R 4,096,363

CLASS 180

8 E 4,095,661
9.22 4,095,662
33 C 4,095,663
65 D 4,095,665
65 R 4,095,664
98 4,095,666

CLASS 181

120 4,095,667
202 4,095,668
210 4,095,669

CLASS 182

128 4,095,670
202 4,095,671

CLASS 184

1.5 4,095,672
4,095,673
6.1 4,095,674
6.12 4,095,675

CLASS 185

40 R 4,095,676

CLASS 187

17 4,095,677
29 R 4,095,678

CLASS 188

32 4,095,679
156 4,095,680
187 4,095,681
289 4,095,682

CLASS 192

70.18 4,095,683
103 FA 4,095,684
111 B 4,095,685

CLASS 195

1.5 4,096,035
31 F 4,096,036
103.5 R 4,096,037

CLASS 198

345 4,095,687
399 4,095,688

CLASS 200

5 A 4,096,364
11 DA 4,096,365
144 B 4,096,366
148 B 4,096,367
314 4,096,368

CLASS 201

32 4,096,038

CLASS 202

205 4,096,039
262 4,096,040
263 4,096,041

CLASS 204

1.5 4,096,042
15 4,096,043
59 R 4,096,044
78 4,096,052
117 4,096,045
157.1 R 4,096,046
195 M 4,096,049
195 P 4,096,047
195 S 4,096,048
4,096,050
196 4,096,051
238 4,096,053
263 4,096,054
298 4,096,055

CLASS 206

106 4,095,689
312 4,095,690
354 4,095,691
386 4,095,692
433 4,095,693
455 4,095,694
610 4,095,695

CLASS 208

4 4,096,056
11 LE 4,096,057

CLASS 209

75 4,095,696
403 4,096,058

CLASS 210

22 A 4,096,059
23 R 4,096,060
45 4,096,061
77 4,096,062
84 4,096,063
120 4,096,064
188 4,096,065
195 R 4,096,066
252 4,096,067
293 4,096,068
342 4,096,069
448 4,096,070

CLASS 211

71 4,095,697
126 4,095,698

CLASS 214

1 BB 4,095,699
1 QA 4,095,700
6 B 4,095,701
8 4,095,702
17 DA 4,095,703
77 P 4,095,704
83.18 4,095,705
147 G 4,095,706
151 4,095,752
301 4,095,707
313 4,095,708
454 4,095,709
620 4,095,714
4,095,715

CLASS 215

100 R 4,095,716
220 4,095,717
223 4,095,718

CLASS 219

10.55 C 4,096,370
10.55 D 4,096,369
69 E 4,096,371
72 4,096,372
73 4,096,373
94 4,096,374
97 4,096,375
328 4,096,376

CLASS 220

4 B 4,095,719
21 4,095,720
90.2 4,095,710
94 R 4,095,711
254 4,095,712
270 4,095,713

CLASS 221

210 4,095,721

CLASS 222

1 4,095,722
56 4,095,723
95 4,095,724
153 4,095,725
175 4,095,726
400.8 4,095,727
529 4,095,728

CLASS 225

42 4,095,729
48 4,095,730

CLASS 226

3 4,095,731
33 4,095,732
162 4,095,733

CLASS 228

104 4,095,734
143 4,095,594

CLASS 229

39 R 4,095,735
62.5 4,095,736

CLASS 235

30 R 4,095,737
144 HC 4,096,377
309 4,095,738
382 4,095,739
466 4,096,378

CLASS 236

47 4,095,740
78 C 4,095,741
92 B 4,095,742

CLASS 238

10 F 4,095,743

CLASS 239

1 4,095,744
109 4,095,745
287 4,095,746
288.5 4,095,747
419.3 4,095,748
458 4,095,749
542 4,095,750

CLASS 241

37.5 4,095,751
175 4,095,753

CLASS 242

65 4,095,754
66 4,095,755
84.2 G 4,095,756
151 4,095,757
192 4,095,758

CLASS 244

17.17 4,095,759
123 4,095,760
135 A 4,095,761
137 R 4,095,762
194 4,095,763

CLASS 246

182 B 4,095,764

CLASS 248

56 4,095,765
119 S 4,095,766
4,095,767
290 4,095,768
346 4,095,769
371 4,095,770

CLASS 249

18 4,095,771
82 4,095,772
117 4,095,773

CLASS 250

199 4,096,380
213 VT 4,096,381
214 A 4,096,382
231 SE 4,096,383
237 G 4,096,384
262 4,096,385
365 4,096,386
372 4,096,387
373 4,096,388
445 T 4,096,389
4,096,390
505 4,096,391
507 4,096,392

CLASS 251

44 4,095,774

CLASS 252

8.55 D 4,096,073
4,096,074
8.6 4,096,071
8.8 4,096,072
12.2 4,096,075
30 4,096,076
33.6 4,096,077
46.7 4,096,078
51.5 R 4,096,079
62.56 4,096,080
89 R 4,096,081
117 4,096,082
171 4,096,083
173 4,096,084
189 4,096,085
299 4,096,086
300 4,096,087
301.4 R 4,096,088
310 4,096,089
389 R 4,096,090
408 4,096,091
429 C 4,096,092
430 4,096,093
440 4,096,094
465 4,096,095
466 J 4,096,096
510 4,096,097
520 4,096,098

CLASS 260

2.5 BE 4,096,101
2.5 D 4,096,099
2.5 R 4,096,100
22 D 4,096,102
27 BB 4,096,103
28.5 B 4,096,104
29.6 NR 4,096,105
29.7 H 4,096,106
33.6 UA 4,096,107
38 4,096,108
40 P 4,096,111
40 R 4,096,109
4,096,110
45.75 M 4,096,116
45.8 N 4,096,112
45.8 NT 4,096,113
45.8 NZ 4,096,114
45.8 RW 4,096,115
45.95 G 4,096,117
46.5 E 4,096,118
47 C 4,096,119
66 4,096,121
75 M 4,096,122
4,096,124
75 N 4,096,123
75 R 4,096,125
4,096,126
77.5 AM 4,096,127
77.5 AN 4,096,129
77.5 CH 4,096,130
77.5 SS 4,096,128
79 4,096,131
79.1 4,096,132
79.3 R 4,096,133
79.5 B 4,096,135
79.5 R 4,096,134
112 B 4,096,136
117 4,096,137
121 4,096,138
152 4,096,139
239 BC 4,096,140
239 BD 4,096,141
239.55 R 4,096,142
281 GN 4,096,145
284 4,096,146
287 AZ 4,096,147
287 B 4,096,148
293.52 4,096,150
294.9 4,096,151
295.5 A 4,096,149
307 H 4,096,152
308 D 4,096,153
327 R 4,096,154
332.2 A 4,096,155
343.6 4,096,156
347.2 4,096,158
438.1 4,096,157
448.2 B 4,096,162
448.2 E 4,096,159
4,096,160
448.2 P 4,096,161
449 R 4,096,163
4,096,164
453 PH 4,096,165
453 RW 4,096,166
455 R 4,096,167
463 4,096,168
4,096,169
465 D 4,096,170
465.3 4,096,171
4,096,172
501.1 4,096,173
506 4,096,174
512 R 4,096,175
515 R 4,096,177
517 4,096,176
520 R 4,096,178
4,096,179
534 C 4,096,180
543 R 4,096,181
544 Y 4,096,182
556 AR 4,096,183
561 N 4,096,184
581 4,096,185
584 R 4,096,186
601 H 4,096,187
604 HF 4,096,188
606.5 P 4,096,189
632 HF 4,096,191
646 4,096,195
650 F 4,096,196
683.47 4,096,197
4,096,198
4,096,199
859 R 4,096,200
873 4,096,202
876 B 4,096,203
4,096,204
879 4,096,201
880 R 4,096,205
4,096,206
900 4,096,207
931 4,096,208
966 4,096,209
973 4,096,210

CLASS 261

23 A 4,096,211
39 B 4,096,212
71 4,096,213
79 A 4,096,214
121 R 4,096,215

CLASS 264

1 4,096,216
20 4,096,217
45.5 4,096,218
46.5 4,096,219
51 4,096,220
60 4,096,120
75 4,096,221
78 4,096,222
89 4,096,223
92 4,096,224
151 Re.29,674
167 4,096,225
168 4,096,226
210 R 4,096,227
271 4,096,228
316 4,096,229
321 4,096,230

CLASS 266

45 4,095,777

CLASS 269

71 4,095,778

CLASS 270

61 F 4,095,779
73 4,095,780

CLASS 271

12 4,095,781
173 4,095,782

CLASS 272

8 R 4,095,783
31 A 4,095,784
71 4,095,657
140 4,095,789

CLASS 273

1 E 4,095,785
4 A 4,095,786
29 A 4,095,787
34 R 4,095,788
73 D 4,095,790
85 G 4,095,791
85 R 4,095,792
87 R 4,095,793
101 4,095,794
143 R 4,095,795
145 C 4,095,796
186 C 4,095,797
200 R 4,095,798
241 4,095,799
251 4,095,800
260 4,095,801

CLASS 274

47 4,095,802

CLASS 277

12 4,095,803
4,095,804
27 4,095,805
4,095,806
40 4,095,807
81 R 4,095,808
180 4,095,809
208 4,095,810

CLASS 279

1 K 4,095,811

CLASS 280

63 4,095,815
87.02 R 4,095,816
87.04 A 4,095,817
289 A 4,095,820
289 R 4,095,812
604 4,095,813
618 4,095,814
628 4,095,821
702 4,095,822
764 4,095,823
784 4,095,819
789 4,095,818

CLASS 283

6 4,095,824

CLASS 285

55 4,095,825
330 4,095,826

CLASS 290

1 R 4,096,393

CLASS 292

65 4,095,827
148 4,095,828
241 4,095,829
288 4,095,830

CLASS 293

62 4,095,831

CLASS 294

8 4,095,832
83 R 4,095,833
97 4,095,834

CLASS 296

1 S 4,095,835
23 MC 4,095,836
24 R 4,095,837
26 4,095,838
28 C 4,095,839
100 4,095,840
137 B 4,095,841

CLASS 297

4 4,095,842
136 4,095,843

CLASS 298

14 4,095,844

CLASS 299

18 4,095,845

CLASS 301

37 R 4,095,846

CLASS 302

24 4,095,847

CLASS 303

2 4,095,848
36 4,095,850
115 4,095,851

CLASS 305

35 R 4,095,849

CLASS 307

46 4,096,394
64 4,096,395
219 4,096,396
231 4,096,397
237 4,096,398
249 4,096,399
254 4,096,400
355 4,096,401
362 4,096,402

CLASS 308

3 R 4,095,852
3.6 4,095,853
6 C 4,095,854
9 4,095,855
29 4,095,856
168 4,095,857

CLASS 310

10 4,096,403
67 R 4,096,404

CLASS 312

198 4,095,858
209 4,095,859
242 4,095,860
250 4,095,861

CLASS 313

174 4,096,405
348 4,096,406
367 4,096,407
417 4,096,408

CLASS 315

5.38 4,096,409
86 4,096,410
158 4,096,411
169 R 4,096,412
276 4,096,413
291 4,096,414
393 4,096,415
401 4,096,416

CLASS 318

7 4,096,417
12 4,096,418
138 4,096,419
254 4,096,420
282 4,096,421
314 4,096,422
370 4,096,423
480 4,096,424
561 4,096,425
611 4,096,426
648 4,096,427

CLASS 320

2 4,096,428

CLASS 322

28 4,096,429

CLASS 323

22 R 4,096,430
119 4,096,431

CLASS 324

3 4,096,432
30 R 4,096,433
115 4,096,434
122 4,096,435
142 4,096,436
227 4,096,437
229 4,096,438

CLASS 325

21 4,096,439
53 4,096,440
133 4,096,441

CLASS 329

112 4,096,442

CLASS 330

267 4,096,443
277 4,096,444

CLASS 331

17 4,096,445
94.5 C 4,096,446
4,096,447
94.5 ML 4,096,448
94.5 P 4,096,450
94.5 PE 4,096,449
116 R 4,096,451
4,096,452
117 D 4,096,453

CLASS 332

37 R 4,096,454

CLASS 333

30 R 4,096,455
72 4,096,456
73 W 4,096,457
96 4,096,458
4,096,459

CLASS 335

136 4,096,460
209 4,096,461
213 4,096,462

CLASS 336

129 4,096,463

CLASS 337

5 4,096,464
49 4,096,465

CLASS 338

320 Re.29,676

CLASS 339

14 R 4,095,862
15 4,095,863
4,095,864
16 R 4,095,865
17 E 4,095,866
92 M 4,095,867
95 D 4,095,868
103 R 4,095,870
119 C 4,095,871

CLASS 340

5 MP 4,096,467
5 T 4,096,466
52 E 4,096,468
81 R 4,096,469
83 4,096,470
146.1 R 4,096,471
146.3 ED 4,096,472
237.5 4,096,473
261 4,096,474
347 DA 4,096,475
347 P 4,096,476

CLASS 343

6.5 SS 4,096,477
7.7 4,096,478
18 C 4,096,479
100 LE 4,096,480
715 4,096,481
778 4,096,482
781 CA 4,096,483

CLASS 346

33 EC 4,096,484
74.1 4,096,485
107 R 4,096,486
110 R 4,096,487
139 C 4,096,488
158 4,096,489

CLASS 350

96.14 4,095,869
96.24 4,095,872
195 4,095,873
239 4,095,874
320 4,095,875
343 4,095,876

CLASS 351

160 4,095,877
161 4,095,878

CLASS 353

122 4,095,882

CLASS 354

21 4,096,490
31 4,096,491
33 4,096,492
38 4,096,493
53 4,096,494
59 4,096,495
60 A 4,096,496
86 4,096,497
127 4,096,498
152 4,096,499
173 4,096,500
179 4,096,501
203 4,096,502
234 4,096,503
241 4,096,504
246 4,096,505
288 4,096,506
307 4,096,507

CLASS 355

3 BE 4,095,887
3 CH 4,095,885
3 DD 4,095,883
3 FU 4,095,886
3 R 4,095,884
4 4,095,879
4,095,888
4,095,889
8 4,095,880
14 4,095,890
30 4,095,881
50 4,095,891
74 4,095,892
4,095,893
75 4,095,894
77 4,095,895

CLASS 356

89 4,095,896
100 4,095,897
102 4,095,775
103 4,095,898
106 S 4,095,899
4,095,900
153 4,095,901
155 4,095,902
169 4,095,903
197 4,095,904
200 4,095,905

CLASS 357

5 4,096,508
23 4,096,509
28 4,096,510
30 4,096,511
4,096,512
45 4,096,522
54 4,096,521

CLASS 358

4 4,096,513
11 4,096,514
28 4,096,515
31 4,096,516
40 4,096,517
74 4,096,518
75 4,096,519
80 4,096,523
85 4,096,524
107 4,096,525
133 4,096,520
4,096,526
4,096,527
148 4,096,528
167 4,096,529
244 4,096,530
248 4,096,531

CLASS 360

16 4,096,532
78 4,096,534
84 4,096,535
94 4,096,533
96 4,096,536
106 4,096,537
132 4,096,538

CLASS 361

93 4,096,539
4,096,540
120 4,096,541
196 4,096,542
230 4,096,543
231 4,096,544
380 4,096,545
383 4,096,546
388 4,096,547
399 4,096,548

CLASS 362

11 4,096,549
31 4,096,550
83 4,096,551
104 4,096,552
183 4,096,553
220 4,096,554
235 4,096,379
302 4,096,555
417 4,096,556

CLASS 363

9 4,096,557
41 4,096,558
96 4,096,559

CLASS 364

105 4,096,562
107 4,096,563
200 4,096,560
4,096,561
4,096,564
4,096,565
4,096,566
4,096,567
4,096,568
4,096,569
4,096,570
4,096,571
4,096,572
4,096,573
501 4,096,574
571 4,096,575
602 4,096,576
712 4,096,577
900 4,096,578
4,096,579

CLASS 365

1 4,096,580
2 4,096,581
13 4,096,582
15 Re.29,677
130 4,096,583
227 4,096,584

CLASS 366

5 4,096,588
7 4,096,585
134 4,096,586
136 4,095,776
163 4,096,587
178

CLASS 400

150 4,095,686

CLASS 401

48 4,095,906
225 4,095,907

CLASS 403

14 4,095,909
16 4,095,908
49 4,095,910
104 4,095,911
187 4,095,912
364 4,095,913
389 4,095,914
402 4,095,915

CLASS 408

1 R 4,095,916
239 R 4,095,917

CLASS 415

7 4,095,918

CLASS 416

142 4,095,919

CLASS 417

12 4,095,920
269 4,095,921
313 4,095,922
475 4,095,923
499 4,095,924

CLASS 423

19 4,096,231
87 4,096,232
101 4,096,233
135 4,096,234
166 4,096,235
210 4,096,236

CLASS 424

1 4,096,237
15 4,096,238
21 4,096,239
54 4,096,241
59 4,096,240
4,096,242
62 4,096,243
85 4,096,244
92 4,096,245
177 4,096,246
180 4,096,247
4,096,248
4,096,249
4,096,250
4,096,260
200 4,096,251
226 4,096,269
230 4,096,252
238 4,096,253
242 4,096,254
246 4,096,255
4,096,256
249 4,096,257
250 4,096,259
4,096,260
4,096,261
4,096,262
251 4,096,263
256 4,096,264
4,096,265
261 4,096,266
262 4,096,267
266 4,096,268
4,096,270
270 4,096,271
272 4,096,272
4,096,273
274 4,096,274
308 4,096,275
4,096,337
322 4,096,276
324 4,096,277
329 4,096,278
330 4,096,279
331 4,096,280

CLASS 425

141 4,095,925
307 4,095,926
525 4,095,927
564 4,095,931
575 4,095,932

CLASS 426

89 4,096,281
140 4,096,282
242 4,096,283
250 4,096,258
535 4,096,284
548 4,096,285
577 4,096,286
588 4,096,287

CLASS 427

24 4,096,288
32 4,096,289
43 4,096,290
120 4,096,291
127 4,096,292
134 4,096,293
197 4,096,294
209 4,096,295
247 4,096,296
248 C 4,096,297
262 4,096,298
264 4,096,299
292 4,096,300
430 A 4,096,301

CLASS 428

91 4,096,303
95 4,096,302
138 4,096,304
182 4,096,305
192 4,096,306
214 4,096,307
247 4,096,308
285 4,096,309
288 4,096,310
289 4,096,311
297 4,096,312
304 4,096,313
307 4,096,314
412 4,096,315
457 4,096,316

CLASS 429

144 4,096,328
145 4,096,317
199 4,096,318

CLASS 431

8 4,095,928
11 4,095,933
19 4,095,929
89 4,095,934
90 4,095,930
167 4,095,935
337 4,095,936

CLASS 432

3 4,095,937
225 4,095,938

CLASS 526

16 4,096,319
72 4,096,320
133 4,096,322
317 4,096,323

CLASS 536

23 4,096,324
91 4,096,325
95 4,096,326
120 4,096,321
122 4,096,327

CLASS 544

21 4,096,329
26 4,096,330
141 4,096,331
174 4,096,332
237 4,096,143
284 4,096,144

CLASS 548

371 4,096,333

CLASS 560

31 Re.29,675
35 4,096,334
53 4,096,335
4,096,336
59 4,096,338
61 4,096,339
77 4,096,340
85 4,096,341
121 4,096,342
4,096,343

CLASS 568

730 4,096,190
866 4,096,192
881 4,096,193
899 4,096,194

CLASSIFICATION OF DESIGNS

D2—	232	248,191		17	248,202		499	248,213			248,224	D15—	144	248,235			248,246
	309	248,192		45	248,203	D9—	83	248,214	D12—	58	248,225		150	248,236		5 JJ	248,250
	320	248,193		54	248,204		219	248,215		129	248,226	D16—	06	248,237		5 L	248,247
D3—	19 D	248,194		64	248,205		220	248,216		146	248,227	D22—	28	248,238			248,251
D6—	113	248,195		78	248,206		255	248,217		155	248,228			248,239		5 SS	248,248
		248,196		87	248,207		290	248,218		169	248,229	D23—	94	248,240			248,249
		248,197		96	248,208	D10—	32	248,219	D14—	5	248,230	D24—	17	248,241		13 R	248,252
		248,198		210	248,209		38	248,220		12	248,231	D25—	52	248,242			
	188	248,199	D8—	91	248,210			248,221		43	248,232		74	248,243	D48—	20 C	248,254
	242	248,200		395	248,211			248,222		49	248,233	D27—	42	248,244		32 R	248,255
D7—	2	248,201		402	248,212			248,223		53	248,234	D34—	4 R	248,245	D87—	1 R	248,253

CLASSIFICATION OF PLANTS

P.—	69	4,266		4,267		4,268		74	4,269		4,270	

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,095,345	4,095,743		4,096,398		4,096,353		4,095,668		4,096,416
	4,095,508	4,095,744		4,096,403		4,096,376		4,095,672		4,096,473
	4,095,643	4,095,745		4,096,406		4,096,422		4,095,682	19 :	Re.29,671
	4,096,381	4,095,746		4,096,409		4,096,544		4,095,684		Re.29,672
	4,096,391	4,095,758		4,096,426	10 :	4,095,320		4,095,695		Re.29,673
2 :	4,096,525	4,095,762		4,096,427		4,095,453		4,095,714		4,095,709
4 :	4,095,426	4,095,772		4,096,441		4,095,518		4,095,715		4,095,783
	4,096,021	4,095,775		4,096,448		4,095,636		4,095,717		4,095,902
	4,096,213	4,095,791		4,096,449		4,096,185		4,095,726		4,096,023
	4,096,521	4,095,809		4,096,450		4,096,190		4,095,741		4,096,036
5 :	4,095,705	4,095,812		4,096,453		4,096,192		4,095,773		4,096,093
	4,095,736	4,095,818		4,096,463		4,096,227		4,095,790		4,096,370
6 :	Re.29,675	4,095,828		4,096,466		4,096,326		4,095,799	20 :	4,095,357
	4,095,299	4,095,844		4,096,478		4,096,341		4,095,810		4,095,459
	4,095,301	4,095,846		4,096,479	11 :	4,095,386		4,095,839		4,095,706
	4,095,313	4,095,855		4,096,482		4,096,480		4,095,843		4,095,711
	4,095,314	4,095,866		4,096,549	12 :	4,095,303		4,095,849		4,096,428
	4,095,341	4,095,867		4,096,560		4,095,315		4,095,870		4,096,429
	4,095,344	4,095,892		4,096,567		4,095,324		4,095,909	21 :	4,095,321
	4,095,350	4,095,906		4,096,579		4,095,365		4,095,920		4,095,500
	4,095,362	4,095,928		4,096,580		4,095,398		4,095,992		4,095,963
	4,095,363	4,095,934		4,096,583		4,095,420		4,096,028	22 :	4,095,346
	4,095,391	4,095,937		4,096,584		4,095,603		4,096,068		4,095,693
	4,095,395	4,095,950	7 :	4,096,356		4,095,667		4,096,077		4,095,918
	4,095,399	4,095,962	8 :	4,095,309		4,095,793		4,096,091		4,096,199
	4,095,404	4,095,968		4,095,452		4,095,797		4,096,138	23 :	4,095,629
	4,095,412	4,095,970		4,095,480		4,095,840		4,096,205		4,096,327
	4,095,415	4,095,974		4,095,679		4,095,926		4,096,261		4,096,464
	4,095,421	4,096,039		4,095,796		4,096,442		4,096,282	24 :	4,095,294
	4,095,466	4,096,055		4,095,881		4,096,578		4,096,284		4,095,527
	4,095,477	4,096,056		4,096,005	13 :	4,095,310		4,096,287		4,095,552
	4,095,494	4,096,064		4,096,079		4,095,337		4,096,351		4,095,832
	4,095,503	4,096,104		4,096,397		4,095,614		4,096,389		4,095,835
	4,095,528	4,096,118		4,096,487		4,095,633		4,096,399		4,095,872
	4,095,549	4,096,121		4,096,535		4,095,824		4,096,408		4,095,923
	4,095,554	4,096,134	9 :	4,095,417		4,095,885		4,096,477		4,096,445
	4,095,556	4,096,167		4,095,491		4,096,010		4,096,533		4,096,447
	4,095,577	4,096,188		4,095,600		4,096,300		4,096,542		4,096,502
	4,095,580	4,096,191		4,095,635	16 :	4,095,356	18 :	4,095,307		4,096,509
	4,095,593	4,096,237		4,095,640		4,095,506		4,095,332	25 :	4,095,329
	4,095,615	4,096,238		4,095,733	17 :	4,095,290		4,095,439		4,095,330
	4,095,618	4,096,239		4,095,820		4,095,351		4,095,571		4,095,423
	4,095,628	4,096,251		4,095,837		4,095,358		4,095,572		4,095,455
	4,095,642	4,096,258		4,095,882		4,095,371		4,095,644		4,095,475
	4,095,654	4,096,272		4,095,896		4,095,440		4,095,722		4,095,484
	4,095,656	4,096,273		4,095,929		4,095,468		4,095,803		4,095,514
	4,095,664	4,096,281		4,095,961		4,095,522		4,095,808		4,095,543
	4,095,671	4,096,298		4,096,006		4,095,523		4,095,960		4,095,620
	4,095,676	4,096,309		4,096,034		4,095,526		4,095,976		4,095,626
	4,095,718	4,096,315		4,096,090		4,095,562		4,096,148		4,095,632
	4,095,719	4,096,357		4,096,100		4,095,566		4,096,173		4,095,699
	4,095,732	4,096,377		4,096,243		4,095,610		4,096,183		4,095,853
	4,095,739	4,096,392		4,096,301		4,095,661		4,096,277		4,095,862

DESIGN PATENTS

U. S. GOVERNMENT PRINTING OFFICE : O - 1978

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

June 27, 1978 Volume 971 Number 4

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $300.00 per annum for first-class mailing, also available as fourth-class mail at $200.00; foreign first-class mailing rates will be furnished upon request; single copies each, $4.00 domestic, $5.00 foreign.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

GENERAL INFORMATION concerning TRADEMARKS, price $1.50 each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

LUTRELLE F. PARKER,
May 2, 1978. *Acting Commissioner of Patents and Trademarks.*

Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before July 14, 1978.

LUTRELLE F. PARKER,
June 5, 1978. *Chairman, Committee on Enrollment.*

A

Aguilar, Michael, 3508 Angelus Ave., Glendale, Calif. 91208
Alford, William R., 110 Whippoorwill Pl., Athens, Ga. 30605
Anderson, Gordon K., 14632 Pacific St., Tustin, Calif. 92680
Anderson, Gregg I., 7802 W. 102nd, Overland Park, Kans. 66212
Anderson, Ronald M., 148 Valle Verde Ct., Danville, Calif. 94526
Arnold, Robert D., 1505 N. Quinn St., #17, Arlington, Va. 22209

B

Babchik, Jack, 149—20 80th St., Howard Beach, N.Y. 11414
Bailey, Edward L., 5948 San Reno, Sylvania, Ohio 43560
Bantle, David W., 19940 Hiawatha St., Chatsworth, Calif. 91311
Bentley, Gustavus A., 1801 Charlton, Ann Arbor, Mich. 48103
Bodenheimer, Stephen J., Jr., 4029 S. 7th St., Arlington, Va. 22204
Booth, William E., 2000 F St., NW., #105, Washington, D.C. 20006
Boudreau, James K., 50 Cortland St., Norwich, N.Y. 13815
Bruzga, Charles E., Box 277, Rt. 4, Manchester, N.H. 03102
Burkwall, Morris P., Jr., 843 Meadow Lane, Barrington, Ill. 60010

C

Caldwell, John W., 649 S. Henderson, #A-211, King of Prussia, Pa. 19406
Callwood, James H., 122 Cranford Pl., Teaneck, N.J. 07660
Caroli, Claude J., 105 Garth Rd., #1A, Scarsdale, N.Y. 10583
Chambers, Charles M., Jr., 4220 Dandridge Terr., Alexandria, Va. 22309
Child, John S., Jr., 8221 Seminole Ave., Philadelphia, Pa. 19118
Christo, James W., % Fireside Inn, P.O. Box 2252, Breckenridge, Colo. 80424
Cohen, Gary M., 1880 Lippincot Rd., Huntingdon Valley, Pa. 19006
Cone, Gregory A., 11915 Morning Dew Lane, Houston, Tex. 77067
Conviser, Donald F., 2823 Clune Ave., Venice, Calif. 90291
Crawford, Dennis A., 4628 Belleview, Apt. 1 N., Kansas City, Mo. 64112
Curatolo, Joseph B., 5850 Marra Dr., Bedford Heights, Ohio 44146
Czernlec, Walter J., 5606 Livingston Terr., Oxon Hill, Md. 20021

D

D'Alexxandro, Ralph, 1938 Harclay Pl., Lancaster, Pa. 17601
Delfiache, Marc L., 12510 Manor Ct., Houston, Tex. 77072
DeLucia, Richard L., 60 Merritt Dr., Lawrence, N.J. 08648
deMile, Donald D., 11745 Phinney Ave. N., Seatle, Wash. 98133
DiPrima, Joseph F., 63 Castle Rd., Chappaqua, N.Y. 10514
Durlacher, James M., 5807 N. New Jersey, Indianapolis, Ind. 46220

E

Elliott, Edward C., 2007 Wyllys, Midland, Mich. 48640
Enright, Charles J., 3645 Chatsworth, Detroit, Mich. 48224
Epstein, Natan, 119 N. Oakhurst Dr., Beverly Hills, Calif. 90210

F

Fallow, Charles W., 10120 Capitol View Ave., Silver Spring, Md. 20910
Feeley, Hugh A., 5006 37th Ave., Hyattsville, Md. 20782
Feider, Michael S., 2119 Laurel Lane, Midland, Mich. 48640
Feldhaus, John J., 402 S. Wayne St., Arlington, Va. 22204
Feldstein, Nathan, 63 Hemlock Cir., Princeton, N.J. 08540
Felger, Thomas R., 1317 Hilldale, Richardson, Tex. 75081
Fish, Ronald C., 1820 Deer Haven, Hacienda Hgts., Calif. 91745

G

Gaffin, Richard A., 5007 Rodman Rd., Bethesda, Md. 20016
Gagala, Bruce M., 6618 Briargate Dr., Downers Grove, Ill. 60515
Gantner, Eric D., 325-1 Caribbean Dr., South Laguna, Calif. 92677
Gavila, Frank M., P.O. Box 522115, Miami, Fla. 33152
Geimer, Stephen D., 1555 N. Dearborn Pkwy., #23-B, Chicago, Ill. 60610
Gerstenfield, Edward H., 6312 Camco Ct., Rockville, Md. 20852
Gibson, Henry H., 4922 11th St. N., Arlington, Va. 22205
Giese, Jennie L., 725 W. Washington Ave., Apt. 203, Madison, Wis. 53715
Girard, Philip A., 7600 Manchester Ave., #404, Playa Del Rey, Calif. 90291
Glenn, Michael L., 2601 Wood St., Midland, Mich. 48640
Goldberg, Elizabeth F., 29820 Spring River Dr., Southfield, Mich. 49076
Gould, James W., 3500 Hamilton St., Philadelphia, Pa. 19104
Greenblatt, Jack A., 3031 Brighton 14 St., Brooklyn, N.Y. 11235
Gregory, Donald A., 256C Merrimac Trail, Williamsburg, Va. 23185
Guillot, Robert O., 211 14th Ave., San Francisco, Calif. 94118
Guttag, Eric W., 2820 Blaisdell Ave., #1, Minneapolis, Minn. 55408
Gwinnel, Harry J., 6803 Bellamy Ave., Springfield, Va. 22152

H

Harps, Joseph P., 127 Executive N., 1850 Columbia Pike, Arlington, Va. 22204
Haslett, Donald B., 13275 SW Glenhaven St., Beaverton, Oreg. 97005
Hedlund, Paul J., 6535 Wilshire Blvd., Los Angeles, Calif. 90045
Hill, Thomas E., 3556 Halifax Way, Concord, Calif. 94520
Hodges, David P., 9235 W. 24th St., Los Angeles, Calif. 90034
Hoey, James M., 1344 N. Dearborn Pkwy., #5B, Chicago, Ill. 60610
Hosford, William C., 97 Stirling Rd., Warren, N.J. 07060
Houser, Harold N., 8303 Winder St., Vienna, Va. 22180
Hovis, W. Ryan, 3108 Wenbledon Lane, Rock Hill, S.C. 29730

I

Ihnen, Jeffrey L., 4124 Ft. Worth Pl., Alexandria, Va. 22304

J

Jacobs, Gary M., 631 Maryland Ave., NE., Washington, D.C. 20002
Jaisle, Cecilia S., Suite 1000, Natl. Bank Bldg., Northwestern St., St. Paul, Minn. 55101
Johnson, Robert T., 603 Collins St., Plymouth, Wis. 53073

K

Kasten, Leslie L., Jr., 6014 Deer Run, Middletown, Ohio 45042
Katz, Eric R., 1900 S. Eads St., #1008, Arlington, Va. 22207
Keller, Raymond F., 1119 S. Green Rd., S., Euclid, Ohio 44121
Kelley, Kevin J., 537 Orchid Lane, Del Mar, Calif. 92014
Kelly, Robert H., 6517 SW. 113 Ct., Miami, Fla. 33173
Kenehan, Edward F., 10312 Rockville, Pk., #402, Rockville, Md. 20852
Kessler, Murray J., 16 Revere Rd., RFD 3, New Milford, Conn. 06776
Kiczek, Casimir R., 27109 Kingswood Dr., Dearborn Hghts., Mich. 48137
Kier, Philip H., 321 Home Ave, Oak Park, Ill. 60302
Konneker, Jon R., 400 W. Orange Rd., Delaware, Ohio 43015
Konrad, William K., 630 W. Stratford 1W, Chicago, Ill. 60657
Kriensky, Joseph, 10214 Topeka Dr., Northridge, Calif. 91324
Kuesters, Eckhard H., 10106 Deer Chase, Columbia, Md. 21046

L

Lashmit, Douglas A., 17600 Collier Cir., Poolesville, Md. 20837
Lazar, Dele, 5850 Cameron Run Terr., #414, Alexandria, Va. 22303
Lee, George R., 67 High St., Winchester, Mass. 01890
Lee, Larry M., 2115 Green Knoll, Houston, Tex. 77067
Lefkoff, Charles B., P.O. Box 95172, Atlanta, Ga. 30347
Lineback, Oliver C., 51 E. Sycamore St., Columbus, Ohio 43206
Linnell, William A., 105 Newton St., Marlborough, Mass. 01754
Long, Timothy A., 1303 SW. Evelyn, Portland, Oreg. 97219
Luckhardt, Philip G., 20 Ridgeway, Easton, Conn. 06602

M

Madden, John P., 519 12th St., Brooklyn, N.Y. 11215
Madera, Gregory A., 180 Maskwonicut St., Boston, Mass. 02067
Marbury, Fendall, 9010 Kensington Pkwy., Chevy Chase, Md. 20015
Markle, Edward D., 1111 Third St., New Orleans, La. 70130
Marshall, James B., Jr., 200 Winthrope St., #330, St. Paul, Minn. 55119
Matukatis, Paul D., 891 Braquewood Dr., Ballwin, Mo. 63011
McCollom, Alan T., 2547½ E. 26th Pl., Tulsa, Okla. 74114

McFall, Robert A., 501 Indian Cir., East Peoria, Ill. 61611
McGee, Bruce W., 422 N. Highland Ave., #104, Pittsburgh, Pa. 15206
McInerney, Kirk M., 613 22nd St. NW., Washington, D.C. 20037
McShane, James E., 100a Minebrook Rd., Edison, N.J. 08817
Miller, John B., 18 Ridge St., Winchester, Mass. 01890
Miller, Landon C. G., 10531 Ravenna Ave. NE., Seattle, Wash. 98125
Molldrem, Bernhard P., Jr., 201 W. 77th St., #9S, New York, N.Y. 10024
Mollick, Don R., 110 E. Niemtz, China Lake, Calif. 98355
Montalto, Nicholas R., 2742 Apple Valley Lane, Audubon, Pa. 19401
Moore, John D., 113 Noble Dr., Belle Chasse, La. 70037
Moore, Thomas J., 1133 24th St. NW., #1, Washington, D.C. 20037
Morgan, Christopher H., 3806 Clarke Ave., Fort Worth, Tex. 76107
Morra, Michael A., 8 Candlewick Way, Colts Neck, N.J. 07722
Mumm, Frederick F., 256C Merrimac Trail, Williamsburg, Va. 23185
Murphy, Gerald M., Jr., 6903 Stonewood Ct., Rockville, Md. 20852

N

Naughten, James R., 19997 Anita Ave., #4, Castro Valley, Calif. 94546
Neagley, Clinton H., 34 Crest Dr., Tarrytown, N.Y. 10591
Neckles, Peter J., 8801 Shore Rd., #5C-S, Brooklyn, N.Y. 11209
Neely, Andrew S., 4805 McKinney Ave., #108, Dallas, Tex. 75205
Nelson, Harry D., 9701 Ashbourn Dr., Burke, Va. 22015
Nesbitt, Stephen L., 8723A Harperspoint, Cincinnati, Ohio 45242
Noll, Steven H., 6570 Baywood Dr., Cincinnati, Ohio 45224
Norton, John S., 156 Kimbrook Dr., Rochester, N.Y. 14612
Nussbacher, Kenneth J., 1750 N. Clark St., #2007, Chicago, Ill. 60614

O

Oakes, Richard T., 5 Union St., Newburyport, Mass. 01950

P

Pannell, Otis R., 9023 McNair Dr., Alexandria, Va. 22309
Peck, Donald G., P.O. Box 643, Manassas Park, Va. 22110
Peterson, Gale Roy, 6414 Wingate St., Alexandria, Va. 22312
Peterson, Gary S., 3705 NW. 70th St., Oklahoma City, Okla. 73116
Porter, Edward W., 440 E. 62nd St., #8C, New York, N.Y. 10021

R

Randeau, George C., Jr., 16625 Wilton Pl., Torrance, Calif. 90504
Randolph, William W., 1305 Barnett Bank Bldg., Jacksonville, Fla. 32202
Reese, Benjamin P., II, 3504 Cheshire Sq., #A, Sarasota, Fla. 33577
Riccardo, Alfred E., 122 Sandpiper Key Harmon Cove, Secaucus, N.J. 07094
Rickett, Robert J., 3304 Skycroft Dr., Minneapolis, Minn. 55418
Roberts, Kent B., 106 Theresa Lane, Bartlesville, Okla. 74003
Robins, Richard S., 6050 Canterbury Dr., #F109, Culver City, Calif. 90230
Rooney, John L., 2034 E. Lacpenter Ave., St. Paul, Minn. 55109
Ross, Monty L., 9568 Mercer Dr., Dallas, Tex. 75228

S

Salva, Casimer K., 7678 E. Von Dette Cir., Centerville, Ohio 45459
Samanta, Mrinmay, P.O. Box 2322, Washington, D.C. 20013
Santucci, Ronald R., 529 E. 235 St., Woodlawn, N.Y. 10470
Sawyer, Karl S., Jr., 1535 Medford Dr., Charlotte, N.C. 28205
Schechter, Marc D., 273 S. Allen St., Albany, N.Y. 12208
Schnayer, Jerold B., 10071 N. Lamon, Skokie, Ill. 60076
Schneider, Michael, J., Jr., 1490 Centennial Dr., Roseville, Minn. 55113
Shenherd, Philip D., 400 Harper Lane, Midland, Mich. 48640
Shuldiner, Irwin, 2231 W. 235th St., Torrance, Calif. 90501
Siegel, Ira M., 6239 Lexington Ave., Hollywood, Calif. 90038
Skopetz, Alexander, 11911 Galaxy Lane, Bowie, Md. 20715
Spaulding, Robert T., 550 Elinor Dr., Fullerton, Calif. 92635
Steen, Edward A., 15 Phipps Lane, Plainview, N.Y. 11803
Stempel, Alan R., 1341 River Rd., Teaneck, N.J. 07666
Stenstron, Dennis G., 9 Buttonwood Ct., Indian Head Park, Ill. 60525
Stern, Edward, 9609 Avenel Rd., Silver Spring, Md. 20903
Stern, Martin L., 6456 N. Fairfield, Chicago, Ill. 60645
Sterne, Robert G., 1627 R St. NW., #301, Washington, D.C. 20009
Summut, Charles P., 31 Snow Ct., Dearborn, Mich. 48124
Sutherland, Stanley E., 111 N. Hickory Dr., Lindenhurst, Ill. 60046

T

Taylor, Roger D., 1301 S. Arlington Ridge Rd., #311, Arlington, Va. 22202
Thomas, Mack L., 7610 Terrace, Kansas City, Mo. 64114
Thomas, Paul D., 271 Plant St., Groton, Conn. 06340
Thut, Timothy T., 1049 11th St., Charleston, Ill. 61920
Trop, Timothy N., 2710 N. 4th St., Arlington, Va. 22202
Twomey, Thomas N., 112 Hoyt St., #4H, Stamford, Conn. 06902

U

Uenishi, Roy K., 914 24th St., #8, Denver, Colo. 80205

V

Valenziano, Frank P., 179 Mountain Ave., Summit, N.J. 07901
Voyce, Brian D., Lower Glencoe Rd., Glencoe Sparks, Md. 21152
Vozzo, Armand M., Jr., 7709 Elm Ave., Wyndmoor, Pa. 19118

W

Warzecha, Gene, 14 Riveredge Rd., Tinton Falls, N.J. 07724
Wheelock, Eugene T., 5444 Midship Ct., Burke, Va. 22015
Wiedmann, John T., 300 Kelp St., #C, Manhattan Beach, Calif. 90266
Wills, Thomas R., 2910 Braley Ct., Midland, Mich. 48640
Wozny, Thomas M., 4253 W. Rivers Edge Cir., #23, Brown Deer, Wis. 53209

Y

Yorks, W. Brinton, Jr., 7 N. Circle Ct., Yardley, Pa. 19067
Young, Thomas E., 1233 Lakelane, Lakewood, Ohio 44107

Z

Zeitzew, Harris, 6646 Maryland Dr., Los Angeles, Calif. 90048
Zimmer, Eugene S., 1149 St. Charles Pl., Atlanta, Ga. 30306

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,805,795, Re. S.N. 901,962, Filed May 1, 1978, Cl. 128/419 D, AUTOMATIC CARDIOVERTING CIRCUIT, Rollin H. Denniston III, et al., Owner of Record: *Medtronic, Inc., Minneapolis, Minn.*, Attorney or Agent: Harry W. Barron, Ex. Gp.: 335

3,805,795, Re. S.N. 901,963, Filed May 1, 1978, Cl. 128/419 D, AUTOMATIC CARDIOVERTING CIRCUIT, Mieczyslaw Mirowski, et al., Owner of Record: *Medtronic, Inc., Minneapolis, Minn.*, Attorney or Agent: Harry W. Barron, et al., Ex. Gp.: 335

3,806,558, Re. S.N. 901,400, Filed May 1, 1978, Cl. 260/897 A, DYNAMICALLY PARTIALLY CURED THERMOPLASTIC BLEND OF MONOOLEFIN COPOLYMER RUBBER AND POLYOLEFIN PLASTIC, William K. Fischer, Owner of Record: *Uniroyal, Inc., New York, N.Y.*, Attorney or Agent: James J. Long, Ex. Gp.: 142

3,864,309, Re. S.N. 899,765, Filed Apr. 24, 1978, Cl. 260/47 UA, COPOLYMER OF POLYIMIDE OLIGOMERS AND TEREPHTHALONITRILE N, N-DIOXIDE AND THEIR METHODS OF PREPARATION, Norman Bilow, et al., Owner of Record: *Hughes Aircraft Company, Culver City, Calif.*, Attorney or Agent: W. H. MacAllister, et al., Ex. Gp.: 143

3,875,441, Re. S.N. 901,975, Filed May 1, 1978, Cl. 313/104, ELECTRON DISCHARGE DEVICE INCLUDING AN ELECTRON EMISSIVE ELECTRODE HAVING AN UNDULATING CROSS-SECTIONAL CONTOUR, Richard Dale Faulkner, Owner of Record: *RCA Corporation, Princeton, N.J.*, Attorney or Agent: E. M. Whitacre, Ex. Gp.: 252

3,890,420, Re. S.N. 900,337, Filed Apr. 26, 1978, Cl. 264/261, METHOD OF MAKING A BIPOLAR ELECTRODE STRUCTURE, Theodore C. Neward, Owner of Record: *Inventor,* Attorney or Agent: John B. Young, et al., Ex. Gp.: 147

3,918,522, Re. S.N. 901,017, Filed Apr. 27, 1978, Cl. 166/285, WELL COMPLETION METHOD AND SYSTEM, George O. Suman, Jr., Owner of Record: *Inventor,* Attorney or Agent: W. F. Hyer, et al., Ex. Gp.: 354

3,922,873, Re. S.N. 901,967, Filed May 1, 1978, Cl. 62/84, HIGH TEMPERATURE HEAT RECOVERY IN REFRIGERATION, Louis H. Leonard, Owner of Record: *Carrier Corporation, Syracuse, N.Y.,* Attorney or Agent: J. Raymond Curtin, Ex. Gp.: 344

3,956,826, Re. S.N. 902,304, Filed May 1, 1978, Cl. 32/58, ULTRASONIC DEVICE AND METHOD, Rene J. Perdreaux, Jr., Owner of Record: *Cavitron Corporation, New York, N.Y.,* Attorney or Agent: Robert M. Skolnik, Ex. Gp.: 333

3,957,525, Re. S.N. 902,767, Filed May 2, 1978, Cl. 106/288 B, ROAD SURFACING MATERIALS, Geoffrey Lees, et al., Owner of Record: *Inventors,* Attorney or Agent: Davidson C. Miller, et al., Ex. Gp.: 113

4,007,721, Re. S.N. 897,659, Filed Apr. 17, 1978, Cl. 123/134, FUEL METERING APPARATUS FOR A CARBURETOR, Jose F. Regueiro, Owner of Record: *Teledyne Industries, Inc., Los Angeles, Calif.,* Attorney or Agent: Ernest I. Gifford, et al., Ex. Gp.: 342

4,025,312, Re. S.N. 899,949, Filed Apr. 25, 1978, Cl. 23/259.5, APPARATUS FOR MAKING CARBON BLACK, Eulas W. Henderson, Owner of Record: *Phillips Petroleum Company, Bartlesville, Okla.,* Attorney or Agent: Donald J. Quigg, Ex. Gp.: 171

4,028,103, Re. S.N. 901,969, Filed May 1, 1978, Cl. 96/29 D, PROCESSING COMPOSITIONS FOR COLOR TRANSFER PROCESSES COMPRISING ALKALI METAL FLUORIDES, David Eugene Hannie, Owner of Record: *Eastman Kodak Company, Rochester, N.Y.,* Attorney or Agent: Harold E. Cole, Ex. Gp.: 166

4,029,025, Re. S.N. 880,989, Filed Feb. 24, 1978, Cl. 108/108, SHELVING STRUCTURE, Harald Lundqvist, Owner of Record: *Inventor,* Attorney or Agent: Alan E. Kopecki, Ex. Gp.: 355

4,031,981, Re. S.N. 903,361, Filed May 5, 1978, Cl. 182/153, FOLDABLE WORK PLATFORM, Edward Spencer, et al., Owner of Record: *Little Giant Industries, Inc., Salt Lake City, Utah,* Attorney or Agent: H. Ross Workman, et al., Ex. Gp.: 354

4,058,899, Re. S.N. 878,553, Filed Feb. 16, 1978, Cl. 33/26, DEVICE FOR FORMING REFERENCE AXES ON AN IMAGE SENSOR ARRAY PACKAGE, William S. Phy, Owner of Record: *Fairchild Camera and Instrument Corporation, Mountain View, Calif.,* Attorney or Agent: Alan H. MacPherson, et al., Ex. Gp.: 243

4,068,798, Re. S.N. 898,445, Filed Apr. 20, 1978, Cl. 233/26, METHOD AND APPARATUS FOR STOPPER REMOVAL, Vernon Carl Rohde, Owner of Record: *E. I. Du Pont de Nemours & Co., Wilmington, Del.,* Attorney or Agent: Charles A. Weigel, Jr., Ex. Gp.: 353

4,074,021, Re. S.N. 901,018, Filed Apr. 27, 1978, Cl. 429/51, HIGH DISCHARGE BATTERY WITH DEPOLARIZED PLATES, Robert R. Aronson, Owner of Record: *Electric Fuel Propulsion Corp., Detroit, Mich.,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 114

4,078,107, Re. S.N. 903,356, Filed May 3, 1978, Cl. 428/356, LIGHTWEIGHT WINDOW WITH HEATING CIRCUIT AND ANTI-STATIC CIRCUIT AND A METHOD FOR ITS PREPARATION, Michael G. Bitterice, et al., Owner of Record: *PPG Industries, Inc., Pittsburgh, Pa.,* Attorney or Agent: Edward I. Mates, Ex. Gp.: 164

4,085,074, Re. S.N. 903,234, Filed May 5, 1978, Cl. 260/17 R, A PRE-MIXED CATALYZED VINYL ACETATE POLYMER ADHESIVE COMPOSITION, Ming Cho Woo, Owner of Record: *National Casein, Riverton, N.J.,* Attorney or Agent: Max R. Millman, Ex. Gp.: 143

PATENT NOTICES

Certificates of Correction for the Week of June 27, 1978

P.P. 4,102	4,053,423	4,067,919	4,073,745
Re. 27,897	4,053,966	4,068,366	4,073,837
Re. 29,467	4,055,783	4,068,634	4,073,935
Re. 29,477	4,055,921	4,068,669	4,074,024
D. 247,430	4,056,483	4,068,762	4,074,025
3,526,288	4,056,488	4,068,913	4,074,113
3,823,704	4,057,268	4,069,043	4,074,504
3,825,648	4,057,408	4,069,093	4,074,722
3,917,308	4,057,481	4,069,170	4,074,972
3,917,485	4,058,365	4,069,318	4,074,998
3,948,930	4,058,511	4,069,376	4,075,225
3,950,298	4,059,156	4,069,455	4,075,235
3,957,682	4,059,679	4,069,555	4,075,244
3,966,333	4,060,129	4,069,594	4,075,308
3,996,733	4,060,421	4,069,684	4,075,361
3,996,855	4,060,555	4,070,144	4,075,375
3,997,123	4,060,794	4,070,198	4,075,433
3,997,466	4,062,048	4,070,314	4,075,568
3,997,647	4,062,157	4,070,438	4,075,757
3,997,859	4,062,302	4,070,452	4,075,807
3,997,963	4,062,953	4,070,475	4,075,808
3,998,958	4,063,151	4,070,515	4,075,909
4,000,148	4,063,392	4,070,560	4,075,949
4,000,347	4,063,441	4,070,594	4,075,950
4,004,861	4,063,677	4,070,626	4,076,052
4,005,349	4,064,119	4,070,629	4,076,111
4,009,268	4,064,237	4,070,637	4,076,120
4,009,377	4,064,452	4,070,729	4,076,197
4,010,262	4,064,648	4,070,996	4,076,392
4,015,084	4,065,165	4,071,216	4,076,509
4,016,280	4,065,313	4,071,383	4,076,549
4,017,832	4,065,320	4,071,457	4,076,757
4,026,854	4,065,666	4,071,598	4,076,865
4,030,805	4,065,713	4,071,667	4,077,053
4,030,830	4,066,290	4,072,002	4,077,311
4,031,023	4,066,433	4,072,051	4,077,414
4,031,256	4,066,700	4,072,071	4,077,768
4,032,647	4,066,701	4,072,088	4,077,991
4,035,930	4,066,702	4,072,182	4,078,009
4,037,435	4,066,789	4,072,389	4,078,143
4,038,995	4,066,842	4,072,503	4,078,410
4,040,113	4,066,879	4,072,762	4,078,411
4,040,495	4,066,948	4,072,765	4,078,755
4,042,810	4,066,963	4,072,778	4,078,902
4,045,443	4,067,002	4,072,903	4,079,006
4,045,474	4,067,199	4,073,134	4,079,071
4,046,600	4,067,203	4,073,235	4,079,127
4,048,194	4,067,362	4,073,371	4,079,133
4,048,386	4,067,558	4,073,497	4,079,928
4,049,358	4,067,709	4,073,558	
4,052,345	4,067,732	4,073,704	

Dedications

Reissue No. 28,317.—*John J. Goodrich,* Pensacola, Fla. GUSSETED TYPE BAGS. Patent dated Jan. 28, 1975. Dedication filed May 8, 1978, by the assignee, *St. Regis Paper Company.*

Hereby dedicates to the Public the remaining term of said patent.

Reissue No. 28,318.—*John J. Goodrich,* Pensacola, Fla. GUSSETED TYPE BAGS. Patent dated Jan. 28, 1975. Dedication filed May 8, 1978, by the assignee, *St. Regis Paper Company.*

Hereby dedicates to the Public the remaining term of said patent.

3,827,262.—*Malcolm O. Manuel,* Stanton, Minn. SPRAY WASHING SYSTEM FOR GARMENTS. Patent dated Aug. 6, 1974. Dedication filed May 10, 1978, by the assignees, *Ludell Mfg. Co., Inc. and American Linen Supply Co.*

Hereby dedicate to the Public the entire remaining term of said patent.

Disclaimers

3,994,415.—*Alan M. Hodge,* San Diego, Calif. TRASH CONTAINER LID SYSTEM. Patent dated Nov. 30, 1976. Disclaimer filed Apr. 24, 1978, by the inventor.

The term subsequent to Dec. 13, 1994 has been disclaimed.

4,061,297.—*George B. Foster,* Worthington, Ohio. APPROACH RANGE MONITOR. Patent dated Dec. 6, 1977. Disclaimer filed Mar. 22, 1978, by the assignee, *Air Data Corporation.*

The term subsequent to Mar. 6, 1994 has been disclaimed.

Patents Available for Licensing or Sale

D. 240,772. JACKET OR SIMILAR ARTICLE. Jerome Williams, 385 Linoleum Way, Pittsburgh, Pa. 15219.

3,680,237. OUT-DOOR ILLUMINATED SIGN. John G. Finnerty, 251 De Grand Ave., Teaneck, N.J. 07666.

3,953,983. REFRIGERATION METHOD AND REFRIGERATION APPARATUS FOR CARRYING OUT THE METHOD. Ernst Sander, Correspondence to: Craig & Antonelli, 909 Watergate Office Bldg., 2600 Virginia Ave. NW., Washington, D.C. 20037.

4,044,476. EDUCATIONAL METHODS AND DEVICES. Jeanette B Marsh, 1400 North Lake Shore Drive, 14–M, Chicago, Ill. 60610.

4,064,880. SANITARY TUBULAR NAPKIN FOR MALES. Dexter J. Logan, P.O. Box 1012, West Covina, Calif. 91793.

4,076,201. ADJUSTABLE CHAIR SPINDLE ASSEMBLY. Walter E. Hudnall, 2157 W. 236th Place, Torrance, Calif. 90501.

The following two patents are offered by John O. Richards, 980 Mill Circle, Apt. #99, Alliance, Ohio 44601.

3,835,507. ROPE HOLDING DEVICE.

3,578,840. REVOLVING REFLECTOR.

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents & Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator,
National Technical Information Service.

U.S. DEPARTMENT OF THE AIR FORCE

AF/JACP, 1900 Half St., SW.
Washington, D.C. 20324

Patent application 871,067. Adding Frequency Agility to Fire-Control Radars. Filed Jan. 20, 1978.

Patent application 871,866. Improved Fabry-Perot Diplexer. Filed Jan. 24, 1978.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research
Code 302, Arlington, Va. 22217

Patent application 840,939. Fluidic Combustion of a Solid Fuel Ramjet. Filed Oct. 11, 1977.

Patent application 843,905. Two-Axis Motion Compensation for AMTI. Filed Oct. 20, 1976.

Patent application 852,646. Parabolic Optical Waveguide Horns and Design Thereof. Filed Nov. 18, 1977.

Patent application 858,873. Wide Field-of-View Michelson Filter. Filed Dec. 8, 1977.

Patent application 860,814. Apparatus for Determining Projectile Position and Barrel Pressure Characteristics. Filed Dec. 15, 1977.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters, NASA—
Code GP-2, Washington, D.C. 20546

Patent application 839,963. Mixed Diamines for Lower Melting Addition Polyimide Preparation and Utilization. Filed Oct. 6, 1977.

Patent application 858,763. Pseudo Continuous Wave Acoustic Instrument. Filed Dec. 8, 1977.

Patent application 860,404. A Speed Control Device for a Heavy Duty Shaft. Filed Dec. 13, 1977.

Patent 3,387,218. Apparatus for Handling Micron Size Range Particulate Material. Filed May 6, 1964. Patented June 4, 1968. Not available NTIS.

Patent 3,492,858. Microbalance. Filed May 8, 1967. Patented Feb. 3, 1970. Not available NTIS.

Patent 3,538,053. Nuclear Alkylated Pyridine Aldehyde Polymers and Conductive Compositions Thereof. Filed Sept. 11, 1968. Patented Nov. 3, 1970. Not available NTIS.

Patent 3.600,599. Shunt Regulation Electric Power System. Filed Oct. 3, 1968. Patented Aug. 17, 1971. Not available NTIS.

Patent 3,777,811. Heat Pipe With Dual Working Fluids. Filed June 1, 1970. Patented Dec. 11, 1973. Not available NTIS.

Patent 4,063,814. Optical Scanner. Filed Apr. 6, 1976. Patented Dec. 20, 1977. Not available NTIS.

Patent 4,064,692. Variable Cycle Gas Turbine Engines. Filed June 2, 1975. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,066,039. Adjustable Securing Base. Filed Sept. 7, 1976. Patented Jan. 3, 1978. Not available NTIS.

Patent 4,067,653. Differential Optoacoustic Absorption Detector. Filed Aug. 27, 1976. Patented Jan. 10, 1978. Not available NTIS.

Patent 4,068,495. Closed Loop Spray Cooling Apparatus. Filed Mar. 31, 1976. Patented Jan. 17, 1978. Not available NTIS.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, 1900 Half St., SW.
Washington, D.C. 20324

Patent application 861,083. Improved Tapered Hole Capacitive Probe. Filed Dec. 15, 1977.

Patent Application 865,270. Roll Attitude Feedback Selector for Use With Aircraft Control Augmentation Systems. Filed Dec. 28, 1977.

Patent application 871,066. High Power Pre-TR Switch. Filed Jan. 20, 1978.

Patent application 871,069. Bimetallic Lightweight Platelet Injector. Filed Jan. 20, 1978.

Patent application 872,193. All-Aluminum Transverse Platelet Injector. Filed Jan. 25, 1978.

Patent application 872,203. Wideband Waveguide Lens. Filed Jan. 25, 1978.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements & Patent Branch, General Services Div., Federal Building, Agricultural Research Service
Hyattsville, Md. 20782

Patent application 873,466. High Shear Strength Adhesives for Bonding Nylon to Nylon. Filed Jan. 30, 1978.

Patent application 873,572. Preparation of Highly Active Copper-Silica Catalysts. Filed Jan. 30, 1978.

Patent 4,073,747. Regeneration of Spent Activated Carbon With Formaldehyde. Filed Dec. 13, 1976. Patented Feb. 14, 1978. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
National Institutes of Health, Chief, Patent Branch
Westwood Building, Bethesda, Md. 20014

Patent application 853,490. Synthesis and Antitumor Activity of 2,4,5- - Tri-Substituted-Pyrrolo(2,3-d) - Pyrimidine Nucleosides. Filed Nov. 21, 1977.

Patent application 855,018. Esters of Aromatic Sulfonic Acids. Filed Nov. 22, 1977.

Patent application 855,384. Fiber Optic pH Probe. Filed Nov. 28, 1977.

Patent application 855,397. Dye Fixation by Copolymerization. Filed Nov. 28, 1977.

Patent application 856,172. Flow-Through Coil Planet Centrifuges With Adjustable Rotation/Revolution of Column. Filed Nov. 30, 1977.

Patent 4,028,410. Process of Preparing 1,3-Bis(2-Chloroethyl)-1-Nitrosourea. Filed Nov. 13, 1974. Patented June 7, 1977. Not available NTIS.

Patent 4,058,602. Synthesis, Structure, and Antiumor Activity of 5,6-Dihydro-5-Azacytidine. Filed Aug. 9, 1976. Patented Nov. 15, 1977. Not available NTIS.

Patent 4,067,070. Prosthetic Joint Lock and Cable Mechanism. Filed Nov. 3, 1976. Patented Jan. 10, 1978. Not available NTIS.

Patent 4,068,310. Display Enhancement Technique for Video Moving Trace Display. Filed July 22, 1976. Patented Jan. 10, 1978. Not available NTIS.

Patent 4,071,768. X-Ray Apparatus With Rotationally Symmetric Gaussian-Like Focal Spot. Filed June 23, 1977. Patented Jan. 31, 1978. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research—
Code 302, Arlington, Va. 22217

Patent application 789,393. Blip Scan Analyzer. Filed Apr. 21, 1977.

Patent application 818,180. Digital Sidelobe Canceller. Filed July 22, 1977.

Patent application 828,710. Flexible Housing, In-Line Electronic. Filed Aug. 29, 1977.

Patent application 844,563. Millimeter Wave MIC Diplexer. Filed Oct. 25, 1977.

Patent application 844,688. Endothermic Approach for Desensitizing Explosive Ordnance. Filed Oct. 25, 1977.

Patent application 850,313. Remote Target Hit Monitoring System. Filed Nov. 10, 1977.

Patent application 852,186. Solid State Data Recorder. Filed Nov. 16, 1977.

Patent application 854,446. Multiple Memory Adaptive MTI. Filed Nov. 23, 1977.

Patent application 854,455. Analog-to-Digital Converter. Filed Nov. 23, 1977.

Patent application 855,099. Adjustable Dynamic Face Seal. Filed Nov. 25, 1977.

Patent application 857,951. Method of Inhibiting Nitrocellulose Rocket Propellants. Filed Dec. 6, 1977.

Patent application 858,771. Electronically Controlled Surface-Acoustic-Phase Shifter. Filed Dec. 8, 1977.

Patent application 858,779. Electronic Thermostat. Filed Dec. 5, 1977.

Patent application 862,311. Picosecond Pulse Generator Utilizing a Josephson Junction. Filed Dec. 20, 1977.

Patent application 863,638. Multiplex-Data Bus Modulator/Demodulator. Filed Dec. 22, 1977.

Patent application 865,752. A Specific Gravity Equalizer System. Filed Dec. 29, 1977.

Patent application 867,550. Drugless Eye Examination System. Filed Jan. 6, 1978.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters NASA—
Code GP-2, Washington, D.C. 20546

Patent application 856,460. Electrochemical Data Signal Process and Display. Filed Nov. 30, 1977.

Patent application 858,762. Filtering Technique Based on High-Frequency Plant Modeling for High-Gain Control. Filed Dec. 8, 1977.

Patent application 861,390. High Performance Ammonium Nitrate Propellant. Filed Dec. 16, 1977.

Patent application 861,396. A Versatile LDV Burst Simulator. Filed Dec. 16, 1977.

Patent application 862,880. Alkali-Metal Silicate Binders and Methods of Manufacture. Filed Dec. 21, 1977.

Patent application 863,024. System for Near Real-Time Crystal Deformation Monitoring. Filed Dec. 21, 1977.

Patent application 868,249. Voltage Feed Through Apparatus Having Reduced Partial Discharge. Filed Jan. 10, 1978.

Patent 3,229,905. Ruler for Making Navigational Computations. Filed Dec. 18, 1961. Patented Jan. 18, 1966. Not available NTIS.

Patent 3,306,134. Wabble Gear Drive Mechanism. Filed Apr. 24, 1964. Patented Feb. 28, 1967. Not available NTIS.

Patent 3,423,627. Particle Parameter Analyzing System. Filed Jan. 28, 1966. Patented Jan. 21, 1969. Not available NTIS.

Patent 3,475,675. Transformer Regulated Self-Stabilizing Chopper. Filed Sept. 22, 1976. Patented Oct. 28, 1969. Not available NTIS.

Patent 3,543,839. Multi-Chamber Controllable Heat Pipe. Filed May 14, 1969. Patented Dec. 1, 1970. Not available NTIS.

Patent 3,573,504. Temperature Compensated Current Source. Filed Jan. 16, 1968. Patented Apr. 6, 1971. Not available NTIS.

Patent 3,641,470. Pressure Transducer. Filed Sept. 18, 1969. Patented Feb. 8, 1972. Not available NTIS.

Patent 3,769,544. Purging Means and Method for Xenon Arc Lamps. Filed June 19, 1972. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,882,417. Gas Ion Laser Construction for Electrically Isolating the Pressure Gauge Thereof. Filed Sept. 10, 1973. Patented May 6, 1975. Not available NTIS.

Patent 4,063,981. Method of Making a Composite Sandwich Lattice Structure. Filed May 20, 1977. Patented Dec. 20, 1977. Not available NTIS.

Patent 4,064,566. Method of Adhering Bone to a Rigid Substrate Using a Graphite Fiber Reinforced Bone Cement. Filed Apr. 6, 1976. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,064,642. Walking Boot Assembly. Filed Dec. 23, 1976. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,065,202. Projection System for Display of Parallax and Perspective. Filed Nov. 6, 1975. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,065,340. Composite Lamination Method. Filed Apr. 28, 1977. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,065,345. Polyimide Adhesives. Filed Oct. 22, 1976. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,067,015. System and Method for Tracking a Signal Source. Filed July 11, 1975. Patented Jan. 3, 1978. Not available NTIS.

Patent 4,067,043. Optical Conversion Method. Filed Jan. 21, 1976. Patented Jan. 3, 1978. Not available NTIS.

Patent 4,067,742. Thermal Shock and Erosion Resistant Tantalum Carbide Ceramic Material. Filed Apr. 1, 1976. Patented Jan. 10, 1978. Not available NTIS.

Patent 4,068,469. Variable Thrust Nozzle for Quiet Turbofan Engine and Method of Operating Same. Filed May 29, 1975. Patented Jan. 17, 1978. Not available NTIS.

Patent 4,068,470. Gas Turbine Engine With Convertible Accessories. Filed Nov. 8, 1974. Patented Jan. 17, 1978. Not available NTIS.

Patent 4,069,028. Magnetic Heat Pumping. Filed Nov. 30, 1976. Patented Jan. 17, 1978. Not available NTIS.

Patent 4,069,212. Flame Retardant Spandex Type Polyurethanes. Filed Feb. 13, 1976. Patented Jan. 17, 1978. Not available NTIS.

Patent 4,069,478. Binary to Binary Coded Decimal Converter. Filed Nov. 12, 1975. Patented Jan. 17, 1978. Not available NTIS.

Inco Limited, Inco United States, Inc. and ESB Incorporated: Patents Available for Licensing

Inco Limited, Inco United States, Inc. and ESB Incorporated will grant or cause to be granted to any person making written application therefor licenses of the following patents and applications, and of know-how related to the controlled microgeometry ("CMG") process of forming, perforating and activating metallic foil and constructing battery electrodes therefrom.

U.S. Pat. No.	Corresponding foreign patent and patent application numbers: Country	Numbers
3,579,383 Patd. May 18, 1971	United Kingdom	1,227,379
	Belgium	736,965
	Canada	910,841
	France	69/24534
	West Germany	1,938,434
	Italy	884,439
	Japan	822,158
	Netherlands	143,736
	Sweden	349,191
	Switzerland	500,596
3,785,867 Patd. Jan. 15, 1974	United Kingdom	1,246,048
	Australia	438,246
	Austria	298,589
	Belgium	749,327
	Canada	936,914
	Denmark	127,829
	France	70/14555
	India	126,204
	Italy	904,223
	Japan	789,196
	Netherlands	148,191
	Norway	134,443
	South Africa	70/2437
	Spain	378,877
	Sweden	353,621
	Switzerland	518,012
	West Germany	*P20 18974.6
3,837,919 Patd. Sep. 24, 1974	United Kingdom	1,398,080
	Australia	469,150
	Austria	317,324
	Belgium	790,585
	Canada	1,005,861
	Denmark	134,375
	France	72/37908
	India	137,150
	Israel	40633
	Italy	969,493
	Luxembourg	66349
	Norway	133,373
	South Africa	72/7370
	Spain	407,966
	Switzerland	561,465
3,852,112 Patd. Dec. 3, 1974	United Kingdom	1,240,445
	Belgium	745,283
	Canada	917,598
	France	70/03268
	West Germany	2,004,469
	Italy	897,363
	Netherlands	143,373
	Sweden	361,385
	Switzerland	512,146
	Japan	*8379/70
3,894,885 Patd. July 15, 1975	United Kingdom	1,240,445
	Belgium	745,283
	Canada	917,598
	France	70/03268
	West Germany	2,004,469
	Italy	897,363
	Netherlands	143, 373
	Sweden	361,385
	Switzerland	512,146
	Japan	*8379/70
3,895,961 Patd. Jul. 22, 1975	United Kingdom	1,421,338
	Australia	461,756
	Austria	320,770
	Belgium	792,349
	Canada	997,825
	India	136,775
	Israel	40986
	Italy	982,395
	Luxembourg	66697
	South Africa	72/8398
	Spain	409,790
	Sweden	72/15476
	Switzerland	560,974
	Denmark	*6318/72
	Eire	36911
	France	*72/45086
	West Germany	*P226 1997.2
	Japan	*123274/72
	Netherlands	*72/16471
	Norway	*4360/72
	U.S.S.R.	561,528
3,898,098 Patd. Aug. 5, 1975	United Kingdom	1,392,188
	Australia	457,245
	Austria	320,046
	Belgium	785,203
	Canada	976,608
	India	136,392
	Israel	39659
	Italy	965,836
	Luxembourg	65540
	Portugal	58020
	South Africa	72/5901
	Spain	404,060
	Sweden	72/08105
	Switzerland	565,456
	Canada	*203,814
	Denmark	*3059/72
	Eire	*771/72
	France	*72/22187
	West Germany	*P222 9977.0
	Japan	*61034/72
	Netherlands	*72/08173
	Norway	135,763
	U.S.S.R.	*1800413/24-7
3,997,364 Patd. Dec. 14, 1976	Belgium	822,136
	Luxembourg	71265
	South Africa	74/6797
	Spain	431,855
	Australia	*74936/74
	Austria	*A9107/74
	Canada	*213,069
	Denmark	*5870/74
	Eire	*2339/74
	France	*74/37145
	West Germany	*P245 3581.7
	Italy	*53953A/74
	Japan	*130071/74
	Netherlands	*74/14723
	Norway	*4036/74
	Sweden	*74/14175.5
	Switzerland	*14985/74
	United Kingdom	*52658/73
4,053,694 Patd. Oct. 11, 1977	Belgium	822,136
	Luxembourg	71265
	South Africa	74/6797
	Spain	431,855
	United Kingdom	*52658/73
	Australia	*74936/74
	Austria	*A9107/74
	Canada	*213,069
	Denmark	*5870/74
	Eire	*2339/74
	France	*74/37145
	West Germany	P 245 3581.7
	Italy	*53953A/74
	Japan	*130071/74

U.S. Pat. No.	Corresponding foreign patent and patent application numbers: Country	Numbers
	Netherlands	*74/14723
	Norway	*4036/74
	Sweden	*74/14175-5
	Switzerland	*14985/74
715,534* (Abandoned.) Patd. Aug. 18, 1976	Belgium	845,558
	Luxembourg	75661
	Australia	*17006/76
	Austria	*A6318/76
	Canada	*259,827
789,689* (Cont. of 715,534*.) Patd. Apr. 21, 1977	Denmark	*3831/76
	Eire	*1887/76
	France	*76/25604
	West Germany	*P 2638115.7
	India	*1537/CAL/76
	Italy	*50999A/76
	Japan	*102155/76
	Netherlands	*76/09393
	Norway	*76/2904
	South Africa	*76/5012
	Spain	*450982
	Sweden	*76/09387-1
	Switzerland	*10793/76
	United Kingdom	35178/75
747,055* Patd. Dec. 3, 1976	Canada	*267,245
	United Kingdom	*50478/75
	Australia	*20269/76
	Austria	*A 9107/76
	Belgium	849,226
	Denmark	*76/5514
	Eire	*2697/76
	France	*76/36785
	West Germany	*P 2655577.1
	India	*2161/CAL/76
	Italy	*52494A/76
	Japan	*147618/76
	Luxembourg	(1)
	Netherlands	*76/13631
	Norway	*76/4158
	South Africa	*76/7110
	Spain	*454048
	Sweden	*76/13783-5
	Switzerland	*15456/76
	U.S.S.R.	*2427155/07
Not now filed in U.S.	United Kingdom [2]	*29423/76
Not now filed in U.S.	United Kingdom [3]	*32287/76

*Represents patent applications.
[1] Represents patents (or patent applications) whose numbers are not yet known.
[2] Filed Jul. 15, 1976; abandoned.
[3] Filed Aug. 3, 1976; abandoned.

Licensees will also be granted certain immunities from suit with respect to other patents. CMG know-how will be furnished to know-how licensees in a written manual available at a cost of $1,000.

Any interested party shall have the right to inspect and make copies of any of the aforelisted U.S. patent applications.

Such patent and know-how licenses, immunities and manual are available on the terms set forth in paragraphs IV (A) and (B) of the final judgment entered on Jan. 27, 1978, in Civil Action No. 76-152 by the U.S. District Court for the Eastern District of Pennsylvania. Requests for the foregoing licenses, immunities or written manual should be addressed in writing to one of the following:

E. C. MacQueen, Esq.
Inco Limited
One New York Plaza
New York, N.Y. 10004

E. C. MacQueen, Esq.
Inco United States, Inc.
One New York Plaza
New York, N.Y. 10004

A. J. Rossi, Esq.
ESB Incorporated
5 Penn Center Plaza
Philadelphia, Pa. 19103

DYER S. WADSWORTH
Chief Legal Officer and Secretary
Inco United States, Inc.
For and on behalf of
Inco Limited
Inco United States, Inc.
ESB Incorporated

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 20, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director: Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-22-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director: Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-16-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director: Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-11-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director: Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	6-1-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director: Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-5-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director: Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	2-2-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director: Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	12-17-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director: Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	3-9-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director: Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-3-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director: Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director: Industrial Arts; Household, Personal and Fine Arts.	6-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director: Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-7-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director: Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders. Woodworking; Tools; Cutlery; Jacks.	7-26-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director: Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-10-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GRAY, Director: Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	5-3-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director: Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	6-20-77

Expiration of patents: The patents within the range of numbers indicated below expire during May 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,981,954 to 2,986,736, inclusive
Plant Patents..... Numbers 2,055 to 2,066, inclusive

REISSUES

JUNE 27, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,678

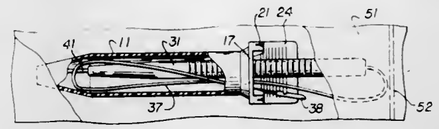
CAUTERIZING INSTRUMENT AND HOLDER

Frank P. Antonini, San Francisco, and Julien I. Schwalbe, Oakland, both of Calif.

Original No. 3,934,715, dated Jan. 27, 1976, Ser. No. 471,197, May 20, 1974. Application for reissue Aug. 2, 1976, Ser. No. 710,410

Int. Cl.[2] **B65D** *69/00, 81/24*

U.S. Cl. 206—571 **4 Claims**



1. A kit for an electro-surgical cauterizing instrument comprising a hollow handle, an electrode insertable in and removable from said handle, an electrical fitting in said handle, said handle having electrical contacts in its interior to establish electrical connection with said electrode when said electrode is inserted in said handle, an elongated [core] *cord* connected to said contacts inside said handle and extending out one end of said handle, a terminal on the end of said cord remote from said handle for electrical connection to a cauterizing machine, a holder formed with a sheath to receive said electrode and handle and having one closed end, said handle with said electrode inserted therein being insertable in and removable from said holder and said electrode being protected from electrical and germ contact with the exterior when inserted in said holder, said holder being substantially larger than said handle, a flange on the open end of said sheath opposite said closed end, said flange formed with means for attachment of said holder to a surgical drape, and an envelope to maintain said handle, electrode and holder sterile until said envelope is opened, said electrode being inserted into said handle and electrically connected to said contacts, said electrode and the end of said handle adjacent said electrode being positioned inside said sheath, most of said cord being inside said sheath, said terminal being exposed immediately outside said sheath, said envelope enclosing the assembly of holder, handle, [core] *cord* and terminal.

Re. 29,679

STEM SEALING FOR HIGH PRESSURE VALVE OR THE LIKE

Boyd D. Boltnott, Jasper, Ark., assignor to Gray Tool Company, Houston, Tex.

Original No. 3,990,679, dated Nov. 9, 1976, Ser. No. 560,237, Mar. 20, 1975. Application for reissue Sep. 15, 1977, Ser. No. 833,605

Int. Cl. F16k *31/44*

U.S. Cl. 251—214 **16 Claims**

1. Apparatus comprising:

a. a body having a cavity adapted to contain a fluid under high pressure,

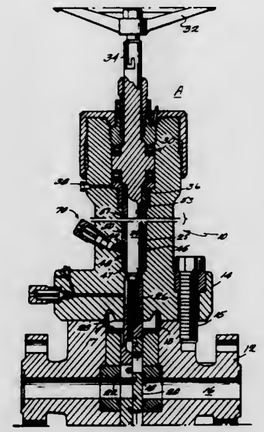
b. an operative element for functioning within said cavity, in response to the rotation of a shaft,

c. a shaft extending through said body from said cavity to a region outside said body of relatively low pressure,

d. means for providing a seal between said shaft and said body between said cavity and said region, said means including a plurality of sealing elements which are successively disposed between the relatively high and low pressure regions and sealing between said shaft and said body each having a side thereof toward said cavity and a side thereof opposite said cavity, [and]

e. a plurality of chambers, each in communication with the side of one sealing element nearest the region and the side of the adjacent sealing element nearest the cavity, and

[e.] *f.* means for ensuring that the differential pressure on each of said sealing elements is not greater than a predetermined amount and that [to] *no* sealing element differential pressure is as large as the pressure differential between



said cavity and said low-pressure region[.], *said means including means for providing flowable plastic material under pressure in each of said chambers decreasing from said high pressure bore to said region comprising a floating piston having one face thereof exposed to the pressure of fluid within said cavity, and having the other face thereof bearing on flowable plastic material in a channel in fluid communication with each of said chambers, and a differential back-pressure valve operatively associated with each of said chambers.*

Re. 29,680

REGENERATION OF ANION EXCHANGE RESINS

Eli Salem, Brooklyn, N.Y.; Donald J. Butterworth, Lyndhurst, and Leo F. Ryan, Sommerville, both of N.J., assignors to Ecodyne Corp., Chicago, Ill.

Original No. 3,645,921, dated Feb. 29, 1972, Ser. No. 30,058, Apr. 20, 1970. Application for reissue Nov. 29, 1972, Ser. No. 310,383

Int. Cl.[2] **C08J** *5/20*

U.S. Cl. 260—2.1 R **11 Claims**

1. A method for converting strong-base anion exchange resin having quaternary ammonium active groups from the monovalent anion form to the hydroxide form comprising: passing a [solution] *source* of polyvalent anions through a first batch of said resin, whereby to displace said monovalent anions [with said polyvalent anions]; subsequently passing a solution of alkali metal hydroxide through said resin to convert said resin to the hydroxide form, and to produce an effluent solution of hydroxide anions and [divalent] *polyvalent* anions; neutralizing said effluent with an acid containing *a source of* polyvalent anions whereby to form a neutralized [solution] *source* of polyvalent anions; and passing said neutralized [solution] *source of polyvalent anions* through a second batch of said resin in the monovalent anion form.

Re. 29,681

METAL SALTS OF 1,1,5,5-TETRASUBSTITUTED DITHIOBIURETS

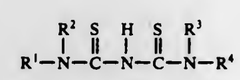
William R. Diveley, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Original No. 3,950,366, dated Apr. 13, 1976, Ser. No. 359,164, May 10, 1973. Application for reissue Jan. 12, 1977, Ser. No. 758,614

Int. Cl.[2] **C07F** *3/06*

U.S. Cl. 260—429.9 **7 Claims**

1. A metal salt of a 1,1,5,5-tetrasubstituted dithiobiuret of the formula:



in which R^1, R^2, R^3 and R^4 independently of each other are selected from the group consisting of C_1-C_{18} alkyl, C_5-C_{12} aryl, C_3-C_{12} cycloakyl and these radicals substituted by at least one member of the group consisting of hydroxyl, C_1-C_4 alkyl, C_1-C_8 [aryl] *acyl,* halo and nitro.

Re. 29,682

LOW CALORIE DRY SWEETENER COMPOSITION

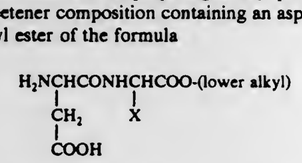
John A. Cella, Carmel, Ind., and William H. Schmitt, Brandford, Conn., assignors to Alberto-Culver Company, Melrose Park, Ill.

Original No. 3,753,739, dated Aug. 21, 1973, Ser. No. 87,303, Nov. 5, 1970. Application for reissue Aug. 19, 1974, Ser. No. 498,298

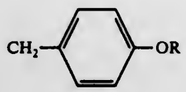
Int. Cl.[2] **A23L** *1/26*

U.S. Cl. 426—548 **8 Claims**

1. A method of preparing a dry pulverulent low calorie sweetener composition containing an aspartyl dipeptide lower alkyl ester of the formula



wherein X is selected from the group of radicals consisting of



and

$(CH_2)_nS(O)_m$(lower alkyl)

R being a member of the group consisting of hydrogen and a lower alkyl radical, m an integer selected from the group consisting of 0 and 2 and n a positive integer less that three, which comprises

a. preparing an aqueous starch hydrolysate solution having a D.E. up to 20 and having a temperature of about 30° to about 80° C,

b. preparing a substantially concentrated aqueous solution or slurry of said ester having a temperature in the range up to about 40° C,

c. admixing a minor proportion of the b. solution or slurry with a major proportion of the a. solution, and

d. promptly drying the c. mixture to provide a dry pulverulent composition containing from 0.5 to 10 percent, by weight, of said ester, and not more than about 4 percent moisture.

Re. 29,683

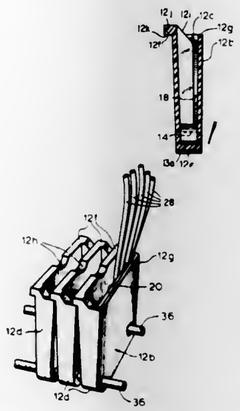
ENCAPSULATION HOUSING FOR ELECTRONIC CIRCUIT BOARDS OR THE LIKE AND METHOD OF ENCAPSULATING

Alfred Ocken, Jr., Franklin Park, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Original No. 3,869,563, dated Mar. 4, 1975, Ser. No. 401,471, Sep. 27, 1973. Application for reissue Feb. 28, 1977, Ser. No. 773,081

Int. Cl.[2] **H05K** *5/06;* **B29C** *6/02*

U.S. Cl. 174—52 PE **22 Claims**



21. An improved protective enclosure for encapsulating an electrical control circuit and heat sink in a circuit board assembly, comprising a housing structure formed with a base, vertical sidewalls and front and back end walls, open at the top; positioning means to position the heat sink flatly against one end wall; said housing further including a ledge extending laterally and outwardly from the top of one end wall, said ledge having a bottom edge, said other end wall having a top edge, the height of the bottom edge of said ledge above said base in relation to the height of the top edge of the other end wall above said base being dimensioned such that said housing is adaptable for stacking in multiple units in a vertical, side by side relation whereby said laterally extending ledge of one housing overlies the top edge of the next adjacent housing.

22. An improved method of encapsulating a control device and heat sink in a circuit board assembly comprising the steps of:

forming a housing having a base, upstanding front and back end walls and side walls, open at its top, inserting the circuit board assembly into the housing, positioning the heat sink of the circuit board assembly within the housing flatly against one of the end walls and pouring encapsulating material into the housing in an amount sufficient to cover the control device assembled on the circuit board.

Re. 29,684

WELDING HELMET WITH EYE PIECE CONTROL

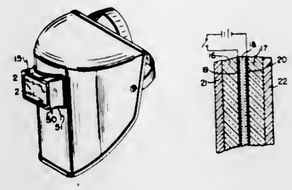
Mack Gordon, 29085 Solon Rd., Cleveland, Ohio 44139

Original No. 3,873,804, dated Mar. 25, 1975, Ser. No. 427,988, Dec. 26, 1973. Continuation-in-part of Ser. No. 244,180, Apr. 14, 1972, abandoned. Application for reissue Jun. 3, 1976, Ser. No. 692,295

Int. Cl.[2] **B23K** *9/32*

U.S. Cl. 219—147 **14 Claims**

1. A protective welding lens assembly for use with an electrical welding machine having an electrical energizing circuit and having a welding electrode connected thereto by an electrical cable, said assembly being [planar and] fixedly mounted in a welder's helmet, and comprising a layer of liquid crystal material sandwiched between opposing parallel plates coated [over their entire area] with unbroken transparent conducting films, said films being pretreated by rubbing the same in parallel lines at right angles to each other whereby to control their polarizing effect upon said liquid crystal material, said plates with the enclosed liquid crystal material being disposed between and parallel to a pair of conventional [cross] polarizers so arranged that when a suitable electrical potential is established across said conducting films and said liquid crystal layer the lens assembly will change [from a uniform] *its* light transmitting condition [to a uniform high



density approximately opaque condition], and means including a low voltage electrical circuit [electrically associated with said electrical energizing circuit and] responsive [solely] to [approach of] *establishment of an arc between* said welding electrode [to the] *and* work to be welded [by the wearer of the helmet] for applying said suitable electrical potential across said conducting films and said liquid crystal layer [in a period of approximately 1/500 of a second].

Re. 29,685

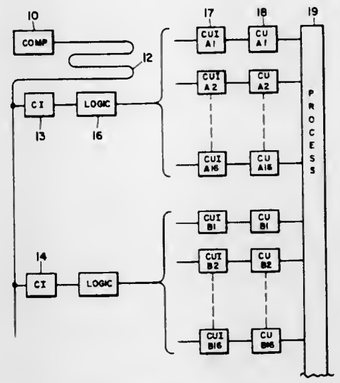
PROCESS CONTROL SYSTEM

Saleh A. Nabi, Sharon, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Original No. 3,760,374, dated Sep. 18, 1973, Ser. No. 241,546, Apr. 6, 1972. Application for reissue Aug. 14, 1975, Ser. No. 604,703

Int. Cl.[2] **G06F** *15/46*

U.S. Cl. 364—900 **35 Claims**



14. In a system for controlling a complex industrial process having a large number of different process conditions, said system comprising a plurality of closed-loop control units, each unit being for a respective process condition; said control units comprising analog controllers, said controllers including means for producing analog control signals to operate respective process devices which determine the magnitudes of corresponding process variables thereby to effect the desired control of the process conditions, said analog controllers being provided with analog set-point signals, indicating the value of the process condition to be established, and corresponding analog measurement signals indicating the actual value of the process conditions, said analog controllers including means for comparing the respective set-point signal with the corresponding analog measurement signal and developing from such comparison the required control signals for the respective process device to maintain each affected process condition at its set-point value;

said control system further comprising a central station with a digital computer which is supplied with information signals respecting the controlled process, including the values of selected process conditions, for producing from such information signals various instructional signals to be transmitted to equipment associated with said analog controllers for directing the functioning of the corresponding process devices in accordance with predetermined characteristics pre-set in the digital computer; said analog controllers and associated equipment being located remotely from said central station computer;

the improvement in such a process control system wherein said equipment associated with said analog controllers comprises:

at least one input/output subsystem assigned to a set of said analog controllers for operation therewith;

a cable extending from said digital computer to said input/output subsystem for carrying digital signals in both directions therebetween;

said input/output subsystem including a set of controller interfaces with each such interface being coupled to a respective controller of said set of analog controllers;

each of said controller interfaces including digital-to-analog converter means responsive to digital signals developed from instructional signals sent over said cable by said computer and representing instructional data for the corresponding analog controller, or the process device associated therewith;

said digital-to-analog converter means at each controller interface including output circuit means operable to produce an output analog signal corresponding to the applied digital signal and to direct such output analog signal to the analog controller corresponding to that controller interface, or to the process device associated with said analog controller, for effecting control of said associated process device;

memory means for each of said digital-to-analog converter means to store signals representing the instructional data directed to the respective converter means by said computer, said memory means being coupled to said corresponding analog controller or to said associated process device whereby such instructional data remains available for use by the corresponding analog controller or the associated process device while said computer is communicating with other of said controller interfaces or is performing other tasks; and

analog-to-digital converter means forming part of said input-/output subsystem for converting analog signals to corresponding digital signals to be sent through said cable to said digital computer.

PLANT PATENTS

GRANTED JUNE 27, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,271

HIBISCUS PLANT NAMED LADY BALTIMORE

Robert H. Darby, 4813 Harvard Rd., College Park, Md. 20740

Filed Sep. 22, 1977, Ser. No. 835,828
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinctive cultivar of hibiscus substantially as herein shown and described, a glowing pink-and-red bicolor of elegant form and substance, a plant of great landscape value, blooming profusely from midsummer to frost.

4,272

CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Sep. 22, 1977, Ser. No. 835,829
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium;* Ramat, known by the cultivar name Yellow Sophisticate and particularly characterized as to uniqueness by the combined characteristics of daisy capitulum type; flat capitulum form; medium yellow ray floret color; yellow green (immature) to yellow (mature) disc floret color; diameter across face of capitulum from 85 to 90 mm. at maturity; uniform 9 week flowering response to photoperiodic short-day control; medium plant height; semi-spreading branching pattern; and minimal pollen development.

4,273

CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Sep. 22, 1977, Ser. No. 835,830
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—78 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium;* Ramat, known by the cultivar name Jasmine and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form, reflexing slightly with age; spider capitulum type; medium yellow ray floret color; diameter across face of capitulum from 140 to 160 mm. at maturity; uniform 9 week flowering response to photoperiodic short-day control; medium plant height; and semi-spreading branching pattern.

PATENTS

GRANTED JUN. 27, 1978

ERRATA

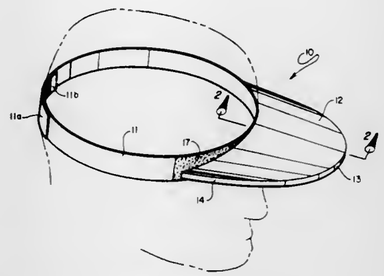
For CLASS	See PATENT NO.
004–255	4,096,597
407–092	4,096,613
126–271	4,096,861
134–003	4,096,869
134–028	4,096,870
134–040	4,096,871
400–110	4,096,934
400–479	4,096,935
366–165	4,097,026
350–149	4,097,110
350–027	4,097,141
209–111.5	4,097,373
428–035	4,097,385
544–353	4,097,478
544–366	4,097,479
560–053	4,097,519
568–807	4,097,537
568–726	4,097,538
568–751	4,097,539
568–862	4,097,540
423–303	4,097,583
423–348	4,097,584
423–574 R	4,097,585
260–045.8 A	4,097,587
560–030	4,097,657
307–141	4,097,763
307–200 A	4,097,764
307–212	4,097,765
307–229	4,097,766
307–229	4,097,767
307–230	4,097,768
307–252 B	4,097,769
307–252 J	4,097,770
307–268	4,097,771
307–279	4,097,772
307–296 A	4,097,773
365–118	4,097,848

PATENTS

GRANTED JUNE 27, 1978

GENERAL AND MECHANICAL

4,096,589
ADJUSTABLE EYE SHADE
Morton I. Goldstein, Columbus, Ohio, assignor to Matrix Groups, Inc., Columbus, Ohio
Filed Jan. 7, 1977, Ser. No. 757,621
Int. Cl.² A61F *9/00*
U.S. Cl. 2—12 **7 Claims**



1. An adjustable eye-shade comprising
a head band positionable in retained relationship on a person's head,
a visor element of flexible material forming an eye-shading panel, said panel having a peripheral edge which includes an inwardly curved portion that is adapted to cooperatively interfit with said headband, and
connecting means for selectively interconnecting said peripheral edge of said visor element to said headband, said connecting means being a two element structure wherein one of said elements includes a loop surface and the other a hook surface which are cooperatively interengageable for subsequent disengagement, one element of said connecting means fastened to said headband at an exteriorally facing surface thereof and the other element secured to the inwardly curved peripheral edge portion of said visor element.

4,096,590
COLLAPSIBLE HAT
Edward G. Keshock, 1625 Kingsway, Norfolk, Va. 24112
Filed Jun. 21, 1976, Ser. No. 697,708
Int. Cl.² A42B *1/20*
U.S. Cl. 2—180 **4 Claims**

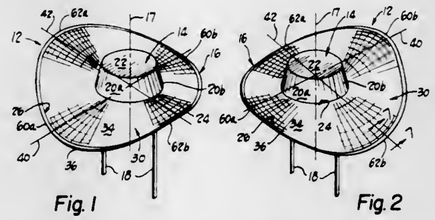
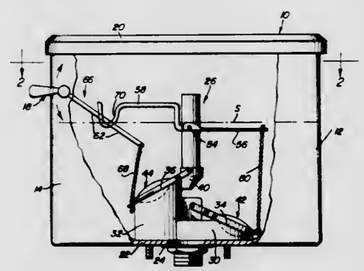


Fig. 1 Fig. 2

1. A hat having a snap brim assembly which is adjustable between two stable brim configurations, the brim assembly comprising a generally annular brim member and a spring member disposed circumferentially about a brim member and extending generally annularly about an axis, said brim member formed from a sheet of flexible bi-directional material whose tensile strength is maximum in first and second transverse directions and less than maximum in other directions, said spring member having a planar configuration prior to assembly with said brim member, said spring member having a circumferential length in excess of the unstressed circumferential length of said annular brim member, said members engaged and reacting with each other so that said spring member is resiliently deformed to one of two stable nonplanar configurations, one configuration characterized by a first pair of diametrical spring member locations aligned in one of said transverse directions and being displaced in a first axial direction from their planar configuration locations and a second pair of diametrical spring member locations aligned in the other transverse direction and being displaced from their planar configuration locations in a second axial direction opposite to said first axial direction, the other configuration characterized by each of said diametrical spring member locations being displaced from their planar configuration locations in the opposite direction from their first configuration displacements, said brim member being resiliently tensioned radially and circumferentially along its juncture with said spring member to maintain said spring member in each of said two nonplanar configurations.

4,096,591
DUAL FLUSH VALVE
Edward Adam Awis, 118 SW. 57th St., Cape Coral, Fla. 33904
Filed Jan. 12, 1977, Ser. No. 758,811
Int. Cl.² E03D *1/34*
U.S. Cl. 4—326 **6 Claims**



1. A flush valve system for use in a flushing tank of a toilet, comprising, in combination:
(a) a pair of valve seats arranged at different levels in a liquid reservoir;
(b) a pair of valve elements, each mounted for blocking a respective one of the valve seats; and
(c) actuator means operating on the valve elements for causing the valve elements to unblock the valve seats independently of one another, the actuator means including in combination:
(1) a lever pivotally mounted on a pivot axis disposed between and above the valve seats, the lever having two oppositely directed arms each arranged for moving toward and away from an associated one of the valve seats, with one of the arms being connected to one of the valve elements for operating same and moving the valve element to a position unblocking the associated one of the valve seats; and
(2) a crank separate from and operable independently of the lever, the crank pivotally mounted on the liquid reservoir substantially coextensive with the lever, the crank and lever pivoting on parallel axes, and connected to the other of the valve elements for operating same in a first direction of rotation of the crank, the crank being arranged for selectively engaging the other of the arms of the lever in a second direction of rotation of the crank opposite to the first direction for pivoting the lever and causing the one of the valve elements to

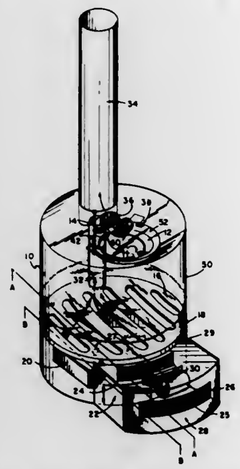
unblock the associated one of the valve seats wherein the other of the arms of the lever terminates in a U-shaped portion opening away from the valve seats and bent from the extent of the lever for engaging with the crank, the crank engaging the U-shaped portion in the second direction of rotation and pivoting the lever thereby for operating the one of the valve elements, and the crank moving away from and out of engagement with the U-shaped portion of the lever in the first direction of rotation while simultaneously operating the other of the valve elements and unblocking the other of the valve seats.

4,096,592

COMPOSTING TOILET

Alexander Clark, 115 Pleasant St., Brunswick, Me. 04011

Filed Jan. 5, 1977, Ser. No. 757,014
Int. Cl.² A41K *11/02*; C05F *3/04*
U.S. Cl. 4—111 **5 Claims**



1. An improved composting toilet comprising:

a substantially hollow casing having a substantially flat top and bottom and a front and rear, said casing's top having defined therein a waste entry aperture in proximity to the front of said casing and an air vent chimney aperture defined therein in proximity to the rear of said casing;

a lid member covering said waste entry aperture, said lid member being adapted to be manually opened in order to allow access to said waste entry aperture;

an air vent chimney positioned at said air vent chimney aperture;

a concave waste pile platform horizontally disposed intermedially within said hollow casing making contact around its perimeter with the interior of said hollow casing, said waste pile platform having defined therein a plurality of parallel elongated apertures running lengthwise in a front to back direction within said casing and further having defined therein an air bypass tube aperture positioned at a point directly below said air vent chimney, the hollow of said concavity of said waste pile platform facing said casing top;

an air bypass tube positioned at said air bypass tube aperture and extending upwards, its top being disposed at the bottom of said air vent chimney, said air bypass tube's cross-sectional area being smaller than the cross-sectional area of said air vent chimney, said air bypass tube adapted to allow air to pass into said air vent chimney from the area below said waste pile platform, said air vent chimney further having defined therein a cutaway section facing said casing's front beneath said casing's top;

a blower affixed beneath said casing top adapted to blow air up said air vent chimney thereby assisting in circulation of air within said casing;

a waste product area defined within said casing below said waste pile platform having positioned therein at least one removable container adapted to rest on said casing's bottom to catch waste products which may fall through said elongated apertures in said waste pile platform;

a door positioned in the side at the front base of said casing lower than the disposition of said waste pile platform within said casing, said door adapted to allow for the removal and reentry of said container for the purpose of emptying waste products from therein;

a hot air entry vent defined within said casing above said door and below the disposition of said waste pile platform, said hot air entry vent having disposed before it outside of said casing a heating blower having a thermostat control located within said waste product area in proximity to said hot air entry vent; and

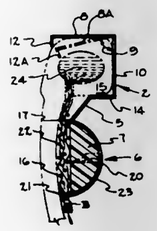
means to support, cover, and protect said heating blower, said means having defined therein at least one air intake vent.

4,096,593

TOILET BOWL DISPENSER

Eftichios Van Vlahakis, 2423 The Strand, Northbrook, Ill. 60062

Filed Jul. 15, 1976, Ser. No. 705,598
Int. Cl.² E03D *9/02*; A61L *9/04*
U.S. Cl. 4—231 **6 Claims**



1. An improved toilet bowl dispenser comprising in operative combination:

(a) means for removably retaining said dispenser on the inner rim of a toilet bowl comprising a clip-on member having a top member, a bottom member, a generally vertical wall member joining said top and said bottom, lateral retaining means depending from said top member, said top member being disposed at an acute angle to said wall member to provide positive vertical clamping action to said rim between said top and bottom members for universal fit and secure retention of said dispenser on rims of varying size and to maintain a disinfectant material retaining means above the normal water level in said bowl;

(b) means for retaining said disinfectant material disposed below said rim in the path of flush water dispensed from said rim comprising a member generally cup-shaped in cross section with imperforate end walls for permitting direct casting of said disinfectant material thereinto, said cup having an opening oriented generally facing an inner wall of said bowl to protect said disinfectant material from dissolving by water other than said flush water, said cup having an upper edge portion spaced from said inner wall of said bowl to provide space for flush water to flow downwardly into contact with said disinfectant material disposed in said cup, and a lower portion of said cup including means extending into contact with said bowl inner wall to space said upper edge portion from said wall and for detaining the downward flow of water into said bowl to provide even dissolution of said disinfectant material along its length; and

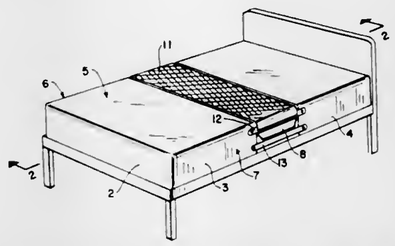
(c) means for urging said disinfectant-retaining cup means against said inner wall of said toilet bowl, said urging means connecting said cup means and said removable retaining means.

4,096,594

MATTRESS DEVICE

Raymond A. St. Jean, West Warwick, R.I., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Dec. 30, 1976, Ser. No. 755,800
Int. Cl.² A61G *7/02*
U.S. Cl. 5—90 **2 Claims**



1. A mattress device for preventing discomfort to a bedwetter using a mattress, said mattress device comprising

a channel formed through a mattress to provide a pair of spaced mattresses, which, together with the channel, form a mattress having a top and sides;

a pan removably positioned in the channel for collecting liquids, said pan being positioned at a pitch in a manner whereby liquids collected therein flow toward a predetermined point at the bottom of the pan;

a hose having one end coupled to the predetermined point at the bottom of the pan for draining liquids in the pan therefrom;

mesh material covering the channel at the top of the mattress for supporting a person on the mattress over the channel and permitting liquid to flow therethrough; and

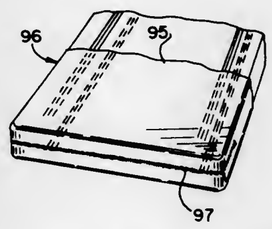
fastening means for fastening the pair of mattresses to each other with the channel between them.

4,096,595

MATTRESSES AND METHOD FOR PRODUCING MATTRESSES

Richard H. Eide, Minneapolis, and Gerald A. Golembeck, Lake Elmo, both of Minn., assignors to The United States Bedding Company, St. Paul, Minn.

Division of Ser. No. 729,386, Oct. 4, 1976, Pat. No. 4,051,644.
This application May 12, 1977, Ser. No. 796,075
Int. Cl.² A47C *27/00*; B65B *63/02*
U.S. Cl. 5—345 R **2 Claims**



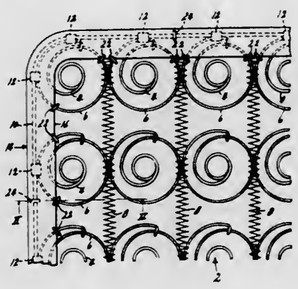
1. In a method for filling a flexible cover with a resilient filler for the formation of mattresses or the like, said method including providing a hopper comprising upper and lower sections defining a filler receiving space and an open end, said cover being dimensioned for attachment to the hopper whereby the interior of the cover communicates with said open end of the hopper, and including the step of driving said filler into said cover, the improvement comprising the steps of locating a dispensing means in association with each section of said hopper in positions such that opposite surfaces of the filler are located adjacent said dispensing means when the filler is in the hopper, providing a supply for adhesive for said dispensing means, and operating said dispensing means while moving the filler into the cover whereby adhesive is deposited on the filler surfaces for contact with opposed cover surfaces to securely fasten the cover to the filler, and including the steps of driving the filler into said cover by providing spaced-apart pusher means, and pressing said pusher means into position adjacent respective hopper surfaces whereby said pusher means engage opposite edge portions of the filler at one end of the filler.

4,096,596

FURNITURE DECK EDGING

George R. Pearson, High Point, N.C., assignor to Flex-O-Lators, Inc., Carthage, Mo.

Filed Feb. 9, 1977, Ser. No. 767,127
Int. Cl.² A47C *25/00*
U.S. Cl. 5—360 **4 Claims**



1. In combination with a furniture deck having a top load-supporting surface and a border member extending along and attached to the marginal edge of said load-supporting surface, and edging strip comprising:

a. an elongated body portion extending along and overlying said border member and the marginal edge portion of said deck, and being formed of a padding material,

b. a first longitudinal fin integral with said body portion adjacent the horizontally outward edge thereof and at the bottom surface thereof and being inclined downwardly and inwardly from said body portion toward the horizontally inward edge of said body portion, whereby a groove is formed between said fin and said body portion, said border member being engaged in said groove,

c. a second longitudinal fin integral with said body portion at the horizontally inward edge thereof, in transversely spaced relation from said first fin, said body portion and said first and second fins of said strip being of one-piece construction of a resilient, porous material of chemically homogenous nature throughout their entire volumes, with gas-filled cells distributed therein, the material forming said fins being densified by a reduction of the volume of the gas-filled cells therein, whereby to be rendered relatively stiff and tough as compared to said body portion, and

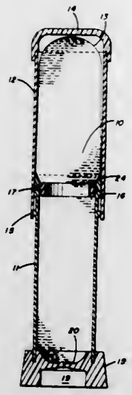
d. fastener means securing said second fin to elements of said deck, whereby horizontally outward movement of said strip relative to said deck is prevented, and said first fin is secured in engagement with said border member.

4,096,597

DRAIN OPENING DEVICE

Gregory E. Duse, 7024 Hamilton Ave., Pittsburgh, Pa. 15208

Filed Sep. 30, 1976, Ser. No. 728,249
Int. Cl.[2] E03D *11/00*; B65D *5/72, 35/38*
U.S. Cl. 4—255 **1 Claim**



1. An apparatus for opening clogged drains comprising:
(a) an upper tube having one closed end and one open end;
(b) a lower tube fitted coaxially within said upper tube to freely telescope;
(c) a flexible plastic bag the open end of which is attached within said lower tube and forming a watertight cavity within said upper tube;
(d) a base attached to the exposed end of said lower tube;
(e) a flap valve mounted in said base openable resiliently in response to fluid under pressure exerted on opposite sides thereof to permit passage of said fluid under pressure through said base in the direction of the applied pressure,
(f) said base having a face normal to the axis of the said coaxial tubes and a recess in said face open to said flap valve; and
(g) a separate member of elastomeric material removably fitted into said recess and having a face sloped at an angle of 10° to 20° to the face of said base.

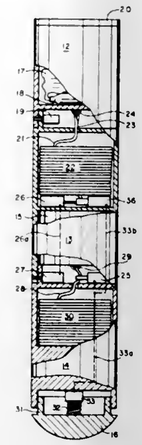
4,096,598

SELECTED DEPTH MOORING SYSTEM

Russell I. Mason, 30 Kensington Rd., Glen Falls, N.Y. 12801

Filed Mar. 21, 1977, Ser. No. 779,740
Int. Cl.[2] B63B *21/52*
U.S. Cl. 9—8 R **10 Claims**

1. A selected depth mooring system for use at sea of any bottom depth, comprising, in combination:
flotation means deployable on the surface of the sea;
mooring means including buoyant submersible means releasably coupled to said flotation means and deployable to a selected depth relative to the surface, anchor means releasably coupled to said submersible means and deployable to the bottom of the sea, first cable means operatively connected between said submersible means and said anchor means for payout to a length equal to the distance from the selected depth to the bottom, the combined weight in water of said anchor means and said first cable means being greater than the buoyant force of said submersible means; and
second cable means operatively connected between said flotation means and said mooring means for payout to a length equal to the selected depth, the combined weight in



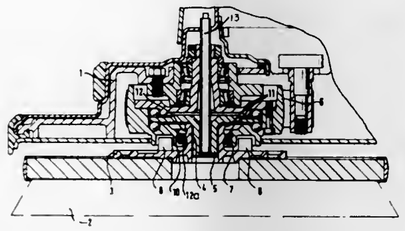
water of said mooring means and said second cable means being less than the buoyant force of said flotation means.

4,096,599

BRUSH RETENTION MEANS FOR FLOOR TREATING MACHINES

Haydn Frank Mayo, Hazlemere, England, assignor to R. G. Dixon & Company Limited, Wembley, England

Filed Mar. 2, 1977, Ser. No. 773,842
Claims priority, application United Kingdom, Mar. 4, 1976, 8743/76
Int. Cl.[2] A47L *11/162*
U.S. Cl. 15—49 R **4 Claims**



1. In a floor treating machine of the type comprising at least one rotary brush alternately engaged with and disengaged from a brush drive, the improvement which comprises a brush retaining element; an upstanding boss on the at least one brush, said boss being slidably mounted on said brush retaining element and connected to the rotary brush; an annular lip formation on said boss and including integral ribs defining two recesses in said boss; and spring clip means mounted on a rotary part of the machine for cooperating with said annular lip formation, said spring clip means being an annular spring clip receivable in one of the recesses when the rotary brush is engaged with the brush drive and receivable in the other of said recesses when the rotary brush is disengaged from the brush drive.

4,096,600

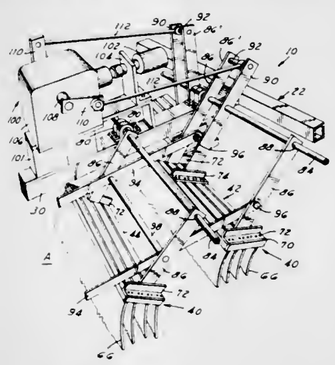
FRICTION CURTAIN APPARATUS

James A. Belanger, 370 S. Rogers, Northville, Mich. 48167

Filed Mar. 11, 1977, Ser. No. 776,791
Int. Cl.[2] B60S *3/04*
U.S. Cl. 15—97 B **13 Claims**

1. A friction curtain apparatus for washing or drying or

finishing a motor vehicle comprising a frame having an opening provided with an entrance and an exit, said opening having a longitudinally extending axis between said entrance and exit, said opening being adapted to receive a vehicle for movement therethrough by relative motion between the aforesaid frame and the vehicle along a predetermined path between said entrance and exit, a pair of swingable scrubbing units pivotally carried by said frame and disposed in said opening and capable of turning in alternate directions forward and then backward with respect to said entrance and to said exit, each of said units being pivotable about a horizontal axis which is generally perpendicular to said longitudinally extending axis, one of said units being located on one side of said longitudinally extending axis and the other of said units being located on the other side of said longitudinally extending axis, each of said units comprising an elongated rack having a plurality of transversely extending elongated slot-defining apertures which are parallel to one another, said apertures having axes lying in a flat plane, a pack unit containing fill material received in each of said apertures and forming a curtain, each curtain being arranged on each rack in spaced apart, generally parallel relation relative to the other curtains, with each curtain extending generally perpendicular to said longitudinally extending axis and having an end portion which extends beyond a side of the vehicle, each curtain defining a row of closely arranged elongated flexible strips which hang freely when the units are beyond the ends of the vehicle and are substantially in continu-



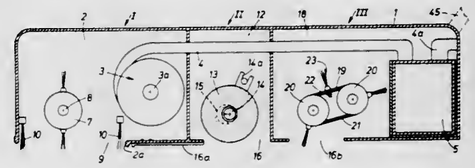
ous contact with the vehicle during the swinging movement of the rack when the units overlie the vehicle, power actuated means for swinging said racks and the curtains carried thereby through an arcuate path forward and then backward and imparting to said curtains a sweeping, scrubbing and flicking motion to permit said curtains to contact the exterior surfaces of the vehicle to finish the vehicle, said power actuated means including means for coordinating the swinging of said racks and said curtains in a predetermined phase relationship whereby the rack and curtains at one side of said longitudinally extending axis are out of phase with the rack and curtains on the other side of said longitudinally extending axis, each slot-defining aperture having a key-hole configuration, each aperture having a generally cylindrical inner portion opening downwardly through a restricted neck portion, each pack unit comprising a substantially solid, elongated, headforming and pack reinforcing support element made from a resiliently firm yet flexible plastic material, said support element including a generally cylindrical, solid, bulb-like portion having single, substantially flat, integral, solid fin portion of rectangular configuration extending from said bulb-like portion, a first sheet of generally flexible material having one portion looped tightly over said elongated support element so as to conform closely to the contours thereof and a second portion extending from the support element, said looped portion having a first section closely overlying said bulb-like portion and second and third sections integrally contiguous with the respective opposite ends of said first section tightly overlying corresponding opposite sides of said fin portion, fastening means for securing the looped portion to said first sheet to said elongated support element to prevent relative sliding movement therebetween and forming a generally cylindrical, flexible material covered bulbous head and neck portion of the pack unit which is telescopically received in the corresponding aperture for replaceably mounting said pack unit thereto, said fill material forming said curtain having an inner portion secured to the second portion of said first sheet and an outer portion engageable with the vehicle.

4,096,601

CLEANING APPARATUS FOR CARPETS, UPHOLSTERY AND THE LIKE

Leopold Knestele, 7967 Bad Waldsee, Germany

Filed Jan. 23, 1976, Ser. No. 651,688
Claims priority, application Germany, Jan. 25, 1975, 2503012
Int. Cl.[2] A47L *11/34*
U.S. Cl. 15—320 **8 Claims**



1. An apparatus for the cleaning of carpets, upholstery and the like comprising:
a housing formed with wall means defining a downwardly open suction compartment containing a rotatable brush at a leading end of said housing, means for sucking air out of said compartment, a flexible-surface vibrating body rearward of said compartment for engagement with the surface to be cleaned, said vibrating body being drivable to vibrate foam into said surface to be cleaned, a foam applicator in said housing rearward of said vibrating body, and means for feeding a foamable cleaning liquid to said applicator, said applicator comprising a belt provided with bristles and a pair of rollers spanned by the belt and rotatable to displace said bristles to apply said foamable cleaning liquid to said surface to be cleaned; and
manually controlled drive means for selectively operating either said brush alone or both said body and said applicator in conjunction.

4,096,602

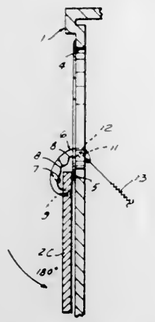
DRYER DOOR STOP ASSEMBLY

James K. Nelson, Marion, Ill., assignor to Fedders Corporation, Edison, N.J.

Filed Sep. 6, 1977, Ser. No. 830,455
Int. Cl.[2] E05F *5/06*
U.S. Cl. 16—85 **5 Claims**

1. A door stop assembly in combination with an appliance having an access door pivotably secured near its lower edge to the front of the appliance; said door stop assembly comprising:
a unitary arcuate link pivotably secured at a point adjacent one end to the door;
said link having an inner arcuate surface;
roller means secured to the appliance and disposed transverse to the curvature of said inner arcuate surface;
a first detent in said inner surface of said link sized and positioned to engage said roller means when said door is in a substantially 180° open position to limit and maintain said door in said 180° open position, said detent comprising a hooked portion;
and biasing means connected to said link adjacent the other end thereof to bias said inner arcuate surface of said link

into engagement with said roller means throughout the length of travel of said link, said biasing means comprising



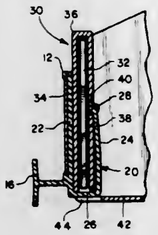
a spring connected between said other end of said link and the bottom wall of said appliance.

4,096,603

DRAWER PULL AND LABEL HOLDER

Gerald R. Klaus, St. Charles, Ill., assignor to Fellowes Manufacturing Company, Franklin Park, Ill.

Filed Nov. 1, 1976, Ser. No. 737,715
Int. Cl.² A47B 95/02; B65D 5/46, 25/28
U.S. Cl. 16—110 R **3 Claims**



1. A detachable drawer pull for a collapsible front panel of a drawer which panel includes an outermost and innermost layer hinged together along a first edge of the panel, and said outermost layer being an extension of the bottom of said drawer along a second edge of said panel opposite said edge and said drawer having an opening adjacent said second panel edge, comprising:

a generally U-shaped member including first and second leg members and a bottom member, said U-shaped member being adapted to be slid into said opening adjacent said second edge of a drawer panel front opposite said hinged edge so that the first and second leg members are adjacent to the outer and inner layers of the panel, respectively, said bottom member having a substantially flat outer surface and said first leg member having a substantially flat inner surface;

pull means positioned on the outer surface of said first leg member, extending perpendicular thereto;

label holder means positioned on the outer surface of said first leg member; and

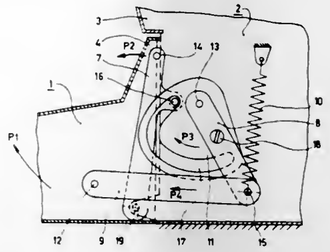
a flange adapted to engage a slot on the inner layer of the drawer front panel on said second leg member.

4,096,604

HINGE MECHANISM

Friedhelm Eckhardt, Burbach-Niederdresselndorf, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 28, 1976, Ser. No. 709,333
Claims priority, application Germany, Aug. 2, 1975, 2534652
Int. Cl.² A47B 95/02
U.S. Cl. 16—128.1 **3 Claims**



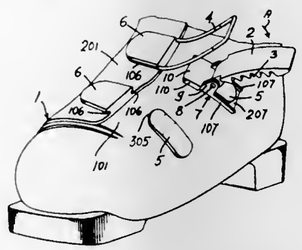
1. A hinge mechanism coupled on one side to a stationary housing and on the other side to a lid hingeable relative to the housing, which comprises a hinge spindle translatorily movable relative to the housing during opening and closing of the lid and pivotably carried by said lid, at least one pair of links pivotably connected to each other, the free end of one of said links being pivotably connected to said lid and the free end of the other of said links being pivotably connected to said housing, a guide affixed to the other link and pivotable simultaneously with said other link in fixed relationship therewith about the pivotable connection of the latter to the housing, said guide being provided with a curved slot, and a pin slidable in said curved slot and arranged on a connecting link pivotably connected at one end to the housing, the other end of said connecting link being pivotably mounted on said hinge spindle.

4,096,605

LACING DEVICE FOR SKI BOOTS

Giuseppe Annovi, Montebelluna, Italy, assignor to Calzaturificio Giuseppe Garbuio S.A.S., Montebelluna, Italy

Filed Nov. 30, 1977, Ser. No. 856,192
Claims priority, application Italy, Dec. 7, 1976, 12922 A/76
Int. Cl.² A43B 11/00; A43C 11/00
U.S. Cl. 24—70 SK **6 Claims**



1. In a ski boot of the type comprising a ski boot upper provided with two flaps defining an opening, a lacing device including a hooked lever-like lacing member provided on one flap and intended to cooperate with a ring-like lacing member on the other flap, anchoring means for securing at least one of said lacing members hingedly and in a removable manner onto the corresponding flap, said anchoring means comprising:

(a) an anchoring guide element in the form of a projection provided on the flap and presenting two side grooves arranged transversally with respect to the opening;

(b) a carrier plate onto which there is hingedly mounted the lacing member, said carrier plate presenting two extensions or legs capable of slidably engaging the side grooves provided on the anchoring guide element;

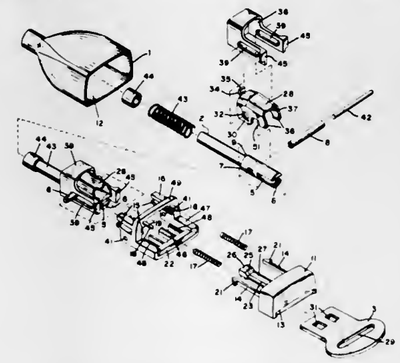
(c) a clamping element provided on said carrier plate, presenting two clamping portions which, in the operative position of the said clamping element, are arranged against the outer sides of the legs of the carrier plate, i.e. the sides which are external with respect to the grooves engaged by the said legs, so as to avoid the divarication of the said legs out of the said grooves.

4,096,606

FERRULE BUCKLE WITH SLIDING RELEASE BUTTON

Robert Larry Stephenson, Sterling Heights, Mich., assignor to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Mar. 4, 1976, Ser. No. 663,942
Int. Cl.² A44B 11/25
U.S. Cl. 24—230 A **11 Claims**



1. A buckle for engaging a tongue comprising: a ferrule having a slot at one end for engaging a tongue; a latch member with at least one latching tooth, said latch member pivotally mounted on the ferrule for releasing motion between an engaged position and a disengaged position in reference to said tongue; a sliding release button mounted at the front of the buckle, and a tongue ejector mounted on said latch member and cooperating with the latch member and the release button for engaging and disengaging the tongue, said release motion of said latch member having a directional component which is parallel to the direction of motion of said tongue when said tongue is released from said buckle, withdrawal force on said tongue cooperating with said latch member to assist said release motion of said latch member, said buckle harnessing a portion of said withdrawal force on said tongue for use in releasing said latch member, said buckle thereby requiring a low release effort on said release button.

4,096,607

SNAP FASTENING DEVICE

Gunilla A. Carlsson, Skidbacken 38, S-172 45 Sundbyberg, Sweden

Filed Feb. 11, 1976, Ser. No. 657,315
Claims priority, application Sweden, Feb. 18, 1975, 7501797
Int. Cl.² A44G 13/00
U.S. Cl. 24—230 AP **3 Claims**

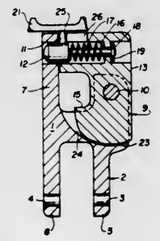
1. A snap fastening device comprising:

a fastener body (1) provided with locking means (11); and

a closure link (9), one portion (14) of which is rotatably mounted in the fastener body (1) and another portion (13) of which is provided with locking means (12) adapted to engage said locking means (11) of said fastener body, said portions (13,14) being disposed substantially perpendicularly to each other;

said fastener body (1) and said closure link (9) together defining an openable loop which is restricted by said fastener body and by said closure link;

said fastener body (1) comprising a substantially U-shaped portion having a pair of shanks (7,8), and a connecting portion connecting said shanks, one of said shanks (8) and at least a portion of said connecting portion having a guiding slot (22) therein which defines a pair of spaced apart ears, a shaft (10) attached to said one shank (8) of said pair of shanks and passing through said slot and between said ears, said closure link (9) being journalled around said shaft (10) with said one portion (14) of said closure link (9) being at least partly in the portion of said slot in said connecting portion and between said ears when in the loop open as well as when in the loop closed position to permit swivelling movement of said closure link (9) about said shaft (10) through an angle of about 90°, said ears forming guiding or bearing surfaces for said one portion (14) of said closure link (9) when said closure link (9) is in the loop open as well as the loop closed position; and the other shank (7) of said pair of shanks having a through hole (11) therein forming said locking means of said fastener body (1), said substantially U-shaped portion cooperating with said closure link (9) to restrict said openable loop, and said closure link (9) comprising a portion



which in the locked or loop closed position bridges the shanks of said U-shaped portion;

said fastener body (1) having an external connection member (2) extending from said connecting portion in a direction opposite from said shanks (7,8); and

said locking means of said closure link (9) comprising a substantially straight groove (16), a spring actuated locking pin (12) which is displaceable in said substantially straight groove (16) and which in the locking position protrudes from an edge of said closure link for cooperating with said hole (11) formed in said other shank (7) of said U-shaped portion of the fastener body (1) and a release member (21) including an actuation member provided with an actuation surface and protruding from said closure link (9), said release member (21) being coupled to said locking pin (12) for displacing said locking pin (12) into the closure link (9) against the spring action upon exertion of a direct acting compressive force on said actuation surface to a release position in which said locking pin (12) is disengaged from said hole (11) and said closure link (9) can be swivelled open by rotation thereof through an angle of about 90° relative to said fastener body (1).

4,096,608

DRILL STRING HOLDER

John Arne Lagerstedt, Skarholmen, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Dec. 9, 1976, Ser. No. 749,163
Claims priority, application Sweden, Dec. 11, 1975, 7513972
Int. Cl.² A44B 21/00; E21C 11/00
U.S. Cl. 24—249 R **24 Claims**

1. Drill string holder in a rock drilling machine, comprising:

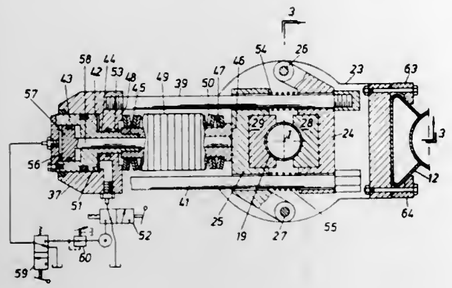
first and second jaws (24,25) mounted opposite each other for receiving a drill string or the like therebetween and for selectively gripping same,

a spring (49) operatively coupled between the jaws (24,25) to

force them towards each other into their gripping position for gripping the drill string,

a first hydraulically actuated piston device (**43**) operatively coupled to the spring (**49**) and being selectively actuable to inactivate the spring and permit the jaws to be separated,

a second hydraulically actuated piston and cylinder device (**56,57**) operatively coupled between the jaws (**24,25**) for



forcing them against each other in response to hydraulic pressure acting on the second piston and cylinder device, and

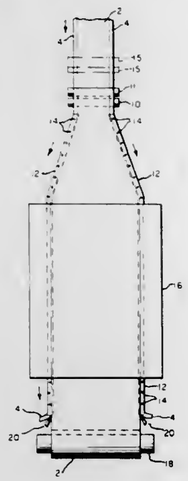
means (**59,60**) coupled to the second piston and cylinder device (**56,57**) for variably and selectively applying said hydraulic pressure acting on the second piston and cylinder device to vary the force applied thereby to the jaws to force them together when the spring is inactivated.

4,096,609

PROCESS FOR MAKING STRETCH FABRIC CAPABLE OF COURSE COUNT CONTROL UPON HEAT SETTING

James Franklin Sayre, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 28, 1976, Ser. No. 700,069
Int. Cl.[2] D04B *21/18*
U.S. Cl. 28—155 **4 Claims**



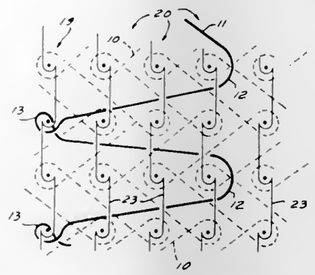
1. A process for producing a knit fabric capable of being longitudinally stretched and heat set to a predetermined course count, comprising warp knitting a longitudinally stretchable fabric of elastic and inelastic yarn and simultaneously warp knitting an additional inelastic yarn into the selvedge along each edge of said fabric, said first-mentioned inelastic yarn being overfed with respect to said additional inelastic yarn during said warp knitting, said additional inelastic yarn imparting a predetermined limit of stretchability to said selvedge which is less than the longitudinal stretchability of said fabric to limit said longitudinal stretchability during heat setting to the stretch which provides said predetermined course count, subjecting said fabric to stretching to the limit provided by said selvedge, and heat setting and fabric.

4,096,610

METHOD OF KNITTING A VELOUR FABRIC

Rudolph G. Bassist, 1003 McGrann Blvd., Lancaster, Pa. 17601

Filed Nov. 21, 1977, Ser. No. 853,683
Int. Cl.[2] D02G *1/16*
U.S. Cl. 28—159 **5 Claims**



1. A method of making a knitted velour fabric, comprising the steps of:

(a) knitting a ground fabric,

(b) knitting velour threads on to the ground fabric, each velour thread being formed as a series of elongated loops knitted into the ground fabric only at their bases,

(c) knitting stitches of soluble yarn on to the ground fabric to temporarily hold the velour thread loops flat against one face of the ground fabric, and

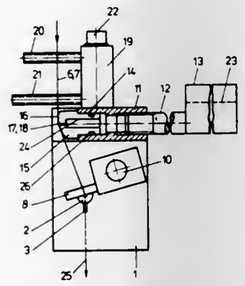
(d) thereafter treating the fabric with a liquid or vapor at a temperature and for a sufficient time to dissolve only the soluble yarn so as to free the velour thread loops to project outwardly from said face of the ground fabric.

4,096,611

APPARATUS FOR MOISTENING AND TEXTURING YARNS

Harald Heyner, Berlin, Germany, assignor to Heberlein Maschinenfabrik AG, Wattwil, Switzerland

Filed Jul. 19, 1977, Ser. No. 816,949
Claims priority, application Germany, Aug. 3, 1976, 2635341
Int. Cl.[2] D02G *1/20*; D02C *1/16*
U.S. Cl. 28—220 **9 Claims**



1. Apparatus for moistening and texturing at least one yarn consisting of filaments and travelling lengthwise through the apparatus, the apparatus comprising texturing nozzle means formed with a nozzle arranged for the yarn to pass therethrough, said nozzle means being adapted to form loops, or

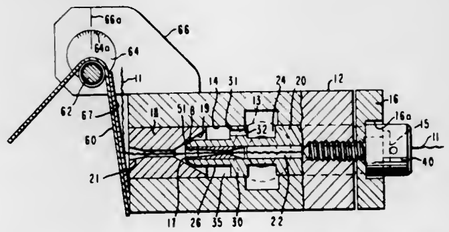
convolutions in filaments in yarn while travelling through said nozzle, delivery and guiding means for determining the path of the yarn prior to entering said nozzle and after leaving said nozzle, a member mounted in position for the yarn to pass thereover prior to entering said nozzle, said member being formed with a convexly curved surface and located for the yarn to slide thereover along a curved path while travelling towards said nozzle and said member being formed with at least one bore opening into said curved surface in said path, and means for feeding liquid through said bore, the diameter of said bore being adapted to the titer of the yarn whereby the yarn travelling over said bore exerts a suction effect on the liquid and carries the liquid between its filaments of said nozzle.

4,096,612

JET FOR FLUID TEXTURING YARN

Brian Michael Agers, Wilmington, Del., and Maurice Cornelius Todd, Glen Mills, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 13, 1976, Ser. No. 731,982
Int. Cl.[2] D02G *1/16*
U.S. Cl. 28—272 **8 Claims**



1. In a yarn texturing jet including a body having yarn inlet and outlet ends connected by a central bore, means for introducing pressurized gas through a gas inlet into said bore between said ends, a nozzle block having a conical entrance located in said bore at said outlet end, and a yarn guiding element sealing off said bore at the yarn inlet end of the body for introducing yarn into said jet, said element having a passage therethrough for guiding yarn from the yarn inlet of the body past the gas inlet through the exit end of said element to the conical entrance of the nozzle block, said element being provided with means for movement toward the conical entrance of the nozzle block for stringup and away from the nozzle block for normal fluid texturing operation, there being a space between said exit end of said element and said conical entrance for throttling the flow of pressurized fluid that flows into said space and out through the nozzle block to create air pressure less than atmospheric at the end of said element, thereby inducing an inward flow of atmospheric air through said passage to draw said yarn through said passage for stringup, the improvement for increasing said inward flow of atmospheric air through said passage to facilitate drawing yarn through said passage during stringup of the yarn comprising: a venturi positioned in said passage, said venturi having a flared inlet and a flared outlet connected by a constriction, said flared outlet being gradually expanded from said constriction to a cylindrical section within said passage and extending through the exit end of said element.

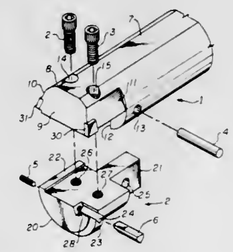
5. In a yarn texturing jet including a body having yarn inlet and outlet ends connected by a central bore, means for introducing pressurized gas through a gas inlet into said bore between said ends, a first venturi located in said bore at said outlet end, and a yarn guiding element sealing off said bore at the yarn inlet end of the body for introducing yarn into said jet, said element having a passage therethrough for guiding yarn from the yarn inlet of the body past the gas inlet through the exit end of said element to the conical entrance of the first venturi, said element being provided with means for movement toward the first venturi for stringup and away from the first venturi for normal fluid texturing operation, there being a space between said exit end of said element and said first venturi for throttling the flow of pressurized fluid that flows into said space and out through the first venturi to create air pressure less than atmospheric at the end of said element, thereby inducing an inward flow of atmospheric air through said passage to draw said yarn through said passage, the improvement for increasing said inward flow of atmospheric air through said passage to facilitate drawing yarn through said passage during stringup of the yarn comprising: a second venturi positioned in said passage, said second venturi having a flared inlet and a flared outlet connected by a constriction, said flared outlet being gradually expanded from said constriction to a cylindrical section within said passage and extending through the exit end of said element.

4,096,613

CUTTING TOOL

Victor C. Takacs, and Joseph E. Takacs, both of Houston, Tex., assignors to Triangle Grinding, Inc., Houston, Tex.

Filed Mar. 25, 1977, Ser. No. 781,207
Int. Cl.[2] B26D *1/00*
U.S. Cl. 407—92 **12 Claims**



1. A cutting tool comprising:

an elongated bar member;

an anvil member removably fastened to one end of said bar member to rigidly clamp a cutting insert between said anvil and bar member for radial projection generally perpendicular to the axis of said elongated bar member;

a support rib projecting radially from said anvil member;

an elongated recess provided in said anvil member and along said rib in which said cutting insert may be removably received for said radial projection from said bar member; and

a chip deflector of substantially harder material than said bar member affixed to said bar member for juxtaposed relationship with said cutting insert on the opposite side from said rib.

4,096,614

METHOD AND APPARATUS FOR REMOVING STATOR VANES

Alvin J. Brungard, Greenhills; Richard M. Galloway, and Donald P. Kerwick, both of Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

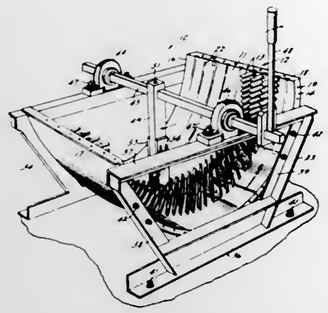
Filed Sep. 2, 1975, Ser. No. 609,601
Int. Cl.[2] B23P *15/04, 19/02, 19/04*
U.S. Cl. 29—156.8 R **15 Claims**

1. An apparatus for removing a single turbomachinery vane and associated platform from a circumferential slot containing a plurality of vanes in an arcuate casing section comprising:

(a) support means for placement on the concave side of the casing;

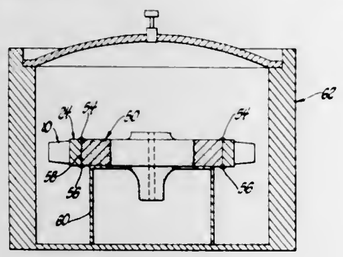
(b) an elongate strike element having its one end pivotably supported by said support means on the axis of the casing and having on its free end a knocker element for imparting a dynamic impact against the single vane and away from

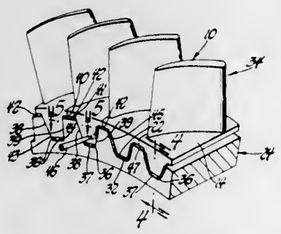
the plurality of vanes with the resultant force being in a direction aligned with the plane of the circumferential slot



to effect removal of the vane from the slot in a circumferential direction.

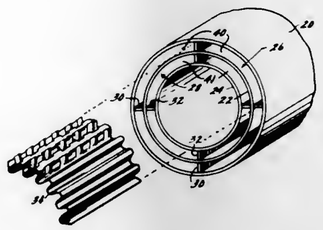
4,096,615
TURBINE ROTOR FABRICATION
Kenneth R. Cross, Lebanon, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed May 31, 1977, Ser. No. 802,020
Int. Cl.[2] B23P *15/04*; B23K *19/00*
U.S. Cl. 29—156.8 R **4 Claims**





1. A method for fabricating a hybrid dual property wheel assembly comprising: preforming a plurality of blades with a base tang thereon, preforming a blade support ring including a plurality of circumferentially spaced blade position slots therein for receiving base tangs of each of said blades whereby adjacent blades are accurately dimensionally located one to the other, sealing each of said tangs within one of said position slots, thereafter machining the inside diameter of the joined blades and ring to expose portions of said blade base tangs, preforming a disc having a controlled outside diameter, press fitting the ring and blades to the disc to form a butt interface, sealing the hub disc and ring blade assemblies at joint lines on either side of the butt interface, thereafter hot isostatically pressing the joined blade, ring and hub disc components to form a diffused metallurgical bond between the blade base tangs, the ring and the disc at the interface therebetween.

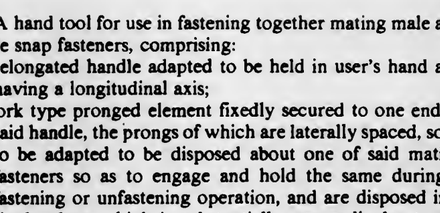
4,096,616
METHOD OF MANUFACTURING A CONCENTRIC TUBE HEAT EXCHANGER
George A. Coffinberry, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio
Filed Oct. 28, 1976, Ser. No. 736,571
Int. Cl.[2] B23P *15/26*
U.S. Cl. 29—157.3 A **13 Claims**

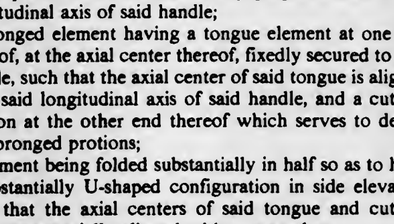


1. A method for use in fabricating a heat exchanger adapted to transfer heat between first and second fluids, said heat exchanger comprised of at least a pair of longitudinally extending concentric tubes, one of said tubes disposed within the other to form a longitudinally extending annular flow channel therebetween and plurality of heat transfer promoting fins disposed within said annular flow channel, said method comprising the steps of:
- disposing one of said tubes within the other of said tubes to form a first longitudinally extending channel therebetween;
- inserting a plurality of spacer members into said flow channel at circumferentially spaced apart locations so as to form a plurality of longitudinally extending flow segments between said plurality of spacer members;
- positioning a plurality of heat transfer promoting fins within said plurality of flow segments; and
- applying a radially directed deforming force to said pair of tubes in sufficient magnitude to achieve permanent deformation of said pair of tubes to retain said spacing members and said heat transfer promotion fins securely disposed within said annular flow channel.

4,096,617
AXLE PULLING MEANS
Arthur J. Ritter, Jr., Metamora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed May 26, 1977, Ser. No. 800,822
Int. Cl.[2] B25B *27/14*
U.S. Cl. 29—278 **4 Claims**

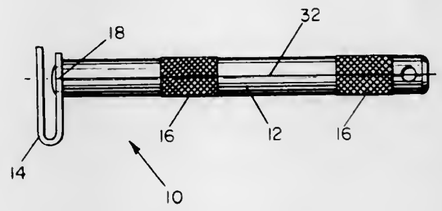
1. Structure for use in manipulating a heavy axle such as during installation in and removal from a vehicle drive assembly, said axle manipulating structure comprising:
- means at one end of said drive axle defining a cylindrical support surface, an annular boss at the inner end of said support surface, a radial outwardly facing limit surface at the inner end of said boss, and a male threaded surface at the outer end of said support surface; and
- a puller tool having an inner end portion defining a socket for snugly receiving said end of the axle, said socket being defined by a distal end surface abutting said axle limit surface, an inner cylindrical portion snugly fitting said boss, an inner-intermediate cylindrical portion snugly fitting said axle support surface, and an outer-intermediate female threaded portion threaded to said axle male threaded surface, said puller tool further having an elongated outer end portion defining a manipulating handle, the length of said inner-intermediate cylindrical portion being at least three times greater than the length of said outer intermediate female threaded portion, said inner cylindrical portion and inner-intermediate cylindrical portion defining support surfaces providing positive surface engagement between the puller tool and the axle end





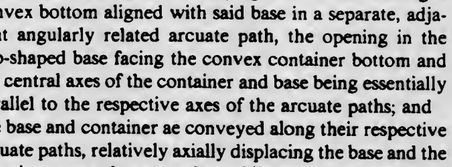
for positive control of the heavy axle during installation and removal operations.

4,096,618
HAND TOOL FOR FASTENING AND UNFASTENING SNAP FASTENERS
Irving W. Perline; Leonard Trapido, both of Kew Gardens; John J. Rottenkolber, Bronx, and Michael L. Rottenkolber, Mt. Vernon, all of N.Y., assignors to Andrew Adams Developing Corporation, Bronx, N.Y.
Filed Dec. 8, 1976, Ser. No. 748,472
Int. Cl.[2] B25B *27/14*
U.S. Cl. 29—278 **2 Claims**



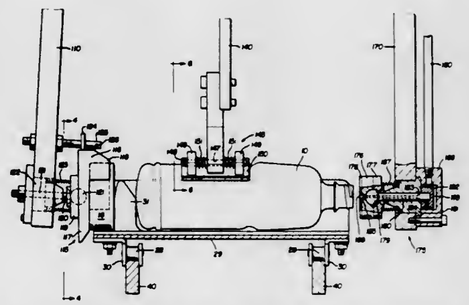
1. A hand tool for use in fastening together mating male and female snap fasteners, comprising:
- an elongated handle adapted to be held in user's hand and having a longitudinal axis;
- a fork type pronged element fixedly secured to one end of said handle, the prongs of which are laterally spaced, so as to be adapted to be disposed about one of said mating fasteners so as to engage and hold the same during a fastening or unfastening operation, and are disposed in a single plane which is substantially perpendicular to the longitudinal axis of said handle;
- said pronged element having a tongue element at one end thereof, at the axial center thereof, fixedly secured to said handle, such that the axial center of said tongue is aligned with said longitudinal axis of said handle, and a cut-out portion at the other end thereof which serves to define said pronged protions;
- said element being folded substantially in half so as to have a substantially U-shaped configuration in side elevation such that the axial centers of said tongue and cut-out portions are axially aligned with one another,
- whereby the axial alignment of said handle, said tongue and said cut-out portion permits insertion or withdrawal forces to be transmitted from said handle to said prongs and said held fastener.

4,096,619
SEMICONDUCTOR SCRIBING METHOD
Charles R. Cook, Jr., North Palm Beach, Fla., assignor to International Telephone & Telegraph Corporation, Nutley, N.J.
Filed Jan. 31, 1977, Ser. No. 764,095
Int. Cl.[2] B23P *17/00*
U.S. Cl. 29—413 **14 Claims**



1. A method of breaking a semiconductor material in accordance with a desired breakage pattern comprising:
- anodizing preselected regions of the semiconductor material; and
- stressing said semiconductor material until said semiconductor material breaks in said regions weakened by the step of anodizing.

4,096,620
METHOD AND APPARATUS FOR ASSEMBLING A SUPPORT BASE TO THE BOTTOM OF A PLASTIC CONTAINER
Robert F. Kontz, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Jan. 6, 1977, Ser. No. 757,415
Int. Cl.[2] B23P *11/00*
U.S. Cl. 29—428 **17 Claims**



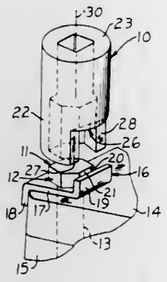
1. In a method of attaching a cup-shaped support base to a convex bottom of a container, the steps of:
- conveying a cup-shaped base along an arcuate path, simultaneously and separately conveying a container having a convex bottom aligned with said base in a separate, adjacent angularly related arcuate path, the opening in the cup-shaped base facing the convex container bottom and the central axes of the container and base being essentially parallel to the respective axes of the arcuate paths; and
- as the base and container ae conveyed along their respective arcuate paths, relatively axially displacing the base and the container toward one another while accommodating pivotal movement of the base into axial alignment with the axis of the container to telescopically assemble the base onto the convex container bottom.

4,096,621

METHOD OF CONCURRENTLY ROTATING A THREADED FASTENER AND DEFLECTING A LOCKING TAB

Richard E. Berger, Pekin, and Herbert L. Wahrenburg, East Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 641,462, Dec. 17, 1975, abandoned. This application Mar. 4, 1977, Ser. No. 774,369
Int. Cl.[2] B23P *19/00*
U.S. Cl. 29—526 R **10 Claims**



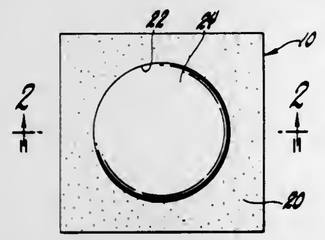
1. The method of selectively controlling the threaded disposition of a threaded element having a turning portion defining an array of flat sides relative to a member having a complementary threaded means, said flat sides of said element extending parallel to the axis of the threaded element and being disposed adjacent said member, comprising the steps of: fixedly securing a deformable retainer to said member to have a retaining portion of the retainer extend adjacent one of said element flat sides to effectively prevent threaded turning of said element relative to said member; and engaging concurrently a first, camming surface of a tool with said retaining portion and a second, turning surface of the tool with said flat sides of the threaded element other than said one flat side for concurrently separately turning said retaining portion away from said element flat side and causing threaded turning of said element relative to said member without interference by said retainer.

4,096,622

ION IMPLANTED SCHOTTKY BARRIER DIODE

Bernard A. MacIver, Lathrup Village, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 600,888, Jul. 31, 1975, abandoned. This application Jan. 14, 1977, Ser. No. 759,324
Int. Cl.[2] B01J *7/00*
U.S. Cl. 29—578 **3 Claims**



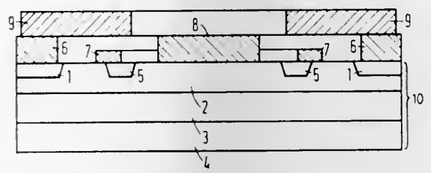
1. A method of making a sub-surface Schottky barrier in a semiconductive body, which barrier has electrical rectification properties substantially unaffected by contaminants on said semiconductive body, said method comprising the steps of:
covering a preselected island-like region of a surface on a semiconductive body portion with a layer that a beam of high velocity metal ions can penetrate, said layer having an ion stopping power at least about equal to that of silicon and a thickness commensurate with the thickness of an ion implanted region to be formed beneath said layer;
masking said surface surrounding said island-like region to isolate said surrounding surface from said ion beam;
uniformly exposing said surface to a beam of high velocity ions of an electronically neutral metal, said ions having an average velocity imparted by an electrical potential preselected to cause only about 50 - 60% of said ions to penetrate said layer, whereby substantially all of said ions that penetrate said layer lodge within about 500 angstroms of said surface and form a shallow island-like region in said portion having a narrow truncated substantially Gaussian concentration profile of metal atoms that is maximum at said surface;
continuing said exposure to said ion beam until said surface is given an ion beam dose of at least about 1×10^{15} atoms per square centimeter and said island-like region becomes functionally metallic with respect to the remainder of said body portion, whereby said island-like region forms a surface-contaminant-free sub-surface Schottky barrier with said body portion within about 500 angstroms of said surface;
making a low resistance electrical connection to said island-like region; and
making a low resistance electrical connection to said body portion outside said region.

4,096,623

THYRISTOR AND METHOD OF PRODUCING THE SAME

Alfred Porst, and Gottfried Schuh, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Division of Ser. No. 590,706, Jun. 26, 1975, abandoned. This application Jan. 18, 1977, Ser. No. 760,272
Claims priority, application Germany, Jul. 1, 1974, 2431506
Int. Cl.[2] H01L *33/00*
U.S. Cl. 29—580 **5 Claims**



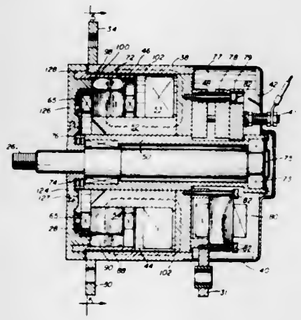
1. A process for producing a thyristor structure having a semiconductor body which includes a plane surface, an emitter zone at least partially covered by an emitter electrode, a base zone located adjacent said emitter zone and accessible at said plane surface of the semiconductor body, a control electrode having a plane surface in contact with said base zone, a contact electrode positioned on said emitter electrode and having a plane face above said plane surface of the semiconductor body and an auxiliary emitter zone positioned between said emitter zone and said control electrode and accessible at said plane surface of the semiconductor body, said auxiliary emitter zone having an auxiliary emitter electrode in contact therewith, the steps comprising:
providing a semiconductor body having at least a plane upper surface, an emitter zone, a base zone and an auxiliary emitter zone therein which are spaced from one another and accessible at said plane upper surface of the semiconductor body;
depositing a metal layer on said plane surface of the semiconductor body in a thickness corresponding to a desired height dimension of an emitter electrode;
masking areas of said metal layer at least partially above said zones in a pattern corresponding to a desired shape of an emitter electrode, a control electrode and an auxiliary emitter electrode with a first photo-mask;
etching uncoated metal layer areas down to said surface of the semiconductor body and thereafter removing said first photo-mask;
masking areas of the resultant metal layer at least partially above the emitter and base zones with a second photo-mask;
etching the uncoated metal layer area above the auxiliary emitter zone to a height less than the masked metal layer areas and thereafter removing said second photo-mask; and
completing said thyristor structure.

4,096,624

METHOD OF MAKING A VARIABLE RELUCTANCE A.C. ELECTRICAL GENERATOR

Alden J. Gray, Ashfield, Mass.; Ian S. Sanderson, Kennebunk, and John C. Hardy, Gorham, both of Me., assignors to Maremont Corporation, Chicago, Ill.

Division of Ser. No. 692,046, Jun. 2, 1976, Pat. No. 4,025,960, which is a continuation of Ser. No. 522,294, Nov. 8, 1974, abandoned. This application May 16, 1977, Ser. No. 797,344
Int. Cl.[2] H02K *15/14*
U.S. Cl. 29—596 **2 Claims**



1. The method of making a variable reluctance inductor alternator which method comprises:
providing a stator housing structure having an annular cavity substantially closed at one of its two ends and open at its other end and which cavity is defined in part by a central portion having a generally cylindrical outer surface,
providing a tubular support having an internal cylindrical surface of such a diameter as to be capable of being slip fit over said central portion,
preassembling on said tubular support (1) an annular stator core with an annular series of radially outwardly extending stator poles, (2) an annular field coil, and (3) a plurality of generating windings each received and a respective one of said stator poles,
thereafter axially sliding said preassembly of said support, said core, said field coil and said generating windings onto said central portion and into said cavity, and
subsequently fixing said preassembly to said housing structure.

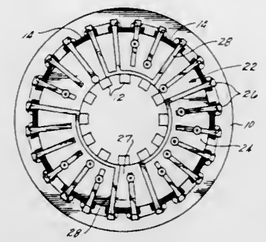
4,096,625

METHOD FOR INTERCONNECTING STATOR COILS

Anthony P. Morreale, Whittier, Calif., assignor to Rapidsyn Co., Santa Fe Springs, Calif.

Division of Ser. No. 629,715, Nov. 7, 1975, Pat. No. 4,039,875. This application Mar. 10, 1977, Ser. No. 776,317
Int. Cl.[2] H02K *15/00*
U.S. Cl. 29—596 **3 Claims**

1. The method of providing electrical connections to a plurality of individual wire coils wound on a salient pole motor stator, comprising the steps of: bringing the two ends of the wire forming each coil out together at the same end of the coil, forming an annular shaped printed circuit board having a plurality of radially outwardly projecting terminals electrically interconnected by the printed circuit, positioning the annular board coaxially on one end of the stator against the ends of the



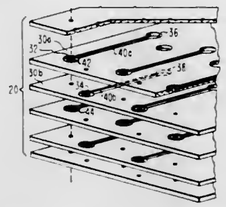
coils from which the ends of the wires are brought out, wrapping and securing the wire ends of each of the individual coils to adjacent ones of the radial terminals of the circuit board, and attaching external leads to terminals on the board.

4,096,626

METHOD OF MAKING MULTI-LAYER PHOTOSENSITIVE GLASS CERAMIC CHARGE PLATE

Carlton Edward Olsen, San Jose, and Leroy Jasper Serpa, Campbell, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,708
Int. Cl.[2] H05K *3/10;* **G01D** *15/18*
U.S. Cl. 29—624 **8 Claims**



1. The method for forming a multi-layer laminated charge plate for an ink jet printer comprising the steps of:
forming a plurality of layers from a photosensitive material by etching each of said layers to produce a predetermined pattern comprising a plurality of openings and conductor paths therein;
stacking said etched layers to that corresponding ones of said openings are in coaxial alignment;
heat treating said layers by heating to a termperature and for a period of time sufficient to bond said layers together; and
metallizing said conductor paths to produce electrically conducting circuits along said conductor paths.

4,096,627

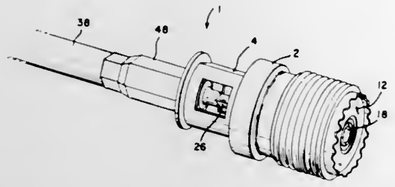
METHOD OF FORMING PORT HOLE COAXIAL CONNECTOR

Edgar Wilmot Forney, Jr., Harrisburg, and Richard Shure Hogendobler, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 689,020, May 24, 1976, Pat. No. 4,047,788. This application Jun. 22, 1977, Ser. No. 808,758
Int. Cl.[2] H01G *43/00*
U.S. Cl. 29—628 **1 Claim**

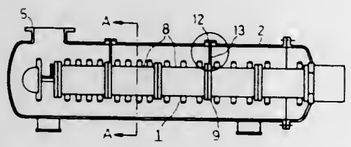
1. A method of crimping a coaxial connector, comprising the steps of: inserting a coaxial connector through a rearward portion of a coaxial connector, projecting a center conductor and at least a portion of an insulation layer of said cable into a

medial portion of a connector, inserting said center conductor into a barrel portion of an electrical contact supported in a dielectric insert in a forward portion of said connector, visually inspecting said center conductor and said insulation layer and said barrel portion through at least one of a pair of opposed port holes in said medial portion, applying a shielding jacket



over said rearward portion, applying a ferrule over said shielding jacket, nesting opposed flat surfaces on opposite sides of said medial portion between opposed walls of a first crimping die, nesting one port hole over at least a portion of said first crimping die, and crimping said ferrule and said barrel portion with said first and a second crimping die through said opposed port holes.

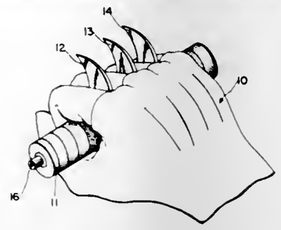
4,096,628
METHOD FOR MAINTAINING THE POSITIONING OF ELECTRICAL ELEMENTS WITHIN A CONTAINER
Hans Bäckskog, Ludvika, Sweden, assignor to Asea AB, Vesteras, Sweden
Filed Dec. 20, 1976, Ser. No. 752,281
Claims priority, application Sweden, Dec. 23, 1975, 7514608
Int. Cl.[2] H01R *43/00*
U.S. Cl. 29—628 **8 Claims**



1. A method of assembling and transporting an electrical device which, when operational, includes electrical elements within a container, comprising the steps of arranging the electrical elements within a container which has openings in the walls thereof at predetermined locations, inserting transport supports radially through the openings in the walls of the container in order to contact the electrical elements therein, securing the transport supports between the container and the electrical elements, transporting the electrical device to an erection site, removing the transport supports from within the container, and covering the openings in the walls of the container.

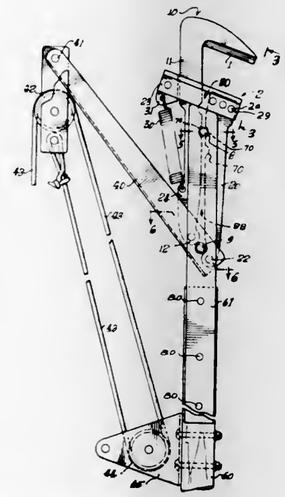
4,096,629
MULTIPLE BLADED RETRACTABLE CLAW WEAPON
Alfred B. Levine, 2924 Terrace Dr., Chevy Chase, Md. 20015
Filed May 16, 1977, Ser. No. 797,231
Int. Cl.[2] B26B *1/02, 1/08, 27/00*
U.S. Cl. 30—152 **11 Claims**

1. An artificial claw weapon comprising:
a handle means having a shape to be substantially entirely enclosed within the encircling fingers of a closed human fist,
a plurality of claw-shaped blade members spaced apart from one another along the length of the handle means and projecting transversely and substantially unidirectionally from the handle means with the spacing between adjoining blade members corresponding to the width of a human finger, whereby the blades may be interdigitated between the fingers and project outwardly from the fist when the handle means is enclosed by the fist,
and means movably attaching the blade members to the handle means for varying the orientation of the blade



memebers with respect to the longitudinal axis of the handle means to an inactive, more compact, reposed condition, thereby to provide ease and safety in the storage and carrying of the claw weapon in the pocket and purse of the user.

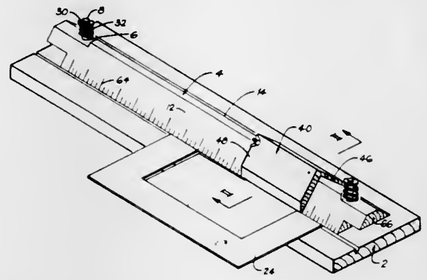
4,096,630
POLE PRUNER
Cecil W. Honick, 4008 W. Ave. 43, Los Angeles, Calif. 90041
Filed Mar. 30, 1977, Ser. No. 782,640
Int. Cl.[2] B26B *13/00*
U.S. Cl. 30—258 **7 Claims**



1. A pole pruner comprising:
a pole;
a blade element having a generally-horizontal cutting edge portion facing downward and a generally vertically-depending stem portion;
an anvil element having two spaced generally-horizontal side bar portions facing said cutting edge portion and a generally vertically-depending anvil stem portion fastened thereto;
an actuating lever;
a side-plate and means fastening said side-plate to said pole;
pivot pins connecting each said stem portion to said lever at stem pivot points;
a lever pivot pin connecting said lever to said side plate at a point between said stem pivot points,
said lever thereby moving said stem portions in opposite directions,
said anvil element side bar portions and said anvil stem portions being fastened together with an anvil back filler piece to form an open box-like structure,

said blade stem portion being slidably enclosed in said structure, and said pivot pins, guide pin, and back filler piece forming the sole means to guide said blade and anvil in parallel relation; and further comprising:
a first pulley on a bracket at the outer portion of said lever,
a second pulley fastened to said pole, and
a flexible actuating cord extending from said bracket around said second pulley, then around said first pulley, and extendable downward therefrom.

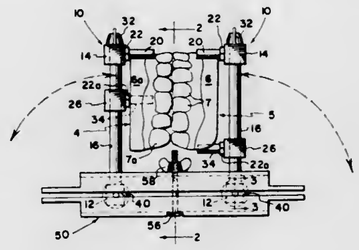
4,096,631
MAT CUTTING MACHINE
Richard Harry Ward, P. O. Box 241, Carpinteria, Calif. 93013
Filed Oct. 29, 1976, Ser. No. 737,055
Int. Cl.[2] B26B *29/00;* B26D *7/02*
U.S. Cl. 30—294 **12 Claims**



1. A mat cutting machine including
a base,
a guide rail attached to the base, the guide rail including a first planar surface terminating in a straight edge adjacent to the base and a second planar surface intersecting the first planar surface in a line parallel to the straight edge,
the base including a recess in line with the straight edge of the guide rail and in the plane defined by the first planar surface,
a carriage removably and slideably mounted with its first and second planar surfaces in face-to-face contact with the first and second planar surfaces of the guide rail, the carriage including a cutting blade projecting beyond the straight edge of the guide rail and into the recess of the base, a side end edge of the second planar surface of the carriage defining a plane perpendicular to the first planar surface of the carriage,
the side end edge and the planar surfaces of the guide rail and the carriage planar surfaces guiding the blade along a plane parallel to the plane of the first planar surface of the guide rail and into the recess in the base as the carriage is rocked onto the guide rail about the side end edge, whereby when a mat is placed between the guide rail and the base, the carriage as it is placed on the guide rail may be rocked down along the guide rail with the first planar surfaces transversely sliding past one another in face-to-face contact and the cutting blade thereby caused to enter the mat at the predetermined angle, this angle being the bevel angle at which the mat is to be cut.

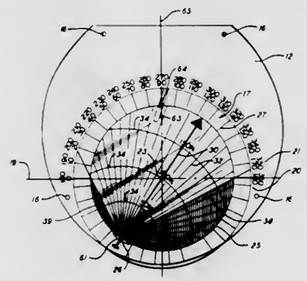
4,096,632
DENTURE MATCHING APPARATUS
William V. Perry, 3300 Mannion Rd., Saginaw, Mich. 48603
Filed May 24, 1976, Ser. No. 689,637
Int. Cl.[2] A61C *11/00*
U.S. Cl. 32—32 **20 Claims**

20. Denture mounting apparatus comprising:
a longitudinally extending frame including movable clamping frame portions;
first and second, longitudinally spaced, denture support members for releasably supporting first and second dentures;
means mounting each denture support members on said clamping frame portions for bodily movement toward and away from the other support member and for swinging movement relative to said frame portions to precisely align and orient said dentures; and
means for clamping said clamping frame portions to said denture support members in any selected one of a plurality of positions;



said frame portions comprising generally horizontal, laterally spaced, vertically opposed clamping bars selectively movable toward and away from each other to clamp said denture support members in adjusted positions; said mounting means mounting said denture support members on said clamping bars for swinging movement between generally vertical positions perpendicular to said bars and generally horizontal positions parallel to said bars.

4,096,633
ANTI-COLLISION PLOTTER
W. Paul Nolan, 427 Winthrop Dr., Pittsburgh, Pa. 15237
Filed Mar. 9, 1977, Ser. No. 775,968
Int. Cl.[2] G01C *21/20*
U.S. Cl. 33—1 SD **13 Claims**



1. An airborne plotter for automatically providing a visual display containing potential collision information regarding closing aircraft flying at about the same altitude as the inflight first aircraft including
a back plate and a cover plate supported in spaced apart relationship by spacer means;
a transparent window provided in the face of the cover plate of the plotter having a semicircular compass rose imprinted thereon;
a range circle also imprinted upon the window inside the compass rose and being concentric therewith;
an opaque mask positioned behind the window and being pivotably secured between the plates in the plotter about a pivot means positioned upon the range circle at the point where a diameter of the circle perpendicular to the base of the semicircular compass rose intersects the circle opposite the compass rose, the mask having two perpendicular sides that intersect at the pivot point;

a course index line inscribed upon the viewing face of the mask which bisects the right angle between the sides thereof for setting the aircraft course into the compass rose whereby the sides cut arcuate shaped sectors in the range circle that are indicative of zones of primary importance; and

means to move said mask to a desired heading.

7. An airborne plotter for providing potential collision information in regard to other aircraft flying about the same altitude of a first aircraft including

a back-plate and a cover plate supported in spaced apart relationship by spacer means;

a transparent window formed in the cover plate having a semicircular compass rose imprinted thereon;

a transparent course indicator dial rotatably supported in the cover plate of the plotter upon a first pivot means located at the radial center of the compass rose, the dial having a range circle which is concentric with said radial center and a diameter which is smaller than the diameter of the compass rose;

an opaque mask having two perpendicular sides, the mask being pivotably supported in the course indicator dial upon a second pivot means at a point on the range circle, said two sides intersecting at said pivot point;

a stationary post supported in the back-plate of the plotter and being arranged to extend into a slotted opening formed in the mask that is axially aligned along the bisector of the right angle formed by said sides of said mask, the post being positioned on the range circle at the point where the radius of the compass rose normal to its base intersects the range circle; and

means to set the indicator dial into the compass rose to the aircraft heading whereby the sides of the mask are automatically moved to cut arcuate sectors in the range circle which are of primary interest to the pilot of said aircraft.

4,096,634

METHOD AND DEVICE FOR THE MEASUREMENT OF ANGLES ON SPACE PLANES

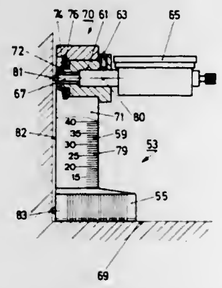
Alfred Gudel, Gaswerkstrasse 26, 4900 Langenthal, Switzerland

Filed Jul. 19, 1976, Ser. No. 706,740

Claims priority, application Switzerland, Jul. 22, 1975, 9595/75; Jan. 31, 1976, 352/76

Int. Cl.² G01B *3/56*

U.S. Cl. 33—75 C **8 Claims**



1. A device for angle measurement of space planes, including: an angle element with two legs rigidly connected to each other and having a specific angle ratio to one another, said legs having longitudinal axes which intersect at a right angle; a planar contact device formed by a plane surface of one of said two legs which is a reference leg for contact with at least two contact points of a space plane located at said reference leg, said planar contact device extending in parallel to said reference leg's longitudinal axes; first and second contact elements mounted on the other of said two legs which is a measuring leg for contact with at least two additional points of said space plane, whereby said contact elements determine at least two distance lines between said measuring leg and respective contact points, said distance lines extending in parallel to the longitudinal axes of said reference leg; means for adjustably supporting at least the first of said contact elements on said measuring leg so that the distance of the respective contact point is variable with respect to the measuring leg, said measuring leg having a longitudinal slot; said first contact element being mounted via slide means in said measuring leg so that it can be measurably moved along said measuring leg, said slide means being spring mounted in said slot to fix it movably in said slot, said first contact element being mounted on the measuring leg at a greater distance from said reference leg than said second contact element, said second contact element on said measuring leg comprising a pair of contact elements for contacting said space plane at least at two spaced apart contact points, said two contact points defining a line which extends normally with respect to the plane defined by said two legs, at least said said first contact element comprising means for automatic adjustment of the length thereof under contact pressure, a measuring device connected to said first contact element in order to measure the distance between the respective contact point of said first contact element and said measuring leg, a measuring scale on said measuring leg between said two contact elements in order to determine the distance between said two contact elements.

4,096,635

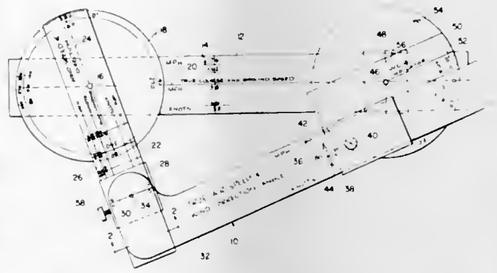
NAVIGATIONAL COMPUTER

Lon M. McMillan, Regency Apartments 209-5, Warner Robins, Ga. 31093

Filed Jul. 19, 1976, Ser. No. 706,183

Int. Cl.² B43L *13/00, 7/06;* **G06G** *1/02*

U.S. Cl. 33—98 **9 Claims**



1. A navigational computer comprising a first arm carrying indicia denoting a first scale, a second arm, said second arm carrying indicia denoting a second scale, a third arm, said third arm carrying indicia denoting a third scale, a first compass rose, means to pivotably secure one end of said first arm and one end of said second arm and said compass rose to each other, said compass rose being disposed intermediate adjacent faces of said first arm and said second arm, said first compass rose carrying indicia in a first circularly disposed scale, means to slideably and pivotably secure one end of said third arm along a selected portion of a length of said second arm, means to slideably and pivotably engage a selected portion of the length adjacent the other end of said third arm to a selected portion of the length adjacent the other end of said first arm, a second compass rose, said second compass rose being disposed at said selected portion of said length of said first arm, said second compass rose carrying indicia in a second circularly disposed scale, first indicating means for use as a sight in conjunction with said second scale extending across the entire width of said second arm, said first indicating means disposed at said one end of said third arm, second indicating means for use as a sight in conjunction with said third scale extending across the entire width of said third arm, said second indicating means disposed at said selected portion of said length adjacent said other end of said third arm, third indicating means for use as a sight in conjunction with said first scale extending across the entire width of said first arm, said third indicating means disposed at said selected portion of said length adjacent said other end of said first arm, fourth indicating means for use as a sight in conjunction with said first circular scale, said fourth indicating means disposed along the length of said first arm extending radially outwardly from the center of said first compass rose and adjacent said first scale, fifth indicating means for use as a sight in conjunction with said first circular scale, said fifth indicating means disposed parallel to the longitudinal axis of said second arm and extending radially outwardly from the center of said second compass rose, sixth indicating means for use as a sight in conjunction with said second circular scale, said sixth indicating means disposed substantially parallel to the longitudinal axis of said third arm extending radially outwardly from the center of said second compass rose and adjacent said second scale.

4,096,636

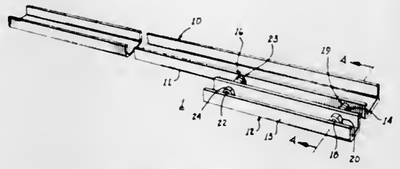
MOTORCYCLE WHEEL ALIGNMENT TOOL

Michael D. Little, 5718 N. 18th Pl., Phoenix, Ariz. 85016

Filed Oct. 26, 1976, Ser. No. 735,151

Int. Cl.² G01B *3/30, 5/255*

U.S. Cl. 33—169 R **5 Claims**



1. An alignment tool for aligning the front and rear wheel mounted tires of a motorcycle having an alignment adjustment mechanism on one of the wheels, said tool comprising:

a. a first bar of a length sufficient to extend fore and aft along chords on one side of the sidewalls of the front and rear tires;

b. a first alignment edge disposed upon said bar for making contact on two points on the sidewall of the front wheel tire to define a plane orthogonal to the axis of the front wheel; and

c. a spacer bar having at least an L-shaped cross section having second and third alignment edges disposed each being capable of bar for making contact on two points on the sidewall of the rear wheel tire to define a further plane orthogonal to the axis of the rear wheel;

d. means mounting said spaces bar on said first bar for discrete lateral adjustment parallel thereto, said mounting means being selectively connectable to either leg of said L-shaped cross section to permit selected use of said second and third alignment edges;

whereby, the front and rear wheel alignment is effected by setting the spacer bar at a predetermined position with respect to said first bar corresponding to the desired wheel alignment, and operating the alignment adjustment mechanism until each of the first and selected alignment edges makes contact with the two points on the respective sidewall to bring said plane into parallelism with said further plane.

4,096,637

ORIENTING DEVICE FOR DENTAL FACEBOW OR PANTOGRAPH

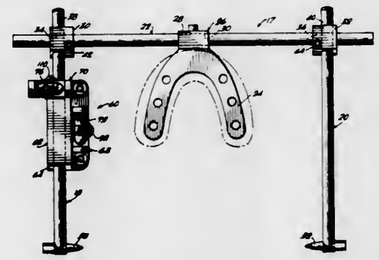
Elwood H. Stade, R.R. #3 Box 369C, Edwardsville, Ill. 62025

Filed Apr. 22, 1976, Ser. No. 679,465

Int. Cl.² A61C *19/04;* **G01C** *9/28*

U.S. Cl. 33—174 D **3 Claims**

1. In combination, a facebow and facebow orienting means, said facebow comprising a first and a second spaced temple portion and a transverse portion, said facebow being adapted to encircle the frontal face zone of a patient, said orienting device comprising a body, a first leveling gauge means including first pivotal means pivotally connecting said first leveling gauge means to the body for swinging movement in a first vertical plane, a second leveling gauge means including second pivotal means pivotally connecting the second leveling gauge means to the body for pivotal movement of said second leveling gauge means in a vertical plane perpendicular to the plane of pivotal movement of said first leveling gauge means, and



adjustment means to pivotally move the gauges with respect to the body and to hold the gauges to the body in adjusted positions, and means to mount the body to said facebow with said first leveling gauge means being oriented generally parallel to a line connecting the ends of said temple portions, and said second leveling gauge means lying in a generally horizontal plane when said facebow is in its use position.

4,096,638

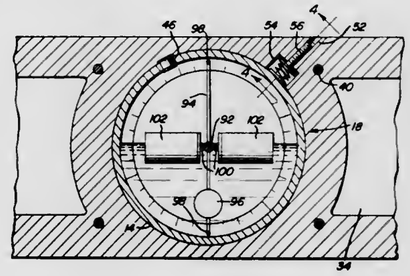
PENDULUM

Fred H. Schimming, Pea Ridge, Ark., assignor to Roland Clardy and Ray Green, Rogers, Ark., part interest to each

Filed Dec. 20, 1976, Ser. No. 755,623

Int. Cl.² G01C *9/12*

U.S. Cl. 33—396 **2 Claims**



1. A level comprising a body defining first and second pairs of opposite sides and a cylindrical opening in said body extending between and opening outwardly of said first pair of sides, said second pair of sides being adapted for selective abutting against a surface whose orientation relative to the horizontal is to be measured, a level assembly disposed in said opening, said level assembly including a sealed hollow housing having opposite sides facing outwardly of said first pair of sides, journal means carried by central portions of said housing sides, indicator means including a horizontal shaft extending between and journaled from said journal means and pointer arm means carried by and projecting outwardly from at least one side of said shaft and including outer end provided with indicator means closely adjacent and swingable about the inner surfaces of the outer peripheries of said housing sides, said housing sides including indicia spaced about said outer peripheries with which said indicator means is registrable, second arm means carried by said shaft and projecting outwardly from opposite sides thereof, the outer ends of said second arm means including float elements spaced along said second arm means in a line normal to a diametric plane of said shaft containing said indica-

a course index line inscribed upon the viewing face of the mask which bisects the right angle between the sides thereof for setting the aircraft course into the compass rose whereby the sides cut arcuate shaped sectors in the range circle that are indicative of zones of primary importance; and

means to move said mask to a desired heading.

7. An airborne plotter for providing potential collision information in regard to other aircraft flying about the same altitude of a first aircraft including

a back-plate and a cover plate supported in spaced apart relationship by spacer means;

a transparent window formed in the cover plate having a semicircular compass rose imprinted thereon;

a transparent course indicator dial rotatably supported in the cover plate of the plotter upon a first pivot means located at the radial center of the compass rose, the dial having a range circle which is concentric with said radial center and a diameter which is smaller than the diameter of the compass rose;

an opaque mask having two perpendicular sides, the mask being pivotably supported in the course indicator dial upon a second pivot means at a point on the range circle, said two sides intersecting at said pivot point;

a stationary post supported in the back-plate of the plotter and being arranged to extend into a slotted opening formed in the mask that is axially aligned along the bisector of the right angle formed by said sides of said mask, the post being positioned on the range circle at the point where the radius of the compass rose normal to its base intersects the range circle; and

means to set the indicator dial into the compass rose to the aircraft heading whereby the sides of the mask are automatically moved to cut arcuate sectors in the range circle which are of primary interest to the pilot of said aircraft.

4,096,634

METHOD AND DEVICE FOR THE MEASUREMENT OF ANGLES ON SPACE PLANES

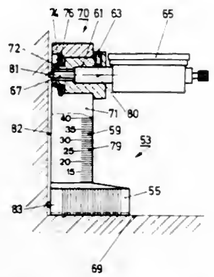
Alfred Gudel, Gaswerkstrasse 26, 4900 Langenthal, Switzerland

Filed Jul. 19, 1976, Ser. No. 706,740

Claims priority, application Switzerland, Jul. 22, 1975, 9595/75; Jan. 31, 1976, 352/76

Int. Cl.[2] G01B *3/56*

U.S. Cl. 33—75 C **8 Claims**



1. A device for angle measurement of space planes, including: an angle element with two legs rigidly connected to each other and having a specific angle ratio to one another, said legs having longitudinal axes which intersect at a right angle; a planar contact device formed by a plane surface of one of said two legs which is a reference leg for contact with at least two contact points of a space plane located at said reference leg, said planar contact device extending in parallel to said reference leg's longitudinal axes; first and second contact elements mounted on the other of said two legs which is a measuring leg for contact with at least two additional points of said space plane, whereby said contact elements determine at least two distance lines between said measuring leg and respective contact points, said distance lines extending in parallel to the longitudinal axes of said reference leg; means for adjustably supporting at least the first of said contact elements on said measuring leg so that the distance of the respective contact point is variable with respect to the measuring leg, said measuring leg having a longitudinal slot; said first contact element being mounted via slide means in said measuring leg so that it can be measurably moved along said measuring leg, said slide means being spring mounted in said slot to fix it movably in said slot, said first contact element being mounted on the measuring leg at a greater distance from said reference leg than said second contact element, said second contact element on said measuring leg comprising a pair of contact elements for contacting said space plane at least at two spaced apart contact points, said two contact points defining a line which extends normally with respect to the plane defined by said two legs, at least said said first contact element comprising means for automatic adjustment of the length thereof under contact pressure, a measuring device connected to said first contact element in order to measure the distance between the respective contact point of said first contact element and said measuring leg, a measuring scale on said measuring leg between said two contact elements in order to determine the distance between said two contact elements.

4,096,635

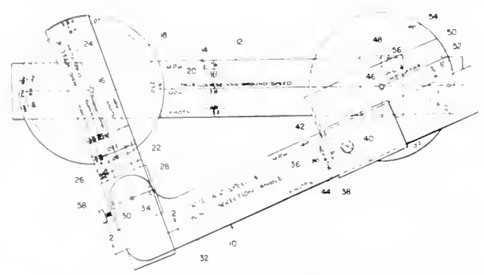
NAVIGATIONAL COMPUTER

Lon M. McMillan, Regency Apartments 209-5, Warner Robins, Ga. 31093

Filed Jul. 19, 1976, Ser. No. 706,183

Int. Cl.[2] B43L *13/00, 7/06;* **G06G** *1/02*

U.S. Cl. 33—98 **9 Claims**



1. A navigational computer comprising a first arm carrying indicia denoting a first scale, a second arm, said second arm carrying indicia denoting a second scale, a third arm, said third arm carrying indicia denoting a third scale, a first compass rose, means to pivotably secure one end of said first arm and one end of said second arm and said compass rose to each other, said compass rose being disposed intermediate adjacent faces of said first arm and said second arm, said first compass rose carrying indicia in a first circularly disposed scale, means to slideably and pivotably secure one end of said third arm along a selected portion of a length of said second arm, means to slideably and pivotably engage a selected portion of the length adjacent the other end of said third arm to a selected portion of the length adjacent the other end of said first arm, a second compass rose, said second compass rose being disposed at said selected portion of said length of said first arm, said second compass rose carrying indicia in a second circularly disposed scale, first indicating means for use as a sight in conjunction with said second scale extending across the entire width of said second arm, said first indicating means disposed at said one end of said third arm, second indicating means for use as a sight in conjunction with said third scale extending across the entire width of said third arm, said second indicating means disposed at said selected portion of said length adjacent said other end of said third arm, third indicating means for use as a sight in conjunction with said first scale extending across the entire width of said first arm, said third indicating means disposed at said selected portion of said length adjacent said other end of said first arm, fourth indicating means for use as a sight in conjunction with said first circular scale, said fourth indicating means disposed along the length of said first arm extending radially outwardly from the center of said first compass rose and adjacent said first scale, fifth indicating means for use as a sight in conjunction with said first circular scale, said fifth indicating means disposed parallel to the longitudinal axis of said second arm and extending radially outwardly from the center of said second compass rose, sixth indicating means for use as a sight in conjunction with said second circular scale, said sixth indicating means disposed substantially parallel to the longitudinal axis of said third arm extending radially outwardly from the center of said second compass rose and adjacent said second scale.

4,096,636

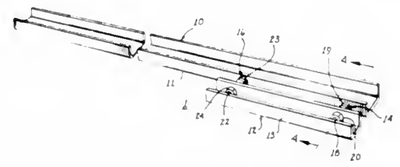
MOTORCYCLE WHEEL ALIGNMENT TOOL

Michael D. Little, 5718 N. 18th Pl., Phoenix, Ariz. 85016

Filed Oct. 26, 1976, Ser. No. 735,151

Int. Cl.[2] G01B *3/30, 5/255*

U.S. Cl. 33—169 R **5 Claims**



1. An alignment tool for aligning the front and rear wheel mounted tires of a motorcycle having an alignment adjustment mechanism on one of the wheels, said tool comprising:

a. a first bar of a length sufficient to extend fore and aft along chords on one side of the sidewalls of the front and rear tires;

b. a first alignment edge disposed upon said bar for making contact on two points on the sidewall of the front wheel tire to define a plane orthogonal to the axis of the front wheel; and

c. a spacer bar having at least an L-shaped cross section having second and third alignment edges disposed each being capable of bar for making contact on two points on the sidewall of the rear wheel tire to define a further plane orthogonal to the axis of the rear wheel;

d. means mounting said spaces bar on said first bar for discrete lateral adjustment parallel thereto, said mounting means being selectively connectable to either leg of said L-shaped cross section to permit selected use of said second and third alignment edges;

whereby, the front and rear wheel alignment is effected by setting the spacer bar at a predetermined position with respect to said first bar corresponding to the desired wheel alignment, and operating the alignment adjustment mechanism until each of the first and selected alignment edges makes contact with the two points on the respective sidewall to bring said plane into parallelism with said further plane.

4,096,637

ORIENTING DEVICE FOR DENTAL FACEBOW OR PANTOGRAPH

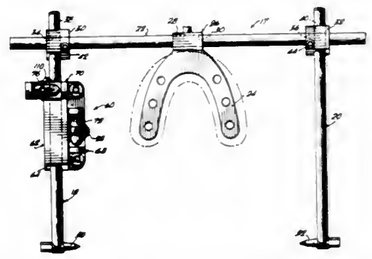
Elwood H. Stade, R.R. #3 Box 369C, Edwardsville, Ill. 62025

Filed Apr. 22, 1976, Ser. No. 679,465

Int. Cl.[2] A61C *19/04;* **G01C** *9/28*

U.S. Cl. 33—174 D **3 Claims**

1. In combination, a facebow and facebow orienting means, said facebow comprising a first and a second spaced temple portion and a transverse portion, said facebow being adapted to encircle the frontal face zone of a patient, said orienting device comprising a body, a first leveling gauge means including first pivotal means pivotally connecting said first leveling gauge means to the body for swinging movement in a first vertical plane, a second leveling gauge means including second pivotal means pivotally connecting the second leveling gauge means to the body for pivotal movement of said second leveling gauge means in a vertical plane perpendicular to the plane of pivotal movement of said first leveling gauge means, and



adjustment means to pivotally move the gauges with respect to the body and to hold the gauges to the body in adjusted positions, and means to mount the body to said facebow with said first leveling gauge means being oriented generally parallel to a line connecting the ends of said temple portions, and said second leveling gauge means lying in a generally horizontal plane when said facebow is in its use position.

4,096,638

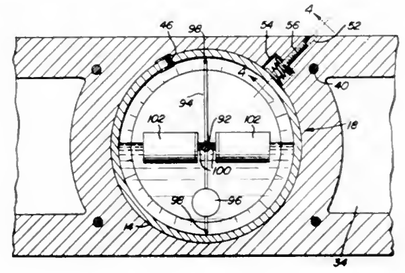
PENDULUM

Fred H. Schimming, Pea Ridge, Ark., assignor to Roland Clardy and Ray Green, Rogers, Ark., part interest to each

Filed Dec. 20, 1976, Ser. No. 755,623

Int. Cl.[2] G01C *9/12*

U.S. Cl. 33—396 **2 Claims**



1. A level comprising a body defining first and second pairs of opposite sides and a cylindrical opening in said body extending between and opening outwardly of said first pair of sides, said second pair of sides being adapted for selective abutting against a surface whose orientation relative to the horizontal is to be measured, a level assembly disposed in said opening, said level assembly including a sealed hollow housing having opposite sides facing outwardly of said first pair of sides, journal means carried by central portions of said housing sides, indicator means including a horizontal shaft extending between and journaled from said journal means and pointer arm means carried by and projecting outwardly from at least one side of said shaft and including outer end provided with indicator means closely adjacent and swingable about the inner surfaces of the outer peripheries of said housing sides, said housing sides including indicia spaced about said outer peripheries with which said indicator means is registrable, second arm means carried by said shaft and projecting outwardly from opposite sides thereof, the outer ends of said second arm means including float elements spaced along said second arm means in a line normal to a diametric plane of said shaft containing said indica-

tor means, a quantity of liquid contained within said housing to a level with said float elements disposed in said liquid and buoyed up thereby with a force substantially to the weight of said indicator means, whereby the shaft ends and journal means function primarily to guide the indicator means during its oscillation rather than support of the indicator means between said housing sides, said float elements coacting with liquid to support said pointer arm means in vertical position, said housing including a pair of aligned cylindrical opposite end sections with said opposite sides of said housing closing the remote ends of said sections, the adjacent ends of said end sections being oppositely and complementary stepped and interfittingly and sealingly secured together, corresponding peripheral portions of said adjacent ends having registered notches formed therein opening toward each other and defining a port through the corresponding outer peripheral wall portion of said housing centrally intermediate its opposite ends, a puncturable resillient plug extending through said port and overlapping the inner and outer surfaces of said corresponding peripheral wall portion, said plug being constructed of a material rendering said plug repeatedly puncturable by a hollow needle and self resealable each time the needle is withdrawn, said housing being removably and rotatably received in said body opening, said body having a bore formed therein extending generally radially of said cylindrical body opening and opening outwardly of one of said second pair of sides of said body at its outer end and into said body opening at its inner end, the inner end of said bore including a diametrically enlarged counterbore, the outer end of said bore being threaded, an abutment screw threaded in said outer end of said bore and including an inner end head loosely received in said counterbore, an abutment piston disposed in said counterbore, and a compression spring interposed between said head and abutment piston, said abutment piston being projectable, at least slightly, from said counterbore into said body opening for frictional abutting engagement with the opposing outer surface portion of said housing.

4,096,639

NICKEL-MISCHMETAL-CALCIUM ALLOYS FOR HYDROGEN STORAGE

Gary Dale Sandrock, Ringwood, N.J., assignor to The International Nickel Company, Inc., New York, N.Y.

Filed Nov. 8, 1976, Ser. No. 739,483
Int. Cl.² F26B *5/04*
U.S. Cl. 34—15 **2 Claims**

1. A method for storing hydrogen at pressures ranging from about 1 atmosphere to about 15 atmospheres comprising, contacting a hydrogen containing gas with a granulated $Ni_5M_{1-y}Ca_y$ compound at an ambient temperature, where M represents mischmetal and y is from about 0.2 to about 0.9.

4,096,640

METHOD AND APPARATUS FOR THERMAL TREATMENT OF OR FOR MATTER-EXCHANGE WITH POURABLE MATERIAL

Wolfgang Krambrock, Ravensburg; Hansjörg Schwedes, Cologne; Wolfgang Richter, Refrath, and Klaus Elgeti, Schildgen, all of Germany, assignors to Waeschle Maschinenfabrik GmbH, Germany

Filed Sep. 3, 1976, Ser. No. 720,451
Claims priority, application Germany, Sep. 2, 1975, 2539042
Int. Cl.² F26B *3/08*; F27B *15/00*
U.S. Cl. 34—10 **13 Claims**

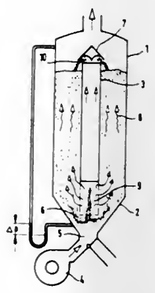
1. A method of treating pourable material, comprising the steps of

accommodating a body of the pourable material in a vessel having a lower end and a central, upright unobstructed passage provided with a bottom end portion which is surrounded by the material;

directing a stream of gaseous fluid into the lower end of the vessel;

splitting the stream into a high-speed first flow and a second flow;

entraining the material surrounding the bottom end portion with the high-speed first flow and conveying it upwardly in the central passage, so that due to the repetition of such



entraining the body of material becomes gradually turned over in the vessel; and

directing the second flow through the body outside the central passage, so as to trickle through and treat the material of the body.

4,096,641

METHOD FOR STORING HYDROGEN IN NICKEL-CALCIUM

Gary Dale Sandrock, Ringwood, N.J., assignor to The International Nickel Company, Inc., New York, N.Y.

Filed Nov. 8, 1976, Ser. No. 739,481
Int. Cl.² F26B *5/16*
U.S. Cl. 34—15 **2 Claims**

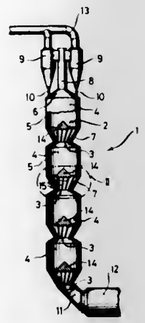
1. An improved method for hydrogen storage, the improvement comprising: storing hydrogen in a $CaNi_5$ compound at a hydrogen partial pressure below about one atmosphere absolute and at temperatures below about 40° C.

4,096,642

APPARATUS FOR HEAT EXCHANGE BETWEEN FINE MATERIAL AND GAS

Wolfgang Triebel, Oelde, Germany, assignor to Polysius, AG, Neubeckum, Germany

Filed Dec. 10, 1976, Ser. No. 749,473
Claims priority, application Germany, Jan. 19, 1976, 2601776
Int. Cl.² F26B *17/00*
U.S. Cl. 34—57 R **8 Claims**



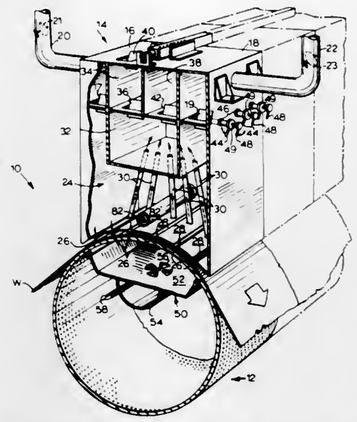
1. Counterflow heat exchanger apparatus for heat exchange between fine material and gas, comprising a generally vertical reaction vessel which is divided by funnel-like constrictions into a number of individual chambers and which has at least one inlet for introducing fine material into the top of the uppermost of such chambers and an opening at the bottom of the lowermost of such chambers for withdrawing heated fine material and for introducing hot gas to be exhausted from said uppermost chamber, each individual chamber having a substantially cylindrical portion above a funnel portion, and a central scattering cone at the upper end of each of said funnel portions, wherein the improvement includes guide elements for the fine material extending downward along the inner surface of at least one funnel portion of the chambers, the guide elements being distributed around said inner surface of said at least one funnel portion.

4,096,643

PAPER WEB STREAK DRYING SYSTEM

Ralph James Futcher, Beaconsfield, Canada, assignor to Dominion Engineering Works Limited, Lachine, Canada

Filed Jan. 17, 1977, Ser. No. 759,679
Claims priority, application Canada, Jan. 21, 1976, 244031
Int. Cl.² F26B *11/02*
U.S. Cl. 34—122 **6 Claims**



1. Web drying apparatus for use in providing selectively differentiated drying across the face of a web comprising a dryer drum rotatably mounted to receive thereon a web in drying relation; a plurality of hood segments in axial abutting relation to provide adjoining control zones across the width of the web, each hood segment having a plurality of outlet nozzles for the supply of pressurized air inwardly towards the face of the drum, and a plurality of return flow conduits to receive in operation a return flow of air from the web surface; a return plenum having the return flow conduits connected thereto; a hot air conduit; a cold air conduit; a mixing chamber communicating with the outlet nozzles; hot air supply means and cold air supply means respectively connected to the hot air conduit and the cold air conduit; and hot air flow control means and cold air flow control means to regulate air flow and temperature within the mixing chamber, whereby the drying capability of each respective hood segment can be selectively controlled.

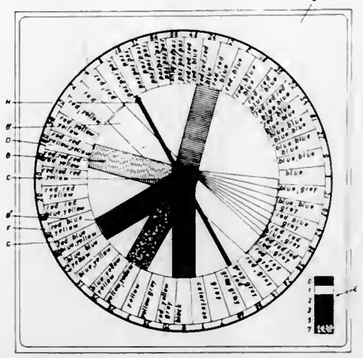
4,096,644

EDUCATIONAL AID

Dan Nesher, 7 Soroka St., Haifa, and Yigael Zemer, 5, Koreh Hadorot, Jerusalem, both of Israel

Filed Jun. 9, 1976, Ser. No. 694,405
Claims priority, application Israel, Feb. 18, 1976, 49058
Int. Cl.² G09B *19/02*
U.S. Cl. 35—31 R **6 Claims**

1. An educational aid comprising a plurality of transparent means each representing a certain basic color and a board on which a plurality of primary numbers are each represented by a different one of said certain basic colors the transparent means being movably attached in spaced relationship to said board in a manner such that they may be selectively brought into over-lying relationship, one with another thereby to obtain a composite number by fields of color the corresponding basic colors being in unit quantities according to the factors making up said composite number, so that given a certain field of color corresponding to a composite number, the student can



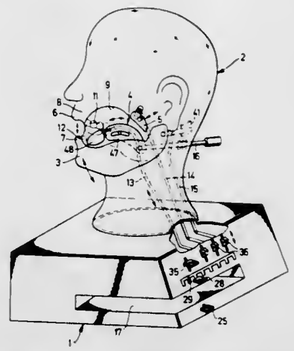
match said field by the correct mixture of said means having basic colors and thereby find the factors of the number represented by said field, or conversely the student can mix said means having said certain basic colors in unit quantities and match the resulting color with a field of color and thereby learn multiplication.

4,096,645

PHONETIC TEACHING DEVICE

Thomas Herbert Mandl, Oststrasse 20, 4005 Meerbusch I, Germany

Filed Nov. 8, 1976, Ser. No. 739,785
Int. Cl.² G09B *19/04, 23/32*
U.S. Cl. 35—35 R **8 Claims**



1. In a teaching device, indicating means for indicating the forms of a plurality of articulation organs used during the oral production of sound and the positions of said plurality of articulation organs during the natural oral production of a particular sound, and control means for selective operation of said indicating means to indicate the positions of said organs during the natural oral production of a plurality of particular sounds, said indicating means comprising a plurality of indicating members having physical forms corresponding to said plurality of articulation organs, and said control means comprising means for selectively positioning said plurality of indicating members, head structure means associated with said indicating members for indicating the form of internal passage walls which cooperate with said articulation organs in the production of sounds and the relationship of said internal passage

walls to said articulation organs represented by said indicating members, said indicating members including rear and front tongue members for representing rear and front parts of a tongue, first pivot means for supporting said rear tongue member for pivotal movement and also for longitudional forward and rearward movements relative to said head structure means, and second pivot means for supporting said front tongue member from said rear tongue member.

4,096,646

DEVICE FOR IDENTIFYING AND LOCATING A STAR IN THE HEAVENS

Philip M. Solem, 30 W. Arrowhead Rd., Duluth, Minn. 55803

Filed Apr. 28, 1977, Ser. No. 791,687
Int. Cl.[2] G09B *27/06*
U.S. Cl. 35—43 **12 Claims**

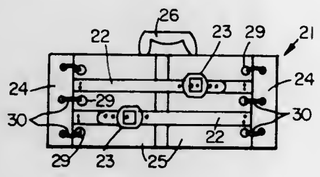
1. A device for identifying and locating a star in the heavens comprising:
(a) an axis rod,
(b) a globe,
(c) means rotatably mounting said globe on said axis rod,
(d) means on said globe indicating the location counterpart of the stars in the heavens,
(e) a hoop,
(f) means mounting said hoop on said axis rod for rotation about said globe,
(g) a mount,
(h) means slidably mounting said mount on said hoop,
(i) viewing means carried by said mount,
(j) pointer means carried by said mount,
(k) means for mounting said axis rod and globe at selected angles,
(l) means for securing said globe against rotation on said axis rod,
(m) means for securing said mount, said hoop and said globe against movement.

4,096,647

LEARN-TO-DRESS MANUAL

James Robert Barry, 160 Regent St., Lincoln, Ill. 62656

Continuation-in-part of Ser. No. 625,000, Oct. 22, 1975, abandoned. This application May 11, 1977, Ser. No. 795,752
Int. Cl.[2] G09B *19/00*
U.S. Cl. 35—56 **5 Claims**



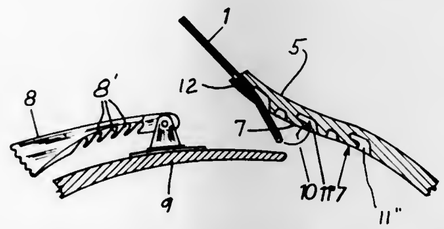
1. A learn-to-dress manual comprising: a relatively rigid flat base lamina; a shoe top, including lacings, fixed to the upper surface of said base lamina; a plurality of superposed pairs of stain-and tear-resistant panels simulating garment members to be interconnected in dressing operations, each pair being centrally divided and each divided portion being swingable laterally away from the other portion thereof to expose the next pair therebeneath, each pair having co-operating conventional means for interconnecting said divided portions in dressing-simulating manner, the upper surfaces of said pairs of garment-simulating panels being of bright attractive colors differing markedly from the colors of the immediately preceding and following pairs, and the under surfaces of said panels being of non-distracting coloration; a plurality of arched-portion rods fixed to the lateral margins of said base lamina; eyelets in the lateral margins of said panels loosely embracing said rods; a pair of relatively stiff cover panels apertured to receive said arched-portion rods; and at least one pair of belt sections including a belt buckle, to fasten said cover panels protectively over said pairs of garment-simulating panels and to constitute an introductory exercise.

4,096,648

SKI BOOT FASTENER

Giuseppe Guolo, Treviso, Italy, assignor to Calzaturificio Giuseppe Garbuio S.A.S., Treviso, Italy

Filed Oct. 7, 1976, Ser. No. 730,686
Claims priority, application Italy, Oct. 10, 1975, 84149 A/75
Int. Cl.[2] A43B *11/00*; A43C *11/00*
U.S. Cl. 36—50 **8 Claims**



1. A ski boot fastener comprising a leg portion including separated parts adapted to be fastened around a skier's leg, a mechanical fastener on one of said parts of the leg portion, a coacting fastening loop on the other part of said leg portion and extending beyond the free end of said other part for connection with said mechanical fastener, and said other part being formed on its interior surface to provide spaced securing elements for selective engagement with the fastening loop to thereby render the fastening loop adjustable longitudinally on said other part to plural fixed positions, said other part being also recessed in its interior surface in surrounding relation to said securing elements, whereby one end of said fastening loop can be selectively engaged around one of the securing elements while the fastening loop is within the recess of the interior surface of said other part, and said spaced securing elements being flush with the interior surface of said other part and said loop during usage lying below said interior surface.

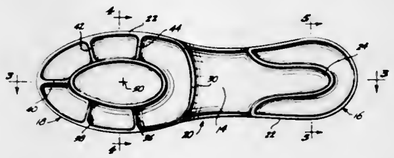
4,096,649

ATHLETIC SHOE SOLE

Albert C. Saurwein, 19702 - 37th Pl. S., Seattle, Wash. 98188

Filed Dec. 3, 1976, Ser. No. 747,353
Int. Cl.[2] A43B *13/04*
U.S. Cl. 36—32 R **34 Claims**

1. A shoe sole having a heel section and a toe section comprising:
a peripheral flange running substantially continuously around the periphery of said heel section and said toe section, said peripheral flange being integral with said heel section and said toe section and extending downwardly and outwardly therefrom, said peripheral flange terminating in a substantially continuous bottom edge lying in a first plane, and
a downwardly extending toe section flange positioned in the toe section of said shoe sole, said toe section flange having an arcuate forward portion spaced inwardly from the forward portion of the peripheral flange on the toe section, having laterally spaced, rearwardly extending side portions spaced inwardly from said peripheral flange and joined to the arcuate portion of said toe section flange, and having an arcuate rearward portion joined to the side



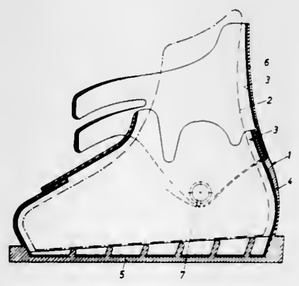
portions of said toe section flange to form an annularly shaped toe section flange, said toe section flange terminating in a substantially continuous bottom edge lying substantially in a second plane parallel to said first plane, said second plane lying below said first plane, and
a downwardly extending heel section flange positioned in the heel section of said shoe sole, said heel section flange having an arcuate rearward portion spaced inwardly from the rearward portion of said peripheral flange on said heel section and having spaced, forwardly extending portions joined with said arcuate portion.

4,096,650

FOOTWEAR

Sigurd Seidel, Graz, Austria, assignor to Skischuhfabrik Dynafit Gesellschaft m.b.H., Graz, Austria

Filed Nov. 15, 1976, Ser. No. 742,060
Int. Cl.[2] A43B *5/04, 1/10*
U.S. Cl. 36—120 **1 Claim**



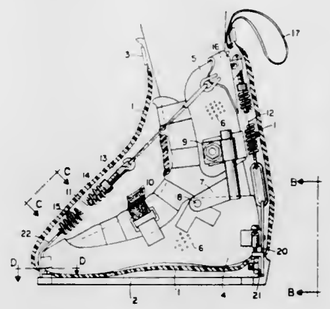
1. A ski boot comprising: an outer shoe having an integral shell formed of at least partially transparent plastics material and having an upper portion and a sole portion; a gaiter formed of at least partially transparent plastics material and hingedly connected to and partially overlapping a portion of the outer surface of said upper portion of said outer shoe; a first lining comprised of a textile fabric which resists tearing and temperatures up to about 150° C and substantially resists penetration of the plastics material when the same is in a molten state, said first lining being firmly bonded to the inner surface of said outer shoe during the molding of the outer shoe; a second lining comprised of a textile fabric which resists tearing and temperatures up to about 150° C and substantially resists penetration of the plastics material when the same is in a molten state, said second lining being firmly bonded to the inner surface of said gaiter during the molding of said gaiter; and an inner shoe inserted into said outer shoe, the inner shoe being at least partially held in said outer shoe by the coefficient of friction between said inner shoe and said lining, the coefficient of friction being greater between said inner shoe and said first lining than between said inner shoe and said outer shoe thereby insuring a good fit of said inner shoe in said outer shoe.

4,096,651

SKI BOOT

Per Ancker, Vändstigen 4, S-181-42 Lidingö, Sweden

Filed Aug. 13, 1976, Ser. No. 714,119
Claims priority, application Sweden, Aug. 22, 1975, 7509358
Int. Cl.[2] A43B *5/04*
U.S. Cl. 36—120 **10 Claims**



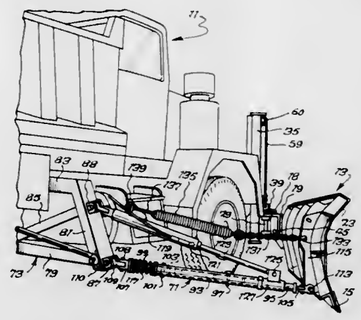
1. A ski boot for downhill skiing, comprising an inner shell including an upper tibia-supporting section and a unitary lower foot-supporting section, means for pivotably connecting said upper section to said lower section for movement relative thereto about a horizontal pivotal axis, a sole adapted for mounting on a ski and an outer environment and climate shield enclosing said inner shell formed of a relatively soft material foldable downwardly to expose said inner shell, said lower section of the inner shell being attached to the sole in such a way that it is pivotable in relation to the sole about an axis generally in the longitudinal direction of the ski and parallel to the plane of the ski, whereby the angle between the foot/tibia and a normal to the plane of the ski can be adjusted sideways.

4,096,652

RETRACTABLE SNOWPLOW WING AND MOUNTING THEREFOR

William L. Raines, and John Karges, Jr., both of Sherman, N.Y., assignors to H. K. Nuttall Equipment Co., Inc., Sherman, N.Y.

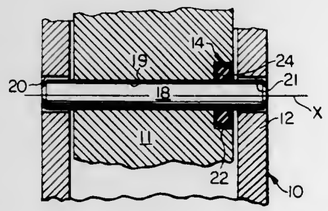
Filed Nov. 8, 1976, Ser. No. 739,940
Int. Cl.[2] E01H *5/00*
U.S. Cl. 37—41 **16 Claims**



1. In a retractable snowplow wing: means for mounting said wing on a vehicle having a longitudinal frame comprising opposed longitudinal members, said mounting means compris-

ing first means attached to the inboard end of said wing for supporting and raising said inboard end and second means, separate and distinct from said first means, attached to the outboard, trailing end of said wing for supporting and raising said outboard end, said first means comprising a member slidably mounted for vertical movement on support means carried by said frame, said second means comprising a strut and motor means both pivotally mounted on a rigid, non-movable bracket that is secured to both longitudinal members of said frame and extends laterally therefrom, said strut constituting the sole support for the outboard end of said wing and being pivotally connected to said wing adjacent the bottom of said wing, and said motor means being operatively connected to and slidable on said strut adjacent its outer end for producing motion of said strut whereby to raise and move horizontally said outboard end of said wing.

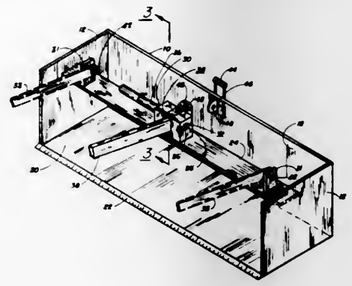
4,096,653
CARTRIDGE RETAINING MEANS FOR EARTHWORKING TIPS
Willard Oswald Kaarlela, and Eugene L. Helton, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Oct. 31, 1974, Ser. No. 519,568
Int. Cl.[2] E02F *9/28*
U.S. Cl. 37—142 A **12 Claims**



1. In an earthworking device comprising a support member, a work tool mounted on a forward end of said support member, a cylindrical pin having a generally smooth surface disposed in aligned bores formed through said support member and said work tool and retaining means to releasably hold said pin in said bore, the improvement wherein said retaining means comprises an annular cartridge including a housing defining an annular chamber therein and an annular elastomeric member disposed in said chamber to have an inner portion thereof extend radially inwardly therefrom into circumferential frictional engagement with said pin, said annular cartridge being mounted in a counterbore in a lateral side of said support member coaxially with said aligned bores, said housing comprising a pair of cupshaped first and second members each having an annular outer wall and a sidewall extending radially inwardly towards said pin, the outer wall of said first member being disposed in telescopic relationship on the outer wall of said second member.

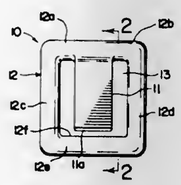
4,096,654
DRAG IMPLEMENT FOR GATHERING AND SPREADING DIRT
Henry Felton McLaughlin, 3925 Sand Ridge Dr., Gautier, Miss. 39553
Filed Sep. 19, 1977, Ser. No. 834,071
Int. Cl.[2] E02F *3/00*
U.S. Cl. 37—118 R **4 Claims**

1. A drag implement for use with a garden tractor having horizontally spaced lift arms extending rearwardly therefrom for raising and lowering the free ends thereof, and comprising:
a. a rectangular bucket means having closed back, bottom and sides, and open front, and an open top, said bottom having a leading sharp edge for gathering dirt, and said bucket for pivotally suspending on the raised free ends of said rearwardly extending lift arms with open top up and said leading sharp edge parallel with the ground;
b. a first transverse element means fixed across said open top, adjacent said open front, for transversely bracing said closed sides;
c. jam bar assembly means center mounted on said first transverse element means, and having a second transverse element means slidably supported above said first transverse element means, for defining an openable and closable center space between said transverse element means;
d. jam bar means, having a vertical dimension less than the height of said center space, pivotally mounted on the back



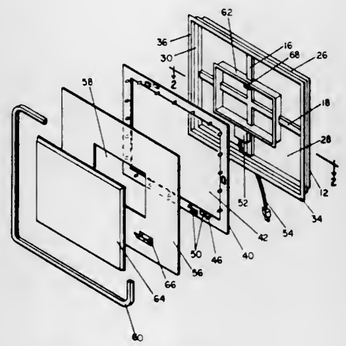
of said garden tractor and adapted for a free end thereof to extend through said center space for jamming between said first and closed second transverse elements means, responsive to said leading sharp edge of said bucket bottom, when lowered, engaging the ground to pivot said bucket and edge to an angle of tilt limited by the ratio of said center space vertical dimension to said jam bar means vertical dimension; and
e. converter link means mounted on the back of said bucket for pivotally engaging the free end of said jam bar means with said second transverse element means open and said bucket is pivoted with the bottom and leading sharp edge normal to the ground for acting as a spreader of dirt.

4,096,655
FABRIC IDENTIFICATION TAG
Myron E. Ullman, Jr., 120 Sleepy Hollow, Canfield, Ohio 44406
Filed Jan. 24, 1977, Ser. No. 761,953
Int. Cl.[2] A44C *3/00*
U.S. Cl. 40—2 R **6 Claims**



1. A permanent fabric marking device comprising: an injection molded tag of resilient water resistant plastic including a body having top, bottom and side portions defining a central aperture; a tab molded to said top portion at an angle to the plane of said body having a width less than said aperture and a length greater than said aperture, being centered between said side portions and biasable through said central aperture by flexing; the free end of said tab being beveled on the inside edge to assist in biasing over said bottom portion; the outside edge of the free end of said tab and the outside edge of said bottom portion being opposed and wedge shaped to grip a fabric therebetween; wherein biasing said tab from its position on one side of said body to a fabric gripping position on the other side of said body places said top portion of said body in torsion to urge said free end of said tab in pressure engaging contact against fabric sandwiched between said wedge shaped edges of said bottom portion and said free end of said tab.

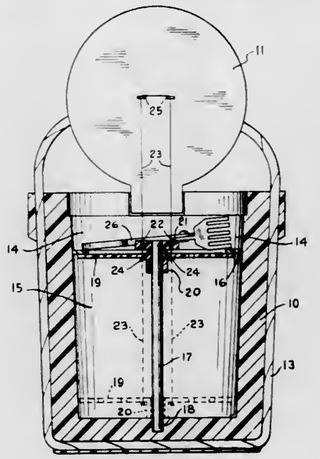
4,096,656
LIGHTED MESSAGE BOARD CONSTRUCTION
Giacomo Diceglie, Box 252, Windermere, Fla. 32786
Filed Dec. 3, 1976, Ser. No. 747,358
Int. Cl.[2] G09F *13/00*
U.S. Cl. 40—564 **20 Claims**



1. A lighted message board comprising:
a support defined by a back and opposing side walls;
a sheet of an insulating material within said support and substantially parallel with said back;
a plurality of conductive layers deposited on one side of said sheet;
a plurality of lighting elements carried by said sheet, each lighting element interconnected with selected ones of said conductive layers;
means electrically connected with said conductive layers for energizing said lighting elements;
a transparent layer overlying said support across the extremities of said side walls;
means for binding the periphery of said transparent layer to the periphery of said side wall; and
a message panel carried by said transparent layer.

4,096,657
MINNOW BAIT KIT
George W. Morrow, 19 Rocco Dr., Little Rock, Ark. 72209
Filed Jun. 30, 1976, Ser. No. 701,321
Int. Cl.[2] A01K *97/04*
U.S. Cl. 43—56 **5 Claims**

1. A minnow bait kit for making accessible a submerged minnow and facilitating its attachment to a fishhook comprising:
a bucket having an enclosure in the shape of an inverted frustum of a cone, a flat bottom and a hinged lid swingable between an open and a closed position;
a horizontally disposed circular peripheral flange rigidly secured to the internal wall of said bucket, said flange projecting radially inward and dividing the enclosed space into a small dry upper compartment and a larger water-containing lower compartment suitable for containing submerged live minnows;
a single fixed guide post extending axially from the bottom of said bucket to an elevation above said flange;
a submergible perforated false bottom normally disposed coextensive with the bottom of said bucket, said false bottom being slidably mounted on said guide post and movable upwardly therealong for capturing a submerged minnow and conveying the minnow to an upper above-water position determined by the engagement of said false bottom with the lower surface of said inwardly projecting flange; said flange including a pair of diametrically opposed spokes coplanar with the circular portion thereof, said spokes extending inwardly from said circular portion to engagement with the upper end of said guide post;
a tongs adapted to pick a minnow from the up-raised false bottom, said tongs manually resting on the upper surface of said flange within said upper compartment; and
coupling means effective to lift said false bottom to said upper position coincident with the opening movement of said lid;
said coupling means including a crossbar mounted at the top of said guide post, said crossbar having a pair of vertically directed apertures radially spaced from opposing sides of said guide post, a flexible cord joined at its ends to said false bottom at locations spatially adjacent to opposing sides of said guide post and extending upwardly therealong in spaced relationship through said apertures to similarly spaced attachment fasteners secured to said hinged lid.



4,096,658
TOY MODEL VEHICLE TRACK SUPPORT SYSTEM
Hermann Neuhierl, Waldstrasse 36, D-8510 Fürth, Bayern, Germany
Filed Mar. 21, 1977, Ser. No. 779,602
Claims priority, application Germany, May 21, 1976, 2622824
Int. Cl.[2] A63H *33/06*
U.S. Cl. 46—17 **21 Claims**

1. A support system for track for toy model vehicles comprising paired pylons, said pylons being positioning one on each side of the track and connected together through means for supporting the track where it passes between the paired pylons, the pylons being formed from a plurality of substan-

tially flat elements including a base plate, an upper piece and side pieces which interlock both the base plate and the upper

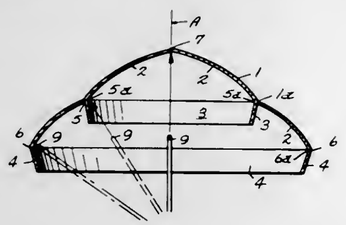
piece, the supporting means being connected to the pylons intermediate the base plate and the upper piece.

4,096,659

SPIN THE SAUCER

Eunice R. Keane, 11 Maeven Ave., Kingston 10, Jamaica

Continuation of Ser. No. 610,658, Sep. 5, 1975, abandoned, which is a continuation of Ser. No. 530,816, Dec. 9, 1974, abandoned. This application Jun. 14, 1977, Ser. No. 806,546
Int. Cl.[2] A63H *1/32*
U.S. Cl. 46—47 **9 Claims**



1. A toy for use with a wand, said toy comprising a hollow, generally dome-shaped shell having a wall with an inner and an outer surface; said wall defining an apex and said inner surface having a first lip defining a first opening; said wall extending from said first lip to a second lip defining a second opening; a first rim means extending from said inner surface at said first lip for engaging an end of said wand and for enabling rotating movement of said wand to cause said toy to spin about said wand; and a second rim means extending from said inner surface at said second lip for engaging an end of said wand and for enabling rotating movement of said wand to cause said toy to spin about said wand.

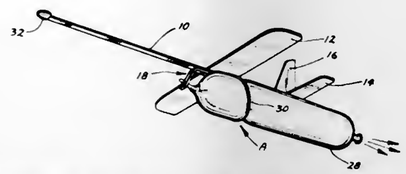
4,096,660

BALLOON POWERED AIRPLANE

William H. Ralph, 301 N. Blackman Ave., Duluth, Minn. 55811

Filed Sep. 2, 1976, Ser. No. 719,852
Int. Cl.[2] A63H *27/06*
U.S. Cl. 46—76 A **1 Claim**

1. A toy balloon powered toy airplane comprising:
(a) a fuselage formed by a single piece rectilinear member and having,
(b) a wing secured thereto,
(c) a stabilizer mounted on said fuselage,
(d) a fin mounted on said fuselage,
(e) a balloon inflatable at one end thereof,
(f) means for securing the other end of the balloon to said fuselage adjacent said wing, and
(g) a loop connected to and depending from said fuselage and at a right angle thereto and through which said balloon extends for holding said balloon in alignment with said fuselage with said one end in position to power the airplane by expulsion of the balloon contents,



said means for securing the other end of the balloon to the fuselage including
(h) a support connected to the fuselage,
(i) said support having a hole therein,
(j) a peg for placement within said balloon and for forcing a portion of the balloon into said hole and for retaining it in frictional engagement with the edge thereof.

4,096,661

METHOD OF INCREASING THE GROWTH OF PLANTS GROWN FROM SEED

John Cleckner, 3414 Rustic Way La., Falls Church, Va. 22044

Filed Mar. 3, 1977, Ser. No. 773,985
Int. Cl.[2] A01N *7/00*
U.S. Cl. 47—58 **18 Claims**

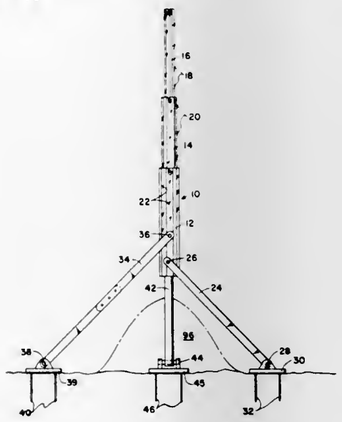
1. In a method of growing crops from seed in non-irrigated fields in fertile soil suitable for growing the crop, the improvement which comprises applying only to that portion of the soil proximate the soil in which the seed is or is to be planted, during the period from about two weeks prior to planting to about six weeks after planting, a growth promoting amount of a linear alkyl sulfonic acid surfactant of at least 6 carbon atoms, or a non-phytotoxic salt thereof.

4,096,662

PLANT STAKE INCLUDING BASKET

Joseph Anderson, 1950 Kennedy Rd. #505, Scarborough, Ontario, Canada

Filed Jul. 19, 1976, Ser. No. 706,245
Int. Cl.[2] A01G *9/02, 9/12*
U.S. Cl. 47—70 **6 Claims**



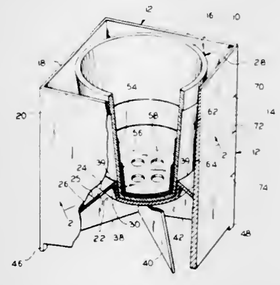
1. A plant stake comprising telescopically adjustable post means having a base, at least 3 leg means extending from said base of said post means for supporting said base above ground level, said leg means terminating in ground anchor means, basket means suspended from said stake for carrying tuberous plants, hoisting means on said stake for raising said basket means from a level beneath said post means to a level next adjacent said post means, said hoisting means comprising threaded shaft means, threaded shaft receiving means operatively engaging said shaft means, crank means for turning said shaft receiving means in relation to said shaft means, securing means on said shaft means for attaching said shaft means to said basket means.

4,096,663

PLANT WATERING SYSTEM AND PROCESS

Stanley Milton Silver, 1331 Lincoln Rd. #705, Miami Beach, Fla. 33319

Filed May 25, 1977, Ser. No. 800,185
Int. Cl.[2] A01G *27/00*
U.S. Cl. 47—80 **27 Claims**



1. An auto-moisturizing system for plants comprising an inner porous pot sealingly adhered near its lower end within a larger outer water-impermeable container for forming a reservoir between said pot and said container, whereby water in said reservoir may make contact with said pot and wicks by capillary action up the porous side walls of the pot, means for surfacing a lower interior part of the pot with a substantially water-impermeable coating extending from substantially the lowest level at which soil may be contained upward to a predetermined height on the side walls to control the elevation at which the wicking water may contact potted soil through the porous walls, and both said pot and said container being adapted to provide aerating means positioned at a lower region thereof.

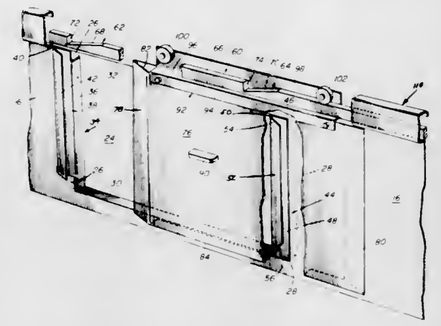
4,096,664

SEAL TIGHT DOOR FOR WAREWASHER

Kenneth E. Perry, Wellesley, Mass., assignor to Adamation, Inc., Newton, Mass.

Filed Nov. 22, 1976, Ser. No. 743,932
Int. Cl.[2] E05D *15/56*
U.S. Cl. 49—235 **4 Claims**

1. In a warewasher having a housing which housing includes an outer wall, the improvement which comprises:
(a) a door frame formed in the wall of the housing, the frame including side edges, a top edge and a lower edge;
(b) first guide means secured to one of said side edges, said guide means formed in a longitudinal substantially U-shaped configuration;
(c) second guide means secured to the other of said side edges and formed in a longitudinal substantially U-shaped configuration;
(d) a horizontal sliding door having a leading edge and a trailing edge and adapted to move between a closed position and an open position, the leading edge adapted to mate in sealing engagement with the first guide means and the trailing edge adapted to mate in sealing engagement with the second guide means such that any water contacting the edges of the door will be directed downwardly; a bottom flange extending across the door and extending inwardly and downwardly whereby water is directed from the combination of the guide means and leading and trailing edges inwardly into the housing; and,
(e) a rail to support the door in a movable manner parallel to the upper edge of the door frame and including at least



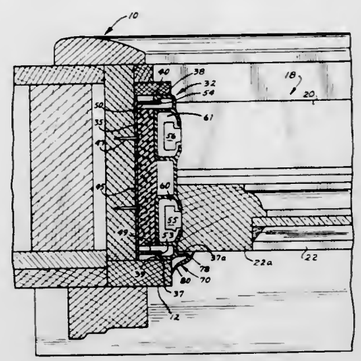
two stop cams, said cams disposed such that when the door is moved to the closed position the stop cams will prevent horizontal movement each of said cams substantially aligned with the first and second guide means respectively.

4,096,665

WINDOW SEALING STRUCTURE

Chester W. Ellingson, Jr., 13909 Frontier Ln., Burnsville, Minn. 55337

Filed Mar. 10, 1977, Ser. No. 776,127
Int. Cl.[2] E06B *7/16;* E05D *13/00*
U.S. Cl. 49—475 **5 Claims**



1. A weather seal structure for the juncture between a sash and the side of a window frame comprising
a rigid jamb member disposed in a window frame,
means holding said jamb member,
a projection integral with said jamb member extending between the sash and the adjacent side of said window frame,
a flexible strip weather seal member extending along said projection of said jamb member integral therewith,
said seal member having a side portion thereof at one side of said projection bearing against said sash, and
said seal member having a portion at the other side of said projection bearing against said adjacent side of said window frame.

4,096,666

ROTARY SEALS

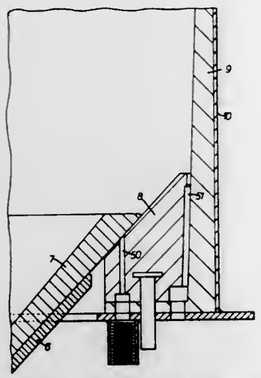
David Brown, Stevenage, England, assignor to Osro Limited, Hemel Hempstead, England

Filed Feb. 2, 1977, Ser. No. 764,988

Claims priority, application United Kingdom, Feb. 9, 1976, 5021/76; Jun. 2, 1976, 22842/76

Int. Cl.² B24B *31/10;* **F16J** *15/40*

U.S. Cl. 51—7 **3 Claims**



1. An abrasive, surface finishing machine comprising a stationary tub of generally cylindrical form and a rotary base, said tub and base having respective annular sealing members in mutual frictional contact, at least one of said members being of resiliently flexible material, and wherein the tub sealing member has a means defining a plurality of ports through it for the injection of a pressurised fluid coolant between the contacting, sealing surfaces of said sealing members, which surfaces are arranged to direct the injected coolant to the interior of said tub.

4,096,667

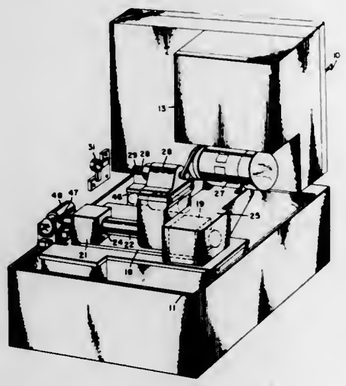
INTERNAL GRINDING MACHINE

Herbert R. Uhtenwoldt; Norman S. Humes, both of Worcester, and Richard E. Crossman, Leominster, all of Mass., assignors to Cincinnati Milacron-Heald Corp., Worcester, Mass.

Continuation of Ser. No. 676,041, Apr. 12, 1976, abandoned. This application Aug. 17, 1977, Ser. No. 825,431

Int. Cl.² B24B *5/10*

U.S. Cl. 51—99 **9 Claims**



1. Internal grinding machine, comprising:

(a) a base having two spaced abutments,

(b) a primary bar extending between the abutments and mounted therein in hydrostatic bearings for rotation of the bar about an axis extending longitudinally of the bar and for movement of the bar in the direction of the axis,

(c) a wheelhead table fixedly fastened to the bar between the abutments and extending laterally thereof, said table including a wheelhead having a rotatable spindle on the end of which is carried an abrasive wheel,

(d) feed means located at a position substantially spaced from the primary bar for rotating the table and the bar together about the said axis, and

(e) an actuator operating on one end of the bar to move the bar and the table longitudinally along the axis, said actuator including a fluid cylinder providing the major longitudinal movements to the bar for bringing the grinding wheel toward and away from a workpiece and a mechanical actuator for oscillating the grinding wheel when it is in contact with the workpiece.

4,096,668

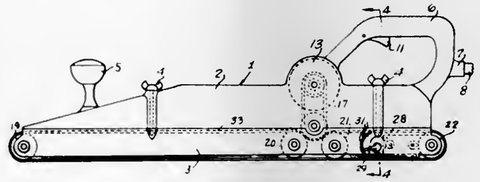
ENDLESS BELT SANDING TOOL

Raymond D. Logan, 10525 Bethesda Church Rd., Damascus, Md. 20750

Filed Jan. 12, 1977, Ser. No. 758,821

Int. Cl.² B24B *23/06*

U.S. Cl. 51—170 EB **10 Claims**



1. An endless belt sanding tool comprising:

(i) a body,

(ii) support means at spaced positions on said body,

(iii) two thrust means at spaced positions on said body between said support means and having a common tangential plane,

(iv) an endless sanding belt engaged for returning about said support means and engaged over said thrust means, and

(v) a driving roller journalled for rotation on said body and positioned with a peripheral portion thereof extending between said thrust means beyond said common tangential plane, to be contacted over an arc by the external face of a run of said belt intermediate the portions of the belt engaged over said thrust means.

4,096,669

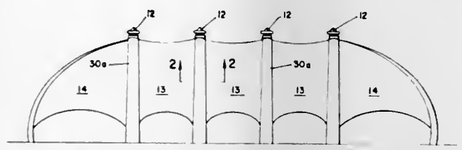
MEMBRANE BUILDING SEGMENT CONNECTION

Alton L. Pabst, Sarasota, Fla., assignor to Seaman Corporation, Sarasota, Fla.

Filed Jul. 6, 1977, Ser. No. 813,319

Int. Cl.² E04B *1/347, 7/14*

U.S. Cl. 52—63 **10 Claims**



1. In a sealed joint structure connecting adjoining membrane segments, an upright truss member forming part of a supporting framework and having an outer chord, attaching clips mounted at intervals along the chord, and link means detachably connecting the side edges of two adjoining segments to said clips under tension, catenary hold-down cables extending along the bottom edges of said segments and having their ends anchored to said framework, said link means comprising links adapted to detachably engage with like links for permitting the use of additional links facilitating progressively connecting the adjoining segments to the truss chord under decreased tension.

4,096,670

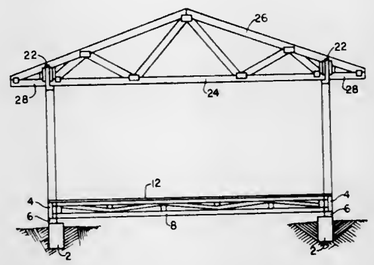
BUILDING STRUCTURAL SYSTEM

Ronald E. Fuller, P.O. Box 30485, Santa Barbara, Calif. 93105

Continuation-in-part of Ser. No. 619,372, Oct. 3, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,423

Int. Cl.² E04B *7/02;* **E04C** *3/02*

U.S. Cl. 52—90 **5 Claims**



1. A building structure system including interconnected girder and span members, the system incorporating interlocking means for interconnecting the girder and span members, said means comprising:

a wedge-shaped girder element with convoluted sides,

a wedge-shaped span element with convoluted sides, the convolutions of the girder element and the span element being shaped to nestle and interlock with one another,

the span element including a top portion shaped to rest upon the top portion of the girder element and to transfer the load of the span member to the girder member,

the girder element and the span element each being formed as two vertical half sections, the half sections being substantially the mirror images of one another, the half sections including a vertical web at substantially the mid-line of the wedge-shaped portions, the ends of the vertical web of the girder element bearing upon the main longitudinal girder members to assist in transferring the load borne by the girder element to the girder members and to assist in reinforcing the girder element, the vertical web of the span element being received between at least a portion of the vertical portions of the girder element, the span element incorporating reinforcing plates at the top portion,

the girder element and span element being formed from sheet metal sections bent to the shape of the respective elements,

means attaching the girder element to the girder member, and

means attaching the span element to the span member, the span and girder elements being connected to their respective members such that when the members are attached to one another, the wedge-shaped interlocking portions point in a generally vertical direction, these convolutions both being sinusoidal-shaped in cross-section.

4,096,671

ROOF EAVE ASSEMBLY

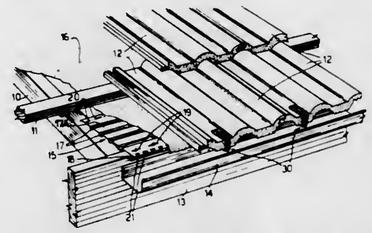
Raymond Joseph Aarons, Jindalee, Australia, assignor to Monier Colourtile Pty. Ltd., Darra, Australia

Filed Jun. 9, 1977, Ser. No. 804,880

Int. Cl.² E04B *7/00;* **E04D** *1/00*

U.S. Cl. 52—94 **7 Claims**

1. In a tiled roof having a fascia, rafters and sarking material, a roof eave assembly comprising a sarking support of thin sheet material including a normally sloped portion to lie beneath the tiling and sarking and to extend over said fascia and a downward flange to lie in front of the fascia, integral spacing means on said sarking support laterally spaced from the downward



flange and adapted to engage the fascia to space the flange from said fascia, and means to fasten the sloped portion of said support to the top edge of said fascia and to the roof rafters.

4,096,672

ANCHORING ARRANGEMENT FOR SECURING AN OBJECT TO A SUPPORT STRUCTURE HAVING AN INTERNAL CAVITY

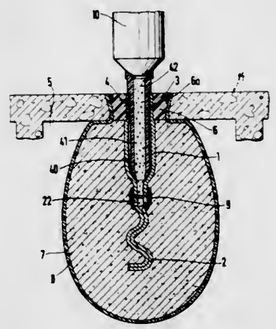
Artur Fischer, and Klaus Fischer, both of Tumlingen, Waldachtal, Germany, assignors to Artur Fisher, Tumlingen, Waldachtal, Germany

Continuation-in-part of Ser. No. 631,153, Nov. 11, 1975, Pat. No. 4,044,512. This application Oct. 14, 1976, Ser. No. 732,447

Claims priority, application Germany, Oct. 25, 1975, 2547823; Nov. 3, 1975, 2548979; Nov. 13, 1975, 2550954; Mar. 27, 1976, 2613178; Nov. 14, 1974, 2453957; May 26, 1975, 2523198; Jun. 6, 1975, 2525220; Jun. 17, 1975, 2525452; Jun. 14, 1975, 2526744; Jun. 21, 1975, 2527773

Int. Cl.² E04B *1/41;* **E04C** *5/12*

U.S. Cl. 52—127 **17 Claims**



1. An arrangement for securing an object to a support structure having an anchoring hole which communicates with a cavity within the support structure, comprising an elongated anchoring element having one part of transverse dimensions smaller than, and another part of transverse dimensions substantially corresponding to those of the anchoring hole so that said anchoring element is insertable into the anchoring hole through an open end thereof until a leading end portion of said one part extends into the cavity and said other part supports said anchoring element at the open end of the anchoring hole and closes the latter, said anchoring element having an interior bounded by an internal surface and extending between said leading and a trailing end portion of said anchoring element; and means for forming a plug about at least said leading end portion of said anchoring element to thereby attach the latter to the support structure and to prevent the extraction thereof from the anchoring hole, including a bag-shaped limiting member mounted on the inserted anchoring element so as to surround at least said leading end portion of the latter and define therewith a compartment for accommodating a body of hard-

enable material for hardening therein, and being impermeable to the hardenable material to prevent the latter from escaping from said compartment into the cavity, and gas-permeable to permit venting of excess air from said compartment into the cavity and an interaction of the air in the cavity with the hardenable material in said compartment during the hardening thereof, and means for introducing the hardenable material into said compartment for hardening therein about said anchoring element, including at least one passage through said leading end portion for communicating said interior of said anchoring element with said compartment, and shielding means situated in said interior of said anchoring element at least during the introduction of the hardenable material into said compartment and operative for guiding the hardenable material through said interior toward said passage and for preventing the hardenable material from contacting said internal surface of said anchoring element at said trailing end portion thereof.

4,096,673

METHOD OF ANCHORING

Robert F. Deike, Cheyenne, Wyo., assignor to Foresight Industries, Cheyenne, Wyo.

Division of Ser. No. 668,695, Mar. 19, 1976, Pat. No. 4,044,513, which is a continuation-in-part of Ser. No. 535,428, Dec. 23, 1974, Pat. No. 3,969,854. This application Nov. 11, 1976, Ser. No. 740,946

Int. Cl.² E02D *5/80*

U.S. Cl. 52—156 **4 Claims**

1. The method of forming a ground anchor which comprises inserting a driving tool into the trailing end of a hollow tubular member having a driving end with an internal abutment adapted to be impacted by the driving tool for forcing the member lengthwise into the ground, providing an out-turned lip on the open trailing end of the member as a continuation of one side of the member to form a fulcrum for tilting the member, attaching a cable to the side of the member opposite the out-turned lip side, impacting the tool against said internal abutment for driving the tubular member with the cable attached to a desired depth in the ground, pulling the cable to rotate the tubular member transversely of the hole formed by the driving operation, filling the hole with concrete, tensioning the cable to center it in the column of concrete above the tubular member, compressing the concrete column to compact the ground surrounding the hole and to fill voids in the ground with concrete, and setting the concrete around the tensioned cable to form a compression loaded concrete column.

4,096,674

FALSE TENON STRUCTURE

Ernest Paul Kollar, and Julie Ann Kollar, both of Rte. 1, Box 221-B3, Longmont, Colo. 80501

Filed Aug. 26, 1977, Ser. No. 827,995

Int. Cl.² E04B *1/10*

U.S. Cl. 52—233 **8 Claims**

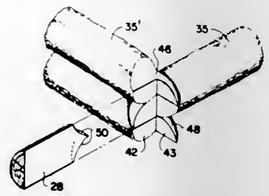
1. A false tenon for use at the intersection of first and second planar structural surfaces which meet at a given angle with each of the structural surfaces having thereon facade members of a thickness "*t*" representing stacked members of a predetermined cross-section, the false tenon comprising;

an elongated member of the full, predetermined cross-section configuration;

a cradle of a shape adapted to receive the predetermined cross-section defined around a cradle axis transversely through and adjacent to one end of the elongated members;

a first tenon planar surface adapted to interface with the first planar structural surface defined at the end of the false tenon and intersecting the surface defining the cradle at a line parallel to the cradle axis; and

a projection having a thickness of "*t*" extending from the end of the elongated member substantially in the direction



of the elongated member and defined by a second tenon planar surface adapted to interface with the second planar structural surface which intersects the first tenon planar surface at an angle substantially that of the given angle of the intersection of the planar structural surfaces and at a line substantially perpendicular to the line of intersection of the first tenon planar surface and the cradle surface, a surface extending as a continuation of the cradle surface and having a configuration substantially that of a portion of the predetermined cross-section, and the surface of the elongated member;

whereby false tenons may be stacked with alternating false tenons formed in mirror image fashion to provide the appearance of full predetermined cross-section stacked members.

4,096,675

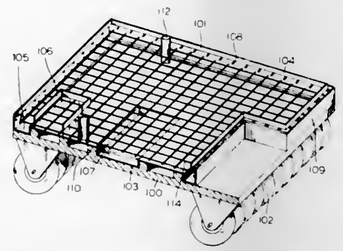
SPLIT-SLAB HOUSE CONSTRUCTION

John R. Howard, Houston, and Robert W. Loomis, Freeport, both of Tex., assignors to Next Generation Housing Corporation of America, Houston, Tex.

Filed Aug. 25, 1976, Ser. No. 717,747

Int. Cl.² E04B *1/343*

U.S. Cl. 52—79.1 **34 Claims**



1. A method of erecting a house comprising the steps of

constructing a transportable concrete first slab having a lower surface at a factory site,

constructing a superstructure upon said first slab, preparing a mating site for said first slab on a lot remote from said factory site, said mating site having an upper surface,

transporting said first slab and superstructure to said mating site, and

mating said lower surface of said first slab with said upper surface of said mating site such that there are no substantial air gaps between said lower surface of said first slab and said upper surface of said mating site and such that said first slab becomes substantially integrated with said mating site.

4,096,676

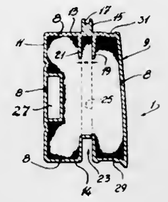
WALL MEMBER

Maurice Hibert, 6250, Bienville St., apt. A205, Brossard, Quebec, Canada

Filed Jul. 18, 1977, Ser. No. 816,678

Int. Cl.² E04B *5/48, 1/00*

U.S. Cl. 52—220 **11 Claims**



1. In a building construction, a wall member comprising:

an elongated substantially rectangular extruded shell defining an inner core, said shell being made of low heat expandable material;

said shell being formed with two substantially vertical faces;

one said vertical face having a permanent building exterior or interior finish;

the other vertical face having a permanent building interior finish,

said shell being additionally formed with two substantially horizontal upper and lower faces wherein said upper face of said shell is provided with a longitudinal tongue, a pair of fins being formed inside said shell opposite said tongue, the space between said fins corresponding to the thickness of said tongue, a groove being formed in said lower face of said shell, said groove to receive a tongue of an adjoining wall member, said tongue, said pair of fins and said groove all being centrally aligned to enable grooving of the ends of said wall member between said fins and including said tongue, said grooving thus producing a channel to permit engagement of said wall member with a structural member;

said shell having its inner core filled with an insulating material.

4,096,677

POST BASE

Tyrell T. Gilb, Berkeley, Calif., assignor to Simpson Manufacturing Co., Inc., San Leandro, Calif.

Filed Jun. 13, 1977, Ser. No. 805,638

Int. Cl.² E02D *27/00*

U.S. Cl. 52—297 **4 Claims**

1. A post base formed from a sheet metal comprising:

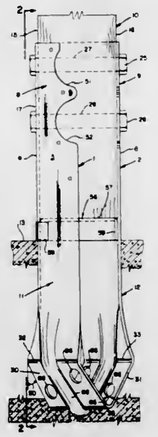
a. a strip of metal having a length several times greater than its width, and having a leading edge and a trailing edge, and having first and second ends;

b. said strip of metal consists of a mid-portion adapted for embedment in a concrete foundation and end portions adapted for connection to a wood post;

c. said metal strip adjacent said leading edge is formed with at least one opening at said first end for receiving a fastener therethrough and said leading edge adjacent to each of said openings is formed with additional metal forming a first projection and said trailing edge at said first end is formed with cut-out portions of substantially equal size and configuration to said first projections;

d. said metal strip adjacent said trailing edge at said second end is formed with at least one opening for receiving a fastener therethrough and said trailing edge adjacent to each of said openings is formed with additional metal forming a second projection;

e. said leading edge at said second end is formed with at least one cut-out portion which is substantially equal in size and configuration to said second projection.



f. said strip of metal is folded at an approximately 90° angle at its mid-point along the short side of said strip of metal and is folded at an approximately 45° angle along said short side along two lines equidistant from said mid-point and parallel to said mid-point fold line; and

g. said strip of metal is folded at an approximately 90° angle at approximately the mid-point of said strip along the longer side of said strip from said two equidistant lines to said first and second ends forming angle members.

4,096,678

INSULATED CONSTRUCTION ELEMENT

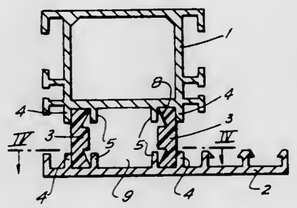
Manfred Diels; Karl Wilhelm Dienstuhl, both of Meinerzhagen; Tilo Jäger, and Eitel Hocker, both of Bielefeld, all of Germany, assignors to Otto Fuchs KG., Meinerzhagen and Schüco Heinz Schurmann GmbH & Co, Bielefeld, both of Germany

Filed Nov. 22, 1976, Ser. No. 744,177

Claims priority, application Germany, Nov. 25, 1975, 2552700

Int. Cl.² E04B *1/62*

U.S. Cl. 52—403 **13 Claims**



1. A construction element comprising:

an elongated bar having a pair of longitudinally extending sides and formed along each of said sides with a longitudinally extending recess having a laterally directed face;

a pair of elongated metallic profiles each formed with a pair of flanges forming a respective groove receiving a respective side of said bar, at least one of said flanges of each of said pairs being plastically deformed into the respective

recess and having a face bearing on the face of the respective recess;

a coating on at least one of said faces; and

particles imbedded in and projecting from said coating, whereby the coefficient of friction between said bar and said profiles is greatly increased at said recesses.

4,096,679

SELF-COMPENSATING TWO-PIECE SIDING OR ROOFING SLAT

Paul Naz, 20502 Harper, Harper Woods, Mich. 48225

Filed May 27, 1977, Ser. No. 801,229
Int. Cl.² E04D *1/34*
U.S. Cl. 52—551 **9 Claims**

1. An interlocking slat assembly for use as siding, roofing and the like to cover surface areas of buildings comprising:

a surface-covering panel including a generally L-shaped anchoring configuration integral with a lower edge portion thereof and a generally hook-like slide configuration integral with the opposite edge portion thereof; and

a separate attachment strip of substantially the same width as said panel for securing said panel to said building surface so as to prevent "oil canning" caused by expansion and contraction, said attachment strip including a nailing tab adapted to be fixedly secured to said building surface by fastening elements, a generally C-shaped passage-defining configuration integral with said nailing tab for laterally telescopically receiving said slide configuration therein to secure the upper edge portion of said panel to said attachment strip so as to provide compensation for expansions and contractions and a generally U-shaped groove-defining formation integral with said nailing tab for engagably receiving a portion of an anchoring configuration therein so as to anchor the lower edge portion of another panel to be attached to said building surface, the anchoring configuration of the panel whose slide configuration is laterally telescopically received in said defined strip passage being anchored in the groove of a previously installed slat assembly for interlocking said slat assemblies together one above the other,

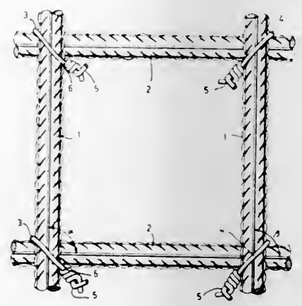
said nailing tab including corrugation means having alternative ridge and valley portions perpendicular to the width of said nailing tab for engagably receiving fastening means therethrough for fixedly securing said attachment strip to the surface of said building being covered, said corrugation means cooperating with said building surface being covered and said fastening elements for compensating for expansion and contraction of said strips with changing weather conditions and for achieving a spring-type buckle washer effect for maintaining a tight fit therebetween thereby preventing said slat assembly from working loose and eliminating rattling and the like.

4,096,680

REINFORCEMENT GRID FOR STEEL CONCRETE CONSTRUCTION

Klaus Ritter; Gerhard Ritter, and Josef Ritter, all of Graz, Austria, assignors to Firma AVI Alpenlandische Veredelungs-Industrie Gesellschaft mbH., Graz, Austria

Filed May 9, 1977, Ser. No. 795,040
Claims priority, application Austria, May 7, 1976, 3378/76
Int. Cl.² E04C *2/42*
U.S. Cl. 52—665 **7 Claims**



1. A reinforcement grid for steel concrete construction, consisting essentially of longitudinal and transverse rods crossing one another at right angles, said transverse and longitudinal rods being tied together at a sufficient number of their crossing points to provide said grid with rectangular stability, each of said tieings being by means of a loop formed by twisting the ends of a piece of wire together, the planes of half of the loops thus formed being 90° away from the planes of the remaining loops, the loops in the said former planes and the loops in said latter planes being uniformly distributed in said grid.

4,096,681

FASTENER FOR RETAINING SHEET CLADDING

Sture Netterstedt, and Bengt Lindstrand, both of Fagersta, Sweden, assignors to Rostfria Tak Aktiebolag, Fagersta, Sweden

Continuation-in-part of Ser. No. 677,986, Apr. 19, 1976, abandoned. This application Jan. 21, 1977, Ser. No. 761,311
Claims priority, application Sweden, May 2, 1975, 7505117
Int. Cl.² E04B *1/38*
U.S. Cl. 52—713 **2 Claims**

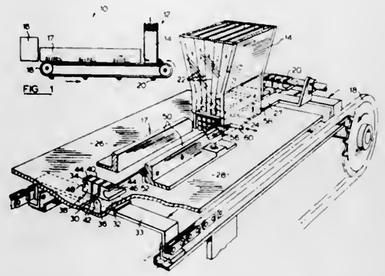
1. A composite fastener for retaining sheet cladding, such as a roof or wall sheeting, with outstanding flange joints, comprising a plate having an anchoring portion formed with a bent end intended for attachment to a substructure and a fastening portion lying generally at right angles to the anchoring portion, which is intended to be united with the outstanding flange of the sheet, said plate being made of hard-rolled one-layer thin sheet of stainless steel with a thickness of 0.05 to 0.15 mm., so that it can be seam-welded to the outstanding flanges in conjunction with welding these together without the continuity of the welding seam being broken, said anchoring portion being reinforced by means of a separate doubling plate of stainless steel, which is softer and thicker than the hard-rolled sheet forming said plate, said doubling plate lying on an exterior surface of the anchoring portion, curved about said bent end and being welded to said anchoring portion.

4,096,682

BUNDLING OF CIGARETTES

Michael H. Sheahan, Toronto, Canada, assignor to Rothmans of Pall Mall Canada Limited, Toronto, Canada

Division of Ser. No. 663,144, Mar. 2, 1976. This application Dec. 27, 1976, Ser. No. 754,414
Int. Cl.² B65B *19/10*
U.S. Cl. 53—149 **10 Claims**



1. Apparatus for the formation of a nested group of cigarettes consisting of three rows of cigarettes the central row of which contains one less cigarette than the other two rows, which comprises:

a hopper for dispensing downwardly cigarettes in parallel rows to an assembly station,

a horizontal support platform at said assembly station to receive said dispensed rows of cigarettes thereon,

an elongate channel extending from said assembly station towards a wrapping station for conveying a group of three rows of cigarettes therealong,

said elongate channel comprising a generally flat bottom surface coplanar with said platform and parallel side walls upstanding from said bottom surface a distance at least equal to the depth of the group of cigarettes, said side walls being spaced apart the width of said group of cigarettes,

a first elongate protrusion on one of said side walls extending longitudinally from said assembly station towards said wrapping station,

said first protrusion being dimensioned so that its maximum vertical thickness is equal to the diameter of a cigarette of said group and it protrudes from said one wall towards said other wall a distance equal to the diameter of a cigarette in said group, adjacent said assembly station and for a distance therefrom at least equal to the length of a cigarette in said group, said first protrusion thereafter tapering longitudinally thereof to a dimension substantially equal to the radius of a cigarette in the group,

said first protrusion having a lower surface spaced from said bottom surface a distance equal to the diameter of a cigarette in said group,

a second elongate protrusion on the other of said walls extending longitudinally from a position part way along the length of said first protrusion towards said wrapping station and corresponding to the position along the length of said first protrusion of commencement of said tapering thereof,

said second protrusion being dimensioned so that it protrudes from said other wall a distance increasing from its upstream end to a maximum dimension substantially equal to the radius of a cigarette in said group at its downstream end which coincides with the downstream end of said first protrusion,

said second protrusion having a lower surface spaced from said bottom surface a distance at least the diameter of a cigarette in said group,

said first and second protrusions cooperating to displace the centre row of cigarettes in a group a distance equal to the radius of a cigarette in that row during movement of said group along said channel past said protrusions, and

pusher means for pushing said group of cigarettes longitudinally thereof out of said assembly station and along said channel towards said wrapping station,

said pusher means comprising a substantially vertical cigarette group-engaging surface, said surface having an opening at one side thereof corresponding to said one wall and dimensioned to allow the passage of a cigarette therethrough,

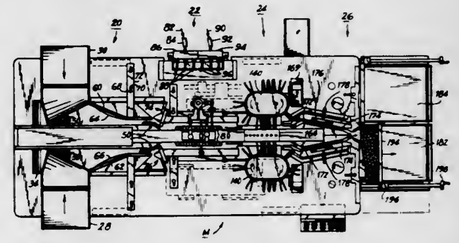
said surface being positioned to engage all the cigarettes in said group with the exception of the one cigarette on the centre row at the end of said row corresponding to said one side of said surface, whereby, when said pusher moves said group of cigarettes out of said assembly station said one cigarette remains in said assembly station as the opening in said surface by-passes said one cigarette.

4,096,683

AMPOULE FILLING AND SEALING MACHINE

John F. McMickle, Jr., Piscataway, N.J., assignor to Cozzoli Machine Company, Plainfield, N.J.

Filed Feb. 16, 1977, Ser. No. 769,188
Int. Cl.² B65B *5/10, 23/22, 3/00*
U.S. Cl. 53—244 **30 Claims**



5. An empty-ampoule feeding station of an ampoule filling and sealing machine comprising an inclined tray to receive empty ampoules base down, a belt having a horizontal reach below the lower edge of said tray, movable means having a vertical reach above said horizontal reach, and means to move the reach of said belt horizontally toward the filling station, so that empty ampoules sliding downwardly on said inclined tray onto said reach are moved toward the filling station by the reach of said belt and said movable means.

4,096,684

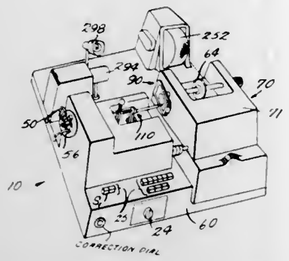
AUTOMATIC LENS GRINDING MACHINE

Hayao Akaba, Akishima; Akira Ikeda, Fussa, and Masayoshi Lee, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Hoya Lens, Tokyo, Japan

Continuation-in-part of Ser. No. 490,188, Jul. 19, 1974, abandoned. This application May 27, 1976, Ser. No. 690,781
Claims priority, application Japan, May 30, 1975, 50-114211
Int. Cl.² B24B *9/14*
U.S. Cl. 51—101 LG **13 Claims**

1. An automatic lens grinding device comprising a base; a glasses frame supporter rotatably mounted to said base and being provided with a circular opening slightly larger than an inner periphery of one side of the glasses frame; a plurality of devices mounted on said supporter for securing the glasses frame to said supporter in front of said circular opening; a profile tracing guide pin for tracing the inner periphery of said glasses frame, said pin being attached on one end of a shaft and moving a cam at the other end of the shaft; a slidable working

table containing a plurality of gears, slidable to forwardly and rearwardly parallel to said supporter; first drive means for moving said slidable working table; coaxial rotary shafts supporting a lens to be ground therebetween; a recording assembly mounted to an extension of said one of said shafts, said recording assembly being provided with a recording substrate; second drive means for rotating driving shafts and said recording plate through said plurality of gears; a grinding stone aligned with said slidable working table; third drive means for driving said grinder stone; a pressure detector for detecting



contact pressure between said grinding stone and for generating an electrical signal corresponding to the detected pressure; a pattern detecting element for detecting the absence or presence of a pattern recorded on said recording substrate and control circuit means for receiving signals from said pattern detecting element and said pressure detector which are then put into a selecting circuit, which puts out a value larger than either one of said signals from said pattern detecting element or said pressure detector for actuating said first drive means drive circuit thereby controlling the functioning of said first drive means.

4,096,685

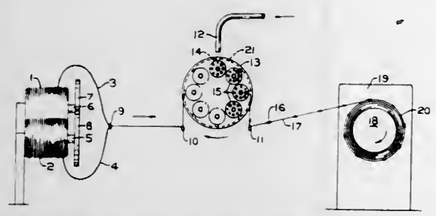
METHOD AND APPARATUS FOR PRODUCING SLUBBY YARN

Herbert W. Barch, Natrona Heights, and August G. Bohy, Lower Burrell, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 639,723, Dec. 11, 1975, abandoned, which is a division of Ser. No. 582,493, May 30, 1975, abandoned. This application Dec. 9, 1976, Ser. No. 749,198

Int. Cl.² D02G *3/34*

U.S. Cl. 57—34 B **33 Claims**



1. A method of providing a slubby strand of fibers comprising forming a low tension portion of said strand, passing the strand through a slubbing tool having an interior surface, introducing onto the surface of the tool a fluid at high pressure continuously while said strand is within said tool, both intermittently twisting and bulking the strand within said tool as the fluid passes through the strand, rapidly passing the strand so twisted and bulked from said slubbing tool, and collecting from said slubbing tool a strand having slub thereon.

14. An air jet for forming twisted slubby yarn which comprises a hollow body having an interior surface and a nozzle having an end portion through which fluid is directed onto said surface comprising two spaced circular portions, said spaced circular portions being arranged to direct said fluid such that a pair of fluid vortices are created approximately perpendicular to said interior surface and approximately perpendicular to the line of passage of said strand through said hollow body.

4,096,686

FEED DEVICE FOR OPEN-END SPINNING ASSEMBLY

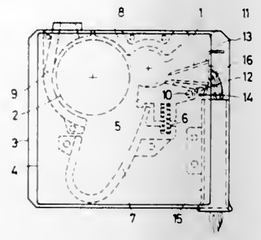
Fritz Stahlecker, Bad Uberkingen, and Hans Raasch, Monchengladbach, both of Germany, assignors to Fritz Stahlecker and Hans Stahlecker, both of Germany

Filed Mar. 14, 1977, Ser. No. 777,561

Claims priority, application Germany, Apr. 2, 1976, 2614182

Int. Cl.² D01H *1/12*

U.S. Cl. 57—58.95 **27 Claims**



1. Feeding apparatus for a spinning assembly comprising:
a transport arrangement for delivering sliver to an opener device and which forms a nip for the sliver presented to the opener device,
a housing surrounding said transport arrangement,
a sliver funnel disposed upstream of said transport arrangement, said sliver funnel having an outlet opening which leads to the transport arrangement,
and sliver funnel guide means for supportably guiding said sliver funnel for movement between an operating position with said outlet opening in the vicinity of the transport arrangement and a servicing position with said outlet opening exposed to the outside of said housing for accommodating visual inspection of the position of the sliver inserted in the sliver funnel without requiring opening of said housing, said sliver funnel guide means including means for supporting said sliver funnel in each of its operating and servicing positions,
whereby sliver can be laid correctly in said sliver funnel without requiring opening of said housing for the transport arrangement.

4,096,687

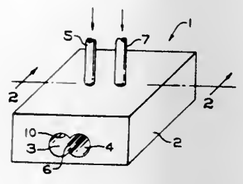
METHOD FOR PRODUCING SLUBBED YARNS

Alan T. McDonald, Cranberry, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 4, 1977, Ser. No. 793,673

Int. Cl.² D02G *1/16, 1/20*

U.S. Cl. 57—157 F **4 Claims**



1. A method for forming a randomly slubbed yarn comprising passing a textile yarn through a fluid jet having a pair of passageways along its length, said passageways being interconnected and overlapped along their lengths and having at least one fluid inlet in fluid flow communication therewith, introducing the strand into one of said passageways while directing a fluid circumferentially around said passageway at a first pressure to thereby treat said yarn with said fluid while moving the strand around the wall of said passageway, passing said yarn to said second passageway while directing a fluid circumferentially around said second passageway at a second pressure in the opposing direction to said directing of said fluid in said first passageway to thereby treat said yarn with said fluid in said second passageway while moving the strand around the wall of said second passageway and alternating said yarn between said passageways in a random pattern during its passage through the jet to thereby produce a randomly slubbed yarn.

4,096,688

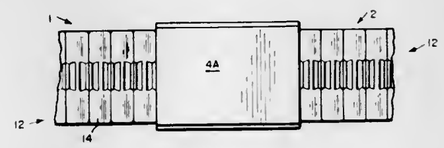
EXPANSIBLE LINKAGE FOR WRIST WATCH BRACELETS, IDENTIFICATION BRACELETS AND THE LIKE

Kurt Albert Rieth, Warwick, R.I., assignor to Textron Inc., Providence, R.I.

Filed Apr. 15, 1977, Ser. No. 787,975

Int. Cl.² F16G *13/24;* A44C *5/18*

U.S. Cl. 59—79 R **10 Claims**



1. In an expansible linkage including in combination,
at least two sections of expansible linkages each of which comprises
a row of top links and a row of bottom links,
means interconnecting the links of each row with the links of the other row to provide displacement of the links relative to each other when the expansible linkage section is stretched longitudinally from a contracted to an expanded position, and
resilient means associated with said links for resisting the displacement of said links and for returning them from expanded to contracted positions upon release of the longitudinal stretching force,
the improvement comprising,
a channel shaped outer member which comprises a top wall, a pair of spaced side walls and a series of aligned perforations extending thru said side walls,
first spring pin means connected to one end of one of said expansible sections having the outer ends of its trunions extending into a first selected pair of said aligned perforations,
second spring pin means connected to one end of the other of said expansible sections having the outer ends of its trunions extending into a second selected pair of said aligned perforations which are spaced longitudinally from said first pair,
a one-piece inner member which comprises a bottom wall and a pair of spaced upwardly extending side members and
means for detachably connecting said upwardly extending side members to said side walls of said channel shaped outer member substantially midway between the ends of said outer member,
whereby said inner member closes the opening between the lower ends of the side walls of said channel shaped outer member, said ends of said expansible linkage sections are positioned between the top wall of said channel shaped outer member and the bottom wall of said inner member and the trunions of the first and second spring pin means can be depressed from the exterior of the channel shaped outer member to adjust the length of the linkage.

4,096,689

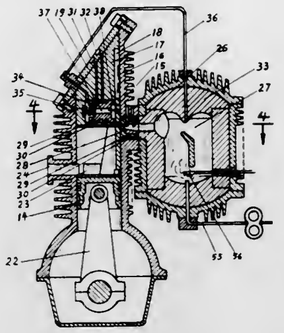
HEATING CHAMBER SEAL PROVIDED IN A HEATING CHAMBER COMBUSTION ENGINE

Georg Karl Buergel, 6 Stone Rd., Plainview, N.Y. 11803

Filed Oct. 26, 1976, Ser. No. 735,825

Int. Cl.² F02G *3/02;* F15B *15/20*

U.S. Cl. 60—39.63 **9 Claims**



1. In a combustion engine comprising a housing, a cylinder defined within said housing, a piston disposed for movement sithin said cylinder, a heating chamber defined within said housing, a fuel inlet and fuel igniting means in said heating chamber, a passageway disposed within said housing connecting said heating chamber and said cylinder interior adjacent the cylinder head; that improvement including an extension of said piston for slidable movement on the wall of said cylinder above said piston, an opening provided in said extension constructed and arranged so that the opening in the extension and said passageway line up with one another solely in the highest position of said piston whereby the gases within said cylinder pass into said heating chamber through said passageway at the end of the compression stroke and return from said heating chamber to said cylinder through said passageway at the beginning of the down stroke of said piston in a reciprocating motion.

4,096,690

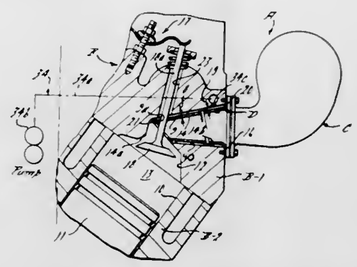
LOUVERED EXHAUST PORT LINER

James J. Florek, Troy, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1976, Ser. No. 754,661

Int. Cl.² F01N *3/10*

U.S. Cl. 60—282 **5 Claims**



1. In an internal combustion engine having a cast housing containing at least one combustion chamber and at least one passage effective to conduct combusted gases from said cham-

ber, said passage having cylindrical walls extending between an entrance and an exit, the combination comprising:

(a) walls defining an annular mounting surface about the exit of said passage,

(b) a unitary sheet metal cylinder having an annular flange effective to be mounted against said surface, said cylinder having a body extending from said flange into and through said passage terminating adjacent said inlet, said body being spaced from said passage a distance of at least 0.035 inch except for the flange contact, said cylinder having one or more apertures therein and an integral baffle bent inwardly at the leading edge of each aperture, said baffle extending inwardly from the wall of said cylinder at an angle of about 30° and in the direction of the passage exit, said baffle acting as an air foil whereby the exhaust gases and the incoming secondary air are both directed at an inward angle with respect to the cylinder wall for proper mixing, and said baffle acting as a flame holder for sustaining secondary combustion, said apertures being spaced a distance from the inlet edge of said cylinder at least 70% of the length of said cylinder, and

(c) means effective to convey a continuous supply of secondary air to said aperture at a controlled rate, whereby air is drawn into and mixed with said exhaust gas to facilitate chemical conversion of certain exhaust gas constituents by the retention of heat in said gases within said liner and by the presence of a controlled amount of excess oxygen.

4,096,691

CATALYST CONTAINER FOR USE IN EXHAUST MANIFOLD

Hidetaka Nohira; Hironori Bessho, and Yasuyuki Sakai, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

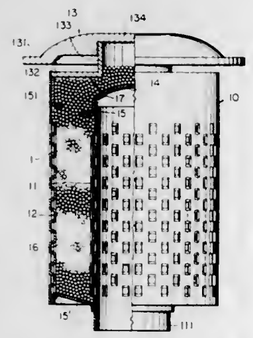
Continuation-in-part of Ser. No. 645,783, Dec. 31, 1975, abandoned. This application Jul. 12, 1976, Ser. No. 704,509

Claims priority, application Japan, Jun. 4, 1975, 50-66402; Sep. 26, 1975, 50-130998[U]

The portion of the term of this patent subsequent to Feb. 1, 1994, has been disclaimed.

Int. Cl.² F01N *3/15*

U.S. Cl. 60—295 **5 Claims**



1. A catalyst container, for use in an exhaust manifold, having perforated substantially vertically disposed inner and outer cylinders, with catalysts in a cylindrical space defined between said inner and outer cylinders, said container comprising:

upper and lower annular lids closing the top and bottom annular openings respectively of the cylindrical space defined between said inner and outer cylinders;

a circular inner cylinder lip covering the top opening of said inner cylinder;

an outer cylinder lid on the top circumferential edge of said outer cylinder covering the top opening of said outer cylinder and said circular inner cylinder lid, said outer cylinder lid including an annular portion, a cylindrical portion having a threaded outer circumferential surface, and an outer cover portion, means defining a cavity having a threaded wall in said outer cover portion, and said outer cover portion being removably threadedly fitted on said threaded outer circumferential surface of said cylindrical portion, said outer cylinder lid and said inner cylinder lid defining a first space therebetween; and

means defining a hole in said upper annular lid through which the first space is communicated with the cylindrical space defined between the inner and outer cylinders.

4,096,692

AIR-PUMP SYSTEM FOR RECIPROCATING ENGINES

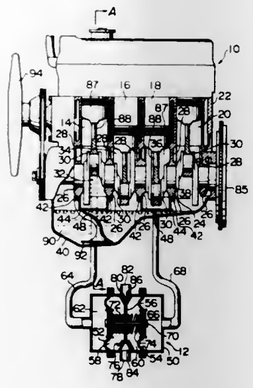
Hirokazu Nakamura; Tsuneo Ohinouye, both of Kyoto; Kenji Hori, Nagaokakyo; Tatsuro Nakagami, Kyoto; Yutaka Tsukamoto, Jyoyo, and Katsuo Akishino, Kameoka, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Aug. 27, 1976, Ser. No. 718,329

Claims priority, application Japan, Apr. 15, 1976, 51-47391[U]; May 28, 1976, 51-69427[U]

Int. Cl.² F01N *3/10*

U.S. Cl. 60—307 **5 Claims**



1. A multicylinder engine, partition and air pump system, comprising:

a cylinder block having therein a plurality of cylinders each with a piston reciprocable therein, the block also having a plurality of division walls extending from the cylinders to provide crank chambers each communicating with one of the cylinders, the walls having bearings therein for a crankshaft to be rotated by the pistons, and the block having an oil pan at a bottom thereof;

a partition plate for at least one of the crank chambers in the cylinder block, the plate being secured to lower portions of the division walls of the respective chamber to separate that chamber from the other crank chambers and from the oil pan; and

an air pump having a variable-pressure chamber communicating with the separate crank chamber, also having an air-pressure chamber which has an inlet communicating with the atmosphere, an outlet for supplying atmospheric air to condition an exhaust of the cylinders, and controls for the inlet and outlet, the air pump having a pump member responsive to differentials of pressure between said pressure chambers, and spring means for urging the pump member to move from one of the pressure chambers toward the other, the spring means having an oscillation frequency natural thereto whereby it is resonant with a predetermined and relatively low frequency at which the pistons reciprocate in the cylinders and supply air at variable pressure through the separate crank chamber to the variable-pressure chamber of the air pump, to render the air pump ineffective when the pistons reciprocate at a relatively high frequency, subject to renewed operation of the air pump with the pump member moving resonant to the relatively low frequency when the pistons again reciprocate at said relatively low frequency.

4,096,693

TORQUE CONVERTER FLUID CONTROL SYSTEM FOR POWER TRANSMISSION SYSTEM

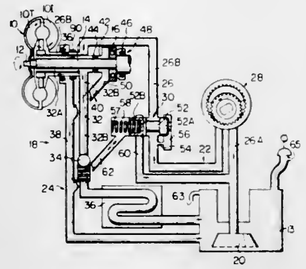
Tamio Kawamoto, Sagamihara, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 12, 1977, Ser. No. 786,827

Claims priority, application Japan, Apr. 12, 1976, 51-44425[U]

Int. Cl.² F16D *33/00*

U.S. Cl. 60—337 **4 Claims**



1. In a power transmission system having a torque converter unit, a driving shaft drivably connected to the impeller of said torque converter unit, a driven shaft drivably connected at one end thereof to the turbine of said torque converter unit, and a bearing mounted on said driven shaft at a location axially spaced apart from said one end,

a torque converter fluid control system, comprising:

a fluid source;

a fluid supply circuit and a fluid return circuit each interconnecting said fluid source and said torque converter unit, said fluid return circuit including a fluid return passage having an annular passage portion formed about said driven shaft; and

a lubrication circuit for said bearing, including an extension annular passage formed about said driven shaft and fluidly connected to said annular passage portion, a flow restriction ring mounted on said driven shaft and fluidly connected to said extension annular passage as a passage portion thereof, said flow restriction ring being situated upstream of said bearing for reducing the flow rate of fluid passed therethrough, a fluid seal mounted on said driven shaft downstream of said bearing for providing with said extension annular passage a closed end, and a lubrication fluid drain passage having one end fluidly connected to said extension annular passage at a location between said flow restriction ring and said bearing and the other end fluidly connected to said fluid source.

4,096,694

CONTROL SYSTEM FOR A FLUID DRIVE

Cyril W. Habiger, and Leon E. Hicks, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 5, 1977, Ser. No. 813,029

Int. Cl.² F15B *15/18, 11/16*

U.S. Cl. 60—459 **8 Claims**

1. A control system for a fluid drive assembly comprising:

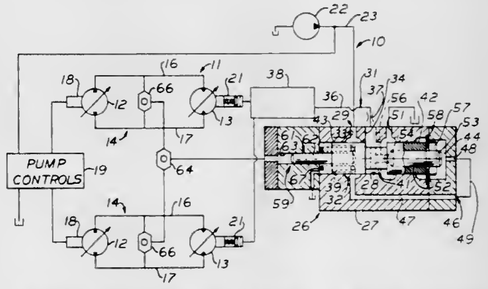
a pump;

a variable displacement two-speed motor having actuator means for controlling the displacement of the motor, said actuator means being movable between a first position at which the displacement of the motor is at a preselected maximum and a second position at which the displacement of the motor is at a preselected minimum;

a fluid circuit connecting the pump to the motor;

a source of fluid at a first preselected pressure level;

valve means connected to the source of fluid and to the actuator means for controlling fluid flow therebetween, said valve means having a valve member movable between a first position at which the source of fluid is blocked from communication with the actuator means and



a second position at which the source of fluid is in communication with the actuator means;

first means for controllably automatically moving the valve member to the first position in response to the fluid pressure in the fluid circuit exceeding a second preselected level;

second means for retaining the valve member in the first position until the fluid pressure in the fluid circuit decreases from the second preselected pressure level to a third preselected pressure level.

4,096,695

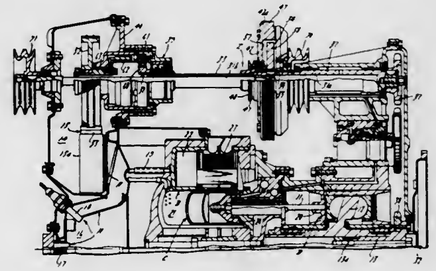
ENGINE DRIVEN HEATING SYSTEM COMPONENTS FOR STIRLING ENGINES

Lowell A. Reams, Plymouth, and Andrew E. Geddes, Detroit, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Mar. 3, 1977, Ser. No. 774,074

Int. Cl.² F02G *1/04*

U.S. Cl. 60—517 **5 Claims**



1. A two power-source drive system for use in a Stirling engine having a longitudinally extending centerline and an engine driven element coincident therewith providing one power source, comprising:

(a) an electrically energized motor providing a second power source,

(b) a first shaft offset but aligned with said centerline, said first shaft being drivingly connected to said driven element,

(c) a second shaft concentrically disposed about said first shaft,

(d) means providing a viscous drive connection between said first and second shafts,

(e) a plurality of combustion circuit components for said engine, each of said components being connected to said second shaft, and

(f) means providing a one-way driven connection between said second shaft and motor whereby drive may be transmitted either from said motor or first shaft to said second shaft in the same rotative direction.

4,096,696

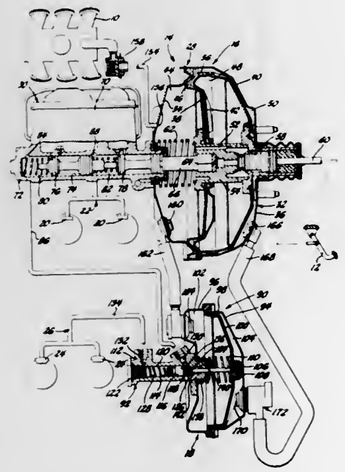
VEHICLE POWER BRAKE SYSTEM WITH MASTER BOOSTER AND SLAVE BOOSTER

Robert M. Van House, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 10, 1976, Ser. No. 751,048

Int. Cl.[2] B60T *13/00*

U.S. Cl. 60—547 **4 Claims**



1. A brake system in a vehicle having first and second brake actuating circuits for actuating first and second brake sets, said system comprising:

a first differential pressure operated booster having first and second operating pressures;

a first master cylinder actuatable by said first booster and having first and second brake actuating pressure outputs respectively connected to said first and second brake actuating circuits;

a second differential pressure operated booster operatively connected with said first booster to receive said first and second operating pressures therefrom and having means acting only upon the establishment of operating pressures of a predetermined differential in said first booster to permit delivery of said differential operating pressures from said first booster to said second booster to operate said second booster;

a second master cylinder actuatable by the operation of said second booster and having normally open valve means in said second brake actuating circuit fluidly intermediate said first master cylinder second brake actuating pressure output and the second brake set;

said normally open valve means permitting brake actuating pressure to pass through said second master cylinder from said first master cylinder to the second brake set while open, and arranged to be closed by initial operation of said second booster, said second master cylinder being actuatable by operation of said second booster when said valve means is closed to pressurize the portions of said second brake actuating circuit from said second master cylinder to the second brake set in accordance with operation of said second booster.

4,096,697

METHOD AND MEANS FOR CONDITIONING THE INTAKE AIR OF A SUPERCHARGED, LOW-COMPRESSION RATIO DIESEL ENGINE

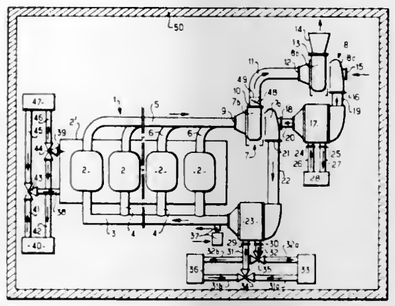
Bernard Treuil, Paris, France, assignor to Societe d'Etudes de Machines Thermiques S.E.M.T., Saint Denis, France

Continuation-in-part of Ser. No. 484,212, Jun. 28, 1974, Pat. No. 3,977,195. This application Feb. 24, 1976, Ser. No. 660,978

Claims priority, application France, Feb. 25, 1975, 75 05851

Int. Cl.[2] F02B *29/04*

U.S. Cl. 60—599 **77 Claims**



1. A method for at least temporarily heating the pre-compressed intake air of a supercharged, low compression ratio, internal combustion engine at start and low-load operating conditions, said method comprising the step of at least temporarily pre-heating said intake air before it is used to support combustion for burning fuel in the cylinder, wherein the improvement comprises initially cranking the engine from the stopped condition while temporarily delaying any fuel injection into at least one cylinder for at least one part of the starting time period of the engine and at the same time selectively impeding the exhaust gas streaming from said at least one cylinder for retaining a controlled amount of residual working gases in said at least one cylinder.

4,096,698

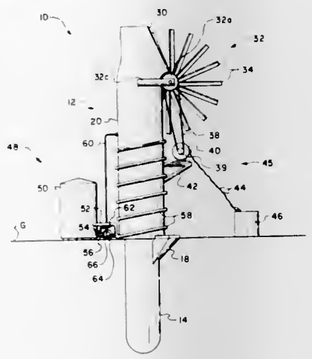
SOLAR ENERGY CONVERTING DEVICE

Charles S. Martin, 207 Hamilton Ave., Albemarle, N.C. 28001

Filed Jan. 14, 1977, Ser. No. 759,581

Int. Cl.[2] F03G *7/02*

U.S. Cl. 60—641 **7 Claims**



1. A solar energy converting device comprising: an upright air channeling device having an elongated generally closed internal air channeling area for channeling air from a lower level to an upper elevated level; means provided about a lower level of said air channeling device for permitting air to enter the lower level thereof; preheating means disposed about the lower level of said air channeling device for heating air entering the lower level thereof which tends to cause the preheated air to more readily move upwardly within the air channeling device; said air channeling device having a main exposed outer solar energy collecting surface for collecting available solar energy and transferring a portion of any collected solar energy inwardly to the air moving vertically therein so as to provide additional heat to the vertically moving air; windmill means having a plurality of radially extending vanes rotatively mounted about an upper level of said air channeling device and disposed such that a portion thereof lies in the normal air flow path of air moving vertically from the lower level of said air channeling device to an upper level of said air channeling device such that said windmill means is rotatively driven in response to rising air moving within said air channeling device engaging vanes of said windmill means, thereby causing the vanes of said windmill means to be rotatively driven; energy conversion means operatively connected to said windmill means and driven thereby for converting energy of said rotatively driven windmill means to a desired form of useful energy; and means for collecting solar energy and storing at least a portion thereof during periods where solar energy is available for use during desired periods such as nighttime or during periods of limited sunlight for preheating said air entering said air channeling device.

4,096,699

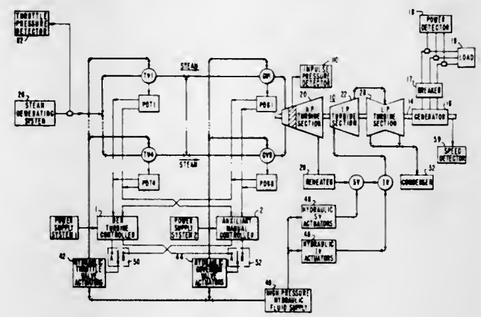
AUXILIARY MANUAL TURBINE CONTROLLER

William E. Zitelli, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 23, 1977, Ser. No. 771,290

Int. Cl.[2] F01K *13/02*

U.S. Cl. 60—657 **9 Claims**



1. A steam turbine control system comprising:

a source of steam;

a steam turbine;

a plurality of steam admission control valves coupled between said steam source and said steam turbine to control the steam flow passing through said steam turbine from said steam source, said steam flow being a function of the position of each of said steam admission control valves;

a rate control means for each steam admission control valve, each of said rate control means being coupled to a corresponding steam admission control valve for controlling the rate of position movement therein;

a position detection means for each steam admission control valve, said each position detection means operative to generate a primary and an auxiliary valve position signal, both representative of the actual position of their corresponding steam admission control valve;

a primary turbine controller governed at times by said primary valve position signals to generate a set of valve position control signals, each valve position control signal corresponding to a steam admission control valve;

an auxiliary turbine controller governed at times by said auxiliary valve position signals to generate a set of auxiliary valve position control signals, each valve position control signal corresponding to a steam admission control valve; and

switching means operative to select one of the primary and auxiliary sets of valve position control signals to govern their respective rate of control means which controls the rate of position movement of each of the steam admission control valves.

4,096,700

OIL BOOM FOR DAMMING AND COLLECTING A FLOATING OIL SLICK

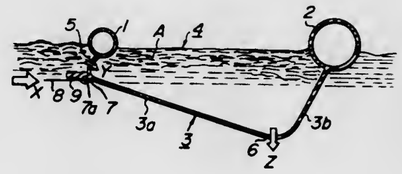
Tateo Muramatsu; Toshio Fukai, both of Yokohama, and Haruo Takahashi, Kawasaki, all of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan

Filed Nov. 4, 1976, Ser. No. 738,977

Claims priority, application Japan, Nov. 12, 1975, 50-152877; Feb. 20, 1976, 51-18251

Int. Cl.[2] E02B *15/04*

U.S. Cl. 61—1 F **15 Claims**



1. An oil boom for damming and collecting a floating oil slick comprising two rows of floats spaced apart from each other and partly submerged in water, one row being disposed upstream of the other row, a flexible base sheet connected across base portions of said two rows of floats and hanging down therefrom below into the water in a curved shape, a plurality of inlet openings arranged near said upper stream side float and extending in its lengthwise direction, an inflow guide plate integral with said flexible base sheet and arranged below said inlet openings, said inflow guide plate projecting upstream in a direction in parallel with the water surface, and a plurality of outlet openings arranged in a rear portion of said flexible base sheet and extending in its lengthwise direction, the total opening area of said outlet openings per unit length of said flexible base sheet in its lengthwise direction being larger than that of the inlet openings.

4,096,701

MATTRESSES FOR SUBAQUEOUS STRUCTURES

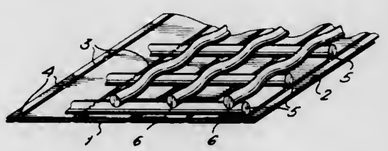
Cornelis Den Boer, Abbenbroek, Netherlands, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 2, 1977, Ser. No. 764,863

Claims priority, application United Kingdom, Feb. 10, 1976, 5176/76

Int. Cl.[2] E02B *3/12*

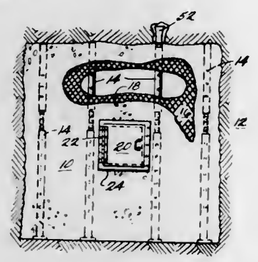
U.S. Cl. 61—38 **2 Claims**



1. A mattress for civil engineering use, including use in subaqueous structures, comprising two plies of synthetic fabric, one of which is non-woven, the other being woven, said plies being joined by sewn threads along one length of the mattress in parallel lines 10–100 cm apart with at 10–100 cm intervals, 2–8 cm lengths of unsewn threads forming loops for

tying on fascines, said mattress being provided with fascines attached by means of said loops, said fascines being formed from tubes of non-woven fabric.

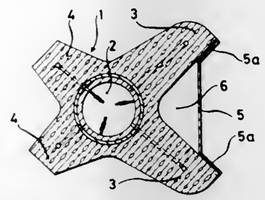
4,096,702
MINE STOPPING DEVICE AND METHOD OF CONSTRUCTING SAME
Willard J. Burton, Box 20, Verdunville, W. Va. 25649
Filed Oct. 17, 1975, Ser. No. 623,457
Int. Cl.² E21F *1/14*
U.S. Cl. 61—45 R **5 Claims**



1. A permanent mine stopping device for use in an underground coal mine tunnel or the like, comprising:
- a plurality of individual self-supporting vertically disposed support members each being laterally spaced from adjacent members said plurality of support members being positioned so as to extend across the width of the mine tunnel being stopped;
- each of said support members having a top and bottom end and adjustment means for vertically adjusting the length of said support member so that the length of each of said support members can be extended until the top and bottom ends respectively come into engagement with the roof and floor of the mine tunnel being stopped so that said support members provide support for the roof of the tunnel;
- wire mesh secured to the individual support members and extending over substantially the entire cross-section of the tunnel;
- plaster applied to the wire mesh and having its outer periphery in substantially air-tight sealing engagement with the walls, floor and ceiling of the mine tunnel, whereby air is prevented from flowing through the tunnel in which the device is placed, each of said support members being comprised of upper and lower members, said upper and lower members being connected together by said adjustment means so as to be movable toward and away from each other, and wherein each of said upper and lower members are provided along their length with a plurality of apertures so as to permit the wire mesh to be secured to said support members.

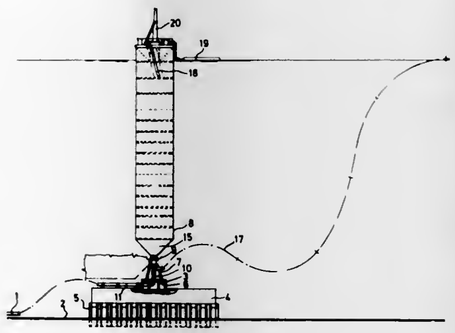
4,096,703
CONCRETE CONSTRUCTIONAL MEMBERS
Friedrich Karl Lüder, P.O. Box 2256, D-2400 Lübeck, Germany
Filed Apr. 1, 1977, Ser. No. 783,744
Claims priority, application Germany, Apr. 3, 1976, 2614438
Int. Cl.² E02D *5/12, 5/32*
U.S. Cl. 61—59 **8 Claims**

1. In a concrete constructional member for building walls and bulkheads and particularly moles, quay bulkheads, groins or the like edifices, consisting of a concrete body having a vertically continuous opening in the central area and having pairs of divergent arms of different length on two opposing sides, the end faces of the shorter pair of arms being capable of being brought into contact with the inner faces of the longer pair of arms on an adjoining constructional member, the improvement which consists in that the constructional member is formed as an integral part of concrete extending in height from the foot of an edifice which is to be built, to at least the vicinity of the surface of the water, and the lower end of the constructional member, on the side facing in the direction of construction, having an extension in the form of an apron which



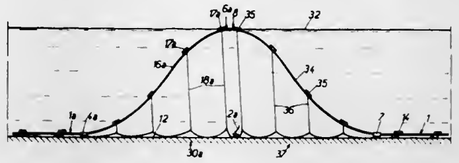
projects beyond the lower end of the constructional member and which masks the space between said longer arms of the cross-section, except for the contact areas for said shorter arms of a succeeding concrete member.

4,096,704
OFFSHORE PRODUCT LOADING TERMINAL
Stewart Marr Adamson, and Alan Edgar John Bliault, both of Portchester, England, assignors to David Brown-Vosper (Offshore) Limited, Portchester, England
Filed Nov. 15, 1976, Ser. No. 742,123
Int. Cl.² E02B *17/00;* B63B *27/24*
U.S. Cl. 61—95 **11 Claims**



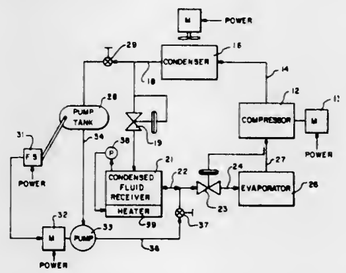
1. An offshore product-loading terminal comprising in combination:
- a support on a sea bed;
- a turntable having a lower part fixed to said support and an upper part rotatable relative to said lower part about a vertical axis passing through said turntable;
- a buoy including means for mooring a ship;
- a universal joint connecting said buoy to said upper part of said turntable, said buoy being rotationally coupled by said joint to said upper part for joint rotation therewith, and said buoy, joint, and turntable constituting a force-transmission path from said means for mooring to said support;
- a pipe swivel outside said force path and including a first portion carried by said support and a second portion rotatable about said vertical axis relative to said first portion;
- an input line connected to one of said portions and connectable to a source of the product to be loaded;
- an output line connected to the other of said portions and connectable to a deposit location for the product to be loaded, the line connected to said second portion being flexible.

4,096,705
LAYING OF UNDERWATER PIPELINES
Jacques Edouard Lamy, Fontenay-aux-Roses, France, assignor to Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines "C.G. Doris", Paris, France
Filed Jan. 5, 1977, Ser. No. 757,098
Claims priority, application France, Jan. 27, 1976, 76 02135
Int. Cl.² F16L *1/00;* B63B *35/04*
U.S. Cl. 61—111 **14 Claims**



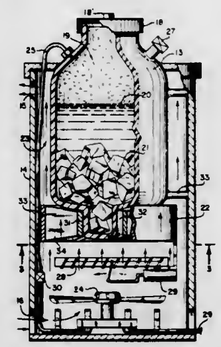
1. Apparatus for laying a pipeline on the bed of a body of water by the process consisting of successively towing in the body of water first and second pipeline sections each having a front end and a rear end, then joining the front end of the first section to the rear end of the second section, comprising
- towing means, including a traction machine, for applying a traction effort at a traction point on a pipeline section being towed to draw the same forward, said traction point being spaced from the front end of said section being towed;
- holding means, including a holding machine, for applying a holding effort at a holding point on said pipeline section being towed to maintain the same in tension, said holding point being spaced from the rear end of said section being towed;
- means for connecting a front end portion of said pipeline section being towed to the traction machine, said front portion being situated in front of said traction point;
- ballasting means incorporating a plurality of short trail-ropes spaced along an intermediate portion of said pipeline section being towed, located between said traction point and said holding point, for supporting said intermediate portion near to the bed of the body of water, thereby to prevent said intermediate portion from deviating;
- and buoyancy means for conferring a positive buoyancy to said front end portion and to a rear end portion situated to the rear of said holding point, in order to maintain the front and rear ends of said pipeline section being towed, near to the surface of the body of water, thereby to make said joining easier.

4,096,706
FREE CONDENSING LIQUID RETRO-PUMPING REFRIGERATION SYSTEM AND METHOD
Sterling Beckwith, 1824 Doris Dr., Menlo Park, Calif. 94025
Filed Mar. 9, 1977, Ser. No. 775,788
Int. Cl.² F25B *1/00, 41/00, 39/04*
U.S. Cl. 62—115 **10 Claims**



8. The method of providing a condensed fluid at a high pressure to an expansion valve coupled to an evaporator, comprising the steps of
- compressing the fluid in gaseous phase from the evaporator to a pressure dependent upon ambient temperature,
- condensing the fluid at ambient temperature to a liquid phase,
- collecting the liquid phase fluid,
- sensing a predetermined level of the collected liquid phase fluid,
- pumping the liquid phase fluid to a high pressure when the predetermined level is reached, and delivering the high pressure liquid phase fluid to the expansion valve.

4,096,707
PORTABLE REFRIGERATION MACHINE
William P. Taylor, 4541 Lyme Bay, Oxnard, Calif. 93030
Filed Oct. 18, 1976, Ser. No. 733,360
Int. Cl.² F25D *3/12*
U.S. Cl. 62—167 **2 Claims**



1. A portable refrigeration machine including, in combination:
- (a) a pressure vessel for receiving carbon dioxide in liquid and/or solid phases;
- (b) a heat exchanger secured to the lower external portion of said vessel;
- (c) an outer housing surrounding said vessel in spaced relationship thereto leave an annulus between the exterior wall surface of the vessel and the interior wall surface of said housing above said heat exchanger, said housing having an upper air outlet opening communicating with said annulus and a lower air inlet opening disposed beneath said heat exchanger;
- (d) a gas operated fan disposed to cause air flow across said heat exchanger;
- (e) conduit means connecting the upper interior of said vessel to said gas operated fan to rotate said fan by expanding carbon dioxide gas from said vessel and thereby causing air to enter said inlet opening and pass through said heat exchanger and annulus out said outlet opening, said heat exchanger absorbing heat in said air into said vessel whereby said air passing out said outlet opening is cool;
- (f) temperature responsive control means including a baffle plate structure between said fan and said heat exchanger;
- (g) thermal means connected to said baffle plate structure for increasing or decreasing the air flow passage therethrough from the fan to the annulus in response to increasing or decreasing temperatures respectively falling outside given upper and lower temperature limits whereby the temperature of the circulating air is maintained within a desired range; and
- (h) a cycling valve interposed in said conduit between said vessel and fan for periodically interrupting the flow of gas to said fan so that said fan is operated intermittently to

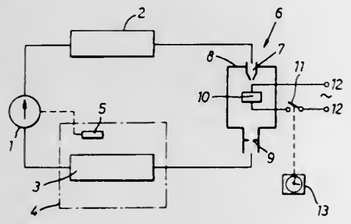
thereby provide inactive time intervals during which the air in a refrigerated compartment in which said machine is placed can redistribute itself to thereby provide a more uniform temperature throughout the volume of the refrigeration compartment to be cooled.

4,096,708

COMPRESSOR REFRIGERATION PLANT

Bent Karll, Augustenborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 744,631, Nov. 24, 1976, abandoned. This application Oct. 25, 1977, Ser. No. 845,119
Claims priority, application Germany, Jun. 22, 1976, 2553562
Int. Cl.² F25D *21/06*
U.S. Cl. 62—275 **4 Claims**



1. A refrigeration unit having a normal operating cycle and a defrosting cycle, comprising, a compressor, a condenser unit, an evaporator unit, said units being connected in series by conduit means, a chamber in said conduit means between said condenser unit and said evaporator unit, a heating resistor in said chamber, circuit means for supplying a current to said resistor, to produce the defrost cycle by heating the refrigerant to a gaseous state to add heat thereto and slow the flow thereof, throttling means downstream of said chamber formed by an axially short throttling element which only slightly impedes the flow of refrigerant in a liquid state but further slows the flow of a refrigerant in a gaseous state, the portion of said conduit means between said chamber unit and said evaporator unit being a single conduit which carries refrigerant in a liquid state during the normal refrigerating cycle and a reduced quantity of heated refrigerant in the gaseous state during the defrosting cycle.

4,096,709

RUPTURE-PREVENTING AIR-RELEASING WATER-FREEZING RESERVOIR

Gerhard Barthel, 14657 Juliana, East Detroit, Mich. 48021

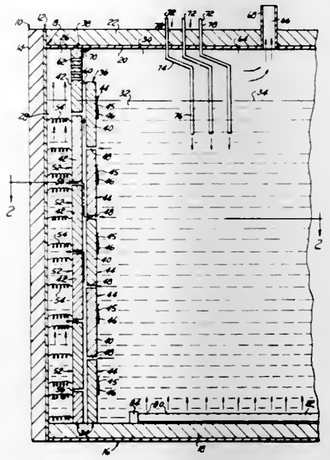
Filed Apr. 14, 1977, Ser. No. 787,326
Int. Cl.² F25D *3/10*
U.S. Cl. 62—307 **10 Claims**

1. A wall-rupture-preventing air-releasing water-freezing reservoir, comprising

a water-tight tank having top, bottom and side wall,

an expansible substantially continuous heat-insulating barrier rising from said bottom wall of said tank above the water level thereof in close proximity but in spaced relationship to said side wall and defining and separating from one another an outer unfrozen-water chamber and a larger inner water-freezing chamber,

said barrier and at least one of said tank walls having expended-air outlet passageways therethrough,



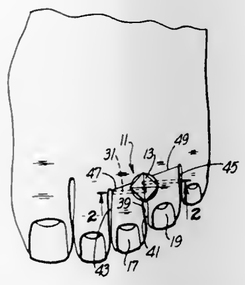
and means for discharging into said inner chamber of said tank below the water level thereof outside atmospheric winter air at below-water-freezing temperatures.

4,096,710

FOOT JEWELRY

Betty Jeanne Sloan, 33915 Calle Acordarse, San Juan Capistrano, Calif. 92675

Continuation-in-part of Ser. No. 676,711, Apr. 14, 1976, abandoned. This application Jan. 14, 1977, Ser. No. 759,486
Int. Cl.² A44C *25/00*
U.S. Cl. 63—2 **10 Claims**



1. An ornamental ring removably attachable to at least two adjacent digits comprising:

an ornament;

attachment means for attaching the ornament to the two adjacent digits;

said attachment means including a wire-like element including first and second hooks and a reverse bend portion;

each of said hooks having an inner end and an outer end, said reverse bend portion joining said hooks at said inner ends;

each of said hooks including a digit embracing section;

said attachment means including means for mounting said ornament on said reverse bend portion of said hooks with said hooks being on the same side of said ornament;

said digit embracing sections extending generally away from each other so that said digit embracing sections can embrace the two adjacent digits, respectively, each of said digit embracing sections extending circumferentially for less than 360°; and

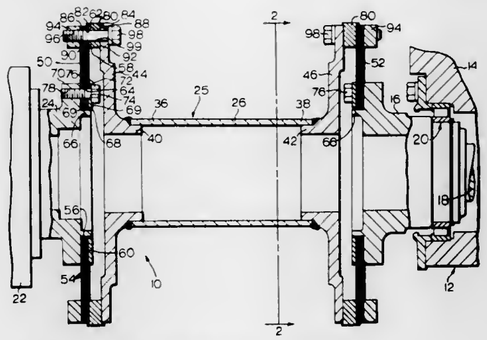
said reverse bend portion offsetting said inner ends of said hooks and at least substantial portions of said digit embracing sections in a direction generally axially of the hooks.

4,096,711

DUAL FLEX PLATE DRIVE

George A. Carlson, and William O. Jankovsky, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 13, 1976, Ser. No. 750,091
Int. Cl.² F16D *3/78*
U.S. Cl. 64—13 **4 Claims**



1. In a vehicle drive assembly, in combination,

(a) a power source having an output,

(b) a transmission axially spaced from said power source and having an input,

(c) a coupling axially aligned with and positioned between said power source and said transmission,

(d) said coupling having means connecting said coupling to said power source and to said transmission,

(e) said means comprising two flexible plates,

(f) each said flexible plate being secured along its outer peripheral portion to flanges on said coupling,

(g) one of said flexible plates being secured along its inner peripheral portion to the output of the power source,

(h) the other of said flexible plates being secured along its inner peripheral portion to the input of the transmission,

(i) a spacer ring secured between each flexible plate and said coupling, and

(j) oppositely extending pilots formed on each said ring with one pilot engaging the coupling and the other pilot engaging one of said flexible plates, said pilots positioning said flexible plates and said coupling relative to each other.

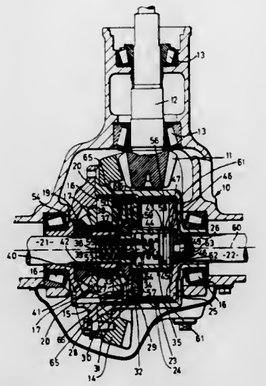
4,096,712

CONTROL COUPLINGS AND GEARING COMBINED THEREWITH

Oswald Webb, Coventry, England, assignor to GKN Transmissions Limited, Birmingham, England

Filed Feb. 23, 1976, Ser. No. 660,075
Claims priority, application United Kingdom, Feb. 25, 1975, 7757/75
Int. Cl.² F16D *3/80;* F16H *1/44;* F16D *19/00, 31/00*
U.S. Cl. 64—26 **12 Claims**

1. A control coupling comprising an enclosure containing a viscous liquid; first and second mutually interleaved sets of annular plates arranged for rotation about a common axis within said enclosure with the viscous liquid in contact with adjacent surfaces of said plates, the first set of plates being arranged for driving connection with a first rotatable member and the second set of plates being arranged for driving connection with a second rotatable member; the plates of at least one set being free to move in directions parallel to said common axis; the plates of one set being mounted on a hollow hub which projects within the enclosure and which has a bore which is open to, and forms part of, the enclosure volume; a piston slidable in the bore to vary the volume of the enclosure; and resiliently yieldable means located in the bore urging the piston towards a limit position in which the volume of the bore in communication with the remainder of the enclosure is at a minimum; the strength of the resiliently yieldable means being chosen according to a desired torque transmitting characteristic for the coupling, and the quantity of viscous liquid within the enclosure being such that at an ambient temperature of 25° C and with the coupling at rest the viscous liquid occupies a volume in the range 85% to 100% of the volume of the enclosure when said piston is in said limit position.

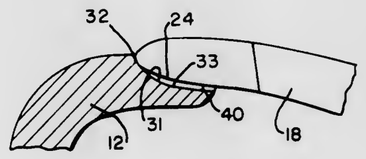


4,096,713

KNITTING NEEDLE

Antone Lopes, Jr., and Richard Wilton Shepard, both of Torrington, Conn., assignors to The Torrington Company, Torrington, Conn.

Filed Aug. 8, 1977, Ser. No. 822,446
Int. Cl.² D04B *35/04*
U.S. Cl. 66—121 **6 Claims**



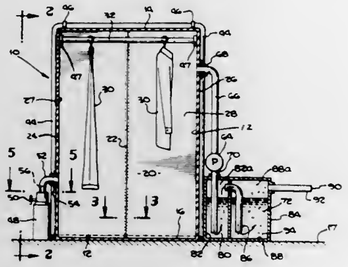
1. A latch needle comprising: a blade; a hook on one end of the blade, said hook having a groove formed on its outer perimeter, the groove having a bottom surface extending from a point on the outer perimeter of the hook longitudinally spaced from the free end of the hook up to the free end, and a latch having one end pivotally connected to the blade, said latch having its free end provided with an inner surface formed to seat in the groove of the hook, the shape of the groove and the shape of the latch being such that initially only the end portion of the inner surface of the latch contacts the bottom surface of the groove in the latch closed position near said point on the outer perimeter of the hook with a remaining part of the inner surface of the latch located in the groove being spaced from the bottom surface of the groove, that portion of the inner surface of the latch coming into contact with the groove bottom surface gradually increasing in area as the groove bottom surface and the inner surface of the latch wear together during needle operation.

4,096,714

SELF-CONTAINED GARMENT TREATING APPARATUS

Robert P. Nirenberg, 1314 17th St., #32, Santa Monica, Calif. 90404

Filed Dec. 3, 1976, Ser. No. 747,232
Int. Cl.[2] D06B 5/24
U.S. Cl. 68—5 C 8 Claims



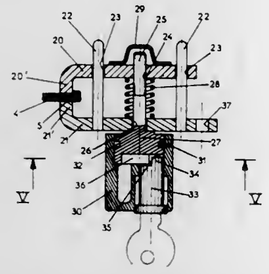
1. Self-contained apparatus for vapor phase treating of garments with durable press treating agents, comprising a pressurized agent supply, a pressurizable treating chamber for enclosing garments to be agent treated, means to vaporize said treating agent, means to feed the vaporized treating agent into said treating chamber for pressurizing said treating chamber and for treating the garments with said treating agent, pump means communicating with said treating chamber for withdrawing unused treating agent from said treating chamber and for cyclically depressurizing the chamber interior in time relation to said agent supply repressurizing said chamber with treating agent to relatively pressure-impregnate the garments with said treating agent in vapor phase, and means in flow communication with said pump means for recovery of unused treating agent.

4,096,715

ANTI-THEFT DEVICE FOR A MOTORCYCLE HELMET

Paul Lipschutz, Croissy, France, assignor to Neiman S.A., Courbevoie, France

Filed Mar. 4, 1977, Ser. No. 774,300
Claims priority, application France, Mar. 31, 1976, 76 09261
Int. Cl.[2] E05B 69/00
U.S. Cl. 70—59 10 Claims



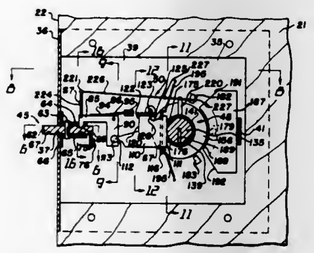
1. An anti-theft device for a motorcycle helmet, said helmet having a continuous rib on the periphery of the edge of its opening, wherein there is provided means for gripping said edge of the opening of the helmet behind said rib, and a lock device for locking said gripping means in the gripping position, wherein said gripping means comprises two branches mounted to pivot about a pin remote from the ends of said branches, two confronting ends of said branches having cooperative nose portions forming a tongs, and a bolt member actuated by a lock device integral with one of said branches, said bolt member being capable of occupying a first position in which it does not prevent the opening of said tongs and a second position in which it prevents the opening of said tongs, said lock device and the bolt member being connected to each other to move in translation.

4,096,716

LOCK-LATCH SET

Paul S. Cormier, #2-520 Victoria St., New Westminster, B.C., Canada

Filed Aug. 23, 1976, Ser. No. 717,261
Int. Cl.[2] E05B 65/06
U.S. Cl. 70—139 51 Claims



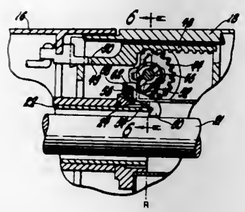
1. A lock-latch set comprising:
a latch member mounted for rotation between a lock position and an unlock position,
stop means on the latch member,
a plurality of locking trains of different lengths, mounted for movement in opposite directions between a locking position and a release position, said trains each having a pivotally mounted outer end portion positioned to engage said stop means and an opposite slidably mounted inner end portion, said outer end portion when the trains are moved to a locking position engaging the stop means to retain the latch member in the lock position and when the trains are oppositely moved to the release position disengaging the stop means to allow the latch member to rotate to the unlock position, and
a shaft assembly mounted adjacent said inner end portions of the locking trains, said assembly having means for receiving a key having a number of teeth of predetermined lengths corresponding to the different lengths of the locking trains with said teeth positioned to engage the train inner end portions, said assembly allowing the key to be turned to permit the key teeth to engage said respective inner end portions to move the locking trains to the release position to allow the latch member to rotate.

4,096,717

TRANSMISSION SHIFT CONTROL

William D. Cymbal, Freeland, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 29, 1977, Ser. No. 792,313
Int. Cl.[2] B60R 25/02, 25/06; E05B 65/12
U.S. Cl. 70—248 3 Claims



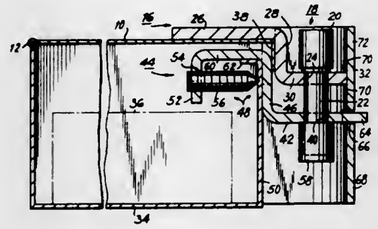
1. For use with a synchromesh steering column including a jacket having a rotatable shift bowl and a nonrotatable housing mounted at the upper end thereof, a shift tube concentrically mounted within the jacket and shift bowl and slidably mounted at its upper end within a central hub bushing secured to the housing, a shift lever pivotally mounted on the shift bowl with its inner end operatively connected to the shift tube for axially moving the latter in either direction within the central hub bushing, the shift bowl being rotatable by manual movement of the shift lever through a predetermined angle in one direction to a common circumferential location for REVERSE position and at least one forward gear position, a gate formed on an inner surface of the shift bowl, a lock cylinder mounted in a wall of the housing and having a rotatable gear sector mounted at its inner end in engagement with an axially movable toothed rack having an off-set extension formed thereon, the improvement comprising a cam formed on a side surface of the gear sector, a locking bar pivotally mounted on the central hub bushing adjacent the upper end of the shift tube, and resilient means operatively connected between the locking bar and the central hub bushing for urging the locking bar into contact with the cam, the shift tube being axially positioned to prevent the locking bar from being pivoted inwardly by the cam via manual rotation of the lock cylinder while in any forward gear position, thereby preventing the lock cylinder from being rotated into the OFF-LOCK position until the shift lever is manually moved into the REVERSE position, thereby causing the shift tube to move axially to a predetermined position wherein the locking bar is pivoted past the upper edge thereof by the cam when the lock cylinder is rotated into the OFF-LOCK position, thus permitting the key to be removed from the lock cylinder while positioning the toothed rack such that the off-set extension of the toothed rack cooperates with the gate to prevent the shift bowl from being rotated by the shift lever.

4,096,718

TAMPER-PROOF LOCKING DEVICE

Lionel S. Michelman, Pomona; Samuel M. Michelman; David L. Michelman, both of Queens, and Milton Michelman, Long Beach, all of N.Y., assignors to Michelman Iron Works Corp., Brooklyn, N.Y.

Continuation-in-part of Ser. No. 693,293, Jun. 7, 1976, Pat. No. 4,031,722. This application Mar. 31, 1977, Ser. No. 783,274
The portion of the term of this patent subsequent to Jun. 28, 1994, has been disclaimed.
Int. Cl.[2] E05B 65/52, 67/38; E05C 19/18
U.S. Cl. 70—63 19 Claims



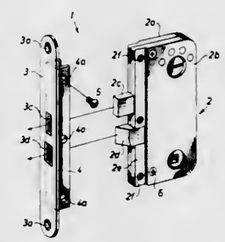
1. A tamper-proof locking device mountable on a lidded container or the like comprising a first member and a second member, said first member being divided into a first, a second, and a third section in series at substantially right angles to each other, the third one of said sections being provided with at least one opening, said second member comprising a strip having a generally U-shaped section and projecting section, said U-shaped section having a first leg and a second leg, said projecting section extending laterally outwards from and substantially perpendicular to the lower end of the first leg of said U-shaped section and being provided with at least one opening, the second leg of said U-shaped section being provided with a threaded bore, and screw means extending through the bore in said second leg, so that the locking device is mountable on a lidded container by placing the U-shaped section of the second member on a wall of a container with said legs straddling said wall and with said second leg and said screw means within the container, turning said screw means until the tip of said screw means contacts and presses against the wall of the container, closing the lid of the container so that the edge of the lid rests on the base of said U-shaped section, and mounting said first member on both the edge of the lid and the projecting section of the second member with the first section of the first member extending over the edge of the lid, the second section of the first member overlying the first leg of the U-shaped section, and the third section of the first member extending substantially over the projecting section of the second member, so that said members are attachable to each other by lock means having a shackle extending through the opening in said third one of said sections of said first member and the opening in said projecting section of said second member, said first member having another section functionally unitary therewith to cooperate with said projecting section to inhibit relative angular movement of the two members about the shackle.

4,096,719

ARRANGEMENT IN DOOR-LOCKS

Erik Rudolf Tranberg, Eskilstuna, Sweden, assignor to GKN-Stenman AB, Eskilstuna, Sweden

Filed Feb 8, 1977, Ser. No. 766,821
Claims priority, application Sweden, Feb. 10, 1976, 7601429; Jun. 24, 1976, 7607329
Int. Cl.[2] E05B 9/08
U.S. Cl. 70—450 6 Claims

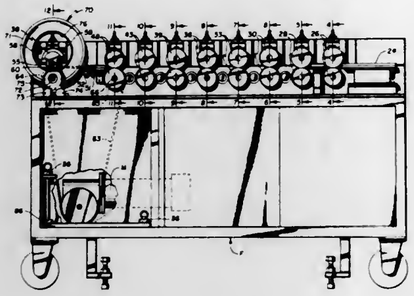


1. A door lock assembly, comprising:
a. a hollow, generally rectangular housing member formed by two connected halves and adapted to accommodate therein a latch bolt mechanism and a dead bolt mechanism, including a latch bolt and a dead bolt extending outwardly from one side of the housing member,
b. face plate means, comprising:
1. an elongated face plate having apertures therein for receiving the latch bolt and dead bolt, the vertical height of said face plate being greater than the horizontal depth of the housing member,
2. an elongated U-shaped member comprising a bridging portion and a pair of opposite leg portions extending outwardly from the bridging portion, said bridging portion being rigidly joined to the back side of said face plate and said leg portions extending into mating engagement with said one side of the housing member over a substantial portion of the length of said face plate, and
c. means removably connecting said leg portions to both halves of the housing member, whereby said U-shaped member stiffens and reinforces said housing member and forms a unitary assembly therewith which presents a high degree of resistance to forcing.

4,096,720
APPARATUS FOR MAKING CORRUGATED FLEXIBLE METAL TUBING

Leroy E. Anderson; Michael P. Schmidt, and William W. Weaver, all of Detroit Lakes, Minn., assignors to Manufacturers Systems, Inc., Detroit Lakes, Minn.

Division of Ser. No. 739,571, Nov. 8, 1976, which is a division of Ser. No. 656,389, Feb. 9, 1976. This application Dec. 9, 1977, Ser. No. 859,258
Int. Cl.² B21C *37/12*
U.S. Cl. 72—50 **9 Claims**

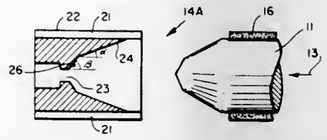


1. Corrugated flexible cylindrical duct-forming mechanism for producing such duct from a flat narrow elongated strip of formable metal of small guage comprising:
(a) a frame;
(b) rotatably mounted powered roller means carried by said frame and constructed and arranged to die-form longitudinally extending corrugations in such a metal strip and to form oppositely extending side edge portions thereon as it passes therebetween;
(c) guide means carried by said frame and positioned adjacent said roller means in metal strip-receiving relation thereto and being constructed and arranged to preform for subsequent interlocking, such side edges of such strip into seam elements as it passes therethrough;
(d) a pair of rotatably mounted powered rollers carried by said frame and positioned adjacent said guide means in position to receive therebetween such a metal strip after it passes through said guide means and constructed and arranged to form the oppositely longitudinally extending side edge portions of such a strip into inboard and outboard seam elements extending generally at right angles to the general plane of the strip and in opposite directions;
(e) a helically extending warping ring carried by said frame immediately adjacent said seam element-forming rollers, said ring having a generally circular helically extending inner warping surface, the axis of which extends substantially parallel to the axis of said seam element-forming rollers, said warping surface having a leading portion and a trailing portion, said leading portion of said ring warping surface being located ahead of said seam element-forming rollers in position to engage and extend into the corrugation next to the inboard seam element of such a strip and positively direct the same within said ring along said helical warping surface to the said trailing portion of said inner warping surface, said trailing portion of said inner warping surface terminating adjacent to and laterally outwardly of the outboard seam element of said strip which has been so guided by said inner warping surface into the outboard seam element of the strip in interengaging relation and thereby complete a convolution of the strip, and
(f) a pair of rotatably mounted lock-seam-forming rollers carried by said frame coaxially with said seam element-forming rollers and outboardly thereof, said lock-seam-forming rollers having lock-seam-forming elements thereon positioned to engage such interengaged seam elements and constructed and arranged to compress and deform the same into a lock-seam constituting a common leg of a corrugation for the contiguous convolutions of the strip, at least one of said lock-seam-forming rollers being power driven.

4,096,721
HYDROSTATIC EXTRUSION METHODS AND APPARATUS

Nazeer Ahmed, Princeton, N.J., and Ivan Gerald Histand, Cornwells Heights, Pa., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 25, 1977, Ser. No. 790,734
Int. Cl.² B21C *23/32*
U.S. Cl. 72—60 **8 Claims**

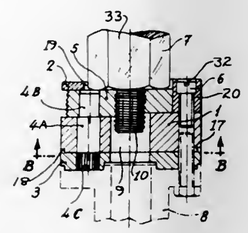


1. A method of forming an elongated product from an elongated workpiece, which elongated workpiece is coated with a hydrostatic medium, the method comprising the steps of:
(a) applying frictional drag forces to the hydrostatic medium in the direction of a die so as to advance the elongated workpiece longitudinally, first toward an aperture extending longitudinally through the die, and then through the die aperture; and
(b) removing substantially all of the hydrostatic medium from each successive longitudinal element of the elongated workpiece, substantially as said longitudinal element reaches the die, such that the elongated workpiece passes through the die aperture in substantially uncoated condition.

4,096,722
ROLL-TYPE THREAD CUTTING DIE

Jose Estaban Torralba, Miguel Servet, 216, Zaragoza, Spain

Filed Jul. 26, 1976, Ser. No. 708,563
Claims priority, application Spain, Jul. 31, 1975, 214.356
Int. Cl.² B21H *3/04*
U.S. Cl. 72—104 **5 Claims**

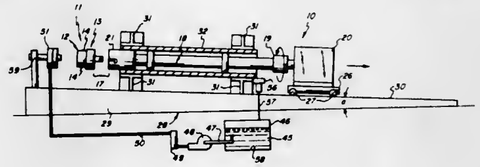


1. A roll-type thread cutting die comprising:
at least three selectively rotatable members, each said selectively rotatable member having an end portion extending from one end of and being eccentric with respect to the axis of rotation of its associated selectively rotatable member; and each said rotatable member having a supported portion that is spaced away from said end portion;
a plurality of rollers, one said roller for each said selectively rotatable member, each said roller being rotatably mounted on said end portion of a different one of said selectively rotatable members, each said roller having an external periphery which is threaded, the threads of each said roller extending radially outward from its associated selectively rotatable member;
support means for supporting each of said selectively rotatable members at said supported portions thereof and for leaving said end portions unsupported and unengaged by said support means; said support means positioning each of said selectively rotatable members such that the axis of rotation of each said selectively rotatable member lies along a different axis spaced from and parallel to a central axis; and
said support means including means for retaining each of said at least three selectively rotatable members at preselected angular orientations whereby said threads of said plurality of rollers may be adjusted to extend a preselected distance towards said central axis such that said rollers alone cooperate to position a shaft to be threaded along said central axis as said rollers thread said shaft;
a cover piece positioned above said rotatable member end portions and positioned to prevent said rollers from leaving said rotatable member end portions; said cover piece having a central opening therethrough of a diameter greater than the diameter of a circle defined by the axes of rotation of said selectively rotatable members, whereby a large head on a narrower shank to be threaded may be received in said central opening; said cover being attached to said support means.

4,096,723
TOOL ASSEMBLY FOR FORMING INTERNAL GROOVES IN TUBES

Robin B. Rhodes, Ogdensburg, and Paul Vobecky, Lafayette, both of N.J., assignors to Isothermics, Inc., Augusta, N.J.

Filed Feb. 17, 1977, Ser. No. 769,795
Int. Cl.² B21H *3/08*
U.S. Cl. 72—123 **16 Claims**

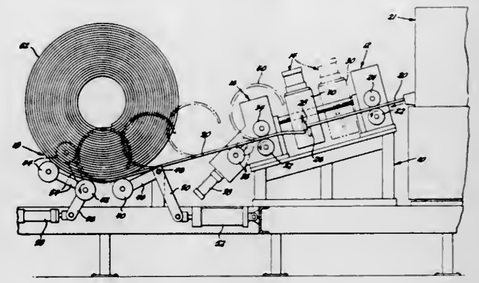


1. A tool assembly for forming internal grooves on the interior surfaces of tubular workpieces which comprises an essentially cylindrical tool holder, having a forming end and an actuating end, said tool holder housing at said forming end a plurality of disc-like forming wheels, said wheels rotatably mounted circumferentially about said holder within recesses provided therein whereby said wheels partially protrude from the permiter of said tool holder, and wherein the central axes of said wheels and the central axis of said holder are longitudinally coplanar but are respectively uniformly disposed at a predetermined skew angle,
a tool holder support comprising rotating motive means detachably connected to said tool holder at said actuating end, said rotating motive means comprising a rotational actuator rollably mounted for the axial movement of said tool holder longitudinally through a tubular workpiece in contact with the interior surface thereof, and
a longitudinally extended base structure, said base structure defining means at one end thereof for the support and securement of said tubular workpiece in axial alignment with said tool holder, said base defining along the remainder of the longitudinal dimensions thereof a travelway for said tool support, said travelway comprising paired track members facilitating the rollable movement of said tool support thereon, said base further disposed at angle with respect to the horizontal whereby said workpiece securement means is apically located with respect to said track members.

4,096,724
METHOD OF COILING A FLAT STRIP

Larry J. Eshelman, Pendleton, and James R. Bish, Anderson, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed May 27, 1977, Ser. No. 801,069
Int. Cl.² B21C *47/08*; B21D *5/14*
U.S. Cl. 72—132 **6 Claims**



1. A method of coiling a flat strip, said method comprising the following steps:
a. advancing the strip longitudinally at substantially constant speed through first and second longitudinally spaced sets of pinch driving rollers having parallel axes;
b. deflecting the end portion of the strip upwardly at the exit from said second set of pinch driving rollers, and continuing to advance said strip to form by bending beyond the elastic limit with substantially circumferential movement of the end of the strip a partial loop capable of clearing an upper one of the second set of pinch driving rollers;
c. discontinuing the deflection of said strip while continuing the longitudinal advancement thereof to advance said partial loop and strip to a coil drive roller and a guide roller having axes substantially parallel to said first axes and initially located to engage an outboard circumferential surface of the partial coil substantially simultaneously to impart circumferential motion thereto in a windup direction and thereafter to move so as to maintain engagement with the periphery of the coil formed by continued winding action;
d. continuing the coiling of the trailing end of the strip by continued advancement thereof by the coil drive roller; and
e. ejecting the finished coil.

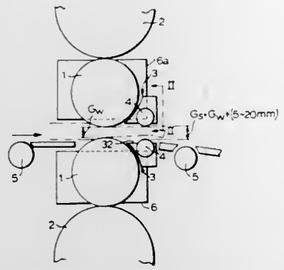
4,096,725
STRIPPER GUIDES FOR ROLLING MILL

Yasunao Kano, Kashima, Japan, assignor to Sumitomo Metal Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 692,022, Jun. 1, 1976, abandoned. This application Nov. 1, 1977, Ser. No. 847,618
Int. Cl.² B21B *39/00*
U.S. Cl. 72—250 **3 Claims**

1. In combination a rolling mill for rolling hot slab into plate or strip and having opposed horizontal upper and lower work rolls and work roll chocks in which said work rolls are mounted, stripper guides being disposed adjacent to the work rolls on the exit side of said rolls and each having a single stripper guide roll rotatably mounted therein, the respective stripper guide rolls being disposed above and below the pass line between the opposed work rolls and spaced from each other a distance equal to the work roll gap plus 5 to 20 mm for bending the turned up or turned down end of a work being rolled back more in line with the length of the plate or strip, a portion of the periphery of each stripper guide roll projecting

slightly from the guide surface of the respective stripper guide, each stripper guide roll being the same length as the corresponding work roll, the lower stripper guide being fixed to the lower work roll chocks and the upper stripper guide being



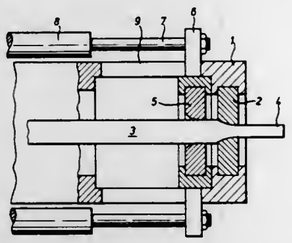
fixed to the upper work roll chocks so that the vertical positions of the stripper guide rolls are adjusted relative to each other in accordance with the adjustment of the gap between the work rolls.

4,096,726

METHOD AND APPARATUS FOR DRAWING TUBES

Otto Uhlmann, Burgdorf, and Norbert Stephan, Hanover, both of Germany, assignors to Marshall Richards Barcro Limited, Crook, England

Filed Feb. 11, 1977, Ser. No. 767,795
Int. Cl.² B21C *1/34*
U.S. Cl. 72—291 **6 Claims**



1. In a tube drawing method having at least one drawing step at a drawing stage with a drawing die, a tube guide upstream of the die for receiving and guiding the tube coaxially to the die and a downstream rotatable draw block for drawing the tube through the die, comprising the steps of axially threading the tube through the guide and die with the tube guide a first distance immediately upstream of the die to reduce the required length of tube for threading the tube through the guide and die, and drawing the tube through the guide and die with the draw block with the coaxial tube guide upstream of the die a second distance substantially greater than said first distance providing for accurately guiding the tube coaxially to the die.

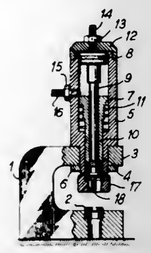
4,096,727

PUNCHING, STAMPING AND RIVETTING APPARATUS

Daniel Pierre Gargaillo, 71, rue Alexandre Boutin, Villeurbanne (Rhone), France

Filed Apr. 29, 1976, Ser. No. 681,755
Int. Cl.² B21D *28/26*
U.S. Cl. 72—312 **8 Claims**

1. A hydraulic punch press comprising a base adapted to receive a workpiece, a cylinder axially disposed opposite to said base, first and second pistons slidably mounted within said cylinder and defining therewithin a first chamber formed between the upper surface of said first piston and one end of said cylinder and a second chamber formed between the first and second pistons, said pistons having coaxial rods extending outwardly of the other end of said cylinder in opposition to said base, the rod of the first piston extending axially through the rod of said second piston and being adapted to carry at its free end a tool, the rod of said second piston being tubular and being adapted to carry at its end holding means for the workpiece, conduit means leading to each of said first and second



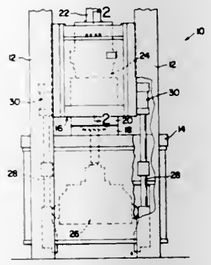
chambers, and means for alternately delivering simultaneously to said first and second chambers hydraulic fluid of high pressure and lower pressure respectively to thereby sequentially reciprocate the rods of both said pistons outwardly in a work phase in which said workpiece holding means engages the workpiece prior to the tool and said rod of said first piston inwardly in a retraction phase while maintaining the rod of said second piston in holding engagement with said workpiece.

4,096,728

ADJUSTING DEVICE FOR SLIDE DRIVEN LIFT OUT ACTUATORS

Donald Leroy Glecker; John F. Roth, both of Salem, Ohio, and Peter N. Bosch, Kentwood, Mich., assignors to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Jul. 27, 1977, Ser. No. 819,489
Int. Cl.² B21D *45/00*
U.S. Cl. 72—345 **15 Claims**



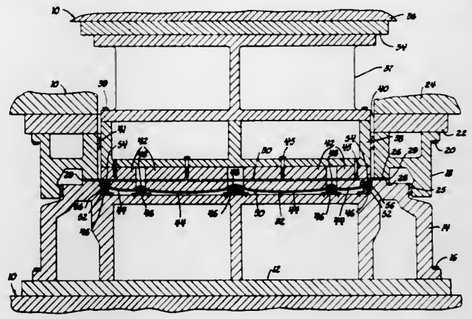
1. In a press having a frame, slide means mounted on said frame for reciprocation toward and away from a bed on said frame to form a workpiece between tooling means on said bed and slide means, drive means for reciprocating said slide means, shut height adjusting means connecting said drive means to said slide means for adjusting the shut height of said slide means relative to said bed, workpiece ejecting means in one of said bed and slide means to eject a workpiece formed between said tooling means, and actuator means interconnecting the other of said bed and slide means with said ejecting means and having a given positional relationship with respect to said ejecting means to actuate said ejecting means in response to reciprocating of said slide means, the improvement comprising: actuator adjusting means for said actuator means, and means to drive said actuator adjusting means and said shut height adjusting means to change said shut height and to maintain said given positional relationship between said actuator means and said ejecting means.

4,096,729

SHEET METAL DRAW DIE APPARATUS

William W. Dupler, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed May 31, 1977, Ser. No. 801,775
Int. Cl.² B21D *22/02*
U.S. Cl. 72—350 **4 Claims**



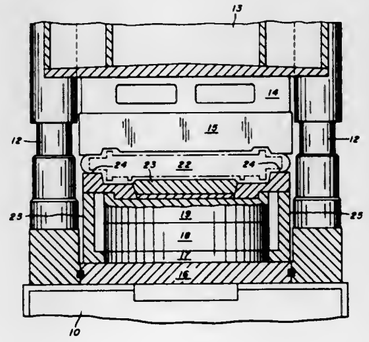
1. A sheet metal draw die apparatus for use with a die press for drawing a planar metal sheet to a predetermined nonplanar drawn article in a single operation, said die apparatus comprising an upper die secured to a vertically movable portion of the die press and including a first plurality of modules laterally spaced in a first predetermined pattern to provide a first plurality of cavities therebetween and having downwardly facing work contact surfaces formed thereon, and a lower die secured to a stationary base portion of the die press and including a second plurality of modules laterally spaced in a second predetermined pattern to provide a second plurality of cavities therebetween and having upwardly facing work contact surfaces formed thereon directly opposite the first plurality of cavities, the juxtaposition of said upwardly and downwardly facing work contact surfaces constituting a distinct, continuous surface defining the drawn article, with the surfaces of said planar metal sheet on the respective sides thereof adjacent said first and second pluralities of cavities being spaced apart from the bottoms of the cavities upon completion of the vertical movement of the upper die.

4,096,730

FORGING PRESS AND METHOD

Wayne A. Martin, Wilkins Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Jul. 1, 1976, Ser. No. 701,934
Int. Cl.² B21D *22/00*
U.S. Cl. 72—352 **4 Claims**



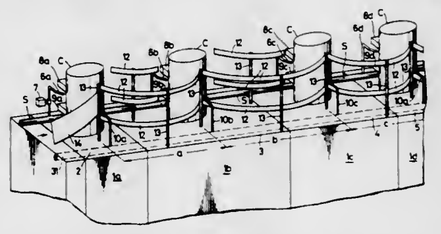
1. In a forging press which includes cooperating sets of top and bottom dies, and an indexing table supporting said set of bottom dies for rotation on a vertical axis, said set of top dies being rectangular in plan and supported for vertical movement, said set of bottom dies being circular in plan, whereby indexing said set of bottom dies through a pattern of arcs moves a workpiece supported thereon successively to positions in which it can be forged throughout its area between said dies, the improvement in which the diameter of said set of bottom dies in larger than the diameter of said indexing table and has edge portions which overhang the table, and comprising a pair of removable diametrically opposed posts outside said table under said set of top dies providing support for said edge portions in the regions which absorb force applied through said set of top dies during a forging operation.

4,096,731

METHOD AND A MEANS FOR TRANSFERRING ARTICLES, IN PARTICULAR SEMIMANUFACTURED ARTICLES OR WORKPIECES, BETWEEN STATIONS ON MACHINERY FOR WORKING THESE ARTICLES MECHANICALLY

Werner Uehlinger, Arlesheim, and Pius Wendelspiess, Binningen, both of Switzerland, assignors to KM-Engineering AG, Basel, Switzerland

Filed Dec. 8, 1975, Ser. No. 638,360
Claims priority, application Switzerland, Sep. 22, 1975, 12256/75
Int. Cl.² B21D *43/18*
U.S. Cl. 72—405 **31 Claims**



1. A method of transferring articles between successive work stations at which working operations are effected, said method comprising the steps of:

a. positioning an article at a first work station,

b. providing at each work station a jet of fluid material including a liquid medium,

c. directing said jet of fluid material by an amount effective in one direction at the article located in the first work station to propel the article toward a successive work station,

d. guiding the article along a defined path to the successive work station after the article has been propelled by said jet, and

e. positioning said article in the successive work station to prepare for a work operation,

f. the defined path is curved between the successive work stations and has an inner and outer side the article is guided by bearing against the outer side,

g. the positioning of said article in the successive work station includes receiving said article along the inner side of said path.

4,096,732

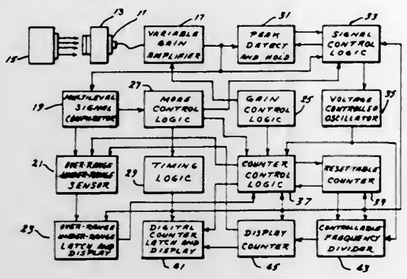
CAMERA TESTING METHODS AND APPARATUS

Barry R. Springer, 10301 Margarita Ave., Fountain Valley, Calif. 92708

Filed Aug. 19, 1977, Ser. No. 826,109
Int. Cl.² G03B *43/00*
U.S. Cl. 73—5 **24 Claims**

1. The method of testing a camera comprising the steps of generating an analog signal pulse responsive to the illuminance admitted during each camera shutter operation,

defining the period of each said analog signal pulse by means of a set minimum signal amplitude threshold, and



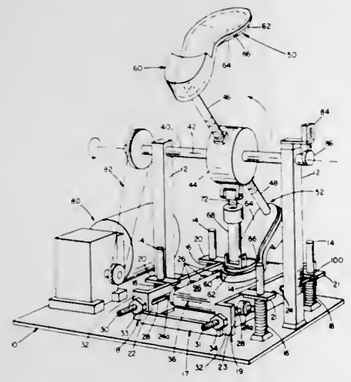
determining the cinematic frame rate of said camera in frames per second as being the reciprocal of the time period, in seconds, between the beginning of two successive signal pulses.

4,096,733

TESTING FOOTWEAR SOLES

Arnold Cohen, Marblehead, Mass., assignor to Jones & Vining, Incorporated, Braintree, Mass.

Filed Sep. 17, 1975, Ser. No. 614,250
Int. Cl.² G01N *3/56*
U.S. Cl. 73—7 **12 Claims**



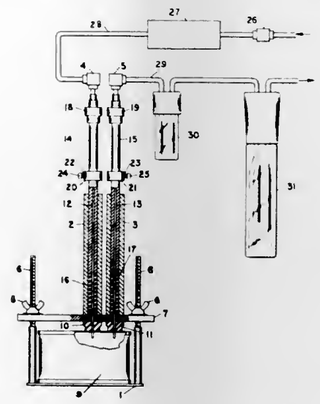
1. Apparatus for testing footwear soles, comprising a frame,
treadmill supports mounted on said frame for movement along an axis,
a treadmill assembly mounted on said supports, said assembly including an operative treadmill surface movable in its own plane along a direction transverse to said axis,
resilient means connected to said frame and said supports for biasing said treadmill surface in a rest position and for resiliently opposing movement of said surface along said axis away from said rest position to a range of operating positions,
a shaft mounted on said frame, said shaft being located with its longitudinal axis parallel to said operative treadmill surface and spaced from said rest position of said surface in the direction away from its said range of operating positions,
a drive for rotating said shaft above its said axis, and
a sole support mounted on said shaft at a distance from said shaft axis sufficient so that when a sole to be tested is installed on said sole support and said shaft is rotated by said drive, said sole support will carry said sole along said operative treadmill surface to move said surface along its said plane and, against the resilient force of said resilient means, to said range of operating positions,
said frame including a base and a plurality of posts on said base, said posts extending through openings in said treadmill supports, said resilient means comprising coil springs around said posts between said base and said supports.

4,096,734

METHOD OF REMOVING HEADSPACE VOLATILES AND ANALYSIS THEREOF

Ali Khayat, Carlsbad, Calif., assignor to Ralston Purina Company, St. Louis, Mo.

Filed Jan. 21, 1977, Ser. No. 760,872
Int. Cl.² G01N *31/08*
U.S. Cl. 73—23.1 **19 Claims**



1. A method of removing volatiles present in the headspace area of a sealed container without prematurely releasing the vacuum and said volatiles in said container comprising the steps of:
(a) inserting a first penetrating means into the headspace area of a sealed container,
(b) inserting a second penetrating means into said headspace area of said container,
(c) passing an inert carrier gas into said headspace area of said container through said penetrating means,
(d) withdrawing said inert carrier gas and volatiles from said headspace area in said container through said penetrating means other than the means utilized for the passing of said inert carrier gas into said container.

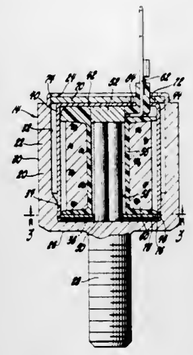
4,096,735

ENGINE DETONATION SENSOR WITH DOUBLE SHIELDED CASE

Gerald O. Huntzinger; Charles E. Buck, and Robert E. Campbell, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 767,995, Feb. 11, 1977, abandoned. This application Sep. 1, 1977, Ser. No. 829,778
Int. Cl.² G01P *15/08*; H01L *41/14*
U.S. Cl. 73—35 **2 Claims**

1. A detonation sensor for a vehicle mounted engine comprising, in combination:
an elongated magnetostrictive element;
means associated with the magnetostrictive element effective to establish a magnetic flux therethrough;
a pickup coil disposed around the magnetostrictive element and responsive to changes in the magnetic flux through the magnetostrictive element to convert said changes into electrical output signals;
a generally cylindrical outer case comprising a magnetic material and having a closed axial end with means for attachment to the engine for vibration therewith and an open axial end, the magnetostrictive element being disposed coaxially within the case, the outer case forming a first shield for the magnetostrictive element from external magnetic fields;
a generally cylindrical inner case comprising a magnetic material and being disposed coaxially within the outer case and around the magnetostrictive element to form a second shield for the magnetostrictive element from external magnetic fields, the inner case having a closed end adjacent the end of the magnetostrictive element opposite



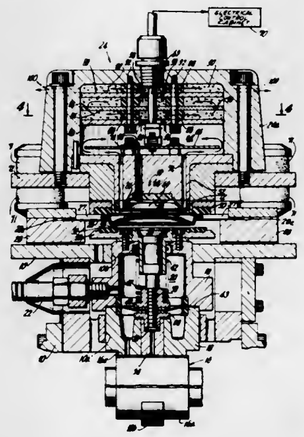
the closed end of the outer case and an open end adjacent the closed end of the outer case;
means on the open axial end of the outer case operatively engaging the closed end of the inner case and biasing the inner and outer cases toward each other, the closed ends of the inner and outer cases operatively engaging and compressing the magnetostrictive element in compressive preload, whereby vibrations of the engine cause corresponding variations in said magnetic flux and thus in said electrical output signals.

4,096,736

ULTRASONIC LEAK HOLE DETECTION APPARATUS AND METHOD

Gary S. Moshier, North Haledon, N.J., assignor to American Can Company, Greenwich, Conn.

Filed Feb. 25, 1977, Ser. No. 772,330
Int. Cl.² G01M *3/24*
U.S. Cl. 73—40 **12 Claims**



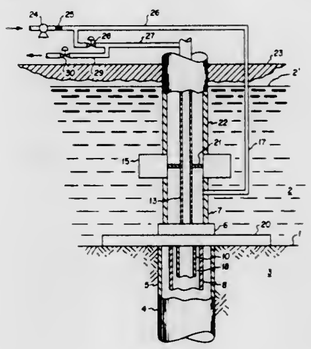
1. A leak detecting device for identification of can tops and similar workpieces with leak holes comprising a compressed gas supply chamber providing a source of compressed gas for testing the workpieces for leaks; an acoustic testing chamber mounted adjacent said gas supply chamber; sealing means between said chambers for holding a workpiece in a gas tight press wherein one side of the workpiece faces said compressed gas supply chamber in a gas tight relationship and the other side of said workpiece faces said acoustic testing chamber in a noise tight relationship; valve means on said compressed gas supply chamber, said valve means being operable to admit compressed gas from said gas supply chamber to the side of said workpiece facing said compressed gas supply chamber; an ultrasonic microphone within said acoustic testing chamber adapted for detecting gas noise created by gas passing through a leak hole in the workpiece; a gas venting port disposed adjacent the periphery of said microphone and communicating with a labyrinth baffle with a gas vent passage leading to the atmosphere; and electrical control means for receiving gas leak noise signals from said microphone after said valve means has opened and for rejecting workpieces giving off gas leak noise signals.

4,096,737

UNDERWATER WELLHEAD TESTING

Frank J. Schuh, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Nov. 7, 1977, Ser. No. 848,835
Int. Cl.² G01M *3/14*
U.S. Cl. 73—46 **5 Claims**



1. A method for pressure testing a packoff between a casing hanger and an underwater wellhead wherein the casing supported by said casing hanger has a pressure rating above which said casing may collapse, said packoff sealing an annulus around the outside of said casing so that during pressure testing of said packoff if said packoff should leak said annulus around said casing will be pressurized and could possibly be pressurized beyond its collapse pressure, said casing having a drill string communicating with the interior thereof, the improvement comprising pressuring the interior of said casing through said drill string so as to maintain the differential pressure across said casing within said casing's collapse rating so that if said packoff does leak, the pressure buildup in said annulus around said casing will not exceed said casing's collapse rating, and during said interior pressurizing of said casing regulating the internal pressure of said casing so that such internal pressure does not exceed the burst rating of said casing.

4,096,738

METHOD FOR TESTING FILLED GLASS CONTAINERS

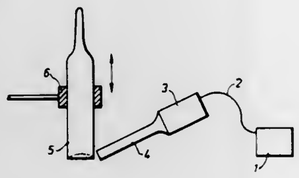
Roland Rupp, Leverkusen; Hildegard Schnoring, Wuppertal; Erhard Schellmann, Cologne, and Kurt Bauer, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 9, 1977, Ser. No. 776,051

Claims priority, application Germany, Mar. 25, 1976, 26128096

Int. Cl.² G01M 7/00

U.S. Cl. 73—52 8 Claims



1. A method for testing filled glass containers in particular, ampoules for leaks and mechanical strength, comprising bringing the containers into an ultrasonic wave field produced by an ultrasonic source, without impact between the containers and the source and setting the intensity of the ultrasonic source to intensity at a predetermined frequency to destroy defective containers, while mechanically perfect containers remain unaffected.

4,096,739

PROCESSABILITY TESTER

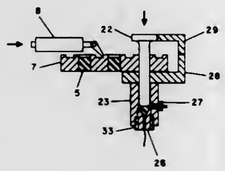
Robert I. Barker, Cuyahoga Falls, and David P. King, Akron, both of Ohio, assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 736,508, Oct. 28, 1976, abandoned.

This application Aug. 17, 1977, Ser. No. 825,538

Int. Cl.² G01N 11/04

U.S. Cl. 73—56 10 Claims



1. In the method of evaluating an extrudable material by charging a supply of such material to a chamber having an outlet and movable member for forcing the material through the outlet and moving said member to force material from the outlet, the improvement which comprises stopping and securing the movable member at a predetermined position and measuring the force on the material as it decays with time.

4,096,740

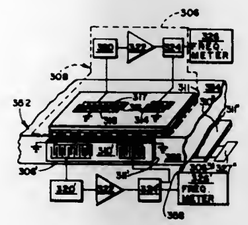
SURFACE ACOUSTIC WAVE STRAIN DETECTOR AND GAGE

Gary F. Sallée, Yorba Linda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jun. 17, 1974, Ser. No. 479,961

Int. Cl.² G01B 7/16; G01N 29/00

U.S. Cl. 73—88.5 R 7 Claims



2. A strain detector comprising:

a first oscillator including a first distortable frequency control element comprising first surface acoustic wave delay line means having frequency control characteristics which vary upon distortion of said first surface acoustic wave delay line means to vary the oscillation frequency of said first oscillator;

a second oscillator including a second distortable frequency control element comprising second surface acoustic wave delay line means having frequency control characteristics which vary upon distortion of said second surface acoustic wave delay line means to vary the oscillation frequency of said second oscillator;

a third oscillator including a third distortable frequency control element comprising third surface acoustic wave delay line means having frequency control characteristics which vary upon distortion of said third surface acoustic wave delay line means to vary the oscillation frequency of said third oscillator; and

support means for affixing said first surface acoustic wave delay line means to a surface of a member in which strain is to be monitored, for affixing said second surface acoustic wave delay line means to a different surface of said member than that to which said first surface acoustic wave delay line means is affixed and for affixing said third surface acoustic wave delay line means to a different surface of said member than those to which said first and said second surface acoustic wave delay line means are affixed, in order to permit variations in the oscillation frequency of said second oscillator different from the variations in the oscillation frequency of said first oscillator and variations in the oscillation frequency of said third oscillator different from the variations in the oscillation frequencies of said first and said second oscillators such that the differences in the frequency variations provide an unambiguous indication of the magnitude and direction of strain in said member.

4,096,741

MATERIALS TESTING DEVICE

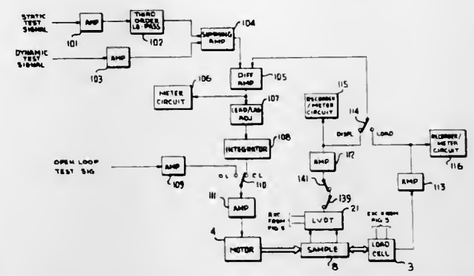
Sanford S. Sternstein, 9 Oak Tree La., Schenectady, N.Y. 12309

Filed Aug. 23, 1976, Ser. No. 716,647

Int. Cl.² G01N 3/08

U.S. Cl. 73—90 12 Claims

1. Apparatus for conducting transient characterization tests on specimens of materials to be tested comprising means for securing a specimen under a no load condition, an electrically actuable direct current voice coil shaker motor secured to one end of said means whereby to apply a force rapidly to a specimen, command means for selectively applying an electrical step function actuation signal to said shaker motor, means for producing an electrical response signal indicative of a predetermined parameter related to the force applied to the specimen, a motor control circuit responsive to said response signal for maintaining said parameter at a specified magnitude, said motor control circuit producing a d.c. signal directly coupled to said motor.



4,096,742

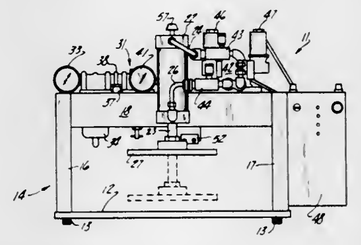
FLEXING DEVICE FOR TESTING RESILIENT ARTICLES AND METHOD OF COMPRESSION TESTING

Thomas Carl Musolf, and Harold Thomas Wyman, both of Southgate, Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Feb. 16, 1977, Ser. No. 769,355

Int. Cl.² G01N 3/10

U.S. Cl. 73—94 8 Claims



1. A flexing device for use in testing flexible foam articles comprising

a bed for receiving samples in a testing position,

support means carried on the bed,

a fluid operated cylinder mounted on said support means,

said cylinder comprising a piston, a first passage means for providing fluid to one side of the piston, a second passage means for providing fluid to the other side of the piston, and a pressure foot member attached to the piston and mounted to move into the testing position,

conduit means for carrying fluid to and from said first and second passage means,

a source of fluid under pressure in communication with said conduit means,

an exhaust means,

switching valve means for supplying fluid under pressure to one of said first and second passage means and for switching fluid from the other of said first and second passage means to said exhaust means,

circuit means for operating the switching valve means comprising a stepping switch, solenoid means for operating the switching valve in positions corresponding to positions of the stepping switch, and a pulse operated drive mechanism for driving the stepping switch,

first switch means mounted on said support means for actuation on an extended movement of the piston, and

a second switch means mounted on said support means for actuation on a retracted movement of the piston

said first and second switch means being located to provide pulses to said pulse operated drive mechanism whereby the stepping switch is moved at each end of the movement of the piston for providing automatic operation through the stepping switch sequence.

4,096,743

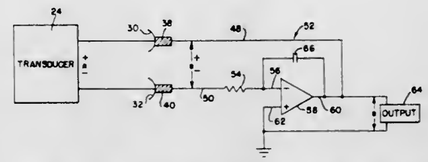
SHAFT TORQUE MEASURING SYSTEM

Joseph M. Diamond, Brooklyn, N.Y., assignor to McNab, Incorporated, Mount Vernon, N.Y.

Filed Nov. 10, 1976, Ser. No. 740,558

Int. Cl.² G01L 3/10

U.S. Cl. 73—136 A 6 Claims



1. In a shaft torque measuring system of the type having transducer means producing an electrical signal representing shaft torque and brush and slip ring means providing an output connection for the electrical shaft torque signal, the improvement comprising

operational amplifier means including an inverting input terminal and an output terminal;

input means for coupling the electrical shaft torque signal from the output connection of the brush and slip ring means to said operational amplifier means between said inverting input terminal and said output terminal; and

output means coupled to said output terminal of said operational amplifier means providing an output signal representative of shaft torque whereby resistance variations or circuit interruptions in the brush and slip ring means do not adversely affect said shaft torque output signal.

4,096,744

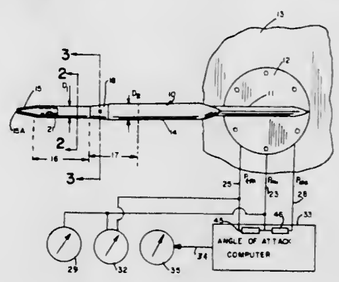
PRESSURE SENSOR FOR DETERMINING AIRSPEED, ALTITUDE AND ANGLE OF ATTACK

Richard V. De Leo, Hopkins, and Floyd W. Hagen, Eden Prairie, both of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.

Filed Sep. 5, 1975, Ser. No. 610,579

Int. Cl.² G01C 21/00

U.S. Cl. 73—180 18 Claims



1. An air data sensing probe of use in fluid streams, comprising a barrel having a longitudinal axia, said barrel having a first leading end facing a preselected direction, and a second end spaced from said first end along said longitudinal axis, means to attach said second end of said barrel to an object, first pressure sensing port means formed in a first section of said barrel spaced from both ends thereof and being arranged to sense static pressure of fluid surrounding said barrel where there is relative motion between a fluid surrounding said barrel and said barrel, and second pressure sensing port means

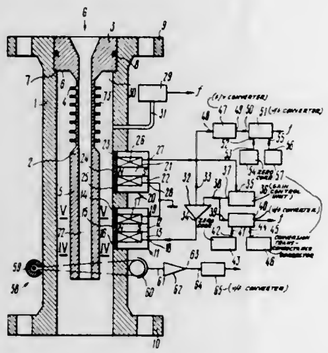
formed in said barrel to independently sense pressure at the surface of said barrel, and said second port means being positioned at a location spaced axially along said barrel from said first pressure sensing port means so that the pressures at the first and second pressure sensing port means change relative to each other when the longitudinal axis of said barrel deviates from a reference position, means to provide a pitot pressure signal due to relative motion between said barrel and the surrounding fluid, and means to combine the sensed pressures and pitot pressure signal to provide an indication of the angle of attack comprising the angle of the longitudinal axis of said barrel with respect to said reference position.

4,096,745

METHOD AND APPARATUS FOR MEASURING MASS FLOW RATE OF INDIVIDUAL COMPONENTS OF TWO-PHASE GAS-LIQUID MEDIUM

Ilya Yakovlevich Rivkin, 2 Kvesisskaya ulitsa, 22, kv. 16; Shamil Mustafovich Aisin, Tsvetnoi bulvar, 16/1, kv. 4; Olga Ivanovna Garkusha, B.Serpukhovskaya ulitsa, 34, korpus 5, kv. 245; Alexandr Lvovich Dondoshansky, 9 Parkovaya ulitsa, 47, korpus 1, kv. 70; Evgeny Alfredovich Zellis, Kashirskoe shosse, 100, stroenie 1, kv. 44; Vladilen Efremovich Karpov, ulitsa Miklukho-Maklaya, 65, korpus 4, kv. 86; Vladimir Konstantinovich Sorokin, Leninsky prospekt, 37, kv. 26, and Oleg Petrovich Shishkin, prospekt Vernadskogo, 89/1, kv. 111, all of Moscow, U.S.S.R.

Filed Feb. 13, 1976, Ser. No. 657,840
Int. Cl.[2] G01F *1/66, 1/76*
U.S. Cl. 73—194 B **10 Claims**



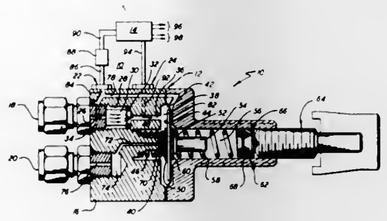
1. An apparatus for measuring mass flow rate of individual components of two-phase medium comprising: a sealed housing having supported therein a hollow pendulum; a first electromagnetic coil for imparting oscillations to said pendulum, and a second electromagnetic coil for converting oscillation velocity of said pendulum into an electric signal, said first and second coils being mounted on said housing; an amplifier having an input connected to the second electromagnetic coil, which converts the oscillation velocity of the pendulum and a control input, the output of said amplifier being connected to said first electromagnetic coil for imparting oscillations; an automatic gain control unit having an input connected to said second electromagnetic coil for converting oscillation velocity and an output connected to said control input of said amplifier; a first voltage-to-frequency converter having an input connected to said output of said automatic gain control unit; a first zero corrector connected to said first voltage-to-frequency converter; a first conversion transconductance corrector connected to said first voltage-to-frequency converter whose output frequency signal is proportional to mass flow rate of a two-phase medium being measure; a frequency-to-voltage converter having an input and output; a second voltage-to-frequency converter having an input connected to said output of said frequency-to-voltage converter; a second zero corrector connected to said second voltage-to-frequency converter; a second conversion transconductance corrector connected to said second voltage-to-frequency converter whose output frequency signal is proportional to density of the two-phase medium being measured; and a pressure sensor for measuring pressure of the two-phase medium in the inner space of the housing.

4,096,746

FLOW CONTROLLER-FLOW SENSOR ASSEMBLY FOR GAS CHROMATOGRAPHS AND THE LIKE

Francis P. Wilson, Oxford, and John E. Purcell, Riverside, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Feb. 25, 1977, Ser. No. 772,179
Int. Cl.[2] G01F *1/34, 25/00*
U.S. Cl. 73—205 R **6 Claims**



1. A flow controller-flow sensor assembly for regulating the flow of fluid through a system, comprising, in combination:

inlet channel means;

first flow restrictor means having an inlet and outlet for passing said fluids, said flow restrictor means having its inlet positioned in fluid flow communication with said inlet channel means, said first flow restrictor means being responsive to the difference in pressure between its inlet and outlet to thereby control the flow rate through said system;

means disposed on the outlet side of said flow restrictor means for varying the pressure between the inlet and outlet of said flow restrictor means so as to vary said flow rate;

outlet channel means in fluid flow communication with the outlet of said restrictor means for returning the fluid within the controller to the system;

transducer means having a first and a second port;

means for connecting said first port to the inlet of said flow restrictor means in fluid flow communication;

said transducer means including means for generating an electrical signal proportional to the pressure difference between said first and second ports;

said means for connecting said first port to the inlet of said flow restrictor means including a second flow restrictor means, said second flow restrictor means having substantially the same flow rate characteristics as the first flow restrictor means so that the time it takes for said first port to sense the pressure at the inlet of said first flow restrictor means is substantially equal to the time it takes for the pressure at the outlet of said first flow restrictor means to build up to its anticipated value based on the setting of said means for varying the pressure between the inlet and outlet of said first flow restrictor means.

4,096,747

DIGITAL OUTPUT, POSITIVE DISPLACEMENT FLOW METER

Paul R. Gilson, 10012 Highcliff Dr., Santa Ana, Calif. 92705

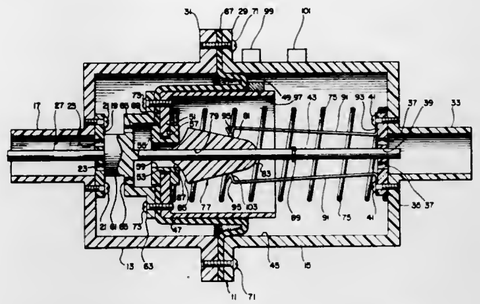
Filed Oct. 14, 1975, Ser. No. 621,884
Int. Cl.[2] G01F *3/16*
U.S. Cl. 73—251 **25 Claims**

14. A meter for measuring the flow of a fluid, comprising:

a housing having an inlet and an outlet;

a piston mounted for reciprocation within said housing between a pair of extremes adjacent said inlet and said outlet;

valve means for bypassing fluid around said piston between said inlet and said outlet, said valve means closing when said piston is at said extreme adjacent said inlet and opening when said piston is at said extreme adjacent said outlet end; said valve means comprising:



an orifice for bypassing fluid around said piston; and

a valve member selectively closing against the downstream end of said orifice;

means for biasing said piston toward said extreme adjacent said inlet end; and

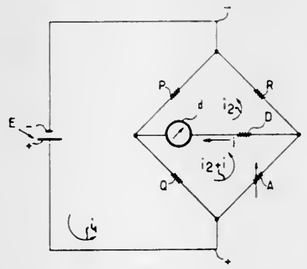
means for producing an output signal in response to the position of said piston within said cylinder.

4,096,748

WHEATSTONE BRIDGE MEASURING CIRCUIT

Michel Pichon, Fontenay, Bois, France, assignor to Compagnie Internationale pour l'Informatique CII-Honeywell Bull (Societe Anonyme), Paris, France

Filed Dec. 22, 1976, Ser. No. 753,305
Claims priority, application France, Dec. 31, 1975, 75 40363
Int. Cl.[2] G01K *7/20;* **G05F** *3/02*
U.S. Cl. 73—362 AR **9 Claims**



1. Apparatus for automatically measuring parameters comprising a Wheatstone bridge including first and second branches and a diagonal connected between taps of the first and second branches, the first branch including first and second series connected resistors having values P and Q, the second branch including third and fourth series connected resistors, respectively having values R and A, said third resistor being responsive to the measured parameter in accordance with:

$$R = \frac{(1 + \alpha_0 T)}{R_0} \quad (1)$$

where:

R_o = the value of said third resistor when said parameter has a value T_o;

T = the value of the parameter sensed by the third resistor, and

α_o = the temperature coefficient of said third resistor,

the diagonal including a voltage detector having an internal resistance D, the voltage detector being connected to a common terminal of the first and second resistances and a common terminal of the third and fourth resistors; a voltage source for energizing the bridge, the source having a value E, such that:

$$E = \frac{(k + 1)^2}{\alpha_0 k} \cdot 10^{-n} \quad (2)$$

where

k = the ratio P/Q and k is much less than 1; and

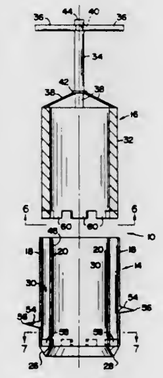
n = an integer that is a function of the range of the parameters to be measured.

4,096,749

CORE SAMPLING DEVICE

Robert A. Stewart, 2844 54th St., North, St. Petersburg, Fla. 33710

Filed Apr. 29, 1977, Ser. No. 792,465
Int. Cl.[2] B28B *7/10;* **G01N** *1/08*
U.S. Cl. 73—425.2 **8 Claims**



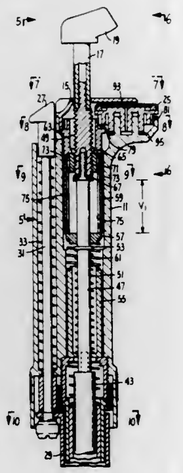
1. A core sampling device of the type primarily intended for forming concrete test cores in situ and facilitating the removal of such test cores, said core sampling device comprising: sleeve means comprising first wall means defining the exterior of said device and second wall means correspondingly configured as said first wall means and disposed within said first wall means, said first and second wall means being interconnected at their bases; a plurality of insertion ledge means formed in interconnecting relation between said first and second wall means bases; and insertion means removably engageable with said sleeve means, said insertion means comprising body means dimensioned and configured for being removably disposed within the space defined between said first and second wall means, said insertion means further comprising a plurality of insertion finger means formed around a peripheral edge of said body means, said finger means being dimensioned and configured to operatively engage said insertion ledge means, whereby said insertion means may be utilized to place said sleeve means within fluid concrete to form a test core at least partially defined by said second wall means.

4,096,750

HAND-HELD MICROPIPETTOR WITH FLUID TRANSFER VOLUME ADJUSTMENT MECHANISM

Ronald Leo Sturm, San Carlos, Calif., assignor to Oxford Laboratories Inc., Foster City, Calif.

Filed Jun. 15, 1977, Ser. No. 806,910
Int. Cl.² B01L *3/02*
U.S. Cl. 73—425.6 **8 Claims**



1. In a device having a plunger reciprocal within a body through a stroke distance defined by limiting abutments for transferring a volume of liquid proportional to the stroke distance, an improved mechanism for adjusting an abutment on the plunger for varying the volume of liquid transferred, comprising:

a cylindrical-like sleeve held within said body against axial movement and surrounding said plunger,

a nut held on said plunger in threaded engagement therewith, said nut travelling back and forth along the length of said plunger when rotated,

means operably connecting said nut and said cylindrical sleeve in a manner that rotation of the sleeve causes rotation of the nut while at the same time permitting reciprocation of the plunger and nut as a nut with respect to the sleeve, and

means provided on the outside of said body for rotating said cylinder to effect a volume adjustment.

4,096,751

HAND-HELD MICROPIPETTOR WITH FLUID TRANSFER VOLUME ADJUSTMENT MECHANISM

Stanley J. Withers, Berkeley, and Ronald L. Sturm, San Carlos, both of Calif., assignors to Oxford Laboratories Inc., Foster City, Calif.

Filed Jun. 15, 1977, Ser. No. 806,909
Int. Cl.² B01L *3/02*
U.S. Cl. 73—425.6 **5 Claims**

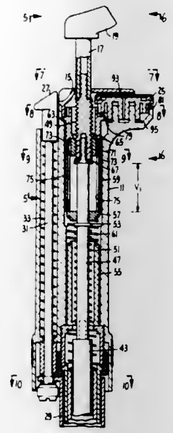
1. In a device having a plunger reciprocal within a body through a defined stroke distance set by limiting abuttments for transferring a volume of fluid proportional to the stroke distance, an improved mechanism for adjusting an abuttment on the plunger for continuously varying the volume of liquid transferred, comprising:

a volume adjustment knob located external of said body,

a motion transmitting element held within said body surrounding a portion of said plunger and held to be rotatable with respect to the body in response to rotation of said volume adjustment knob,

an adjustable stop carried by said plunger within said motion transmitting element and operably connected therewith in a manner that rotation of said element causes said stop to move axially along said plunger,

means within said body for normally restraining movement of said element, and



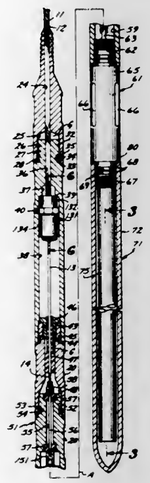
means responsive to said plunger being placed at a particular position for releasing said element restraining means, whereby movement of said volume adjustment knob is automatically locked unless the operator deliverately places the plunger in a particular position, thus avoiding inadvertent volume setting changes.

4,096,752

OIL WELL LOGGING PROBE ASSEMBLY

Gerald J. Tonnelli, Long Beach, Calif., assignor to Production Data Inc., Bakersfield, Calif.

Filed Jul. 6, 1976, Ser. No. 702,915
Int. Cl.² E21B *47/024*; H02G *15/22*
U.S. Cl. 73—431 **5 Claims**



1. In a cylindrical probe assembly adapted to include selected instruments arranged in a cylindrical stack each instrument communicating by way of a common coaxial cable having a braided wire strand shield thereof connected to support said probe assembly, the improvement comprising:

an annular guide segment including a first central bore conformed to the exterior of said cable, a first cavity axially aligned with said first central bore on the lower end of said segment a first threaded peripheral surface formed on the interior surface of said first cavity, and a first sealing peripheral surface formed along said threaded first peripheral surface proximate the lower end of said segment;

an annular attachment segment including a first reduced diameter section at the upper end thereof adapted for receipt within said first cavity for threadable engagement therewith and including a first sealing ring disposed peripherally thereabout to abut said first sealing peripheral surface said attachment segment further includes a second central bore formed in the upper end thereof adapted to receive said cable, a second cavity formed in the lower end thereof communicating with said second bore, a clamping device disposed within said second cavity for engaging the shield of said cable thereat, said clamping device having a male fitting including a peripheral flange on the upper portion thereof conformed to sealably engage said second cavity, and exteriorly threaded surface over a lower portion thereof below said flange and an internally threaded annular female fitting provided with a plurality of longitudinal radially disposed openings conformed to receive selected wires of said braided wire strand shield, said wires extending to the upper end of said female fitting to be secured by compression against said flange and a second threaded and sealing peripheral surface formed on the interior periphery of said second cavity proximate the lower end thereof; and

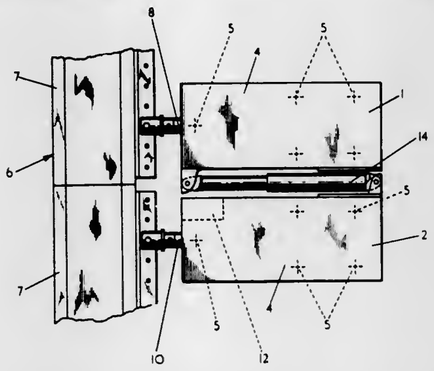
said fluid includes a non-conducting grease compound deposited in said first cavity prior to the receipt of said first section therein.

4,096,753

MINE EQUIPMENT

Rex Mullins, Burton Upon Trent, England, assignor to Coal Industry (Patents) Limited, London, England

Continuation of Ser. No. 618,163, Sep. 30, 1975, abandoned. This application Mar. 17, 1977, Ser. No. 778,547
Claims priority, application United Kingdom, Nov. 19, 1974, 50091/74
Int. Cl.² G01B *7/14*
U.S. Cl. 73—432 R **9 Claims**



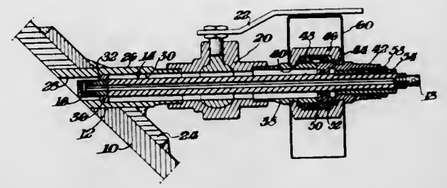
1. Mine equipment for measuring the advance of a longwall face conveyor including a plurality of articulately connected sections, comprising first and second components adapted to be releasably anchored adjacent to a mine goaf behind the conveyor, each of the components being capable of being advanced relative to the other component, control means for controlling actuation of the components such that, in use, each of the components is advanceable only when the other component is anchored, and sensor means associated with both the components and sensitive to movement of at least one of the components relative to the other component.

4,096,754

REMOVABLE PROBE

Wendell Hazelton Beveridge, Jr., Claremont, and William Edward Van Over, Monrovia, both of Calif., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 26, 1977, Ser. No. 828,144
Int. Cl.² G01L *19/00*
U.S. Cl. 73—432 R **8 Claims**



1. A mounting for removably introducing a probe into a fluid enclosure, said mounting including a boss having a bore and a counter bore forming a positioning shoulder therebetween and penetrating said enclosure, a valve connected to said boss, and an extension pipe connected to said valve, comprising:

a removable housing in fluid tight end-to-end relation with said pipe and having a bore of lesser diameter than the internal diameter of said pipe to form a retaining shoulder therebetween,

coupling means to secure said pipe and said housing in said end-to-end relationship,

said housing, said pipe, said valve and said boss forming a continuous passageway for said probe into said enclosure,

said probe having a collar continguous one end for seating on said positioning shoulder or abutting said retaining shoulder, and

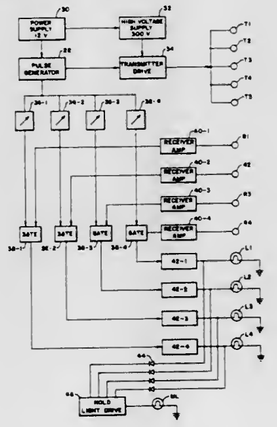
means for maintaining said probe collar seated on said positioning shoulder.

4,096,755

ULTRASONIC INSPECTION APPARATUS

Leroy Robert Hause, Seattle, and Clarence William Coplin, Auburn, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Aug. 31, 1977, Ser. No. 829,400
Int. Cl.² G01N *29/04*
U.S. Cl. 73—598 **8 Claims**



1. Ultrasonic inspection apparatus comprising a carriage movable over a surface to be ultrasonically inspected, alternate transmitting and receiving ultrasonic transducers mounted on said carriage in a linear array and in contact with the surface to

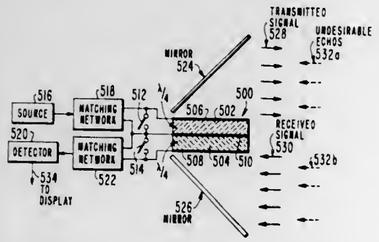
be inspected such that ultrasonic wave energy from a transmitting transducer will pass through the surface to an adjacent receiving transducer, means for causing each of said transmitting transducers to generate a burst of sound in the surface, a separate detector for each of said receiving transducers for detecting a shift in phase in the sound received by its associated receiving transducer due to a defect in the surface, a separate indicator for each of the receiving transducers for momentarily indicating a shift in phase indicative of a defect, a single master indicator for all of said receiving transducers, and means for actuating said master indicator for a predetermined period of time longer than the momentary indications of the separate indicators whenever a defect is sensed by any of the separate detectors.

4,096,756

VARIABLE ACOUSTIC WAVE ENERGY TRANSFER-CHARACTERISTIC CONTROL DEVICE

Gerard Argant Alphonse, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jul. 5, 1977, Ser. No. 812,706
Int. Cl.² G01N *29/00*; H03H *9/26*; H01L *41/10*
U.S. Cl. 73—609 **12 Claims**



1. A variable acoustic wave energy transfer characteristic control device including:

a piezoelectric unit comprising a plurality of contiguous layers of piezoelectric material which define two outer faces and define an interface between each pair of adjacent ones of said contiguous layers, each of said layers having a respective specified thickness, first and second electrodes respectively at said outer faces, and at least one additional electrode at each interface;

an electrical circuit connected across said first and second electrodes; and

switch means for selectively connecting said at least one additional electrode to another one of said electrodes which selectively short circuits at least a portion of at least one of said layers of said piezoelectric element.

4,096,757

METHOD AND APPARATUS FOR EXAMINING WELD DEFECTS IN VERTICAL PIPES BY SUPERSONIC WAVES

Ryoichi Ishii; Yoshishige Sakurai; Hiroshi Yamada; Kuniharu Uchida, all of Yokohama, and Kanekichi Suzuki, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Dec. 7, 1976, Ser. No. 748,370
Claims priority, application Japan, Dec. 8, 1975, 50-145141; Dec. 8, 1975, 50-145143; Dec. 12, 1975, 50-147422; Dec. 12, 1975, 50-147423
Int. Cl.² G01N *29/04*
U.S. Cl. 73—621 **13 Claims**

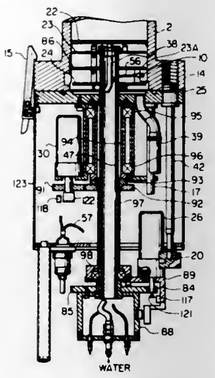
1. Supersonic defect detection apparatus for examining the weld of a vertical pipe comprising:

a supersonic probe,

means for revolving said probe along the inner surface of said vertical pipe, said probe revolving means including a first disc mounted on a rotary shaft,

means removably connected to the lower end of said pipe for vertically driving said probe revolving means,

means connected to said vertically driving means for circulating contact liquid between the operating surface of said probe and a tank containing said contact liquid, and



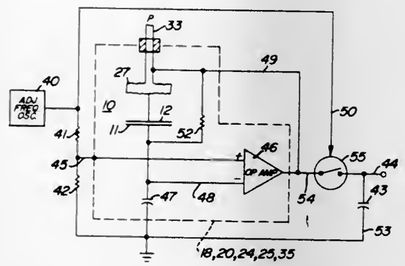
means for supplying said contact medium onto said first disc including a baffle plate mounted above said first disc for directing said contact liquid in the radial direction of said first disc, said probe being positioned beneath said first disc near the periphery thereof, and said first disc being provided with a notch above said probe for guiding the contact liquid between the operating surface of said probe and the inner wall of said pipe to be examined.

4,096,758

PRESSURE TO ELECTRIC TRANSDUCER

James O. Moore, Worcester Township, Montgomery County, Pa., assignor to Moore Products Co., Spring House, Pa.

Filed May 24, 1977, Ser. No. 799,957
Int. Cl.² G01L *9/12*
U.S. Cl. 73—718 **10 Claims**



1. A pressure-to-electric transducer comprising

a housing,

a fluid pressure responsive member in said housing,

a capacitor in said housing having a fixed plate and a movable plate connected to said fluid pressure responsive member for movement thereby,

an operational amplifier for delivery of an output signal,

said amplifier having a negative input terminal, a positive input terminal and an output terminal,

means for determining the output of said amplifier in response to a fluid pressure applied at said fluid pressure responsive member,

said means comprising an oscillator as an input source connected to said positive input terminal, and

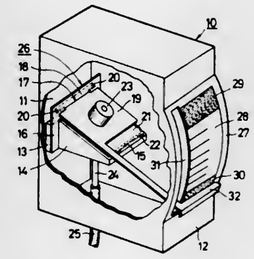
a feedback network including said capacitor and a resistor connected between said output terminal and said negative input terminal of said amplifier for controlling the gain of said amplifier.

4,096,759

PRESSURE GAUGE FOR INDICATING SMALL PRESSURE CHANGES

Gerhard Desor, Bad Homburg, Germany, assignor to Hauser Verwaltungs-Gesellschaft mit beschrankter Haftung, Oberursel, Germany

Filed Mar. 7, 1977, Ser. No. 775,351
Claims priority, application Germany, Mar. 10, 1976, 2609882
Int. Cl.² G01L *7/00*
U.S. Cl. 73—731 **16 Claims**



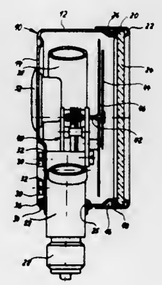
1. A pressure gauge for indicating small pressure changes comprising a sac of thin flexible film material communicable with and inflatable by the pressure to be indicated, during use; a base for supporting the sac wherein the sac effectively inflates generally outwardly therefrom, during use; a transmission plate; means pivotally mounting the transmission plate to rest freely against the sac, comprising a hinge connecting the transmission plate to the base for free swinging movement of the transmission plate in response to the inflation and deflation of the sac; and a pointer directly connected to the transmission plate to indicate the position thereof under the influence of pressure to the sac to effect the indication of that pressure.

4,096,760

PRESSURE GAUGE

Paul Bilbert, Burgstadt, and Ewald Rössner, Obernburg, both of Germany, assignors to Alexander Wiegand GmbH u. Co., Armaturen- u.Manometerfabrik, Klingenberg, Germany

Filed Jun. 10, 1977, Ser. No. 805,603
Int. Cl.² G01L *7/04*
U.S. Cl. 73—738 **4 Claims**



1. A pressure gauge comprising

a rigid housing having a peripheral wall, a front side and a rear side;

a view plate mounted to seal said front side;

a gauge member located within said housing;

an elongated gauge support member having one end extending outside said housing to provide a support for said pressure gauge and its other end extending inside said housing to provide a mounting for said gauge member;

a pointer mechanism and pointer connected with said gauge member for articulated movement observable through said view plate;

said rear side formed as a wall having an opening therein formed with an edge thereof;

a closure element corresponding in size to said opening and having a first groove extending about its periphery to sealingly engage said edge of said opening thereby retaining said closure element in said opening;

said closure element having a second groove extending about its periphery, said second groove located so as to provide an opening into the interior of said housing;

a resilient membrane extending into said housing and having its edge sealingly secured within said second groove opening along its entire length; and

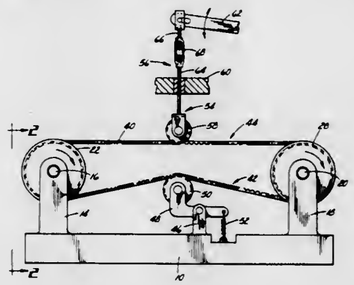
said closure element having a vent hole and capable of being pressed out of said opening when the pressure in said housing exceeds a specific value.

4,096,761

APPARATUS AND METHOD FOR INCREMENTALLY ROTATING A SHAFT

Keith E. Brown, Solon, Ohio, assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio

Filed Jul. 15, 1976, Ser. No. 705,688
Int. Cl.² F16H *27/02*
U.S. Cl. 74—128 **4 Claims**



1. An apparatus for providing intermittent rotary motion in a predetermined direction comprising:

an endless substantially nonstretchable belt;

a pair of spaced driven pulleys around which said belt is trained with said belt having first and second continuous runs each disposed between said pulleys and each extending from one pulley to the other, said pulleys having their axes fixedly positioned and the length of the belt being such as to normally exhibit significant slack when thus trained arond the pulleys;

means for preventing rotation of each pulley in one direction while permitting it in the other, the directions of permitted rotation of the pulleys being alike with respect to a single predetermined direction of belt travel;

first deflecting means for alternately deflecting said first run of the belt in a direction transversely of its path and then withdrawing trom the deflecting position; and

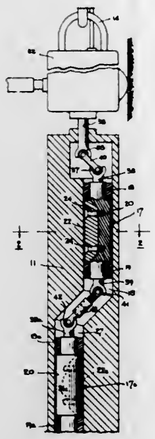
second deflecting means for alternately deflecting the second run of the belt in a direction transversely of its path and then withdrawing from the deflecting position, said first and second deflecting means being arranged for mutual coaction such that the deflecting and withdrawing actions alternate in opposite sense to the actions of the other so as to maintain said belt substantially taut about the pulleys, whereby the pulleys are alternately stepped in their permitted directions of rotation.

4,096,762

TORSIONAL SONIC OSCILLATOR EMPLOYING UNIVERSAL JOINTS AND TANDEM ARRANGED OSCILLATOR ROTORS

Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Jul. 30, 1976, Ser. No. 710,317
Int. Cl.[2] F16H *33/00*
U.S. Cl. 74—61 11 Claims



1. A torsional sonic oscillator for generating torsional vibration in a torsionally elastic member comprising:

a first eccentrically weighted rotor unit mounted for rotation on said elastic member,

a second eccentrically weighted rotor unit, similar in size, weight and configuration to said first rotor unit, mounted for rotation on said elastic member in tandem series driven relationship with said first rotor unit,

said rotor units being rotatably mounted on the elastic member with their rotation axes substantially parallel to each other and each displaced from a central axis of said elastic member equally but oppositely in a non-aligned relationship with each other, the eccentrically weighted portions of said rotor units being in 180° phase relationship with each other,

linkage means for coupling said rotor units to each other, and

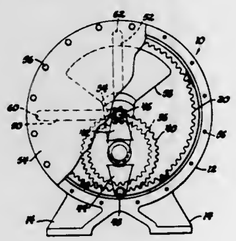
drive means for rotatably driving said rotor units.

4,096,763

HYPOCYCLOIDAL REDUCTION GEARING

Nathaniel B. Kell, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 22, 1976, Ser. No. 753,261
Int. Cl.[2] F16H *21/14*
U.S. Cl. 74—69 4 Claims



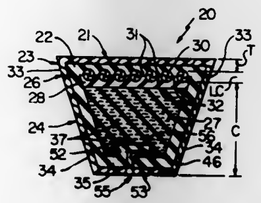
1. A speed reducing mechanism comprising; a housing; an output shaft rotatably supported in said housing; an input shaft rotatably supported in said housing; a gear carrier rotatably supported in said housing and being drivingly connected to said input shaft; an internally toothed gear; a pinion gear rotatably mounted on said gear carrier and meshing with said internally toothed gear and having at least one-half tooth more or less than one-half the number of teeth on said internally toothed gear; a plate member having first and second slots formed thereon in intersecting relation to each other with said intersection occurring at the central axis of said internally toothed gear; and first and second reaction means formed on said pinion gear and being disposed in said first and second slots; one of said internally toothed gear or said plate member being secured to said housing and the other being drivingly connected to said output shaft.

4,096,764

POWER TRANSMISSION BELT STRUCTURE AND METHOD OF MAKING SAME

Kenneth D. Richmond, Nixa; Russell E. Hartman, Springfield; Jerry W. Rogers, Springfield, and Jack Nelson, Springfield, all of Mo., assignors to Dayco Corporation, Dayton, Ohio

Filed Mar. 30, 1977, Ser. No. 782,699
Int. Cl.[2] F16G *5/16;* B29H *7/22*
U.S. Cl. 74—233 20 Claims



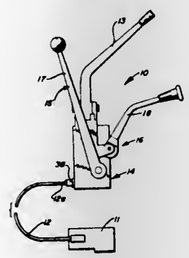
1. A power transmission belt structure having substantially its entire periphery covered by an outer fabric layer adjoined by an elastomeric layer, at least a portion of said elastomeric layer and fabric layer being the only structure defining a tension section of said belt structure.

4,096,765

CONTROL LINKAGE ARRANGEMENT

Thomas E. Cochran, Yorkville, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 28, 1977, Ser. No. 772,802
Int. Cl.[2] G05G *11/00*
U.S. Cl. 74—473 R 27 Claims



1. In a vehicle drive having speed control means including a movable control element for causing the speed of the drive to vary in accordance with the positioning of said control element, and a manually operable speed lever mounted for selective positioning about mutually transverse first and second pivot axes, an improved connecting means interconnecting said speed lever and said control element for moving said control element as a function of pivotal movement of said speed lever, comprising:

a pivot member;

means for mounting said pivot member for pivoting about a third, fixed pivot axis intersecting said first pivot axis;

means connecting said pivot member to said control element to position said control element as a function of the pivotal position of said pivot member about said third pivot axis;

a ball connector;

a guide carried by said pivot member defining a channel spaced from said first pivot axis, said channel transversely intersecting said third pivot axis and slidably retaining said ball container; and

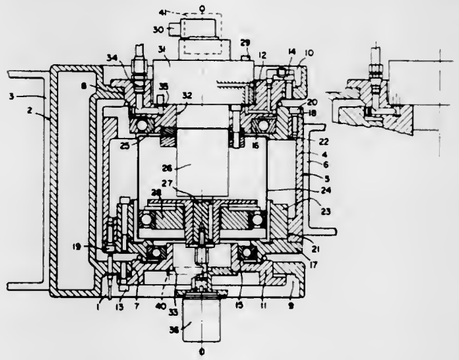
extensible means connecting said ball connector to said speed lever for mounting therewith about said first and second pivot axes, movement of said speed lever about said second pivot axis causing said extensible mounting means to move said ball connector in said guide channel from said third pivot axis to an operating position spaced from said third axis, and movement of said speed lever about said first pivot axis causing said extensible connecting means to move said ball connector disposed in said operating position arcuately about said third pivot axis to swing said control lever to an extent corresponding to the amount of pivoting of said speed lever about said first pivot axis.

4,096,766

SELF-CONTAINED MODULAR JOINT, NOTABLY FOR ROBOTS

Pierre Pardo, and François Pruvot, both of Meudon la Foret, France, assignors to Sofermo, Meudon la Foret, France

Filed Jun. 11, 1976, Ser. No. 695,306
Claims priority, application France, Jun. 13, 1975, 75 18497
Int. Cl.[2] B25J *17/00;* A61F *1/04;* F16H *33/00*
U.S. Cl. 74—640 5 Claims



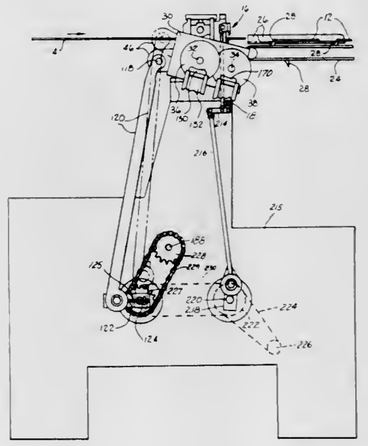
1. Self-contained modular joint adapted to interconnect two machine elements to permit a relative rotation of less than one revolution therebetween, wherein the first element comprises a strap consisting of a pair of wing-like extensions encompassing the second element in such a manner that said second element can pivot between said two wing extensions, each wing extension of said strap being provided with a bore concentric to the axis of said relative rotation, said bore being adapted to be engaged by first and second members of revolution each adapted to center and position in the axial direction an inner race of rolling contact bearings capable of absorbing axial and radial efforts, the outer race of each one of said bearings being carried by third and fourth members of revolution centered and secured to said second element so as to constitute between said two elements a joint free of both axial and radial play, wherein one of said third and fourth members of revolution secured to said second element has fitted thereon a toothed annulus of a reduction gearing assembly and wherein another element of said reduction gearing assembly comprises a flexible toothed ring which is secured to one of said first and second members of revolution rigid with the wing extension of said strap which is opposite said one of said third and fourth members of revolution rigid with said second element having said annulus secured thereto, said joint being further characterized in that said one of said first and second members of revolution also supports a control motor having a drive shaft mechanically connected to said reduction gearing assembly so as to drive said reduction gearing in such a manner that all the essential component elements of the joint are distributed along the axis of rotation about which one machine element can pivot in relation to the other element to an extent of less than one revolution.

4,096,767

INDEXING AND INTERMITTENT DRIVE MECHANISM

Charles Luther Peters, Jr., Norco, Calif., assignor to Box Innards, Inc., Anaheim, Calif.

Filed Mar. 21, 1977, Ser. No. 779,804
Int. Cl.[2] B23Q *17/00;* F16H *27/02*
U.S. Cl. 74—822 10 Claims



1. In combination:

a housing;

a shaft extending through opposite walls of said housing, said shaft being adapted to be coupled at one end to apparatus to be intermittently operated;

a first bevel gear in said housing fixed to said shaft;

a pair of spaced bevel gear pinions on an axis at right angles to the axis of said shaft,

said pinions both being in mesh with said first bevel gear;

means supporting said pinions for angular movement in unison about said shaft;

means to reciprocally rotate said pinions about said shaft through a predetermined angle;

means to effect rotation of said first bevel gear and said shaft during angular movement of said pinions in one direction;

and means to prevent rotation of said first bevel gear and said shaft during angular movement of said pinions in the opposite direction.

4,096,768

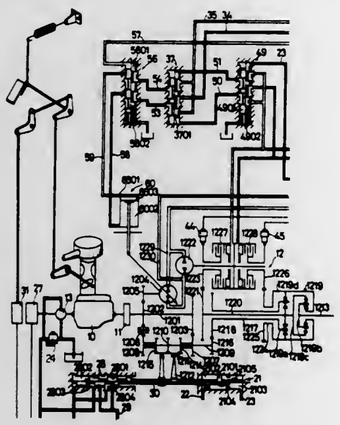
HYDRO-MECHANICAL TRANSMISSION

Takayuki Miyao, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed Oct. 3, 1975, Ser. No. 619,386
Claims priority, application Japan, Oct. 3, 1974, 49-114195
Int. Cl.[2] B60K *41/00;* F16H *47/04*
U.S. Cl. 74—865 4 Claims

1. In a hydro-mechanical transmission having an input shaft, an output shaft, a differential gear set including an input element connected to said input shaft and an output element

connected to said output shaft, a first positive displacement hydraulic pump-motor connected to said input shaft, a second hydraulic pump-motor connected to said first hydraulic pump-motor through a pair of conduits, a first clutch connected to said second hydraulic pump-motor for performing a low operational mode of a low speed ratio, and a second clutch connected to said second hydraulic pump-motor for performing a high operational mode of a high speed ratio, the operational modes thereof being switched-over when the rotational speed of said first clutch corresponds to or is synchronized with that of said second clutch an actuator connected to said first hydraulic pump-motor for varying the displacement ratio of said first hydraulic pump-motor, and a calculator operatively associated with said first and said second clutch the improvement which comprises:



a solenoid valve operatively associated with said first and second clutch actuable in response to a signal of said calculator indicating the synchronous condition of said clutches;

a first valve means operatively associated with and connected to said solenoid valve and actuable by a setting signal for increasing or decreasing the speed ratio of said transmission;

a second valve means connected to and actuable by said first valve means for supplying the hydraulic pressure selectively to said first clutch or said second clutch; and

a third valve means operatively connected with said actuator for controlling said actuator in response to the movement of said second valve means.

4,096,769

PLANETARY GEAR TYPE TRANSMISSION

Kazuhito Horikiri; Hiroshi Hirasawa, and Minoru Fujiwara, all of Okayama, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan

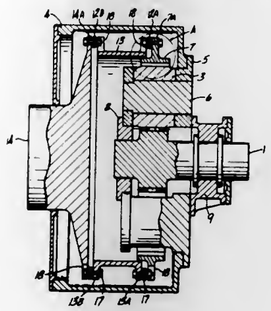
Continuation-in-part of Ser. No. 594,942, Jul. 11, 1975, abandoned. This application Apr. 22, 1976, Ser. No. 679,482
Int. Cl.² F16H *1/48*
U.S. Cl. 74—801 **6 Claims**

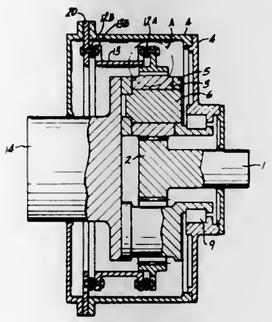
1. A planetary gear type transmission comprising a sun gear formed integrally with a high-speed shaft, carrier arms secured to a casing, a plurality of planet gears which are rotatably supported on respective spindles provided on the carrier arms and which are meshed with the sun gear, a ring gear disposed in mesh with the planet gears, and a low-speed shaft in coaxial connection with the ring gear, wherein the improvement comprises:

an intermediate ring or annulus disposed coaxially with and between the ring gear and the low-speed shaft, the annulus being formed with a first flange facing the periphery of the ring gear and a second flange facing the low-speed shaft;

a first endless chain-like coupling means disposed between the ring gear and the first flange of the annulus; and

a second endless chain-like coupling means disposed between the second flange of the annulus and the low-speed shaft, each of the endless chain-like coupling means being composed of a plurality of lengthwise overlapped flat resilient link assemblies, adjacent ends of which are fixed together, each assembly consisting of a plurality of flat





parallel resilient elements arranged so that each assembly of each connected pair of assemblies has alternate ones of its resilient elements overlapping alternate ones of the other assembly of the pair, said adjacent ends of the first endless chain-like coupling means are alternately fastened to the ring gear and the first flange of the annulus, whereas the adjacent ends of the second endless chainlike coupling means are alternately fastened to said second flange of the annulus and the low-speed shaft.

4,096,770

METHOD AND APPARATUS FOR MODIFYING THE POSITION OF A MACHINE SLIDE TO COMPENSATE FOR DIFFERENT FOLLOWING ERRORS

Randall Curtis Tanner, Lebanon, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Jun. 6, 1977, Ser. No. 803,566
Int. Cl.² B23B *1/00, 5/46*
U.S. Cl. 82—1 C **14 Claims**

1. A turning machine and a numerical control system of the type wherein a cutting tool initially contacts a rotating workpiece at the same angular position in response to a constant following error during successive machining passes, said numerical control responding to input signals for generating command signals to cause a servomechanism circuit to control the motion of the cutting tool relative to the workpiece, said input signals including a position signal representing a change of position of the cutting tool along an axis of motion and a velocity signal representing the velocity of the cutting tool during a machining pass, wherein the improvement comprises:

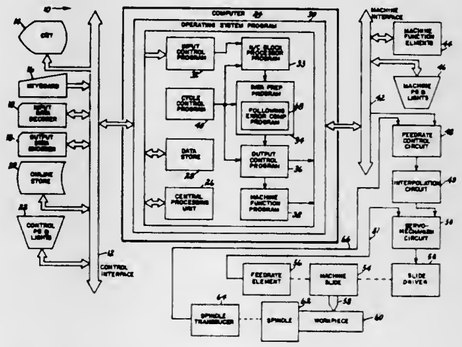
(a) means responsive to first position and velocity signals for generating first command signals to cause the servomechanism circuit to move the cutting tool through a first machining pass whereby the cutting tool initially contacts the workpiece at a first angular position of the workpiece;

(b) means responsive to the first velocity signal and a subsequent velocity signal for producing a compensation signal, said compensation signal representing a change in the following error caused by the difference between the first and subsequent velocity signals;

(c) means responsive to the compensation signal for generating second command signals to cause the servomechanism circuit to move the cutting tool through a displacement defined by the compensation signal; and

(d) means responsive to a subsequent position signal and the subsequent velocity signal for generating third command signals to cause the servomechanism circuit to move the cutting tool through a subsequent machining pass whereby the cutting tool initially contacts the rotating workpiece at the first angular position of the workpiece.

4. A method for use with a turning machine and numerical control system of the type wherein a cutting tool initially contacts a rotating workpiece at the same angular position in response to a constant following error during successive machining passes of the tool past the workpiece, said numerical control responding to input signals for generating command



signals to cause a servomechanism circuit to control the motion of the cutting tool relative to the workpiece, said input signals including a position signal representing a change of position of the cutting tool along an axis of motion and a velocity signal representing a velocity of the cutting tool during a machining pass, the improvement comprising the steps of:

(a) generating, in response to first position and velocity signals, first command signals to cause the servomechanism circuit to move the cutting tool through a first machining pass whereby the cutting tool initially contacts the workpiece at a first angular position of the workpiece;

(b) producing a compensation signal in response to the first and a subsequent velocity signal, said compensation signal representing a change in the following error corresponding to the difference between the first and subsequent velocity signals;

(c) generating, in response to the compensation signal, second command signals to cause the servomechanism circuit to move the cutting tool through a displacement defined by the compensation signal; and

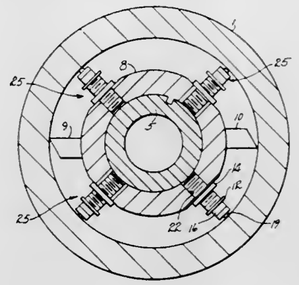
(d) generating, in response to the subsequent velocity signal and a subsequent position signal, third command signals to cause the servomechanism circuit to move the cutting tool through a subsequent machining pass whereby the cutting tool initially contacts the rotating workpiece of the first angular position of the workpiece.

4,096,771

ADJUSTABLE AND FLOATING BORING BAR STABILIZER

David Jan Monro, Milford, Conn., assignor to USM Corporation, Farmington, Conn.

Filed Oct. 8, 1976, Ser. No. 730,746
Int. Cl.² B23B *29/02, 29/14*
U.S. Cl. 82—35 **2 Claims**



1. A device for stabilizing the boring bar of a lathe adapted to machine an interior cylindrical surface of a hollow workpiece comprising a tool head mounted on the boring bar and a plurality of assemblies extending radially from the tool head for engaging said interior surface to support and stabilize the boring bar, each assembly including:

A. a cylindrical housing slidably received in the tool head for adjustment radially of the boring bar,

B. a shaft slidable axially in the housing,

C. a guide mounted on the outer end of the shaft,

D. spring means in the housing urging the shaft outward radially of the boring bar to engage the guide with said interior surface, and

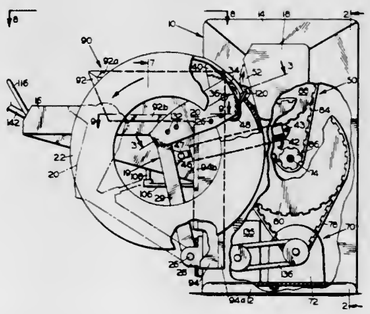
E. a flange threaded on the exterior of the housing and engaging the tool head for adjustably determining the location of the housing radially of the boring bar and thereby adjustably predetermining the resilient stabilizing forces acting against said interior surface.

4,096,772

TIRE SLITTING APPARATUS

Walter Dennis Hall, 13729 NE. Klickitat, Portland, Oreg. 97230; Merrell Thomas Miller, 13707 NE. Marine Dr., Portland, Oreg. 97211, and Douglas L. Roof, 3117 NE. 33rd Ave., Portland, Oreg. 97212

Filed Sep. 26, 1975, Ser. No. 617,060
Int. Cl.² B23B *3/04*
U.S. Cl. 82—82 **6 Claims**



1. A tire slitting apparatus for slitting tire carcasses circumferentially into segments, comprising:

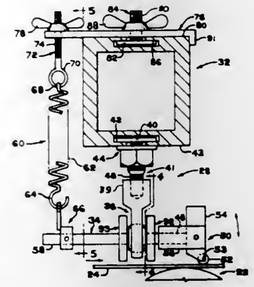
a. a frame,

b. a tire head assembly mounted on the frame and receiving the tire,
c. a tire slitting head mounted on the tire head assembly and fitting inside the body of the tire engaging the inner crown thereof,
d. tire drive means engaging the outer crown of the tire and operative to rotate the tire around the tire slitting head,
e. external guide means mounted on the frame and positionable against the side wall of the tire to guide and stabilize the tire during rotation, and the external guide means comprising:
1. an L-shaped plate mounted on the frame parallel to the plane of the tire and positioned to make three point contact with the side wall of the tire,
2. sliding support means mounting the plate to allow lateral movement of the plate relative to the tire, and
3. linkage means connected to the plate to initiate movement of the plate on the sliding support means, and
f. cutting means mounted on the tire slitting head and positioned to slit the tire from the inside out.

3. A tire slitting apparatus for slitting tire carcasses circumferentially into segments, comprising:
a. a frame,
b. a tire head assembly mounted on the frame and receiving the tire,
c. a tire slitting head mounted on the tire head assembly and fitting inside the body of the tire engaging the inner crown thereof,
d. tire drive means engaging the outer crown of the tire and operative to rotate the tire around the tire slitting head, the tire drive means comprising:
1. drive rollers rotatably mounted in the frame and positioned to frictionally engage the outer crown surface of the tire,
2. elastic bands defining a plurality of peripheral holes and configured to fit releasably over the drive rollers for frictional engagement therewith,
3. tire studs located within the holes and having head portions positioned between the bands and the drive rollers and gripping portions protruding from the bands, and
4. power means for rotating the drive rollers,
e. external guide means mounted on the frame and positionable against the side wall of the tire to guide and stabilize the tire during rotation, and
f. cutting means mounted on the tire slitting head and positioned to slit the tire from the inside out.

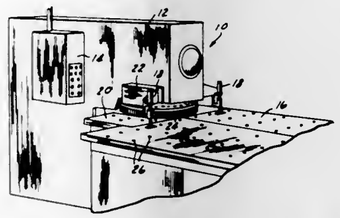
4,096,773
SELF-ALIGNING APPARATUS FOR SCORING FRACTURABLE MATERIAL
Robert P. DeTorre, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.
Filed Sep. 22, 1976, Ser. No. 725,222
Int. Cl.² B26D *3/08*
U.S. Cl. 83—8 **16 Claims**

1. An apparatus for scoring a fracturable material, comprising:
an elongated member having a first section and a second section;
a rod end ball joint mounting said member between the first and second sections;
scoring means mounting the first section of said member; and



biasing means acting on said elongated member to urge said scoring means under a predetermined scoring force toward the fracturable material to be scored.

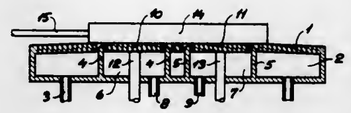
4,096,774
TURRET PUNCHES
Harold Kaufmann, Rochester, Minn., assignor to Houdaille Industries, Inc., Buffalo, N.Y.
Filed Jun. 21, 1976, Ser. No. 698,474
Int. Cl.² B26F *1/14*
U.S. Cl. 83—552 **14 Claims**



1. In a machine tool having a work station and at least one rotatable turret means carrying a plurality of individually utilized tools, the improvement of said turret means having a support portion, a plurality of individual tool holding members supported by said support portion, coupling means retaining said tool holding members in a relatively fixed position with respect to the support portion and the turret means for rotation with the turret means, at least some of said tool holding members receiving and accurately positioning with respect to the tool holding member a plurality of individual tools, means for assuring precise positioning of one of the tool holding members with respect to the work station when a given tool of the one tool holding member is positioned at the work station and said means for assuring positioning including reciprocatable means acting on the one of the tool holding members for assuring said precise positioning of the one of the tool holding members.

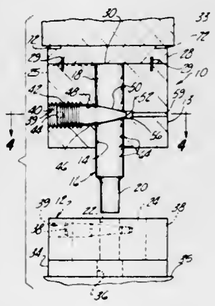
4,096,775
METHOD OF CUTTING WRAPPERS FOR TOBACCO PRODUCTS AND CUTTING TABLE FOR CARRYING OUT SAID METHOD
Jorgen Thyrsted Thomsen, Fredericia, Denmark, assignor to J. P. Schmidt Jun. A/S, Fredericia, Denmark
Filed Feb. 2, 1977, Ser. No. 764,873
Claims priority, application Denmark, Feb. 5, 1976, 481/76
Int. Cl.² B26D *1/02*
U.S. Cl. 83—511 **3 Claims**

1. A cutting device for cutting wrappers for cigars, cigarillos or cheroots from tobacco leaves, said device including a cutting table, a plurality of cutting knives having cutting edges adjacent said table, said cutting edges of each of said knives defining a contoured shape desired for a wrapper with an acute lobe at one end thereof, said table and said knives being movable relative to one another to position said edges in a first position withdrawn from said table, said table and said knives being operable to position said knives in said first position



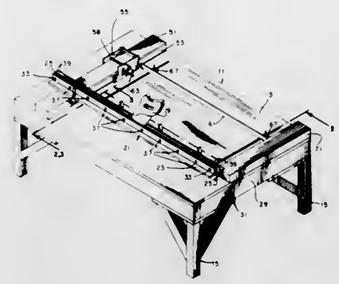
independently of one another, pressure means movable relative to said table and knives and cooperable with said knife edges when said knives are in said first position to cut tobacco leaves, said knives being positioned relative to one another so that consecutive operations can be performed on a tobacco leaf after displacement of said leaf while maintaining the same orientation of the stem of the leaf.

4,096,776
RETAINER FOR PUNCH AND DIE SETS
Ivan Laucke, 17 Farmstead Rd., #1601, Willowdale, Ontario, Canada
Filed Aug. 8, 1977, Ser. No. 822,420
Int. Cl.² B26F *1/14*
U.S. Cl. 83—698 **13 Claims**



5. A punch or die retainer arrangement for securing a tool within a bore formed in a tool holder body structure, the tool retainer arrangement comprising:
a pin retainer having a conically tapered portion, a straight-sided portion integral with said tapered portion and a threaded portion integral with said straight-sided portion opposite said tapered portion, said pin retainer disposed within a retainer seat formed in said holder body extending transversely to said bore in said holder body, said retainer seat having a threaded portion engaging said threaded portion on said taper pin retainer, a tapered portion complementary to said taper portion on said taper pin retainer, and partially intersecting said bore in said holder body, and an intermediate straight-sided portion between said threaded and tapered portion adapted to receive said straight-sided portion of said pin retainer; and, a partially conical taper groove formed on said tool and complementarily shaped to said tapering portions of said pin retainer and said retainer seats to be engaged by said pin retainer taper portion as said taper pin retainer is advanced into said retainer seat by said threaded engagement.

4,096,777
HAND POWER TABLE SAW
Charles Lee Adams, Rte. 6, Fayetteville, Ark. 72701
Filed Dec. 9, 1976, Ser. No. 749,111
Int. Cl.² B23D *49/10*
U.S. Cl. 83—762 **17 Claims**

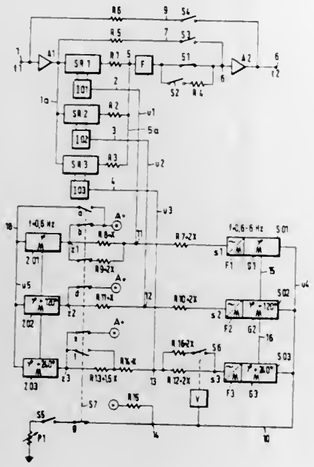


10. Hand power table saw apparatus comprising
a handsaw with a semi-rigid blade,
substantially flat sheet material forming a horizontal work surface,
support means for supporting such sheet material above floor level,
said sheet material being formed with a straight slot therethrough with a width at least slightly greater than the thickness of said handsaw blade and of a length at least about twice the width of said handsaw blade,
a saw guide structure including two rigid, parallel members spaced apart to form an opening of a width greater than the thickness of said handsaw blade and a length at least about twice the width of said handsaw blade,
means fixedly supporting such structure at least about one-half inch to two inches above the upper surface of said sheet material to form an unobstructed passage for a handsaw blade between said parallel members and through said slot, and
means for fully restraining a workpiece being sawed, said means including at least one adjustable clamp device on said saw guide structure acting to clamp a workpiece downwardly on said work surface and a work guide fixed on said surface at a predetermined angle to said parallel members.

4,096,778
APPARATUS FOR PROCESSING TONE SIGNALS
Wilfried Dittmar, Halsenbach, Germany, assignor to WERSI-electronic GmbH & Co. Kommanditgesellschaft fur elektronische Bauelemente, Halsenbach, Germany
Filed Feb. 14, 1977, Ser. No. 768,546
Claims priority, application Germany, Feb. 21, 1976, 2607136
Int. Cl.² G10H *1/02*
U.S. Cl. 84—1.25 **23 Claims**

1. Apparatus for the processing of tone signals, particularly tone signals which are produced by electronic organs, comprising a plurality of delay circuits including a first and a second delay circuit each having a multi-stage analog shift register including a tone signal receiving input and an output for delayed transmission of tone signals, a low-frequency oscillator including an output for transmission of variable-frequency control signals, the control signals at the outputs of said oscillators being out of phase with respect to each other, and a high-frequency oscillator having an input connected to the output of the respective low-frequency oscillator and output means for transmission of variable-frequency tone signal transporting pulses to the respective shift register whereby the frequency of said pulses and the intervals of transport of tone signals

through said shift registers vary as a function of variations of amplitude of the respective control signals; and means for



respectively connecting the inputs and outputs of said shift registers to each other.

4,096,779

STRING ANCHOR REPLACEMENT FOR REPETITION LEVER AND JACK IN A PIANO ACTION

Ernest Vagias, 265 Prospect St., Baden, Pa. 15005

Filed Jan. 7, 1977, Ser. No. 757,764
Int. Cl.² G10C *3/22*
U.S. Cl. 84—239 **9 Claims**

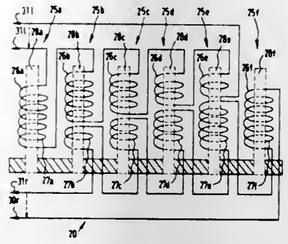
1. In a piano action of the type including a wippen having a support pedestal extending from the upper surface of said wippen, a repetition lever pivotally connected to said support pedestal, a jack pivotally connected at one end of the wippen to extend into an opening in an end of the repetition lever, a spring having one end connected to said repetition lever and a free end overlying a second opening through said repetition lever to urge a regulation button mounted at the end of the repetition lever which is opposite the jack toward a contact area on said upper surface of said wippen, the improvement comprising, in combination, an anchor plate adhered onto the upper surface of said wippen between said support pedestal and the contact area, said anchor plate having a string opening therethrough at a generally underlying location beneath said second opening in the repetition lever, and a string having end portions anchored between said wippen and said anchor plate while (a) an intermediate looped portion extends through the string opening in said anchor plate, the looped portion of the string having a sufficient length to extend through said second opening in the repetition lever for connection with said spring.

4,096,780

STEREOPHONIC ELECTROMAGNETIC PICKUP DEVICE FOR STRINGED MUSICAL INSTRUMENTS

Lorna Ann Dawson, 12 Grove Rd., Pinner, Middlesex, England

Filed Dec. 23, 1976, Ser. No. 753,734
Int. Cl.² G10H *3/08*
U.S. Cl. 84—1.16 **10 Claims**



1. A polyphonic pickup device for use with a stringed musical instrument of a type having an instrument body, a plurality of strings of ferromagnetic material, means for suspending said strings under tension from two spaced portions of the instrument body and means for individually adjusting the tension in each string so as to adjust the musical pitch of that string, the pick-up device comprising:

a support;

a plurality of groups of electric coils mounted to the support, the number of groups of said coils corresponding to the number of strings of the musical instrument, each group of coils being spaced apart from the other groups of coils, several of said groups having at least first and second coils;

a plurality of spaced-apart permanent magnets mounted to the support and corresponding in number to the number of groups of said coils and hence to the number of said strings; each group of coils being positioned close to an associated one of the said magnets so as to be in the magnetic field thereof;

first electrical connections between said first coils of said groups of coils;

second electrical connections between said second coils of said groups of coils;

the ratio of the number of turns in the first coil to the number of turns in the second coil being different for each group of coils;

means for mounting the support to the instrument body to place each string in the magnetic field of a respective one of the said magnets;

means for producing as a first electrical output signal a combination of electric signals from said first coils resulting from vibration of said strings;

and means for producing as a second electrical output signal a combination of electric signals from said second coils resulting from vibration of said strings;

whereby polyphonic reproduction of said first and second electrical output signals produces an aural effect as if the individual strings of the musical instrument are widely spaced apart.

4,096,781

PROCESS AND MACHINE FOR PRODUCTION OF BRAIDED PACKING

Kurt Bock, Estebogen 49, 2151 Hamburg Cranz, and Georg Flohr, Margarethenstr. 25, 2110 Buchholz, both of Germany

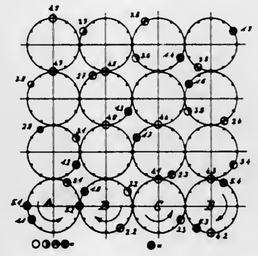
Division of Ser. No. 503,435, Sep. 5, 1974, abandoned. This application Dec. 10, 1975, Ser. No. 639,410
Int. Cl.² D04C *3/08*
U.S. Cl. 87—28 **8 Claims**

1. In a braiding process of the type adapted to insert an additive thread along a fabric surface and including revolution

of a plurality of base material containing bobbins about a base material bobbin path, the improvement comprising:

(a) guiding at least one bobbin containing additive thread around said base material bobbins whenever the latter pass through a portion of said base material bobbin path corresponding to said fabric surface; and

(b) providing stationary switch means along said base material bobbin path portion so that said additive material bobbins revolve exclusively about said portion, while said base material bobbins revolve about the entire base material bobbin path.



3. In a braiding apparatus of the type including a bobbin path, base material containing bobbins, and means for rotating said bobbins about said bobbin path to form a braided fabric, the improvement comprising:

(a) additive yarn containing bobbins disposed in said bobbin path;

(b) means for driving said additive yarn containing bobbins along said bobbin path; and

(c) stationary switch means disposed along said path for limiting movement of said additive yarn containing bobbins to a certain bobbin path portion so that said additive yarn extends only along a certain fabric surface.

4,096,782

BARRIER FOR WHEELED VEHICLES

Pierre J. Deschenes, Shrivenham, Nr. Swindon, England, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed May 28, 1976, Ser. No. 689,173
Claims priority, application Canada, May 29, 1975, 228002
Int. Cl.² F41H *11/08*
U.S. Cl. 89—1 A **5 Claims**

1. A barrier adapted to check passage of pneumatically tired vehicles comprising, in combination,

an elongated rod,

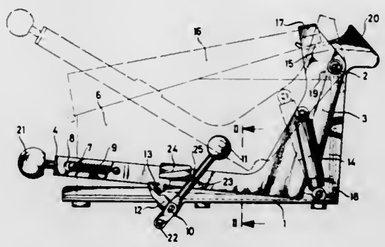
a plurality of substantially planar cutters each having an aperture therethrough to enable the cutter to be mounted on the rod, each cutter having at least two elongated cutting edges oriented to engage a support surface and to project into the path of vehicle tires, each cutter comprising two similar elongated plates, each plate having a profile defining a central portion and two diametrically opposed cutting tips extending outwardly of the central portion; said two plates being secured together with the length dimensions at right angles to one another and spacer means for spacing said cutters along said rod.

4,096,783

MOUNTING FOR AMMUNITION CONTAINERS ON RAPID-FIRE GUN MOUNTS

Erich Wallwey; Wolfgang Becker, both of Vellmar, and Heinrich Heldmann, Kassel, all of Germany, assignors to Wegmann & Co., Kassel, Germany

Filed Dec. 6, 1976, Ser. No. 747,587
Claims priority, application Germany, Dec. 12, 1975, 2555126
Int. Cl.² F41F *9/06*
U.S. Cl. 89—34 **10 Claims**



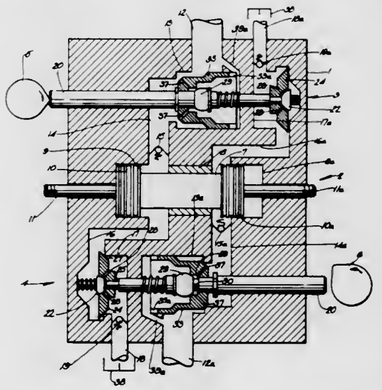
1. A mounting for an ammunition container for mounted rapid-fire weapons comprising a yoke disposed on a bracket, said yoke pivotable about a horizontal axis disposed at about the level of the upper edge of an ammunition container to be contained therein, said yoke being secured at its lowermost position by a catch means and consisting of a pair of laterally running, parallel arms joined by a transverse member.

4,096,784

HYDRAULIC POWER SYSTEM

Theodore Ongaro, c/o Ongaro Dynamics Ltd., 939 King Ave., Columbus, Ohio 43212

Filed Sep. 7, 1976, Ser. No. 720,562
Int. Cl.² F01B *25/02*
U.S. Cl. 91—6 **23 Claims**



1. An hydraulic power system comprising a housing, a piston reciprocally mounted in said housing, said piston having an opposing pair of piston heads defining with said housing a first and a second piston chamber, at least one piston rod connected to said piston for movement thereby, fluid delivery passageways and fluid discharge passageways in communication with said piston chambers, a first and a second control valve for sequentially introducing fluid under high pressure into said piston chambers, said control valves each having a valve stem mounting a high pressure valve member and a pressure relief valve member, said valve members being movable by said valve stems from closed to opened positions and return upon actuation of said valve stems, the high pressure valve member of the first control valve being connected to the fluid delivery

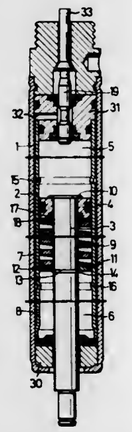
passageway of the first of said piston chambers, the pressure relief valve member of said first control valve being connected to the fluid discharge passageway of the second of said piston chambers, the high pressure valve member of the second control valve being connected to the fluid delivery passageway of the second of said piston chambers, and the pressure relief valve member of said second control valve being connected to the fluid discharge passageway of the first piston chamber, means for sequentially actuating said valve stems to open and close the valve members of said control valves so as to relieve high pressure fluid in one of said piston chambers prior to the introduction of high pressure fluid into the other of said piston chambers, and means for maintaining said passageways and said piston chambers filled at all times with fluid under positive pressure.

4,096,785

ELASTIC COLUMN OF ADJUSTABLE LENGTH

Winfried Wirges, Koblenz, Germany, assignor to Stabilus GmbH, Koblenz, Germany

Filed Jun. 21, 1976, Ser. No. 697,980
Claims priority, application Germany, Jun. 28, 1975, 2528980
Int. Cl.² F15B *15/17*; F16J *1/10*
U.S. Cl. 91—416 **15 Claims**



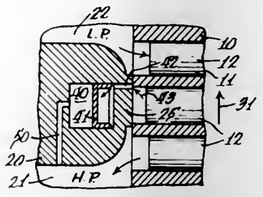
1. A column of adjustable height comprising:
(a) a cylinder member having an axis and enclosing a cavity;
(b) a piston member axially slidable in said cavity and axially dividing the cavity into two compartments sealed from the ambient atmosphere;
(c) valve means operatively interposed between said compartments;
(d) valve operating means for moving said valve means toward and away from an open position in which said valve means connect said compartments,
(1) said valve operating means including an operating member having a manually movable portion outside said cavity in said atmosphere,
(2) said operating member being connected to said valve means for moving the same when said portion of the operating member is moved.
(3) said valve means sealing said compartments from each other when away from said open position;
(e) a piston rod member secured to said piston member for relative axial movement and extending axially outward of said cavity in movable, sealing engagement with said cylinder member;
(f) a fluid under a pressure higher than atmospheric pressure filling said compartments; and
(g) yieldably resilient means abuttingly interposed between said piston member and said piston rod member for impeding said relative movement.

4,096,786

ROTARY FLUID ENERGY TRANSLATING DEVICE

George A. Schauer, Ames, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.

Filed May 19, 1977, Ser. No. 798,603
Int. Cl.² F01B *13/04*
U.S. Cl. 91—499 **26 Claims**



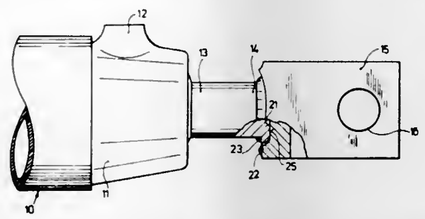
1. A rotary fluid energy translating device comprising, a rotatable cylinder block having a plurality of cylinders therein, valve means having inlet and outlet port means adapted to serially connect with the cylinders and a pair of cross-over areas positioned to block a cylinder from simultaneous communication with the inlet and outlet port means, each of said cylinders having a movable member with the members of the cylinders adjacent one cross-over area positioned to provide small fluid volume in the associated cylinders and the members of the cylinders adjacent the other cross-over area positioned to provide large fluid volume in the associated cylinders, a trapped fluid chamber in each of said cross-over areas having a flow passage positioned to communicate with a cylinder prior to a cylinder communicating with one of the port means in order to reduce the rate of pressure change when a cylinder subsequently communicates with one of said port means, movable means in each chamber to vary the volume of said chamber, and means for controlling said movable means to have a small volume chamber when an adjacent cylinder has a small fluid volume and to have a large volume chamber when an adjacent cylinder has a large fluid volume.

4,096,787

CYLINDER-AND-PISTON ARRANGEMENT AND METHOD OF MANUFACTURING THE SAME

Hartmut Sandau, Möglingen; Wilhelm Weigert, Schwieberdingen; Winfried Steinel, Königsfeld; August Kraisel, Bittenfeld; Klaus Ritter, Stuttgart; Erwin Gaub, Zwelbrücken, and Heinrich Kochendörfer, Rommelshausen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 8, 1976, Ser. No. 730,713
Claims priority, application Germany, Dec. 5, 1975, 2554748
Int. Cl.² B23P *15/10*; F16J *1/12*
U.S. Cl. 92—260 **11 Claims**



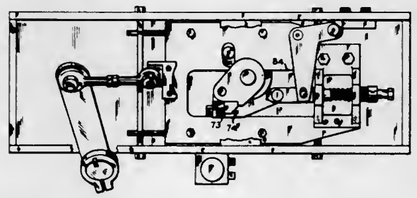
1. A method of forming a fork-shaped member and of connecting the same to one end of a piston rod projecting outwardly of a cylinder and connected at the other end with a piston, comprising the steps of bending without twisting a flat steel strip into a fork-shaped member having a base portion and a pair of parallel leg portions projecting parallel to each other and substantially normal to the base portion from opposite ends of the latter to one side thereof; forming in said base portion midway between said opposite ends a substantially circular depression extending from the other side of the base portion into the latter and having a planar end face; abutting said one end of said piston rod against said planar end face; and friction welding said one end of said piston rod to said end face to fixedly connect said fork-shaped member to said piston rod.

4,096,788

APPARATUS FOR FORMING A CONTAINER SIDE WALL

Jerry W. Young, Weston, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 18, 1977, Ser. No. 798,048
Int. Cl.² B31B *1/32*
U.S. Cl. 93—39 L **7 Claims**



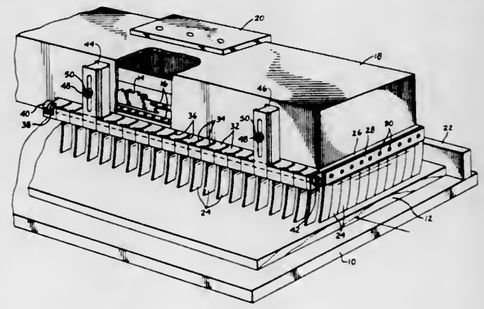
1. An apparatus for making a container by wrapping a blank around a mandrel to form a tubular side wall for a container, said apparatus including:
(a) a mandrel;
(b) clamp means cooperating with said mandrel for holding a portion of a blank in engagement with said mandrel;
(c) first and second wing means positioned for contact with an outer disposed surface of the held blank on opposite sides of the clamp means;
(d) first means operably connected to said first and second wing means for rotating said first and second wing means about the axis of the mandrel for wrapping the held blank around the mandrel and for terminating rotation of the first wing means around the axis before opposite side margins of the blank are overlapped by continuing rotation of the second wing means around the axis, said first means including:
(1) a carriage;
(2) guide means for movably supporting said carriage;
(3) drive means operably connected to said carriage for effecting reciprocating movement thereof in forward and retractive directions;
(4) first and second shaft means each carrying one of said first and second wing means, respectively;
(5) first and second arms each connected to one of said first and second shafts, respectively, said second arm having a first cam follower thereon;
(6) first cam means carried by said carriage and cooperating with said first cam follower whereby movement of said carriage effects movement of said second arm and thereby rotation of said second shaft and the second wing means;
(7) a third arm pivotally mounted on said carriage and movable therewith;
(8) a linkage means operably connecting said third arm to said first arm whereby movement of said carriage effects movement of said first arm and thereby rotation of said first shaft and the first wing means; and
(9) stop means cooperating with said first arm for substantially stopping movement thereof during forward movement of said carriage and thereby substantially stopping movement of the first wing means;
(10) second means cooperating with said third arm for selectively preventing pivotal movement thereof until said carriage nears the end of the forward movement whereby upon pivotal movement of said third arm said carriage can continue forward movement after said first arm has stopped moving to effect further movement of said second arm and said second wing means; and
(e) third means operable for urging the overlapped side margins into engagement with one another and effect securing same together to form a tubular side wall.

4,096,789

SAW GUARD

James Edward Blessinger, Jasper, Ind., assignor to Kimball International, Inc., Jasper, Ind.

Filed Apr. 6, 1977, Ser. No. 785,066
Int. Cl.² B27G *19/00*
U.S. Cl. 83—478 **7 Claims**



1. A splinter shield for a saw blade associated with a work supporting table comprising:
a downwardly opening housing adapted to be mounted above the saw blade and having a front and a side,
a plurality of flexible strips depending from the front and side of said housing, said strips being substantially wider than they are thick,
said strips across the front of said housing being arranged in edge to edge relation so that they are substantially coplanar with adjacent strips being in close proximity to one another,
said strips along the side of said housing being arranged in front to back relation and being spaced by an appreciable distance from one another,
said strips along the side being substantially parallel to the plane of strips across the front.

4,096,790

VENTILATION AND INSULATION BAFFLE

Laurence E. Curran, 460 E. High Point, Peoria, Ill. 61614

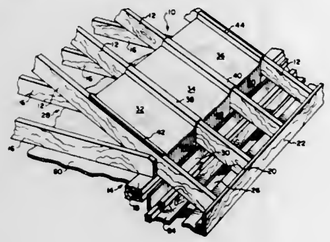
Filed Jun. 24, 1977, Ser. No. 809,528
Int. Cl.² F24F *7/00*
U.S. Cl. 98—37 **2 Claims**

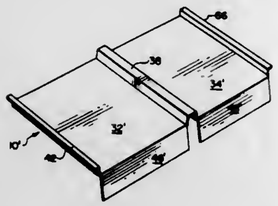
1. An insulation baffle for mounting over an exterior wall and between a roof and ceiling of a building structure to provide a ventilation passageway to an air space between the ceiling and roof and to prevent insulation which is subsequently applied to the ceiling from clogging said passageway, in which the exterior wall has a sill on which ceiling joists and inclined parallel roof rafters are supported, said rafters being spaced from each other a predetermined distance, said insulation baffle comprising:
a formed sheeting of substantially moisture impervious material, said sheeting including upper and lower surfaces, opposed side edges, and opposed end edges;
the width of said sheeting between the side edges thereof being generally a multiple of the predetermined distance between adjacent rafters;
said opposed side edges being laterally upwardly offset relative to the upper surface of the sheeting and defining predetermined height rafter overlying downwardly opening edge channel portions, each edge channel portion conforming to and being engageable with a substantial

portion of the width of a rafter along the upper edge of the rafter for the full length of the side edge of the sheeting;

at least one integral intermediate upwardly offset downwardly opening rafter overlying channel defined across said sheeting parallel to and of equal height with the opposed side edge channel portions and spaced relative thereto, said intermediate channel conforming to and being engageable over the full width of a rafter along the upper edge of the rafter;

the sheeting between the edge channel portions and the





intermediate channel forming planar panels of a width generally equal to the predetermined distance between adjacent rafters for engagement therebetween upon positioning of the edge channel portions and intermediate channel over adjacent rafters;

each of said planar panels having an integral full length extension along one end edge thereof, said extensions extending laterally downward from the lower surface of the sheeting for engagement with the sill between adjacent rafters whereby to block the movement of insulation particles from the interior of the structure past the sill.

4,096,791

APPARATUS FOR MAKING A FRIED FORMED CHIP

Verne E. Weiss, Wayzata; Glenn M. Campbell, and Gerald L. Wilson, both of Minneapolis, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Division of Ser. No. 355,260, Apr. 27, 1973, Pat. No. 3,935,322.
This application May 21, 1975, Ser. No. 579,748
Int. Cl.[2] A47J *37/12*
U.S. Cl. 99—353 **7 Claims**

1. Apparatus for making chip type snack products from a farinaceous dough, said apparatus comprising:

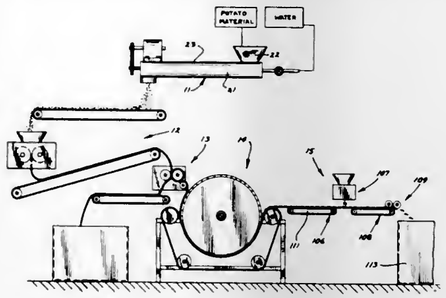
(a) first forming means comprising a pair of rolls for forming said dough into a continuous sheet;

(b) second forming means for forming and cutting said sheet into a continuous ribbon having alternative wide and narrow portions, said alternating wide and narrow portions defining a series of uniformly-shaped chip preforms;

(c) frying means for frying said continuous ribbon of dough including means for constraining said ribbon in a uniform shape while frying said ribbon;

(d) severing means for severing said fried ribbon at said narrow portions, thereby providing a plurality of uniformly-shaped fried chips; and

(e) conveying means, including means for conveying said dough from said first forming means to said second forming means, means for conveying said ribbon from said second forming means to said frying means, means for



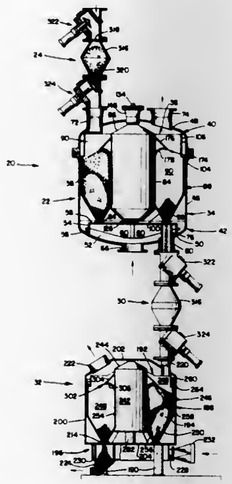
conveying said ribbon through said frying means with a positive movement, and means for conveying said fried ribbon from said frying means to said severing means.

4,096,792

CONTINUOUS COFFEE ROASTING APPARATUS

Horace L. Smith, Jr., Richmond, Va., assignor to Smitherm Industries, Inc., Richmond, Va.

Filed Nov. 5, 1975, Ser. No. 628,915
Int. Cl.[2] A23F *1/02;* A23N *9/02*
U.S. Cl. 99—355 **16 Claims**



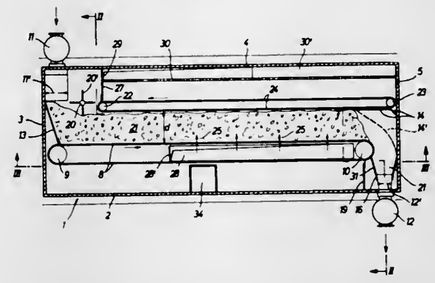
1. Apparatus for roasting coffee and the like which comprises: first and second reactors, each of which includes a shell, means in said shell comprising a movable assembly for supporting the beans to be processed therein, means for rotating the movable assembly about a vertical axis to thereby displace the beans in the reactor from a first location in said reactor to a second location therein, an inlet means above the movable assembly through which beans can be charged into said assembly, and deflector means for keeping beans from falling between the movable assembly and the reactor shell, said movable assembly having an outer wall means which includes a first member and a second member spaced inwardly from and extending above the first member and said deflector means extending inwardly from said shell to said outer wall means to direct beans falling outside the movable assembly through the gap between the first and second members of the outer wall means into the interior of the movable assembly; means for introducing coffee beans into said first reactor at one location; means for roasting said beans as they are displaced from the first to the second of said locations in said first reactor by so effecting a flow of roasting fluid upwardly through the first reactor that the beans circulate into intimate and uniform contact with the roasting fluid; means for discharging roasted beans from the first reactor at said second location and into the second reactor at the first location therein; means for cooling the roasted beans as they are displaced from the first location to the second location in said second reactor by so effecting a flow of fluid upwardly through the second reactor that the roasted beans circulate into intimate and uniform contact with the fluid; and means for discharging cooled beans from the second reactor at the second location therein.

4,096,793

APPARATUS FOR COOLING HOPS

Rudolf Ludwig Wachter, and Winfried Franz Edinger, both of Au, Hallertau, Germany, assignors to Firma Permahop Hopfenpulver GmbH & Co. KG, Germany

Filed Mar. 25, 1976, Ser. No. 670,289
Claims priority, application Germany, Mar. 27, 1975, 2513884
Int. Cl.[2] A23L *3/36;* B60H *3/04*
U.S. Cl. 99—467 **8 Claims**



1. Apparatus, for continuously cooling hops, comprising:

(i) a cooling chamber having an inlet opening adjacent to a first endwall thereof and an outlet opening adjacent to a second endwall thereof

(ii) an air lock charging means disposed at said first endwall of said chamber substantially centrally of one end of the chamber roof for charging hops into said chamber, said airlock charging means having a closure openable under the weight of hops accumulated thereon

(iii) an air lock discharging means disposed at said second endwall in the bottom of said chamber for discharging cooled hops therefrom and having a closure openable under the weight of hops accumulated thereon

(iv) a rotatable hop-distributing roller disposed in said cooling chamber adjacent to said charging means and above said conveyor belt, said roller extending transversely to the direction of conveying movement of said conveyor belt, said roller being adapted to shift hops axially for distributing charged hops evenly on said conveyor belt

(v) a driven gas-permeable mesh screen endless conveyor belt, having openings slightly smaller than lupulin granules, disposed substantially horizontally in said cooling chamber and extending substantially from said first endwall to said air lock discharging means and having a portion disposed to receive hops from said charging means to form a bed of hops on said conveyor belt

(vi) a second driven endless belt, having openings smaller than lupulin granules, disposed in said cooling chamber above said conveyor belt and parallel thereto and extending substantially from said air lock charging means to said second endwall for engaging said hops thereon to maintain said bed of hops at a predetermined height on said conveyor belt

(vii) means in said cooling chamber for directing a flow of cooling gas through said bed of hops on said conveyor belt, and for collecting said cooling gas after passage through said bed of hops, and

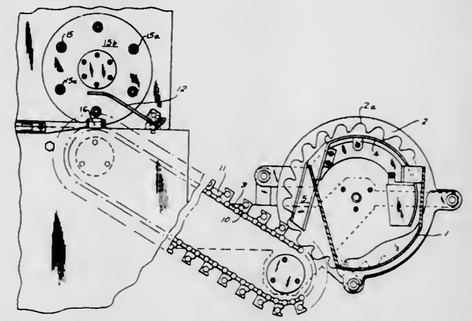
(viii) means for receiving said collected gas, re-cooling it, and passing it to said gas directing means.

4,096,794

OLIVE PITTER AND STUFFER

Clemente del Ser González, Villaverde Alto Paseo de Talleres No. 5, Madrid, Spain

Filed Apr. 15, 1975, Ser. No. 567,811
Claims priority, application Spain, Oct. 28, 1974, 431.436
Int. Cl.[2] A23N *4/08*
U.S. Cl. 99—494 **6 Claims**



1. An olive pitting and stuffing machine comprising hopper means for receiving olives to be pitted;

a pair of olive selection disks rotatable in spaced-apart relation in said hopper means to entrain successive olives thereon;

respective olive-conveying chains assigned to each of said disks and receiving olives in succession therefrom, each of said chains carrying its olives in succession to a respective pitting station;

a pair of turntables in space-apart relationship provided with a set of axially displaceable pitting plungers individually successively positionable at the respective pitting stations in alignment with successive respective olives and being movable successively to respective stuffing stations by rotation of their respective turntables;

a respective olive coring device disposed at each of said pitting stations opposite the respective turntable from its plunger and provided with a tubular knife for cutting an opening in the respective olive for ejection of the pit therethrough by the respective plunger;

a common mechanism for rotating said turntables and axially displacing said plungers to eject the pits at the pitting stations and to impale the olives thereon, to transport the olives to the stuffing stations and ultimately to retract from the olives at their respective stuffing stations;

respective stuffing devices disposed at the stuffing stations opposite each of said turntables from said plungers and each including retainers for retaining successive olives carried by the plungers in an open condition by engagement therewith;

means for inserting stuffing through the retainers in the openings of the respective olives at the stuffing stations; and

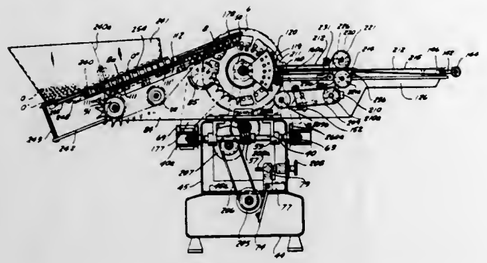
a common operating mechanism for synchronously operating both said selection disks, chains, sets of plungers, coring devices, rotating means, retainers, and stuffing devices.

4,096,795

OLIVE PITTING AND STUFFING MACHINE

Clemente Del Ser Gonzalez, Po.de Talleres 36, Villaverde Alto (Madrid), Spain

Continuation-in-part of Ser. No. 701,942, Jul. 1, 1976, abandoned. This application Aug. 6, 1976, Ser. No. 712,320
Claims priority, application Spain, Feb. 3, 1976, 444888
Int. Cl.² A23N 4/08
U.S. Cl. 99—494 8 Claims



1. In a pitting and stuffing machine for olives and the like, a pair of juxtaposed gripper members having aligned central passageways circumscribed by frusto-conical olive engaging surfaces defining an olive receiving chamber therebetween; powered means mounting said members for movement toward and from each other to grasp and to release olives therebetween; an elongated tubular cutter; means mounting the cutter for longitudinal reciprocal movement to and from the chamber through a passageway of a member to core an olive therein and to retract from the chamber; an elongated pitting plunger; means mounting the pitting plunger for reciprocal movement to and from the chamber through the passageway of the member opposite to the cutter in substantial alignment therewith; an elongated feed plunger; means mounting the feed plunger for longitudinal reciprocal movement into and out of the cutter coaxially thereof; means for positioning stuffing material in alignment with the cutter when the feed plunger is retracted therefrom; and means sequentially moving the gripper members toward each other to grasp an olive therebetween, thrusting the cutter into the chamber to core an olive held therein and retracting therefrom, thrusting the pitting plunger into the chamber to eject the pit from the olive therein in the direction of the cutter as the cutter is retracted, moving the feed plunger relative to the retracting cutter and in the opposite direction to eject olive core therefrom, concurrently retracting the feed plunger from the cutter to receive stuffing materials therebetween, the pitting plunger from the chamber and re-inserting the cutter into the olive in the chamber, subsequently thrusting the feed plunger into the cutter for the delivery therethrough of stuffing material into the olive, and concurrently retracting the feed plunger from the cutter, the cutter from the chamber and separating the gripper members to release the stuffed olive.

4,096,796

APPARATUS AND METHOD FOR CONTROLLING PRESS RACKING

Robert J. Saunders, Lewiston, Id., and Harold A. Keller, Clarkston, Wash., assignors to Potlatch Corporation, Lewiston, Id.

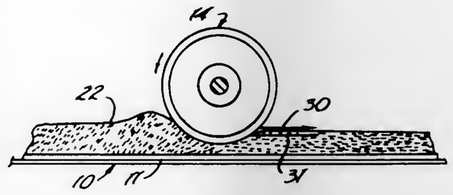
Filed Dec. 22, 1975, Ser. No. 642,710
Int. Cl.² B29J 5/00, 5/04
U.S. Cl. 100—35 6 Claims

1. A method for reducing the amount of press racking to which a platen press is subjected during production of reconstituted wood panels due to shingling of elongated wood strands during mat formation in which transversely wood strands overlap one another and lie at acute angles relative to a horizontal plane along the direction of movement of a forming surface on which the mat is supported, the direction of movement of the forming surface being perpendicular to the transverse orientation of the wood strands, said method comprising the following steps:

engaging the mat by a transverse roll at a location downstream of a mat forming unit and upstream of a platen press, said roll having a small uniform diameter outer cylindrical surface of 6 to 11 inches centered about a rotative axis for rolling engagement of the cylindrical surface against the upper surface of the formed mat;

urging the roll toward the formed mat to thereby apply downward pressure against the upper surface of the formed mat in opposition to the forming surface on which the mat is supported;

moving the formed mat beneath the roll at a selected translational velocity;



rotating the roll about its rotative axis at an angular velocity such that the roll periphery in contact with the formed mat tangential to a vertical plane through the axis has a translational velocity component parallel and identical to the translational velocity of the mat so that there is no relative movement between the mat and the roll at the area of engagement between them;

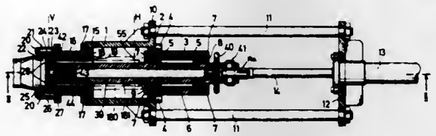
the roll diameter and pressure being such as to apply an abrupt vertical downward rolling force to the top surface and interior of the formed mat so as to produce a standing transverse wave across the moving mat immediately upstream of the roll which rearranges the mat structure to thereby reduce the amount of shingling therein and the consequent press racking that would othewise occur during pressing of the formed mat.

4,096,797

METHOD OF COMPACTING SOLIDS-CONTAINING WASTE OR THE LIKE

Niklaus Seiler, Lenzburg, and Hanspeter Seiler, Aarau, both of Switzerland, assignors to Seiler Pumpenanlagen A.G., Erlinsbach, Switzerland

Division of Ser. No. 558,717, Mar. 14, 1975, Pat. No. 4,036,124. This application Mar. 5, 1976, Ser. No. 664,370
Claims priority, application Switzerland, Mar. 18, 1974, 3701/74
Int. Cl.² B30B 1/32
U.S. Cl. 100—39 6 Claims



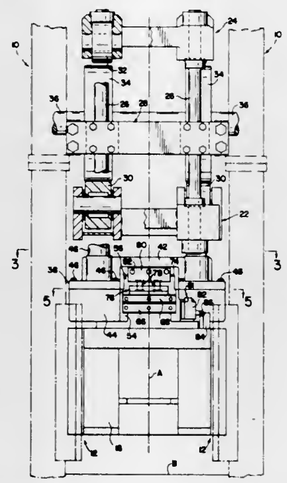
1. A method of compacting solids-containing waste or the like, comprising the steps of accumulating a supply of uncompacted waste in a hopper having a trough-shaped extension provided with a concave internal surface; reciprocating a piston which is retractable into said supply and thereupon moved forwardly and which slides on said surface, so as to intermittently force waste from said supply into an elongated confining path to thereby compact the waste and convert the thus compacted waste into a slug; sealing the front end of the confining path upon completed expulsion of a slug therefrom; and maintaining the front end of said confining path sealed during retraction of the piston from said path into said supply.

4,096,798

PRESS SLIDE ADJUSTING AND OVERLOAD PROTECTION ASSEMBLY

James M. Moskalik, Hastings, Mich., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Mar. 14, 1977, Ser. No. 777,006
Int. Cl.² F16P 7/00
U.S. Cl. 100—53 18 Claims



1. A slide adjustment and overload protection assembly for a press including a slide having an axis and driven means to axially reciprocate said slide, said assembly comprising, first and second members coaxial with said slide and connectable one to said slide and the other to said driven means, and interengaging means on said first and second members supporting said members for axial sliding movement relative to one another between normal and overload positions, said interengaging means including adjusting means interconnected with said second member for axial adjustment relative thereto, and overload responsive means interposed between said adjusting means and said first member releaseably holding said members in said normal position, said overload responsive means including a housing removably mounted between said adjusting means and said first member, shearable metal means removably supported by said housing, and shearing member means separate from said shearable metal means and removably supported by said housing, said housing, shearable metal means and shearing member means being removable as a unit from between said adjusting means and said first member.

4,096,799

BALER FOR LOOSE WIRE

Joseph Zupancic, Downey, Calif., assignor to Weiner Steel Corporation, Pico Rivera, Calif.

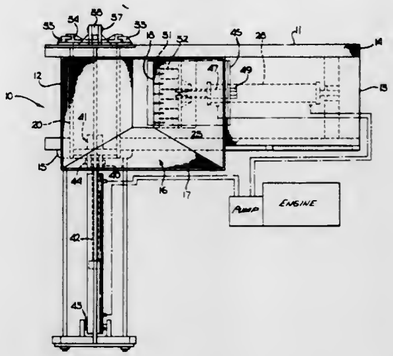
Filed Mar. 11, 1977, Ser. No. 776,513
Int. Cl.² B30B 15/30
U.S. Cl. 100—215 3 Claims

1. A baler for baling loose wire which said baler receives from a loose wire loading device, said baler comprising:

a. a mounting member having a top, a base, a first and a second end;

b. a hopper having an open top, an open base and four sidewalls, said base of said hopper being disposed adjacent to said first end of said mounting member and mounted to said top thereof;

c. a cylindrical member having a first open end and a second open end and also having one-quarter of its sidewall removed to form an opening, said cylindrical member being disposed on said top at said first end of said mounting member so that said opening has a first edge perpendicular to said top of said mounting member and a second edge parallel to said top of said mounting member and faces said second end of said mounting member and also being disposed adjacent to said base of said hopper so that loose wire may enter therein, and said cylindrical member being adapted to receive a heavy pounding;



d. a first plate having a first end and a second end, said plate being disposed on said top of said mounting member and being mechanically coupled to slide reciprocally, horizontally thereon so that its said first end enters said cylindrical member between its said first and second edges and contacts the oppositely disposed portion of said cylindrical member;

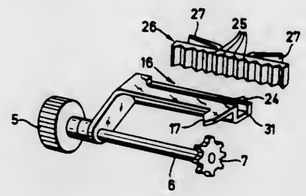
e. hydraulic means for reciprocally driving said first plate, mechanically coupled to said mounting member.

4,096,800

DETENT DEVICE FOR A KEY SHAFT OF A PRINTING MECHANISM

Heinz Kistner, Neckarsteinach, and Heinrich Volk, Beerfelden, both of Germany, assignors to Meto International GmbH, Hirschhorn, Germany

Continuation of Ser. No. 605,783, Aug. 18, 1975, abandoned. This application Mar. 24, 1977, Ser. No. 780,952
Claims priority, application Germany, Aug. 17, 1974, 2439523
Int. Cl.² B41J 1/22
U.S. Cl. 101—110 5 Claims



1. A printing apparatus for use with a price marking device, said apparatus comprising:

a housing;

a rotatable shaft extending into said housing;

a pinion gear attached to said rotatable shaft;

a plurality of read-out positioning wheels selectively engagable by said pinion gear;

a positioning wheel mounting shaft including an axial recess therein adapted to receive said rotatable shaft, said positioning wheels thereby surrounding said rotatable shaft and said mounting shaft;

a printing type means adapted to be driven by said positioning wheels, said printing type means comprising a plurality of printing type wheels having on the circumference thereof a plurality of printing type characters, said printing type wheels being directly drivable by said positioning wheels;

a pointer carrying means including a pointer attached to said rotatable shaft;

a detent attached to said pointer carrying means;

a detent rail including recesses therein for engaging said detent, said detent rail being located in a channel-like recess in said housing, said recess in said housing having a slot-like opening on one side thereof through which the detent of said pointer carrying means passes; and,

a resilient means for holding said detent rail in engagement with said detent,

wherein said pointer and said detent and said pinion gear all lie in substantially the same plane which is at right angles to said rotatable shaft.

4,096,801

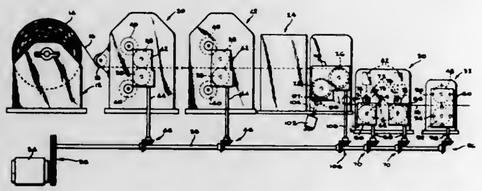
REGISTER CONTROL METHOD AND APPARATUS

John R. Martin, 2516 Harlem Blvd., Rockford, Ill. 61103

Continuation of Ser. No. 222,657, Feb. 1, 1972, abandoned, which is a continuation of Ser. No. 34,798, May 5, 1970, abandoned. This application Jan. 4, 1974, Ser. No. 430,662

Int. Cl.[2] B41F *13/02;* **B41J** *15/04, 15/16*

U.S. Cl. 101—227 **3 Claims**



1. In a rotary printing press having at least a first printing station, means for feeding a web continuously to the first printing station, and a cut-off mechanism for severing the web spaced downstream from the first printing station by a substantial predetermined distance, apparatus for automatically maintaining accurate registry of successive operations performed upon the web including printing at the first printing station and severing by the cut-off mechanism without sensing position and feeding back a position signal to control means to maintain registry, said apparatus comprising a plurality of driven rolls for engaging the web at respective spaced positions along its path of travel from the first printing station to the cut-off mechanism, engagement means for causing all of said driven rolls to engage the web at respective ones of said positions without slippage therebetween, said engagement means including means for forcing the web against at least the last of said driven rolls before the cut-off mechanism with force sufficient to preclude slippage therebetween, and motive means for driving all of said driven rolls at respective tangential speeds bearing substantially constant ratios to one another so that the elongation of the web between respective driven rolls is substantially constant, the ratios of speeds being such that the web is maintained in tension without breaking between driven rolls.

4,096,802

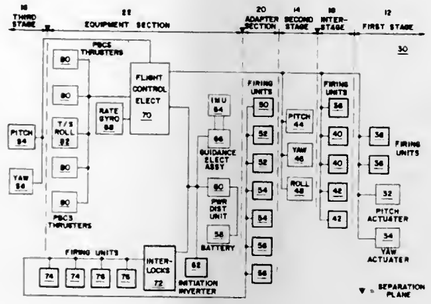
MOTION-INDUCED STIMULI INITIATION SYSTEM

Garry L. Waln, Sunnyvale, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 26, 1976, Ser. No. 745,131

Int. Cl.[2] F42C *11/06*

U.S. Cl. 102—49.5 **4 Claims**



1. A motion-induced stimuli initiation system for a multistage missile comprising:

(a) a plurality of firing units to initiate respective pyrotechnic events;

(b) means for obtaining motion-induced stimuli;

(c) means for computing from said motion-induced stimuli redundant acceleration, velocity and distance data;

(d) means for combining said redundant acceleration, velocity and distance data to provide valid respective outputs to said firing units should said obtaining means incur a partial failure; and

(e) means for comparing said redundant data with predetermined values of acceleration, velocity and distance to assure that said missile has attained a nominal velocity and a safe distance from the launch facility within a predetermined time after launch before initiation of arming of destruct system and of igniting a missile engine and to initiate said pyrotechnic events when said values have been attained.

4,096,803

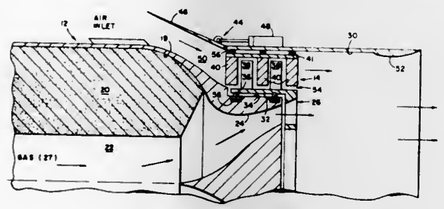
SOLID PROPELLANT AIR TURBO ROCKET

Lawrence W. Kesting, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 27, 1976, Ser. No. 755,390

Int. Cl.[2] F42B *9/06*

U.S. Cl. 102—49.5 **1 Claim**



1. An air turbo solid propellant rocket motor comprising:

a. a first chamber loaded with a fuel rich solid propellant and having a combustion space and an exhaust port;

b. a turbine located outside of said first chamber at said exhaust port with blades of said turbine in the exhaust path of gases produced by the combustion of said propellant whereby the passing of said gases cause said blades to rotate;

c. a second chamber attached to said first chamber, said second chamber having a combustion space into which said gases from said first chamber pass;

d. a compressor driven by said turbine which compresses atmospheric air from outside said rocket motor and feeds said compressed air into said combustion space of said second chamber, whereby oxygen in said compressed air reacts with fuel in said gases from said first chamber;

e. a nozzle attached to said second chamber through which combustion products of said compressed air and said gases pass into the atmosphere, whereby a thrust is given to a missile;

f. means for jettisoning the compressor and turbine and their respective supporting rings, said jettisoning means being actuated when the rocket motor reaches a velocity of about Mach 2.

4,096,804

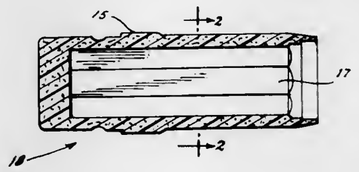
PLASTIC/MISCHMETAL INCENDIARY PROJECTILE

Stephen J. Bilsbury, Shalimar, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 10, 1977, Ser. No. 776,387

Int. Cl.[2] F42B *13/14*

U.S. Cl. 102—66 **5 Claims**



1. A plastic incendiary projectile for firing through a weapon having a rifled bore comprising a thermoplastic jacket having an integral rotating band disposed around the outer circumference near the rearward end thereof, said thermoplastic jacket having a substantially hollow inner cavity with an open forward end and a closed rearward end, a core of incendiary material substantially filling the inner cavity of said thermoplastic jacket, and a nose tip of resinous material having a low coefficient of friction disposed over the open forward end of said thermoplastic jacket, the impact of the projectile with a target causing the jacket to rupture thereby allowing said core of incendiary material to break up by kinetic energy into lethal particles causing fire to start in the presence of flammable material.

4,096,805

AIR TARGET FUZE DECISION CIRCUIT

Mark S. Miner, Washington, D.C., and Charles W. Crickman, Glen Echo Heights, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 9, 1968, Ser. No. 721,134

Int. Cl.[2] F42C *13/04, 13/00*

U.S. Cl. 102—214 **5 Claims**

1. A decision circuit for a proximity fuze, comprising:

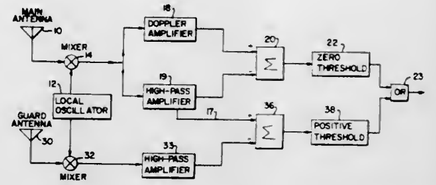
(a) a first antenna connected to a first receiver channel, said first antenna having a pattern having a main beam and a plurality of sidelobes;

(b) a second antenna connected to a second receiver channel, said second antenna having a pattern having a broad beam and a gain of less than said main beam but greater than the gain of said sidelobes of said first antenna;

(c) a first means in said first receiver channel to detect and amplify a valid target return signal;

(d) a second means in said first receiver channel to detect and amplify signals having a frequency different from that of a valid target return signal, said second means having a higher gain than said first means;

(e) a first comparison means for producing a signal when the output of said first means exceeds the output of said second means;



(f) a third means in said second receiver channel to detect and amplify signals having a frequency different from the frequency of a valid target return signal; and

(g) a second comparison means for producing a signal when enough output from said second means at a lower gain point exceeds the output from said third means by a predetermined difference.

4,096,806

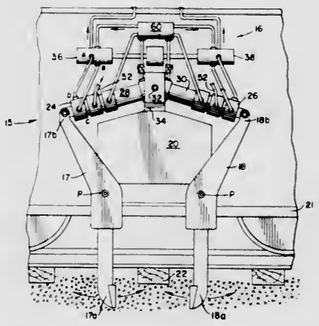
TRACK TAMPER WITH HINGEABLE UNITARY PIVOTABLE TAMPING UNIT

Franz Allmer, Sophia, N.C., assignor to Graystone Corporation, Monroeville, Pa.

Continuation-in-part of Ser. No. 632,710, Nov. 17, 1975. This application Nov. 29, 1976, Ser. No. 745,602

Int. Cl.[2] E01B *27/16*

U.S. Cl. 104—12 **8 Claims**



1. A track tamping apparatus of the type comprising a pair of opposed, vibrating tamper arms pivotally mounted on a tamping frame member supported on a carriage, means for positioning corresponding lower ends of the tamper arms on either side of a railroad tie, and means for drawing the vibrating arms together to compact the ballast thereunder, wherein the improvement comprises:

a pair of oscillating cylinders operatively connected between the drawing means and the upper ends of said tamper arms, respectively, such that reciprocation of each oscillating cylinder causes vibration of the respective tamper arms to aid in compacting the ballast, said drawing means being respectively connected to said tamping frame member, each of said oscillating cylinders having a supply line and a return line for filling and evacuating hydraulic fluid from said oscillating cylinder, respectively, said tamper arms, said drawing means, and said oscillating cylinders being operatively connected to said tamping frame member to define a unitary tamping unit;

a frame assembly hingedly connected to said carriage, said frame assembly including vertically adjustable means for

securing said tamping unit thereto so that said tamping unit is vertically movable relative to said frame assembly;

a pair of rotary valve means connected respectively to said oscillating cylinders for alternately communicating said supply and return lines for said respective oscillating cylinders with a common source of pressurized hydraulic fluids; and

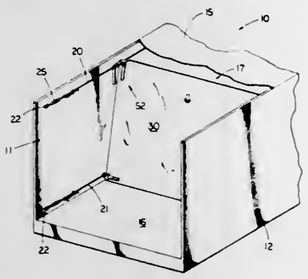
drive means for imparting continuous rotation to each said rotary valve means.

4,096,807

RESTRAINT SHIELD

Ernest F. Woodward, 9950 A Royal Oak Ct., Sun City, Ariz. 85351

Filed Oct. 26, 1976, Ser. No. 735,400
Int. Cl.² B61D *45/00*
U.S. Cl. 105—467 **3 Claims**



1. A cargo control restraint shield for use in a vehicle container which comprises:

a flexible sheet;

a pair of cables secured at opposite end portions thereof to said vehicle within said container so as to provide a pair of taut lengths of cable;

a pair of clamps each received upon and slidable on a respective one of said cables, said clamps each including locking means which blocks movement of the clamp in one direction on its cable but permits movement in the opposite direction;

hooks mounted on said flexible sheet, said hooks each being attachable to a respective one of said clamps, said vehicle container being adapted to receive cargo, said clamps being arranged so that said locking means blocks movement of said flexible sheet away from said cargo;

said hooks being detachable from said clamps and connectable to said cables for hanging said flexible sheet out of the way;

said flexible sheet being formed of waterproof material for protection of the cargo within said container, said sheet incorporating stiffening material extending horizontally from one side of said sheet to the other for causing said sheet to engage the sides of said container, said sheet having a generally rectangular configuration with the upper corners thereof cut off at approximately a 45° angle, said hooks being mounted on said flexible sheet at said cut off corner areas with the hooks in board of the rectangular sides of said sheet.

4,096,808

METHOD AND APPARATUS FOR BURNING AIR-SUSPENDED PARTICULATE FUEL

Lorn L. Trickel, 8806 NE. Thompson St., Portland, Oreg. 97220

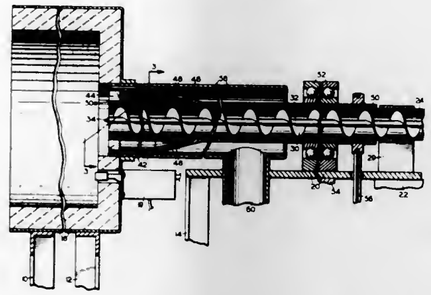
Filed Nov. 11, 1976, Ser. No. 740,862
Int. Cl.² F23G *7/00*; F23K *3/02*
U.S. Cl. 110—244 **7 Claims**

1. Apparatus for burning air-suspended particulate fuel comprising:

(a) a pair of radially spaced, substantially coaxial tubes having infeed ends and juxtaposed discharge ends,

(b) mounting means rotatably mounting one of the tubes,

(c) drive means connected to the rotatably mounted tube for rotating it relative to the other of the tubes,



(d) a source of forced draft combustion air connected to the infeed end of the rotatably mounted tube,

(e) fuel feed means arranged for feeding particulate fuel in solid flow into the infeed end of the other of the tubes, and

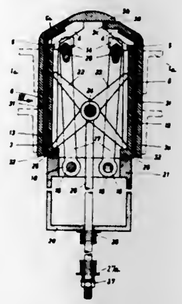
(f) a plurality of spaced, radially directed vanes secured to the rotatably mounted tube at the outfeed end thereof.

4,096,809

APPARATUS FOR COMPENSATING FOR THERMALLY INDUCED DEFORMATION OF SECTIONS OF GRATES IN INDUSTRIAL FURNACES OR THE LIKE

Johannes Josef Martin, and Erich Weber, both of Munich, Germany, assignors to Josef Martin Feuerungsbau GmbH, Munich, Germany

Filed May 16, 1977, Ser. No. 797,186
Claims priority, appilcation Germany, May 21, 1976, 2622965
Int. Cl.² F23H *11/00*
U.S. Cl. 110—271 **25 Claims**



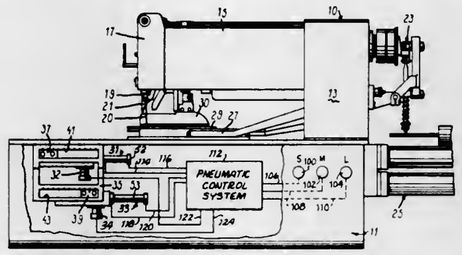
1. Apparatus for compensating for thermally induced dimensional changes of sections of grates in industrial furnaces or of analogous structural elements of the type having an elongated marginal portion extending transversely of the direction of thermally induced expansion or contraction, comprising a side wall adjacent to the marginal portion of a structural element which is subject to expansion or contraction; means for swingably supporting said side wall, including a fulcrum extending in substantial parallelism with the marginal portion of said elements; guide means for said supporting means, said fulcrum being movable with respect to said guide means substantially at right angles to the marginal portion of said element; and means for yieldably biasing said side wall against the marginal portion of said element.

4,096,810

DEVICE FOR VARYING THE POCKET LENGTH PROVIDED ON SEWING MACHINES FOR MAKING WELTED POCKETS

Nereo Bianchi, Pavia, Italy, assignor to NECCHI Societa per Azioni, Pavia, Italy

Filed Sep. 21, 1976, Ser. No. 725,416
Claims priority, application Italy, Oct. 3, 1975, 42907 A/75
Int. Cl.² D05B *3/10*
U.S. Cl. 112—65 **2 Claims**



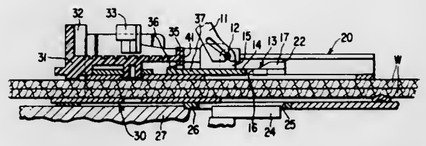
1. In a device for varying the pocket length provided on sewing machines for making welted pockets comprising a bed, a mounting, an arm and a head, two groups with adjustable positioning carrying a mounting for driving valves and a mounting for one of the patch turners, the improvement comprising frames for carrying said valves and patch turner movable relative to said groups, a pneumatic cylinder fixed to each of said groups to move said frames to two extreme positions, corresponding to the two extreme operating positions of said cylinders and defining two sizes of pockets and lock means positioned intermediate said extreme positions to define a pocket size intermediate the other two.

4,096,811

INTERLOCK FOR BUTTONHOLE SEWING PRESSER DEVICE

Walter H. W. Marsh, Fanwood, N.J., assignor to The Singer Company, New York, N.Y.

Filed Jul. 7, 1977, Ser. No. 813,568
Int. Cl.² D05B *3/24*
U.S. Cl. 112—77 **4 Claims**



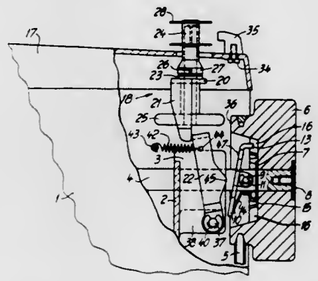
1. In a buttonhole sewing presser device of the type having a work engaging presser foot member, a traveling shoe member, means shiftably supporting said traveling shoe member on said presser foot member for movement with the work being sewn relatively to the presser foot member, stop means defining one extreme relative position between said members, and spring means biasing said traveling shoe member toward said extreme position defined by said stop means, the improvement which comprises clearance between the means shiftably supporting said traveling shoe member on said presser foot member permitting a predetermined amount of relative movement vertically between said members when the presser device is elevated, and cooperating interlock elements carried respectively on said presser foot member and on said traveling shoe member for preventing travel of said traveling shoe member relatively to said presser foot member, and said interlock elements being arranged for engagement when the presser device is elevated and the traveling shoe member occupies a position abutting said stop means.

4,096,812

CLUTCHING DEVICE FOR SEWING MACHINES

Fritz Gegauf, Steckborn, Switzerland, assignor to Fritz Gegauf Aktiengesellschaft, Bernina-Nahmaschinenfabrik, Switzerland

Filed Dec. 16, 1974, Ser. No. 533,211
Claims priority, application Switzerland, Jan. 10, 1974, 273/74
Int. Cl.² D05B *59/00*
U.S. Cl. 112—220 **4 Claims**



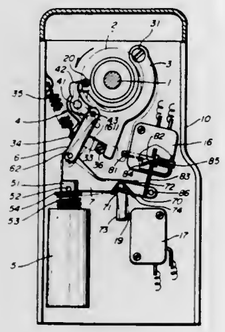
1. A clutching device, for a sewing machine having an arm, a drive wheel, a sewing mechanism including an arm shaft, and a thread winder, said clutching device comprising, in combination, a clutch member interposed between said arm shaft and said drive wheel to couple said drive wheel to said arm shaft; pivot means mounting said clutch member, intermediate its ends, on said arm shaft for pivoting about an axis extending diametrically through said arm shaft; said drive wheel being formed with a series of circumferentially adjacent recesses on its inner surface facing said clutch member, and said clutch member having at least one tooth projecting from one end thereof toward said drive wheel for engagement in one of said recesses; spring means biasing the opposite end of said clutch member away from said drive wheel to engage said at least one tooth in one of said recesses to normally couple said drive wheel to said arm shaft; said thread winder including a drive member and being swingable about a vertical axis to engage said drive member with said drive wheel; means operable by said thread winder, responsive to said swinging movement thereof to engage said drive member with said drive wheel, to engage said clutch member at a point closely adjacent its pivot axis but spaced therefrom toward said opposite end to pivot said clutch member, against the bias of said spring means, to disengage said at least one tooth from the then-engaged drive wheel recess to uncouple said arm shaft from said drive wheel; and further means operable, responsive to accumulation of a predetermined amount of thread on said thread winder, to swing said thread winder in a direction to disengage said drive member from said drive wheel; said means operable by said thread winder, responsive to such disengagement of said drive member from said drive wheel, disengaging said clutch member for biasing of said clutch member, by said spring means, to engage said at least one tooth in one of said recesses to re-couple said drive wheel to said arm shaft.

4,096,813

INTERMITTENT STITCHING DEVICE FOR SEWING MACHINES

Masakatsu Niikura, Kokubunji, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan

Division of Ser. No. 589,533, Jun. 23, 1975, Pat. No. 4,027,610.
This application Mar. 25, 1977, Ser. No. 781,444
Claims priority, application Japan, Jun. 26, 1974, 49-72233
Int. Cl.[2] D05B *69/10*
U.S. Cl. 112—275 6 Claims



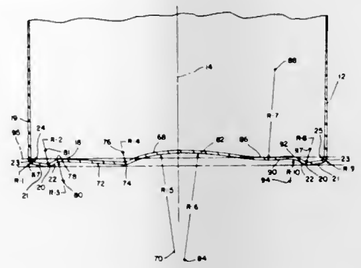
1. A sewing machine comprising, in combination, a machine frame; a main shaft rotatably journalled on the machine frame and operative for vertically reciprocating a needle bar; an electric motor operative for rotating the main shaft; selector switch means having a continuous stitching setting and an intermittent-stitching setting for preselecting continuous or intermittent stitching operation of the sewing machine; user-controlled switch means having a first state and a second state; motor-energization control circuit means connected to said selector switch means and to said user-controlled switch means and operative when the selector switch means is in the intermittent-stitching setting and for so long as the user-controlled switch means is kept in the second state for repeatedly energizing the electric motor at predetermined time intervals; and a stopping mechanism operative when said selector switch means is in the intermittent-stitch setting and for so long as the user-controlled switch means is kept in the second state for stopping the main shaft each time the main shaft reaches a predetermined angular position, the stopping mechanism including engaging means coupled to and sharing the movement of the main shaft, blocking means mounted for movement between an inoperative position remote from and an operative position in the path of movement of said engaging means and operative when in the operative position for blocking the movement of the engaging means and stopping the main shaft in the predetermined angular position, and means operative when the selector switch means is in the intermittent-stitching setting and for so long as the user-controlled switch means is kept in the second state for moving the blocking means into the operative position during successive rotations of the main shaft.

4,096,814

CONTAINER WITH OUTWARDLY FLEXIBLE BOTTOM END WALL HAVING INTEGRAL SUPPORT MEANS AND METHOD OF MANUFACTURE THEREFORE

Joseph Francis Dulmaine, Wheatridge, and Michael Edward Bagrosky, Arvada, both of Colo., assignors to Coors Container Company, Golden, Colo.

Division of Ser. No. 631,539, Nov. 13, 1975, Pat. No. 4,037,752.
This application Jan. 27, 1977, Ser. No. 763,293
Int. Cl.[2] B21D *51/00*
U.S. Cl. 113—120 M 2 Claims



1. A method of forming integral support structure in the bottom wall of a metallic container comprising:

firstly engaging the outer surface of the bottom wall with a first force applying tool having a centrally located protruding convexly curved dome-like area and forming a central wall area of indentation in the bottom wall of generally concave curvature;

secondly engaging the inner surface of the bottom wall with a second force applying tool having a polygonally shaped central cavity defined by elongated peripheral edge surfaces; and

thirdly applying additional force to the outer surfaces of the bottom wall with said curved dome-like area on said first force applying tool and thereby further forming said central wall area of indentation in the bottom wall in said cavity without engagement of the inner surface of the bottom wall in said central area of indentation with said first force applying tool and simultaneously forming elongated peripheral edge surfaces on the outer surfaces of the bottom wall about said central wall area of indentation.

4,096,815

FORMING PROCESS

Philip George Faulkner, Banstead, England, assignor to The British Petroleum Company Limited, London, England

Filed Jun. 28, 1976, Ser. No. 700,557
Claims priority, application United Kingdom, Jul. 8, 1975, 28677/75
Int. Cl.[2] B21D *51/26*
U.S. Cl. 113—120 A 11 Claims

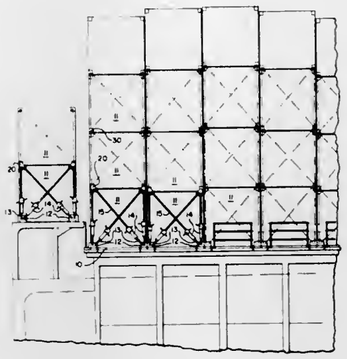
1. A process for forming a metal workpiece involving predominantly plane strain deformation and a change in gauge and providing an inert coating on the finished workpiece which comprises applying directly on the surface of the metal prior to forming a coating, which is not removed after forming, of a composition consisting essentially of a high molecular weight polyolefin, containing in proportion of from 0.1 to 20% by weight of radicals selected from carbonyl groups, carboxyl groups, organic derivatives thereof, carboxylate groups with associated metal ions and mixtures thereof, and then forming the metal with the polyolefin acting as lubricant between the forming tool and the metal.

4,096,816

CONTAINER LASH SYSTEMS

W. W. Patterson, III, Witherow Rd., Sewickley, Pa. 15143, and Eugene F. Grapes, 1106 Eighth Ave., Irwin, Pa. 15642

Division of Ser. No. 611,200, Sep. 8, 1975, Pat. No. 4,048,938.
This application May 6, 1977, Ser. No. 794,670
Int. Cl.[2] B63B *25/08*
U.S. Cl. 114—75 3 Claims



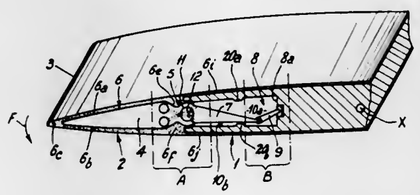
3. A container lashing system for fastening shipboard containers comprising in combination a hollow corner casting on at least each shipboard container roof corner, a rigid elongate lashing bar having at least one generally ball shaped end, a keyhole slot in each corner casting opening into the hollow interior thereof and having an opening receiving said ball shaped end of the lashing bar and a slot receiving said bar adjacent the ball shaped end in sliding engagement and retaining the ball within the corner casting, and means acting on the lashing bar opposite the ball end to place said lashing bar under tension in the corner casting.

4,096,817

SUPPORTING FOIL FOR A HYDROFOIL COMPRISING AT LEAST ONE DEFORMABLE PART

André Jules Edmond Bordat, Aix en Provence, France, assignor to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Jun. 17, 1976, Ser. No. 697,270
Claims priority, application France, Jun. 17, 1975, 75 18874
Int. Cl.[2] B63B *1/18;* B64C *9/00*
U.S. Cl. 114—280 7 Claims



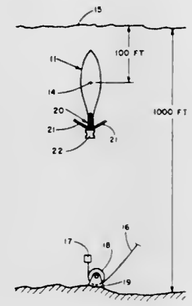
1. A supporting foil for a hydrofoil, comprising a rigid part having an inner cavity, at least one deformable part extending along the leading edge or the trailing edge of the foil over at least a fraction of its span, the deformable part essentially comprising a mobile core of rigid material having a tubular sleeve freely rotatable on a shaft, continuity of profile between the deformable part and the rigid part being provided by a layer of resilient material deposited on to the mobile part and the tubular sleeve thereof and completely embedding them, the mobile core having a rigid prolongation beyond the tubular sleeve, extending into the inner cavity of the rigid part of the foil, and a single elongated connecting member joining the prolongation to the rear wall of the cavity and adapted for enabling the prolongation to pivot the connecting member forming with the prolongation a single mobile wall dividing the cavity in sealing-tight manner into two variable-volume chambers, the chambers receiving and discharging a control fluid.

4,096,818

DROGUE TYPE DECELERATION DEVICE

Richard F. Wameling, Crofton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 24, 1977, Ser. No. 800,110
Int. Cl.[2] B63B *21/48*
U.S. Cl. 114—311 10 Claims



1. A device for rapidly decelerating a high velocity projectile in a liquid medium comprising:

a plurality of decelerating panels pivotably connected to the aft end of said projectile;

means in said projectile for deploying said panels upon the occurrence of a selected pressure condition;

means in said projectile connected to said panels for damping the deployment of said panels; and

coupling means at the aft end of said projectile for bringing said projectile to a selected depth for release,

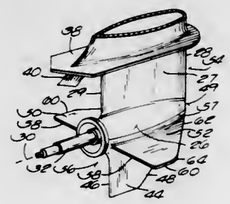
said panels conforming to the outer periphery of said projectile in the inoperative or nested condition.

4,096,819

MARINE PROPULSION DEVICE INCLUDING PROPELLER PROTECTION MEANS

Ralph S. Evinrude, Jensen Beach, Fla., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Nov. 3, 1976, Ser. No. 738,528
Int. Cl.[2] B63H *21/26*
U.S. Cl. 115—17 3 Claims



1. A marine propulsion device comprising a lower unit including a gear case which is normally submerged in water and has a forward end, a propeller shaft mounted in said gear case for rotation about an axis and carrying a propeller, and a pair of generally flat, horizontally extending side fins affixed on and extending laterally in substantially coplanar relationship from the opposite sides of said gear case, said fins extending wholly rearwardly from said gear case forward end, each of

said fins having a laterally extending trailing edge located wholly forwardly of said propeller, a generally straight outermost edge extending to a location corresponding to the peripheral path of the propeller and forwardly from said trailing edge generally parallel to said propeller shaft axis, and a leading edge extending at an incline outwardly and rearwardly from said gear case forward end toward said outermost edge.

4,096,820

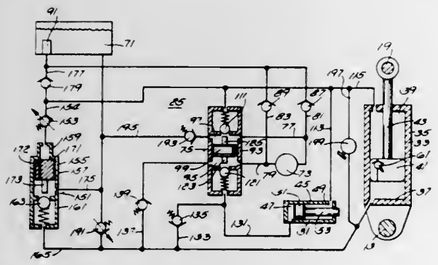
HYDRAULICALLY POWERED MARINE PROPULSION TILTING SYSTEM WITH AUTOMATIC LET-DOWN ASSEMBLY

Charles B. Hall, Ingleside, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 571,077, Apr. 24, 1975, abandoned. This application Jul. 15, 1976, Ser. No. 705,617

Int. Cl.[2] B63H *21/26*

U.S. Cl. 115—41 HT **27 Claims**



6. A marine propulsion device including a member adapted to be attached to a boat hull, a propulsion assembly pivotally connected to said member for vertical swinging movement when said member is attached to the boat hull, a tilt hydraulic cylinder-piston assembly connected between said member and said propulsion assembly and including a tilt cylinder having opposed first and second ends, pressure fluid supply and control means including a control valve housing having first and second ends, first conduit means communicating between said first end of said tilt cylinder and said first end of said control valve housing and including a first valve preventing fluid flow from said first end of said control valve housing to said first end of said tilt cylinder and releasably preventing fluid flow from said first end of said tilt cylinder to said first end of said control valve housing, and second conduit means communicating between said first end of said tilt cylinder and said first end of said control valve housing and including a second valve preventing fluid flow from said first end of said tilt cylinder to said first end of said control valve housing and releasably preventing fluid flow from said first end of said control valve housing to said first end of said tilt cylinder, and a normally closed third valve located between said first end of said control valve housing and said first conduit means and arranged to releasably prevent fluid flow therethrough to and from said first end of said control valve housing.

4,096,821

SYSTEM FOR FABRICATING THIN-FILM ELECTRONIC COMPONENTS

Edwin W. Greeneich, Plum Borough, and William S. Escott, McKeesport, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 13, 1976, Ser. No. 749,870

Int. Cl.[2] C23C *13/03*; B05B *15/04*

U.S. Cl. 118—10 **1 Claim**

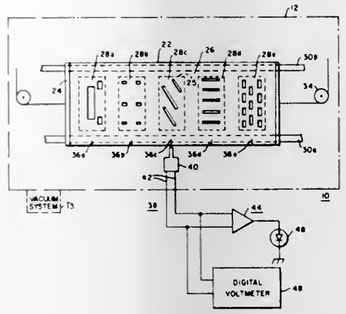
1. A system for fabricating thin-film electronic components upon a substrate comprising:

(a) an evacuable chamber connectable to a vacuum system; and within the chamber are disposed,

(b) at least one evaporant material source;

(c) a substrate holder alignable with the evaporant source;

(d) movable aperture mask means comprising guide means on which is movably mounted a mask holder, a unitary elongated aperture mask supported by the mask holder between the substrate holder and the aligned evaporant source, which aperture mask has discrete spaced apart aperture patterns in a linear array, which guide means are linear parallel rails extending in the direction of the linear array of aperture patterns, with the mask holder slidably mounted on said rails so that the aperture mask is constrained to movement in the direction of the linear array, and wherein the aperture mask has light reflective or absorptive alignment position indicia disposed thereon aligned with each of the discrete spaced apart aperture patterns; and



(e) position indicia sensing and indicating means including fiber optic means, aligned with the substrate holder and the evaporant source, for directing light onto the aperture mask position indicia and for collecting light from the position indicia to permit determining when a desired aperture pattern is aligned between the evaporant source and the substrate.

4,096,822

GASEOUS ATMOSPHERE CONTROL APPARATUS FOR A SEMICONDUCTOR MANUFACTURING SYSTEM

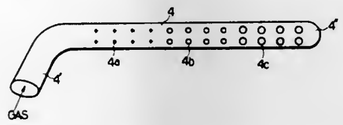
Masao Yamawaki, Handa; Katsuo Aoki, Aichi; Yoshio Oka, Toyota; Takao Suzuki, Kariya; Osamu Ina, Okazaki, and Kunihiko Hara, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Sep. 29, 1976, Ser. No. 727,772

Claims priority, application Japan, Sep. 29, 1975, 50-117409

Int. Cl.[2] C23C *11/00*

U.S. Cl. 118—48 **5 Claims**



1. A gaseous atmosphere control apparatus for a semiconductor manufacturing system comprising:

a reaction pipe through which semiconductor wafers are transferred in the longitudinal direction thereof;

a gas distribution pipe longitudinally fixed to the inside wall of said reaction pipe and having a plurality of blow-off holes for supplying heat-treating gas in said reaction pipe, the diameters of said blow-off holes increasing with increase in the distance from the gas inlet of said gas distribution pipe to thereby supply constant amount of heat-treating gas through each blow-off hole; and

a boat positioned slidably in said reaction pipe to be moved therethrough guided by said gas distribution pipe and having slits in which said semiconductor wafers are supported, said boat having two circular walls which contact both said gas distribution pipe and the inside wall of said reaction pipe to prevent lateral movement of said boat.

4,096,823

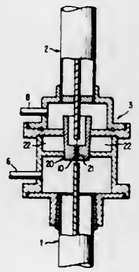
APPARATUS FOR METALLIZATION OF FIBERS

Hermann J. Schladitz, Munich, Germany, assignor to University of Virginia, Charlottesville, Va.

Filed Jan. 27, 1977, Ser. No. 763,013

Int. Cl.[2] C23C *13/10*

U.S. Cl. 118—48 **10 Claims**



1. An apparatus for decontamination and metallization of a filament which comprises

a first decontamination chamber having two concentric tubes having an annular space therebetween, the inner tube of which has a series of holes throughout its length;

heating means for heating the entire length of said inner tube;

means in the outer tube to introduce a gas into said annular space;

a second metallization chamber having two concentric tubes having an annular space therebetween, the inner tube of which has a series of holes throughout its length;

second heating means for heating the entire length of said inner tube of said metallization chamber;

means in the outer tube of said second chamber to introduce gas into said second annular space;

an intermediate chamber, one end of which is connected to one end of said first chamber and the other end of which is connected to one end of said second chamber, such that the adjoining ends of said annular spaces in said first and second chambers are sealed air tight;

a membrane within said intermediate chamber; said membrane disposed transverse to the axial direction of said inner tubes; said membrane dividing said intermediate chamber into two separate regions and said membrane having a small pinhole aperture colinear with the axes of said inner tubes;

said intermediate chamber being fully enclosed except that said inner tubes of said first and second chambers project into the respective ends of said intermediate chamber and except that in each of said regions, said intermediate chamber contains a gas outlet;

means for moving said filament through the inner tubes of said first and second chambers and through said aperture in said membrane; and

air-tight sealing means for sealing the ends of said annular spaces of said first and second chambers which are unattached to said intermediate chamber.

4,096,824

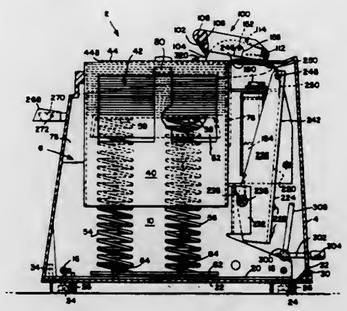
SLIDE SMEARING DEVICE

Marshall S. Levine, Wayne, and Albert A. Faulkner, Conshohocken, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Jul. 9, 1976, Ser. No. 703,939

Int. Cl.[2] B05C *11/04*

U.S. Cl. 118—100 **21 Claims**



1. A device for smearing on a slide liquid placed at a predetermined point on the slide comprising:

a slide magazine containing a plurality of slides with the uppermost slide having its upper face exposed for the reception of a drop of liquid towards one end thereof,

a spreader adjacent the other end of the uppermost slide,

means to advance the spreader to said predetermined point on the slide and to retract the spreader to its original position to smear a drop of liquid placed on the uppermost slide in the magazine.

4,096,825

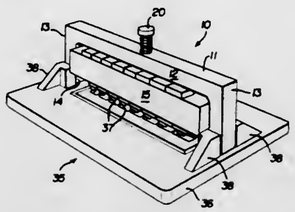
APPARATUS FOR APPLYING AN ORGANIC LIQUID SAMPLE

Tipton L. Golias, and David Mayes, both of Beaumont, Tex., assignors to Helena Laboratories Corporation, Beaumont, Tex.

Continuation of Ser. No. 620,736, Oct. 8, 1975, abandoned. This application Feb. 18, 1977, Ser. No. 769,977

Int. Cl.[2] B05C *1/02*

U.S. Cl. 118—221 **9 Claims**



1. Apparatus for transferring uniform samples of blood or the like onto an absorbent sample support comprising:

means defining a reservoir for receiving a relatively massive sample;

first guide means defining a first vertical guide path aligned with said reservoir means;

a sample carrier vertically displaceable relative to said first guide path toward and away from said reservoir means, said sample carrier being immersible in said sample;

means for vertically displacing said sample carrier relative to said first guide path to removably immerse said carrier into the sample with the sample adhered to the sample carrier by surface tension;

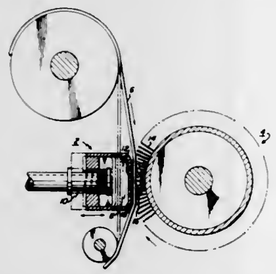
a sample support base; and
second guide means defining a second vertical guide path aligned with said base;
said sample carrier displacing means also vertically displacing said sample carrier relative to said second guide path to removably contact said sample carrier with a sample support on said sample support base to break the surface tension between the sample and the sample carrier and to deposit the sample on the sample support;
said sample carrier including a vertically displaceable slide bar having a slot extending therethrough;
said sample carrier including an applicator element freely suspended from said slide bar and extending through said slot so that upon vertically displacing said sample carrier, said applicator element is vertically displaced solely under the influence of gravity to contact either the sample in said reservoir means when the sample carrier is displaced relative to said first guide means or said sample support when the sample carrier is displaced relative to said second guide means.

4,096,826

MAGNETIC BRUSH DEVELOPMENT SYSTEM FOR FLEXIBLE PHOTORECEPTORS

Klaus K. Stange, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 21, 1976, Ser. No. 688,814
Int. Cl.² G03G *15/08*
U.S. Cl. 118—656 **5 Claims**



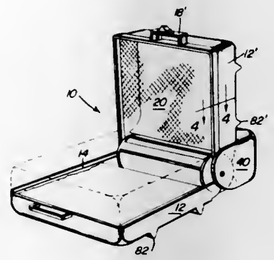
1. An improved magnetic brush development system for developing a latent electrostatic image on a flexible member, comprising:
(a) a development zone defined by
(i) a magnetic brush development assembly positioned apart from the latent image-bearing surface of the flexible member; and
(ii) deflection means positioned adjacent to the non-image-bearing side of the flexible member, said deflection means being provided with an air-cushion chamber, one wall of which comprises a plate having a plurality of apertures to permit formation of an air cushion at the interface of said chamber and the non-image-bearing side of the flexible member and an actuator assembly, which upon receipt of an appropriate signal from a machine logic, advances the air-cushion chamber and air cushion against the non-image-bearing side of the flexible member to permit feedable engagement of the developer assembly and a latent image-bearing side of the flexible member;
(b) means for coordinating the activation of the activator assembly and moving the flexible image-bearing member; and
(c) means for supplying a pulsating air stream to the air-cushion chamber of the deflection means concurrent
with the activation of the actuator assembly whereby a powder cloud of developer materials is created within the development zone concurrent with the passage through said zone of a latent image-bearing surface of the flexible member.

4,096,827

SELF-CLEANING CAT WASTE DISPOSAL DEVICE

James A. Cotter, 9195 Keegan Trail, Missoula, Mont. 59801

Filed Jan. 11, 1977, Ser. No. 758,552
Int. Cl.² A01K *29/00*
U.S. Cl. 119—1 **12 Claims**



12. An animal waste disposal device, comprising:
means for holding litter material in a manner which permits easy portability thereof and yet permits easy set up for availability for use by an animal, the holding means including two substantially identical compartments hinged along similar edges of the respective compartments;
means for cleaning the litter material automatically whenever the holding means is arranged for use of the litter material by an animal, the cleaning means including a screen member pivotally mounted between the two compartments for free movement between or with either one of the compartments;
means for receiving waste accumulated by the cleaning means until said waste can be disposed of; and,
a three-way latch structure associated with each of the compartments and the screen between said compartments for positively latching the compartments and the screen together or for latching the screen to either of the compartments.

4,096,828

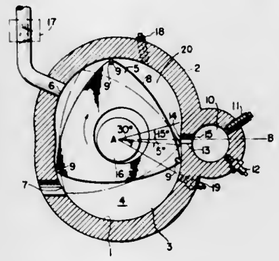
ROTARY PISTON INTERNAL COMBUSTION ENGINE

Haruhiko Satou; Yoshinori Honiden; Motoyuki Hayashida, and Mutsuo Wakamoto, all of Hiroshima, Japan, assignors to Toyo Kogyo Co. Ltd., Hiroshima, Japan

Continuation of Ser. No. 325,979, Jan. 23, 1973, abandoned. This application Apr. 14, 1976, Ser. No. 676,783
Claims priority, application Japan, Jan. 24, 1972, 47-10219; Jan. 24, 1972, 47-10220; Jan. 24, 1972, 47-10221; Jan. 24, 1972, 47-10222
Int. Cl.² F02B *53/10*
U.S. Cl. 123—209 **4 Claims**

1. In a two lobed and three apexed rotary piston internal combustion engine of the Wankel type comprising a housing having a rotor housing having trochoidal inner peripheral surface and side housings having an end wall provided at both sides thereof, a cavity formed by said side housing end walls and said trochoidal inner peripheral surface, said housing being formed with spaced intake and exhaust ports, a rotary piston having three side flanks and eccentrically rotatably mounted on a power output shaft within said cavity, said rotary piston having three circumferentially spaced apexes and substantially flat end faces at opposite ends thereof, each of said apexes and flat end faces having sealing members engaging the inner housing surfaces of said cavity to form between said rotary piston and said housing a plurality of working chambers, a first combustion chamber provided in said housing outside of said trochoidal inner peripheral surface, one of said working chambers

forming a second combustion chamber at the exploding stroke, a fuel injection nozzle and a spark plug provided in said first combustion chamber, the improvement comprising: said first combustion chamber having a volume of 35 to 65% of the sum of the volume of the first combustion and second combustion chambers at engine top dead center, a passage means communicating between said first combustion and second combustion chambers, said passage means opening into said trochoidal inner peripheral surface at a rotary angle in the range of the short axis to 10° after the short axis as defined by the rotary shaft and the intersection of the two arcuate portions of said trochoidal inner surface, and whereby said passage means is



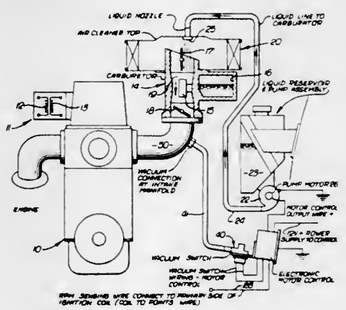
located relative to said intake port such that the intake port is closed off to one of the working chambers by the rotary piston, prior to the leading side apex seal for that chamber opening that chamber to said passage means, said passage means being located circumferentially relative to said exhaust port such that the trailing side apex seal for a given working chamber just crosses over the opening of the passage means to that working chamber as the leading side apex seal relative to that working chamber begins to open the exhaust port, and said passage means comprises a single duct having a cross sectional area smaller than that of said combustion chamber, said cross sectional area being 0.3 to 2.4% of the area of the surface of one of said three side flanks of said rotary piston.

4,096,829

WATER INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

George B. Spears, 8634 Franklin Ave., Los Angeles, Calif. 90069

Filed Apr. 29, 1976, Ser. No. 681,418
Int. Cl.² F02D *19/12*
U.S. Cl. 123—25 J **7 Claims**



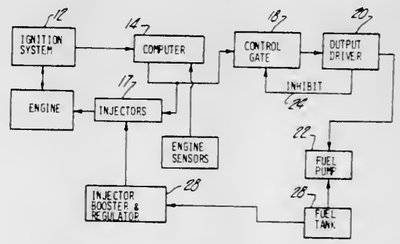
1. In liquid injection apparatus for use with an internal combustion engine having an ignition system and an air intake manifold, the combination comprising
a. a liquid pump and electrical drive therefor, the drive including an electrical motor, the pump having an outlet communicable with the engine air intake,
b. and control means including an electrical make or break switch and a pulse rate frequency to analog converter to control electrical current flow to the drive via said switch in response to and as a function of electrical pulses produced by said ignition system, whereby the flow of liquid to the engine air intake will be a function of the pulse output of the ignition system, the switch directly connected in series with the motor,
c. there being a switch actuator connected with the switch, the actuator operatively connected with the engine air intake manifold to close the switch enabling said current flow to the drive when air pressure in the manifold drops to predetermined level, whereby said flow of liquid to the engine air intake will then be established, the switch, when open, blocking current supply to the motor,
d. the control means including a semiconductor connected to pass drive current to the pump drive, and an operational amplifier connected between the converter and semiconductor to supply said drive current as a function of the voltage output of the converter,
e. and an RC feedback loop connected between the motor side of the switch and the operational amplifier to be responsive to closing of the switch to allow the control means to provide a temporary increase in power supplied to the drive followed by a reduction in power supplied to the drive, whereby the device may be quickly brought up to speed for providing a rapid delivery of liquid to said outlet.

4,096,830

CONTROL SYSTEM FOR ELECTRICALLY ENERGIZED ENGINE FUEL

E. David Long, Elmira, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 6, 1975, Ser. No. 629,349
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EA **17 Claims**



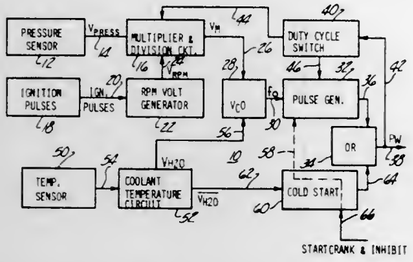
1. A control system for a fuel pump for a spark ignited, internal combustion engine having a fuel injection system, said fuel pump being a solenoid actuated, positive variable displacement piston pump; said control system comprising: means connected to the engine for generating an electric signal which varies as engine speed; and means controlled by said electric signal for generating one trigger pulse per engine cycle to said pump for energizing the solenoid of the pump to reset the piston once per engine cycle to provide a fuel flow at a rate which is a function of said signal, said means for generating one trigger pulse comprising counter means for generating said pulse, gate means for permitting delivery of said pulse to said solenoid once per engine cycle and pulse forming means for changing the duration of said pulse.

4,096,831

FREQUENCY MODULATED FUEL INJECTION SYSTEM

Rajamouli Gunda, Rochester, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Oct. 4, 1976, Ser. No. 729,068
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EG **10 Claims**



1. A frequency modulated fuel injection system for internal combustion engines comprising:

pressure sensing means for measuring the manifold pressure of the engine and generating a pressure electrical signal representing said manifold pressure;

means responsive to the rotational speed of the engine and generating a speed electrical signal representing said rotational speed;

function generating means responsive to said pressure and speed electrical signals for generating a control signal directly proportional to a function of both said pressure and speed electrical signals;

means associated with the engine for sensing the temperature of the engine and generating first and second temperature signals which vary as a direct and indirect function, respectively, of the temperature of the engine;

oscillator means connected in responsive relation to said function generating means and said first temperature signal generating means for generating a frequency modulated electrical signal;

pulse generator means connected to said oscillator means for generating an electrical pulse signal in response to said frequency modulated electrical signal having a variable duty cycle, said duty cycle varying depending upon the frequency of said frequency modulated signal;

injection means operative in response to said electrical pulse signal for supplying the fuel demand to the engine; and

cold start means connected to said injection means and responsive to said second temperature signal generated by said engine temperature responsive means for generating a cold start electrical pulse signal having a fixed pulse width and variable pulse repetition rate, said pulse repetition rate varying solely in proportion to the magnitude of said engine temperature responsive means and independent of engine speed, said cold start electrical pulse signal being ORed with said frequency modulated electrical signal.

4,096,832

IGNITION APPARATUS AND METHOD FOR AN INTERNAL COMBUSTION ENGINE

Don C. Casull, 2459 Cardinal Way, Salt Lake City, Utah 84117; James M. Dalton, 253 Elm St., Salt Lake City, Utah 84107; Calvin W. Jackson, 2970 E. 4310 South, Salt Lake City, Utah 84117, and Amos R. Jackson, 2887 McClelland St., Salt Lake City, Utah 84106

Filed Aug. 26, 1976, Ser. No. 717,970
Int. Cl.² F02B *19/10*
U.S. Cl. 123—32 SP **14 Claims**

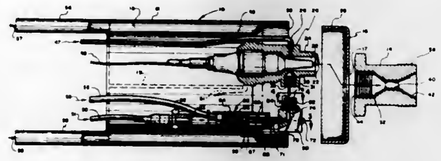
1. An ignition apparatus for a cylinder of an internal combustion engine comprising:

a torch nozzle removably attached to a spark plug thereby enclosing a spark gap of the spark plug in a torch chamber, the torch nozzle being adapted to be screwed into the conventional spark plug opening in an engine block and thereby providing fluid communication between the torch chamber and the cylinder; and

means for introducing fuel and air into the torch chamber comprising:

a fuel supply source of pressurized fuel;

valving means in the fuel supply source upstream from the torch chamber and a means for diffusing the vaporized fuel into the torch chamber, the valving means comprising a porous plug in the fuel supply source, the porous



plug restricting fuel flow to seepage action thereby opposing reverse flow action from higher vapor pressures downstream from the porous plug, the seepage rate being generally proportional to the pressure imposed on the fuel;

means for inhibiting vaporization of the fuel upstream of the valving means;

vaporizing means downstream of the valving means for vaporizing the fuel; and

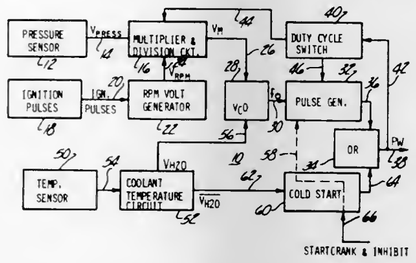
means for diffusing the vaporized fuel into the torch chamber.

4,096,833

CIRCUIT FOR FREQUENCY MODULATED FUEL INJECTION SYSTEM

Charles R. Sweet, Royal Oak, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Oct. 4, 1976, Ser. No. 729,070
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EA **16 Claims**



1. A frequency modulated fuel injection system for internal combustion engines comprising:

pressure sensing means for measuring the manifold pressure of the engine and generating a pressure electrical signal representing the manifold pressure of the engine including an operational amplifier having one input connected to the pressure sensing means and the other input connected to receive a reference signal;

means responsive to the rotational speed of the engine and generating a speed electrical signal representing said rotational speed including an operational amplifier and a unijunction transistor connected to an input of the amplifier;

function generator means responsive to said pressure and speed electrical signals for generating an analog signal representative of a direct function of both said pressure and said speed signals;

means for generating a reference signal;

voltage controlled oscillator means responsive to said analog signal and said reference signal for generating a frequency modulated electrical signal including a current source having a magnitude of current flow proportional to said analog signal and storage means connected to said current source, said current source charging said storage means;

pulse generator means connected to said frequency modulated electrical signal for generating an electrical pulse signal having a predetermined duty cycle depending upon the frequency of said frequency modulated signal including a multivibrator circuit having a fixed period; and

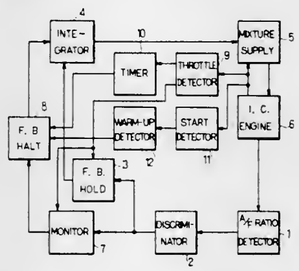
injection means connected to said pulse generator means and operative in response to said electrical pulse signal for supplying the fuel demand to the engine.

4,096,834

AIR-TO-FUEL RATIO FEEDBACK CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Hideaki Norimatsu; Mitsuo Nakamura, both of Kariya; Toshio Kondo, Anjyo; Akira Masuda, Aichi, and Sigenori Kitajima, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 15, 1976, Ser. No. 742,120
Claims priority, application Japan, Nov. 25, 1975, 50-141433
Int. Cl.² F02B *3/00*; F02D *33/00*
U.S. Cl. 123—32 EE **14 Claims**



1. An air-to-fuel ratio feedback control system for internal combustion engines comprising:

means for detecting the air-to-fuel ratio of air-fuel mixture supplied to an internal combustion engine;

means for comparing the detected ratio with a preset ratio indicative of the stoichiometric air-to-fuel ratio;

means for integrating the comparison results continuously with respect to time, the integration output value changing in increasing and decreasing directions in accordance with the change in the comparison result;

means for detecting a preselected first operating condition of said engine;

means for detecting a preselected second operating condition of said engine, said second operating condition being indicative of the position of a throttle valve of said engine;

means for controlling the integration output value of said integrating means to a preset constant value during said first operating condition irrespective of the comparison result;

means for holding the integration output value of said integrating means unchanged during said second operating condition irrespective of the comparison result, the unchanged integration output valve being equal to a value produced just before said second operating condition is detected; and

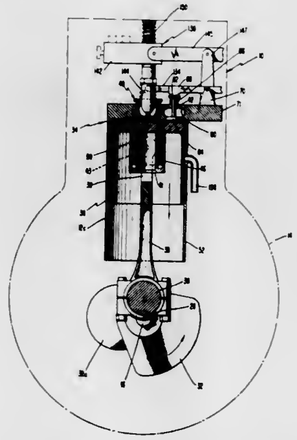
means for supplying said engine with air-fuel mixture of a ratio corrected in accordance with the difference between the integration value and the preset constant value, whereby said mixture supplying means is enabled during said first and second operating conditions, to supply the air-fuel mixture to the air-to-fuel ratio of which is other than the stoichiometric ratio.

4,096,835

INTERNAL COMBUSTION ENGINE METHOD AND APPARATUS

Charles Edward Lamont, 70 Ethelbert St., Winnipeg, Canada (R3G 1V3)

Filed Jan. 4, 1977, Ser. No. 756,600
Int. Cl.² F02B *75/18, 3/04, 75/36*; F02F *1/22*
U.S. Cl. 123—52 B **23 Claims**



1. A method of deriving useful work from a gaseous charge and fuel in an internal combustion engine comprising the steps of:

ingesting a gaseous charge into a central chamber defined by a piston, a cylinder and a movable head;

compressing the gaseous charge by moving the piston into the central chamber;

supplying a quantity of fuel to the chamber to create a combustible mixture with the gaseous charge;

moving the movable head to maintain a predetermined schedule of compression ratio in the central chamber;

igniting the combustible mixture of the gaseous charge and the fuel quantity to increase temperature and pressure of resulting combustion products;

transferring at least a portion of the combustion products from the central chamber to a surrounding chamber defined by the cylinder and a cooperating second piston;

expanding the combustion products in the surrounding chamber to atmospheric pressure by allowing the combustion products to push against the second piston which is connected to a shaft that performs work; and

exhausting the expanded combustion products from the surrounding chamber.

4,096,836

VARIABLE TIMING DEVICE PARTICULARLY FOR ENGINE CAMSHAFTS

Leonard F. Kopich, Madison Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 19, 1977, Ser. No. 760,741
Int. Cl.² F01L *1/34*
U.S. Cl. 123—90.15 **3 Claims**

1. The combination in an internal combustion engine of the type having an output shaft and a camshaft operable in timed relation with the output shaft of a variable camshaft timing drive comprising

a first rotatable drive member driven by the output shaft,

a second rotatable drive member mounted on the camshaft

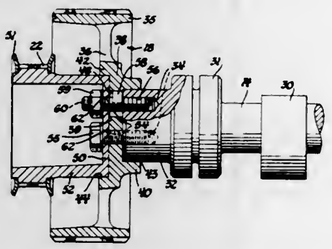
and operably connected with the first drive member for rotation in timed relation therewith,

means mounting said second drive member on said camshaft for rotation on a common axis, said second drive member and said camshaft having opposing engageable surfaces capable of being secured together to fix the angular relation of said members, said mounting means being formed to permit limited relative angular rotation of said members when said surfaces are not so secured, and

means for adjusting the relative angular positions of said second drive member and said camshaft and for securing said second drive member to said camshaft in their adjusted positions, said adjusting and securing means comprising

an adjusting and retaining stud having an elongated body with first and second threaded coaxial end portions and an eccentric cam portion intermediate said end portions, said stud having its first end portion threadably retained in said camshaft and its eccentric cam portion closely fitted between spaced parallel sides of a radially extending slotted opening in said second member, said stud second end portion including tool engageable means for rotating said stud in said camshaft to cause relative angular adjustment of the second drive member on said camshaft through engagement of the stud eccentric cam portion with said opening parallel sides, and

a nut threadably received on said stud second end portion and operatively engageable with said second drive member to secure together said opposing surfaces of the cam-



shaft and second drive member and prevent rotation of said members and said stud.

3. A drive coupling assembly comprising

first and second rotatable members connected for rotation on a common axis and having opposing engageable surfaces capable of being secured together to maintain said members in fixed angular relation but formed to permit limited relative angular rotation of said members when said surfaces are not so secured, and

means for adjusting the relative angular positions of said members and for securing said members in their adjusted positions, said adjusting and securing means comprising

an adjusting and retaining stud having an elongated body with first and second threaded coaxial end portions and an eccentric cam portion intermediate said end portions, said stud having its first end portion threadably retained in said first member, said stud extending through a slotted opening in said second member distant from said axis with the stud eccentric cam portion positioned within said slotted opening and closely fitting between angularly spaced parallel sides thereof, said second end portion including tool engageable means for rotating said stud in said first member to cause relative angular adjustment of said members through engagement of said stud eccentric cam portion with the parallel sides of said slotted opening, and

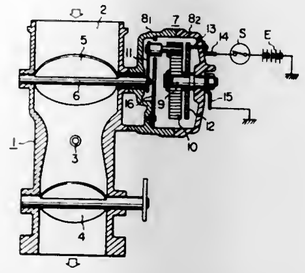
a nut threadably received on said stud second end portion and operatively engageable with said second member to secure together the opposing surfaces of said first and second members and prevent rotation of said members and said stud.

4,096,837

AUTOMATIC CHOKING DEVICE OF ELECTRIC HEATING TYPE

Masahiko Iiyama, Tokyo, and Makoto Ishii, Wako, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Dec. 8, 1976, Ser. No. 748,634
Claims priority, application Japan, Dec. 16, 1975, 50/149949
Int. Cl.[2] F02D *11/08;* **F02M** *1/110, 23/04*
U.S. Cl. 123—119 F **34 Claims**



1. An automatic choking device of an electric heating type for use in an automobile engine, and the like which comprises in combination:

(a) a carburetor main body;

(b) a choke valve provided in said carburetor main body;

(c) a shaft for rotating said choke valve, said rotational shaft being supported on said carburetor main body in a freely rotatable manner;

(d) a bimetal member which is connected to said rotational shaft for the choke valve by means of a connecting member, and which causes said rotational shaft to rotate, when heated, to open said choke valve;

(e) heating means having an electric heating mechanism to heat said bimetal member, said electric heating mechanism having functions to maintain said choke valve in a substantially perfectly closed state without actuating said bimetal member when the internal combustion engine is at a low temperature level, to open said choke valve by heating said bimetal as the temperature of the engine rises with lapse of time, and to lower the temperature thereof after the bimetal is sufficiently heated to be able to open the choke valve; and

(f) a switch means to open and close a connecting circuit between said heating means and a power source for the same.

4,096,838

FUEL CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Eizi Tanaka, Anjo; Michihiro Ohashi, Handa; Hiroshi Mochizuki, and Akira Nishimatsu, both of Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Dec. 20, 1976, Ser. No. 752,305
Claims priority, application Japan, Dec. 26, 1975, 51-157416; Apr. 6, 1976, 51-38446
Int. Cl.[2] F02M *17/00, 19/00*
U.S. Cl. 123—139 AW **6 Claims**

1. A fuel control system for a spark ignition internal combustion engine having an intake pipe, comprising:

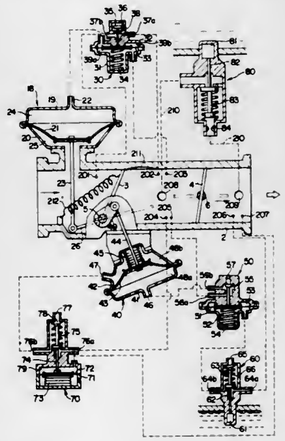
a throttle valve disposed within said intake pipe for controlling the flow of intake air;

an air-flow measuring member mounted for an angular movement within said intake pipe at a position upstream of said throttle valve, the amount of said angular movement of said air-flow measuring member being substantially in proportion to the flow rate of said intake air;

fuel measuring means operatively connected to said air-flow measuring member and adapted to meter and control the rate of fuel supply to said engine in accordance with said angular movement of said airflow measuring member, said fuel metering means having a fuel metering shaft unitarily connected to said air-flow measuring member for angular movement therewith and a bearing for rotatably supporting said fuel metering shaft, said fuel metering shaft and said bearing in combination defining at least one variable fuel metering orifice therebetween;

a first pressure-response means connected to said fuel metering shaft so as to drive the metering shaft and adapted to control said angular movement of said fuel metering shaft in response to pneumatic signals;

a second pressure-responsive means connected to said fuel metering shaft so as to drive the metering shaft and



adapted to control said angular movement of said fuel metering shaft in response to pneumatic signals;

a constant-pressure-differential valve adapted to control a pneumatic signal to be applied to said first pressure-responsive means in response to a pressure differential across said air-flow measuring member, thereby to keep said pressure differential at a predetermined value; and

detecting means mounted on said engine for detecting conditions of operation of said engine, and adapted to produce pneumatic signals representative of said conditions, said detecting means being pneumatically connected to said second pressure-responsive means so as to deliver said signals to said second pressure-responsive means;

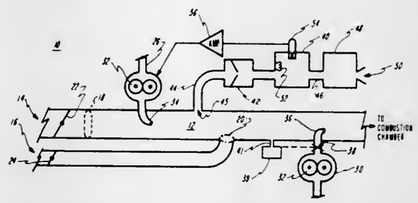
whereby fuel-air mixtures of an air-fuel ratio corresponding to said conditions are supplied to said engine.

4,096,839

INTERNAL COMBUSTION ENGINE AIR-FUEL RATIO CONTROL SYSTEM UTILIZING OXYGEN SENSOR

Frank Niertit, Webster, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Feb. 24, 1976, Ser. No. 660,905
Int. Cl.[2] F02M *7/16*
U.S. Cl. 123—139 AW **8 Claims**



1. A method for controlling the air-fuel ratio in an internal combustion engine having a combustion chamber arranged to operate at subatmospheric pressures, an intake manifold communicating with the combustion chamber for providing a flow of air to the combustion chamber, adjustable throttle means in the intake manifold for controlling the flow of air through the intake manifold, and fuel pumping means for introducing a first flow of fuel into the intake manifold and producing an air-fuel mixture, the method comprising the steps of:

continuously sampling the air-fuel ratio of the mixture flowing adjacent a first loation in the intake manifold;

continuously adjusting the air-fuel ratio at the first location to the stoichometric value by adjusting the first flow of fuel into the intake manifold;

substantially continuously providing an additional flow of air at a second location in the intake manifold, spaced apart from the first location in the direction of the combustion chamber, and

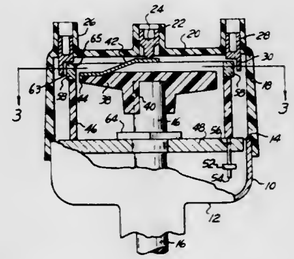
introducing a second flow of fuel into the intake manifold adjacent the second location in an amount sufficient to reduce the air-fuel ratio of the mixture flowing into the combustion chamber below the stoichometric ratio when engine acceleration is desired.

4,096,840

PULSE IGNITION DISTRIBUTOR

Richard J. Jordan, 15821 Chestnut, Roseville, Mich. 48066

Continuation of Ser. No. 654,376, Feb. 2, 1976, abandoned, which is a continuation of Ser. No. 481,196, Jun. 20, 1974, abandoned. This application Dec. 20, 1976, Ser. No. 752,463
Int. Cl.[2] F02P *5/00*
U.S. Cl. 123—146.5 A **4 Claims**



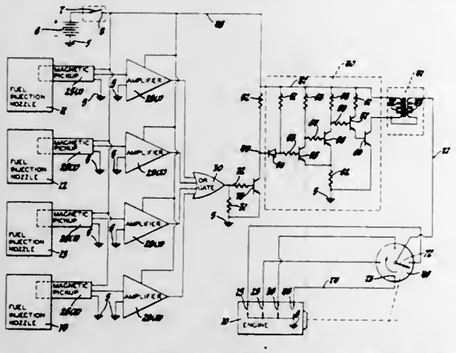
1. In a distributor for a spark-ignition internal combustion engine comprising a distributor body, a removable cap for said body provided with a centrally disposed input terminal and peripherally disposed output terminals each connected to a spark plug of said engine, a rotatable shaft extending through said body, a rotor mounted on the end of said shaft for placing said input terminal successively in spark gap proximity with each of said output terminals in the course of a revolution of said shaft, and timing means comprising a plate angularly positionable relative to said body about said shaft for advancing and retarding ignition as a function of engine RPM, the improvement consisting of a high voltage high frequency generator having an output constantly electrically connected to said input terminal, a dielectric timing ring disposed in said body between said rotor and said output terminals, a current conductive segment for each of said output terminals carried by said timing ring and defining a contactless bridging member disposed in said spark gap corresponding to each of said output terminals, and means for mounting said timing ring on said plate for timing the occurrence of start of sparking through said spark gap relative to degree of angular rotation of said shaft as a function of the angular position of said timing ring relative to said output terminals.

4,096,841

IGNITION SYSTEM FOR USE WITH FUEL INJECTED-SPARK IGNITED INTERNAL COMBUSTION ENGINES

Joseph C. Kindermann, Romeo, and Ronald L. Colling, Millington, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 10, 1976, Ser. No. 694,784
Int. Cl.[2] F02B *15/00, 1/02;* F02M *63/06, 51/06*
U.S. Cl. 123—148 E **4 Claims**



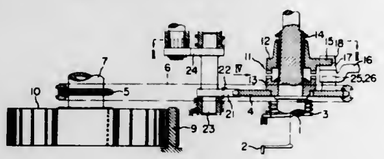
1. An ignition system for use with a fuel injected-spark ignited internal combustion engine of the type having a spark igniting device for each cylinder thereof, comprising: a fuel injector having a movable member corresponding to each cylinder of an associated internal combustion engine for injecting fuel into the combustion chamber of the said cylinder to which it corresponds upon the actuation of said movable member; means corresponding to and in cooperative relationship with the said movable member of each said fuel injector, each said means being responsive to the initiation of actuation of the corresponding said movable member to inject fuel into the combustion chamber of the said cylinder to which said fuel injector having said actuated movable member corresponds for producing an output electrical signal of a selected polarity; circuit means responsive to each said electrical signal for producing an ignition spark creating voltage; and means for directing said ignition spark creating voltage to the said spark igniting device of the said cylinder of said engine next to be fired.

4,096,842

DEVICE FOR WINDING A SPIRAL SPRING TO START AN ENGINE

Noboru Kurata, Kamifukuoka, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 15, 1976, Ser. No. 750,897
Claims priority, application Japan, Dec. 20, 1975, 50-172608
Int. Cl.[2] F02N *3/04;* F03G *1/08*
U.S. Cl. 123—179 S **1 Claim**



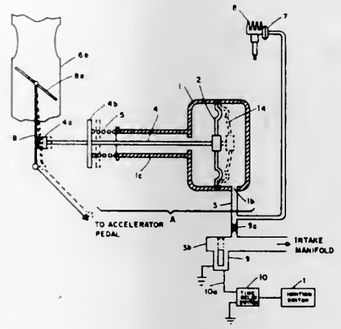
1. An apparatus for winding a spiral spring to start an engine, employing a pedal shaft; a starting pedal connected to said pedal shaft; a driving sprocket rotatably mounted on said pedal shaft having driving teeth formed on the outer periphery thereof; clutch means mounted on said pedal shaft for respectively connecting and disconnecting said pedal shaft and said sprocket for integral or separate rotation in response to forward and reverse rotation of said pedal shaft; ratchet pawl means being engageable with said driving teeth for preventing reverse rotation of said sprocket to permit forward rotation thereof; starter shaft means adapted to be drivingly connected with an engine; and spiral spring means having an inner end secured to said starter shaft means and an outer end to a stationary member; a driven sprocket fixedly mounted on said starter shaft means being operatively connected to said driving sprocket through a power transmission chain, whereby said spiral spring is wound around said starter shaft means as said driving sprocket is rotated in a forward direction, said clutch means comprising: a driving clutch member mounted on said pedal shaft for axial sliding movement and being held against rotation relative thereto, said driving clutch member being provided with an actuating arm extending therefrom in a radial direction; a driven clutch member integrally secured to said driving sprocket in axially opposed relation therewith; a clutch spring for directing said driving clutch member into engagement with said driven clutch member; and cam means cooperating with said actuating arm of said driving clutch member for directing said actuating arm to cause disengagement of said driving and driven clutch members against the action of said clutch spring as said pedal shaft is rotated in a reverse direction to restrict further reverse rotation thereof.

4,096,843

STARTING SYSTEM

Frederick J. Marsee, Clawson, Mich., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 370,665, Jun. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 261,665, Jun. 12, 1972, abandoned. This application Sep. 19, 1975, Ser. No. 614,856
Int. Cl.[2] F02N *17/00*
U.S. Cl. 123—179 A **10 Claims**



1. A system for improving the warm-up characteristics on cold starting of a spark ignition internal combustion engine which comprises in combination

(a) a distributor having at least a vacuum actuated spark advance means and a carburetor having throttle means operatively connected to first control means for simultaneously

(i) opening said throttle means to obtain increased engine speed and

(ii) retarding spark advance, on starting said engine, said first control means acting to maintain said engine speed and spark retard for a predetermined time after starting, said first control means comprising in combination

(1) engine vacuum actuated throttle means position control means,

(2) conduit means in communication at one end thereof with said throttle means position control means and said vacuum actuated spark advance means, and in communication at the other end with the atmosphere and with engine vacuum means,

(3) valve means positioned in said other end of said conduit, said valve means operable to alternatively connect said conduit means to the atmosphere or to said engine vacuum means,

(b) second control means, said second control means acting to lock out said first control means when a predetermined engine condition exists,

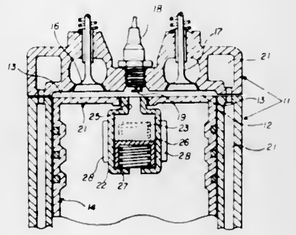
whereby a substantial reduction in exhaust emissions is obtained for the cold start engine operating mode.

4,096,844

INTERNAL COMBUSTION ENGINE APPARATUS

James Bellamy Mackaness, 28 The Crescent, Chettenham, NSW, Australia (2119)

Continuation of Ser. No. 443,515, Feb. 19, 1974, abandoned. This application Dec. 30, 1976, Ser. No. 755,718
Int. Cl.[2] F02F *1/00*
U.S. Cl. 123—193 P **5 Claims**



1. Internal combustion engine apparatus comprising:

body cylinder means defining a primary combustion chamber; p1 a primary piston reciprocable in said cylinder means during compression and power strokes, respectively, that reduce and increase the volume of said primary combustion chamber;

intake means for periodically introducing fuel charges into said primary combustion chamber;

ignition means for igniting the fuel charges introduced by said charge means;

exhaust means for removing residual gases from said primary combustion chamber after ignition of each fuel charge;

housing means mounted on and movable with said primary piston and defining an auxiliary combustion chamber, said housing means further defining an orifice providing communication between said primary and auxiliary combustion chambers; and

purge means comprising an auxiliary piston reciprocable in said auxiliary combustion chamber, said auxiliary piston being biased by a bias means toward a closed position wherein said orifice is closed and movable during each compression stroke of said primary piston into a fully open position to allow complete filling of said auxiliary chamber with a fuel charge in response to a given pressure in said primary chamber substantially less than the maximum compression pressure provided therein by said primary piston, said auxiliary piston being adapted to move into said closed position during each power stroke of said primary piston so as to purge through said orifice substantially all residual gases from said auxiliary combustion chamber.

4,096,845

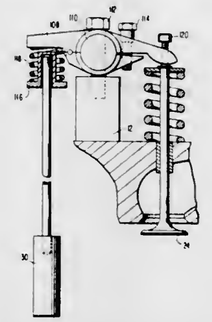
SYSTEM FOR REDUCING THE NUMBER OF CYLINDERS USED IN A MULTI-CYLINDER ENGINE

Charles F. Holmes, 804 E. Pembroke, Tuscola, Ill. 61953

Filed Jun. 30, 1976, Ser. No. 701,272
Int. Cl.[2] F02D *13/06*
U.S. Cl. 123—198 F **13 Claims**

1. A conversion kit for deactivating half of the cylinders of a multi-cylinder reciprocating internal combustion engine of the type having an intake manifold to direct fuel/air mixture into said cylinders wherein said manifold has a first passage communicating with half of the cylinders and a separate, second passage communicating with the remaining cylinders, and having at least one intake valve opening and exhaust valve opening for each cylinder comprising:

(a) means to prevent fuel/air mixture from entering the first of said intake manifold passages, thereby deactivating all of the cylinders served by this passage;



(b) means to maintain each of the intake valve openings in those deactivated cylinders connected by said first intake manifold passage in an opened condition throughout the operational cycle of the engine such that the deactivated cylinders and the first intake manifold passage form a closed chamber; and

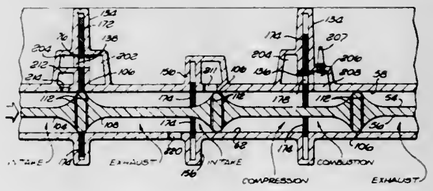
(c) means to maintain each of the exhaust valve openings in those deactivated cylinders connected by said first intake manifold passage in a closed condition throughout the operational cycle of the engine.

4,096,846

ROTARY FLUID PRESSURE ENGINE

Alfred Biles, 74809 Sunset Dr., Twenty-Nine Palms, Calif. 92277

Continuation-in-part of Ser. No. 503,837, Sep. 6, 1974, abandoned. This application May 17, 1976, Ser. No. 687,381
Int. Cl.[2] F02B *53/00*
U.S. Cl. 123—228 **9 Claims**



1. An engine comprising: an annual cylinder of uniform cross-section forming a cylinder housing;

a rotor positioned in and movable in said cylinder housing, having a width approximately equal to the width of said housing and having a plurality of uniform thickness height sections which are interconnected by at least one enlarged height section;

a plurality of valve members in said cylinder housing each valve member being movable when an enlarged height section passes adjacent thereto;

said valve members being movable in chambers formed in said engine, at least one of said chambers forming a combustion-exhaust chamber and another of said chambers forming a compression-intake chamber and means for supplying an air fuel mixture coupled to said compression-intake chamber;

said valve members in each of said combustion-exhaust chambers have a pair of openings therein, a delay section formed in said combustion-exhaust chamber, one of said openings being movable by said piston enlarged height section and forming a path for enabling an air-fuel mixture to enter said delay section of said combustion chamber, and a second opening in said valve member being movable and forming a path for enabling said air-fuel mixture to pass from said delay section to an ignition section of said combustion-exhaust chamber, and ignition means formed in said combustion-exhaust chamber for igniting said air-fuel mixture;

means for introducing a source of fluid into said cylinder; and

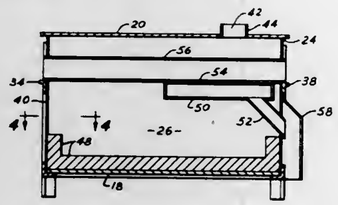
means for exhausting said fluid in a compressed form from said cylinder.

4,096,847

STOVE

Allen L. Mitchell, Butler, Ohio, assignor to Paul David Hill, Ashland, Ohio

Filed Aug. 27, 1975, Ser. No. 608,067
Int. Cl.[2] F24C *1/14*
U.S. Cl. 126—61 **12 Claims**



1. A stove comprising: an enclosure having a front, back, opposite sides and a top surrounding a fire chamber; a transverse warm air conduit opening outwardly of said enclosure; a longitudinally extending warm air conduit opening outwardly of said enclosure; said longitudinally extending conduit being positioned over said transverse conduit; means extending between said conduits to communicate air from said transverse conduit to said longitudinally extending conduit; and a smoke exit opening for said enclosure positioned over said transverse conduit.

9. A stove comprising: an enclosure having four sides and a top surrounding a fire chamber for combustible material a warm air conduit extending through said fire chamber and being spaced from the side walls of said enclosure and opening outwardly of at least one of said sides of said enclosure; a smoke exit in the top of said enclosure positioned above said warm air conduit, said warm air conduit being positioned adjacent the combustible material so that flame extends around said warm air conduit; and an inlet conduit bringing air to be heated upwardly and onto the bottom of a region of said conduit that is remote from the region which opens outwardly of said enclosure.

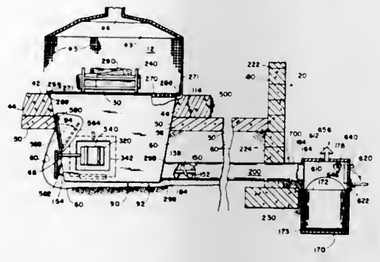
4,096,848

FIREPLACE ASH SYSTEM FOR BASEMENTLESS BUILDINGS

William M. Richman, Hill-Top Heights, North Platte, Nebr. 69101

Continuation-in-part of Ser. No. 331,666, Feb. 12, 1973, abandoned. This application Nov. 5, 1974, Ser. No. 521,167
Int. Cl.[2] F24B *1/18*
U.S. Cl. 126—120 **8 Claims**

1. A fireplace ash removal system, building, and fireplace assembly comprising: a building, said building having a foundation and having a major load-bearing outer wall above said foundation, earth disposed under and against the outer side of at least a substantial part of said building, a fireplace in said building having a hearth and provided with an open side through which fuel can be inserted thereinto, hopper means disposed beneath said fireplace and extending downwardly beyond said floor, said hopper means having opening means on its upper side in communication with the interior of said fireplace for receiving ash therethrough, said fireplace being disposed within the outer sides of said outer walls of said building, an auger conveyor assembly disposed in communication with said hopper for receiving ash therefrom, said conveyor assembly extending from said hopper to a point for delivering ash to said point, said point being on the other side of said major leadbearing outer wall of said building from said hopper, an ash-receiving means disposed at said point, said ash-receiving means having walls and having an ash chamber therein receiving ash from said conveyor assembly and having an ash removal opening through its walls, the region beneath said hearth and the region outside of said building in the vicinities of said ash-receiving means and of that portion of said conveyor assembly that is outside of said outer wall defining a pair of regions, said conveyor assembly comprising a housing leading from said hopper, and an auger in said housing, said conveyor housing being free of such an inclination with respect to



the horizontal that ashes can fall freely therethrough by gravity alone, said conveyor assembly having a drive motor, drive train means drivably connecting said motor to said auger, said motor and drive train means being located in one of said regions, the area above said floor and to the side of said fireplace and the area above the ground outside of said building defining a pair of areas of easy human access, said building and earth defining a building and earth assembly, said building and earth assembly creating an obstruction so great as to leave no passage of over four feet minimum height a human being can pass through from either one of said areas of easy human access so as to enter the space beneath said floor and surrounding said hopper means, said fireplace having a fireplace floor, said fireplace floor and said building floor and said earth all together defining at least a partial barrier to access to the place in which said motor is disposed, said barrier having a service opening means through it providing access to said drive motor for servicing, said fireplace being substantially spaced from the outer walls of said building whereby said auger is important, said hopper having a motor access opening therethrough from an inner side thereof to an outer side thereof and serving as a portion of said service opening means.

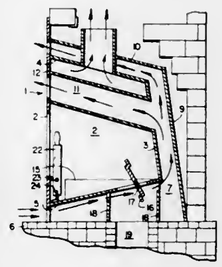
4,096,849

FIREPLACE UNIT WITH SLOPING BED PLATE

Alexander John Moncrieff-Yeates, 8609 Hillside Pl., Fairfax, Va. 22030

Filed Oct. 6, 1976, Ser. No. 729,955
Int. Cl.[2] F24B *7/00*
U.S. Cl. 126—121 **9 Claims**

1. In a fireplace unit of the type which includes room air circulating passageway including an incoming room air inlet extending substantially the full width of the unit, and opening into an inlet passageway underlying the bed plate of the fire enclosure, at least one vertical passageway defined in part by a wall of said fire enclosure, and an air outlet to a room, the improvement wherein said bed plate is sloped upwardly in the



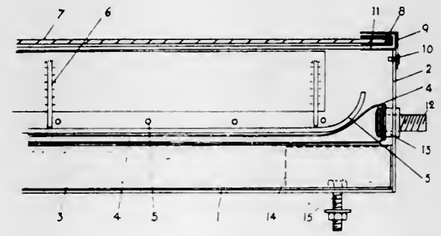
direction of flow of incoming air in the underlying passageway as it flows toward said air outlet.

4,096,850

HEAT ABSORBER FOR A SOLAR HEATING SYSTEM

John Mackay Hadcroft, 190 Waimunu Rd., Massey, New Zealand

Filed Feb. 24, 1976, Ser. No. 660,890
Claims priority, application New Zealand, Feb. 24, 1975, 176740
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **8 Claims**



1. A heat absorber for a solar heating system, said absorber including a support tray, a flexible heating bag having inlet and outlet connections and arranged to be supported in use by said support tray, and a retaining grill or grid positioned in use on the opposite side of said bag from said support tray and engaging said bag so as to control the depth of said heating bag between said support tray and said retaining grill or grid when said heating bag is filled with liquid.

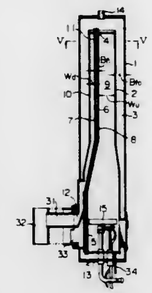
4,096,851

LIQUID HEATING APPARATUS

Noboru Maruyama, No. 26-14, Shirasagi 2-chome, Nakano-ku, Tokyo, Japan

Filed Jul. 23, 1976, Ser. No. 708,189
Claims priority, application Japan, Aug. 11, 1975, 50-96682
Int. Cl.[2] F22B *7/10*
U.S. Cl. 126—350 R **4 Claims**

1. A liquid heating apparatus comprising a vertical rectangular outer body portion, an inner body portion which has a shape substantially the same as that of said outer body portion, said inner body portion being disposed within said outer body portion and being spaced therefrom to define an outside water jacket therebetween, two vertically oriented plate members disposed within said inner body portion, said plate members being spaced from each other to define an inside water jacket therebetween, said plate members also being spaced from said inner body to define therewith a first chamber which extends alongside one of said plate members and through which heated gas rises and a second chamber which extends alongside the other of said plate members and through which said gas descends, said first chamber communicating with said second chamber at their upper ends, the ratio ξf of the width Wd of said second chamber to the width Wu of said first chamber being equal to or less than 0.8, a flue at the upper end of said first chamber and communicating with said second chamber, a flue gas exit provided at the lower end of said second chamber,



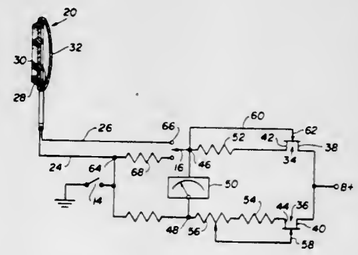
an exhaust pipe communicating at one end thereof with said flue gas exit, means defining a combustion chamber at the lower end of said first chamber, and a combustion air supply tube surrounding the outside of said exhaust pipe and being spaced therefrom, one end of said air supply tube communicating with an opening in the side wall of said outer body portion and thereby communicating with said combustion chamber.

4,096,852

SKIN CONDITIONING INDICATOR

Guy Adams, Monroe, N.Y., assignor to Solitron Devices, Inc., Tappan, N.Y.

Filed Dec. 22, 1976, Ser. No. 753,536
Int. Cl.[2] A61B *5/00*
U.S. Cl. 128—2 H **4 Claims**



1. A constant current temperature measuring apparatus comprising:

a power source;

leads from said source to provide separate paths for current flow, said paths being characterized as a first leg of the circuit and a second leg of the circuit;

a first field effect transistor in said first leg of the circuit;

a second field effect transistor in said second leg of the circuit;

means connecting said source to the drain terminals of said first and second field effect transistors;

resistance means in each of said first and second leg of the circuit, each said resistance means being connected to a respective source terminal of said first and second field effect transistors, said resistance means in said first leg including a variable resistance whose control arm is connected to the gate of said first field effect transistor and said resistance means in said second leg being connected to the gate of said second field effect transistor;

a first terminal in said second leg of the circuit at the point of

connection of said resistance means with the gate of said second field effect transistor;

a second terminal in said first leg of the circuit after the variable resistance;

an indicator connected between said first terminal and said second terminal; and

means to recombine said separate paths of said first and second leg of the circuit, said means to recombine having a first switch in said second leg, a calibration means in said second leg beyond beyond said first switch, a probe device in said second leg, a resistor in said first leg, a lead connecting said first leg and said second leg and a second switch connecting the lead to the source in completion of the temperature measuring apparatus.

4,096,853

DEVICE FOR THE INTRODUCTION OF CONTRAST MEDIUM INTO AN ANUS PRAETER

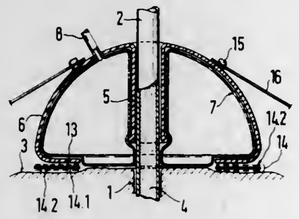
Hanfried Weigand, Mainz, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jun. 15, 1976, Ser. No. 696,404

Claims priority, application Germany, Jun. 21, 1975, 2527706

Int. Cl.[2] A61M 3/00

U.S. Cl. 128—2 A **10 Claims**



1. A device for the introduction of a contrast medium into an anus praeter formed in an abdominal wall comprising an inlet pipe adapted to be inserted into said anus praeter, a housing having an open end, said housing surrounding said inlet pipe and having an abdominal contact area surrounding said open end, the housing being adapted to be positioned with said contact area against said abdominal wall with its open end facing the wall when said inlet pipe is in said anus praeter, and an inflatable bladder contained within said housing separate from and surrounding said inlet pipe, said bladder having at least one flat surface defining an abdominal wall contact surface surrounding said inlet pipe and extending radially therefrom for contacting the surface of said abdominal wall surrounding said anus praeter when the bladder is inflated, and means for holding said contact area of the housing against said abdominal wall, thereby to hold said flat surface of said bladder against the abdominal wall and form a seat therewith while the inflated bladder holds said inlet pipe against longitudinal movement.

4,096,854

CARDIAC MONITOR WITH RATE LIMIT MEANS

Jacob E. Perica, Warren; Wayne F. Poyer, Ann Arbor, and Neale F. Koenig, Ypsilanti, all of Mich., assignors to Jacob E. Perica, Warren, Mich.

Filed Mar. 1, 1976, Ser. No. 662,540

Int. Cl.[2] A61B 5/02

U.S. Cl. 128—2.05 T **5 Claims**

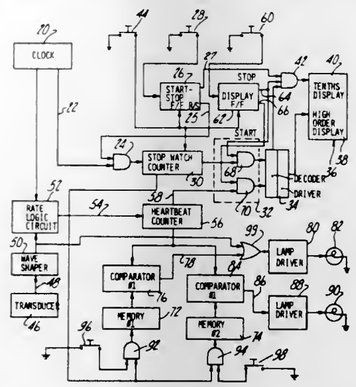
1. A body worn cardiac monitor comprising:

transducer means adapted to be secured to the body of the wearer and adapted to detect heart beats and to produce an electrical signal representative thereof,

means for receiving the signals from said transducer means and producing a heart beat rate signal representative of the heart beat rate per unit time,

display means for displaying said heart beat rate signal,

manually actuated means for variably establishing a pair of separated digital rate limits, said means for establishing said rate limits further comprising a clock and a counter, a manually actuated switch operable upon activation to gate an output from the clock to an input for the counter, said counter having an output connected to the display means whereby the count in the counter is displayed on the display means, a pair of memories, each memory having an input and a gate connected to each input, said counter output being connected to each gate, and a manually operated switch connected with each gate which, upon activation, stores the instantaneous count in the respective memory, and



means for comparing said heart beat rate signal with said rate limits and means for actuating indicator means whenever the heart beat rate exceeds one of said preset limits or falls below the other preset limit.

4,096,855

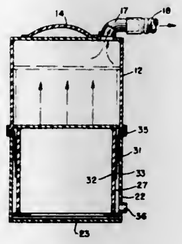
INCENTIVE SPIROMETER

George J. Fleury, Jr., 1005 Abbey Way, McLean, Va. 22101

Filed Dec. 22, 1976, Ser. No. 753,466

Int. Cl.[2] A61B 5/08

U.S. Cl. 128—2.08 **9 Claims**



1. An incentive spirometer for measuring the volume of inspired air or the volume of exhaled air capable of relatively easy assembly comprising an upper cylindrical housing having an internal cylindrical surface, said upper cylindrical housing having an enclosing top, said top having at least one port means providing communication internally of said upper housing and externally thereof and adapted and constructed to receive a tubular means when said incentive spirometer is used for measuring the volume of inspired air, a lower cylindrical housing having an internal cylindrical surface of the same diameter as the cylindrical suface of the upper housing, said lower cylindrical housing having an enclosing bottom said upper housing being open at its bottom, said lower housing being open at its top, said upper housing at its bottom having a

first outwardly radially extending annular flange, said lower housing at its top having a second outwardly radially extending annular flange, said first flange and said second flange being in confronting relating relationship mating said upper and lower housings together, means associated with said first and said second flange to secure the upper housing and the lower housing together, a cylindrical hollow free floating piston being positioned in said secured complementary mating upper and lower housings, saidn piston having outwardly radially extending means at the top portion thereof and at the bottom portion thereof, said radially extending means having a diameter slightly less than the diameters of the internal cylindrical surfaces of the upper and lower housings whereby the said extending means act as guide means against the internal cylindrical surface of the upper housing and the internal cylindrical surface of the lower housing to permit virtually frictionless vertical movement when said spirometer is utilized, said piston having an external diameter less than the diameters of the internal cylindrical surfaces of the upper and lower housings whereby an annular space is defined between said piston and said internal cylindrical surfaces of said housings, a flexible imperforate sleeve being positioned in said space, one end portion thereof being annularly secured to approximately the midportion of said piston, the other end portion being affixed between said first and said second flanges of said housings, said sleeve having a length between its attachment on said piston and its attachment between said flanges of approximately one half of the length of said free floating piston, said upper housing having at least a portion that is transparent whereby any vertical movement of the piston in the upper housing may be viewed, said lower housing having at least one port means providing communication internally of said lower housing and externally thereof.

4,096,856

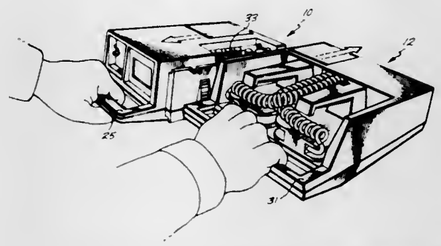
PORTABLE ELECTRONIC PHYSIOLOGICAL INSTRUMENT HAVING SEPARABLE FIRST AND SECOND COMPONENTS, AND IMPROVED MECHANICAL CONNECTOR THEREFOR

David B. Smith, Mercer Island, and James A. Benson, Bellevue, both of Wash., assignors to Physio-Control Corporation, Redmond, Wash.

Filed Sep. 3, 1976, Ser. No. 720,102

Int. Cl.[2] A61N 1/36

U.S. Cl. 128—4.19 D **8 Claims**



1. A portable electronic physiological instrument including:

a. separable first and second components, said first component comprising an EKG monitor having a pair of signal inputs, and said second component comprising a defibrillator having a pair of paddle electrodes, wherein said components have separate housings, each of said housings having a plurality of exterior surfaces;

b. tongue member means coupled to the housing of one of said first and second components and extending from one of said plurality of exterior surfaces thereof;

c. groove member means coupled to the housing of the other of said first and second components and extending from one of said plurality of exterior surfaces thereof, said groove member means receiving said tongue member means with a translative, sliding fit to provide mechanical interconnection between said first and second components;

d. first and second electrical slide connectors located, respectively, in the housings of said first and second components in proximity to said tongue member means and said groove member means, said first and second electrical slide connectors each including first and second electrical contacts, said first and second electrical contacts of said first and said second electrical slide connectors contacting each other upon said tongue member means being received in said groove member means to provide electrical interconnection between said first and second components; and

e. said first component further comprising means for electrically connecting said pair of signal inputs to said first and second contacts of said first electrical slide connector, and said second component further comprising means for electrically connecting said pair of paddle electrodes to said first and second electrical contacts of said second electrical slide connector.

4,096,857

TELESCOPICALLY ADJUSTABLE SURGICAL INSTRUMENT

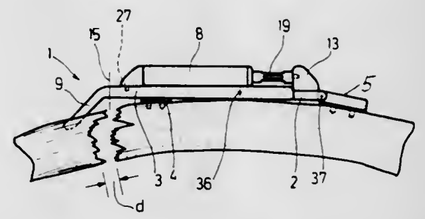
Rudolf Cramer, Piesenkam, and Juergen J. Hildebrandt, Brunnthal, both of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Germany

Filed Dec. 27, 1976, Ser. No. 754,127

Claims priority, application Germany, Jan. 20, 1976, 2601938

Int. Cl.[2] A61F 5/04; A61B 17/18

U.S. Cl. 128—84 R **6 Claims**



1. A telescopically adjustable surgical instrument, especially for performing an elongation osteotomy, comprising rigid guide rail means including a first end and a second end, recess means in said guide rail means extending from said second end toward said first end, rigid extension rail means having an inner end and an outer end, said inner end being received for axial movement in said recess means of said guide rail means, first bone connecting means forming part of said first end of said rigid guide rail means, second bone connecting means operatively secured to said rigid extension rail means, first extension actuator support means operatively connected with said rigid guide rail means, second actuator support means operatively connected to said rigid extension rail means, and connector means for rigidly but releasably securing said guide rail means and said extension rail means to each other, said first extension actuator support means comprising connecting means located in said rigid guide rail means substantially adjacent to said first end, wherein said second actuator support means comprise support block means releasably secured to said rigid extension rail means substantially at the outer end thereof, and wherein said connector means comprise set screw means.

4,096,858

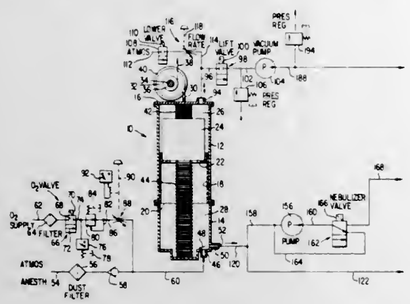
VOLUME-RATE RESPIRATOR SYSTEM AND METHOD

Theodore B. Eyrick, Reading; Allen C. Brown, Acton, and Neil R. Hattes, Danvers, all of Mass., assignors to Chemetron Corporation, Chicago, Ill.

Division of Ser. No. 545,287, Jan. 29, 1975, which is a division of Ser. No. 402,677, Oct. 2, 1973. This application Dec. 20, 1976, Ser. No. 752,753

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—145.6 7 Claims



1. In a respirator system, the method of delivering a variable but selectable volume of breathing gas at a preselected limited rate, comprising:

mounting a gravity-operated driver for vertical motion within a closed housing;

defining within said housing an upper control chamber above said driver and a lower delivery chamber below said driver, said chambers being divided by a diaphragm connected between said driver and said housing;

producing a vacuum within said control chamber to lift said driver and thereby expand said delivery chamber;

controlling said vacuum to regulate the distance and the rate at which said driver is lifted to expand said delivery chamber to a selected volume;

admitting breathing gas at substantially atmospheric pressure to said delivery chamber only during the lifting of said driver;

releasing said vacuum at a controlled and variable rate to enable said driver to fall solely under the force of gravity at a maximum rate determined by the rate of release of said vacuum to contract said delivery chamber;

discharging said breathing gas from said delivery chamber at a rate and pressure limited by the rate of release of said vacuum and the weight of said driver; and

periodically and alternately producing and releasing said vacuum for drawing in and discharging breathing gas in a breathing cycle.

4,096,859

APPARATUS FOR PERITONEAL DIALYSIS

Mahesh C. Agarwal, 6040 Bathurst St., Suite 1707, Toronto, Ontario M2R 2A1, and Joseph E. Dadson, 2515 Bathurst St., Suite #503, Toronto, Ontario, both of Canada

Filed Apr. 4, 1977, Ser. No. 784,416

Int. Cl.[2] A61J *7/00*; B01D *13/00*; A61M *5/00*

U.S. Cl. 128—213 18 Claims

1. A dialysis apparatus comprising:

first means for supplying dialysis fluid,

second means for measuring a predetermined quantity of dialysis fluid,

third means for detecting a minimum quantity of dialysis fluid,

a catheter,

structural means supporting said first means above said second means, said second means above said catheter and said third means below said catheter,

a said fluid flow path interconnecting said first and second means,

a second fluid flow path interconnecting said second means and said catheter,

a third fluid flow path interconnecting said catheter and said third means,

a fourth fluid flow path for fluid draining from said third means,

valve means for selectively

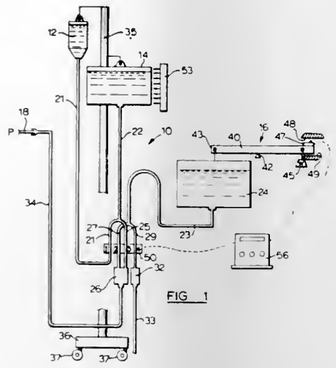


FIG. 1

(i) blocking said first and third paths while leaving said second and fourth paths open,

(ii) blocking said second and third paths while leaving said first and fourth paths open, and

(iii) blocking said second and fourth paths while leaving said first and third paths open,

and timer/computer means for dictating the time intervals during which the valve means is in modes (i), (ii) and (iii).

4,096,860

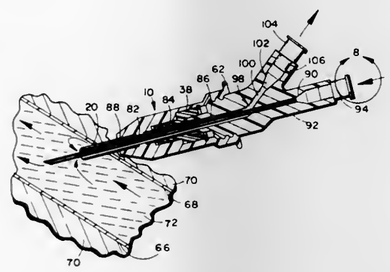
DUAL FLOW ENCATHETER

William F. McLaughlin, 67 Balboa Cove, Huntington Beach, Calif. 92663

Filed Oct. 8, 1975, Ser. No. 620,600

Int. Cl.[2] A61M *5/00*

U.S. Cl. 128—214.4 10 Claims



1. An apparatus for simultaneously withdrawing and implacing fluid within a blood vessel comprising:

an insertion conduit suitable for extending into a blood vessel;

a hub connected to said insertion conduit having means to connect said insertion conduit to a device for withdrawing fluid from a blood vessel;

one-way valve means in fluid connected relationship to said insertion conduit to prevent the flow of fluid through said insertion conduit from said blood vessel;

a biaxial branch flow device having first and second branches and a main conduit within said device being in fluid communication with said insertion conduit through said hub;

said first branch within said biaxial flow device adapted for receiving fluid from said insertion conduit; and,

a tube connected with said biaxial branch flow device for coaxially passing through said insertion conduit valve means and said main conduit in spaced relationship from the interior walls of said main conduit to allow fluid flow therebetween and wherein said tube is connected at one end to said second branch and extends at its other end to the end of or beyond the distal end of said insertion conduit.

4,096,861

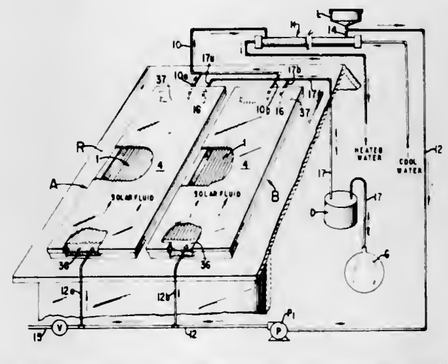
SOLAR HEAT COLLECTION

Vernon O. Bowles, Naples, Fla.

Filed Apr. 12, 1976, Ser. No. 676,156

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—271 19 Claims



1. Apparatus for collecting solar heat comprising a substantially planar radiation receptor adapted to be supported at an inclination across the path of sunlight, said receptor being composed essentially of thin sheet material and comprising a thin front panel exposed to the solar radiation, a back panel and means interconnecting said panels peripherally and in and along laterally spaced longitudinal regions thereof so as to define between them a shallow fluid-tight chamber subdivided into a multiplicity of long shallow channels for confining liquid filling them to a thin layer and extending from a common plenum space in the lower end of the chamber to a common plenum space in its upper end, an inlet to said lower plenum space for liquid flow thereinto, an outlet from said upper plenum space for outflow of liquid, said channels each being of not more than ½ inch in average depth and being sufficiently limited in width so that liquid filling and being heated in said channels will not distort them and will flow only upwardly in them under the influence of thermal-specific gravity gradients to bring hotter liquid perferentially into said upper plenum space, conduit means for conducting liquid in a circuit from said outlet to a heat exchnage zone and thence back into said inlet, means for keeping said receptor and said conduit means completely filled with liquid and holding the liquid in said receptor constantly under a substantially uniform limited hydrostatic pressure insufficient to rupture said receptor, and means for continuously circulating the liquid in said circuit into and upwardly through and from said receptor under a constantly low pumping pressure sufficient to prevent substantial deviation from said hydrostatic pressure as said liquid is being circulated,

said heat exchange zone comprising a heat exchanger having therein passageway connected in said circuit with said conduit means for conducting said liquid along one side of heat transfer walls adapted to be contacted over their other side by a fluid to be heated, said liquid circulating means including a pump in said conduit means, means for flowing said fluid through said heat exchanger in contact with said other side of said walls, means for sensing the temperature of liquid in said chamber, means activated by said sensing means for operating said pump when said temperature exceeds a first predetermined level, a second means for sensing the temperature of liquid being pumped through said circuit, and means activated by said second means for operating said means for flowing said fluid when the latter temperature exceeds a second predetermined level higher than said first level.

4,096,862

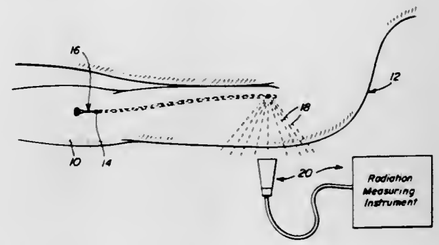
LOCATING OF TUBES IN THE HUMAN BODY

Salvatore A. DeLuca, 607 Revere Beach Blvd., Revere, Mass. 02151

Filed May 17, 1976, Ser. No. 687,103

Int. Cl.[2] A61M *25/00*

U.S. Cl. 128—348 2 Claims



1. A method for locating internal lines within a passage of a patient's body, comprising the steps of:

(a) inserting a line into a passage of a patient;

(b) inserting a finite radioactive source into the line inserted by step (a), the inserting step (b) including the step of placing a single discrete radioactive element inside a sheath closed only at one end for preventing contamination of the radioactive element; and

(c) monitoring with a radiation measuring instrument the radioactive source inserted by step (b) and determining the location of the line at the position of the radioactive source.

4,096,863

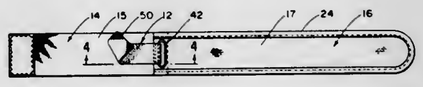
BAND FOR ANCHORING A CATHETOR OR ANY OTHER TUBULAR DEVICE TO THE BODY

David Kaplan; Irving Brezack, both of Sharon, Mass.; Nathan H. Young, deceased, late of Boynton Beach, Fla.; by David Kaplan, executor; by Irving Brezack, executor, both of Sharon, Mass., and Herbert H. Wapner, Canton, Mass., assignors to Baka Manufacturing Company, Inc., Plainville, Mass.

Continuation-in-part of Ser. No. 612,364, Sep. 11, 1975, abandoned. This application Nov. 29, 1976, Ser. No. 745,804

Int. Cl.[2] A61M *25/02*

U.S. Cl. 128—349 R 13 Claims



1. A band for anchoring a catheter or other tubular device to the body comprising;

an extendible primary strap adapted to encircle the portion of the body to which the device is to be anchored,

fastening means connected to the primary strap for securing it in place on the body,

a secondary strap means made of a flexible material and having a length less than the length of the primary strap,

means for connecting one end of the secondary strap means

to the primary strap intermediate the ends of the primary strap,
a relatively rigid clip having an eye through which another end of the secondary strap means may be threaded to form a loop for encircling the device,
means for securing the clip to the primary strap adjacent the one end of the secondary strap means and thus fixed with respect to said one end,
and additional fastening means at the other end of the secondary strap means for retaining the end through the eye with the loop tightly bound about the device.

4,096,864

FLUID CARRYING SURGICAL INSTRUMENT OF THE FORCEPS TYPE

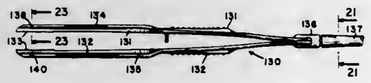
Harold D. Kletschka, Minneapolis, and Edson D. Rafferty, Excelsior, both of Minn., assignors to Bio-Medicus, Inc., Minnetonka, Minn.

Continuation of Ser. No. 562,126, Mar. 26, 1975, abandoned, which is a continuation of Ser. No. 446,408, Feb. 28, 1974, abandoned, which is a continuation-in-part of Ser. No. 384,461, Aug. 1, 1973, abandoned, which is a continuation of Ser. No. 198,900, Nov. 15, 1971, abandoned. This application Apr. 8, 1976, Ser. No. 674,916

The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.

Int. Cl.[2] A61B *17/28;* A61M *1/00*

U.S. Cl. 128—354 **44 Claims**



33. A suction surgical instrument comprising:
(a) at least one elongated leg member of predetermined length and having a functional end constructed to perform a surgical function;
(b) a fluid conduit tube externally affixed to at least a portion of said elongated leg member, said fluid conduit tube being adapted for connection to a source of fluid pressure;
(c) said fluid conduit tube terminating in an open end of predetermined cross sectional size disposed proximate the extreme functional end of said one elongated member, said open end lying in a substantially oblique plane which transects the fluid conduit tube, whereby the cross sectional size of the open end is greater than the internal perpendicular cross sectional size of the fluid conduit tube;
(d) and first and second transverse openings formed through the wall of the fluid conduit tube in a position spaced from said open end, said transverse openings being of lesser cross sectional size than said open end and disposed on opposite sides of the fluid conduit tube.

4,096,865

METHOD AND APPARATUS FOR MONITORING A TIMED FAILURE CONDITION RELATIONSHIP IN A CARDIAC PACER

Albert A. Auerbach, New York, and Sidney Steinberg, Spring Valley, both of N.Y., assignors to Medalert Corporation, New York, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,952

Int. Cl.[2] A61N *1/36*

U.S. Cl. 128—419 PT **7 Claims**

1. An improvement for detection of a sensing failure in a pacer for cardiac pacing and condition monitoring, including generating means for providing periodic cardiac stimulating signals over a predetermined time period, sensing means responsive to cardiac activity for providing an electrical signal in accordance with said cardiac activity, comparing means for comparing a threshold signal level to said electrical signal, and monitoring means providing a first output signal for changing the electrical characteristics of the signals provided by said generating means by a first amount sufficient to be discernible when said comparing means indicates that said electrical signal did not exceed said threshold level, said sensing means responsive to each spontaneous cardiac event for resetting said generating means to the initial level of said predetermined time period, the improvement comprising means for providing a first signal corresponding to each said initial level, means for providing a second signal in accordance with each said spontaneous cardiac event, means for coincidently comparing said first and second signals, means for generating a second output signal in response to said first and second signals not coinciding, said lack of coincidence indicating a sensing failure, and means responsive to said second output signal for changing the electrical characteristics of the signals provided by said generating means by a second amount sufficient to be discernible.

4,096,866

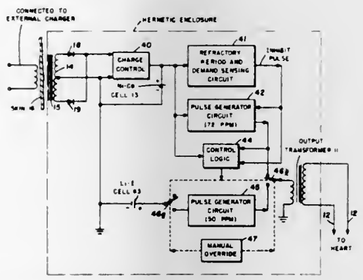
RECHARGEABLE BODY TISSUE STIMULATOR WITH BACK-UP BATTERY AND PULSE GENERATOR

Robert E. Fischell, Silver Spring, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Division of Ser. No. 682,505, Apr. 30, 1976, abandoned. This application Jul. 29, 1977, Ser. No. 820,545

Int. Cl.[2] A61N *1/36*

U.S. Cl. 128—419 PG **8 Claims**



1. An implantable stimulator for applying electrical stimulation to body tissue of a patient comprising,
means constituting a source of operating energy,
generator means operably connected to receive operating energy from said source means for generating said electrical stimulation,
said generator means including a circuit means forming a first primary generator of electrical stimulation and a circuit means forming a second stand-by generator of back-up electrical stimulation,
circuit means operably connected to said first primary and second stand-by generators for applying said electrical stimulation, and
control means responsive to the output of said first primary generator for selectively rendering said second stand-by generator effective to apply said back-up stimulation if said first primary is not properly generating said electrical stimulation.--

4,096,867

APPARATUS FOR PYROLYZING TOBACCO

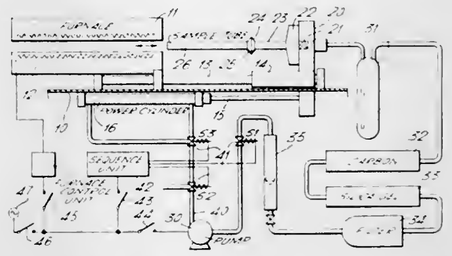
Terence Michael Long, Yatton, and Clifford Hendrik Henneveld, Oldland Common, both of England, assignors to Imperial Group Limited, London, England

Filed Oct. 12, 1976, Ser. No. 731,223

Claims priority, application United Kingdom, Oct. 10, 1975, 41648/75

Int. Cl.[2] A24F *1/10, 47/00*

U.S. Cl. 131—171 R **9 Claims**



1. Apparatus for use in determining the total particulate matter in tobacco smoke comprising, (a) a filter device, (b) within the filter device a filter for extracting particulate matter from tobacco smoke passing through the filter, (c) a reusable non-combustible cartridge for holding a charge of tobacco and having an inlet and an outlet, (d) means for mounting the cartridge when charged with tobacco on the filter device such that air passing through the tobacco charge will pass from the cartridge outlet through the filter, (e) heater means for pyrolysing the tobacco charge within the cartridge, and for enclosing at least a portion of the cartridge including the inlet tobacco, (f) pump means to draw air continuously through the tobacco charge and filter, and, (g) control means (i) for controlling the heater means to pyrolyse the tobacco charge, (ii) for controlling the pump means to draw air continuously through the charge and thence through the filter until the charge has been completely pyrolysed, and, (iii) for thereafter resetting the apparatus for pyrolysis of a further charge of tobacco within the cartridge.

4,096,868

SMOKING APPARATUS AND METHODS OF CONSTRUCTING AND UTILIZING SAME

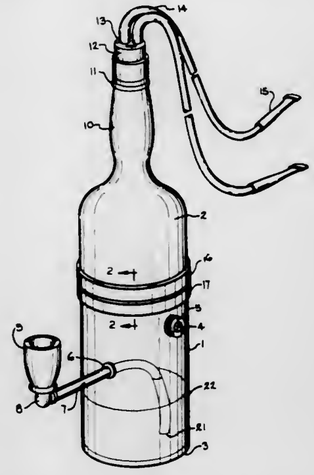
Tom Norman, Flint, Mich.

Filed Nov. 5, 1976, Ser. No. 739,076

Int. Cl.[2] A24F *1/30*

U.S. Cl. 131—173 **5 Claims**

1. A smoking apparatus comprising:
an open top bottle of the commonly-available type having an elongated upper neck portion with a cross section substantially smaller than a similarly oriented cross section of said bottle near the bottom closed end of said bottle, said bottle being substantially of the same general configuration as a standard beverage bottle:
said bottle being segmented to form a lower bottle portion including a closed bottom end and an open top section large enough to enable standard size ice cubes to pass therethrough, and an upper bottle portion including an open top end and an open bottom section adapted to detachably engage said open top section of said lower bottle portion;
a first aperture provided in said lower bottle portion, said first aperture having removably disposed therein a tube extending from said first aperture;
said tube having detachably secured at the outer end thereof a pipe bowl for retaining therein at least one smokable product, while the inner end of said tube extends downwardly into the interior of said lower bottle portion into close proximity with said closed bottom end of said lower bottle portion so as to be submerged within a liquid and/or ice cooling medium selectively disposed in said lower bottle portion for cooling smoke which passes from said smokable product through said tube into said lower bottle portion;
a second aperture provided in said lower bottle portion, said second aperture being disposed above the level of said cooling medium to serve as a ventilation hole for said apparatus;



a removable stopper member disposed in said open top end of said upper bottle portion to substantially cover and seal said open top end;
said stopper member having provided therethrough at least one aperture; and
a tube provided in said aperture of said stopper member and extending outwardly therefrom to enable a user of said smoking apparatus to inhale smoke therethrough.

4,096,869

FORMULATION FOR THE DISSOLUTION OF GYPSUM

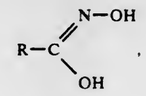
Michael B. Lawson, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed May 5, 1977, Ser. No. 794,277

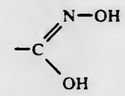
Int. Cl.[2] C23G *1/02*

U.S. Cl. 134—3 **10 Claims**

1. A method for dissolving gypsum comprising contacting said gypsum with a solvent composition consisting essentially of water and an agent selected from the group consisting of a hydroxamic acid, represented by the formula



an alkali metal salt of said hydroxamic acid, an amine salt of said hydroxamic acid, an alkanol amine salt of said hydroxamic acid and mixtures thereof wherein R is selected from hydrogen, alkyl groups having 1 to 10 carbon atoms and the group



and further wherein said salts are those derived from the reaction of said acid with alkali metal hydroxides, ammonia, ammonium hydroxide, ethylenediamine, monoethylamine, mono-

methylamine, monoethanolamine, diethanolamine, triethanolamine and mixtures thereof.

4,096,870

METHOD FOR CLEANING SOFT HYDROPHILIC GEL CONTACT LENSES

John A. Manfuso, Jr., Chevy Chase, Md., assignor to Burton, Parsons and Company, Inc., Washington, D.C.

Filed Jun. 9, 1977, Ser. No. 805,147
Int. Cl.[2] B08B *3/08*
U.S. Cl. 134—28 **7 Claims**

3. A method for removing proteinaceous deposits from hydrophilic polymer gel contact lenses comprising:

dispersing an effective cleaning amount of an eye-compatible enzyme formulation in water to form a slurry, said formulation being in the form of a tablet consisting essentially of pancreatin 4X, sodium chloride and boric acid;

contacting said lenses with said slurry for at least 10 minutes to remove said proteinaceous deposits; and

rinsing the cleaned lenses to remove pancreatin from the lens surfaces.

4,096,871

DRAIN OPENING METHOD

Eftichios Van Vlahakis, Northbrook, Ill.

Continuation-in-part of Ser. No. 614,306, Sep. 17, 1975, abandoned. This application Apr. 13, 1976, Ser. No. 676,570
Int. Cl.[2] B08B *7/04;* **C23G** *1/02*
U.S. Cl. 134—40 **1 Claim**

1. A method of opening domestic or industrial drain clogs comprising of the steps of:

a. contacting said clog with an aqueous sulfuric acid composition, consisting essentially of an aqueous solution of between 80.8% to 84.5% by weight of sulfuric acid, 0.1–0.5% by weight of corrosion inhibitors, and 15.0–19.1% by weight of inert materials including 10–19% by weight of water, to dissolve said clog in less than 5 minutes;

b. said composition producing heat of solution upon dissolution with water in said drain adjacent said clog in the range of 1:1±0.1 by volume in an amount sufficient to raise the temperature of fluid adjacent said clog in the range of about 161° F (71.6° C) to 172° F (77.8° C); and

c. flushing said dissolved clog material with water.

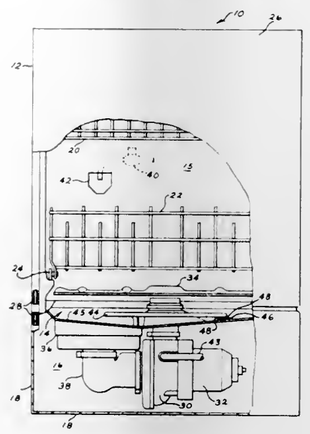
4,096,872

HEAT SHIELDING STRUCTURE FOR DISHWASHERS

LeRoy J. Herbst, and Thomas E. Jenkins, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Mar. 3, 1977, Ser. No. 774,208
Int. Cl.[2] B08B *3/02, 13/00*
U.S. Cl. 134—105 **8 Claims**

1. In a dishwasher including a tub formed of a material subject to deformation under heat, said tub including a sloping bottom wall, and a heating element for drying article placed in said tub, said heater being in relatively close spaced relationship with a portion of said bottom wall, a heat shielding structure for preventing deformation of said bottom wall under heat from said heating element during the drying operation comprising a shallow receptacle disposed on said bottom wall



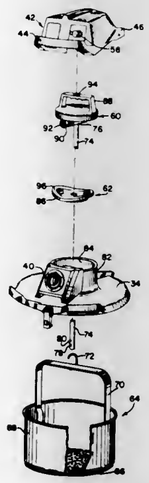
between said heater and said bottom wall for collecting a small quantity of the water employed in the washing operation.

4,096,873

IMMERSION CLEANER

Karl G. Otzen, Brookfield, Wis., assignor to Safety-Kleen Corporation, Elgin, Ill.

Filed Jun. 20, 1977, Ser. No. 808,169
Int. Cl.[2] B08B *3/04*
U.S. Cl. 134—135 **11 Claims**



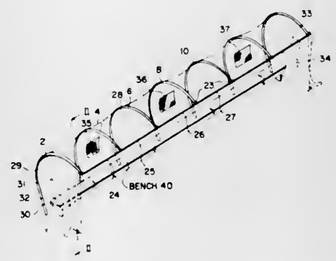
1. An immersion cleaner for parts and articles comprising, in combination, a receptacle for articles, a cover unit for a container of cleaning liquid, a cam plate unit disposed on said cover and including a circumferentially extending cam track surface having axially undulating portions, a combination receptacle support and cam follower unit having a vertical axis of rotation and being disposed in use above said cam plate, said receptacle support unit including means adapted to engage said cam track and to ride thereover upon oscillation of said support unit about said axis thereof, means attached to a portion of said support unit for forming an operative connection between said receptacle and said support unit, said connecting means extending through a portion of said cover, means on said support unit for receiving a driving force for oscillating said support unit about said axis, and means for securing said cover unit to a container for a cleaning liquid, said securing means being adapted to permit closing of said cover unit to prevent escape of the contents therefrom and to permit opening said cover unit for access to said receptacle and to the interior of said cleaning liquid container.

4,096,874

WEATHER SHELTER

Mark G. Weatherly, Lynchburg, Va., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 8, 1977, Ser. No. 785,743
Int. Cl.[2] E04F *10/04*
U.S. Cl. 135—5 R **3 Claims**



1. A disassembleable and portable weather shelter, comprising

a plurality of like shelter supports equidistantly horizontally spaced in parallel vertical planes, each support consisting of a curved elongated unit having a central section resembling the letter C, said section having a lower end portion which extends vertically below said section and terminating in a bottom pointed end, each section having an upper end portion shorter than the lower end portion and extending upwards and outwards to form a stub, each of said supports including two curved hollow tubes, one slidable and adjustably positioned within the other;

a plurality of elongated connector members, the number of connector members being one less than the number of supports, each of said connector members having spaced opposite ends and being connected at each end to a stub of a corresponding one of a corresponding pair of next-adjacent supports and extending horizontally therebetween, the combination of supports and connector members defining a frame; and

a flexible waterproof cover applied over the frame and secured thereto, said cover having an opening extending vertically from the stubs to the lower end portions and extending horizontally along the entire frame and including end parts extending next-adjacent the supports at the opposite ends of said plurality of supports, each of the end parts having screened cutouts formed therein and flaps for selectively covering said cutouts.

4,096,875

PRESSURE FLUID-ACTUATED OSCILLATOR

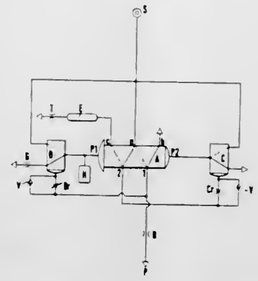
Norman Stewart Jones, Leighton Buzzard, and Geoffrey Richard Bennett, Linslade, both of England, assignors to Pneupac Limited, London, England

Filed Mar. 5, 1976, Ser. No. 664,185
Claims priority, application United Kingdom, Mar. 7, 1975, 9697/75
Int. Cl.[2] A61M *16/00*
U.S. Cl. 137—102 **6 Claims**

1. A pressure fluid-actuated oscillator comprising

(a) a double-piloted five-port valve including an inlet port for receiving the pressure fluid, two outlet ports and two exhaust ports;

(b) two biased timer valves respectively connected to a respective one of the outlet ports to control oscillating change-over between two part-cycles of the five-port valve, the inlet port being in communication with one of the outlet ports during each part-cycle of the oscillating change-over, and the other outlet port being in communication with a respective one of the exhaust ports during each part-cycle, and each of the timer valves being set at a timing period determining the respective part-cycle;



(c) control means for directly adjusting the timing period of one of the timer valves whereby the duration of the part-cycle of the oscillating change-over controlled by the one timer valve is directly adjusted; and

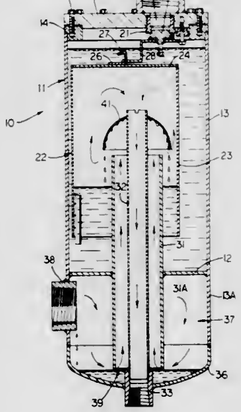
(d) means sensitive to the duration of said part-cycle for determining the timing period of the other timer valve.

4,096,876

CONDENSATE CONTROLLER

Otho E. Ulrich, Three Rivers, Mich., assignor to Armstrong Machine Works, Three Rivers, Mich.

Filed Jul. 2, 1976, Ser. No. 702,150
Int. Cl.[2] F16T *1/30*
U.S. Cl. 137—185 **5 Claims**



1. In a condensate controller comprising a casing having a bottom wall, a side wall and a top wall and defining a closed compartment, an inverted bucket vertically movable inside the compartment, a condensate discharge valve in the top wall of the compartment, valve operating means connected to said bucket for opening and closing the valve in response to the vertical position of said bucket in said compartment, an inlet conduit for vapor and condensate extending upwardly through said bottom wall into the bucket and a blow-thru conduit extending upwardly through said bottom wall into the bucket to a position above the upper end of said inlet conduit whereby vapor can continuously escape from the bucket regardless of the vertical position of the bucket in the compartment, the improvement which comprises: wall means defining a closed

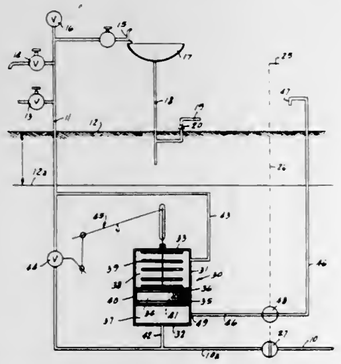
chamber connected to said casing and located below the bottom wall thereof, an inlet connection for supplying vapor and condensate into the upper end of said chamber, said chamber defining a vapor space for absorbing pressure surges in the pressure of the vapor and condensate fed into said chamber, said inlet conduit extending downwardly through said chamber to a location close to, but spaced upwardly from, the lower end of said chamber, the lower end of said inlet conduit defining an opening providing the sole communication between said chamber and the interior of said inlet conduit, said opening as defined at the lower end of said inlet conduit being located below said inlet connection so that the vapor and condensate entering through said inlet connection flow downwardly to the lower end of said chamber and then the vapor flows upwardly through said opening into said inlet conduit and carries with it portions of condensate whereby to maintain the level of condensate in said chamber close to the lower end of said inlet conduit, said blow-thru conduit extending through the lower end of said chamber for discharging outside the chamber the vapor that flows through said blow-thru conduit, and a flow-impingement plate positioned adjacent the upper end of said inlet at an elevation below the upper end of said blow-thru conduit, said plate having a lower concave surface opening downwardly and being disposed in confronting relationship to the open upper end of said inlet conduit, the lower and radially outer edge of said concave surface being disposed radially outwardly of the upper edge of said inlet conduit.

4,096,877

FREEZEPROOF SANITARY WATER SUPPLY APPLIANCE

E. R. Arledge, II, 5600 "C" St., Little Rock, Ark. 72205

Filed May 17, 1976, Ser. No. 687,327
Int. Cl.[2] E03B *9/04*
U.S. Cl. 137—281 **18 Claims**



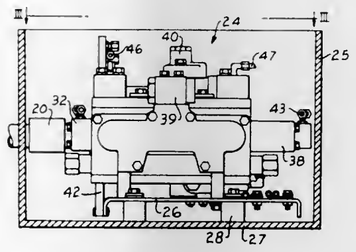
1. A freeze-proof sanitary valve assembly comprising:
a housing forming a combined cylinder and liquid reservoir and adapted to be buried in soil beneath a local frost line;
a piston means slidable in said cylinder and normally sealingly dividing said reservoir into variable first and second chambers;
bias means urging said piston means to a position minimizing the volume of said first chamber;
a pressurized water supply line selectively communicating to said first chamber;
an exposed water outlet device through which water passes to atmosphere and communicating to said second chamber;
valve means responsive to movement of the piston means for selectively communicating said supply line to said outlet device when said piston means has moved to minimize said volume of said second chamber;
said bias means being overcome by water pressure from said supply line exerted upon said piston means in opposition to the force of said bias means and permitting said movement of said piston means; and
a pump-out passage selectively communicating said first chamber to atmosphere,
whereby upon inflow of water from said supply line said piston is moved through the cylinder and reservoir against said bias means to a fully charged position, whereupon said valve means opens to permit flow of said water to said outlet device, and whereby upon termination of said flow and movement of said piston away from said fully charged position under the urging of said bias means said valve means closes, water in said first chamber is pumped therefrom through said pump-out passage by said piston in a pump-out stroke, and said stroke simultaneously draws water from said water outlet device into said second chamber.

4,096,878

VALVE GROUP SUBASSEMBLY

Stanley B. Adams, Yorkville; Gregory A. Loebbaka, Aurora, and Michael P. Morge, Oswego, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 9, 1976, Ser. No. 675,360
Int. Cl.[2] F16K *51/00*
U.S. Cl. 137—351 **10 Claims**



1. In a vehicle having hydraulically operable mechanisms, means for providing controlled delivery of hydraulic fluid from a pressurized supply to said mechanisms including a plurality of main valves and a plurality of pilot valves for controlling operation of the main valves, each of said valves having removable movable valve members, a cab, a housing carried by the vehicle remotely of the cab, and operator-controllable controls in said cab for operating said pilot valves, the improvement comprising: a unitary support; means mounting said main valves to said support; means mounting said pilot valves to said support; a manifold; means mounting said manifold to said support; interconnecting duct means hydraulically interconnecting said valves and manifold; connecting means for removably connecting said interconnecting duct means to said supply; connecting means for removably hydraulically connecting said main valves to said vehicle mechanisms; connecting means for removably hydraulically connecting said pilot valves to said controls in said vehicle cab; and means for removably mounting said support with said valves, duct means, and connecting means as a unit in said housing with said valves disposed to permit removal of said removable valve members from the valves with the valve body portion being maintained mounted to the support.

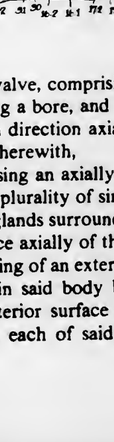
4,096,879

ADJUSTABLE FLUID FLOW REGULATOR

Juan Ricardo Serur, Brookline, and Herbert Heinz Loeffler, Arlington, both of Mass., assignors to International Biomedical Laboratories, Inc., Boston, Mass.

Continuation-in-part of Ser. No. 715,907, Aug. 19, 1976, abandoned. This application Sep. 27, 1976, Ser. No. 726,591
Int. Cl. F16k *21/18*
U.S. Cl. 137—391 **21 Claims**

1. In a rate of flow regulator for use in a gravity assisted fluid delivery system, the regulator comprising: an upper fluid chamber having a fluid inlet and a fluid outlet and further having means for maintaining a predetermined level of fluid in said upper chamber; a separate lower fluid chamber having a fluid inlet and a fluid outlet; a flexible tube connecting said fluid inlet in fluid flow communication with said upper chamber fluid outlet; and vent means for communicating atmospheric pressure to each said chamber; the improvement in which structure defining a restricted metering orifice of predetermined cross-sectional area at said lower chamber fluid inlet in the fluid flow path from said upper chamber to said lower chamber for metering fluid flow to said lower chamber, said tube connected to said metering orifice structure; the vertical distance between said lower chamber and said upper chamber is adjustable to vary the distance between said metering orifice and said predetermined level in said upper chamber whereby fluid flow rate between said chambers may be adjusted by adjusting said vertical distance.

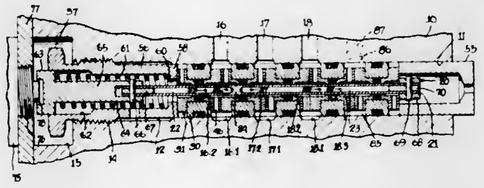


4,096,880

CARTRIDGE VALVE

John C. Lemmon; Donald R. Olson, both of Salem, and Dean E. Zepernick, Hanoverton, all of Ohio, assignors to Hunt Valve Co., Inc., Salem, Ohio

Filed Sep. 15, 1976, Ser. No. 723,320
Int. Cl.[2] F16K *3/26*
U.S. Cl. 137—454.2 **16 Claims**



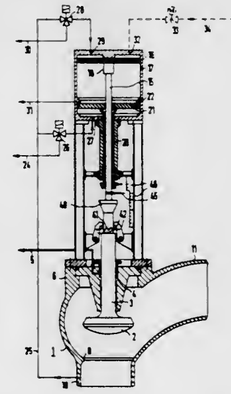
1. A fluid control valve, comprising:
a valve body having a bore, and a plurality of lateral ports spaced-apart in a direction axially of said bore and each communicating therewith,
a cartridge comprising an axially reciprocable, cylinderical valve plunger, a plurality of similar separators and a plurality of similar glands surrounding said plunger in predetermined sequence axially of the latter,
said glands each being of an external diameter to closely but slidably fit within said body bore and carrying sealing means on an exterior surface to seal against fluid flow along said bore, each of said glands having a circular opening of a diameter larger than the external diameter of said valve plunger,
said separators each having a head portion of a diameter smaller than said body bore but larger than the opening in a gland, and each having a stem portion adapted to closely but slidably fit within an end of a gland opening,
each separator having a circular opening of a larger diameter than the external diameter of said valve plunger, such opening extending from the side face at said head portion toward but short of the opposite side face at said stem portion and merging thereat with a smaller diameter portion which closely but slidably fits over said valve plunger,
said separators and said glands being arranged in sequence on said valve plunger and stationary within said body bore with a pair of separator head portions on opposite side faces of a respective one of said glands and with side faces of adjoining head portions in abutment, said stem portions of the separators on opposite sides of a gland closely but slidably fitting within opposite ends of a respective gland opening, the end faces of such stem portions being held from abutment to provide an annular space therebetween, and a seal within each such space to seal against fluid flow along the exterior surface of said plunger,
said separator circular openings providing annular chambers about said valve plunger, which chambers are separated axially along said plunger and which communicate with respective ports of said valve body, and
said valve plunger being hollow and having radial ports cooperable with said seperator chambers to regulate flow of fluid between said valve body ports.

4,096,881

NUCLEAR-REACTOR STEAM-GENERATOR SHUT-OFF VALVE

Hans-Peter Schabert, and Erwin Laurer, both of Erlangen, Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim an der Ruhr, Germany

Filed Jun. 26, 1975, Ser. No. 590,674
Claims priority, application Germany, Sep. 26, 1974, 2446044
Int. Cl. F16k *31/122*
U.S. Cl. 137—492 **9 Claims**



1. A fast acting valve for use in the live steam line of a nuclear reactor installation, which steam line leads from a containment to outside thereof, comprising:
a. a valve housing having a valve seat with an aperture corresponding to the diameter of the live steam line;
b. a valve disc adapted for reciprocal motion with respect to said valve seat to move from a position where it fully closes said aperture to a position where said aperture is fully open providing within the valve a cross section corresponding to the cross section in the live steam line,

said valve disc supported for said reciprocal motion on a valve stem;

c. a first piston and cylinder arrangement having a piston rigidly coupled to said valve stem, said piston having a range of travel at least equal to the travel of said valve disc between said fully open and fully closed positions;

d. a second piston and cylinder arrangement with a range of travel between first and second end positions less than the range between said fully opened and fully closed positions coupled to said stem such as to be moved to said first end position when said valve disc is in the fully closed position and such as to permit moving said valve disc and stem from said closed position to a first intermediate position when at its second end position;

e. means coupled to the inlet side of said valve for supplying the steam pressure therein to said first piston and cylinder arrangement when there is a leak in the steam line to move said piston and move said valve disc from a fully open to a fully closed position and thereby move said second piston to its first end position; and

f. second means coupled to said inlet and responsive to an excess pressure above normal operating pressure at said inlet to admit steam to said second piston cylinder arrangement to move said piston from said first end position to said second end position thereby opening said valve to said first intermediate position.

4,096,882

CONTROL VALVE

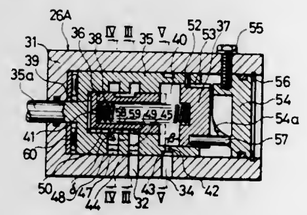
Kazuhiko Yano; Kazuhiko Otsuki, both of Nishinomiya, and Ryota Ohashi, Sakai, all of Japan, assignors to Kanzaki Kokyukoki Mfg. Co., Ltd., Amagasaki, Japan

Filed Dec. 20, 1976, Ser. No. 752,198

Claims priority, application Japan, Dec. 24, 1975, 50-155529; May 31, 1976, 51-63883; Jul. 8, 1976, 51-91567[U]

Int. Cl.² F15B *13/06*

U.S. Cl. 137—596.12 **11 Claims**



1. A control valve means comprising a valve case having an inlet port which is to be connected to a fluid pump, at least one outlet port which is to be connected to a fluid operated means, and a fluid drain port which is to be connected to a fluid tank; a rotor rotatably arranged in the valve case which rotor provides fluid passages for communicating said outlet port selectively to said fluid drain port at a neutral position thereof or to said inlet port at an operation position thereof; and a handling means for rotating said rotor selectively to one of said positions, characterized in that said rotor is provided with a hollow space having an opened rear end in which space are slidably inserted a first piston defining a first fluid chamber in the hollow space before the said piston and a second piston defining a second fluid chamber in the hollow space between said pistons, said first piston further defining a fluid passage for communicating said inlet port to said outlet port within said hollow space outside the first piston, and said first fluid chamber being communicated to said outlet port through a fluid passage formed between the rotor and first piston at said operation position of the rotor, said first and second fluid chambers being in communication to each other through a throttled fluid passage formed in the first piston, and said second fluid chamber being communicated to said fluid drain port through a fluid drain passage formed in the rotor; a compression spring provided between said first and second pistons for biasing the pistons to move apart from each other, said spring being compressed with an advance of the second piston so that force applied to the first piston by such spring is enlarged; said first piston being provided at the periphery thereof with a blocking portion which blocks said fluid passage for communicating the inlet port to the outlet port at said operation position of the rotor when the first piston has been retreated by a predetermined distance; and means for advancing said second piston by a selected distance.

4,096,883

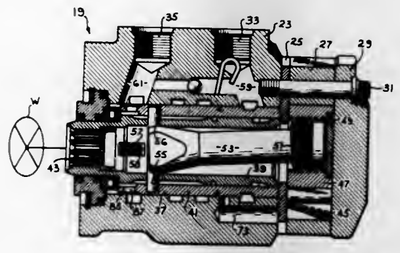
CLOSED-CENTER CONTROLLER AND NEUTRAL BYPASS ARRANGEMENT THEREFOR

James K. Yip, Richfield, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 24, 1976, Ser. No. 717,735

Int. Cl.² B62D *5/08*

U.S. Cl. 137—596.13 **9 Claims**



1. A closed-center controller for fluid pressure operated devices, said controller comprising:

(a) a housing having a fluid inlet port, a fluid return port adapted to be connected to reservoir, and a pair of control fluid ports adapted for connection to a fluid pressure operated device;

(b) valve means disposed within said housing and defining a neutral position, said valve means including a generally cylindrical, hollow valve member;

(c) said housing defining inlet passage means in fluid communication with said fluid inlet port and said valve means defining first fluid passage means in continuous fluid communication with said inlet passage means, said first fluid passage means being disposed toward an axial end of said valve means;

(d) said valve means defining a variable, main flow control orifice having a zero flow area when said valve means is in said neutral position, said orifice having a gradually increasing flow area as said valve means is displaced from said neutral position, said orifice having a maximum flow area capable of passing a maximum system flow;

(e) said housing defining return passage means in fluid communication with said fluid return port and said valve means defining second fluid passage means in continuous fluid communication between the interior of said hollow valve member, toward the opposite axial end thereof, and said return passage means;

(f) said valve means defining bypass passage means communicating between said first fluid passage means and the interior of said hollow valve member, toward said one axial end thereof, said bypass passage means including a variable bypass orifice having a flow area which is a maximum when said valve means is in said neutral position and progressively decreasing toward zero as said valve means is displaced from said neutral position; and

(g) said bypass passage means, when said bypass orifice is at a maximum flow area, being capable of passing not more than about five percent of said maximum system flow.

4,096,884

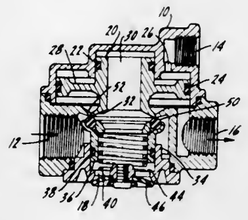
RELAY VALVE

Charles Horowitz, Niles, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.

Filed Dec. 20, 1976, Ser. No. 752,131

Int. Cl.² F16K *11/16*

U.S. Cl. 137—627.5 **8 Claims**



1. A relay valve for use in vehicle air brake systems including a housing having a service port, a supply port, at least one delivery port, and an exhaust port, a piston movable in said housing in response to pressure at said service port to control communication between said supply and delivery ports, a shuttle movable in said housing to control communication between said exhaust and delivery ports,

said shuttle having a groove and a seal positioned in said shuttle groove, sealing surfaces on said piston and housing, spring means urging said shuttle seal into sealing engagement with said piston and housing sealing surfaces thereby closing communication between said supply and delivery ports and between exhaust and delivery ports,

and vent means connecting said shuttle seal groove and said exhaust port, to prevent pressure buildup behind said shuttle seal.

4,096,885

METHOD FOR SEALING LEAKING PIPES AND REPAIR UNIT FOR USE IN THE METHOD

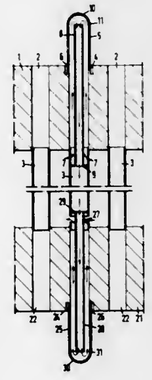
Jan Essebaggers, Nieuwerkerk aan de IJssel, Netherlands, assignor to B.V. Neratoom, The Hague, 's-Gravenhage

Filed Feb. 2, 1976, Ser. No. 654,398

Claims priority, application Netherlands, Feb. 5, 1975, 7501372

Int. Cl.² F16L *55/18*; F28F *11/00*

U.S. Cl. 138—97 **5 Claims**



1. A method for sealing off a leaking pipe in a bundle of pipes having first and second open ends terminating, respectively, in spaced apart first and second header plates of an apparatus adapted to transfer heat between a fluid flowing through the pipes from the outer side of one header plate to the outer side of the other header plate and a liquid flowing through the space surrounding the pipes between the inner sides of the header plates, the method including severing the leaking pipe adjacent to the inner side of the first header plate to permit liquid to enter the pipe from said surrounding space and to prevent thermal stresses in the pipe, and sealing the openings to the first and second ends of the pipe with first and second closure members from the outer sides of the first and second header plates, respectively, wherein the improvement comprises:

making at least one opening through the wall of said leaking pipe adjacent to the inner side of the second header plate to permit liquid to flow between the surrounding space and the pipe interior at the at least one opening and

longitudinally dividing the interior of the pipe at said first and second ends into first flow paths connecting the interior of the pipe inward of the severed portion and the at least one opening with the inner sides of the first and second closure members, respectively, and second flow paths between the inner sides of the first and second closure members, and the severed portion and the at least one opening in the pipe wall, respectively, such that liquid passing through the severed portion and the at least one opening through the pipe wall will traverse the entire length of the pipe and flow past the inner faces of the first and second closure members, thereby avoiding any region of stagnant liquid adjacent to the closure members.

4,096,886

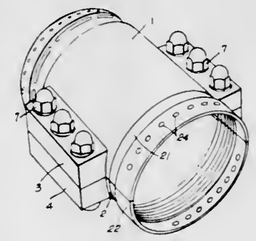
CLAMP FOR REPAIR OF LEAKING UNDERWATER PIPELINES

Ronald Albert Daspit, 2401 Delille St., Chalmette, La. 70043

Filed May 2, 1977, Ser. No. 784,340

Int. Cl.² F16L *55/16*

U.S. Cl. 138—99 **1 Claim**



1. A clamp for repair of leaking underwater pipelines employing two matching semicircular segments with longitudinal flanges on each segment and fastening means passing through apertures in said segments to secure them together, aligning slots in each opposing faces of the segments, elongated seals in said slots, annular seals at the ends of the segments, adapted to seal the clamp against leakage from the pipe on which it is mounted and circular grooves adjacent the ends of the clamp, externally thereof, a shroud spaced from the circular grooves and extending to the end of the clamp at each end thereof, a plurality of ribs supporting the shroud to the clamp, and a plurality of apertures spaced about the periphery of the shroud for passage of liquid therethrough.

4,096,887

MULTIBORE CONDUIT

Kenneth F. Streit, Mt. Prospect, Ill., assignor to Phone-Ducs, Inc., West Chicago, Ill.

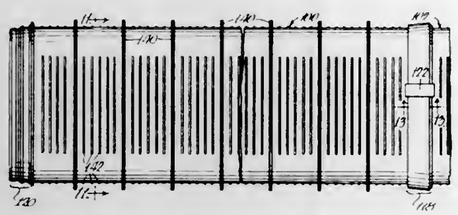
Filed Jul. 28, 1976, Ser. No. 709,491

Int. Cl.² F16L *9/22*

U.S. Cl. 138—117 **8 Claims**

1. An elongated lightweight injection molded plastic conduit section with male and female ends comprising: an enclosing wall means of given thickness having first and second pairs of generally flat parallel walls having adjacent ends intercon-

nected by integral radial portions to define an elongated smooth surfaced, generally planar rectangular passage therein with partition wall means integral with said enclosing wall means to divide said passage into a plurality of elongated passageways, a plurality of longitudinally spaced transversely continuous reinforcing ribs extending outwardly from a peripheral surface of said enclosing wall means, said ribs extending completely around the periphery of said enclosing wall means, a plurality of transversely extending ridges extending outwardly from the peripheral surface each of said parallel walls, said ridges being spaced from one another and from said ribs and said ridges being parallel to said ribs and to one an-



other with at least two elongated ridges on each wall between adjacent pairs of ribs, said ridges each having an elongated dimension less than the dimension between opposite edges of an associated wall with all of said ridges terminating in common planes extending generally parallel to said passageways and spaced from said radial portions, each of said ridges having a substantially constant height and cross-section throughout a major portion of the length thereof, each of said ribs having a constant height throughtout the length thereof with the height of said ribs being substantially greater than the height of said ridges, the enclosing wall means between said ribs and said ridges being flat and having said given thickness dimension.

4,096,888

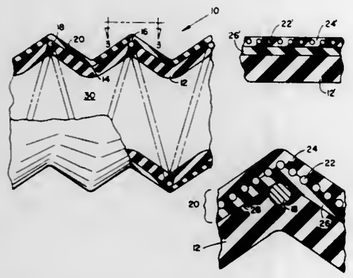
HALOGENATED BUTYL INTERLAYER FOR REINFORCED ELASTOMERIC HOSE ARTICLES

Gene E. Stefano, Littleton, and David N. Tally, Arvada, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Filed Jul. 7, 1975, Ser. No. 593,591

Int. Cl.² F16L *11/08, 11/12*

U.S. Cl. 138—125 **12 Claims**



1. A unitary reinforced vulcanized elastomeric hose article for conveying fluids including an inner tube and outer cover which are composed of dissimilar polymers not readily bondable to one another comprising:

an inner heat setting elastomeric tube of a given permeability to the conveyed fluids and composed of a terpolymer of mixed mono-olefins and polyolefins;

an outer heat setting elastomeric cover;

a reinforcement embedded within the hose article and telescoped over and free from contact with the inner tube; and

an elastomeric tie gum layer of a heat setting halogenated butyl interposed between and mutually securely bonded to each of said inner tube and outer cover;

said tie gum layer exhibiting a substantially lower permeability to the conveying fluids than said given permeability to thereby provide an internal fluid barrier for the hose article and protection to the embedded reinforcement.

4,096,889

WEAVING LOOM

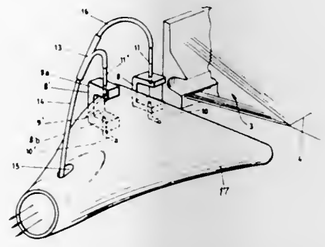
Adrianus Johannes Franciscus Larmit, Moergestel, Netherlands, assignor to Ruti-te Strake B.V., Deurne, Netherlands

Filed Jan. 6, 1977, Ser. No. 757,234

Claims priority, application Netherlands, May 31, 1976, 7605882

Int. Cl.² D03D *47/28*

U.S. Cl. 139—435 **5 Claims**



1. A loom comprising two sheets of warp threads which are momentarily held in diverging planes to form a weaving shed with a conveying tunnel for wefts, a blowing nozzle arranged in position at one side of such shed to propel wefts through such shed by means of a fluid discharged from said nozzle, and a main tensioning device arranged in position at the other side of such shed, operating with a fluid jet, to tension inserted wefts during the heating up movement of the loom, wherein the improvement comprises so arranging the jet that the jet issues substantially, transversely, and freely across the conveying tunnel to suck in the weft and is caught by a passage disposed in alignment with said jet, and an auxiliary tensioning device similar to the main tensioning device is provided at the main tensioning device, the main and auxiliary tensioning devices being used for normal and startup operations, respectively, and each having fluid pressure supply means for normal or startup operation.

4,096,890

WOVEN FABRIC UTILIZING A PARTICULAR TEXTURED YARN AND METHOD FOR MANUFACTURING THE SAME

Haruhiko Kusakabe; Masashi Makita, and Masutoshi Ueda, all of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

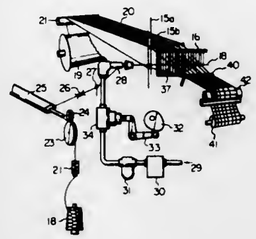
Continuation-in-part of Ser. No. 630,753, Nov. 10, 1975, abandoned. This application Jun. 1, 1977, Ser. No. 802,523

Claims priority, application Japan, Nov. 12, 1974, 49-129556; Nov. 12, 1974, 49-129557

Int. Cl.² D03D *47/28*

U.S. Cl. 139—435 **5 Claims**

1. A process for producing a woven fabric from a false twisted, multifilament yarn by means of a power loom provided with healds and a reed, which comprises a first step of preparing an interlaced yarn for utilization as warp from a false twisted multifilament yarn made from a multifilament yarn without twist, in such a condition that the degree of interlacing of said inter laced multifilament yarn (CF value) is in a range between 100 and 260, a second step of carrying out a weaving operation by using said interlaced yarn without sizing as the warp by means of a power loom in such a condition that an average tension applied to said warp is in a range between 0.1 and 1.0 g/d, and each said warp contains water in at least 30



weight percent of said warp in a weaving zone between said healds and a cloth-fell defined by a beating motion of said reed.

4,096,891

METHOD AND APPARATUS FOR AUTOMATICALLY FORMING WIRE FRAMES

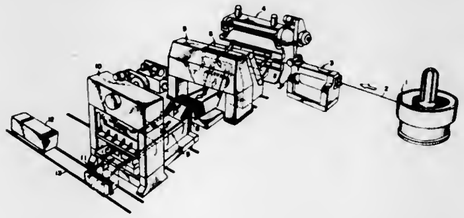
Katsuyasu Suzuki, Aichi; Yoshitoshi Morita, and Motoo Morita, both of Nagoya, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha and Morita Iron Works Co., Ltd., both of Japan

Filed Jun. 8, 1977, Ser. No. 804,811

Claims priority, application Japan, Dec. 10, 1976, 52-149052

Int. Cl.² B21F *1/00, 21/00, 45/00*

U.S. Cl. 140—1 **2 Claims**



2. A production line for automatically forming wire frames comprising:

a wire reel stand for holding wire stock rolled on a reel;

a wire straightening machine located adjacent said wire reel stand which straightens the wire stock unrolled from said wire reel stand;

a location stamping press provided adjacent to a wire stock exit side of said wire straightening machine in a direction of the wire stock for cutting the advancing wire stock into prescribed lengths and forming ripples in the cut wire stock sections and ejecting the rippled cut wire stock sections in a lateral direction;

a press bender auto loader located adjacent to the wire stock ejection side of the location stamping press for gathering a prescribed number of rippled cut wire stock sections ejected from the location stamping press and intermittently feeding them to a next process;

a press bender provided adjacent the press bender auto loader which receives the intermittently fed rippled cut wire stock sections from the press bender auto loader and which simultaneously bends a prescribed number of wire stock sections received from the press bender auto loader in the same plane as the ripples;

a press bender unloader which removes the wire stock sections from the press bender after the completion of the pressing;

a wire stock separating device which pools the wire stock sections which have been removed from the press bender unloader and conveys them singly onwardly at prescribed intervals;

a three-dimensional bending press which receives the singly conveyed separated wire stock sections and which presses a three-dimensional bend into each of the wire stock sections; and

a three-dimensional bending press auto loader which is provided between the wire stock separating device and the three-dimensional bending press for loading the wire stock sections from the wire stock separating device into the three-dimensional bending press at one time, said three-dimensional bending press auto unloader further including an unloader arm which simultaneously ejects the wire stock sections which have been bent by the three-dimensional bending press.

4,096,892

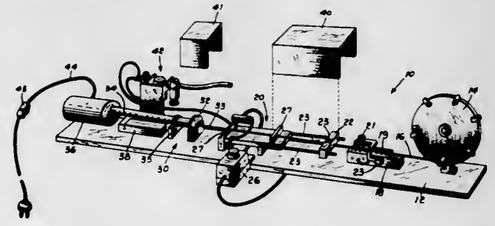
RIGID COAXIAL CABLE CUTTING AND SCORING MACHINE

Humberto F. Guevara, New Haven, and Michael R. Geimer, Fort Wayne, both of Ind., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Filed Feb. 28, 1977, Ser. No. 773,367

Int. Cl.² B21F *11/00*

U.S. Cl. 140—140 **4 Claims**



1. A device for cutting and/or scoring variable precision lengths of variable diameter tubular materials, particularly rigid or semi-rigid coaxial cable and small diameter tubing, including:

supply means for holding a continuous length of said tubular material;

adjustable diameter means for straightening said material;

feeding means for drawing an adjustably predetermined length of said material from said supply means through said straightening means and for advancing and guiding said straightened predetermined length of said material;

means for positioning said predetermined length of straightened material in means for cutting and/or scoring said material;

additional means associated with said cutting and/or scoring means for scoring the end of one predetermined length of said material, for cutting said material to said predetermined length and for scoring one end of the next length of said material;

said drawing means operating to cause a previously cut predetermined length of said material to advance beyond said cut and/or scoring means to cause said previously cut predetermined length of said material to advance;

means for activating said feeding means and said cutting and/or scoring means; and

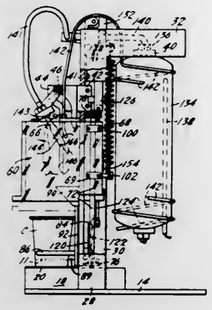
means for receiving said cut and/or scored predetermined lengths of said material.

4,096,893

SYSTEM AND APPARATUS FOR THE RECONSTITUTION OF A FOOD OR BEVERAGE CONCENTRATE

John K. Harvey, Jr., Fairfield; Morris T. Watson, Danbury, both of Conn.; Constantine F. Economy, Allentown, and Robert J. LeFevre, Bethlehem, both of Pa., assignors to American Can Company, Greenwich, Conn.

Filed Oct. 4, 1976, Ser. No. 729,033
Int. Cl.[2] B65B *3/34*
U.S. Cl. 141—90 **19 Claims**



1. A system for reconstituting food concentrates and the like comprising, a container having an open end and a food concentrate disposed therein, a pierceable and peelable cover adhered over said open end, means defining a source of reconstituting fluid, injection means comprising nozzle means in fluid flow communication with said source for discharging said fluid and piercing means connected therewith, said nozzle means and said piercing means operable for substantially vertical movement from a first, retracted position to a second, extended position to pierce said cover to form an opening therein and position said nozzle means to inject said fluid into said container through said opening to mix with and reconstitute said food concentrate, said nozzle means and said piercing means in said retracted position further being displaced laterally as respects the direction of vertical movement, mechanism for guiding said nozzle means and said piercing means between said retracted and said extended positions, means defining a source of rinsing fluid, means for directing rinsing fluid from said last recited source over said nozzle means and said piercing means upon movement thereof to said retracted position, means for positioning said container in relation to said nozzle means and said piercing means at said extended position to accommodate said piercing and said fluid injection, and means for controlling respective durations of the recited discharge of reconstituting fluid and direction of rinsing fluid in the corresponding extended and retracted positions of said injection means.

4,096,894

DUST COLLECTION DEVICE

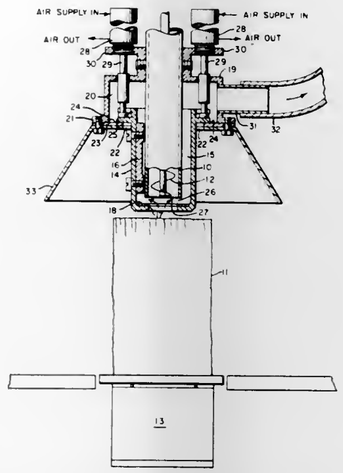
Richard Ernest Guy, Baytown, Tex., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 10, 1977, Ser. No. 823,325
Int. Cl.[2] B65B *1/28*
U.S. Cl. 141—93 **4 Claims**

1. In a container filling machine for powdered materials of the type wherein the material is dispensed into the containers through a generally vertical elongated filler tube, the improvement which comprises, in combination;

a dust collecting chamber mounted on the upper portion of said filler tube coaxial therewith and extending outwardly to form a first annular cavity between said filler tube and the inner surface of said dust collecting chamber, said chamber terminating in a peripheral edge forming an opening surrounding said filler tube, said peripheral edge having a first sealing surface thereon;

a sleeve, coaxial with and moveable along the lower portion of said filler tube, arranged to form a second annular cavity integral with said first annular cavity between the outer surface of said filler tube and the inner surface of said sleeve, the lower end of said sleeve adapted to form a second annular sealing surface with the bottom of said filler tube, the upper end of said sleeve adapted to engage said first sealing surface;



means to move said sleeve reciprocally along the longitudinal axis of said filler tube from a first position at which said upper end of said sleeve engages said first sealing surface while said lower end of said sleeve forms an annular opening around the bottom of said filler tube, to a second position at which said lower end of said sleeve engages said bottom end of said filler tube while said upper end of said sleeve forms an annular opening between said sleeve and said peripheral edge of said chamber; and

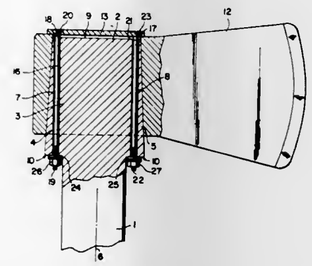
means for pulling a partial vacuum on said first annular cavity.

4,096,895

HAMMER-TYPE TOOL

Kenneth Fernitz, Waterloo, Wis., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 7, 1977, Ser. No. 849,007
Int. Cl.[2] B25C *1/00*; B25D *1/00*
U.S. Cl. 145—29 R **1 Claim**



1. A hammer-type tool, comprising

a shaft-type handle having spaced opposite ends and substantially the same cross-sectional area except for an end area at one end of the handle, said end area having a cross-sectional area different from that of the remainder of the handle in a manner whereby the end area extends beyond the remainder of the handle at substantially diametrically opposite points in a pair of spaced opposite protruding portions extending substantially parallel to the axis of the handle, said end area having a pair of bores formed therethrough extending through the protruding portions in spaced relation substantially parallel to the axis of the handle, each bore opening at the opposite ends of the corresponding protruding portion;

a hammer-type head mounted on the end area of the handle and extending at substantially right angles to the axis of the handle;

a metal plate at the end of the handle at which the end area is provided, said metal plate having larger dimensions than the cross-sectional area of the end area so that it overlaps the head for a predetermined border area extending beyond said end area, and having a pair of holes formed therethrough coinciding with the bores through the protruding portions of said end area;

a pair of elongated screws each extending through a corresponding bore through the end area and a corresponding hole through the metal plate, each of the screws having a pair of spaced opposite ends with a head at one end;

a pair of lock washers each on a corresponding one of the screws at the other end thereof where it extends beyond the end area; and

a pair of nuts each affixed to a corresponding one of the screws at the other end thereof, over the corresponding lock washer.

4,096,896

COMPOSITE TOOL STRUCTURE

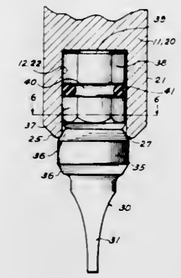
Paul Richard Engel, Rochester, N.Y., assignor to Upson Tools, Inc., Rochester, N.Y.

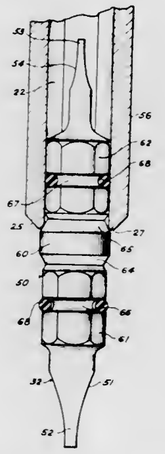
Filed Apr. 29, 1977, Ser. No. 792,250
Int. Cl.[2] B25B *15/00*
U.S. Cl. 145—50 B **9 Claims**

1. A tool receiving device having at least one openend, axially extending opening of polygonal cross-section with a plurality of longitudinally straight surfaces, comprising in combination:

a tool member comprising at least three axially coextensive portions including a first portion having a cross-section conforming generally to that of the polygonal opening and insertable therein and a generally intermediate annular recess, a second portion having a cross-section different from and dimensionally larger than that of the first portion, a facing surface contiguous to the first portion for limiting the extent of insertion of the first portion into the opening, and a second facing surface spaced from the first facing surface, and a third portion extending from the second facing surface and having a tool configuration at the free end thereof; and

an elastomeric ring arranged in the recess and having an outer diameter dimensionally greater than that of the polygonal cross-section of the first portion and of the second portion for frictionally engaging the respective straight surfaces of the opening when the first portion is inserted therein to retain the tool member in the opening





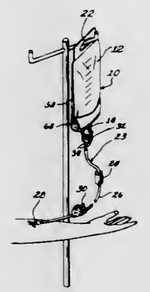
and for providing an optimum torque transfer between the device and the tool member.

4,096,897

MOLDED COLLAPSIBLE SOLUTION CONTAINER HAVING TRANSVERSE FOLD LINES

Frank Cammarata, III, Wheeling, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 670,306, Mar. 25, 1976, abandoned, which is a division of Ser. No. 526,037, Nov. 21, 1974, abandoned. This application May 27, 1977, Ser. No. 801,494
Int. Cl.[2] B65D *1/02*
U.S. Cl. 150—0.5 **7 Claims**



1. In a collapsible solution container, which container defines a body portion having an integral neck portion and a semi-rigid shoulder portion at one end thereof, and is sealed at

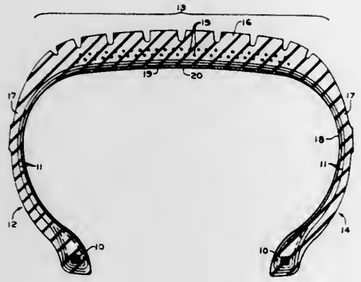
its end opposite said one end, said body portion defining, in its original, unstressed state, generally oval, transverse cross sections adjacent said neck and shoulder portions, said cross sections tapering progressively along a major portion of its length to a flat, sealed end portion at said end of the container opposite to said one end; transverse lines of folding weakness defined along opposite edges of said shoulder portion to facilitate the collapse of said container, and gusset portions defined in said body portion adjacent said shoulder portion and adjacent the ends of said transverse lines of folding weakness, said gusset portions including lines of flexing weakness to facilitate collapse of the container adjacent said shoulder portion, whereby said container collapses to a uniform flat configuration progressively from said opposite end toward said one end as the contents thereof are withdrawn through said neck portion, the transverse lines of folding weakness and gusset portions causing said container to collapse about the inner surface of said shoulder portion as the container empties, whereby the residual volume of said collapsed container is minimal.

4,096,898

INTERNAL TIRE LUBRICANT

James W. Messerly, Stow, and James J. Shipman, Akron, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio

Filed Feb. 9, 1976, Ser. No. 656,450
Int. Cl.² B60C *17/00*
U.S. Cl. 152—330 L **1 Claim**



1. A radial cord tubeless pneumatic tire having an essentially inextensible belt under the tread to restrict the circumference and produce a low aspect ratio, and having an air-impervious liner layer and a layer of closed cell cellular rubber the cells of which contain nitrogen gas under pressure covering at least a portion of the liner, and an internal coating consisting essentially of a mixture of:

(a) 100 parts of a soft solid partly-crystalline polyethylene of average molecular weight between about 1000 and 5000, a density of about 0.88, which becomes liquid at about 85° C, and

(b) about 35 parts of an amorphous noncrystallizable polypropylene of molecular weight about 900 which has a softening temperature of about 82° to 95° C,

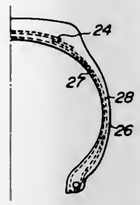
the layer of closed cell cellular rubber and the internal coating extending across the entire inner surface of the crown region including the shoulder zones on which the weight of the vehicle rests when the tire goes flat.

4,096,899

LIGHT WEIGHT PNEUMATIC TIRE HAVING A THIN SIDE WALL RUBBER

Yoichi Kitazawa, Kodaira; Takeshi Sato, Higashi-Yamato, and Hisao Tsuji, Akigawa, all of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan

Filed Sep. 3, 1976, Ser. No. 720,294
Claims priority, application Japan, Sep. 18, 1975, 50-112066
Int. Cl.² B60C *9/06*
U.S. Cl. 152—354 R **11 Claims**



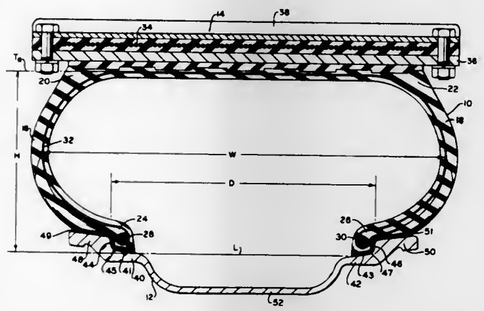
1. A light weight pneumatic tire having a thin sidewall rubber, comprising a bias laid carcass ply composed of cords angularly disposed with respect to the circumferential direction of the tire and extending from one of a pair of bead portions through a crown portion to another bead portion, a breaker layer superimposed about the crown portion of said carcass ply, an upper ply disposed on said carcass ply and extending from the bead portion to at least an edge of the crown portion and maintaining an overlapping relation with the breaker layer, said upper ply being composed of cords crossed to the cords of the carcass ply symmetrically with respect to the circumferential direction of the tire, and a thin rubber layer disposed on the outer surface of said upper ply and having a thickness of 0.5 to 3.0 mm and a Shore A hardness after vulcanization of 40° to 55°.

4,096,900

EARTHMOVER TIRE AND RIM ASSEMBLY

Richard J. Olsen, Massillon, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 5, 1976, Ser. No. 646,717
Int. Cl.² B60C *9/02, 15/00*
U.S. Cl. 152—354 R **10 Claims**



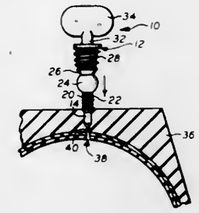
1. A tire and rim assembly for use on earthmovers in which (A) the tire comprises a tread portion, a pair of sidewall portions, a pair of annular bead portions and a carcass structure extending circumferentially around said tire and from one bead portion to the other bead portion, each said bead portion having an annular inextensible bead core, a bead seat surface disposed radially inwardly of the annular bead core, a bead register surface extending radially outwardly of the axially outer edge of the bead seat surface and a flange contact surface extending axially outwardly of the radially outer end of the bead register surface, (B) the rim is of the drop center type and having a bead seat in engagement with the bead seat surface of the tire, a flange register in contact with the flange register surface of the tire and a stabilizer flange being substantially straight throughout its axial extent and disposed at an angle of less than 10° with respect to the rotational axis of the tire and extending axially outward of the radially outer edge of the bead register for a distance equal to at least 10% of the maximum axial width of said tire when mounted on the rim and inflated, (C) said assembly being characterized by the flange contact surface of the tire being in contact with the stabilizer flange for a distance equal to at least 10% of the section width of the carcass structure and the distance between the contact surface of the flange and the carcass structure decreasing from a maximum at the axially outer extremity of the contact surface to a minimum adjacent the bead register surface to provide a preloading on said flange when said tire is inflated.

4,096,901

TIRE PLUG FOR TUBELESS TIRES

William Reichenbach, 238 Java St., Brooklyn, N.Y. 11222

Continuation-in-part of Ser. No. 634,586, Nov. 24, 1975, abandoned. This application Dec. 6, 1976, Ser. No. 747,740
Int. Cl.² B60C *21/00*
U.S. Cl. 152—370 **10 Claims**



1. A tire plug for insertion into the puncture of a tubeless tire, said plug comprising:

(a) a rigid body member having a plurality of integrally formed portions extending longitudinally of said member, said portions comprising:

(1) a pointed entrant portion located at one end of the body member;

(2) a severable finger gripping portion located at the opposite end of said member, said finger gripping portion providing the sole leverage for threaded insertion of said plug into the tire without the need of any separate tool;

(3) a tapered threaded portion located between said entrant portion and said gripping portion; and

(4) a fracturable stem portion connecting said gripping portion to said tapered portion;

(b) said entrant portion having a smooth surface extending from the pointed end in the direction toward said tapered portion to facilitate initial sliding insertion of said plug into the puncture of said tire to a position to support itself for threaded insertion therein;

(c) the diameter of said tapered threaded portion increasing in the direction toward said gripping portion for exerting an increasingly compressive force on the tire material of the wall defining the puncture to seal said puncture upon threaded insertion of said plug; and

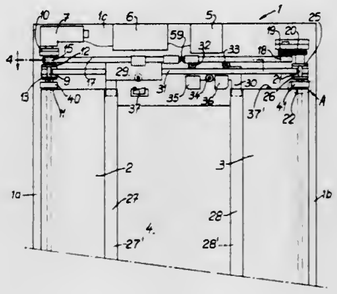
(d) said stem portion fracturing in response to a predetermined force; whereby said gripping portion is severed from said body member after the puncture has been sealed.

4,096,902

DOOR WITH FLEXIBLE WOUND SECTIONS

Louis Junod, 78, rue des Moulins, 1400 Yverdon, Switzerland

Filed Jun. 11, 1976, Ser. No. 694,946
Claims priority, application Switzerland, Jun. 13, 1975, 7682/75
Int. Cl.² E06B *9/08*
U.S. Cl. 160—122 **8 Claims**



1. A door comprising;

a door frame having two side members, a top member and a bottom member jointly generally defining a vertical plane;

a pair of flexible door sections, aligned with one another in said plane, each section having a vertical winding tube rotatably mounted and extending along one of the sides of the frame, each section also having a first vertical edge portion secured to the respective winding tube so that the section can be wound on the tube, and having a second and free vertical edge portion;

two rigid uprights each extending along and secured to the free vertical edge portion of one of the flexible door sections;

a mounting, driving and synchronizing system for the two uprights, comprising (a) an upper toothed belt disposed adjacent and along the top of the frame and fixed to upper ends of the two uprights, the belt being movable to synchronously move the upper ends in mutually opposite directions in said plane, and a lower toothed belt disposed adjacent and along the bottom of the frame, fixed to lower ends of the two uprights, and movable to similarly move the lower ends, (b) a driving shaft rotatably mounted at the top and bottom of the frame, extending through and supporting one of the winding tubes, and having upper and lower drive wheels secured to the shaft near upper and lower ends, respectively, of the winding tube supported by the shaft, for driving the upper and lower toothed belts, (c) a driven shaft and drive wheel means similarly mounted and having means for driving them by the belts; and (d) motor means for reversibly rotating the driving shaft;

two carriages, one secured to the upper end of each upright and each secured to the upper toothed belt;

rail means for supporting and guiding the carriages to keep the flexible door sections in said vertical plane, and

a pair of elastic biasing couplings, each interposed and acting between one of the shafts and the respective winding tube for biasing the respective tube and first vertical edge portion towards winding said portion and the respective door section onto the tube to keep the flexible door sections flat in said vertical plane while the uprights and free edge portions are reversibly driven by the motor, drive shaft and belts toward the sides of the frame, and while the door sections are held in resulting positions.

4,096,903

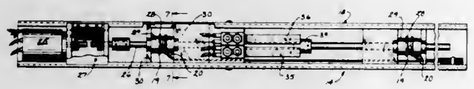
POWER DRIVE FOR A VENETIAN BLIND

John Ringle, III, 1410 Fairmont St., Wausau, Wis. 54401

Continuation-in-part of Ser. No. 485,820, Jul. 5, 1974, abandoned, which is a continuation of Ser. No. 307,979, Nov. 20, 1972, abandoned. This application Sep. 8, 1975, Ser. No. 611,015

Int. Cl.[2] E06B *9/26*

U.S. Cl. 160—176 R **6 Claims**



1. In a venetian blind drive and control, a reversible rotary direct current electric motor, a source of direct current connected to drive said motor, switch means in the motor circuit operable to select the direction of motor rotation and to determine the increment of movement in either direction, a speed reduction gear train driven by said motor selectively in either direction in accordance with the direction of motor rotation, an output shaft for said gear train, a cross shaft for said blind in axial alignment with and coupled at all times to said output shaft and connected to the slats of the venetian blind to provide a predetermined tilt adjustment for the latter between predetermined opposite closure positions by a partial revolution of said cross shaft, a separate limit switch connected directly in a branch of the power circuit of said motor for each direction of operation of the motor, and separate abutment means generally carried by and rotatable with at least one of said shafts to actuate corresponding of said limit switches to open the motor circuit and stop said motor upon said shafts reaching a limit of rotation corresponding to a predetermined position of blind operation in either of the selected directions.

4,096,904

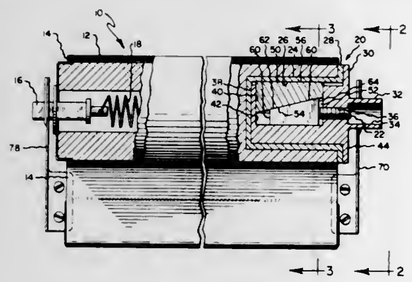
ROLLER SHADE BRAKING MECHANISM

John D. Donofrio, Ogdensburg, N.Y., assignor to Joanna Western Mills Company, Chicago, Ill.

Filed Aug. 29, 1977, Ser. No. 828,949

Int. Cl.[2] E06B *9/208*

U.S. Cl. 160—299 **9 Claims**



1. An improved roller shade of the type having an axially elongated barrel adapted to receive a shade wound thereabout, said elongated barrel having an internally mounted motor for urging said barrel to rotate in a shade winding direction, said barrel further including an internally mounted braking mechanism for resisting rotation of said barrel, said braking mechanism comprising a hollow brake drum with an internally disposed braking mechanism having first and second oppositely directed brake shoes, said brake shoes each having an outside surface adapted for frictional engagement with the interior surface of said brake drum, wherein the improvement comprising:

(a.) said first and second brake shoes having opposed inwardly facing surfaces forming an axially tapering cavity;

(b.) an axially moveable means adapted to be inserted in said cavity and adapted to engage said opposed inwardly facing surfaces for causing said first and second brake shoes to be urged laterally outwardly proportional to the axial position of said axially moveable means; and

(c.) means operatively engaging said axially moveable means for axially and adjustably positioning said axially moveable means.

4,096,905

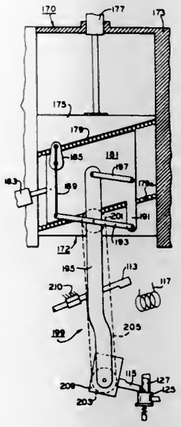
METHOD OF INTRODUCING HARDENABLE MATERIAL INTO CONTAINING MEANS THEREFOR

Jesse A. Stoner, Scotia, N.Y., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 490,257, Jul. 22, 1974, Pat. No. 3,979,032, which is a division of Ser. No. 397,425, Sep. 14, 1973, Pat. No. 3,974,873. This application Oct. 14, 1975, Ser. No. 622,030

Int. Cl.[2] B22D *19/04*

U.S. Cl. 164—51 **21 Claims**



1. A method of casting a metal into means for containing it comprising the steps of:

(a) supplying the metal in its solid state to a receptacle therefor;

(b) transferring the metal in its solid state from the receptacle into means for casting the metal disposed in a first position generally adjacent the receptacle;

(c) displacing the casting means with the metal in its solid state therein from the first position to a second position for heating the metal and melting the metal in the casting means at the second position;

(d) moving the casting means from the second position to a position generally adjacent the containing means for casting the molten metal from the casting means into the containing means; and

(e) casting the metal from the casting means into the containing means.

4,096,906

CASTING MACHINE WITH MULTI-BAND POSITIONING DEVICE

Yves Bernard Bonnamour, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

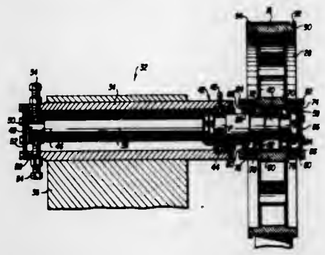
Division of Ser. No. 612,216, Sep. 10, 1975, Pat. No. 3,991,814. This application Aug. 30, 1976, Ser. No. 718,497

The portion of the term of this patent subsequent to Nov. 16, 1993, has been disclaimed.

Int. Cl.[2] B22D *11/06*

U.S. Cl. 164—433 **5 Claims**

1. In a casting machine for continuously casting molten metal wherein a flexible endless band is guided into closed relationship with an arcuate portion of the peripheral groove of a rotatable casting wheel to form a casting mold and including means for positioning the band over the peripheral groove of the casting wheel, said casting machine having a support frame, the improvement comprising said band positioning means including at least two band support wheels arranged on said support frame adjacent said casting wheel for supporting said endless band, said two band support wheels being rotatably mounted on shafts arranged along axes substantially parallel to the rotational axis of said casting wheel, axial motion means operatively connected to each of said band support



wheels for independently moving each band support wheel along a line of motion substantially parallel to its axis of rotation, and pivotal motion means axially immovably mounted relative to said support frame and operatively connected to the shaft of each of said band support wheels for independently pivoting the axis of rotation of such band support wheel about a point laterally displaced therefrom and for transmitting axial thrust applied to said shaft by said axial motion means directly to said support frame.

4,096,907

STRAND WITHDRAWAL ASSEMBLY FOR CONTINUOUS CASTING PLANTS

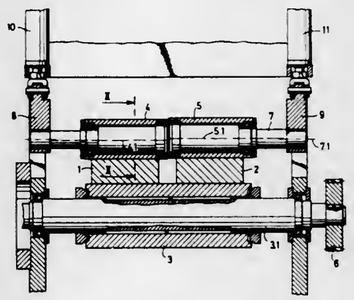
Heribert A. Krall, Wurzburg, and Helmut Maag, Waldbuttelbrunn, both of Germany, assignors to Technica-Guss GmbH, Wurzburg, Germany

Filed Jul. 25, 1977, Ser. No. 818,688

Claims priority, application Germany, Oct. 28, 1976, 2649015

Int. Cl.[2] B22D *11/12*; B65H *17/20*

U.S. Cl. 164—448 **3 Claims**



1. A strand withdrawl assembly for withdrawal of strands emerging from a casting mould in a continuous casting plant, said strand withdrawal assembly comprising:

a lower roller, said lower roller being rotatably carried in said assembly and having drive means to rotate said lower roller;

at least first and second upper rollers, said upper rollers being each rotatably carried above said lower roller on a common eccentric shaft;

means rotatably supporting end portions of said eccentric shaft; and

means raising and lowering said eccentric shaft to move said upper rollers into contact with the strands positioned between said upper and lower rollers for withdrawal whereby said eccentric shaft rotates in said support means to position said upper rollers to apply equal pressure to the strands positioned between said upper and lower rollers for uniform withdrawal of said strands.

4,096,908

HEATING AND COOLING ENCLOSURE FOR A GAS CHROMATOGRAPHIC COLUMN

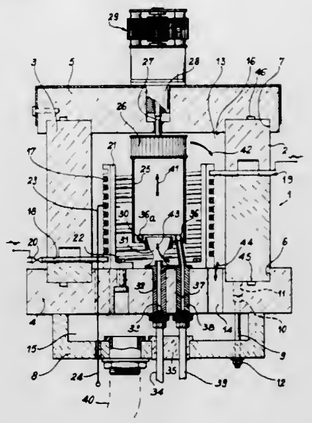
Henri Lamy, Morlaas, France, assignor to Elf Union, Paris, France

Filed Dec. 15, 1976, Ser. No. 750,998

Claims priority, application France, Dec. 17, 1975, 75 38735

Int. Cl.[2] B01D *15/08*; G01N *31/08*

U.S. Cl. 165—64 **7 Claims**



1. A heating and cooling enclosure for a chromatographic column comprising an insulating and demountable box unit which surrounds the column and has a side wall which rests on a bottom support and is closed at the top by a lid, the column itself being constituted by a metallic tube having a constant cross-sectional area supplied with an electric heating current and wound in a helix having a vertical axis, and means for producing a circulation of air around the column within the box unit, wherein the means aforesaid comprise an open cylindrical skirt arranged coaxially within the interior of the column, a centrifugal fan placed in the axis and above the skirt so as to draw the air into said skirt and discharge the air into the spaces delimited on each side of the column between the skirt and the side wall of the insulating box unit, a nozzle also located in the axis of the column beneath the skirt, an air-injection pipe which opens into the throat of the nozzle and openings for the discharge of the injected air after circulation within the box unit in contact with the column, said openings being provided through the bottom support of said box unit.

4,096,909

FLUIDIZED BED PROCESS HEATER

Walfred Wilhelm Jukkola, Westport, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.

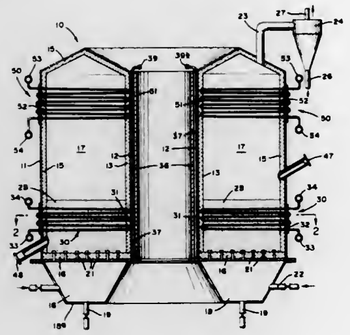
Filed Dec. 23, 1976, Ser. No. 754,063

Int. Cl.[2] F28D *13/00*

U.S. Cl. 165—76 **11 Claims**

10. A fluidized bed process heater comprising a vessel of toroidal configuration having an outer wall and a generally concentric inner wall, a horizontal annular constriction plate extending between said outer and inner walls and separating a heater chamber in the upper portion of said vessel from a windbox occupying the lower portion of said vessel, said constriction plate being capable of supporting a fluidized bed of particulate solids thereon, a plurality of heat exchanger coil units within said vessel each comprising horizontal runs of

tubing extending inwardly through the fluidized bed region of said heater chamber along a radius of said vessel, said horizontal runs of tubing of each of said coil units being arranged one above the other and joined at the ends thereof by vertically positioned return bends, the return bends adjacent said outer



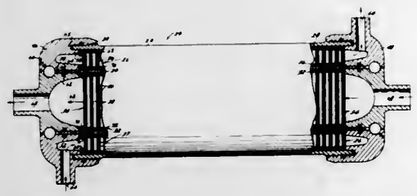
wall being outside said outer wall and the return bends adjacent said inner wall being supported in said heater chamber in recesses provided in said inner wall whereby said inner return bends are supported within said heater chamber and protected from the erosive environment therein.

4,096,910

CONCENTRIC-TUBE STACKED PLATE HEAT EXCHANGER

George A. Coffinberry, Cincinnati, and Howard B. Kast, Fairfield, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Oct. 28, 1976, Ser. No. 736,572
Int. Cl.[2] F28F 7/00; F28D 7/10
U.S. Cl. 165—81 **13 Claims**



1. In an apparatus for transferring heat between first and second fluids, the improvement comprising:

a first longitudinally extending annular flow passage adapted to provide a flow path for a first fluid flowing therein;

a second longitudinally extending flow passage adapted to provide a flow path for a second fluid flowing therein, said second flow passage disposed concentrically with said first annular flow passage

first tubular means for at least partially defining said first and second flow passages

a first plurality of annular heat transferring plates disposed consecutively in the longitudinal direction in said first annular flow passage and extending radially across said first annular flow passage said plates including a first set of apertures extending longitudinally therethrough and adapted to pass said first fluid

spacer means for maintaining an axial spacing between consecutively disposed plates of said first plurality of plates and for providing a radial heat conduction path

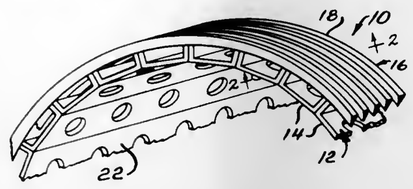
and resilient means for biasing said spacer means in the radial direction and into heat transferring engagement with said first tubular means.

4,096,911

CHANNEL BASE WELL SCREEN

Bruce R. Geske, Fridley, Minn., assignor to UOP Inc., Des Plaines, Ill.

Filed Jul. 5, 1977, Ser. No. 813,047
Int. Cl.[2] E21B 43/08
U.S. Cl. 166—234 **8 Claims**



1. A well screen comprising a hollow, multiple channel core portion and a formed wire enwrapment portion defining open slots for the passage of liquid or gas; said core portion comprising a continuous ring of longitudinal channel members, each of said channel members having a relatively wide web portion and relatively short leg portions extending radially outwardly from said web portion, said web portions being perforated and said leg portions being welded to said formed wire enwrapment at each juncture therewith.

4,096,912

METHODS FOR MINIMIZING PLASTIC FLOW OF OIL SHALE DURING IN SITU RETORTING

Arthur E. Lewis, Los Altos, and Richard G. Mallon, Livermore, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 6, 1977, Ser. No. 804,194
Int. Cl.[2] E21B 43/24, 43/26
U.S. Cl. 166—259 **8 Claims**

1. In a method for recovering shale oil from a rubble region in a subsurface oil shale formation by in situ retorting wherein a kerogenpyrolyzing fluid is caused to flow through a retorting zone in the rubble region, thereby decomposing the kerogen and producing oil and gaseous products, product oil and product gases are recovered from the retorting zone, and the shale in the retorting zone becomes spent, the steps comprising:

establishing a downwardly moving retorting zone in the rubble region, thereby forming an upper zone of spent shale and a lower zone of hot, rubblized oil shale in the rubble region; and

introducing carbon dioxide and water into the upper zone of spent shale in amounts sufficient to react with the mineral constituents of the spent shale and form a cement-like material which binds individual shale particles together and to the walls of the rubble region, thereby relieving the weight burden of the spent shale on the hot, rubblized oil shale in the lower zone and minimizing plastic flow of said hot, rubblized oil shale.

4,096,913

HYDRAULICALLY SET LINER HANGER AND RUNNING TOOL WITH BACKUP MECHANICAL SETTING MEANS

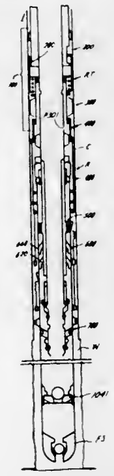
John W. Kenneday; Charles W. Kinney; Floyd L. Scott, Jr., all of Houston, Tex., and Phillip W. Schmuck, New Orleans, La., assignors to Baker International Corporation, Orange, Calif.

Continuation-in-part of Ser. No. 758,359, Jan. 10, 1977, Pat. No. 4,060,131. This application Aug. 22, 1977, Ser. No. 826,284
Int. Cl.[2] E21B 43/10, 23/00
U.S. Cl. 166—290 **38 Claims**

1. An apparatus for running, setting and anchoring a liner in a well bore casing, comprising: an inner longitudinally extending body; an outer longitudinally extending body around said

inner body; connecting means on one of said inner and outer bodies for connection of a liner therebelow; expander means carried on one of said inner and outer bodies; gripping means carried on the other of said inner and outer bodies and engagable with said expander means whereby said gripping means are shifted into gripping engagement with said casing; a manipulatable tubular running tool releasably secured to said inner and outer bodies; drag means mounted on said running tool slidable longitudinally along said casing; means for selective disengagement of said running tool from said inner and outer bodies; and setting means responsive to each of fluid pressure and mechanical manipulation and carried on said running tool to longitudinally shift one of said inner and outer bodies with respect to the other of said inner and outer bodies to anchor said liner to said casing, said drag means resisting longitudinal travel of said apparatus while in said well bore with sufficient frictional force to support the weight of one of said inner and outer bodies therebelow and to afford operation of said setting means during response to mechanical manipulation.

37. A method of running, setting and anchoring a liner in a well bore casing, comprising the steps of: (1) inserting within said well bore and apparatus connectible to a tubular member extendible to the top of the well thereof, said apparatus comprising: a longitudinally shiftable tubular body; expander means carried by said tubular body; lower connection means



on said tubular body for connecting the tubular body to a liner therebelow; sleeve means mounted on said tubular body and operably associatable with said tubular body upon longitudinal shifting of said tubular body with respect to said sleeve means; gripping means carried on said sleeve means engagable by said expander means and movable outwardly into gripping engagement with said well bore casing; drag means slidable longitudinally along said casing for resisting longitudinal travel of said apparatus while in said well bore with sufficient frictional force to support the weight of one of said tubular body and said sleeve means therebelow; and setting means responsive to at least one of fluid pressure and mechanical manipulation, said setting means including slot means and carriage means initially selectively engaged to said slotted member for travel within said slot means to shift said longitudinally shiftable tubular body with respect to said sleeve means to anchor said liner in said well bore and on said casing, said setting means further comprising a radially extending annular piston chamber, and a piston element in said chamber responsive to selectively disengage said carriage means, and means for selective entrapment of fluid within said apparatus; (2) running said apparatus in said well to a positionable depth within said well bore adjacent said casing; (3) applying pressure within said apparatus to activate said setting means to cause said carriage means to travel in said slot means to position for anchoring said liner within said well bore and on said casing and for shifting said longitudinally shiftable tubular body upwardly with respect to said sleeve means to cause said expander means carried by said tubular body to engage said gripping means carried on said sleeve means and move said gripping means outwardly into gripping engagement with said well bore casing; (4) rotating said tubular member extendible to the top of the well to release said tubular running tool from said longitudinally shiftable body for subsequent retrieval of said running tool out of said well bore; (5) discharge of said pressure contained in said apparatus through said means for selective entrapment of fluid within said apparatus; and (6) injecting within said tubular member extendible to the top of the well a cement slurry pumpable through said tubular member, said apparatus and said liner, for subsequent setting in said well bore between said well bore and said liner to affix said liner in said well bore.

4,096,914

ACIDIZING ASPHALTENIC OIL RESERVOIRS WITH ACIDS CONTAINING SALICYLIC ACID

William A. McLaughlin, Bellaire, and Edwin A. Richardson, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 6, 1976, Ser. No. 748,087
Int. Cl.[2] E21B 43/16
U.S. Cl. 166—307 **10 Claims**

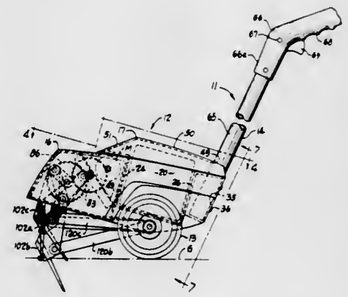
1. In a well treating process in which an aqueous hydrochloric acid-containing acid capable of dissolving solids in a manner increasing the permeability of a subterranean earth formation is brought into successive contacts with iron and an asphaltene-containing oil that is present within a subterreanean reservoir in a manner that may form permeability impairing iron-asphaltene solids, the improvement which comprises, including within at least the first portion of the aqueous hydrochloric acid-containing acid, a solution or homogeneous dispersion of at least enough salicylic acid to chelate with and prevent the formation of iron-asphaltene solids by substantially all of the ferric ions that become dissolved within the acid that enters the earth formation.

4,096,915

GROUND WORKING APPARATUS WITH TOOLS TO DRAW THE APPARATUS FORWARD

Hugh F. Groth, Brecksville, Ohio, assignor to True Temper Corporation, Cleveland, Ohio

Filed Apr. 11, 1977, Ser. No. 786,479
Int. Cl.[2] A01B 33/00, 39/06
U.S. Cl. 172—42 **12 Claims**



1. A ground working apparatus comprising:

support means having a forward portion and a rearward portion;

guide means connected to said support means for guiding and controlling the apparatus;

crankshaft means mounted on said support means for rotation about an axis generally parallel with the ground;

power transmission means for rotating said crankshaft means about the axis of rotation;

an axle disposed rearwardly of said crankshaft means and being generally parallel to the axis of rotation of said crankshaft means;

a pair of wheels rotatably mounted at opposite ends of said axle for transporting the apparatus over the ground;

at least three crankpins;

web means supporting said crankpins parallel with and angularly spaced about the axis of rotation of said crankshaft means and rotating said crankpins about said axis in response to rotation of said crankshaft;

at least three tool support arms each including a bearing end pivotally mounted on one of said crankpins and a tool supporting end extending toward the ground;

at least three elongated ground working tools, each connected to a tool supporting end of a respective tool support arm and disposed between said wheels at the forward portion of said support means, said tools having generally pointed ground impinging distal end portions; and

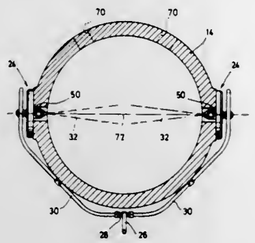
link means located between said wheels and pivotally secured to said tool support arms and to said axle for restricting said tool support arms to paths of movement wherein the ground working tools sequentially impinge upon the ground in a substantially vertical direction and proceed through the ground at a rearward inclination to draw the apparatus forward across the ground in response to rotation of said crankshaft means.

4,096,916

DIESEL PILE DRIVER

Rudolf Hennecke, Buoch, and Albert Haussmann, Oberboihingen, both of Germany, assignors to Delmag-Maschinenfabrik Reinhold Dornfeld, Esslingen am Neckar, Germany

Filed Feb. 27, 1975, Ser. No. 553,573
Claims priority, application Germany, Mar. 13, 1974, 2412036
Int. Cl.² E02D *7/12*
U.S. Cl. 173—137 **4 Claims**



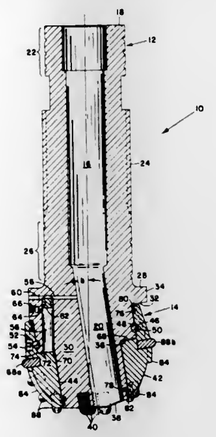
1. A diesel pile driver comprising a pile driver cylinder, a pile driver piston mounted in said cylinder and having an impact surface, an impact member mounted in said cylinder adjacent to said piston and having an impact surface facing the impact surface of said piston, a pair of liquid jet injection nozzles mounted in the wall defining said cylinder for injecting liquid fuel onto the impact surface of said impact member, said nozzles being operable to discharge the liquid fuel onto the impact surface when the piston is descending from an elevated position for subsequent impact atomization of the fuel induced by the piston engaging the impact member, said nozzles being positioned to discharge jets of liquid fuel that impinge upon one another on the impact surface of the impact member so as to destroy substantially the kinetic energy of flow of the liquid fuel, and a fuel injection pump for delivering fuel to said nozzles as an incident to the descending movement of the piston at said elevated position.

4,096,917

EARTH DRILLING KNOBBY BIT

Jesse W. Harris, 527 Sonnet Dr., San Antonio, Tex. 78216

Continuation of Ser. No. 617,959, Sep. 29, 1975, abandoned. This application Feb. 8, 1977, Ser. No. 766,589
Int. Cl.² E21B *9/08*; E21C *13/01, 13/06*
U.S. Cl. 175—228 **13 Claims**



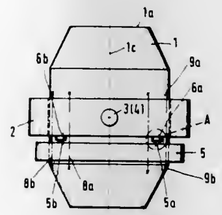
1. A percussion drill bit having an upper end comprising an anvil surface, a lower end comprising a cutting bit, and a generally cylindrical side surface adapted to be received for slidable longitudinal movement in the casing of a fluid operated percussion hammer, said cutting bit having a central shank portion offset relative to the longitudinal axis of said drill bit and terminating in a cutting end surface, and a rotatable cutting head secured on said shank portion for rotary motion thereon.

4,096,918

METALLURGICAL VAT SUPPORT SYSTEM

James Ingram Beggs, Hamilton, Canada; Karlheinz Langlitz, Mulheim, Germany; Gunter Schmitz, Duisburg, Germany, and Wolfgang Jansa, Moers, Germany, assignors to Demag Aktiengesellschaft, Duisburg, Germany

Filed Feb. 4, 1977, Ser. No. 765,795
Claims priority, application Germany, Feb. 5, 1976, 2604353
Int. Cl.² G01G *19/00*
U.S. Cl. 177—145 **10 Claims**



1. Apparatus for mounting dynamic test cells for tilting metallurgical vats to avoid outside influences from affecting the test results, comprising

(a) a vat;

(b) extension means fixed to said vat and extending radially therefrom;

(c) an annular ring surrounding said vat;

(d) diametrically opposed bearings in said ring;

(e) said vat supported in said ring for tilting through angles of 360°; the improvement characterized by

(f) opposed horizontal surfaces on said extension means and said annular ring;

(g) a plurality of dynamic test cells mounted between said opposed horizontal surfaces; and

(h) a plurality of elongated vertically disposed expandable flexible connecting elements connecting said vat, said annular ring, and said extension means;

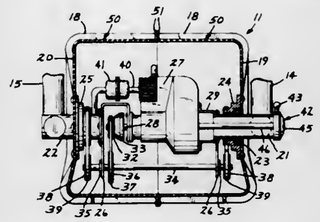
(i) whereby tilting said vat on said bearings also tilts said dynamic test cells.

4,096,919

PROPULSION UNIT FOR SKIERS

Richard G. Thompson, 312 County Rd. #5, Stillwater, Minn. 55082

Filed Sep. 2, 1976, Ser. No. 719,855
Int. Cl.² B62M *27/02*
U.S. Cl. 180—6 R **14 Claims**



1. Improved propulsion unit for skiers comprising:

(a) a hollow cleated roller of resiliently flexible material including two molded shell members each having an end wall and an open end, said end walls having axially aligned openings therein, at least one of said open ends containing flange means extending around its periphery, and said shell members being joined at their open ends;

(b) first and second inner hub members extending through the openings in said first and second end walls, respectively, for permitting relative rotation between said inner hub members and said roller;

(c) first and second handles attached to said first and second inner hub members, respectively;

(d) an engine frame positioned within said roller and rigidly mounted to said first and second inner hub members so as to secure said engine frame from rotation relative to both of said inner hub members;

(e) an engine mounted to said engine frame within said roller, said engine including an output shaft; and

(f) drive means operatively connecting said output shaft to each of said end walls for rotating said roller relative to said inner hub members.

4,096,920

POWERED SHOPPING CART AND TRAILER

Bennington Heyn, 1009 Alexander Ave., Ridgefield, N.J. 07657

Filed Dec. 30, 1976, Ser. No. 755,789
Int. Cl.² B62D *59/04*
U.S. Cl. 180—11 **5 Claims**

1. A shopping cart-trailer vehicle for operation either by a riding passenger or walking operator, comprising:

(a) A shopping cart basket frame;

(b) A basket removably attached to said basket frame for causing a load to be transported;

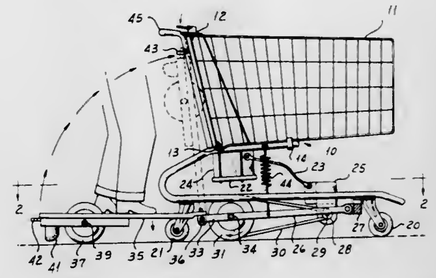
(c) a pair of casterable wheels rotatably secured to the front of said basket frame;

(d) A pair of rear wheels rotatably secured to the rear of said basket frame;

(e) A tiltable trailer operatively associated with said basket frame for transportating a passenger wherein said tiltable trailer comprises a drive wheel carrier and a pivotable and tiltable passenger carrying platform operatively associated therewith and wherein said pivotable and tiltable passenger carrying platform further comprises a rubber friction brake mounted at the rear thereof for engaging the ground when said passenger shifts his weight rearward on said passenger carrying platform;

(f) A pair of drive wheels rotatably mounted on said trailer for alternately engaging or disengaging the ground when said tiltable passenger carrying platform is tilted forward or rearward by movement of said passenger forward or rearward on said tiltable passenger carrying platform;

(g) Drive means mounted on said trailer and operatively associated with said drive wheels for rotating said drive



wheels when they engage the ground thereby propelling the cart-trailer vehicle along the ground;

(h) A pair of wheels rotatably mounted toward the rear of said trailer to allow the trailer to traverse the ground; and,

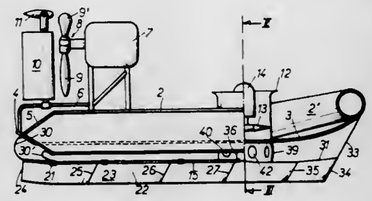
(i) A plurality of springs operatively associated at one end with said tiltable trailer and at their other end with said basket frame for urging said trailer and said drive wheels out of ground engagement when said passenger to be transported shifts his weight rearward on said passenger carrying platform.

4,096,921

VEHICLE SUPPORTED BY AN AIR CUSHION

Paul Francois Guienne, 5, rue de Bagatelle, Neuilly, France (92200)

Filed Jun. 10, 1977, Ser. No. 805,526
Int. Cl.² B60V *1/04, 1/16*
U.S. Cl. 180—121 **10 Claims**



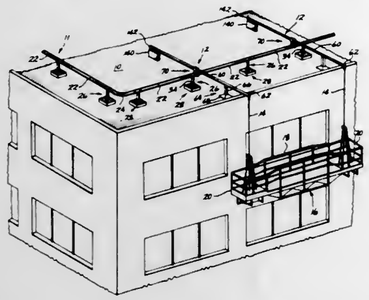
1. A vehicle supported by an air cushion extending beneath at least the greater part of the lower surface of the rigid structure of the vehicle, characterised in that, the said cushion is bounded on each side of the axis of the vehicle by two parallel skirts, a peripheral skirt and an inner skirt, inclined towards the inside of the vehicle defining between them a row of auxiliary air cushions separated by transverse partitions which form skirts at least in part inclined towards the rear with respect to the sense of movement of the vehicle, the bottoms of the auxiliary air cushions being formed by perforated plates articulated to one another, the edges of the said plates are connected to the rigid structure by flexible walls forming a flexible volume connected to the supply of air under pressure.

4,096,922

ROOF SUPPORT SYSTEM FOR A SUSPENDED STAGING

Harry S. Fisher, Renton, Wash., assignor to Spider Staging, Inc., Renton, Wash.

Filed Jun. 24, 1977, Ser. No. 809,553
Int. Cl.² E04G *3/10, 3/14*
U.S. Cl. 182—36 **22 Claims**



1. For use with a guidance and support rail positioned on a building roof above the roof level, inwardly from the roof edge, an outrigger which is co-operable with such rail for supporting a suspended staging from the roof, said outrigger comprising:

an elongated outrigger beam which during use extends outwardly from the side of the building;

carriage means including guideway means supporting said outrigger beam for endwise adjustment relative to the rail, and mounting means engageable with the rail, for mounting said guideway means onto the rail for both translational movement along the rail length and angular movement about the longitudinal axis of the rail;

said outrigger beam having an outboard end portion which during use projects outwardly of both the rail and the edge of the building roof, to serve as an overhead anchor for a suspension line of a suspended staging, and an inboard end portion which during use is positioned on the opposite side of the rail; and

leg means for supporting said outrigger beam, said leg means depending from said outrigger at a location inwardly of said beam outboard end portion and outwardly of the rail.

4,096,923

FIRE ESCAPE TO BE ATTACHED TO THE OUTSIDE OF A BUILDING

Giuseppe Verderio, via Padana Superiori 1, Gessate (Milan), Italy

Filed Jan. 7, 1977, Ser. No. 757,690
Claims priority, application Italy, Jan. 23, 1976, 19502 A/76
Int. Cl.² E04F *11/00*
U.S. Cl. 182—83 **3 Claims**

1. A fire escape attached in parallel position to the outside of a face of a building having vertically aligned safety outlets of like widths therein, said fire escaping comprising:

A. a different horizontal platform extending away from the building at the sill of each safety outlet,

i. the widths of the platforms being substantially equal to the widths of the associated outlets,

B. two supporting columns the lower ends of which are located adjacent and spaced outwardly from the base of the building,

i. said columns extending the whole height of the building,

ii. said columns being located adjacent the outside corners of the platform and supporting the same,

iii. one column being substantially horizontally registered with one vertically registered set of vertical edges of the safety outlets and the other column being substantially horizontally registered with the other vertically registered set of vertical edges of the safety outlets whereby the columns are mutually spaced apart in a horizontal direction parallel to said face of the building by substantially the width of the safety outlets,

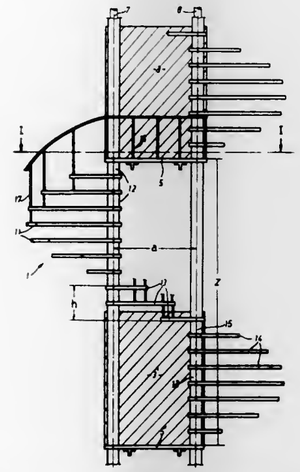
C. two sets of half-turn spiral stair winders

i. each set being associated with and supported by a different column, and

D. plural vertically registered series of straight steps,

i. each series of straight steps of the plural series being spaced away from the building and parallel to said face of the building and being located vertically midway between safety outlets,

E. the two sets of half-turn spiral stair winders, the plural series of straight steps and the platforms being interconnected in a sequence such that



i. a descending half-turn spiral stair winder of one set leads from a higher horizontal platform down and around to a series of descending straight steps which leads to a descending half-turn spiral stair winder of the other set which leads down and around to the next lower horizontal platform which leads to the next lower descending half-turn spiral stair winder of the one set in a repeating arrangement that terminates adjacent the base of the building,

F. whereby a building occupant in the event of fire when leaving the building by the fire escape exits through a safety outlet and then continuously moves down and around the fire escape with a minimum change in direction which occurs for only a short span at the platforms and the series of straight steps so that the building occupants can descend the fire escape rapidly and without hindrance.

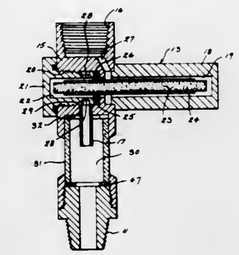
4,096,924

OILER ASSEMBLY

Frank J. Lyden, Manitowoc, Wis., assignor to Oil-Rite Corporation, Manitowoc, Wis.

Division of Ser. No. 595,118, Jul. 11, 1975, Pat. No. 4,062,424. This application Apr. 4, 1977, Ser. No. 784,422
Int. Cl.² F16N *17/06*
U.S. Cl. 184—58 **9 Claims**

1. In an oiler assembly for delivering a liquid lubricant to a point of lubrication, a vented reservoir containing the lubricant, a supply line extending from the bottom of the reservoir, a body having an inlet communicating with the supply line and an outlet, said body further having a bore with one end thereof communicating with the inlet and the other end thereof communicating with the outlet, a porous rod of sintered construction disposed in said bore between said inlet and said outlet and in spaced relation from the wall thereof, seal means disposed in said bore between the porous rod and the wall of the bore to preclude passage of lubricant from the inlet end to the outlet end of the bore except by passage through said porous rod, tubing placing the outlet of the body in communication with



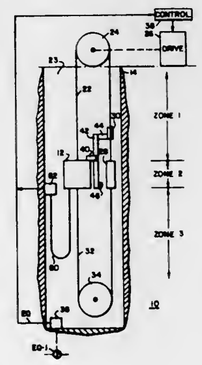
the lubrication point, and a source imposing a vacuum at the lubrication point, said porous rod being of selected density to provide for the desired feed rate of lubricant in response to the vacuum condition of the lubrication point.

4,096,925

ELEVATOR SYSTEM WITH DETECTOR FOR INDICATING RELATIVE POSITIONS OF CAR AND COUNTERWEIGHT

Robert W. Koob, Hopatcong, and Alan L. Husson, Budd Lake, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 8, 1977, Ser. No. 785,977
Int. Cl.² B66B *1/30, 1/50*
U.S. Cl. 187—29 R **7 Claims**



1. An elevator system, comprising:

a building having a plurality of floors and a hoistway,

an elevator car,

a counterweight,

said elevator car and counterweight being mounted for guided movement in adjacent vertical travel paths in the hoistway of said building to serve the floors therein,

detector means for determining the relative positions of said elevator car and counterweight,

said detector means including first and second vertically spaced sources of electromagnetic radiation, and first and second vertically spaced switching devices operable from a first condition to a second condition in response to electromagnetic radiation from said first and second sources of electromagnetic radiation, respectively,

shielding means,

said detector means and said shielding means being mounted for relative motion responsive to movement of said elevator car,

said shielding means shielding said first and second switching devices from the electromagnetic radiation of said first and second sources when the counterweight and elevator car bear a predetermined positional relationship to one another,

with said first and second switching devices being in their first conditions when shielded from the electromagnetic radiation,

first means responsive to at least one of the first and second switching devices being in a predetermined one of its conditions for providing a signal indicating the elevator car and counterweight are within a predetermined zone where collision could occur in the event the counterweight is outside of its normal travel path,

said first and second switching devices being sequentially operated by the shielding means as the elevator car and counterweight leave the predetermined zone,

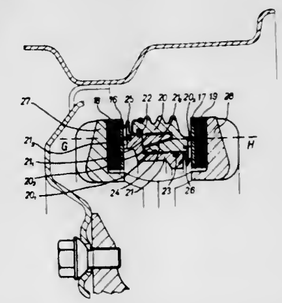
and second means responsive to the sequence for indicating the relative positions of the elevator car and counterweight.

4,096,926

ACTUATOR AND COOLING STRUCTURE FOR DISK BRAKES

Hermann Klaue, Tour d'Ivoire 28e, 1820 Montreux, Switzerland

Continuation-in-part of Ser. No. 694,399, Jun. 9, 1976, which is a continuation-in-part of Ser. No. 634,896, Nov. 24, 1975, Pat. No. 4,054,189, which is a continuation of Ser. No. 415,681, Nov. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 288,287, Sep. 12, 1972, Pat. No. 3,885,650, which is a continuation-in-part of Ser. No. 73,566, Sep. 18, 1970, abandoned. This application Aug. 3, 1976, Ser. No. 711,276
Claims priority, application Germany, Dec. 2, 1969, 1960286; Dec. 27, 1969, 1965171; Dec. 27, 1969, 1965170; Switzerland, Nov. 17, 1972, 16741/72; Germany, Nov. 22, 1975, 2552451; Dec. 19, 1975, 2557331
Int. Cl.² F16D *55/10*
U.S. Cl. 188—71.4 **8 Claims**



1. A fully lined disk brake adapted for motor vehicles comprising a rotating externally open, radially ribbed brake housing and a stationary brake carrier disposed over the brake housing, brake lining disks suspended on the brake carrier and fixed in the circumferential direction but freely movable axially,

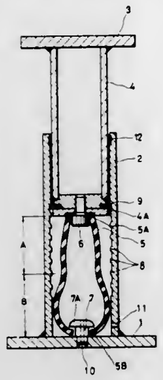
said brake housing being formed of two annular parts and having an inner wall member having circumferentially spaced openings, said annular parts having yoke-shaped housing extension members integral with the inner wall member between openings, means for attaching the brake housing to a flange on a wheel hub comprising bolts which connect the yoke-shaped housing extension members between bolts which attach the wheel to the flange, and a hydraulic actuating device having two step rings, axial extending spaced projection members on each step ring, lying in the region of the step between the step rings, said projections contacting said brake disks.

4,096,927

SHOCK ABSORBER

Suehiro Takatsu, 3-21-6, Marunouchi, Naka-ku, Nagoya-shi, Aichi-ken, Japan

Filed Apr. 19, 1977, Ser. No. 788,766
Claims priority, application Japan, Jun. 11, 1976, 51-68363
Int. Cl.[2] F16F *9/30*
U.S. Cl. 188—268 **7 Claims**



1. A shock absorber comprising a cylinder with a closed lower end, a hollow tubular cushion fabricated of elastic material within the cylinder, an inwardly bent edge formed on the cushion at the lower end thereof, a stopper on the cylinder extending into the lower end of the cushion and engaged by the inwardly bent edge thereof to prevent movement of the cushion beyond a specified limit, a plunger above the cushion slidably fitted within the cylinder, and resistance means between the cylinder and the plunger for inhibiting sudden reversion of the plunger to its original position while providing little resistance on the down stroke of the plunger whereby movement of the plunger into the cylinder causes the cushion to buckle and the resistance means prevents the plunger from suddenly reverting to its original position by the elasticity of the cushion material, and wherein the resistance means comprises saw-teeth arranged longitudinally on the inside wall of the cylinder and at least one elastic ring on the plunger that meshes with the saw-teeth as the plunger and the cylinder move relative to one another, each saw-tooth having an inwardly and downwardly sloping upper surface and a lower surface at substantially right angles to the inside wall of the cylinder.

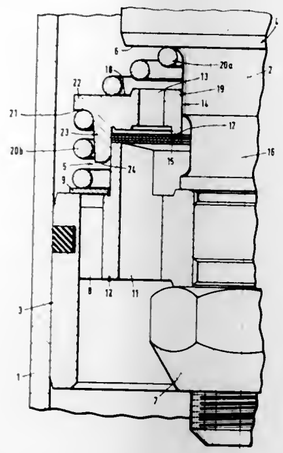
4,096,928

VALVE ASSEMBLY FOR A SHOCK ABSORBER

Rolf Krafzig; Paul Langer, and Erhard Leppich, all of Wolfsburg, Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Jun. 14, 1977, Ser. No. 806,496
Claims priority, application Germany, Jun. 26, 1976, 2628893
Int. Cl.[2] F16F *9/348*
U.S. Cl. 188—282 **6 Claims**

1. In a valve assembly for a shock absorber containing a damping medium and including means defining separate first and second channels for the opposite flow directions of the damping medium; the valve assembly having an axially displaceable valve body; at least one first valve and one second valve arranged to control the first channel and the second channel, respectively; the first valve including at least one resilient valve disc, and a first spring urging the valve body against the resilient valve disc for spring-biasing the resilient valve disc; the second valve including a closing disc and a second spring urging the closing disc into a closed position; and a shaft common to said first and second valves and being surrounded by the resilient valve disc and the closing disc; the improvement comprising an axially displaceable valve cage being common to said first and second valves, said valve cage having a cylindrical portion surrounding said resilient valve disc for a centered guiding thereof, said cylindrical portion



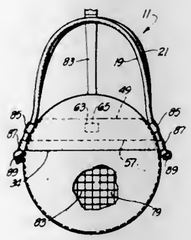
having, at an edge face, an abutment for cooperating with said closing disc; said valve cage further having a disc-like portion including first and second spring support faces for engagement with said first and second springs.

4,096,929

MULTIPURPOSE BAG

Nancy R. Frey, Newport Beach, Calif., and Shirley Schieber, Hanalei, Hi., assignors to ESEF Co., Newport Beach, Calif.

Filed Oct. 11, 1977, Ser. No. 840,551
Int. Cl.[2] A45C *3/00*
U.S. Cl. 190—42 **8 Claims**



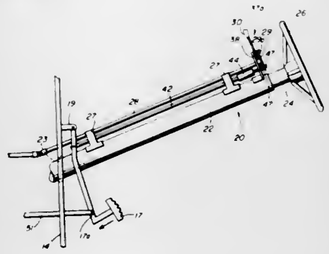
1. A multipurpose bag comprising:
first and second bag sections, each of said bag sections including outer and inner walls and means for interconnecting said walls to define a chamber, each of said bag sections having a peripheral edge;
said first bag section having means for providing access to the chamber thereof whereby items can be carried in said first bag section;
resilient means in said second bag section whereby said second bag section is adapted to serve as a cushion;
means for releasably joining said bag sections along a region adjacent the peripheries of said bag sections with the inner walls of the bag sections confronting each other whereby a compartment is defined between said bag sections;
means for providing an opening to said compartment through which access to said compartment can be obtained;
handle means coupled to at least one of said bag sections to facilitate manual grasping of the multipurpose bag, said opening to said compartment facing generally upwardly when the multipurpose bag is carried by said handle means; and
said joining means being releasable to allow said bag sections to be separated whereby said first bag section can be used as a container while said second bag section is being used as a cushion.

4,096,930

GEAR SHIFT SELECTOR BRAKE INTERLOCK

Frank Viscardi, 16 Benson Rd., Glen Rock, N.J. 07452

Filed Aug. 5, 1977, Ser. No. 822,294
Int. Cl.[2] B60K *29/02;* **G05G** *5/10*
U.S. Cl. 192—4 A **4 Claims**



1. A mechanically-actuated gear shift selector brake interlock mechanism, for motor vehicles having automatic transmissions comprising:
a gear shift selector plate mounted rotatably at the upper end of a conventional steering column sleeve;
said gear shift selector plate being circular and having gear position markings along the periphery of said selector plate;
interlock pin holes situated on said gear shift selector plate;
an interlock pin means consisting of a tubular elongated chamber containing an interlock pin spring and an interlock pin;
said interlock pin holes on said gear shift selector plate serving to receive interlock pin of the interlock pin means;
a brake interlock lever being an elongated rod-like structure extending from a linkage on the conventional brake pedal means to said interlock pin means;
said interlock pin captured in said interlock pin hole on said gear shift plate when conventional gear shift selector lever is at park or neutral positions;
said interlock pin being retracted from interlock pin hole located on said gear shift selector plate when brake pedal means has been actuated.

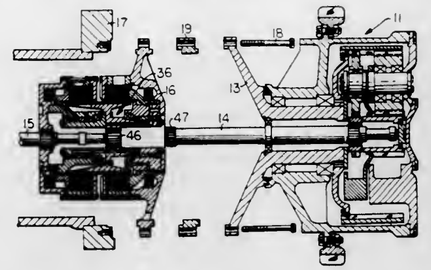
4,096,931

MODULAR STEERING CLUTCH AND BRAKE PACKAGE

Gerald E. Whitehurst, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 16, 1976, Ser. No. 696,680
Int. Cl.[2] F16D *67/04*
U.S. Cl. 192—18 A **12 Claims**

1. A clutch and brake assembly for use in a power drive system having a mounting support, comprising: a first housing; a brake pack having a plurality of brake plates; first biasing means for providing a predetermined adjustable bias of said brake plates; first bolt means removably securing said brake pack in said first housing to define a brake assembly; a second housing; a clutch pack having a plurality of clutch plates; second biasing means for providing a predetermined bias of said clutch plates; second bolt means removably securing said clutch pack in said second housing to define a clutch assembly; a carrier defining a mandrel for maintaining the alignment of said brake plates and said clutch plates during adjustment of the bias thereof by said first and second biasing means; and third bolt means for mounting the clutch and brake assemblies as a unit to said mounting support whereby said clutch and brake assemblies may be removed as separate assembled units



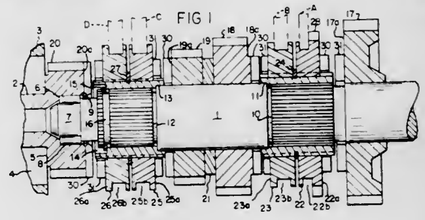
from the support for servicing of either when desired without disassembly of the other.

4,096,932

DRIVE FOR POWER TRANSMISSION

Joseph C. Liberty, Jr., 4216 Grindley Park, Dearborn Heights, Mich. 48125

Filed Feb. 7, 1974, Ser. No. 440,454
Int. Cl.[2] F16D *21/04*
U.S. Cl. 192—48.91 **3 Claims**



1. A power transmission device including, a drive shaft,
at least one rotatable driving element carried by said drive shaft,
a driven shaft,
at least one rotatable driven member carried by said driven shaft,
drive means carried by said driving element,
driven means carried by said driven member,
said driven member having sliding travel between a neutral position and a position of releasable driving engagement wherein said drive means is releasably engaged with said driven means,
an actuator to effect said sliding travel of said driven member,
said driving engagement being effective to impart a rotational drive to said driven member, when the rotational speed of said driving element exceeds the rotational speed of said driven member, wherein the improvement comprises,
a first adapting means adapting said drive means for reverse engagement with said driven means in the sliding travel of said driven member when the rotational speed of said driven member exceeds the rotational speed of said driving element, to retard the rotational speed of said gear,
a second adapting means adapting said driven means to receive such reverse engagement,
a first lateral face on said element,
a second lateral face on said member, confronting said first lateral face,
said drive means being carried by said first lateral face, and said drive receiving means being carried by said second lateral face,

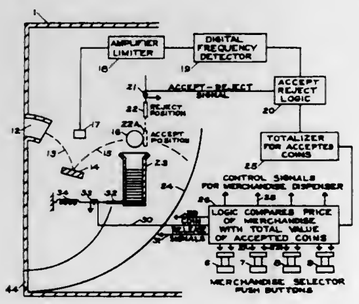
said drive means including a driving surface disposed approximately transversely to said first lateral face,
said driven means including a drive receiving surface disposed for engagement by said driving surface,
a first cam surface inclined relative to and convergent with said drive surface,
a second cam surface inclined relative to and convergent with said drive receiving surface,
said cam surfaces co-acting to impel said driven member from said rotatable driving element to a neutral position when the rotational speed of said member exceeds the rotational speed of said element, and;
said first and second adapting means being lips formed respectively on said first cam surface and said second cam surface, for selective engagement of said lips responsive to said actuating means.

4,096,933

COIN-OPERATED VENDING SYSTEMS

Frank Massa, Cohasset, Mass., assignor to Fred M. Dellorfano, Jr. and Donald P. Massa, Trustees of The Stoneleigh Trust u/d/t, both of Cohasset, Mass.

Filed Nov. 16, 1976, Ser. No. 742,192
Int. Cl.[2] G07F *3/02*
U.S. Cl. 194—100 A **12 Claims**



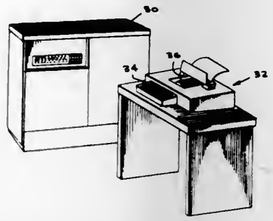
1. In combination in a coin-operated vending system, a plurality of storage sections containing a plurality of dispensable items, a plurality of openings for receiving a plurality of coins of different denominations, guide means associated with said openings for directing the trajectory of a coin after a coin is deposited in one of said openings, means located along the trajectory of said coin for causing said coin to vibrate at its resonant frequency mode, said means including a rigid plate positioned with one surface of said plate perpendicular to the plane of the trajectory so that the edge of the coin strikes said surface while the coin is falling during the initial stage of its trajectory and while the plane of the coin is at right angles to said rigid surface at the moment of contact, sensor means responsive to said resonant frequency mode of said vibrating coin, frequency measurement means associated with said sensor means, frequency classification means associated with said frequency measurement means, said frequency classification means characterized in that each different coin is separately classified in accordance with its different resonant frequency mode of vibration, means for returning said deposited coin if said frequency classification means indicates that the measured resonant frequency of said coin lies outside the established normal frequency range of vibration for an acceptable valid coin, coin identification means characterized in that the denomination of said deposited coin is identified from the measured resonant frequency of said coin if the resonant frequency lies within the acceptable frequency range established for an acceptable valid coin, coin storage means for holding acceptable valid coins which have been so recognized by said coin identification means, totalizing means characterized in that a signal is generated by said totalizing means which is representative of the total value of the accepted coins, merchandise dispensing means associated with said plurality of storage sections, control means for selectively operating said plurality of storage sections for the dispensing of a desired item, said selectively operable control means characterized in that it is activated only when the totalizer signal, which is representative of the total value of the accepted coins, indicates that the total value of the accepted coins equals or exceeds the price of the selected item of merchandise to be dispensed.

4,096,934

METHOD AND APPARATUS FOR REPRODUCING DESIRED IDEOGRAPHS

Philip George Kirmser, 1009 Michael Rd., and Kuo-Kuang Hu, 925 Mission Ave., both of Manhattan, Kans. 66502

Filed Oct. 15, 1975, Ser. No. 622,773
Int. Cl.[2] B41J *1/52*
U.S. Cl. 400—110 **30 Claims**



1. An input-output typing machine for selecting and printing desired ideographs from a list of available ideographs comprising means for storing information representing at least a portion of the phonetic spelling of the commonly used names of the ideographs and for storing information representing a descriptive characteristic of each ideograph in the list of available ideographs to uniquely identify each available ideograph, means for inputing information representing at least a portion of the phonetic spelling of a desired ideograph, means for inputing information representing the descriptive characteristic of the desired ideograph, means for comparing the information representing the phonetic spelling and descriptive characteristic of the desired ideograph with the stored information of the available ideographs, means for selecting the desired ideograph based on the stored information and the input information and means for visually reproducing the selected ideograph thereby permitting the use of a conventional keyboard by a person without special training to uniquely identify and print each desired ideograph.

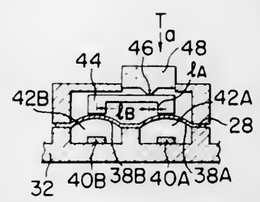
4,096,935

INPUT DEVICE

Takayoshi Hanakata, Yokohama, and Shunji Mitaka, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 551,394, Feb. 20, 1975, abandoned.
This application Aug. 12, 1976, Ser. No. 713,884
Claims priority, application Japan, Feb. 22, 1974, 49-21682; Feb. 22, 1974, 49-21683; Feb. 7, 1975, 50-16101
Int. Cl.[2] B41J *5/12*
U.S. Cl. 400—479 **11 Claims**

1. In apparatus of the type wherein desired letters, symbols or the like may be printed in a given direction on a recording medium by a printing device, in response to the depression of corresponding keys on a keyboard, and having means for effecting relative displacement between said printing device and said recording medium wherein said printing device and said recording medium are relatively displaced in said given direction after the printing of each of said letters, symbols or the like, and means for printing a corrective character on said recording medium,
an input device comprising:
(a) first switching means for generating a first instruction for effecting relative displacement between said printing device and said recording medium in the direction opposite to said given direction;
(b) second switching means for generating a second instruction for actuating said corrective character means;
(c) a first push button;
(d) a second push button;



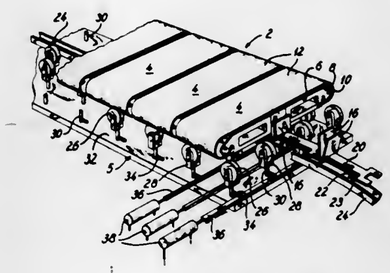
(e) means responsive to the displacements of said first and second push buttons for discriminatively actuating said first and second switching means so that said first switching means and said second switching means are driven in the aforementioned order by the displacement of said first push button and that said second switching means and said first switching means are driven in the aforementioned order by the displacement of said second push button.

4,096,936

SELECTIVELY CONTROLLABLE UNLOADING ARRANGEMENT FOR SORTING CONVEYOR CONSTRUCTIONS

Jacob August Nielsen, Vibly J., Denmark, assignor to Kosan Crisplant A/S, Denmark

Continuation of Ser. No. 270,030, Jul. 10, 1972, abandoned, which is a continuation of Ser. No. 86,250, Nov. 3, 1970, abandoned. This application Aug. 19, 1975, Ser. No. 605,814
Claims priority, application United Kingdom, Nov. 3, 1969, 53783/69; Nov. 19, 1969, 56596/69
Int. Cl.[2] B65G *43/00*
U.S. Cl. 198—356 **18 Claims**



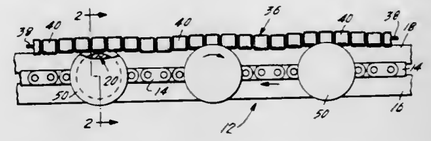
1. A sorting conveyor having a main conveyor operable to move forwardly in an article carrier run past at least two stationary discharge stations, said main conveyor comprising a plurality of juxtaposed links each constituted by a conveyor element h ing a cross-conveyor means mounted cross-wise of the moving direction of said conveyor element, movement control means operable to cause said cross-conveyor means to carry out a conveying movement being located adjacent said discharge stations and being selectively operable for effecting diversion of an article resting on said cross-conveyor means at a selected one of said discharge stations, said conveyor means of each pair of consective conveyor elements being operable to effectively support an article of a length greater than the width of the cross-conveyor means of each of said conveyor elements, length registering means being provided for resigtering the length of each article conveyed on said main conveyor belt, said movement control means being operatively connected with said length registering means so as to cause conveying movement of said cross-conveyor means of as many consecutive conveyor elements as occupied by an article to be diverted.

4,096,937

ARTICLE TRANSPORT SYSTEM

Sydney Johnstone Wallace, Point Roberts, Wash., assignor to American Can Company, Greenwich, Conn.

Continuation of Ser. No. 622,092, Oct. 14, 1975, abandoned.
This application Jan. 31, 1977, Ser. No. 764,451
Int. Cl.[2] B65G *17/32, 29/00, 47/24, 47/84*
U.S. Cl. 198—377 **3 Claims**



1. An article transport system comprising: a conveyor for moving a plurality of hollow cylindrical articles along a travel path for subjection of said articles to irradiation, said conveyor including a plurality of holders for said articles rotatably mounted at spaced locations on said conveyor, each of said holders having a pulley portion associated therewith and disposed to rotate about a generally horizontal axis; and a rail assembly comprised of a series of axially-aligned, generally cylindrical members, the axial dimension of each said member being less than the recited spacing between said holders, and means supporting said members in mutually abutting relationship while permitting independent movements of adjacent ones thereof relative to said supporting means in a substantially vertical direction, said rail assembly being mounted to extend along at least a portion of said travel path of said conveyor, and with said cylindrical members disposed above the recited horizontal axis and effective to undergo the recited independent movements while resting upon and riding within said pulley portions as said holders are moved therepast by said conveyor, said cylindrical members frictionally engaging said pulley portions to effect uniform rotation of said holders as they are moved by said conveyor along said travel path for irradiation of said articles.

4,096,938

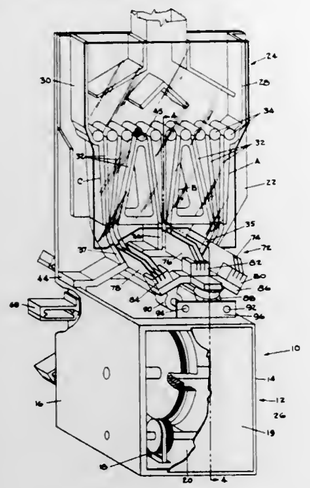
APPARATUS FOR TRANSFERRING CIGARETTES ON A CIGARETTE PACKAGING MACHINE

Leslie Elmer Payne, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Continuation of Ser. No. 498,823, Aug. 19, 1974, abandoned.
This application Jan. 8, 1976, Ser. No. 648,605
Int. Cl.[2] B65G *65/44*
U.S. Cl. 198—420 **9 Claims**

1. An improved supply and transfer apparatus for a cigarette packing machine which transfers groups of twenty cigarettes into compression pockets carried on an intermittent motion conveyor of said cigarette packing machine, said compression pockets being indexed adjacent said supply and transfer mechanism, said apparatus comprising:
(a) at least three transfer chambers, each receiving a group of cigarettes, each of said transfer chambers being in registration with one of three adjacent compression pockets on said conveyor when said conveyor is indexed;
(b) hopper means connected to said transfer chamber for receiving a supply of cigarettes and distributing said cigarettes to said transfer chambers;
(c) at least three plungers being operated simultaneously to engage the groups of cigarettes in said transfer chambers and insert the cigarettes into the three adjacent compres-

sion pockets in registration with said transfer chambers when said conveyor is indexed; and



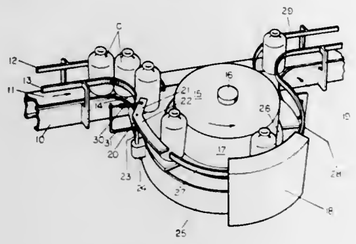
(d) means for operating said plungers only after at least each third successive index of said conveyor.

4,096,939

APPARATUS FOR FEEDING GLASS CONTAINERS AT SPACED INTERVALS

Darius O. Riggs, Ottawa Lake, Mich., and Charles G. Vogel, Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 12, 1976, Ser. No. 666,294
Int. Cl.[2] B65G *43/00, 47/26*
U.S. Cl. 198—460 **6 Claims**



1. In apparatus for feeding glass containers to a test device wherein:

a moving, horizontal conveyor carries a plurality of containers in single file to a means for guiding containers from the side of the conveyor into the entrance of a testing device mounted at the side of the conveyor, the test device having container sidewall engaging means for moving the containers in precession from the entrance, to and through a testing station, the improvement comprising:

a generally arcuate, horizontal arm, said arm having a short leg and a long leg;

means mounting said arm at the entrance to said test device for pivotal movement about a vertical axis intermediate said legs;

said short leg, in a first position, contacting a container and blocking movement thereof into engagement with said container sidewall engaging means;

said long leg of said arm engaging containers that are being moved by said container engaging means to a point just prior to the testing station;

means biasing the long leg of said arm into engagement with a container;

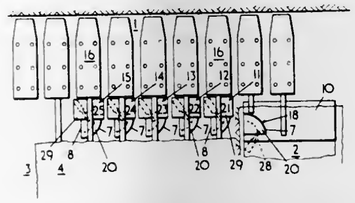
said biasing means permitting said arm to pivot into a second position when the long leg is not in engagement with a container to thereby move the short leg out of said first position and permitting a single container to move into engagement with said engaging means and said long leg of said arm whereby containers will be fed to the testing device at spaced intervals depending on the length of said long leg.

4,096,940

CONVEYING APPARATUS

David Garner, Measham, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Mar. 3, 1975, Ser. No. 554,525
Int. Cl.[2] B65G *47/18*
U.S. Cl. 198—560 **5 Claims**



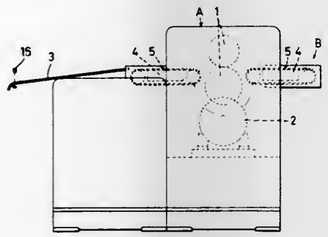
1. Apparatus for packing broken rock debris adjacent to a roadway in an underground mine, comprising a deck assembly mountable in the roadway and having an elevated deck, a hopper located below the deck for receiving broken rock debris falling from the deck, a first displaceable paddle device movably mounted so as to urge broken rock debris out of the hopper in a generally horizontal direction, a second displaceable paddle device movably mountable on advanceable staker means, displacing means for displacing said first and second paddle devices which are repeatedly traversable to and fro in a conveying mode and in a non-conveying mode, and control means for the displacing means which thereby, in use, traverse the paddle devices in the conveying mode in sequence.

4,096,941

CONVEYOR SYSTEM FOR A CUTTER FOR A WEB OF CORRUGATED FIBERBOARD

Masateru Tokuno, Nishinomiya, Japan, assignor to Rengo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 29, 1976, Ser. No. 745,926
Claims priority, application Japan, May 28, 1976, 51-69078[U]
Int. Cl.[2] B65G *47/91*
U.S. Cl. 198—689 **3 Claims**



1. A conveyor system for feeding a web of corrugated fiberboard into and out of a cutter, said conveyor system comprising:

belt conveying means at the entrance into and exit from said cutter for carrying said fiberboard into and from said cutter, said conveying means comprised of:

a plurality of parallel, longitudinal perforated conveyor belts arranged side by side leading into and from said cutter;

suction box means beneath said plurality of perforated conveyor belts and having a plurality of openings in the top thereof aligned with said perforations in said conveyor belts for attracting said conveyor belts and said fiberboard thereon;

vacuum source means connected to said suction box means for creating a vacuum in said suction box means;

suction control means within said suction box means for controlling the suction through said openings in said suction box means beneath said conveyor belts; and

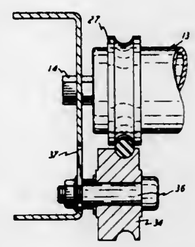
detecting means at the forward end of said belt conveying means and connected to said suction control means for detecting the width of the fiberboard on said conveyor belts and for regulating said suction control means in said suction box means corresponding to the width of fiberboard being carried by said conveyor belts, whereby the effective width of said belt conveying means is adjusted by providing vacuum from said suction box means only beneath those conveyor belts carrying fiberboard, said detecting means being comprised of a light source and a phototube on opposite sides of each of said parallel, longitudinal perforated conveyor belts.

4,096,942

ROLLER TYPE OF CONVEYOR

Thomas Paul Shepherd, S45W22061 Tansdale Rd., Waukesha, Wis. 53186

Filed Oct. 1, 1976, Ser. No. 728,559
Int. Cl.[2] B65G *13/07*
U.S. Cl. 198—781 **15 Claims**



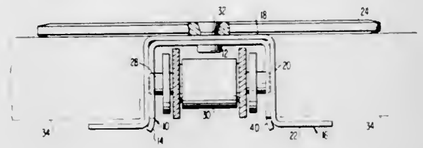
1. A roller type of conveyor comprising a support, a plurality of rollers rotatably mounted on said support for supporting items on said rollers and moving the items along said rollers when said rollers are rotated and each of said rollers having an external cylindrical surface thereon, driving pulleys rotatably mounted on said rollers and each having an inner cylindrical surface slightly larger than said external cylindrical surface and in contact therewith to be rotatable relative to said rollers to slip thereon and also to be in selectable frictional drive contact relative to said rollers for frictionally drivingly rotating said rollers when said pulleys are pressed against said rollers, each of said pulleys having an external cylindrical groove, a powered driver, an endless drive means drivenly connected with said powered driver and extending between and trained in said grooves of said pulleys and being taut between said pulleys for engaging said grooves and positioning said pulleys relative to the longitudinal axes of said rollers, and a tension member in contact with said drive means on the side thereof opposite from the side said drive means is in contact with said pulleys for urging said drive means toward said pulleys and thereby press said pulleys against said rollers to effect the frictional drive between said pulleys and said rollers.

4,096,943

SNAP-ON TOP PLATE ASSEMBLY

C. Stewart Gentsch, Longmeadow, Mass., assignor to Rexnord Inc., Milwaukee, Wis.

Filed Nov. 28, 1975, Ser. No. 635,837
Int. Cl.[2] B65G *17/14*
U.S. Cl. 198—793 **13 Claims**



7. A snap-on top plate assembly for a roller chain, said assembly comprising:

(a) an inside steel saddle in the shape of a channel having a base and two upstanding legs, the legs having holes therethrough shaped and positioned to accept the outside ends of the pins in a link of roller chain when the link is positioned within said inside saddle, said inside saddle being made from a relatively but not totally inflexible material;

(b) an outside steel saddle in the shape of a channel having a base, two upstanding legs, and flanges extending outwardly from the ends of the legs remote from the base, said outside saddle being dimensioned to accept said inside saddle therewithin with the base and the legs of said outside saddle in close engagement with the base and the legs of said inside saddle and the legs of said outside saddle extending up along the legs of said inside saddle at least past the holes therein, said outside saddle being made from a relatively but not totally inflexible material;

(c) a top plate;

(d) first means for retaining said inside saddle in place within said outside saddle; and

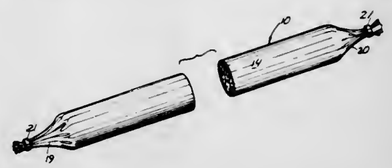
(e) second means for retaining said top plate in place on the base of said outside saddle on the side thereof opposite to said inside saddle.

4,096,944

CARTRIDGE FOR GROUTING AN ANCHOR ELEMENT IN A HOLE OF A SUPPORT STRUCTURE

Robert E. Simpson, Spokane, Wash., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Continuation-in-part of Ser. No. 809,883, Jun. 24, 1977, abandoned. This application Nov. 21, 1977, Ser. No. 853,700
Int. Cl.[2] B65D *25/08*; C04B *11/14*; E21D *11/00*
U.S. Cl. 206—219 **6 Claims**



1. A cartridge for grouting an anchor element in an elongated hole of a support structure, comprising:

an elongated tubular casing fabricated of a frangible material capable of being punctured and shredded by an anchor element thrust into the cartridge and having a diameter between enclosed ends sufficient to enable the cartridge to be introduced into the hole;

a heterogeneous mixture of a continuous phase of dry hydraulic cement powder and a discontinuous phase of a multitude of water-containing microcapsules essentially

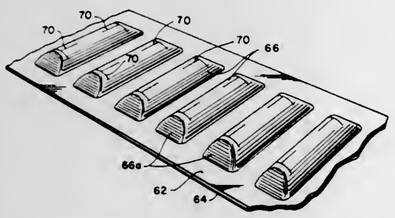
uniformly dispersed in the continuous phase that fills the interior of the tubular casing between the enclosed ends; wherein the microcapsules have diameters in a range of 400 to 5000 microns and have inert, frangible shells enclosing droplets of liquid water that are pressure sensitive and are capable of being progressively ruptured by the force of said anchor element being thrust into the cartridge when the cartridge is positioned in the hole to thereby dispense the water substantially uniformly throughout the cement powder to enable the water and cement powder to thoroughly interact to form a flowable cement paste in intimate contact with the hole wall and the anchor element, which when solidified forms a uniform grout about the anchor element to secure the anchor element to the support structure.

4,096,945

SYSTEM FOR INJECTING PARTICULATE MATERIAL INTO THE COMBUSTION CHAMBER OF A REPETITIVE COMBUSTION COATING APPARATUS

Rosser B. Melton, Jr., Helotes, and Elbert M. Hubbard, Dallas, both of Tex., assignors to Southwest Research Institute, San Antonio, Tex.

Division of Ser. No. 458,884, Apr. 8, 1974, Pat. No. 3,893,578. This application Nov. 4, 1974, Ser. No. 520,672
Int. Cl.² B65D *75/62*
U.S. Cl. 206—469 **20 Claims**



1. The encapsulating tape for successively delivering predetermined quantities of particulate coating material to a pneumatic stripping station where the particulate coating material is pneumatically removed from the tape and injected into a heating and pressurizing chamber, said tape comprising a plurality of discrete encapsulating pockets each filled with a predetermined quantity of very finely ground particulate material the particles of which are capable of being heated and impacted against a work piece to form a specialized coating on the work piece, each pocket having a pneumatic inlet face and a pneumatic outlet face, the pneumatic inlet face including means for admitting gas to the interior of the pocket to burst the outlet face before the inlet face is deformed by gas pressure applied to the inlet face to an extent sufficient to press the particulate material against the outlet face to rupture the outlet face to thereby prevent the lodging of the fine particulate material between the two faces.

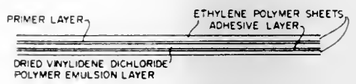
4,096,946

LAMINATE FOR USE IN PACKING OIL

Herbert G. Cook, and Jack A. McAvity, both of Toronto, Canada, assignors to E.S. & A. Robinson (Canada) Ltd., Toronto, Canada

Continuation of Ser. No. 506,582, Sep. 16, 1974, abandoned, which is a continuation of Ser. No. 277,049, Aug. 1, 1972, abandoned. This application Mar. 15, 1976, Ser. No. 667,030
Int. Cl.² B65D *75/26*
U.S. Cl. 206—484.2 **8 Claims**

1. A package formed from a sheet material which is a laminate consisting essentially of outer layers of copolymer of ethylene with propylene or butene and at least one inner barrier layer consisting of a vinylidene chloride polymer in the form of a dried emulsion coating which is free of plasticizer, said barrier layer being bonded to the inner surface of said outer layers, one of said ethylene polymer layers being bonded



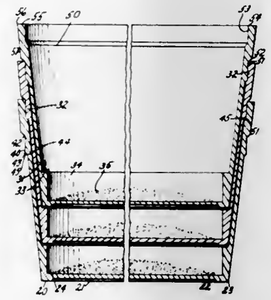
to said dried vinylidene chloride polymer coating layer by means of an oil resistant adhesive and an oleaginous material contained within said package.

4,096,947

SYNTHETIC RESINOUS NESTING CUP CONSTRUCTION

Milton Morse, 44 Honeck St., Englewood, N.J. 07631

Filed Jan. 21, 1977, Ser. No. 761,056
Int. Cl.² B65D *1/22, 21/00*
U.S. Cl. 206—519 **3 Claims**



1. A nesting cup construction of resilient synthetic resinous material comprising: a bottom wall and a generally conically shaped side wall connected thereto, said side wall having a free upper edge, and including first, second and third wall portions; said first wall portion interconnecting with said bottom wall, and having a conical outer surface and a conical inner surface, said conical outer surface extending to said second wall portion, said conical inner wall surface extending past said second wall portion; said second wall portion being disposed above said conical outer surface, and having an outer surface extending upwardly from said first wall portion to include a first tapering portion forming a first ledge, and a first cylindrical surface extending upwardly from said ledge; said third wall portion being disposed above said second wall portion and having an inner second cylindrical surface adjacent a free upper edge thereof of unstressed diameter slightly less than that of said first cylindrical surface of said second wall portion, and a tapering surface forming a second ledge selectively engageable with said first ledge; whereby upon the nesting of a first cup within a second cup, the ingress of the former with respect to the latter is limited by engagement of said first and second ledges, and a sealing action is accomplished by the sliding engagement of said first and second cylindrical surfaces resulting in the resilient expansion of said second cup.

4,096,948

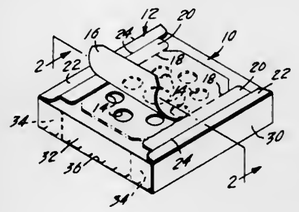
COOK-IN CARTON WITH INTEGRAL REMOVABLE SECTION AND BLANK THEREFOR

Morris W. Kuchenbecker, Neenah, Wis., assignor to American Can Company, Greenwich, Conn.

Filed Mar. 18, 1977, Ser. No. 779,807
Int. Cl.² B65D *5/70*
U.S. Cl. 206—622 **8 Claims**

1. A carton adapted for use in heating a product contained therewithin, comprising a plurality of hingedly interconnected

panels, two of said panels being similarly dimensioned and configured and being secured in face-to-face contact to provide a two-ply wall in said carton, a portion of the inner of said two panels having openings formed therein to permit substantial exposure of the contained product, the outer of said two panels having a weakened area extending to opposite margins thereof defining therein a removable section dimensioned and configured to cover said open portion of said inner panel, said removable section overlying said inner panel to close said openings thereof, a rectilinear fold line extending between said



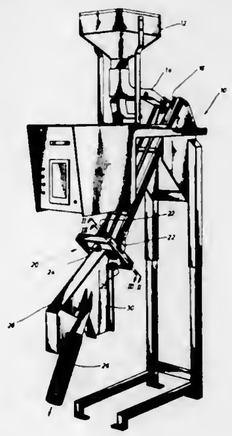
opposite margins of said outer panel at a location spaced to each side of said weakened area to define foldable tab portions therebetween, the portions of said outer panel lying outwardly of said tab portions being secured to said inner panel so that, upon removal of said removable section of said outer panel, said tab portions may be folded about said fold lines away from said inner panel, to thereby provide support legs on said carton, and disengagement of said removable section from the remainder of said outer panel uncovering said openings and effecting substantial exposure of the product contained within said carton.

4,096,949

APPARATUS FOR PERFORMING A THREE-WAY SORT

Michael C. Hoover, and William C. Long, both of Houston, Tex., assignors to Geosource Inc., Houston, Tex.

Filed Jun. 1, 1976, Ser. No. 691,908
Int. Cl.² B07C *5/342*
U.S. Cl. 209—74 M **16 Claims**



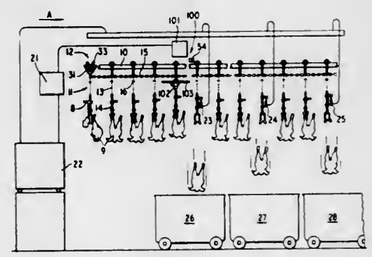
1. Apparatus for sorting particles into three groups according to predetermined physical characteristics comprising:
means for providing a singulated stream of particles;
first classifying means including a first viewing zone for classifying each particle passed therethrough according to a first physical characteristic thereof and for generating a first electrical trip signal responsive to a particle having said first physical characteristic;
second classifying means including a second viewing zone for classifying each particle passed therethrough according to a second physical characteristic thereof and for generating a second electrical trip signal responsive to a particle having said second physical characteristic;
a first ejector element associated with said first classifying means and spaced a first predetermined distance therefrom, said first ejector element responsive to said first trip signal to expel a particle having said first physical characteristic from said particle stream;
a second ejector element associated with said second classifying means and spaced a second predetermined distance therefrom, said second ejector element responsive to said second trip signal to expel a particle having said second physical characteristic from said particle stream, said first ejector element and said second ejector element both being disposed in a plane substantially normal to said particle stream and 180° from one another across said particle stream;
first signal delay means disposed intermediate said first classifying means and said first ejector element for delaying a trip signal generated by said first classifying means for a first predetermined period of time functionally related to the time required for a particle to traverse said first predetermined distance;
second signal delay means disposed intermediate said second classifying means and said second ejector element for delaying a trip signal generated by said second classifying means for a second predetermined period of time functionally related to the time required for a particle to traverse said second predetermined distance; and,
means responsive to the simultaneous output of trip signals from said first and second signal delay means to said first and second ejector elements for permitting actuation of one of said ejector elements and for inhibiting actuation of said other ejector element.

4,096,950

SORTING SYSTEMS AND SENSING DEVICES FOR USE THEREWITH

Richard Morley Brook, Huddersfield, England, assignor to AutoSystems Limited, England

Continuation-in-part of Ser. No. 495,016, Aug. 5, 1974, Pat. No. 3,997,013. This application Oct. 27, 1976, Ser. No. 736,059
The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.
Int. Cl.² B07C *5/28*
U.S. Cl. 209—121 **15 Claims**



1. A conveyor system for use in sorting a plurality of articles according to their weight, said system comprising:
(a) an overhead conveyor comprising a continuous rail defining a path and a plurality of shackles movable therealong in succession, each shackle being arranged to carry a poultry carcass,
(b) a weighing station disposed along said path,
(c) an electronic weight sensing transducer arranged at said weighing station to emit a weight signal related to the weight of each poultry carcass as said carcass passes through said weighing station,
(d) a plurality of sorting stations spaced apart along said path

downstream of said weighing station, each sorting station being associated with carcasses having a particular weight range,

(e) a shackle release device and a carcass receiving container arranged at each sorting station,

(f) a sensing device arranged to emit a counting pulse each time a shackle passes said sensing device, and

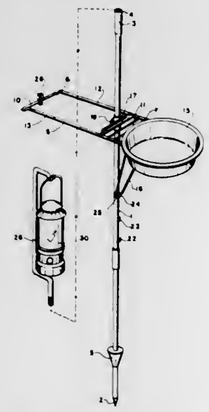
(g) control means connected to said weight sensing transducer, said sensing device and each of said shackle release devices to receive and store said weight signals and said counting pulses and to actuate each shackle release device when there arrrives at the associated sorting station a shackle carrying a carcass having a weight lying in the weight range associated with the particular sorting station to sort said articles by weight.

4,096,951

CAMPING UTILITY STAND

Leroy K. Menssen, Estherville, Iowa, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed May 12, 1977, Ser. No. 796,228
Int. Cl.[2] A47K *1/04, 1/05*
U.S. Cl. 211—207 **3 Claims**



1. A camping utility stand, comprising

a main rod having spaced opposite first and second ends, said first end having a point thereon for piercing supporting ground and said second end having a coaxial bore formed therein;

an anchor member affixed to the main rod in the area of the first end thereof and surrounding said main rod for applying pressure to urge the main rod into the ground;

a substantially square loop rod having spaced opposite first and second ends with first and second cross rods at the first and second ends, respectively, and a grating at the first end of said square loop rod for supporting a bar of soap, the remainder of said square loop rod supporting towels, a circular rod extending beyond the first end of the square loop rod for supporting a wash pan, and a generally V-shaped support rod pivotally mounted on the first cross rod;

mounting means pivotally mounting the square loop rod on the main rod in an adjustable manner whereby said square loop rod is positionable at a desired point along the length of the main rod from a position substantially perpendicular to said main rod to a position substantially next-adjacent said main rod; and

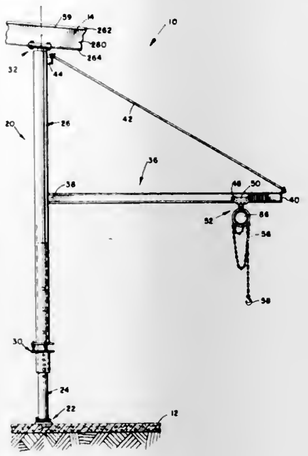
a plurality of spaced protruding members on the main rod for supporting the end of the support rod farthest from the square loop rod to maintain said square loop rod substantially perpendicular to said main rod at different points therealong.

4,096,952

ADJUSTABLE JIB CRANE

Richard E. Diggs, 12A Rd., Carthage, Mo. 64836

Filed Dec. 21, 1976, Ser. No. 752,869
Int. Cl.[2] B66C *23/06*
U.S. Cl. 212—56 **20 Claims**



1. A jib crane comprising:

a base element mounted on a floor, said base element including an anchor embedded in the building floor, a floor plate mounted on the building floor and fixed to said anchor, an annular collar having a top rim and a bottom rim fixed to said floor plate to be coaxial with said anchor, a rotation boss seated in the annulus defined in said annular collar;

a lower tubular mast section having a mounting flange fixed to one end thereof, and a bearing surface on said lower mast section one end receiving said rotation boss, said mounting flange having a lower surface resting on said base element annular collar top rim, said lower mast section having a plurality of fastener receiving holes defined therein, said fastener holes being spaced apart longitudinally of said lower mast section;

an upper tubular mast section telescopingly receiving said lower section in one end thereof; said mast sections being longitudinally aligned and essentially upright;

a top element connecting the other end of said upper section to a ceiling in a manner such that said upper section is freely rotatable about the longitudinal axis thereof, said top element including ceiling slope accommodating means for connecting said upright upper mast section to a ceiling which slopes with respect to said mast sections;

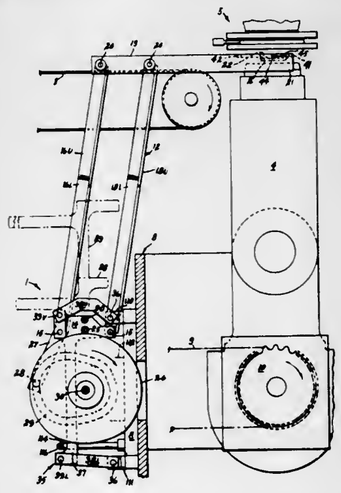
connecting means connecting said mast sections together, said connecting means including a rough crane height adjustment means which comprises a tubular jacket telescopingly receiving the other end of said lower mast section and having a plurality of fastener receiving holes defined therein to be spaced apart longitudinally on said tubular jacket, and a fastener fitting through said fastener receiving holes and coupling said tubular jacekt to said lower mast section in a manner which prevents rotation of said coupled elements with respect to each other thereby further preventing rotation of said upright upper mast section with respect to said top element, and a fine crane height adjustment means which comprises a first flange on said tubular jacket, a second flange mounted on said upper mast section one end and having a plurality of bolt receiving openings defined therein, said flanges being facially opposed, a plurality of bolts mounted on said first flange and received in said second flange bolt receiving openings, said bolts preventing rotation of said upper mast element with respect to said tubular element so that said mast sections are coupled together in a non-rotatable manner by said connecting means, and a locking nut threaded onto each bolt and engaging said second flange, said flanges being separated by a distance determined according to the position of said locking nuts on said bolts so that the height of the crane is adjustable via said fine adjustment means independent of a crane height adjustment via said rough adjustment means and with said mast sections being non-rotatably connected together by said connecting means and load handling means connected to one of said most sections to move a load horizontally and vertically.

4,096,953

MECHANISM TO TRANSFER WORKPIECES BETWEEN LOCATIONS

Arnold LeRoy Kellermann, Goshen, and David Ian McDonald, Cincinnati, both of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Mar. 21, 1977, Ser. No. 779,732
Int. Cl.[2] B65G *47/91*
U.S. Cl. 214—1 BT **37 Claims**



1. A machine for transferring a workpiece substantially horizontally from a first location to a second location comprising

a machine frame;

a four bar mechanism with a pair of approximately vertical connecting rods between a driver link at the bottom and follower link at the top;

a workpiece engaging means supported from said follower link;

vertical driving means to substantially vertically drop then lift said four bar mechanism periodically by engaging said driver link;

constraining means supported from said frame to guide said four bar mechanism to move in a substantially vertical path relative to said frame; and

horizontal driving means supported from said frame to substantially horizontally oscillate said follower link from one of said drop and lift positions at one said location to one of said positions at the other said location and return;

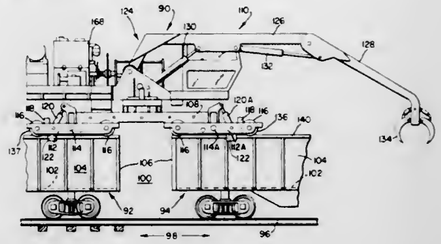
both said vertical and horizontal driving means operating in timed relation to each other to vertically lift said four bar mechanism sufficiently for a workpiece at said first location to be engaged by said workpiece engaging means before substantial oscillation to said second location has occurred.

4,096,954

GONDOLA CAR LOADER

Walter E. Buckner, Hartselle, Ala., assignor to Lucky Manufacturing Company, Huntsville, Ala.

Filed Apr. 22, 1977, Ser. No. 789,887
Int. Cl.[2] B65G *67/00*
U.S. Cl. 214—38 CC **9 Claims**



3. An apparatus moveable along the length of a plurality of railroad gondola cars positioned end to end comprising:

a chassis; and

means for supporting said chassis on upper edges of the walls of the cars and for facilitating movement of the chassis across gaps between immediately adjacent cars, said means comprising:

a first pair of elongated beams mounted to a forward portion of said chassis, each of said first pair of elongated beams carrying a plurality of wheels spaced along the length thereof for engaging the upper edges of the walls of the cars, and each of said beams being selectively pivotable in a substantially vertical plane with respect to the chassis at a point intermediate two of said plurality of wheels about an axis generally perpendicular to the length of the beam; and

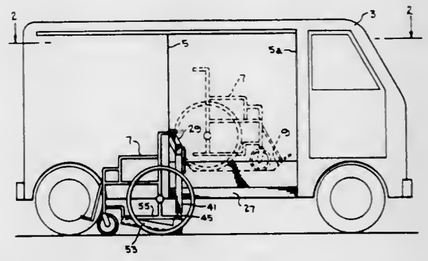
a second pair of elongated beams mounted to a rearward portion of said chassis, each of said second pair of elongated beams carrying a plurality of wheels spaced along the length thereof for engaging the upper edges of the walls of the cars, and each of said beams being selectively pivotable in a substantially vertical plane with respect to the chassis at a point intermediate two of said plurality of wheels about an axis generally perpendicular to the length of the beams.

4,096,955

LIFTING MECHANISM

Nolan Dake, 378 Connaught Way, Houston, Tex. 77015

Filed Sep. 10, 1976, Ser. No. 722,007
Int. Cl.[2] B60P *1/44*
U.S. Cl. 214—75 G **6 Claims**



1. In a lifting and lowering apparatus for wheelchairs and the occupants thereof to and from a motor vehicle comprising:

a supporting strut means vertically disposed within the vehicle,

an articulating arm means operatively interconnected to said supporting strut means for moving vertically with respect thereto,

a wheelchair support frame supported from the remote end of the articulated arm means and including a pair of rail supports for supportively receiving the rails of a wheelchair and,

motive power means and lifting means operatively associated with the articulating arm means for moving a wheelchair on the rail supports to and from the interior of the vehicle and,

said rail supports being disposed at an angle with respect to the horizontal so that the ends thereof proximate the front of a wheelchair carried thereon are higher than the back, thereby producing a backward tilt to the wheelchair during the lifting thereof,

said wheelchair support frame including a substantially vertically disposed support housing bar, and coupling means connecting said rail supports to said support housing bar, said coupling means being vertically movable toward said articulating arms upon actuation thereof so as to move the wheelchair on the ground and thus tilt it rearwardly prior to operation of said articulating arm means.

4,096,956

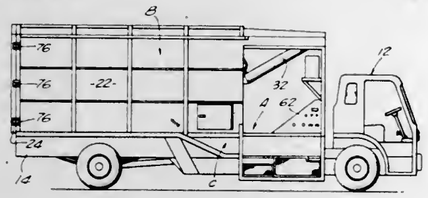
REFUSE VEHICLE

Raymond Lester Gaskin, 809 Valley Crest, La Canada, Calif. 91011

Continuation of Ser. No. 592,349, Jul. 1, 1975, abandoned. This application Jan. 26, 1977, Ser. No. 762,401

Int. Cl.[2] B60P *1/00*; B65F *3/00*

U.S. Cl. 214—82 **4 Claims**



1. An apparatus adapted to be mounted upon a vehicle chassis rearwardly of the cab thereof for loading and compacting compressible material comprising:

(a) a refuse loading compartment disposed rearwardly of the cab having a floor and side walls;

(b) a forwardly open storage compartment disposed rearwardly of said loading compartment and in open communication therewith having side walls, a substantially vertically disposed end wall and a floor elevated with respect to the floor of said loading compartment;

(c) a generally planar member disposed intermediate said loading and storage compartments said member being pivotally connected to said storage compartment proximate the forward edge of said floor thereof and being pivotally movable from a first position defining an inclined plane interconnecting said floors of said storage and loading compartments to a second generally horizontal position substantially coplanar with said floor of said storage compartment;

(d) a longitudinally movable, generally vertically disposed, substantially planar compaction blade including means for moving said blade comprising a fluid actuated assembly consisting of a plurality of telescopically interconnected members housing a fluid actuated piston, one end of said assembly being connected to said compaction blade for uniform movement of said blade, the other end of said assembly being connected to the forward end of the loading compartment, said compaction blade being movable relative to said planar member from a first position forward of the forward edge of said planar member wherein said blade closes the forward opening in said storage compartment, to a second position proximate said rearward end wall of said storage compartment said blade being constructed and arranged to cooperatively interact with said planar member for removing refuse from said planar member when the latter is in a second position and carrying the refuse rearwardly of said planar member and storage compartment toward the end wall thereof for compaction of the trash between said compaction blade and said end wall;

(e) a pusher assembly carried within said loading compartment and reciprocally movable rearwardly beneath said compaction blade to a position proximate said planar member for moving refuse deposited into said loading compartment onto said planar member when said latter member is in a first position, said pusher assembly being provided with a curved refuse engaging blade adapted to cooperate with said planar member to lift the trash deposited thereon as said member is raised to said second position, the curvature of said blade closely corresponding to the arc generated by the movement of the forward edge of said planar member as said member moves from said first to said second position, whereby as said member is moved to said second position said blade and said planar member cooperatively interact so that as the trash is lifted it will not fall between said blade and said planar member; and

(f) means for moving said planar member from the first to second postion.

4,096,957

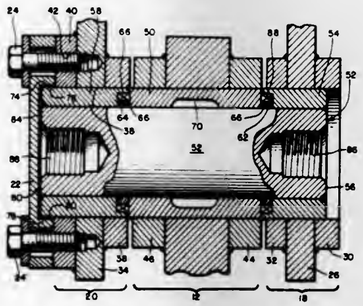
PIVOT PIN ASSEMBLY

Lowell P. Iverson, Aurora; George W. Dirscherl, Chicago, and Paul D. Hagen, Yorkville, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 18, 1977, Ser. No. 816,579

Int. Cl.[2] B23P *19/04*

U.S. Cl. 214—145 R **6 Claims**



1. In a loader bucket having a bucket bracket assembly secured thereto and mounted for rotation about a loader arm assembly of an earth-working implement, an improved pivot pin assembly for mounting the bucket brackets to the loader arm assembly comprising:

an elongated cylindrical pin having a first end face and a second end face;

a first retaining sleeve having an inner surface and an outer surface and an interior end and an exterior end, the inner surface engaging the cylindrical pin, the exterior end of said first sleeve being secured to the first end face of the elongated cylindrical pin, the outer surface of the sleeve engaging the bucket bracket assembly of the loader bucket;

a second retaining sleeve having an inner surface and an outer surface and an interior end and an exterior end, the inner surface engaging the cylindrical pin, the exterior end of the second sleeve being secured to the second end face of the elongated cylindrical pin, the outer surface of the sleeve engaging the bucket bracket assembly of the loader bucket, flange means extending outwardly from the exterior end of the second retaining sleeve for abutting the bucket bracket assembly, the flange means defining two spaced-apart sides;

a sleeve bearing having an inner bearing surface engaging the cylindrical pin and an outer surface engaging the loader arm assembly, the sleeve bearing captured between the interior surface of the first and the second retaining sleeves; and

a cover plate mounted on the bucket bracket assembly having a channel for capturing the flanges between the cover plate and the bucket bracket assembly for restricting axial movement of the elongated cylindrical pin, and said two spaced-apart sides retained in the channel for restricting rotational movement of the elongated pin with respect to the loader bucket.

4,096,958

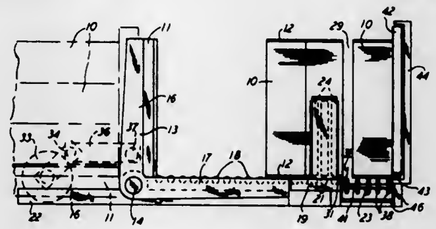
METHOD FOR HANDLING BUNDLES OF SHEETS

Walter John Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.

Division of Ser. No. 663,825, Mar. 4, 1976, Pat. No. 4,018,351. This application Feb. 14, 1977, Ser. No. 768,106

Int. Cl.[2] B21C *47/24*

U.S. Cl. 214—152 **2 Claims**



1. A method for automatic depalletizing rows of bundles of sheets from a pallet which is in a prone position with the bundles of sheets lying thereon on top of each other, comprising the steps of bringing a common vertical side of the pallet and bundles of sheets into contact with a vertical arm, tipping the said arm and pallet and the bundles of sheets to an upright side-by-side position and thereby positioning the bundles onto inclined anti-friction members on said arm and thereby present upstanding rows of said bundles of sheets, moving all of said rows of said bundles of sheets in a first direction along a first conveyor which thus moves all of the rows of said bundles by gravity along said anti-friction members as a unit away from said pallet which remains stationary, holding some of said rows of said bundles of sheets on said first conveyor while passing one of said rows of said bundles of sheets to a second conveyor, moving said one row of said bundles of sheets on said second conveyor in a direction transverse to the movement of said rows of said bundles of sheets relative to said first conveyor and thereby moving said one row of said bundles of sheets along the length of said one row and on said second conveyor, and dispersing individual bundles of the sheets to different locations.

4,096,959

GARBAGE COLLECTING AND TRANSPORT VEHICLE

Georg Schaffler, Augsburg, Germany, assignor to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft, Germany

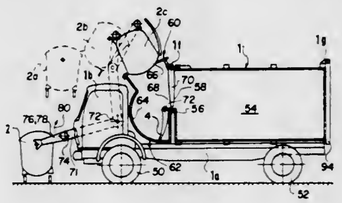
Filed Oct. 7, 1976, Ser. No. 730,315

Claims priority, application Germany, Oct. 8, 1975, 2545051

Int. Cl.[2] B65F *3/02*

U.S. Cl. 214—302 **9 Claims**

1. A garbage collecting and transport vehicle for loading garbage from a garbage can or similar container, comprising a wheeled chassis having a driver's cabin at one end of said chassis, a removable garbage receiving container adapted to be positioned on said chassis having one end with a garbage receiving opening facing toward the driver's cabin, a garbage loading housing mounted on said chassis adjacent said cabin and having a top with a garbage receiving opening and an end opposite to the end facing said driver's cabin with a transfer opening adapted to align with the garbage receiving opening for the transfer of garbage from the garbage loading housing to said garbage receiving container, a pivotal garbage can loader arm pivotally mounted on said chassis for pivotal movement about a horizontal axis adjacent said cabin and having means thereon for engaging the garbage can, said loader arm being pivotally movable with the garbage can through an arc extending from adjacent the ground level to said garbage can receiving opening to dump the garbage from the can into said loader housing, a pickup blade pivotally mounted on said loader housing adjacent the bottom of the transfer opening and having an end opposite the pivotal mounting extending substantially to the bottom of said loader housing, said pickup blade being pivotal to raise the garbage in the loader housing to the level of the transfer opening, a closing blade mounted on said garbage receiving container and said loader housing and being pivotally mounted adjacent the top of said transfer opening and being of a length to extend substantially to the bottom of the transfer opening and the inlet of said receiving container, said closing blade being pivotal to a position spaced from the transfer opening in a direction toward the garbage receiving opening so as to permit the pickup blade to lift the garbage dumped into the housing so as to place it in alignment with the transfer opening, said closing blade being pivotal backwardly toward the transfer opening to deflect the garbage off the pickup blade and to move it through the transfer opening into the garbage receiving container.



4,096,960

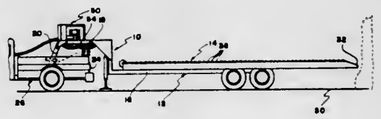
HAYSTACK MOVER CONTROL MEANS

Charles L. Gilmore, P.O. Box 231, Sterling, Kans. 67579

Filed Apr. 26, 1977, Ser. No. 790,958

Int. Cl.[2] B60P *1/28*

U.S. Cl. 214—505 **9 Claims**



1. Mobile material handling apparatus and controls therefor, comprising a wheeler trailer, hydraulic fluid actuated means mounted on the trailer for handling material, electrically operated valves mounted on said trailer for controlling hydraulic fluid actuation of the hydraulic fluid actuated means, an internal combustion engine mounted on the trailer and drivingly coupled to a hydraulic pump that is operationally connected to said valves, said trailer being provided with fifth-wheel towing vehicle coupling means at its forward end, said engine including electrically operated components, electrical control means for said valves and for said components, said control means including an array of electric switches and an elongated flexible multiconductor electric cable having its conductors at one

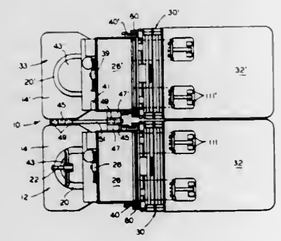
end thereof operatively connected to the valves and the engine components and having its conductors at its other end operatively connected to said array of switches, said cable having a length such as to be extendible to position its said other end forwardly of the fifth-wheel coupling means, whereby the valves and the engine components can be controlled from a position remote from both the valves and the engine, and said electrically operated components including an ignition system therefor, and an electric starter therefor, whereby the engine, even when cold, can be started and stopped from said remote position.

4,096,961

DUAL LOW LIFT TRUCK

Jack O. Rocco, Burlington, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Continuation-in-part of Ser. No. 673,221, Apr. 2, 1976, Pat. No. 4,065,012. This application Dec. 2, 1976, Ser. No. 746,908
The portion of the term of this patent subsequent to Dec. 27, 1994, has been disclaimed.
Int. Cl.² B60P *1/04*
U.S. Cl. 214—510 **14 Claims**



1. In a dual low lift powered truck, a tractor drive portion having a main frame, a tractor non-drive portion having a main frame, coupling means connecting said tractor portions in side-by-side relation for operation as a single dual unit truck, hydraulic actuator means and guide means supported from and rearwardly of the forward end portion of each of said main frames, vertical guide means supported from a forward end portion of each of said frames, a pair of relatively short L-frame assemblies having a horizontal leg portion extending beneath and forwardly of respective ones of said main frames and a corresponding vertical leg portion actuatable by said hydraulic actuator means for guided vertical movement, a pair of elevatable load wheel means and actuator assemblies connected to respective ones of said L-frame assemblies and cooperating with said hydraulic actuator means to raise and lower said L-frames bodily vertically, and a pair of relatively long L-frame assemblies coupled with respective ones of said vertical guide means for guided vertical movement in at least a portion of the movement thereof, said long L-frames overlapping, extending forwardly of and elevatable by said short L-frames.

4,096,962

RING OPENER FOR HERMETICALLY SEALED MOLDED PLASTIC CONTAINERS

Arduino E. Riuli, Wayne, and Bernard F. Kopacz, Little Falls, both of N.J., assignors to Becton, Dickinson and Company, Rutherford, N.J.

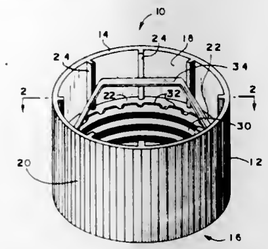
Filed Aug. 1, 1977, Ser. No. 820,584
Int. Cl.² B65D *1/02*
U.S. Cl. 215—32 **3 Claims**

1. A ring-type opener for a plastic container having an integrally molded, hermetically sealed, bulbous cap portion, which comprises;

a cylindrical ring member open at first and second ends and having a bore therethrough communicating between the open ends;

threads on the wall of said bore adjacent said first end, adapted to mate with threads on said plastic container immediately beneath said cap portion;

retainer means attached to said cylindrical member and partially closing said second end; and



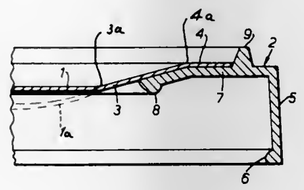
chisel means mounted on the walls of said bore above said threads and extending towards said second open end at an angle so as to engage with the underside of said bulbous cap portion of the container when said cylindrical member is mounted thereon, said engagement being uniform on all sides of said cap.

4,096,963

COMPOSITE LID

Kenneth Francis Rumball, Great Bookham, England, assignor to Airfix Industries Limited, London, England

Filed Jul. 30, 1976, Ser. No. 710,222
Claims priority, application United Kingdom, Jul. 30, 1975, 31954/75
Int. Cl.² B65D *41/18*
U.S. Cl. 215—317 **1 Claim**



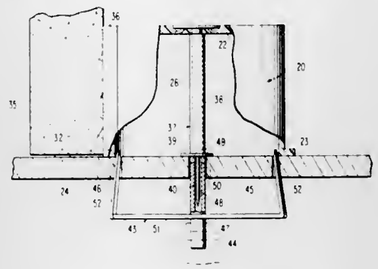
1. A composite lid of given form comprising a blank of flexible sheet material and a peripheral moulding of synthetic plastics material injection moulded in position on the blank and of form following the periphery of the blank, the blank comprising a generally planar central part, an inner marginal part displaced relative to the central part to extend from an inner junction with the central part out of the plane of said central part in a first direction and a generally planar outer marginal part which extends outwardly from an outer junction with the inner marginal part in a plane substantially parallel with and spaced from the plane of said central part, said planar outer marginal part terminating in a free edge part, the moulding comprising an inwardly extending portion abutting and bonded by moulding in position on the blank to the displaced marginal parts of the blank on the faces thereof which are directed away from said first direction, said moulding extending outwardly beyond the free edge part of said blank, said moulding including an integral skirt extending from the outwardly extending part of said moulding in a direction opposite to said first direction, the inwardly extending portion of the moulding overlying the outer junction between the inner and outer marginal parts of said blank but not the inner junction between the inner marginal part and the central part.

4,096,964

UNIVERSAL ELECTRICAL OUTLET BOX AND METHOD OF INSTALLING

Earl Glick, 13015 Lincoln St., NW., Massillon, Ohio 44646

Filed Jun. 3, 1977, Ser. No. 803,364
Int. Cl.² H02G *3/08*
U.S. Cl. 220—3.4 **11 Claims**



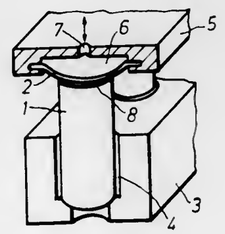
5. An electrical outlet box and installation means comprising a substantially cylindrical outlet box body having an open forward end and a flat annular flange adjacent the open forward end, the box body having a rear wall, a central threaded axial post on the rear wall and extending forwardly thereof in the box body, a mounting bracket means on the box body including a forward end apertured attaching web adapted for securement to a wall stud, a dry wall panel penetrating means temporarily telescopically engaged with said threaded post and extending axially forwardly of the post and being readily separable from the post after usage, and a rotary cutter means adapted to be centered on the penetrating means for producing a dry wall panel opening in substantial registry with said open forward end.

4,096,965

STORAGE DEVICE FOR SAMPLE CONTAINERS

Werner Lessnig; Günter Metz, both of Cologne; Willi Spiegel, and Jürgen Fleischer, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sep. 17, 1976, Ser. No. 724,199
Claims priority, application Germany, Oct. 4, 1975, 2544533
Int. Cl.² A47B *73/00*; B65D *53/00*
U.S. Cl. 220—20 **1 Claim**



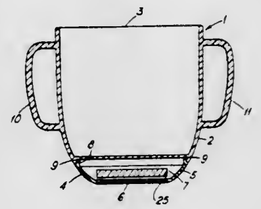
1. A device for the storage of sample containers comprising: a holder having a plurality of cavities therein, each cavity receptive of a sample container having a portion projecting outwardly therefrom; a common cover for all of the received sample containers and positionable over the holder and on the projecting portions of the containers to float thereon unsupported by the holder; and means coactive with said cover when disposed in position over the holder and unsupported thereby for individually sealing each sample container simultaneously, wherein the means for sealing comprises a cavity in the cover, an elastic inflatable membrane disposed on the underside of the cover in the cavity deformable outwardly into sealing engagement with the received sample containers and retractable into the cavity to release the sealing engagement.

4,096,966

SELF-RIGHTING CUPS

Marvin Stanley Korshak, 1738 Montemar Way, San Jose, Calif. 95125

Continuation-in-part of Ser. No. 598,235, Jul. 23, 1975, abandoned. This application May 20, 1976, Ser. No. 688,141
Int. Cl.² B65D *11/00*
U.S. Cl. 220—69 **5 Claims**



1. A two-piece self-righting drinking cup comprising a generally rigid cylindrical hollow cup container having a downwardly inwardly curved side wall of uniform thickness and a bottom wall which is for the reception and retention of a liquid, a separate base member which is circular in cross section and on which the hollow cup container is mounted, means for mounting said cup container on said base member, said base member being rigid and having a convex outer surface progressively decreasing in diameter from the junction of said base member and said hollow cup member to the lowermost portion of said base member, said lowermost portion defining a flat bottom the diameter of which is at least 39% of the greatest external diameter of the hollow cup container, said base member having a structure including an enclosed compartment containing ballast, said ballast having a center of gravity which lies on a vertical axis extending through the center of said cup container, wherein said self-righting drinking cup is characterized by the following critical parameters:

(a) the ratio of the diameter of the lowermost portion of the base to the greatest diameter of the drinking cup itself is about 0.39 to 0.75,

(b) the ratio of cup height to maximum cup diameter is about 0.80 – 1.1,

(c) the ratio of the cup height to the diameter of the lowermost portion of the base is about 1.3 to 2.5, and

(d) the ratio of cup height to the height of the convex portion of the base member is about 1.8 to 3.2.

wherein said self-righting drink cup resists being knocked over but quickly self right itself without any substantial subsequent wobble after being knocked over.

4,096,967

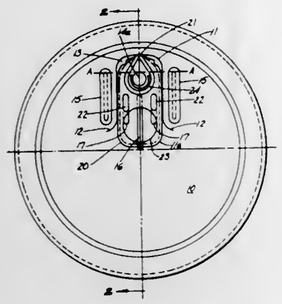
ECOLOGICAL EASY-OPEN CAN END

Elton George Kaminski, Sidney, Ohio, assignor to The Stolle Corporation, Sidney, Ohio

Filed Jun. 6, 1977, Ser. No. 803,514
Int. Cl.² B65D *41/32*
U.S. Cl. 220—269 **3 Claims**

1. In an easy-open can end having a primary score defining a tear tab, an integral rivet in said score, and a pull tab secured to said can end by means of said rivet, said primary score being generally U-shaped with the open end of the U toward the center of the can end, the ends of the U being flared outwardly, and the parallel arms of the U being spaced very slightly further apart than the width of said pull tab, said tab having a penetrating nose disposed over the bottom center of the U; stiffening beads embossed in said can end, one on each side of said pull tab and parallel thereto, and extending slightly in front of said rivet, and a substantial amount behind said rivet,

and an axial bead debossed in said can end extending behind said rivet to a point beyond the end of said pull tab, whereby when said pull tab is raised to a vertical position, said penetrating nose ruptures said primary score, whereupon downward pressure on said vertical pull tab causes the remainder of said



primary score to be ruptured and the tear tab to be bent downwardly below the can end, and said tab may then be bent forwardly and snapped under the opened edge of said can end, the entire tear strip and pull tab being thus disposed below said can end.

4,096,968

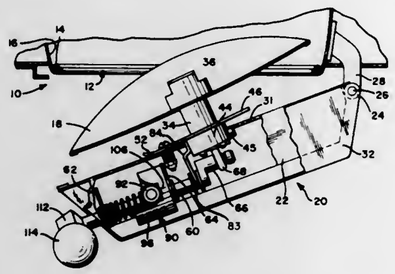
DOOR MOUNTING AND ACTUATOR FOR A PRESSURE VESSEL

Fritz F. Treiber, Centerville, and Francis E. Graham, Kettering, both of Ohio, assignors to Hobart Corporation, Troy, Ohio

Filed Sep. 16, 1977, Ser. No. 833,720

Int. Cl.[2] B65D *45/28*

U.S. Cl. 220—314 **12 Claims**



1. Apparatus for mounting and actuating a closure door of a pressure vessel, comprising:

an elongated door support member positionable across the vessel opening and pivotally supported adjacent said opening to swing toward and away from said opening;

a rotationally and axially movable shaft mounted lengthwise on said door support member;

cam and follower means operably associated with said shaft and said door support member for moving said shaft axially in response to rotation thereof; and

coupling means connecting said shaft to the door and responsive to axial movement of said shaft for shifting the door laterally with respect to said door support member and for causing translational movement of the door toward and away from said door support member in response to shaft rotation.

4,096,969

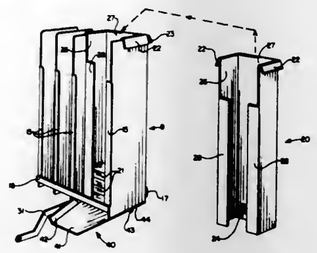
CIGARETTE DISPENSER ADAPTER

Anthony Ragusa, 4916 Rye St., Metairie, La. 70002

Filed May 9, 1977, Ser. No. 794,931

Int. Cl.[2] B65H *31/20*

U.S. Cl. 221—199 **10 Claims**



1. An apparatus for adapting a conventional mechanical cigarette vending machine having a magazine for dispensing shorter cigarettes to dispense longer cigarettes, said magazine having a series of vertical divider means for holding cigarettes, said apparatus comprising:

a. a generally elongated, rectangular sleeve means having a flat back means;

b. two flat, rectangular side panel means extending approximately perpendicularly on the same side of said back panel means and being connected thereto;

c. lip means connected to the top of said sidewall means for connecting said apparatus to said dividers; and

d. front panel means connected to and extending from said side panel means to contain said longer cigarettes within said sleeve means.

4,096,970

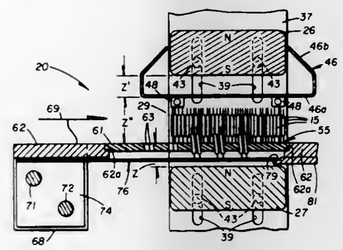
METHODS OF AND APPARATUS FOR HANDLING ARRAYS OF PARAMAGNETIC ARTICLES

Kenneth L. Wyatt, Oklahoma City, Okla., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Mar. 31, 1977, Ser. No. 783,116

Int. Cl.[2] B07C *1/06*

U.S. Cl. 221—264 **41 Claims**



1. A method of successively loading a predetermined number of elongated paramagnetic articles out of a mass thereof, wherein the articles of the mass are initially stored in parallel relationship within a magnetic field, into precisely spaced arrays for subsequent transfer to an unloading station, whereat each array of articles is unloaded into an aligned array of receiving areas of an associated workpiece, comprising the steps of:

maintaining the mass of stored articles temporarily within said magnetic field such that said articles have one of their respective ends in contact initially with a smooth planar surface of a first non-magnetic but field transparent member portion positioned within and at least substantially perpendicular to the established lines of magnetic force;

advancing said first planar member portion beyond the influence of said magnetic field such that a second non-magnetic but field transparent member portion is positioned within said field, said last mentioned portion constituting at least an associated coplanar extension of said first member portion, and being formed with a predetermined array of article-receiving and selectively-confining bores, the advancement of said second member portion within said magnetic field causing different ones of said stored mass of articles to be magnetically attracted to and initially confined at a predetermined depth within said respective bores;

withdrawing said second member portion with an array of articles confined within the bores thereof from within said magnetic field, and transferring said array of articles to the unloading station, while simultaneously advancing the planar surface of said first member portion back into said magnetic field so as to again be in contact with the remaining mass of stored articles, and

actuably releasing said confined articles within said respective bores at said unloading station so as to allow them to fall, at least in part by gravity, into respectively aligned article-receiving areas of an associated workpiece positioned therebeneath.

4,096,971

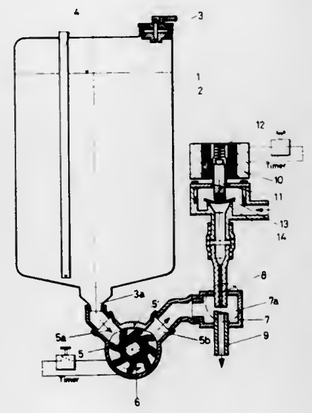
METHOD OF AND APPARATUS FOR DISPENSING SELF-CONSERVING LIQUIDS

Alexander Kückens, Hamburg, Germany, assignor to Dagma GmbH & Co. Deutsche Automaten- und Getränke - Maschinen, Reinfeld, Holstein, Germany

Continuation of Ser. No. 560,798, Mar. 21, 1975, abandoned, which is a continuation-in-part of Ser. No. 536,592, Dec. 26, 1974, abandoned. This application Sep. 30, 1976, Ser. No. 728,170

Int. Cl.[2] B67D *5/56*

U.S. Cl. 222—1 **12 Claims**



10. A method of dispensing liquids, comprising admitting a high-viscosity first liquid into a mixing chamber; directing a less viscous second liquid into said mixing chamber via a supply opening therefor; mixing said first and second liquids in said mixing chamber to form a product liquid; withdrawing said product liquid from said mixing chamber via an outlet opening therefor; terminating said directing; continuing said admitting for such a period subsequent to termination of said directing that said outlet opening becomes sealed by a quantity of said first liquid; and thereafter terminating said admitting.

4,096,972

APPARATUS FOR THE SELECTIVE DELIVERY OF PORTIONS OF A FLUID MEDIUM

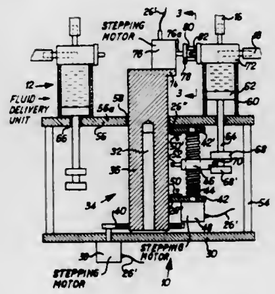
Hermann Bartels, Binningen; Fritz Gallati, Zurich; Karl Lang, Uerikon, and Heinz Rutishauser, Greifensee, all of Switzerland, assignors to Mettler Instrumente AG, Greifensee-Zurich, Switzerland

Filed Dec. 20, 1976, Ser. No. 752,601

Claims priority, application Switzerland, Feb. 6, 1976, 1459/76

Int. Cl.[2] B67D *5/60*

U.S. Cl. 222—135 **8 Claims**



5. An apparatus for the selective delivery of portions of fluid, comprising:

a plurality of fluid delivery units, each fluid delivery unit including a respective conveyor means for conveying fluid to be delivered, said fluid delivery units being stationarily arranged along a circle having an axis, each delivery unit including a multi-way valve for controlling flow of fluid into and from its associated delivery unit;

a journalled member arranged along said axis;

valve actuating means common to said multi-way valves and carried by said journalled member for actuating a selected multi-way valve;

means common to said fluid delivery units and carried by said journalled member for actuating the conveyor means of said fluid delivery units;

means for connecting said actuating means to the conveyor means; and

electrically operated drive means connected to said journalled member for rotating said journalled member about said axis to selectively locate said actuating means and connecting means in a position for actuation of a selected fluid delivery unit.

4,096,973

PORTABLE SEALANT APPLICATOR

John C. Checko, 5 Northern Dr., Bridgewater, N.J. 08807

Filed Mar. 17, 1976, Ser. No. 667,863

Int. Cl.[2] B67D *5/62*

U.S. Cl. 222—146 HE **9 Claims**

1. Apparatus for heating and extruding flowable sealant material onto a work surface comprising:

a portable feed chamber having an opening for receiving sealant material in bulk form and an outlet for supplying sealant material in a fluid state to a pump device;

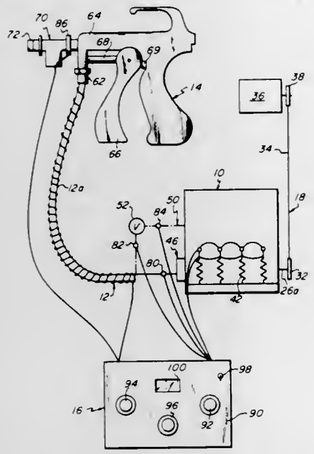
first heating means disposed with respect to said feed chamber for heating the bulk sealant material contained therein to a fluid state having a pumpable viscosity;

conveyor means disposed within said feed chamber for forcing said fluid sealant material through said outlet of said feed chamber under pressure into said pump device;

said pump device being disposed outside of said feed chamber with respect to said outlet for forcing the fluid sealant material under pressure through a heated hose, said pump device including second heating means for maintaining the sealant material passing therethrough at a predeter-

mined temperature level; said pump device further including a rotor and a stator and being of the positive displacement type having progressing cavities formed as the rotor turns within the stator;

said heated hose being connected to said pump device for receiving fluid sealant material supplied therefrom under pressure, said heated hose including third heating means for maintaining the sealant material passing therethrough in a fluid state;



feedback means connected between said pump device and said heated hose for returning fluid sealant material to said feed chamber when the pressure in said heated hose reaches a predetermined level, said feedback means including fourth heating means for maintaining the sealant material passing therethrough in a fluid state; and

means connected to said heated hose for applying said fluid sealant material onto a work surface.

4,096,974

COVER ASSEMBLY FOR SPRAY CANS

Terry M. Haber, 3050 S. Bristol #8C, Santa Ana, Calif. 92707, and James G. P. Dehlsen, 1740 Plaza del Norte, Balboa, Calif. 92661

Filed Mar. 11, 1977, Ser. No. 776,583
Int. Cl.[2] B65D *83/14*
U.S. Cl. 222—402.13 **7 Claims**

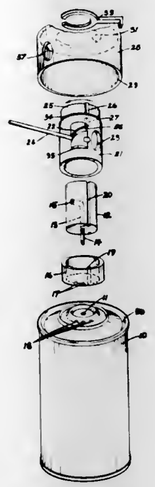
1. A cover assembly for spray cans including, in combination:

(a) a rotatable sleeve receivable over the normal discharge valve and nozzle on said spray can and having a discharge port in its side wall positionable to register with said discharge nozzle when rotated to a first position;

(b) a flexible hose connected to said discharge port;

(c) a cup shaped cover positioned over said sleeve and locked against rotation to said spray can, said cover having a side wall opening in alignment with said discharge nozzle through which said flexible hose extends; and

(d) means passing through the top of the cup shaped cover to effect engagement and opening of said discharge valve whereby fluid from said can is discharged through said flexible hose for accurate directing of the fluid and whereby said sleeve can be rotated to a second position to cause said flexible hose to be withdrawn through said side wall opening and wrapped around said sleeve in the annular space between the exterior of said sleeve and the interior of said cover to thereby store said flexible hose when not in use.

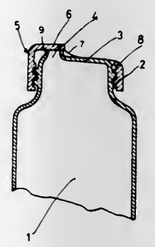


4,096,975

CONTAINER

Mureo Furukawa, 8-2-22, Shakujiidai, Nerima-ku, Tokyo, Japan

Filed Jan. 17, 1977, Ser. No. 759,626
Claims priority, application Japan, Jan. 21, 1976, 51-4697[U]
Int. Cl.[2] B67D *3/00*
U.S. Cl. 222—552 **12 Claims**



1. A container and closure device comprising:

a container having a circular head at the top thereof, said head having an external spiral groove therein;

an outlet projecting upwardly from the top of said head at a point off-center near the periphery of said head, the remainder of said head being closed, said outlet having a raised area therearound which extends above the remaining portion of said closed head; and

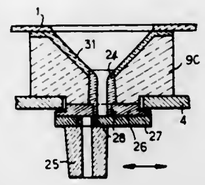
a cap having an opening therein, a closure means which is engagable with said raised area to close said outlet of said head, and an internal spiral groove for engaging said external spiral groove of the said container, said closure means of said cap opening and closing said outlet of said head by turning of said cap relative to said container, said opening of said cap being at least partly in registration with said outlet of said head when said cap is in an open position on said container and said closure means being in engagement with said raised area when said cap is in a closed position on said container.

4,096,976

VESSELS FOR TRANSFERRING LIQUID METAL HAVING A REMOVABLE INSULATING LINING

Henri Jean Daussan, Longeville-les Metz, France, assignor to Daussan et Compagnie, Metz, France

Filed Jun. 18, 1976, Ser. No. 697,633
Claims priority, application Luxembourg, Jun. 30, 1975, 72865
Int. Cl.[2] B22D *41/02*
U.S. Cl. 222—591 **5 Claims**



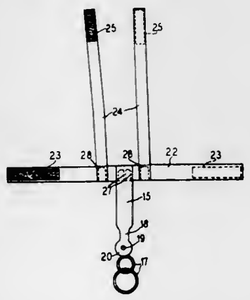
1. A vessel for transferring liquid metal and having pouring holes, said vessel having lateral walls and a bottom provided with a permanent lining of refractory material, wherein the permanent lining is covered with a removable heat-insulation lining formed of inorganic particles embedded in a binder, said inorganic particles being sinterable at the temperature of the liquid metal which is intended to be introduced into said transfer vessel, and wherein the vessel pouring holes are fitted with a detachable internal lining of insulating material which is also sinterable in contact with the liquid metal, said detachable internal heat-insulating lining being inserted between said removable heat-insulating lining covering the permanent refractory lining provided on the bottom of the vessel and said permanent refractory lining adjacent to the pouring hole.

4,096,977

DEVICE FOR ANCHORING BOTTLES OR THE LIKE, AND METHOD

George W. Barville, 268 Sheffield La., Glen Ellyn, Ill. 60137, and Joel R. Peterson, Sr., 5542 S. Natoma, Chicago, Ill. 60638

Filed Aug. 24, 1976, Ser. No. 717,345
Int. Cl.[2] A45F *3/14*
U.S. Cl. 224—5 BC **10 Claims**



1. A device especially suitable for anchoring an object such as a baby bottle or the like to a body encircling harness, comprising:

an elongate flexible element having a neck portion and opposite ends, one end being adapted for attachment to the harness and the opposite end having a terminal eye with an eyehole therein;

a resiliently flexible retaining ring of larger diameter than said eyehole;

said terminal eye being adapted for projection through the ring so that the ring encircles said neck portion;

said ring being compressible to collapse it, after it encircles said neck portion, to a small enough elongated dimension to pass through said eyehole, with one end of the collapsed ring engaging a part of said neck portion adjacent to said terminal eye and the opposite end of the collapsed ring providing a leading tip for guiding the collapsed ring through said eyehole to pull said neck portion part into a coupling loop and through the terminal eye, similarly as a needle passing through a fabric draws a thread through the fabric, and the ring then being permitted to expand to its ring form, and said terminal eye then engaging as a ring-retaining locking collar about said neck portion adjacent said ring and said coupling loop whereby to retain the ring attached to said flexible element;

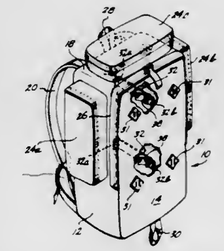
and the thus retained expanded ring being adapted to fit about and thereby attach an object such as a baby bottle to the harness.

4,096,978

BACKPACK

Frank M. Noice, Big Fork, Mont., assignor to Maran Corporation, Big Fork, Mont.

Filed Aug. 9, 1976, Ser. No. 712,741
Int. Cl.[2] A45F *3/00*
U.S. Cl. 224—8 R **16 Claims**



1. In a back pack including a flexible bag comprising a front, a back, sides, a top and a bottom, for containing a load to be packed and shoulder straps attached to and extending forwardly from the front of the bag, the improvement comprising means to adjust the interior volume of said flexible bag including an adjustable length connection means extending across the interior of the bag and interconnecting the front and rear thereof at locations spaced inwardly from the sides, the top, and the bottom such that the effective interior volume of said bag can be varied by adjusting the length of said connection means thereby drawing said locations on said front and said back together.

4,096,979

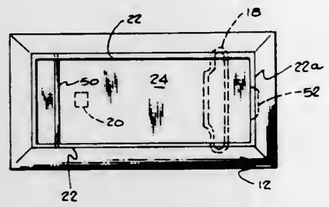
BELT BUCKLE KNIFE

Walter W. Collins, Rock Hill, S.C., assignor to Robert W. Brewer, Jr., Rock Hill, S.C.

Filed Nov. 22, 1976, Ser. No. 743,595
Int. Cl.[2] A45C *11/00*
U.S. Cl. 224—26 B **12 Claims**

1. A combination belt buckle and knife comprising a base member having a recess therein, means on said base member for attaching opposite ends of a belt thereto, a cover plate for said base member recess, means for removably attaching said cover plate to said base member in overlying relation with said recess, a knife blade, and means mounting said knife blade on the inside face of said cover plate for movement between a first position overlying the inside face of said cover plate whereby said knife blade is receivably concealed within said recess of

said base member when said cover plate is attached to said base member, and a second position extending outwardly from said



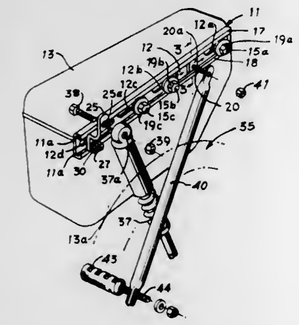
cover plate whereby said cover plate upon removal from said base plate serves as a handle for said knife blade.

4,096,980

UNIVERSAL MOUNTING MOTORCYCLE SADDLEBAG BRACKET

William E. Clow, Los Alamitos, Calif., assignor to Kimstock, Inc., Santa Ana, Calif.

Filed Feb. 14, 1977, Ser. No. 772,449
Int. Cl.[2] B62J *11/00*
U.S. Cl. 224—39 **5 Claims**



1. A bracket assembly for mounting a saddlebag on a motorcycle comprising:

an elongated bar member, said bar member having a flat back portion and a front portion formed by a pair of strips running substantially parallel to said back portion with a slot being formed between each of said strips and said back portion, said slots forming a C-shaped track,

a flat headed "T" bolt having its head portion supported in said slots for adjustable positioning along said track;

means for attaching said bar member to the saddlebag;

bracket means mounted on said bar member and spaced along the track from the flat headed bolt for attaching the bar member to a first portion of the motorcycle; and

strut means attached at one end to said flat headed bolt and at the other end to a second portion of the motorcycle, the head portion of said flat headed bolt being adapted to be adjustably positioned along said track to an optimum position for supporting the saddlebag on the motorcycle.

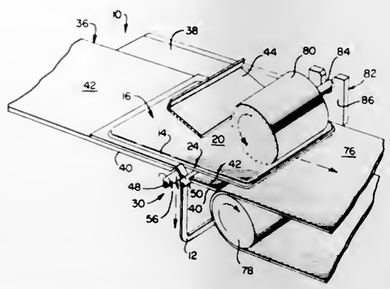
4,096,981

APPARATUS FOR STRIPPING A CONTINUOUS WEB OF MATERIAL FROM THE MARGINAL EDGE OF A BODY

Sam Martorano, Des Plaines, Ill., assignor to Wilson Jones Company, Chicago, Ill.

Filed Mar. 18, 1977, Ser. No. 779,002
Int. Cl.[2] B26F *3/02*
U.S. Cl. 225—99 **3 Claims**

1. An apparatus for use in stripping a continuous web of severable material from at least along a portion of the marginal edge of a body comprising supporting means having a receiving surface upon which the body with the continuous web is advanced along a predetermined path, deflecting means pivotally connected to the supporting means for assisting in directing the leading edge of the advanced continuous web vertically so as to facilitate a stripping thereof while permitting travel of the body along the path, stripping means including a pair of generally longitudinal and cooperating rollers are connected to the supporting means and positioned along the path for grabbing therebetween the vertically deflected continuous web and stripping it from the body in response to the advancement of the body along the path, and advancing means operatively



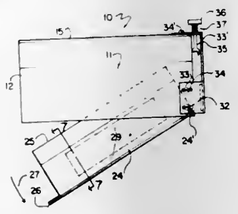
connected to the supporting means remote from the stripping means for automatically continuing the advancement of the body by pulling the body past said rollers along the path for ensuring complete tearing apart of the web from the marginal edge, said advancing means including roller means automatically vertically movable for accommodating bodies of varying thickness, and said deflecting means being comprised of an inclined and pivotally mounted plate having its free end terminate above said stripping means by a distance which serves to have such plate guide the advancing web towards and into engagement with said stripping means while permitting bodies of varying thickness to move therepast.

4,096,982

AUTOMATIC MULTI NAIL DISPENSER

Michael Stahl, Box 65, Elie, Canada

Filed Apr. 19, 1977, Ser. No. 788,760
Int. Cl.[2] B25C *1/00*
U.S. Cl. 227—113 **13 Claims**



1. A nail dispenser adapted to be used with a block of nails consisting of a plurality of rows of nails, each row containing a plurality of nails in side by side relationship adhesively secured together, said rows being adhesively secured together to form said block, each nail having a head end and an engaging end; comprising in combination a container for said nails, means to selectively separate one row of nails from the remaining row of nails and to position said separated row of nails against one side wall of container, means to urge said separated row of nails towards one end of said container, said one end being apertured to receive one end of said separated row of nails, means to limit the movement of said separated row of nails through said aperture whereby one nail projects through said aperture with the head of said nail being uppermost; tappet means mounted on said one end of said container and situated over said one nail whereby downward movement of said tappet engages the lower side of said tappet upon the head of said one nail and separates if from the remainder of said separated row of nails, and means to return said tappet means to the uppermost position whereby said means to urge said separated row of nails towards said one end projects a further nail through said aperture ready to be engaged by said tappet means, said means to selectively separate one row of nails from the remaining rows of nails including a wedge plate pivoted by one end thereof to one end of said container, said container including a base, a slot in said base to receive said wedge plate, downward movement of said wedge plate disengaging said wedge plate from the interior of said container through said slot, upward movement of said wedge plate engaging said wedge plate within said container and between adjacent rows of nails to separate one row from the remaining rows of nails, and magnetic means on one side of said wedge plate to maintain said plurality of rows of nails against said one side of said wedge plate when said wedge plate is in said container and maintaining said rows of nails in the upright and operative position.

4,096,983

BONDING COPPER LEADS TO GOLD FILM COATINGS ON ALUMINA CERAMIC SUBSTRATE

Loraine F. Beilein, Pinellas Park, and Frank S. Burkett, Jr., Seminole, both of Fla., assignors to E-Systems, Inc., Dallas, Tex.

Filed Apr. 11, 1977, Ser. No. 786,389
Int. Cl.[2] B23K *31/02*
U.S. Cl. 228—122 **8 Claims**

1. A process for bonding copper wire leads to gold films on alumina ceramic substrates, comprising the steps of:

(a) forming a gold die-formed head bonding pad on the gold film by thermocompressing a gold lead wire with a gold die-formed head to the gold film;

(b) removing the gold lead wire; and

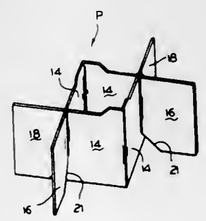
(c) thermocompressing a copper wire to the gold die-formed head bonding pad forming a bond between the copper wire and the gold film with a gold interface in between.

4,096,984

INTERNAL PARTITION ARRANGEMENT

Jeffrey M. Gardner, Wheaton, Ill., assignor to Container Corporation of America, Chicago, Ill.

Filed Dec. 19, 1977, Ser. No. 861,879
Int. Cl.[2] B65D *5/48, 25/04*
U.S. Cl. 229—15 **2 Claims**



1. An internal partition, formed of a unitary blank of foldable paperboard, for providing a multi-cell arrangement within a package, comprising:

(a) a pair of first and second panel sections of substantially similar overall dimensions and each including four partition panels;

(b) each of said panel sections including a pair of intermediate panels foldably joined to each other on a common fold line but being free from attachment to the intermediate panels of the other panel section;

(c) each of said panel sections including a pair of end panels foldably joined along their inboard edges to respective outboard edges of adjacent intermediate panels along second fold lines extending parallel to said common fold line but being free from direct attachment to related end panels of the other panel section;

(d) a pair of generally triangular gussets, each being formed of material cut from a respective end panel of said first panel section;

(e) each of said gussets being foldably joined along one edge to an adjacent intermediate panel of said first panel section and being foldably joined along another edge to an adjacent end panel of said second panel section;

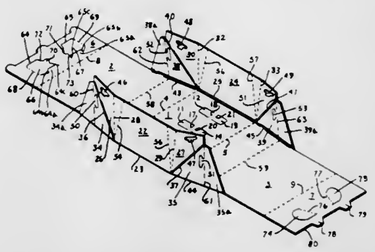
(f) said gussets forming the sole means of connection between the respective panel sections to permit the panels to be folded into various planes, all of which are normal to a common plane, to form a plurality of cells separated from each other.

4,096,985

ARTICLE CARRIER AND BLANK THEREFOR

Prentice J. Wood, Hapeville, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Jan. 16, 1978, Ser. No. 869,467
Int. Cl.[2] B65D *5/02, 75/08, 1/22*
U.S. Cl. 229—40 **18 Claims**



1. An article carrier comprising a bottom wall, a pair of side walls foldably joined respectively to the side edges of said bottom wall, a pair of overlapping top panels foldably joined respectively to the upper edges of said side walls, a securing aperture formed in one of said top panels and having a securing edge, said securing edge being disposed in diagonal relation to the side edges of said top panels, a securing tab foldably joined to the other of said top panels and disposed in said securing aperture, and the fold line between said securing tab and said other top panel being disposed in substantial coincidence with said securing edge.

4,096,986

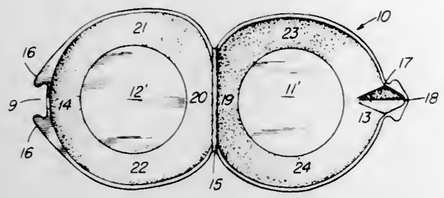
FOOD TRAY WITH INTEGRAL LOCK

John Florian, Bakersfield, Calif., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 23, 1976, Ser. No. 707,971
Int. Cl.[2] B65D *1/00, 5/66, 51/16*
U.S. Cl. 229—44 R **1 Claim**

1. A thermoplastic container comprising two dishlike sections which are hinged together along a common side by an integral flexible hingeline, cooperating locking means on each of said sections remove from said hingeline for releasably

locking said sections together one of said locking means on one of said sections comprising an outwardly projecting flute which terminates in an outwardly flared arrow head shaped skirt, said second locking means on said other section comprising an upwardly inclined lip on a portion of the periphery of



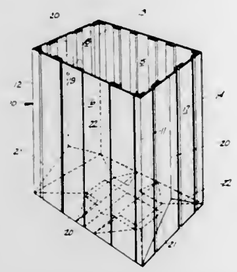
said other section, said lip having a central cut out slot adapted to receive, in locking engagement, said arrow head shaped skirt, said arrow head shaped skirt being compressed by finger action for insertion into said slot so that when said compression is released said arrow head shaped skirt expands in said slot to a locked position.

4,096,987

REINFORCED PAPER BAG

John Rodish, Ft. Wright, Ky., assignor to The Ritter Company, Cincinnati, Ohio

Filed Aug. 30, 1976, Ser. No. 718,408
Int. Cl.² B65D *33/02*
U.S. Cl. 229—55 **9 Claims**



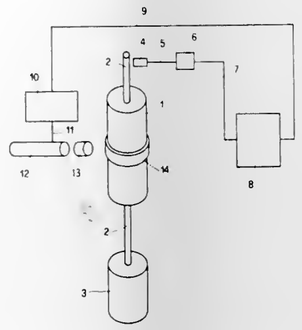
1. A reinforced bag having enhanced load carrying capacity, said bag being formed from a single ply of sheet stock cut, folded and secured to define enclosing body walls meeting at corner edges and a bottom closure, a series of relatively narrow continuous pleats extending lengthwise of the body walls and across the bottom closure at spaced apart intervals, the pleats being spaced so as to perform the major load carrying function of the bag, with each corner edge of the bag bridged by one of said pleats, and with the remainder of the pleats extending lengthwise of the body walls intermediate the corner edges, said pleats each comprising a pair of reversely folded pleat sections folded over and juxtaposed to the bag stock, said pleats being permanently secured in their folded over condition so as to provide multiple thickness areas of reinforcement for the body walls and bottom closure of the bag when the bag is expanded to its fully opened condition, thereby enhancing the strength of the opened bag so as to permit a lighter weight sheet stock to be used than would be otherwise required for a bag of the same size and carrying capacity.

4,096,988

METHOD AND AN APPARATUS FOR THE DYNAMIC BALANCING OF ROTATING BODIES, PARTICULARLY FOR CENTRIFUGES

Giovan Battista Scuricini, Rome, Italy, assignor to Comitato Nazionale per l'Energia Nucleare, Rome, Italy

Filed Dec. 14, 1976, Ser. No. 750,455
Claims priority, application Italy, Dec. 16, 1975, 52710 A/75
Int. Cl.² B04B *9/14*
U.S. Cl. 233—23 A **20 Claims**



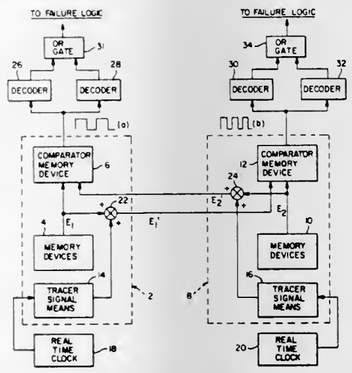
1. A method for the dynamic balancing of a rotating body, particularly a centrifuge, while it is revolving within its own frame, wherein the vibration amplitude, frequency and phase of said rotating body are sensed at least within two planes of said body, so that vibration signals are produced, which are processed and converted into piloting signals, said method comprising the step of using these piloting signals to actuate means which vary the mass of the rotating body.

4,096,989

MONITORING APPARATUS FOR REDUNDANT CONTROL SYSTEMS

David A. Tawfik, Fort Lee, N.J., assignor to The Bendix Corporation, Southfield, Mich.

Filed Jun. 20, 1977, Ser. No. 807,935
Int. Cl.² G06F *11/00*
U.S. Cl. 235—307 **8 Claims**



1. Monitoring apparatus for control systems including a plurality of redundant channels; comprising:

each of the channels including means for generating a command signal, means for generating a tracer signal, means for combining the command signal and the tracer signal, and comparator means;

the comparator means in one channel comparing the command signal generated by the command signal generating means in the one channel to the combined command signal and tracer signal from the combining means in one of the other channels, and providing an output which toggles between the "good" and "fail" states of the comparator means in the one channel; and

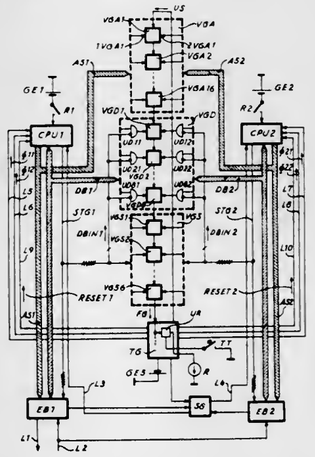
means responsive to the toggle output for providing a failure logic output.

4,096,990

DIGITAL DATA COMPUTER PROCESSING SYSTEM

Horst Strelow, Weddel, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 13, 1976, Ser. No. 752,426
Claims priority, application Germany, Mar. 22, 1976, 2612100
Int. Cl.² G06F *11/08*
U.S. Cl. 235—307 **8 Claims**



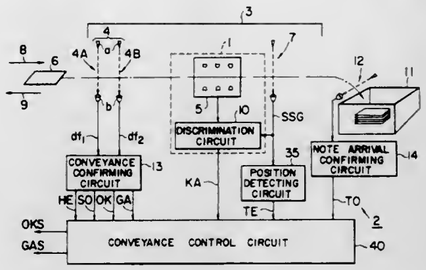
1. A data processing system comprising two computing systems receiving input data and independently operating on it, each computing system having separate microprocessing units and separate control, memory and input-output units with address, data and control signal buses, a synchronizing unit connected to said two computing systems, an address comparator unit including a first plurality of comparators connected in series and connected to the address bus of each computing system to compare associated address information, a data comparator unit including a second plurality of comparators connected in series and connected to the data bus of each computing system to compare associated data information, a control signal comparator unit including a third plurality of comparators connected in series and connected to the control signal bus of each computing system to compare associated control signal information, said address comparator unit, said data comparator unit and said control signal comparator unit connected in series, a keyable pulse current supply connected to said two computing systems and supplying an input to said series connected address, data and control signal comparator units and receiving a keyable input pulse therefrom when all of the first, second and third plurality of comparators indicate the same conditions in said two computing systems, first and second power supplies, and first and second switching means controlled by said pulse current supply to respectively connect said first and second power supplies to said two computing system to disconnect power therefrom if any of said plurality of comparators do not receive comparable information.

4,096,991

NOTE DISCRIMINATING APPARATUS

Masayuki Iguchi, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Himeji, Japan

Filed May 13, 1976, Ser. No. 686,236
Claims priority, application Japan, May 13, 1975, 50-56632; May 13, 1975, 50-56631; Sep. 18, 1975, 50-112957
Int. Cl.² G06K *13/08;* **G06F** *7/02;* **G06K** *7/08*
U.S. Cl. 235—419 **10 Claims**



1. A note discriminating apparatus comprising:

detector means for detecting characteristics of a bank note;

a reference level generating means receiving the output of said detector means for generating a reference level signal; and

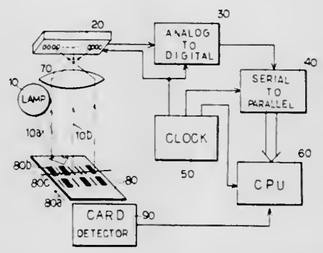
a level detecting means receiving the output of said detector means and said reference level signal from said reference level generating means for comparing the output of said detector means with said reference level signal and for generating a note discrimination signal.

4,096,992

SYSTEM FOR RECOGNIZING BAR CODE INFORMATION

Tadao Nojiri, Kariya, and Akio Sugiura, Nagoya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 11, 1977, Ser. No. 823,737
Claims priority, application Japan, Sep. 6, 1976, 51-106535
Int. Cl.² G06K *7/14, 9/13, 7/10*
U.S. Cl. 235—462 **4 Claims**



1. A system for recognizing bar code information having a plurality of parallel bars recorded in different colors and widths on an object comprising:

a light source for supplying said object with illumination light;

an image sensor having a plurality of light responsive elements aligned to be transverse to the longitudinal direction of said parallel bars, said elements being adapted to be driven one by one by a first clock pulse of a first fixed frequency and to serially produce an image signal having the peak level varying with the density of reflected light produced by said parallel bars on said object;

a sample-and-hold circuit, connected to said image sensor, for sampling the peak level of said image signal in syn-

chronization with said first clock pulse and for holding the sampled peak level of said image signal during one cycle period of said first clock pulse, thereby producing a staircase output signal which changes the signal level from one to the other in synchronization with said first clock pulse;

a smooth circuit, connected to said sample-and-hold circuit, for charging and discharging a capacitor in response to said staircase output signal, thereby producing a continuous output signal which gradually changes the signal level from said one to said the other during said one cycle period of said first clock pulse;

a comparison circuit, connected to said smooth circuit, for comparing said continuous output signal with a reference signal, thereby producing a rectangular signal which changes the signal level each time the former signal reaches the latter signal; and

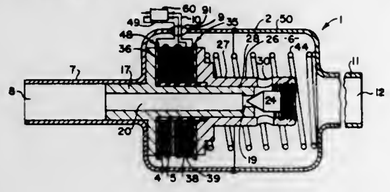
measuring means for counting a second clock pulse of a second fixed frequency higher than said first fixed frequency during each time interval of said rectangular signal, thus measuring each bar width of said a plurality of bars.

4,096,993

COMPENSATED CONTROL VALVE

Joseph L. Behr, Des Peres, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Jan. 21, 1977, Ser. No. 761,291
Int. Cl.[2] F16K *31/18*; G05D *23/20*
U.S. Cl. 236—68 B **4 Claims**



1. A temperature compensated electrically operated modulating valve, comprising:

a valve including a shell, said valve having an inlet, an outlet and valve means for regulating fluid flow between said inlet and said outlet;

electrically energizable means for controlling the operating position of said valve means, said electrically energizable means including heater means mounted within said shell, said heater means comprising a first insulative surface, a second insulative surface and a resistive heater interposed between said first and said second surfaces, said heater means being flexible and folded to define receptacles for receiving a plurality of bimetallic discs interleaved between folds of said heater means;

sensing means mounted to at least one of said bimetallic discs for sensing the temperature of said electrically energizable means, the temperature of said electrically energizable means being dependent upon the temperature of said heater means, the temperature of the fluid passing between the inlet and outlet of the valve, and the ambient temperature of the valve; and

means for regulating power input to said electrically energizable means operatively connected to said sensing means, said regulating means adjusting the power input to said heater means to control the position of said valve means, said input power regulating means comprising a summing amplifier having a first input and a second input, said first input being electrically connected to a reference signal source, the second input being electrically connected to said sensing means, said summing amplifier having an output operatively connected to said electrically energizable means.

4,096,994

MANUAL DEODORIZER DISPENSER

John D. Bryson, Milwaukee, Wis., assignor to Will Ross, Inc., Milwaukee, Wis.

Filed Jan. 21, 1977, Ser. No. 761,544
Int. Cl.[2] A61L *9/04*
U.S. Cl. 239—57 **21 Claims**

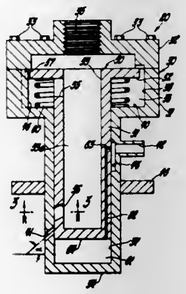
1. A dispenser comprising a housing having a first end wall having therein a first aperture, a second aperture spaced from said first end wall, a first valve member mounted on said housing for movement relative to said first aperture between a position closing said first aperture and a position opening said first aperture, a second valve member mounted on said housing for movement relative to said second aperture between a closed position closing said second aperture and an open position opening said second aperture, a plurality of spaced legs extending integrally from said first valve member in a direction extending away from said housing and adapted to support said housing in upright position on a supporting surface, to facilitate manual movement of said first valve member, and to afford flow of air between said legs and through said apertures and said housing when said valve members are in said open positions, and a container located in said housing and containing a substance which is to be dispensed in response to air flow through said housing.

4,096,995

VARIABLE SPRAY DIRECTION FUEL INJECTION NOZZLE

Edward D. Klomp, Mt. Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 19, 1977, Ser. No. 788,989
Int. Cl.[2] F02M *47/00*
U.S. Cl. 239—94 **4 Claims**



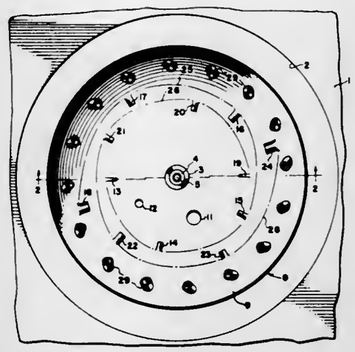
1. A variable spray direction fuel injection nozzle includes a hollow nozzle body having a bored cylindrical portion at one end thereof closed by an end wall of said nozzle body, said nozzle body having an inlet for pressurized fuel at its opposite end, a hollow plunger valve, closed at one end and open at its other end, reciprocably positioned in said bored cylinder for predetermined axial movement relative thereto with its open end positioned to receive pressurized fuel from said inlet and having its closed end forming with the closed end of said bored cylinder a low pressure fuel chamber, a radial port orifice in said nozzle body in communication with said bored cylinder a predetermined axial distance from said end wall, a radial slot extending through the peripheral wall of said valve and located a predetermined axial distance from its closed end whereby, during axial movement of said valve in said bored cylinder between a first position and a second position, said radial slot will be out of registry with said radial port orifice when said valve is in said first position and said radial slot will traverse said radial port orifice when said valve is in said second position, said nozzle body including first guide means and said valve including second guide means operatively associated with said first guide means to position said radial slot in axial alignment with said radial port orifice, spring means operatively associated with said nozzle body and with said valve to normally bias said valve in an axial direction to said first position so that said radial slot is out of registry with said radial port orifice and, fuel bleed passage means, including at least a fuel port in said nozzle body, in communication at one end with said low pressure fuel chamber and at its opposite end being operatively connectable to a low pressure fuel accumulator.

4,096,996

DIFFUSER FOR FUEL BURNERS

Elmer Ketchum, Jr., 4805 Lansing Ave., Jackson, Mich. 49201

Filed Sep. 13, 1976, Ser. No. 722,646
Int. Cl.[2] F23D *15/00*
U.S. Cl. 239—406 **21 Claims**



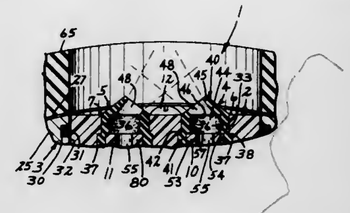
1. A diffuser construction for a fuel burner through which fuel is emitted in a conical stream, said construction comprising a generally conical wall forming a support having a central opening at its longitudinal axis through which said fuel stream may pass, said support diverging in the direction of flow of said fuel stream; and at least one series of a plurality of jets supported by and extending through said wall and through each of which a combustion-supporting gas may pass into said support, said jets spiraling about said support from its smaller diameter end toward its larger diameter end, each of said jets having a longitudinal axis extending along a line which substantially intersects the longitudinal axis of said support, and each of said jets having an inclination to said support such that the longitudinal axis of each of said jets forms with said wall an acute angle.

4,096,997

DUAL OUTLET CHECK VALVE ASSEMBLY

Richard E. Larson, Minnetonka, Minn., assignor to Cherne Industrial, Inc., Edina, Minn.

Continuation-in-part of Ser. No. 631,842, Nov. 13, 1975, abandoned. This application Aug. 27, 1976, Ser. No. 718,217
Int. Cl.[2] B05B *7/24*
U.S. Cl. 239—413 **8 Claims**



1. A check-valve assembly useful in dispensing the individual liquid substances of a two-substance chemical material without clogging the assembly, comprising:

a valve body;

nozzle means supported by said valve body for dispensing liquids under pressure, said nozzle means including at least two nozzle elements, each of said nozzle elements having a tubular bottom portion which adjoins a flexible generally closed dome-shaped upper portion, said dome-shaped upper portion having an exterior surface and an interior surface, said exterior surface having a conical shape tapering downwardly and outwardly from an apex spaced apart from said valve body, and containing a discharge aperture extending between said interior and said exterior surfaces and bounded by opposite sides, said discharge apertures being elongated slot-like apertures having one end positioned generally at said conical surface apex and extending radially therefrom toward said valve body, said nozzle element upper portions being deformable from a normally closed shape, in which the opposed sides of said discharge aperture generally abut one another, to an open shape in which the opposed sides of said discharge aperture are at least partially spaced apart from one another to form an opening therebetween in response to a positive pressure differential acting on said interior surface relative to said exterior surface, said nozzle element upper portion tending to be nondeformable in response to a positive pressure differential acting on said exterior surface relative to said interior surface, the bottom portion of each of said nozzle elements containing an inlet opening in communication with said discharge aperture; and

means for mounting said nozzle means in said valve body with said discharge apertures generally aligned, said discharge apertures being positioned facing one another to allow fan-like sprays of fluids which may be ejected from said outlet apertures to intersect, thereby facilitating mixing of such fluids.

4,096,998

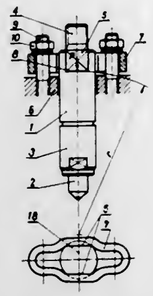
FUEL INJECTOR

Eugeniusz Siwak; Andrzej Krainski; Krzysztof Lendzion, and Jerzy Wewiór, all of Warsaw, Poland, assignors to Warszawskie Zaklady Mechaniczne PZL-WZM, Warsaw, Poland

Filed Apr. 30, 1976, Ser. No. 682,169
Int. Cl.[2] B05B *1/00*; F02M *61/14*
U.S. Cl. 239—533.3 **13 Claims**

1. A yoke for a fuel injector to be secured in an internal combustion engine, said yoke being an oval shaped ring of

uniform cross-section throughout its extent and including a waist portion adapted to embrace an injector and at least one



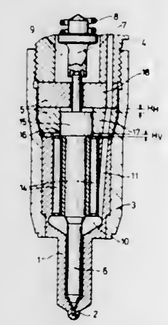
projecting portion extending away from the waist portion and constituted as a loop to engage a fixing bolt to secure said yoke.

4,096,999

FUEL INJECTION VALVE FOR PRELIMINARY AND PRINCIPAL INJECTION

Konrad Eckert, Stuttgart; Karl Hofmann, Neckarrems, and Kurt Seifert, Esslingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Nov. 29, 1976, Ser. No. 745,666
Claims priority, application Germany, Dec. 6, 1975, 2555019
Int. Cl.[2] B05B *1/30*
U.S. Cl. 239—533.5 **5 Claims**



1. In a fuel injection valve for injecting a preliminary and main fuel quantity under pressure, including:

a nozzle body defining a valve seat, an injection aperture, at least part of a pressure chamber and at least part of a fuel line through which fuel is delivered to the pressure chamber, said aperture, pressure chamber and fuel line being in communication for the passage of fuel from the injection valve; a closing spring; and a needle valve in communication with the pressure chamber, and displaceable by the force of the closing spring against the fuel pressure into engagement with the valve seat the thereby terminate fuel flow from the injection aperture, the improvement comprising:

at least one piston means in communication with the pressure chamber, for joint displacement with the needle valve by the fuel pressure, in a direction opposite to the direction in which the needle valve displaced by the closing spring; and

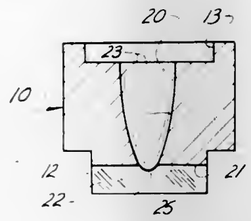
means defining a stop surface which is engageable with said at least one piston means, said stop surface defining means, being located in the path of the displacement of said at least one piston means by the fuel pressure such that the displacement of said at least one piston means by the fuel pressure is terminated prior to the termination of the displacement of the needle valve by the fuel pressure, said joint displacement of the needle valve and said at least one piston means, being associated with the injection of the preliminary fuel quantity, and said displacement of the needle valve after termination of the displacement of said at least one piston means being associated with the injection of the main fuel quantity.

4,097,000

SPRAY NOZZLE

Bernard A. Derr, 75 Granview Rd., Granville, Ohio 43023

Continuation-in-part of Ser. No. 593,198, Jul. 7, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,503
Int. Cl.[2] B05B *1/00*
U.S. Cl. 239—599 **11 Claims**



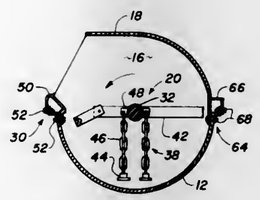
1. A spray nozzle for producing a wide-angle, fan shaped fluid discharge pattern having a body with a longitudinal flow axis, a discharge end portion with an outer end face, and elongated clearance channel formed in said discharge end portion in transversely oriented relationship to said flow axis opening at said outer end face, and a spray pattern control chamber formed in said body along said flow axis and having an inlet end axially spaced from said discharge end portion and an outlet end disposed interiorally of said body and intersecting with said clearance channel thereby defining an outlet orifice, said control chamber being an elongated cavity of generally oval cross-section with a long axis thereof oriented perpendicular to said clearance channel and transversely to said flow axis, said chamber having axially extending sidewalls and edge portions interconnecting said sidewalls and which both converge throughout their length relatively inwardly toward each respective wall or edge portion in the direction of said outlet orifice said edge portions converging at a relatively greater rate than said sidewalls.

4,097,001

DETACHABLE WEAR PLATE FOR A FLAIL-TYPE MATERIAL SPREADER

Warren H. Brackbill, Paradise, and William F. Ostergren, Terre Hill, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Jan. 27, 1977, Ser. No. 763,168
Int. Cl.[2] A01C *3/06*
U.S. Cl. 239—658 **6 Claims**



6. In combination with a flail-type material spreader of the kind wherein a partially open topped tank has an arcuate-shaped wall with an upper elongated discharge edge, a material discharge mechanism mounted within operable to propel material from within said tank over said discharge edge, said mechanism including rotatable shaft means and a plurality of flail members connnected thereto and extensible therefrom in response to the generation of centrifugal force by the rotation of said shaft means, said flail members travelling in a substantially circular path adjacent the inner circumference of said wall and said discharge edge, wherein the improvement comprises:

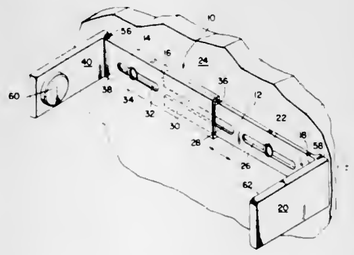
a detachable wear absorbing member having at least one portion disposed inwardly from said inner circumference of said wall such that upon rotation of said shaft means said flail members strike said wear absorbing member and not said wall thereby preventing damage to said wall in the event of wear elongation occurring in said flail members.

4,097,002

PAPER TOWEL HOLDER

John H. Krueger, 29600 Hillcrest Dr., Chisago City, Minn. 55013

Filed Jan. 28, 1977, Ser. No. 763,349
Int. Cl.[2] B65H *19/00*
U.S. Cl. 242—55.2 **4 Claims**



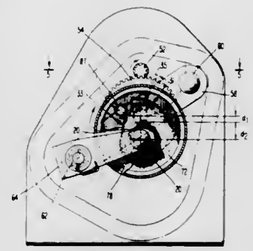
1. A device suited to hold and dispense paper toweling from a roll thereof comprising, a first bracket, a second bracket, said first bracket being telescopable into said second bracket between first and second predetermined limits, a strap means, said first and second brackets each having a free end respectively proximate each other and an end hingedly connected to said strap means, said first bracket comprising a first substantially planar web having an interior longitudinally elongated first slot located therein, means for slidably mounting said first bracket on a wall, said means for slidably mounting said first bracket being introduced through said first slot into a wall and having a first camming surface along which said first slot may cam between first and second positions, said second bracket comprising a channel member including a second substantially planar web, a pair of sidewalls, each sidewall depending normally from an opposite edge of said second web, each of said sidewalls terminating in a respectively inwardly turned lip flange, said second web of said second bracket having an interior longitudinally elongated second slot therein, means for slidably mounting said second bracket on said wall, said means for mounting said second bracket being introduced through said second slot into said wall and having a second camming surface along which said second slot may cam between another set of first and second positions, said free end of said first bracket having an interiorly extending longitudinal slot therein defining first and second runners in closely spaced relationship to each other, said first and second runners being telescopable into said second-bracket, said interiorly extending longitudinal slot having sufficient clearance so as to permit said first and second runners to by-pass said means for mounting said second bracket to said wall, means to hingably limit said strap means to a cantilevered position extending outwardly and normally from a plane passing through said first bracket and said second bracket, and journal means mounted on said strap means on which said roll of paper toweling may rotatably journal as said paper toweling is dispensed.

4,097,003

CONSTANT PULL SAFETY BELT RETRACTING MECHANISM

Richard C. Stouffer, Auburn Heights, and Jerome W. Schotthoefer, New Baltimore, both of Mich., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Jan. 31, 1977, Ser. No. 763,779
Int. Cl.[2] A62B *35/02;* **B65H** *75/48*
U.S. Cl. 242—107 **7 Claims**



1. In a vehicle safety system including a safety belt adapted to restrain an occupant in position on a seat, a safety belt constant pull retracting mechanism comprising:

a housing;

a spindle journalled on said housing and adapted to receive said safety belt in helical wrap, said spindle being rotatable in a winding direction and in an opposite, unwinding direction;

positive force coefficient characteristic biasing means for biasing said spindle to rotate in the winding direction; and

a spiral-shaped gear for coupling said biasing means to said spindle;

an end of said spindle including a first pinion having a constant radius, and means for coupling said spiral-shaped gear to said first pinion;

a decreasing gear ratio established between said spiral-shaped gear and said first pinion during protraction of said belt producing a negative coefficient of force characteristic to compensate for the positive characteristic of said biasing means, a resulting pull applied to the belt thereby being approximately constant as the belt is protracted from said housing; and

second biasing means biasing said spiral-shaped gear and said first pinion in enmeshment.

4,097,004

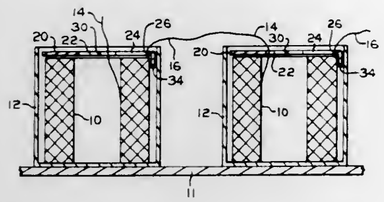
METHOD AND APPARATUS FOR UNWINDING ROVING PACKAGES FROM THE INSIDE

Walter J. Reese, North Huntington, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 6, 1977, Ser. No. 794,592
Int. Cl.[2] B65H *49/36*
U.S. Cl. 242—129.72 **5 Claims**

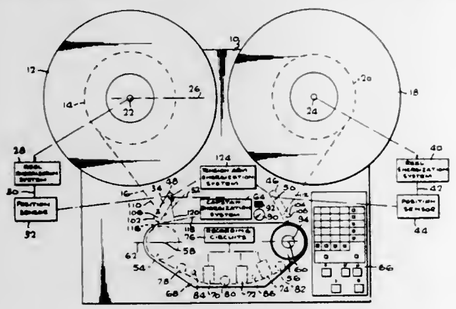
1. Apparatus for unwinding strand material from the inside of a package of strand material comprising an axially movable guide means having an opening therein through which said strand material is unwound, a slot connected to said opening within which the outside end of the package is isolated from the balance of the package and one or more legs upon which said guide means may stand, said guide means being sufficient

in weight to restrain lifting of the package during unwinding of said package and said legs being sufficient in height to avoid



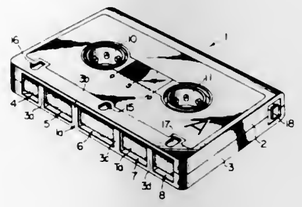
tangling of the package during the unwinding of the last portions of said package.

4,097,005
WEB TRANSPORT SYSTEM
Roger R. Sleger, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.
Filed May 3, 1976, Ser. No. 682,373
Int. Cl.[2] G11B *15/43, 15/28;* **B65H** *77/00, 75/22*
U.S. Cl. 242—189 **30 Claims**



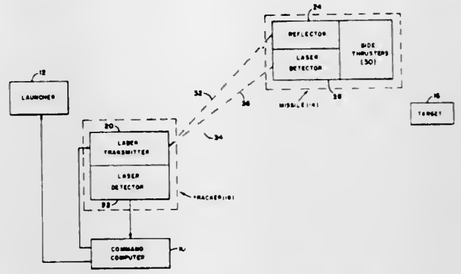
1. A web transport system comprising:
a web storage system disposed to supply and take up web material that is movable bidirectionally along a web path;
a drive capstan positioned along the web path in non-slip engagement with the web material to control the motion of web material along the web path in accordance with motion of the capstan;
a capstan energization system coupled to control bidirectional motion of the capstan;
a pair of web tension arms positioned along the web path on opposite sides of the capstan to maintain buffer loops of web material on opposite sides of the capstan and to maintain web tension on opposite sides of the capstan in accordance with a torque applied to the respective tension arms;
a pair of torque transducers coupled to apply torque to the pair of tension arms respectively in response to tension command signal with said applied torque opposing the moments of web tension on said arms increasingly as said tension decreases and decreasingly as said tension increases; and
a torque control system coupled to generate tension command signals which vary in accordance with web transport system operating conditions.

4,097,006
MAGNETIC TAPE CASSETTE
Shoichi Saito, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan
Filed Aug. 4, 1976, Ser. No. 711,630
Claims priority, application Japan, Aug. 11, 1975, 50-110648[U]; Aug. 12, 1975, 50-111300[U]; Aug. 14, 1975, 50-112166[U]; Sep. 10, 1975, 50-124567[U]; Sep. 12, 1975, 50-126672[U]; Sep. 12, 1975, 50-126673[U]; Nov. 19, 1975, 50-157232[U]; Nov. 22, 1975, 50-159017[U]; Jan. 27, 1976, 51-007786[U]
Int. Cl.[2] G11B *23/10*
U.S. Cl. 242—199 **7 Claims**



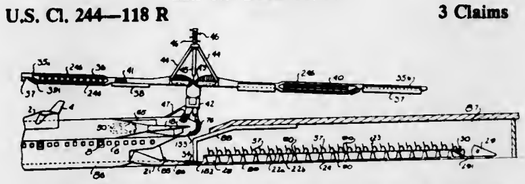
1. A magnetic tape cassette including a pair of upper and lower cassette halves molded from a synthetic resin material and having a generally similar configuration and dimension, said cassette halves being disposed in abutting relationship at their opening ends to be joined together to define a substantially flat rectangular cassette body, one lateral end face of which has a greater dimension than other end faces disposed at right angles thereto being formed as a front end face; the cassette comprising a window slot centrally formed in the front end face by a pair of partitioning posts integrally formed with the cassette half or halves for receiving a pinch roller, a pair of window slots symmetrically formed in front end face on the opposite sides of the first mentioned window slot by similar partitioning posts for receiving magnetic heads, an aperture formed adjacent to the front end face in alignment with the window slot associated with the pinch roller so as to extend vertically through the cassette halves, the aperture receiving a capstan, a spring abutment formed with one of the cassette halves immediately behind the capstan aperture, a pair of cassette positioning apertures formed toward the opposite ends of the front end face so as to vertically extend through the cassette halves, a pair of openings vertically extending through the cassette halves for receiving a pair of tape hubs, including a tape supply and a tape take-up hub rotatably disposed in the respective openings, a length of magnetic tape disposed on the tape supply hub and extending therefrom along the respective window slots while maintaining its magnetic surface in parallel relationship with the plane thereof to be taken up on the tape take-up hub, a plurality of tape guide pins and tape guide rollers located so as to cause the magnetic tape to extend along the respective window slots, one of said cassette halves including areas of a reduced wall thickness in its central portion which includes the tape hub openings and at positions rearwardly of at least some of said guide pins which are integrally molded with said one of said cassette halves, the areas of reduced wall thickness serving to maintain the pins in their upright position, a pair of liner sheets disposed on the opposing inner surfaces of the cassette halves for providing a smooth running of the magnetic tape, and a pad carrying leaf spring disposed between a portion of the tape length which extends along the window slots and the spring abutment and carrying a pair of tape pads which cause the tape to be urged against a magnetic head or heads which are advanced into the window slot or slots associated with the magnetic heads.

4,097,007
MISSILE GUIDANCE SYSTEM UTILIZING POLARIZATION
James J. Fagan; William F. Otto, and William B. McKnight, all of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Continuation-in-part of Ser. No. 514,697, Oct. 15, 1974, Pat. No. 3,995,792. This application Sep. 13, 1976, Ser. No. 722,837
Int. Cl.[2] F42B *15/00*
U.S. Cl. 244—3.11 **5 Claims**



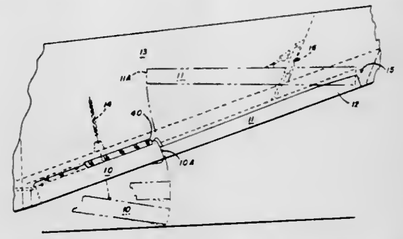
1. A missile system for guiding a missile to a predetermined target comprising a launcher for launching a missile in a predetermined trajectory from the launcher to the target and in which said missile is rotating, said missile having polarized reflector means thereon and detector receiver means interconnected to side thrusters on the missile for correcting the course of the missile; a tracker for tracking said missile and including radar transmitter means for transmitting electromagnetic rays to said polarized reflector means and said detector receiver means and further including return detector means for detecting polarized reflections from said polarized reflector means; and a command computer means interconnected to said launcher and said tracker for control thereof, said command computer means having a predetermined trajectory from the launcher to the target programmed therein, said command computer means receiving information from said tracker and said return detector means and comparing said received information with said predetermined trajectory to cause error signals to be transmitted as correction coded signals from said radar transmitter means to said detector receiver means to cause appropriate ones of said side thrusters to be actuated and cause the missile to be directed into a new trajectory relative to the target.

4,097,008
CARGO HANDLING SYSTEM FOR AIRCRAFT
David R. Pender, 1018 Marion St., Columbia, S.C. 29201
Division of Ser. No. 735,130, Oct. 21, 1976. This application May 23, 1977, Ser. No. 799,172
Int. Cl.[2] B64D *11/06*
U.S. Cl. 244—118 R **3 Claims**



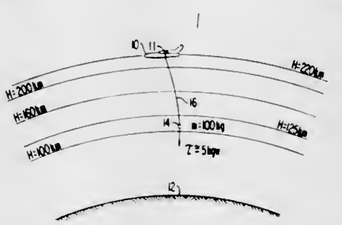
2. In a passenger and cargo handling system for an aircraft, an aircraft fuselage having a rear end ramp door hinged to the bottom of the fuselage to swing downwardly to an open position and upwardly to a closed inclined position, tracks on the bottom of the fuselage longitudinally thereof, a roll-in-roll-out cable train of cars guidably engaging said tracks, said cars each including a portion which constitutes a floor section of the aircraft and passenger seats above the floor sections and baggage compartments beneath the floor sections, and at least the rear endmost car of said cable train being tapered in a vertical plane rearwardly to fit snugly in the rear of the fuselage above said rear end ramp door when the latter is in said closed inclined position.

4,097,009
AIRCRAFT RAMP DOOR
Franklin K. Barnes, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.
Filed Apr. 27, 1977, Ser. No. 791,228
Int. Cl.[2] B64C *1/14*
U.S. Cl. 244—129.5 **14 Claims**



1. In an aircraft having a fuselage with a cargo door opening therein, a ramp door to seal at least part of said opening including the combination of hinge means to pivotally connect said ramp door to the fuselage of the aircraft, stationary ramp support means carried by the fuselage at spaced-apart locations along each of opposite sides of said cargo door opening, stationary carrier members on said ramp door at spaced-apart locations along each of opposite sides thereof for interlocking engagement with said support means, and actuator means coupled with said hinge means to linearly translate the entire said ramp door including said stationary carrier members from a forward-door sealing position wherein said carrier members are interlocked with said ramp support means and into an unlocked aft position of said ramp door wherein said carrier members are slidingly disengaged from said ramp support means.

4,097,010
SATELLITE CONNECTED BY MEANS OF A LONG TETHER TO A POWERED SPACECRAFT
Giuseppe Colombo, Padova, Italy, and Mario D. Grossi, Cambridge, Mass., assignors to Smithsonian Institution, Washington, D.C.
Filed Oct. 8, 1975, Ser. No. 620,679
Int. Cl.[2] B64G *1/20*
U.S. Cl. 244—158 **18 Claims**

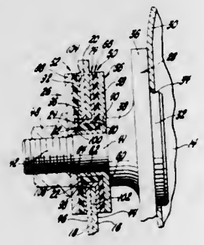


1. A system for conducting space experiments comprising a powered spacecraft, said spacecraft having thruster means capable of maintaining said spacecraft in a desired orbit, a satellite disposed in a suborbital mode and a flexible tether coupling said spacecraft and said satellite.

11. A method of conducting scientific investigations in space comprising the steps of:

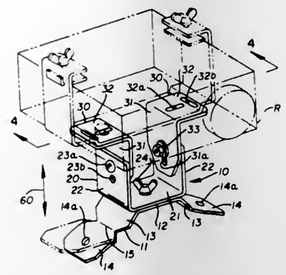
(a) launching a satellite to an orbital altitude by carriage with a powered spacecraft,
(b) deploying said satellite from said powered spacecraft to a suborbital altitude by release of a tether, and
(c) maintaining said satellite and spacecraft in a uniform orientation once deployed.

4,097,011
ENGINE MOUNT
Robert F. White, Speedway, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed Jul. 13, 1977, Ser. No. 815,108
Int. Cl.[2] B64D *27/26*
U.S. Cl. 248—5 **2 Claims**



1. A noise isolation mount assembly for association with an engine and an opposite sided engine support strut for isolating structure borne transmission of high frequency gas turbine engine vibrations from the engine through the strut and into a passenger compartment comprising: a trunnion fixedly connected to the gas turbine engine, said trunnion having a locater shoulder and an outboard stud with a fastener end, a double-walled resilient bushing seated on said locater shoulder and including a first layer of elastomeric material bonded within the double-walled bushing to isolate noise vibration therebetween, said double-walled bushing including an integral, inner pilot tube close fit on said stud and further including an outboard bushing with an integral outer tubular extension arranged concentrically of said inner pilot tube and close fit within an engine strut, a double-walled resilient washer having a bore therethrough fit on said stud, said double-walled resilient washer including a second layer of elastomeric material bonded within the double-walled washer for allowing movement therebetween and to isolate high frequency noise transmission therebetween, and connector means connected to said fastener end to press said resilient double-walled washer and said outboard bushing against opposite sides of the engine strut to radially pilot the strut with respect to said trunnion, said inboard pilot tube being in contact with the outboard one of the double walls of said resilient washer to rigidly couple the trunnion and said connector means, an inboard one of the double walls of said resilient washer being supported on said outer tubular extension, and means for resiliently supporting said outer tubular extension on said trunnion to cause engine loads radially of said trunnion to be transferred into said inboard one of the double walls of said resilient washer and into said outboard bushing to cause said first and second layers of elastomeric material to be placed in shear to support the aforesaid engine loads and to maintain a vibration isolation break between said trunnion and the strut thereby to reduce structure borne transmission of noise between the engine and the strut.

4,097,012
MOUNTING BRACKET ASSEMBLY
Vernon E. McIntyre, Akron, Ohio, assignor to Wadsworth Equipment Company, Akron, Ohio
Filed Aug. 5, 1976, Ser. No. 711,855
Int. Cl.[2] B60R *7/00*
U.S. Cl. 248—23 **2 Claims**



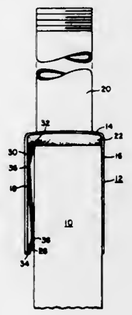
1. A mounting bracket assembly, comprising:
(A) a unitary base having
(1) a central planar support portion, and
(2) integral opposed leg portions projecting therefrom;
(B) a first, generally U-shaped support member having its base adjustably secured to said planar support portion of said unitary base for movement about an axis normal to the plane thereof and its opposed legs projecting normally to said plane;
(C) a pair of opposed, generally L-shaped second support members, each being
(1) releasably secured to one leg of said first support member for movement
(a) about an axis normal to the plane of the legs of said support member, and
(b) in a plane lying parallel to the plane of the legs of said support member;
(D) the legs of said first support member each have a plurality of vertically aligned through apertures lying along the longitudinal axis thereof;
(E) said second support members having first and second legs;
(F) said first legs of each of said second support members having an elongate slot therein lying along the longitudinal axis of said leg for registry with said apertures of said first support members; and
(G) said opposed leg portions of said unitary base each being divided into first and second sections by a locally weakened area of reduced cross-section and said second sections defining the terminus sections and being deformable relatively of said first sections.

4,097,013
TRIPOD STAND FOR PROJECTION SCREEN
Michael D. Broome, Greenfield, Ind., assignor to Draper Shade and Screen Co., Spiceland, Ind.
Filed Apr. 13, 1977, Ser. No. 787,169
Int. Cl.[2] F16M *11/38;* **G03B** *21/56*
U.S. Cl. 248—171 **2 Claims**

1. A tripod stand for a projection screen comprising a standard having an upper end and a lower end, a set of legs, a bracket slidably mounted on the standard and pivotally connecting upper ends of said legs to the standard adjacent said lower end thereof for swinging movement between extended open and operative positions for supporting the stand and folded positions substantially parallel to one another, means latching the legs in the folded position thereof including an annular keeper secured around the standard and extending below the lower end thereof, detent elements secured to the legs and engaging in an open lower end of the keeper, a collar slidably mounted on the standard below said bracket, leg braces having corresponding ends pivotally connected to said collar and opposite ends pivotally connected to said legs for bracing the legs in their extended positions, spring means supported by the standard and urging said collar downwardly,

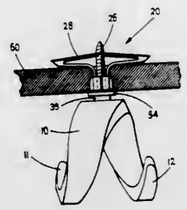
said spring means permitting upward movement of the collar with said bracket, legs and braces for displacing said detents upwardly and into the keeper, and means for latching said bracket to the standard to retain the legs in folded, latched positions.

4,097,014
COMBINATION SUPPORT BRACKET AND SELF-ADJUSTING WEDGE
Bruce K. Boundy, Holland, Mich., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed May 17, 1977, Ser. No. 797,889
Int. Cl.[2] A47F *5/00*
U.S. Cl. 248—225.4 **7 Claims**



1. A combination support bracket and self-adjusting wedge comprising:
an inverted U-shaped saddle member including a top wall and a pair of downwardly extending side walls;
resilient pad means mounted to the underside of said top wall between said side walls; and
self-adjusting wedge means including a central planar portion and a pair of mounting tabs, said mounting tabs mounted to said resilient pad means adjacent one of said side walls, and said wedge means being movable to vary the distance between said wedge means and the other of said side walls whereby said saddle member can accommodate panels of varying thicknesses.

4,097,015
CEILING HOOK
Daniel Frishman, Andover, Mass.
Filed Sep. 7, 1976, Ser. No. 721,158
Int. Cl.[2] B42F *13/00*
U.S. Cl. 248—339 **2 Claims**

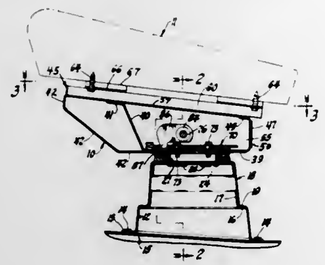


1. A ceiling hook comprising
a helical segment spiralling through more than 360°, said segment tapering from a maximum width at its center, uniformly to a minimum width at each end, and having a substantially uniform thickness along its length;
and a means for pivotally securing said helical segment remote from its ends to a support with the axis of the segment substantially horizontal so that the ends of the helical segment are disposed to retain an object hung from them, said means for pivotally securing located at said center so that the ends of said segment form two hooks extending symmetrically on either side of said means for pivotally securing and said segment having a uniform thickness along its length;
said helical segment formed with a cylindrical hole passing through it substantially perpendicular to its helical axis at a point located midway between its ends, and wherein said means for securing comprises:
a hollow, cylindrical spacer, adapted to fit loosely within said hole, and having a base formed on one end perpendicular to its cylindrical axis,
an axle means comprising: a shaft fitting loosely within and extending along the axis of said cylindrical spacer; a head end adapted to rotatably support said helical segment and said cylindrical spacer, and a securing end adapted to attach to said support,
a washer having an outer diameter larger than the circumference of said hole, and fitting around said shaft and seating between said head of said axle means and the end of said cylindrical spacer opposite said base,
said cylindrical spacer having a length longer than the thickness of said helical segment so that when the securing ends of the axle means is attached to the support with said base pressed firmly against the support, the helical segment rotates freely on the cylindrical spacer.

4,097,016
ROTATABLE SEAT SUPPORT ASSEMBLY
Primo O. Petrucci, Livonia, Mich., assignor to Danbar, Inc., Warren, Mich.
Filed May 12, 1977, Ser. No. 796,427
Int. Cl.[2] F16M *13/00*
U.S. Cl. 248—418 **11 Claims**

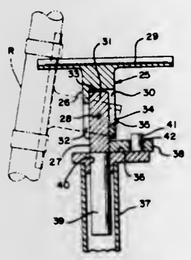
1. In a rotatable seat support assembly for supporting a seat for swiveling movement in opposite directions, the combination comprising:
(a) a seat pedestal means;
(b) a support tube fixedly mounted on said pedestal means;
(c) a ring bearing means mounted around the support tube;
(d) a seat support means mounted around said support tube;
(e) means retaining said seat support means on said ring bearing means and on said support tube to prevent axial movement relative to said support tube and allow rotative movement about said support tube;

(f) means for releasably locking said seat support means in a normal use position;
(g) stop means for limiting a swiveling movement of the seat support means about the support tube; and,



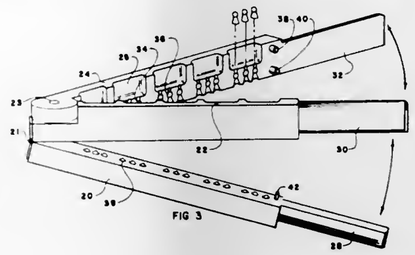
(h) anti-noise means mounted between said support tube and means for retaining said seat support means on the bearing means.

4,097,017
FISHING ROD HOLDING DEVICE
William H. Hazlitt, 112 "C" St., Pacheco, Calif. 94553
Continuation-in-part of Ser. No. 550,772, Feb. 18, 1975, abandoned. This application May 18, 1976, Ser. No. 687,521
Int. Cl.² A45B *25/28*
U.S. Cl. 248—515 **3 Claims**



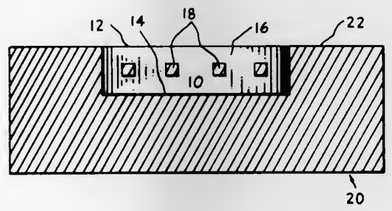
1. A fishing rod holder comprising:
a. pivotal cradle member having an integral support element constructed to receive a fishing rod mounted thereto, and having an integral depending pivot element depending a relatively short length from the integral support element;
b. a pivot mounting member connected to said depending pivot element of said cradle member, said pivot element of said cradle member and said pivot mounting member having cooperating pivot means for providing free rotation of said cradle member on said mounting member in a vertical plane within predefined limits; said means including first stop means for limiting orientation said support element of said cradle member at a substantially horizontal position and second stop means for limiting orientation of said support element of said cradle member at a position approaching a vertical position, said cradle member being freely rotatable between said stop means; and
c. means for supporting said pivot mounting member to an ancillary means; wherein said cooperating pivot means includes a head portion having a receiving slot and a keyway; and, said depending pivot element has a depending tab with a distal end insertable in said receiving slot and has a pair of projecting wing tabs transverse to said depending tab, said wing tabs having ends short of the distal end of the depending tab, said ends engaging said keyway for pivot of said cradle member on said mounting member; and wherein said keyway has stop surfaces engageable with said wing tabs and limiting pivotal movement of said cradle member in said mounting member, said stop surfaces comprising said first and second stop means.

4,097,018
RIFLE PELLET CASTING MOLD
Charles R. O'Herien, Canastota, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed Nov. 8, 1976, Ser. No. 739,697
Int. Cl.² B22C *9/06, 9/08*
U.S. Cl. 249—105 **6 Claims**



1. A rifle pellet casting mold, comprising:
a bottom section hingedly attached to a side section,
the side section pivotally attached to a second side section,
means for rigidly securing the sections together attached to the sections,
the assembled side sections forming a sprue through which a molten material may be poured,
a side section forming a gate connected to the sprue, &
the sections forming a mold connected to the gate, whereby a pellet may be cast.

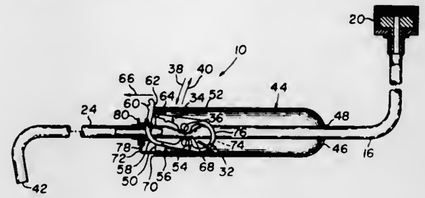
4,097,019
INGOT MOLD BASE MEMBER
Charles W. Connors, Wilmette, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.
Filed Mar. 8, 1976, Ser. No. 664,725
Int. Cl.² B22D *7/12, 19/00;* **C04B** *35/10*
U.S. Cl. 249—204 **6 Claims**



1. A cast iron ingot mold base member, the top portion of which contains a preformed integral refractory insert of at least 4 inches in thickness united with the cast iron ingot mold base member during the casting of said base member, and where the thickness of the ingot mold base member exceeds the thickness of the refractory insert.

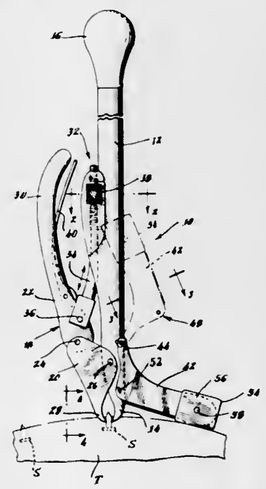
4,097,020
PLANT-WATERING DEVICE
Howard Sussman, c/o The Crackerbarrel, E. Shore Rd., Huntington, N.Y. 11743
Filed May 5, 1977, Ser. No. 793,925
Int. Cl.² B05B *1/30;* **F16K** *7/06*
U.S. Cl. 251—10 **4 Claims**

1. An improved device for watering a plant or the like at a location remote from a water source of the type including a flexible hose attached to convey water from said water source to the free end of said hose occupying an operative position in watering relation to said plant, said improvement comprising a clamp mounted adjacent said hose free end responsive to external pressure to partake of closing movement upon said hose for causing corresponding selected restricted flow of water exiting from said hose, and a tubular-shaped holding member disposed in covering relation over said clamp, said diameter of said tubular-shape thereof being of a selected extent to normally hold said clamp in a position closed upon said hose providing



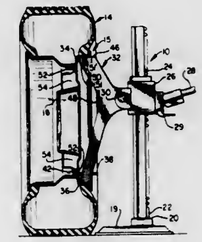
a desired restricted flow that obviates said exiting water from making splashing contact against said plant, and said construction material of said holding member being a pliable plastic sufficiently rigid to hold said clamp in said position to provide restricted flow and sufficiently pliable to enable an external pressure applied in an area of said holding member coextensive with said internal clamp to be transmitted to said clamp for effecting closing movement of said clamp, whereby said clamp normally provides a desired restricted flow in said exiting water and further responds to external pressure applied through said pliable cover to close upon said hose to provide complete shut-off of said water.

4,097,021
TIRE STUD PULLER
Walter J. Loboda, 1027 N. Lincoln, Park Ridge, Ill. 60068
Filed Jul. 29, 1977, Ser. No. 820,344
Int. Cl.² B66F *15/00*
U.S. Cl. 254—22 **6 Claims**



1. A tire stud puller comprising:
an elongated element terminating in a first jaw;
said first jaw substantially positioned along the longitudinal axis of said elongated element;
a pivotal element terminating in a second jaw, said pivotal element pivotably affixed to said elongated element with said second jaw operably disposed adjacent to said first saw;
means for urging said second jaw adjacent to said first jaw;
means for fixedly maintaining and locking said pivotal element in a position wherein said first and second jaws are clamped about a tire stud disposed therebetween; and
a leg pivotably affixed on one end thereof to said elongated element, said leg pivotable from a storage position adjacent to said elongated element to a use position extensive therefrom and adjacent to said first jaw.

4,097,022
WHEEL JACK APPARATUS
Robert E. Taylor, 309 SW. 11th St., Andrews, Tex. 79714
Filed Jul. 25, 1977, Ser. No. 818,825
Int. Cl.² B66F *13/00*
U.S. Cl. 254—133 R **9 Claims**

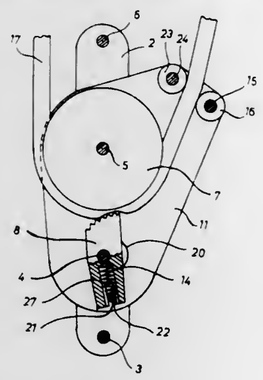


1. In combination with a vehicle supported by a plurality of wheels, each wheel having a circumferentially extending tire receiving rim spaced from a hub receiving bolt circle by a plurality of spokes, with the rim forming a circumferentially extending shoulder, a wheel jack for engaging and lifting the wheel along with a vehicle attached thereto;
said wheel jack includes a vertical column having a plurality of lift detents formed thereon, and a lifting mechanism which cooperates with said detents to cause the lifting mechanism to climb said column;
a wheel lift adaptor, means by which said adaptor is affixed to said lift mechanism; said adaptor having an upper end spaced forwardly and above and a lower end spaced forwardly and below the location where the adaptor is attached to the lift mechanism;
said upper end of said adaptor terminates in an edge portion which engages said shoulder; the marginal lower end of said adaptor has a fastener means formed thereon which extends through said spokes and engages wheel structure located in opposition to said shoulder.

4,097,023
ROPE CLAMPING ARRANGEMENTS FOR SAILBOATS OR OTHER APPLICATIONS
Werner Muller, Aarau, Switzerland, assignor to Mubir AG fur Maschinen-und Apparatebau, Switzerland
Filed Sep. 8, 1976, Ser. No. 721,384
Claims priority, application Switzerland, Sep. 12, 1975, 12086/75; Dec. 16, 1975, 16321/75
Int. Cl.² B66D *5/16*
U.S. Cl. 254—156 **3 Claims**

1. Rope clamping arrangement, comprising:
a block;
a lever pivotally attached on said block at a first pivot mount and pivotable with respect to said block between a first and a second lever pivot position;
a cam pivotally attached on said block at a second pivot mount spaced from said first pivot mount, and pivotable with respect to said block between a third and fourth cam pivot position;
a pin on said lever and a slit in said cam in which said pin is

received, whereby said slit guides said pin and said pin is moved by said lever and, in turn, moves said cam; said pin and said slit being generally at one side of said second pivot mount and said first pivot mount being at the opposite side of said second pivot mount; said cam thereby being connected to said lever such that pivoting of said lever to its said first position pivots said cam to its said third position and pivoting of said lever to its said second position pivots said cam to its said fourth position;



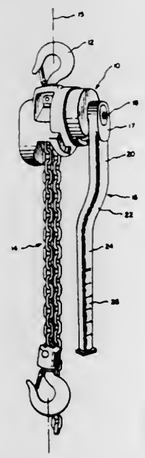
said cam having a clamping surface;
biasing means for biasing said cam to said third position;
a rotatable roller supported to rotate on said block; said roller having a periphery which is located at a position between said first and said second pivot mounts; said cam clamping surface being so positioned that when said cam is pivoted to its said third position, its said clamping surface presses a rope against said roller periphery.

4,097,024

HAND HOIST/PULLER OPERATING HANDLE/LEVER

Kenneth D. Schreyer, Clarence, N.Y., assignor to Columbus McKinnon Corporation, Tonawanda, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,595
Int. Cl.² B66D *1/00*
U.S. Cl. 254—169 **3 Claims**



1. A hoist/puller unit comprising in combination:
a load pull mechanism comprising a body having an anchoring means on one side thereof, a flexible tension member issuing from the other side of said body and adapted for connection to a load, and drive mechanism for applying tension to said tension member thereby defining a load system having a center line which extends longitudinally of said tension elements and passes through said body to said anchoring means, said drive mechanism being rotatable in said body about an axis which extends generally perpendicular to said center line;
a handle for operating said drive mechanism, said handle including a first portion connected to said drive mechanism in offset, spaced relation to said center line, a hand-operated end portion extending substantially parallel to said center line and spaced more closely thereto than is said first portion, and a reverse-curved portion joining said first portion to said hand-operated end portion;
said reverse-curved portion being formed of plastically deformable material whereby said hand-operated end will twist when the handle is subjected to an overload in order to apprise an operator of such overload and upon such twisting said hand-operated end portion displaces towards said center line which further apprises the operator of such overload.

4,097,025

ELECTRONIC FENCE SURVEILLANCE APPARATUS

Charles R. Dettmann, Independence, and John J. Frederick, Excelsior, both of Minn., assignors to Electronic Surveillance Fence Security, Inc., Wayzata, Minn.

Filed Jul. 19, 1976, Ser. No. 706,500
Int. Cl.² E04H *17/00*; G08B *21/00*
U.S. Cl. 256—1 **8 Claims**

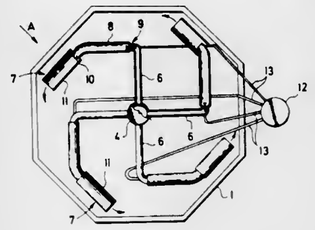
1. In combination with a fence enclosing an area to be protected against intrusion and supported by a plurality of spaced, rigid, substantially vertical fence posts, an intrusion detection system comprising:
a plurality of sections of relatively rigid electrical conduit supported on and in contact with said fence serially therealong and independently of said fence posts so that relatively small vibrations of such fence causes vibration of said conduit in contact therewith, said conduit being of ferrous material and having a wall thickness between approximately 0.10 and 0.12 inches,
a plurality of liquid tight housings, each interposed between and having a threaded, liquid tight connection with two adjacent sections of said conduit so that said sections are serially connected together by said housings,
a vibration sensor secured in each of said housings and responsive to vibrations transmitted to the housing in which it is located, each of said vibration sensors being effective to produce a vibratory electrical signal upon said conduit being vibrated,
an indicating device, and
connecting means operatively connecting a group of said sensors to said indicating device.

4,097,026

APPARATUS FOR MIXING A BASIC LIQUID SUBSTANCE WITH OTHER MEDIA

Karel Haindl, Prague, Czechoslovakia, assignor to Vyzkumny ustav vodohospodarsky, Prague, Czechoslovakia

Filed Jun. 6, 1975, Ser. No. 584,250
Claims priority, application Czechoslovakia, Jan. 24, 1975, 508-75
Int. Cl.² B01F *5/02*
U.S. Cl. 366—165 **11 Claims**



1. Apparatus for mixing a basic liquid with another medium, comprising in combination:
a. a container for the basic liquid having a bottom and peripheral walls,
b. a pressure source communicating with the interior of said container for producing a pressure stream of the basic liquid,
c. at least one supply pipe leading from the source of pressure,
d. at least one mixing means comprising:
e. a tubular body having an inlet end connected to said supply pipe and an outlet end communicating with the basic liquid within and near the bottom of the container,
f. baffle means within said tubular body in the vicinity of said inlet end of the tubular body, said baffle means occupying a substantial portion of the central part of the cross section of said tubular body, and providing a substantially annular gap between the internal surface of the tubular body and the periphery of the baffle means for directing a substantially annular flow of the basic liquid along at least a part of the internal surface of the tubular body, thereby leaving a hollow space within the annular flow in said part of the tubular body, and
g. means for supplying another medium into said hollow space within the tubular body behind the baffle means.

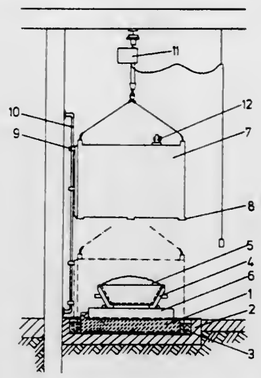
4,097,027

DEVICE AND PROCESS FOR LIMITING SURFACE OXIDATION OF GLOWING HOT METAL DROSS

Jean Michel, Marly, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Nov. 10, 1976, Ser. No. 740,421
Claims priority, application Switzerland, Nov. 21, 1975, 15102/75
Int. Cl.² C22B *21/00*
U.S. Cl. 266—44 **3 Claims**

1. A process for limiting surface oxidation of glowing hot metallic dross in an apparatus including a metal bell having a space formed therein and an open bottom, a container for holding the dross, a base for the container to rest on, and a tank filled with liquid for receiving the base, the bell being formed with openings near the bottom thereof for providing communication channels for the liquid to pass therethrough, the steps comprising:
placing the shallow container onto said base, lowering the metal bell over said dross, and,



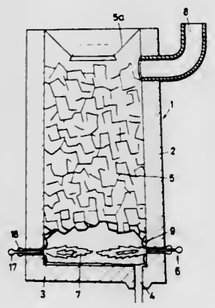
sealing off the space formed within said bell from the outside atmosphere, whereby additional oxygen is prevented from being supplied to the surface of said dross.

4,097,028

METHOD OF MELTING AND APPARATUS THEREFOR

Hans-Jürgen Langhammer, Platjenwerbe, Germany, assignor to Klockner-Werke AG, Duisburg, Germany

Filed Jan. 22, 1976, Ser. No. 651,526
Claims priority, application Germany, Feb. 6, 1975, 2504946
Int. Cl.² C21B *7/16*
U.S. Cl. 266—47 **5 Claims**



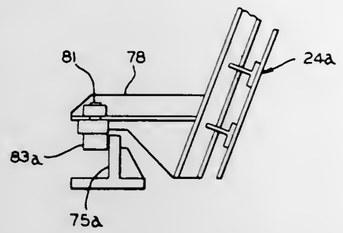
1. A melting method, comprising the steps of confining a charge of a material selected from the group consisting of scrap, sponge iron and pellets in a melting zone having a peripheral region; applying heat to a lower end of the charge to gradually melt the material thereof, including concurrently introducing a stream of a combustion-supporting substance and a layer of a combustible hydrocarbon substance which at least partly surrounds the stream into the melting zone to obtain a combustible mixture of the substances in the melting zone, and combusting the mixture in the melting zone outside the peripheral region thereof; and forming at least one protuberance of a solidified quantity of the molten material at the peripheral region of the melting zone to serve as a support for the charge, including passing the stream and the layer through the peripheral region of the melting zone for the layer to cool the peripheral region to an extent sufficient for the molten material present at the peripheral region of the melting zone to solidify and thereby form the protuberance.

4,097,029

ENCLOSURE FOR STEEL CONVERTING APPARATUS

Joseph Ziegler, Apollo, Pa., assignor to Pennsylvania Engineering Corporation, Pittsburgh, Pa.

Filed Dec. 31, 1975, Ser. No. 645,529
Int. Cl.² C21C 5/42
U.S. Cl. 266—142 **19 Claims**



1. A converter vessel having a metal receiving opening formed adjacent an upper end,

an enclosure having an upper wall portion disposed above said vessel and side wall portions extending downwardly along the sides of said vessel,

an access opening formed in one of said wall portions, door means mounted adjacent said opening and externally of said enclosure, said door means having an inner surface facing said vessel and an outer surface,

mounting means disposed externally of said enclosure for movably supporting said door means and including first rail means adjacent the upper end of said door means and second rail means disposed adjacent the lower end of said door means,

first roller means mounted on said door means externally of said access opening for engaging said first rail means, said second rail means has one end adjacent one side of said opening and extends therefrom laterally away from said opening so that a substantial portion of the lower end of said opening is not fronted by said second rail means,

second roller means mounted adjacent the outer surface of said door and the lower end thereof and adjacent one side thereof for engaging said second rail means, said second rail means having a surface portion disposed between said access opening and said second roller means, said doors extending outwardly from said first rail means and relative to said opening whereby the center of gravity thereof is forwardly of a vertical plane containing said first rail means to create a moment urging said second roller means into engagement with said surface portion,

motive means coupled to said door means for moving the latter between open and closed positions relative to said access opening,

and exhaust means extending through the upper wall of said enclosure and being movable toward and away from the upper end of said vessel for collecting gases evolved from said vessel.

4,097,030

LANCE FOR DESULPHURIZING CAST IRON OR STEEL

René Desaar, Rue Michel Body, 67, 4330 Grace-Hollogne, Belgium

Filed Jan. 7, 1977, Ser. No. 757,533
Claims priority, application Belgium, Jan. 7, 1976, 45320; Dec. 17, 1976, 45792
Int. Cl.² C21C 5/32
U.S. Cl. 266—225 **7 Claims**

1. A desulphurizing lance for desulphurizing cast iron or steel comprising:

an injection pipe,

means for connecting the injection pipe with a source of desulphurizing agent and with a source of pressurized gas for carrying the desulphurizing agent through said injection pipe,

a refractory sleeve consisting of superposed refractory rings mounted about the injection pipe,

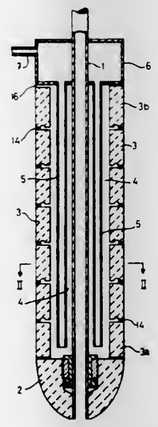
a refractory head enclosing the lower part of the injection pipe below the refractory sleeve,

a distributor case attached to the injection pipe at the end remote from the refractory head and hermetically enclosing said injection pipe about the refractory sleeve,

means for connecting the distributor case to a source of compressed air,

tightening means mounted between the distributor case and the refractory sleeve for resiliently pressing the refractory rings, one on top of the other, against the refractory head,

an annular cooling chamber closed at its lower and lateral parts and defined by the injection pipe, the refractory sleeve and the refractory head,



a plurality of inflow pipes connected to the distributor case at the bottom thereof and extending within the cooling chamber in a circumferential array parallel to the injection pipe as far as the lower part of the annular cooling chamber, said inflow pipes having open ends facing the closed lower part of said chamber, and

at least one discharge opening for the annular cooling chamber provided between the distributor case and the refractory sleeve at the top of said chamber such that cooling air flows after being introduced via the distributor case and the inflow pipes rapidly into the lower part of the annular cooling chamber to immediately cool the refractory head, upwardly about the inflow pipes and within the refractory sleeve, to cool the injection pipe and the refractory sleeve upon rising within the chamber with said heated air flow discharging through the cooling chamber discharge opening.

4,097,031

LANCE SUPPORTING AND GYRATING DEVICE IN A STEEL-REFINING CONVERTER

Kousaku Higuchi, Kakogawa; Satoshi Sato, Kobe, and Susumu Wada, Yokohama, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe and Nippon Kokan Kabushiki Kaisha, both of, Japan

Filed Sep. 21, 1977, Ser. No. 835,290
Claims priority, application Japan, Sep. 25, 1976, 51-114938; Sep. 25, 1976, 51-128805[U]; Sep. 25, 1976, 51-128806[U]; Sep. 25, 1976, 51-128807[U]; Sep. 25, 1976, 51-128808[U]
Int. Cl.² C21C 5/32
U.S. Cl. 266—226 **12 Claims**

1. In a steel-refining converter having a lance disposed therein, a device for supporting and gyrating the lance, said device comprising:

a lance carriage disposed above the converter and supported and adapted to be movable in guided vertical movement;

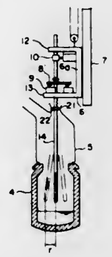
wobble bearing means attached to a part of the lance to support the lance in a manner permitting the lance to undergo gyratory motion relative thereto;

a lance receiving structure for supporting the wobble bearing means, supporting to undergo a revolutionary motion in a horizontal plane about a specific vertical axis;

means for supporting the lance receiving structure on the lance carriage in a manner permitting said revolutionary motion;

means for adjusting the radius of revolution of said revolutionary motion;

means for driving the lance receiving structure in said revolutionary motion;



a lance holding means mounted on the lance carriage at a position vertically apart from the wobble bearing means in the lance supporting state thereof and operated to hold the lance in vertically fixed position coincident with said specific vertical axis; and

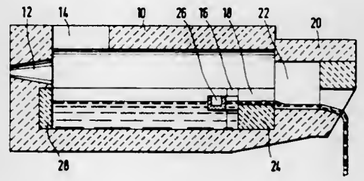
node bearing means for the lance provided at a position such as to fit into a stationary structure disposed below and spaced apart from the wobble bearing means when the lance is in operative position in the converter and functioning to hold the lance against horizontal movement thereof thereby to constitute a central node about which the lance undergoes a gyratory motion when the lance receiving structure is thus driven in said revolutionary motion.

4,097,032

FOREHEARTH WITH WEIR, PARTICULARLY FOR USE IN A BASALT SMELTING FURNACE

Wonter Mauritz, Bad Honnef, Germany, assignor to Schmelzbasaltwerk Kalenborn, Dr. Ing. Mauritz Kg, Kalenborn, Germany

Filed Mar. 3, 1977, Ser. No. 773,852
Int. Cl.² F27D 15/00
U.S. Cl. 266—230 **11 Claims**



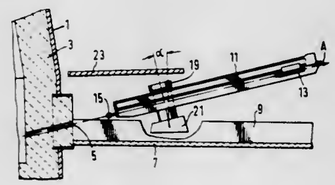
1. A foundry forehearth for collecting molten material to be cast, comprising a weir disposed at the discharge end of the forehearth, said weir having a channel transversing the top surface thereof, for discharging molten material into the discharge end of the forehearth, a free-floating float being many times smaller than the forehearth and having a U-shaped cross-section, said float bracing against said weir and defining a transit passage therebetween leading to said channel, said transit passage being uniformly shaped throughout its entire length, the cross-section thereof, transversally to its longitudinal axis, having an inverted trapezoid configuration, and said weir comprising a pair of jaws defining a centrally disposed recess in the wall of said weir facing said float, a portion of said float being loosely held within the depth of said centrally disposed recess, such that said float is continuously free-floating even when it is forced against said weir under the pressure of the molten material.

4,097,033

DRILLING MACHINE FOR BLAST FURNACE TAPHOLES

Pierre Mailliet, Howald, Luxembourg, assignor to S. A. des Anciens Etablissements Paul Worth, Luxembourg, Luxembourg

Filed Feb. 18, 1977, Ser. No. 770,191
Claims priority, application Luxembourg, Feb. 20, 1976, 74398
Int. Cl.² C21B 7/12
U.S. Cl. 266—271 **23 Claims**



1. Apparatus for opening shaft furnace tapholes, the furnace having a vertical axis and an external longitudinally extending molten metal flow channel in registration with each taphole, the apparatus comprising:

support column means, said support column means having a longitudinal axis which is angularly inclined toward the furnace axis, said column means longitudinal axis also being angularly inclined with respect to a vertical plane through the taphole and the axis of the flow channel in registration with the taphole with which the apparatus cooperates;

arm means pivotally mounted on said support column means and extending outwardly therefrom, said arm means having an axis;

tool holder means, said tool holder means including an elongated tool support bar;

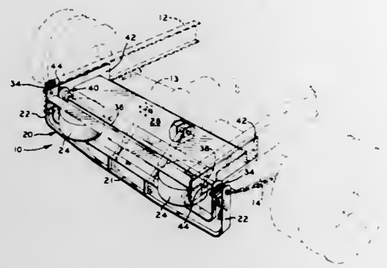
means for rigidly attaching said tool holder means support bar to a first end of said arm means, said attaching means permitting adjustment of said tool holder means support bar relative to said arm means;

fluid operated drill means mounted on said tool holder means support bar for movement along said bar;

means for delivering operating fluid to said drill means; and

means for rotating said arm means about the axis of said column means to move said tool holder means between operating and retracted positions, said rotating means including a hydraulic actuator having a movable output member coupled to said arm means, said rotating means further including means for limiting the displacement of said actuator output member to an amount corresponding to the operating position of said tool holder means.

4,097,034
AIR-RIDE SUSPENSION SYSTEM
Philip J. Sweet; Buck C. Hamlet, and David L. Sweet, all of Fresno, Calif., assignors to American Carrier Equipment, Inc., Calif.
Filed Apr. 7, 1977, Ser. No. 785,344
Int. Cl.² B60G 11/46
U.S. Cl. 267—15 A 9 Claims



1. In a suspension system for a wheeled vehicle characterized by at least one pair of laterally spaced longitudinal frame members, a load bearing axle and a pair of laterally spaced leaf spring assemblies mounted on said axle in transverse relation therewith, the improvement comprising:

A. a load supporting cradle having an elongated base adapted to be extended transversely beneath a pair of laterally spaced frame members for a given vehicle;

B. means adapted to connect opposite end portions of the base of the cradle in suspension from the trailing end portions of a pair of laterally spaced leaf spring assemblies mounted on the axle in parallelism with the direction of intended vehicular travel for the vehicle;

C. means for supporting a pair of frame members for the vehicle including at least one pair of mutually spaced air bags seated on said base and a pillow plate seated on the air bags and adapted to be connected to the frame members; and

D. centering means for restraining said cradle from transverse motion relative to said pair of frame members including a link rigidly extended in substantial parallelism with said base and adapted to be connected with at least one leaf spring assembly of said pair of leaf spring assemblies and one frame member of said pair for restraining the pair of frame members from lateral motion relative to said leaf spring assemblies.

4,097,035
CLAMPING FRAME FOR PLASTIC FORMING APPARATUS
Jack N. Shuman, 3330 Foxcroft Rd., Charlotte, N.C. 28211
Filed May 31, 1977, Ser. No. 802,133
Int. Cl.² B25B 5/14
U.S. Cl. 269—121 7 Claims

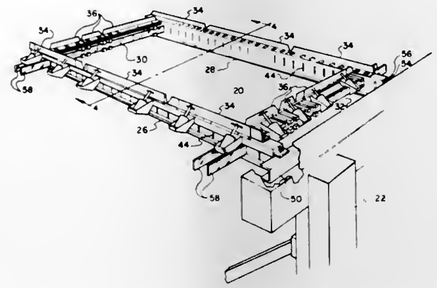
1. In apparatus for use in forming plastic material into predetermined configurations, the improvement comprising a clamping frame for engaging the peripheral edges of a sheet of plastic material during plasticising and forming of said plastic material, said clamping frame including:

(a) a pair of side elements having clamping means mounted along the length thereof for engaging said peripheral edges of said plastic material, said side elements being arranged in a spaced parallel relationship with each said side element having a plurality of facing apertures formed along the length thereof and extending therethrough;

(b) mounting means permitting said side elements to move toward and away from one another to a plurality of positions at which said side elements have a predetermined spacing therebetween;

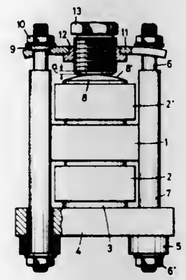
(c) a pair of support means slidably mounted in said facing apertures of said side elements to extend therebetween at all said positions thereof; and

(d) a plurality of individual clamping sub-assembly means selectively mountable in side-by-side relationship on each said support means along the extending length thereof,



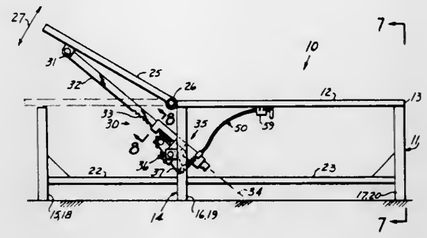
said clamping sub-assembly means having different predetermined lengths which provide, in selected combinations thereof, a total extending length along each said support means corresponding generally to said predetermined spacing between said side elements at each of said plurality of positions thereof.

4,097,036
CLAMPING DEVICE FOR A THERMALLY AND ELECTRICALLY PRESSURE-CONTACTED SEMICONDUCTOR COMPONENT IN DISK-CELL CONSTRUCTION
Arno Henke, Gorxheimertal, Germany, assignor to BBC Brown, Boveri & Company, Limited, Mannheim, Germany
Filed May 4, 1977, Ser. No. 793,775
Int. Cl.² B25B 5/14
U.S. Cl. 269—254 R 6 Claims



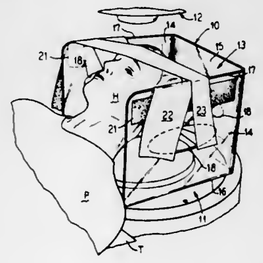
1. A clamping device for a thermally and electrically pressure-contacted semiconductor component in diskcell construction comprising two pressure or conductor plates in the form of liquid-cooled capsules between which the semiconductor component is disposed, the two liquid-cooled capsules being squeezed together by a clamping device comprising four clamping bolts passing through the corners of a large-area resilient clamping plate with a central threaded insert and a central clamping screw pressing on a convex surface of one of the two liquid-cooled capsules, the clamping screw being screwed over a certain rotation angle measurable on the clamping device, stressing the clamping plate and pressing on the convex surface with a force proportional to said angle.

4,097,037
TABLE WITH LEAF AND LOCKING SYSTEM
Victor H. Tardiff, San Jacinto, Calif., assignor to Tru-Eze Manufacturing Co., Inc., Temecula, Calif.
Filed Jul. 8, 1977, Ser. No. 813,844
Int. Cl.² A61G 13/00
U.S. Cl. 269—323 9 Claims



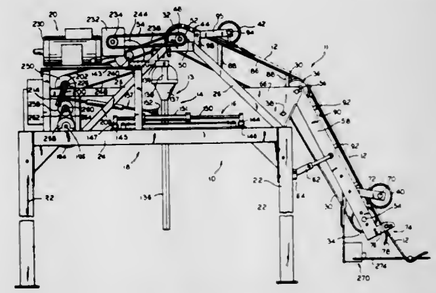
1. In combination: a platform having a horizontal surface and an upright support beneath said horizontal surface, said support having a dimension of height; a horizontal first hinge means on said platform; a rigid leaf pivotally mounted to said platform by said first hinge means to permit the leaf to hinge around said first hinge means; horizontal second hinge means on said leaf spaced from first hinge means; a lock shaft having an axis of motion, and being pivotally mounted to said second hinge means; third hinge means attached to the support at an elevation below said horizontal surface; and releasable lock means pivotally mounted to said third hinge means, said lock shaft being engaged to said lock means for axial movement therein, whereby a three link locking system is created for the leaf as follows: a first rigid link between the third and first hinge means, a second rigid link between the first and the second hinge means, and a third rigid link between the second and third hinge means, said lock means being so constructed and arranged as releasably to lock the shaft thereto and at any shaft position in the range of permissible positions, thereby to adjust the length of the third link and the angle of the leaf, said three link system being rigid when the lock means is locked, in which said lock shaft bears rack gear teeth, and in which said lock means comprises an idler gear with teeth meshed to the rack gear teeth, and a lock gear having teeth always meshed to the idler gear teeth and so disposed and arranged that they can also be meshed with the rack gear teeth to lock the gears together or removed therefrom to enable the rack gear teeth to move relative to the idler gear.

4,097,038
HEADREST
Alan A. Jansen, 4201 SW. 47th Dr., Portland, Oreg. 97221
Filed Sep. 30, 1977, Ser. No. 838,244
Int. Cl.² A61G 13/00
U.S. Cl. 269—328 11 Claims



1. A headrest which comprises a U-shaped body with an open unobstructed front, top and bottom having upstanding side walls connected by an end wall sized to freely surround a human head, said side walls having bottom edges for resting on a supporting surface and smooth top edges, a flexible sling tape draped over said smooth top edges and suspended from said side walls for cradling a human head projecting through said open unobstructed front within the body in spaced relation from the side and end walls above the bottom of the body, annd cooperating fastener materials on the sling tape and outer faces of the side walls adhering when pressed together to adjustably anchor the sling to the side walls.

4,097,039
STRIP LAYING APPARATUS
Thomas A. Fischer, Fargo, N. Dak., assignor to Applied Power Inc., Menomonee Falls, Wis.
Filed Jul. 23, 1976, Ser. No. 708,065
Int. Cl.² B65H 45/20
U.S. Cl. 270—79 37 Claims



1. Apparatus for laying strip material including support means,

first translating means movably mounted on said support means for reciprocating movement in a first direction and in an opposite direction,

said first translating means comprising slider means, first slider supporting means mounted on said support means for supporting said slider means for sliding movement in said first and opposite directions on said support means,

said first slider supporting means including elongate means extending in said first direction, said slider means includes tubular means slidably mounted and telescopingly received on said elongate means,

second translating means mounted on said first translating means for reciprocating movement in a second direction generally normal to said first direction,

said second translating means including second elongated slider support means extending in said second direction and tubular means slidably mounted on said second slider supporting means for reciprocating movement thereon,

elongate material distributing means universally pivotally mounted adjacent to an end on said support means and extending generally downwardly therefrom to define upper and lower ends, said material distributing means being constructed and arranged for receiving material at its upper end and discharging the same from its lower end,

said distributing means being coupled adjacent its lower end to said second translating means for movement therewith,

drive means coupled to each of said translating means for moving said first translating means in said first and said opposite direction and for reciprocating said second translating means in said second direction on said first translating means,

an elongate, upwardly inclined conveyor means having one end elevated and disposed adjacent the upper end of said material distributing means, said conveyor means being constructed and arranged for receiving an elongate strip of material,

said conveying means including elongate means movable generally upwardly toward the upper end of said distrib-

uting means, said conveying means including pressure means for biasing a strip of material against said elongate means whereby the latter moves said material upwardly to said distributing means and guide means disposed above the upper end of said conveying means for redirecting said strip material downwardly to the upper end of said distributing means,

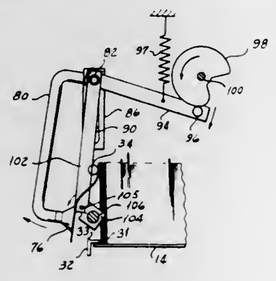
said drive means including first crank means mounted for rotation about an axis generally parallel to said first direction and linkage means connecting said crank means to said second translating means for moving the second translating means in said second direction, and means for adjusting the distance from said axis that said crank means is engaged by said linkage means so that adjustment thereof will change the magnitude of reciprocation of said second translating means.

4,097,040

MULTIPLE SIZE ENVELOPE FEEDER

Gary L. Pugh, Kansas City, Mo., and Glenford Rowlett, Prairie Village, Kans., assignors to Stephens Industries, Inc., Lenexa, Kans.

Filed Oct. 28, 1976, Ser. No. 736,448
Int. Cl.² B65H *3/08, 3/56*
U.S. Cl. 271—104 **19 Claims**



1. Apparatus for supplying envelopes one at a time from a stack of envelopes arranged on edge including, in combination: first and second spaced retainer members for retaining one end of said stack; an arm having a suction device mounted at one and thereof; a pivot shaft supporting the arm at the other end for pivotal movement thereof; means for providing a slot slidably receiving said pivot shaft; and means for sequentially moving said pivot shaft along said slot in one direction to move the suction device adjacent to said one end of said stack, rotating said shaft in such a direction as to move said suction device into engagement with said one end of said stack to grip the leading envelope, rotating said shaft in the opposite direction to separate said leading envelope from said first retainer member, and then moving said pivot shaft along said pivot shaft slot in the opposite direction to separate said leading envelope from said second retainer member, said moving means including a drive shaft having an eccentric mounted thereon, means coupling the eccentric to the pivot shaft, a cam shaft having a cam mounted thereon, a follower arm having one end fixedly attached to said pivot shaft, and means urging the follower arm against the cam.

4,097,041

SHEET FEEDING APPARATUS

Sakae Fujimoto, Chofu, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 2, 1976, Ser. No. 738,222
Claims priority, application Japan, Nov. 6, 1975, 50-133206
Int. Cl.² B65H *3/06, 3/56*
U.S. Cl. 271—114 **9 Claims**

1. A sheet feeding apparatus for feeding sheets from a stack disposed on a sheet receptacle, said apparatus comprising:

a pair of pivotable support arms having their free ends rockable toward and away from said sheet receptacle;

a feed roller support shaft rotatably mounted on the free ends of said support arms;

feed roller means on said support shaft for engaging and feeding a sheet from said sheet receptacle;

drive means for rotating said feed roller means;

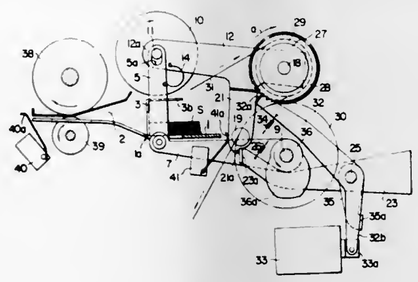
means for controlling the operation of said drive means;

means for rocking said support arms in a direction to cause said feed roller means to move away from said sheet receptacle at the termination of a feeding operation of a single sheet;

means for retaining said support arms in their removed position;

means for releasing said retaining means at the commencement of a sheet feeding operation;

a pair of corner separators disposed adjacent the opposite



corners of the front end of said sheet receptacle for bearing against the opposite corners of the leading end of a sheet during a sheet feeding operation; and

means for mounting said corner separators on said support arms for movement at least partly in following relationship with the rocking motion of said support arms whereby said corner separators bear against the opposite corners of the leading end of a sheet only during a sheet feeding operation, said mounting means comprising:

a pair of support links having the corner separators mounted thereon and respectively connected to the free ends of the respective support arms by freely pivoting at one end on the opposite ends of said feed roller support shaft; and

a pair of additional pivotable arms each having one of its ends loosely fitted on said rocking means and its other end respectively pivoted to the other ends of said support links.

4,097,042

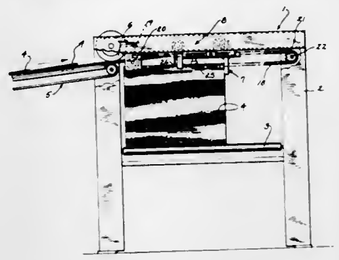
BACKSTOP CONSTRUCTION FOR A STACKING MACHINE

Vincent E. Rozga, Greendale, Wis., assignor to Kelley Company, Inc., Milwaukee, Wis.

Filed Feb. 25, 1977, Ser. No. 771,976
Int. Cl.² B65H *31/20*
U.S. Cl. 271—171 **11 Claims**

1. A machine for stacking sheet material, comprising a supporting structure, a conveyor mounted on the supporting structure to convey sheet material in a given direction, a lift table mounted on the supporting structure and disposed to receive a plurality of sheets and stack the sheets, a truck located above the table and mounted for movement with respect to said table in said direction, a carriage mounted for linear movement on the truck in said direction, said carriage being movable between a first position adjacent the upstream end of the truck to a second position adjacent the downstream end of

the truck, latching means to lock the carriage in the first position, and a backstop carried by the carriage and disposed to be



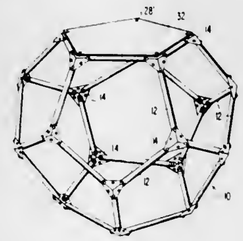
engaged by the leading ends of the sheets as they are stacked on the table.

4,097,043

PLAYGROUND CLIMBER

Richard Rudy, Reedsville, Pa., assignor to Kilgore Corporation, Toone, Tenn.

Filed Feb. 20, 1976, Ser. No. 659,686
Int. Cl.² A63B *9/00*
U.S. Cl. 272—113 **5 Claims**



1. A playground climber, comprising a plurality of modular units connected to one another, each said modular unit being a regular dodecahedron formed of interconnecting dodecahedron structural member means having generally cylindrical climbing interconnecting struts on the face of the dodecahedron so closely spaced a child could stand on one strut and grasp any of the other struts of the face on which the child is climbing, each face of each dodecahedron unit comprising a regular pentagon and a majority of said faces being open to permit a child to pass therethrough climbing thereon and grasping of said climbing struts by a child, each said pentagon comprising five climbing struts with two said adjacent struts meeting at an angle of 108°, each said dodecahedron unit having twenty corners, and each said corner being formed by the juncture of three of said climbing struts whereby a child can climb said playground climber by grasping and placing his feet on said struts which form each face of each unit.

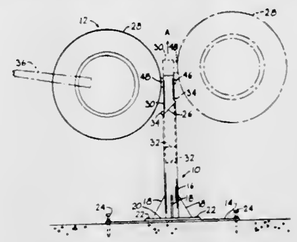
4,097,044

BASEBALL BATTING TRAINING APPARATUS

Jack K. Miniere, 685 Minnesota Ave., Winter Park, Fla. 32789

Filed Nov. 26, 1976, Ser. No. 745,062
Int. Cl.² A63B *69/40*
U.S. Cl. 273—26 R **7 Claims**

1. A batting training device comprising: support means for operatively positioning said device above a support surface; target means rotably disposed on said support means and positioned to receive the impact of a bat swung into contact therewith, said support means including cam means formed thereon to guide the movement of said target means whereby said target means will assume a substantially identical stationary position after each impact of said target means by said bat, and wherein said target means comprises a contact element disposed to receive the impact of said bat and pivot means fixedly attached to said contact element, said pivot means including guide means formed thereon in engaging relation to said cam means; and attachment means disposed in fixed, interconnecting relation between said contact element and said pivot means



and comprising plate means for supporting said contact element to said pivot means and being attached to said contact element, said plate means and said contact element including correspondingly positioned apertures formed therethrough, and fastening means extending through said apertures, one end of said fastening means being attached to said pivot means.

4,097,045

BOWLING RAMP

Russell D. Bechtel, Pensacola, Fla., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 28, 1977, Ser. No. 792,008
Int. Cl.² A63D *5/00*
U.S. Cl. 273—54 R **1 Claim**

1. A bowling ramp for the acceleration of a bowling ball by a handicapped, disabled, infirm, and the like, person, said bowling ramp comprising

a portable ramp for a bowling ball, said ramp being bent at approximately 135° to form a first substantially linear section of predetermined length and a second substantially linear section having a length approximately three times the predetermined length, said second section extending substantially angularly from said first section and curving slightly at its end farthest from said first section, said ramp having a top with a central channel extending along its length for directing a bowling ball and a bottom;

a pair of spaced socket members at the bottom of the first section intermediate its end joining the second section and its end farthest from said second section;

a pair of legs removably accommodated in the socket members for supporting the ramp with the first section substantially horizontal at a predetermined height above a supporting surface and the second section extending from said predetermined height to said supporting surface at approximately 45° and curving slightly upward in its area abutting said supporting surface, said legs being symmetrical about a vertical line through the center of the first

section and angularly disposed relative to said line since they diverge from said line as their distance from said first section increases;

a rubber strip on the bottom of the ramp at the free end of the second section for abutting the supporting surface and preventing slippage thereon and scuffing thereof;

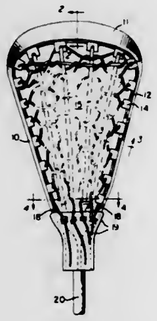
a handle in the channel of the second section of the ramp for facilitating carrying thereof; and

resilient clamps on the bottom of the second section of the ramp for releasably supporting the legs.

4,097,046
LACROSSE STICK

Elias Stewart Friant, Baltimore, Md.

Filed Feb. 8, 1977, Ser. No. 766,654
Int. Cl.[2] A63B *59/02*
U.S. Cl. 273—96 D **8 Claims**



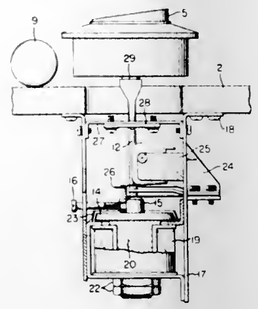
1. A lacrosse stick head, of the type including a frame and a net forming a ball pocket secured to said frame at spaced points there along, said frame being formed of a length of flat strip material bent to provide at least one elongated side element and an end portion twisted with respect to said side element to form the conventional scoop-shaped end of the frame; the novelty including that said strip of material has a narrow slot extending along the edge of said strip forming the back of said frame and the inner edge of said scoop-shaped end, said slot being narrow at the edge of said frame and having a larger section interiorly of said strip than at its edge, an elongated flexable element carrying means fixed at spaced points therealong to which said net is secured, said elongated flexible element with said means fixed thereto being slideable along said slot with said means extending outwardly through said slot at the edge of said frame, said flexible element being of a diameter greater than said slot at the edge of said frame whereby said means spaced along said frame by said flexible element forms a strong securement for said net on said frame and accurately spaces said means along said frame.

4,097,047
DEVICE FOR KICKING BALL IN A PINBALL GAME MACHINE

Shikanosuke Ochi, Hon, Japan, assignor to Kabushiki Kaisha Sega Enterprises, Tokyo, Japan

Filed Dec. 20, 1976, Ser. No. 752,662
Claims priority, application Japan, Dec. 24, 1975, 50-173651[U]
Int. Cl.[2] A63F *7/00*
U.S. Cl. 273—127 R **8 Claims**

1. A device for kicking a ball in a pinball game machine having a playing surface on which the ball is adapted to be rollingly moved and bumper heads adapted to repel the ball when the same abuts thereagainst, wherein the improvement comprises a frame detachably mounted on the lower surface of said playing surface in position beneath each said bumper head, an electromagnetic coil secured to said frame and spaced below said playing surface, an armature disc movably held on said electromagnetic coil between said electromagnetic coil and said playing surface, pole means rigidly connecting said armature disc to the respective bumper head and a switch connected to said electromagnetic coil to detect the tilting of

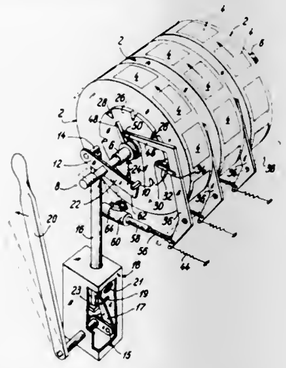


said bumper head upon abutment thereof by said ball so as to be closed for energizing said electromagnetic coil which causes said armature disc to be attracted to said electromagnetic coil and rapidly return said bumper head to a normal position to repel said ball.

4,097,048
SLOT MACHINE

Freddy Poulsen, Højbjerg, and Robert Edvin Poulsen, Hinnerup, both of Denmark, assignors to Bell-Matic A/S, Denmark

Filed Jan. 27, 1976, Ser. No. 652,785
Int. Cl.[2] A63F *5/04*
U.S. Cl. 273—143 R **9 Claims**



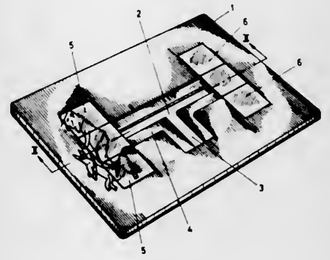
1. A slot machine which includes a common shaft, a plurality of rotary drums individually rotatable about said common shaft, an annular row of various signs and symbols provided on each of said drums, a starting mechanism for providing a start rotation of said common shaft, an actuator handle operatively connected with said starting mechanism, means for starting a rotation of the drums in response to an actuation of said starting mechanism by said actuator handle, and means for automatically stopping the respective drums at mutually different periods of time after a start of rotation of the drums, characterized in that said starting mechanism includes means for causing said common shaft to be rotated initially in a first direction of rotation in response to the actuator handle being pulled toward a start position and for imparting to said common shaft a rapid start rotation in a second direction of rotation opposite to the first direction in response to the actuator handle reaching the start position, means are provided for mounting the drums on said common shaft so as to permit the common shaft to be rotatable relative to the drums through at least a fraction of one

revolution including a one-way rotation clutch arranged between the common shaft and each respective drum for causing the drums to be rotated by the rapid start rotation of the common shaft and for allowing the respective drums to continue rotation upon the rapid start rotation of the common shaft being stopped, said one-way rotation clutch including a release for rendering the clutch inoperative thereby allowing the relative rotation both ways between the common shaft and the associated drums, in that an annular row of abutments or notches are provided at each of the drums, said means for automatically stopping the respective drums including a pawl means mounted so as to be displaceable from an inoperative position outside of the annular row of abutments or notches to an operative or stop position in engagement with one of the abutments or notches, means are provided for controlling said pawl means so as to maintain a pawl means in engagement with an abutment or notch during the initial rotation of said common shaft in said first direction and to the inoperative position immediately before the rapid start rotation of the common shaft, and in that holding means are associated with the respective drums for enabling a player selected individual arresting of any one of the drums while the remaining drums are rotated, said holding means including means for actuating said release means of the one-way rotation clutch.

4,097,049
SLIDE-PUZZLE

Marc Francois DeVos, Binnenhof 3, Knokke-Heist, Belgium, and Hoan Giok Gouw, Porto Buenolaan 16, Ouderkerk a,d Amstel, Netherlands

Filed Aug. 23, 1976, Ser. No. 716,878
Claims priority, application Netherlands, Aug. 28, 1975, 7510190
Int. Cl.[2] A63F *9/08*
U.S. Cl. 273—153 S **1 Claim**

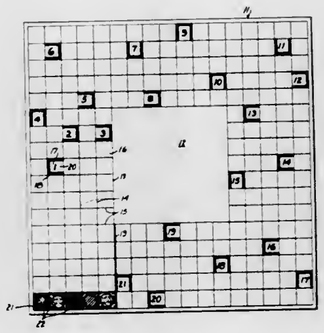


1. A slide puzzle comprising, in combination, a plate having a space therein with inwardly directed flanges extending along the inner surface of the part of said plate which forms the perimeter of said space, a plurality of slide pieces each having a circumferential groove in the side thereof, said slide pieces being slidably retained in said space by means of said circumferential grooves interengaging at least two of said flanges, said slide pieces being of such dimension that the surfaces thereof lie in the same plane as the surface of said plate, said space being of substantially I-shaped configuration including a leg and two transverse portions, said transverse portions being dimensioned to accommodate three or a larger odd number of slide-pieces which are positioned in side by side abutting relationship in a row, said leg having an opening in communication with the middle thereof, said opening being dimensioned to accommodate one slide piece, the total number of slide pieces being equal to the sum of the slide pieces that said two transverse portions can accommodate, said slide pieces having part of a picture on both surfaces thereof and said plate having part of a picture on the surfaces of the plate adjacent to the transverse portions of the space such that when the slide-pieces are positioned in side by the abutting relationship in the correct sequence in each transverse portion, two complete pictures are shown on one surface while on the reverse surface no coherent pictures are shown.

4,097,050
BOARD GAME APPARATUS

Mason D. Miller, 821 Payson St., La Verne, Calif. 91750

Filed May 16, 1977, Ser. No. 797,053
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—243 **6 Claims**



1. A game comprising

playing pieces for respective ones of different players,

a playing board having a central area,

a plurality of contiguous squares on said board surrounding said central area,

certain of said squares comprising starting positions for respective ones of said playing pieces,

certain of said squares being progressively numbered,

said numbered squares being marked to form cells,

each of said cells having an entrance on one side only,

a selection device for randomly selecting the number of squares said playing pieces are to be advanced in turn from said starting positions around said central area,

a registering device for indicating throughout the game the highest numbered cell to which any player has advanced,

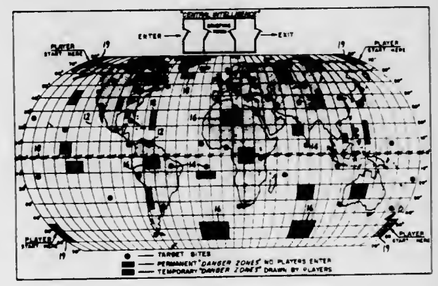
said registering device having a plurality of registering elements, and

indicia identifying said registering elements with corresponding ones of said numbered squares.

4,097,051
BOARD GAME APPARATUS

Robert M. Goldberg, 1321 Dutch Broadway, and John R. O'Connor, 74 Jackson Rd., both of Valley Stream, N.Y. 11581

Filed Nov. 11, 1976, Ser. No. 740,809
Int. Cl.[2] A63F *3/04*
U.S. Cl. 273—254 **9 Claims**



1. Game apparatus for play by two or more players, comprising:

a game board on which is imprinted an unlegended map of at least a portion of the earth's surface, including latitude parallels and longitude meridians at intervals of predetermined indicated degree spacing dividing said map into spaces formed by the intersection of said latitude parallels and longitudinal meridians, and a plurality of indicia on said map designating unidentified preselected target sites within respective ones of said spaces and representing real locations on the earth's surface,

a first plurality of mission cards, each of which bears a written clue to the identity of one of said preselected target sites and the nature of a mission to be performed thereat, for distribution of one or more to each of the players at commencement of play,

a plurality of playing pieces for each player, one for each mission card distributed to a player, each of said pieces being employed to designate movement of the player from a starting point to a preselected target site, and

means for randomly governing movement of said playing pieces along paths comprised of the spaces formed by intersection of successive latitude parallels and longitude meridians.

4,097,052

GAS-SEALED CONTACT-FREE SHAFT SEAL

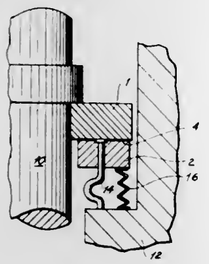
Manfred Heinen, Oberhausen, Germany, assignor to Gutehoffnungshutte Sterkrade A.G., Germany

Filed Mar. 8, 1976, Ser. No. 664,811

Claims priority, application Germany, Mar. 8, 1975, 2510196

Int. Cl.[2] F16J *15/34*

U.S. Cl. 277—96.2 **2 Claims**



1. A seal for high speed shafts, comprising a shaft, a shaft ring tightly mounted on and circularly embracing the shaft, a packing ring, support means elastically suspending said packing ring in a gas-proof enclosure around said shaft, said shaft ring and said packing ring being separated by a narrow sealing gap defining a gas cushion, said shaft ring being made of hardened beryllium copper containing from 1 to 4% of beryllium and from 0.1 to 0.5% cobalt, said packing ring being of aluminum material which has a surface opposed to said shaft ring which is provided with a hard oxide layer of said aluminum extending over at least a portion of the area of said packing ring surface.

4,097,053

HIGH SPEED POWER CHUCK

Joseph Steinberger, Dusseldorf, Germany, assignor to Paul Forkardt Kommanditgesellschaft, Germany

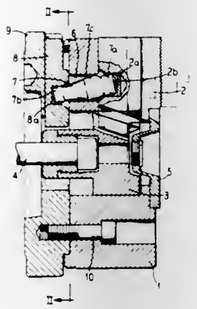
Filed Mar. 16, 1977, Ser. No. 777,961

Claims priority, application Germany, Apr. 30, 1976, 7613635[U]

Int. Cl.[2] B23B *31/16*

U.S. Cl. 279—1 C **4 Claims**

1. In a commercial chuck for lathes having a chuck body with a rear face and a front face having a plurality of chuck jaws therein, the chuck jaws radially movable in the chuck body, chuck jaw movement control means including an axially movable member centrally received in the chuck body operatively connected with the chuck jaws, to radially move the same, the improvement of, in combination with the above, centrifugal balancing means including a plurality of axial holes through said chuck body open to a rear face of the chuck body, one of each holes aligned with one of the chuck jaws, blind holes in rear faces of the chuck jaws communicating with the axial holes in the chuck body, a plurality of radially movable centrifugal weights carried by a weight carrying flange member attached to the rear face of the chuck body the weights being radially movable with respect thereto, the centrifugal



weights positioned on an opposite side of the axial bores from the chuck jaws, a plurality of compensating levers with one of said levers received in each of the axial bores and having opposed ends received respectively in the bores of the chuck jaw and the bores in an associated centrifugal weight, a central portion of each compensating lever forming a pivot within the axial bore whereby movement of one end of the compensating lever in a first radial direction will cause movement of the other end of the compensating lever in the opposite radial direction, the centrifugal balancing means being separate from and independent of the control means.

4,097,054

DRILL CHUCKS

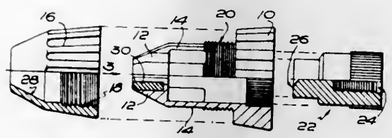
George Cecil Derbyshire, Sheffield, England, assignor to The Jacobs Manufacturing Company, Limited, Sheffield, England

Filed Sep. 24, 1976, Ser. No. 726,184

Claims priority, application United Kingdom, Oct. 7, 1975, 41056/75

Int. Cl.[2] B23B *31/04*

U.S. Cl. 279—64 **9 Claims**



1. A drill chuck comprising at least three jaw elements each having a conical tapered exterior surface of diminishing radii in the direction of the end thereof, a jaw carrier; respective flexible elements connecting said jaw elements to said jaw carrier, said flexible elements each being coextensive in arcuate dimension with the maximum arcuate dimension of the conical jaw element to which it is connected; a nose cone having a frusto-conical bore portion; and means for urging said jaw elements axially relative to said nose cone so that the jaw elements act against the frusto-conical bore portion of the nose cone and are urged radially inwards, accompanied by flexing of the flexible elements, to grip the shank of a drill bit placed in the chuck.

4,097,055

SKI-SUPPORTED VEHICLES

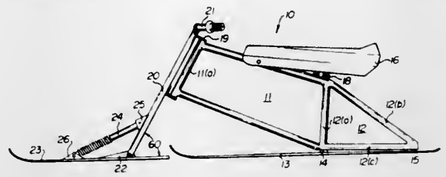
Kevin Wendell Laycraft, 1423 Carlyle Rd. SW., Calgary, Alberta, Canada (T2V 2V2)

Filed Feb. 18, 1977, Ser. No. 769,930

Claims priority, application Canada, Jan. 5, 1977, 26919301

Int. Cl. B62b *13/04*

U.S. Cl. 280—16 **13 Claims**



1. A vehicle comprising: a rearwardly inclined supporting frame of closed-loop configuration incorporating a triangulated strengthening segment at the rear end thereof, said triangulated segment including a generally horizontal lower member; a steering mechanism comprising at least one steering column pivotally attached to an upper front portion of said frame, and handle means attached to such steering mechanism; a front ski, pivotally attached to the lower end of said steering mechanism, pivotal movement being constrained by shock absorber means mounted between said ski and said at least one steering column; a rear supporting ski, rigidly attached to said generally horizontal lower member to extend longitudinally thereof such that the front portion of said rear ski extends substantially unsupportedly and forwardly from said lower member and is permitted to flex in response to contact with a snow surface and; seat means resiliently mounted on a upper, rear portion of said frame.

4,097,056

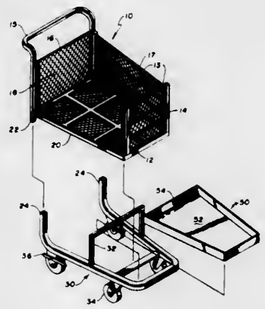
MODULAR PART CART

Paul Eugene Castellano, Wyoming, Minn.

Filed Jan. 3, 1977, Ser. No. 756,413

Int. Cl. B62b *3/02*

U.S. Cl. 280—47.35 **1 Claim**



1. A modular part cart for loading, transporting, and unloading of oily industrial parts conveniently, expeditiously and economically comprising:

(a) a lower frame unit;

(b) an upper frame unit slideably mounted over said lower frame unit; and

(c) a drip catch pan inserted between said lower frame unit and said upper frame unit; and

wherein said lower frame unit comprises;

(a) a tubular frame in 'U' shape with perpendicular ends;

(b) a plurality of casters fastened to said 'U' shaped tubular frame in a direction opposite to said perpendicular ends; and

(c) an inverted 'U' shaped support member bridging the width of said 'U' shaped tubular frame;

and wherein said upper frame unit comprises:

(a) a rectangular bottom frame having a mesh;

(b) plurality of perpendicular tubular members fastened perpendicular to said rectangular bottom frame;

(c) a handle fastened to one side of said rectangular bottom frame above said perpendicular tubular members; and

(d) plurality of slideably removeable side panels of mesh for easy loading and unloading of parts;

and wherein

(a) a back panel is pivotally attached to said upper frame unit under said handle via a rod;

(b) said bottom frame of said upper frame unit has additional tubular frame members fastened parallel to its sides; and

(c) said plurality of perpendicular tubular members of said upper frame unit have slots for sliding sections of said plurality of side panels of mesh.

4,097,057

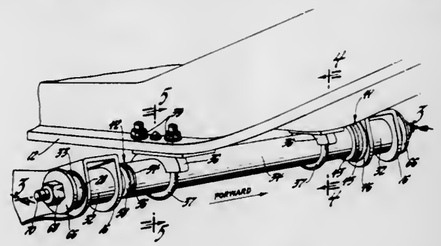
INDEPENDENT SUSPENSION SYSTEM

Stanley R. Goodrich, Jr.; David J. Skolnik, both of Saginaw; Joseph A. Stearns, Frankenmuth; Robert C. Farrell; Richard R. Brezinski, both of Saginaw, and Robert R. Parks, Warren, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 27, 1976, Ser. No. 754,280

Int. Cl.[2] B60G *11/42;* **F16F** *1/38*

U.S. Cl. 280—96.1 **7 Claims**



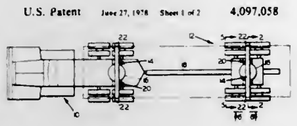
1. In an independent front suspension system for a vehicle having a frame and including a wishbone-shaped control arm having an outer end mounted for pivotal movement on a steering knuckle and spaced apart inner ends each mounted around a control arm bushing including an elastomeric sleeve between outer and inner metal sleeves, the inner sleve being mounted around the end portion of a control arm shaft, a coil spring and a shock absorber mounted between the control arm and the frame, and a road wheel and tire rotatably mounted on the spindle of the steering knuckle, elastomeric isolation means comprising a pair of spaced apart elastomeric bushings secured to the control arm shaft and each having a side wall of reduced effective thickness facing the road wheel, a tubular member mounted around the elastomeric bushings with a predetermined space between the ends thereof and the adjacent inner ends of the control arm bushings, clamping means mounted around the tubular member adjacent each end thereof to secure the tubular member to the frame, a shoulder formed on each end of the control arm shaft adjacent the ends of the tubular member, and end stop means mounted on each end of the shaft between the inner metal sleeve of the control arm bushing and the shoulder and adjacent end of the tubular member to limit axial and lateral movements of the control arm shaft relative to the tubular member as determined by the horizontal distortion of the elastomeric bushings by the movement of the control arm shaft within the tubular member when the road wheel contacts uneven terrain and during braking.

4,097,058

CABLE OPERATED LOG BUNK

Dennis Ray Hassell, 250 Dead Indian Rd., Ashland, Oreg. 97520

Filed Nov. 8, 1976, Ser. No. 739,490
Int. Cl.[2] B60P *7/00*
U.S. Cl. 280—145 **12 Claims**



1. A log bunk assembly comprising:
a. a bunk adapted for mounting transversely of a vehicle,
b. a pair of stakes,
c. pivot means securing the lower end of each stake to an end of the bunk for angular movement between raised and outwardly lowered positions,
d. a pair of flexible link means one associated with each stake for securing the stake in said raised position,
e. securing means securing one end of each flexible link means to its associated stake intermediate the ends of the latter,
f. latch means releasably securing the other end of each flexible link means to the bunk intermediate the ends of the latter, whereby when each stake is secured in raised position the associated flexible link means extends angularly upward and outward from the bunk to its connection to the stake,
g. a pair of latch-operating means mounted one at each end of the bunk and
h. connecting means interconnecting each latch-operating means with the latch means at the remote end of the bunk for alternately shifting the latch means between latched and unlatched positions.

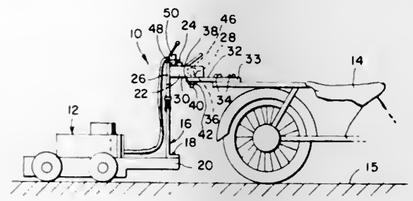
4,097,059

CONNECTING BRACKET ARRANGEMENT FOR TOWING LAWN MOWER

Joseph E. Springer, Sr., Star Rte. 2, Box 2116, Hernando, Fla. 32642

Filed Sep. 27, 1976, Ser. No. 726,495
Int. Cl.[2] B62D *13/00;* **B62K** *27/12*
U.S. Cl. 280—204 **6 Claims**

1. A connecting bracket for connecting a lawn mower to a powered vehicle or the like comprising:
a first elongated bracket for affixment on a first end thereof to a lawn mower resting on the earth;
an engaging element fixedly secured to the second end of said first elongated bracket, said engaging element providing an open-ended chamber on a surface thereof, said chamber opening through said surface;
a second elongated bracket for affixment on a first end thereof to a powered vehicle resting on said earth;
a ball element fixedly secured to the second end of said second elongated bracket, said ball element providing a partially spherical surface dimensioned to be captured within said open-ended chamber;
means for removeably retaining said partially spherical surface within said open-ended chamber, said removeable retaining means providing a bias means urged release lever; and
wherein said first elongated bracket is substantially "U"



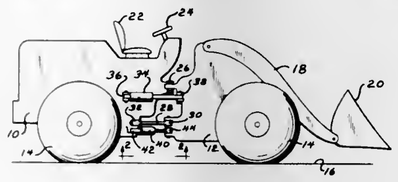
shaped, including a pair of legs having free ends and a base portion, said pair of free ends of said "U" shaped first bracket being fixedly secured to said lawn mower, said base portion of said "U" shaped first bracket being fixedly secured to said engaging element, and wherein said legs of said "U" shaped first bracket are each severed from said base portion and are flexibly reconnected thereto by flexible connecting means.

4,097,060

ROLL STIFFENING AND DAMPENING IN ARTICULATED VEHICLES

Dale H. Unruh, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 30, 1977, Ser. No. 782,668
Int. Cl.[2] B62D *53/00*
U.S. Cl. 280—492 **5 Claims**



1. An articulated vehicle comprising:
first and second vehicle frames;
ground engaging means on each of said frames for emgaging the underlying terrain and supporting the vehicle for movement thereover;
means coupling said frames together for relative rolling movement about a generally horizontal axis and for relative pivotal movement about a generally vertical axis; and
means interconnecting said frames at a location on at least one frame remote from said coupling means for (a) resisting and (b) dampening rolling movement between said frames about said generally horizontal axis.

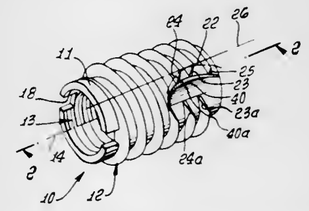
4,097,061

SKI INSERT FOR ANCHORING A SKI BINDING SCREW IN A SKI

Robert W. Dietlein, 2904 Harmony Pl., La Crescenta, Calif. 91214

Filed Apr. 19, 1976, Ser. No. 677,899
Int. Cl.[2] A63C *5/00*
U.S. Cl. 280—607 **3 Claims**

1. In combination with a ski, a ski insert for anchoring a ski binding screw, the insert comprising
(a) a tubular metallic body having an axis and external and internal threads extending about said axis and along the body, the ski defining an opening into which said body is closely received, the external thread penetrating the ski about said opening,
(b) the external thread being locally interrupted along an arcuate locus intersecting at least three successive turns to form three chisel cutting edges proximate one end of the body and adapted to cut into the ski material upon twisting of the insert into said opening in the ski, the external thread having opposite flanks defining an angle less than about 31° in axial radial planes, one of said cutting edges having zero spacing from an axial radial plane and two adjacent cutting edges at opposite sides of said one edge having positive spacings from said plane, there being a recess sunk in the body and having an arcuate side wall



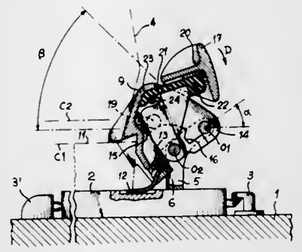
adjacent the roots of said three turns, said recess being shallow and having a bottom wall extending from said arcuate wall to the body surface near continuations of said turns, said bottom wall defining a plane generally tangent to terminals defined by said continuations, said recess sized to collect cuttings, the outermost radial dimension of said chisel edges and said continuations closest to said edges being the same as the outer radius of said external thread, said continuations being spaced from said chisel edges by the dimension of said interruptions, said continuations having edges which extend at sharp angles relative to intersecting radii from said axis, and relatively away from said chisel edges, the interruptions of said turns subtending angles substantially less than 90° about said axis,
(c) the internal thread receiving a ski binding screw.

4,097,062

SKI BINDING

Georges Pierre Joseph Salomon, Annecy, France, assignor to Etablissements Francois et Fils, Annecy, France

Filed Aug. 2, 1976, Ser. No. 710,805
Claims priority, application France, Aug. 28, 1975, 75 26507
Int. Cl.[2] A63C *9/08*
U.S. Cl. 280—618 **15 Claims**



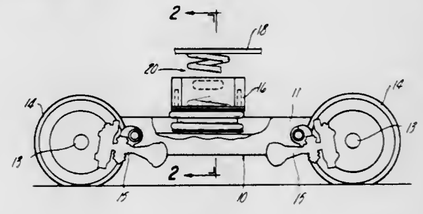
1. A binding designed to hold a ski boot to a support, such as a ski or a plate mounted upon a ski, said binding comprising:
a mounting secured to said support,
a jaw mounted to pivot about a first axis of said mounting, said axis being parallel to the surface of the ski in such a manner that said jaw is able to move between:
(a) a position in which the boot is held to the support,
(b) a position in which the boot is released;
a boot-removing lever mounted to pivot about a second axis on said mounting, said second axis being parallel with said first axis,
ramp and stop means provided respectively on one of said lever and jaw
and a resilient means urging said ramp and said stop means into contact with each other, said resilient means being attached to said jaw and to said lever in such a manner that it exerts traction between points of attachment of said resilient means to said jaw and said lever and causes automatic closing and opening of said jaw upon actuation of said lever.

4,097,063

PNEUMATIC COIL SPRING SUPPORT FOR VEHICLES

Albert G. Dean, Narberth, Pa., assignor to The Budd Company, Troy, Mich.

Filed Dec. 27, 1976, Ser. No. 754,873
Int. Cl.[2] B61F *3/08*
U.S. Cl. 280—712 **4 Claims**



1. Spring means for supporting a vehicle body on a truck, comprising in combination, a pneumatic-coil spring unit having end seats on the truck and vehicle body, said pneumatic-coil spring unit including pneumatic and coil spring components, an intermediate seat plate between said pneumatic and coil spring components of said spring unit, said intermediate seat plate having an elongated rigid lateral stay member including a pivotal connection on the remote end thereof, and pivotal mean secured to said truck for pivotally receiving said pivotal connection and said pivotal connection and pivotal means co-acting for permitting arcuate movement of said intermediate seat plate about said pivotal connection substantially in a vertical direction and restricting any other tilting movement of said pneumatic spring component.

4,097,064

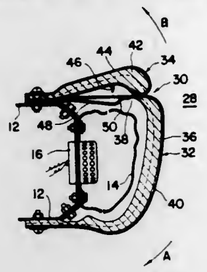
AIR-CUSHION DEVICE WITH A COVER AND A COVER CUTTER

Kazuo Ikawa, and Hideoki Matsuoka, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 28, 1976, Ser. No. 727,613
Claims priority, application Japan, Sep. 30, 1975, 50/117883
Int. Cl.[2] B60R *21/10*
U.S. Cl. 280—732 **7 Claims**

1. An air-cushion device having an expansible air-cushion into which a gas generated by a gas generator is fed for expanding said air-cushion to protect an occupant of a vehicle during an accident, said air-cushion device comprising:
cover means for substantially covering said air-cushion in a collapsed condition; and

cutting means for cutting said cover means by the assistance of the expansion of said air-cushion so that said cover



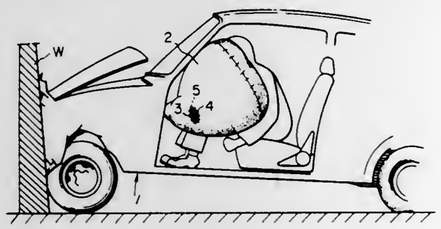
means is broken to allow said air-cushion to get out from said cover means to fully expand.

4,097,065

SAFETY AIR CUSHION BAG IN AUTOMOTIVE VEHICLES

Motohiro Okada; Katsumi Oka, both of Asaka; Kiyoshi Honda, Wako, and Kazuo Matsuura, Kamifukuoka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Oct. 6, 1976, Ser. No. 729,909
Claims priority, application Japan, Oct. 9, 1975, 50-122279
Int. Cl.² B60R *21/08*
U.S. Cl. 280—739 **1 Claim**



1. A safety air cushion bag for use in automotive vehicles and the like, which comprises in combination:
(a) a main body of said air cushion bag;
(b) a circular air outlet port formd in one part of said air cushion bag;
(c) a gas-permeable cloth joined to said bag around the periphery of said circular air outlet port, said gas-permeable cloth being stretchable in one direction and being relatively difficult to stretch in a direction at right angles to the stretch direction; and
(d) a dart formed on said gas-permeable cloth which extends through the center of said circular air outlet port, folding lines of said dart being substantially at right angles to the direction in which said cloth is relatively difficult to stretch,
so that said gas-permeable cloth is able to readily conform to the deformation in said air outlet port owing to the stretch of said gas-permeable cloth itself and to said dart.

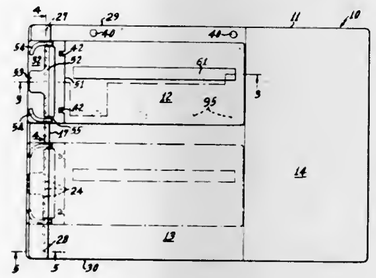
4,097,066

SHEET ENTRY AND AUTOMATIC COPYING APPARATUS

Herbert C. Davis, 6321 Oak Ct., Lakeland, Fla. 33803

Filed Nov. 25, 1975, Ser. No. 635,046
Int. Cl.² B41L *3/10*
U.S. Cl. 282—29 B **18 Claims**

1. A sheet entry and automatic copying apparatus for use in making entries on a means which includes a plurality of record sheets with pressure sensitive duplication means therebetween comprising a writing board of a predetermined area, a movable carriage plate being of an area smaller than said predetermined area and positioned above said board, guide means connected to said board for movably mounting said plate to said board, said guide means comprising indexing means for restraining said plate in one and another predetermined selected position with respect to said board, record sheet-positioning means disposed on said board for releasably connecting such record sheet means thereto with such sheet means at least partially overlying said plate and said board, a shield overlying said plate and carried thereby for movement therewith, said shield and plate being adapted to sandwich such record sheet means therebetween, said shield having an opening therethrough for transferring information from pertinent data areas of an entry sheet to such record sheet means, said plate comprising positioning means for positively positioning such entry sheet and



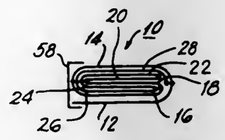
said shield thereon, said shield generally coextensive with and underlying such entry sheet with said shield opening registering with pertinent data areas of such entry sheet, said shield having a solid portion underlying and extending across areas adjacent said pertinent areas of such entry sheet to shield said record sheet means in the areas underlying said areas adjacent said pertinent areas, and a rigid anvil having a shape complementary to said shield opening and of a size smaller than said opening, said anvil being carried by said plate in underlying relation to said shield opening, said anvil being of a thickness generally the thickness of said shield whereby such record sheet means positioned overlying said anvil will be pushed by said anvil into said shield opening generally in the plane of the upper surface of said shield.

4,097,067

PRINTED COUPON FOLDER

Sheldon Schechter, 34 Bush Pkwy., East Brunswick, N.J. 08816

Continuation-in-part of Ser. No. 626,629, Oct. 29, 1975, Pat. No. 4,010,964. This application Jan. 3, 1977, Ser. No. 756,077
The portion of the term of this patent subsequent to Mar. 8, 1994, has been disclaimed.
Int. Cl.² B42D *15/04*
U.S. Cl. 283—56 **8 Claims**



1. A printed coupon direct mail folder comprising an odd numbered plurality of individual panels that are oblong in plan and equal in size and are attached edge to edge seriatim with their narrow sides in alignment to form a unitary element that is oblong in plan, the long axis of each individual panel being perpendicular to the long axis of said element, each of said individual panels bearing printed promotional material related to an associated saleable item, at least one of said individual panels bearing a printed redemption coupon, said printed coupon providing for the purchase of the associated saleable item

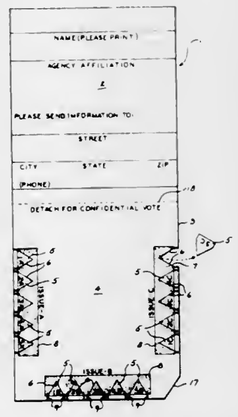
at a predetermined reduction in price, each of said individual panels being connected across said element to an adjacent individual panel by a rectilinear weakened zone, said weakened zones being perpendicular to the long axis of said element, said element being folded by a plurality of parallel over-and-over folds to a member that has the plan size of a single individual panel and a thickness of all of said individual panels combined, said parallel over-and-over folds including a first fold whereby the oblong element is folded to provide pairs of individual panels which are registered in planar parallelism, together with a single endmost panel not in registration with another panel, and with weakened zones being superimposed, and succeeding parallel over-and-over folding of said element at said superimposed weakened zones exclusive of said single endmost panel, terminating with a final parallel over-fold of the element exclusive of said single endmost panel onto said single endmost panel, and means to secure said folder in folded condition against premature opening.

4,097,068

FEED-BACK COMMUNICATION CARD

Robert C. Garnier, Sr., 9611 W. Lorraine Pl., Milwaukee, Wis. 53222

Filed Oct. 14, 1976, Ser. No. 732,371
Int. Cl.² B42D *15/00*
U.S. Cl. 283—5 **2 Claims**



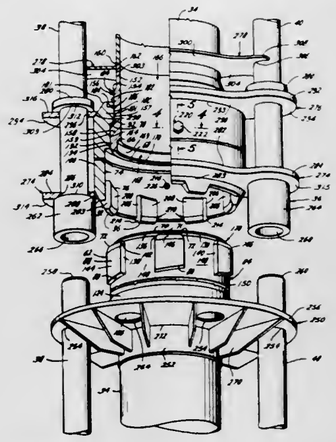
1. Feed-back communication cards to ascertain the views in a meeting of participants, which comprises on the face of the card and at least along one edge thereof a plurality of scored members with the elongated base of each member facing outwardly to effect ready removal of the scored members and leave an elongated space along the facing edge of each card upon removal so that when the cards are stacked the spaces can readily be observed to determine the predominant views of the meeting and quickly provide at least an approximate number of the views expressed on the issue, the base of each scored member being slightly horizontally spaced from the base of each adjacent scored member to provide a spaced area therebetween, and ink marks extending over the extreme edge and edge face of each card in the spaced area between the scored members and horizontally spaced from each other to thereby border each side of a column of assembled card edges within which the spaces appear to readily indicate that the scored members have been removed and for visual tabulation of the views expressed by those present.

4,097,069

MARINE RISER CONNECTOR

Charles D. Morrill, Bellaire, Tex., assignor to McEvoy Oilfield Equipment Company, Houston, Tex.

Filed Apr. 8, 1976, Ser. No. 674,775
Int. Cl.² F16L *39/00*
U.S. Cl. 285—84 **33 Claims**



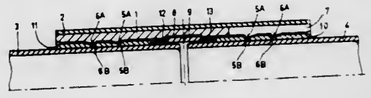
1. A nut combination for supporting choke and kill line pipe sections and for holding a first member of a marine riser connection telescopically engaged to a second member of a marine riser connection, comprising:
a body having a bore axially therethrough for receiving such members telescopically;
holding means on the interior of said body for holding such members telescopically engaged; and
support means for rotatably supporting such choke and kill line pipe sections on the exterior of said body.

4,097,070

HIGH-STRENGTH PIPE COUPLING

Petrus Marinus Acda, Enkhuizen, Netherlands, assignor to Polva Nederland B.V., Enkhuizen, Netherlands

Filed Oct. 27, 1976, Ser. No. 736,156
Claims priority, application Netherlands, Oct. 27, 1975, 7512515
Int. Cl.² F16L *21/02*
U.S. Cl. 285—86 **5 Claims**



1. A coupling for high-strength connection of ends of plastic pipe, comprising a spigot portion formed on a pipe end, the spigot portion having a first cylindrical length of outside diameter greater than the pipe outside diameter, and a second cylindrical length having a plain cylindrical surface of lesser diameter than said first cylindrical length and extending beyond the first cylindrical length to the adjacent terminal end of the pipe, said first length having an annular sawtooth groove formed on its outer surface, the slanting side of the sawtooth groove converging toward the said terminal end of the pipe; a coupling sleeve formed of a synthetic resin material and having a center portion having an inner wall, and an end portion, the end portion having an inwardly extending annular ridge with a counter profile to the groove and a plurality of longitudinal slots extending past the ridge but terminating short of the center portion, to permit radial flexing of portions of the end

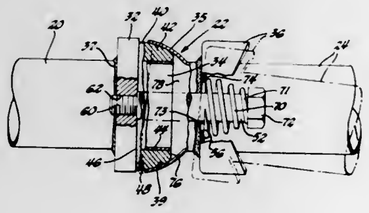
portion between the slots; a seal member arranged between the inner wall of the center portion and the outer cylindrical surface of the second cylindrical length; and a lock member tightly fitted around the coupling sleeve end portion, adapted to be so fitted around the coupling sleeve after insertion of the spigot.

4,097,071

FLEXIBLE EXHAUST COUPLING

Daniel G. Crawford, Dryden; Stanley E. James, Flint, and Donald H. Nixon, Swartz Creek, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 6, 1977, Ser. No. 803,526
Int. Cl.² F16L *21/08*
U.S. Cl. 285—94 **4 Claims**



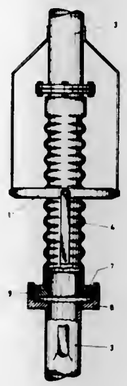
1. A flexible exhaust coupling assembly for maintaining a circumferential seal between pipe segments subject to angular movement therebetween during exhaust flow therethrough comprising: a first pipe, a seal flange supported on said first pipe, means for connecting said seal flange to said first pipe and forming a continuous circumferential gas tight seal between seal load flange and said first pipe, said first pipe having a tubular free end thereon extending axially beyond said seal flange, a second pipe having a flared free end formed continuously circumferentially therearound, said flared free end having a spherical seal surface thereon, a key flange on said second pipe at a point axially spaced from said flared free end to prevent outer radial binding of said free end, means for fixedly securing said key flange to said second pipe segment, a ring seal having an outer peripheral spherical surface thereon impregated with high temperature lubricant material in engagement with said spherical seal surface and freely movable with respect thereto, said ring seal including a radial reference surface sealingly engageable with said seal flange to be located thereby axially with respect to said first pipe, means for spring biasing said flared free end axially against said outer peripheral spherical surface, said last mentioned means including a pair of bolts each having a threaded end thereon engaged with said seal flange and each including a segment freely movable with respect to said key flange and including a heat portion axially spaced with respect to said key flange, compression spring means in engagement with said head and said key flange, said compression spring means being spaced with respect to said key flange to permit angular movement of said first pipe segment with respect to said second pipe segment, said compression spring means biasing said flared free end with respect to said spherical outer surface on said ring seal to maintain a continuous circumferential seal therearound throughout the range of angular movements between the first and second pipes.

4,097,072

CONDUIT WITH CARDAN JOINT

Willem Jan van Heijst, Monte-Carlo, Monaco, assignor to N. V. Industrieele Handelscombinatie Holland, Rotterdam, Netherlands

Continuation of Ser. No. 653,457, Jan. 29, 1976, abandoned. This application Mar. 25, 1977, Ser. No. 781,422
Claims priority, application Netherlands, Jan. 29, 1975, 7501057
Int. Cl.² F16L *27/00*
U.S. Cl. 285—114 **1 Claim**



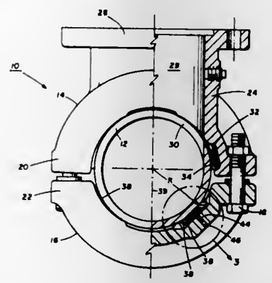
1. In a conduit comprising a pair of rigid conduit sections having ends disposed adjacent each other, a hose extending between and interconnecting said adjacent ends of said conduit sections, a gimbal ring surrounding said hose, means interconnecting said gimbal ring and said end of one said conduit section for relative rotation about a first axis, and means interconnecting said gimbal ring and said end of the other said conduit section for relative rotation about a second axis perpendicular to said first axis; the improvement comprising a first annular flange carried by one end of said hose, a second annular flange carried by said end of said one conduit section, said first annular flange having a sealing surface thereon on the same side thereof as said other conduit section, said second annular flange having a sealing surface thereon on the opposite side thereof from said other conduit section, said sealing surfaces being in sliding sealing contact with each other, whereby torsional stresses on said hose are relieved by the sliding of said surfaces on each other.

4,097,073

TAPPING SLEEVE FOR LARGE SIZE PIPE

Richard George Van Houtte, Bradford, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sep. 22, 1976, Ser. No. 725,207
Int. Cl.² F16L *41/00*
U.S. Cl. 285—197 **8 Claims**



1. A tapping sleeve adapted for mounting onto a pipe section

of contemplated diametral variation per nominal pipe size in which a branch opening is to be formed comprising the combination of complementary sleeve halves adapted to be secured together in substantially encircling relation on the pipe section and a branch connection extending outward from one of said halves to define the location on the encircled pipe at which a branch opening is to be formed, the improvement comprising:

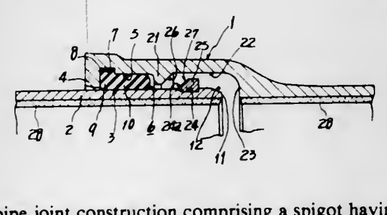
a. support means of substantially inelastic composition to provide added load support for the pipe wall against internally imposed line content forces; and
b. joint means positively attaching said support means for articulated movement on the pipe engaging wall of the other of said sleeve halves.

4,097,074

PIPE JOINT CONSTRUCTION

Shozo Nagao; Junkichi Iwamatsu; Hiroshi Kitsukawa; Kozo Nishizaki; Yuichi Watanabe, and Yasunori Okamoto, all of Amagasaki, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed May 23, 1977, Ser. No. 799,329
Claims priority, application Japan, Dec. 8, 1976, 51-148067; Jan. 13, 1977, 52-3330
Int. Cl.² F16L *21/08*
U.S. Cl. 285—231 **8 Claims**



1. In a pipe joint construction comprising a spigot having a taper surface on the outer periphery at the front end, a socket having a first projection on the inner periphery at the open end adapted to be loosely fitted over said spigot, an annular groove disposed adjacent the inner side of said first projection and a packing seat formed adjacent the inner side of said annular groove, and a packing having a back-up portion with a fitting portion projecting from its outer periphery for fittng in said annular groove and a seal portion adapted to be interposed in squeezed condition between said packing seat and the outer peripheral surface of the spigot, the inner peripheral surface of said packing tapering from the end edge of said back-up portion toward the seal portion, the improvement comprising:

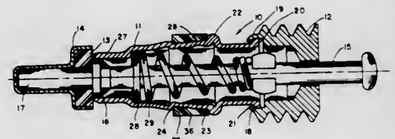
(a) said packing seat being formed as an internal cylindrical surface extending from said annular groove inwardly of the socket;
(b) a secnd projection formed on the socket at the inner end of said packing seat and projecting toward the spigot;
(c) a step surface provided on the socket in inwardly spaced relation to said second projection, said step surface being opposed to the front end of the spigot;
(d) an annular seat provided in the outer peripheral surface of the spigot adjacent the front end thereof, a radially contractible lock ring fitted in said annular seat, said lock ring being disposed between said second projection and said step surface and being engageable with said second projection upon relative axial separating movement between the socket and spigot, and fastening means for preventing disengagement of said lock ring from said annular seat;
(e) the socket having an inner peripheral surface extending axially from said second projection towards said step surface, said inner peripheral surface having a diameter such as to provide an annular clearance space with the outer periphral surface of the spigot for passage of said lock ring and such as to provide a radial clearance with the lock ring for relative bending movement between the socket and the spigot;
(f) the axial length of said inner peripheral surface being equal to the sum of the distance between the front end of the spigot and the lateral surface of the lock ring opposed to said second projection and a distance provided for all allowable relative axial movement between the socket and the spigot; and
(g) said inner peripheral surface of the packing tapering inwardly of the socket from a maximum diameter of at least equal to the inner diameter of said first projection to a minimum diameter on said packing seal portion which is compressively engaged by the outer periphral surface of the spigot.

4,097,075

TIRE VALVE CORE

Russell K. Clayton, Rougemont, N.C., assignor to Eaton Corporation, Cleveland, Ohio

Filed May 26, 1977, Ser. No. 800,767
Int. Cl.² F16L *25/00*
U.S. Cl. 285—332.3 **5 Claims**



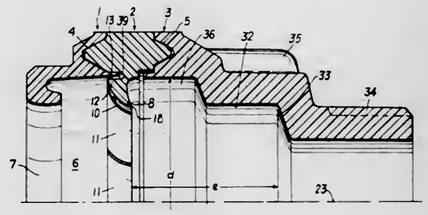
1. In a tire valve core including a tubular barrel and an externally threaded head, the tubular barrel terminating at one extremity in an outwardly directed enlarged flange receivable within said head and said head being provided with a relatively thin annular wall portion terminating in an inwardly directed extremity to insure retention therein of the annular flange on said tubular barrel, a gasket receiving area formed on said tubular barrel substantially centrally of the length thereof, said gasket receiving area being bounded by substantially perpendicular wall portions formed on said barrel to define first and second shoulders spaced apart along the length of said barrel, and a gasket surrounding said barrel and received between said first and second shoulders; the improvement wherein said gasket receiving area of said barrel is defined by a first annular sealing surface, a second annular sealing surface of smaller diameter than the first sealing surface, a third annular sealing surface of smaller diameter than the second sealing surface, a first beveled transition area connecting said first and second sealing surfaces, and a second beveled transition area connecting said second and third sealing surfaces.

4,097,076

FITTING PIECE FOR RIGID OR FLEXIBLE TUBES

Helmut Wackenreuther, and Alexander Svec, both of Krems, Austria, assignors to Oesterreichische Salen-Kunststoffwerk Gesellschaft m.b.H., Vienna, Austria

Filed Feb. 19, 1976, Ser. No. 659,359
Claims priority, application Austria, Feb. 25, 1975, 1444/75
Int. Cl.² F16L *19/06*
U.S. Cl. 285—340 **9 Claims**



1. A fitting piece for connecting rigid or flexible tubes which are made of plastic, said fitting piece including a body having

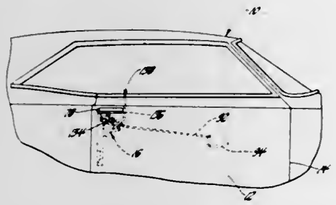
an opening to receive therein an end of the tube and being provided with at least one radially inwardly protruding annular rib having a base portion and a sharp tip, said rib being divided into segments by radial slots and tapering in cross-section from its base toward its tip, said tip being adapted to contact the surface of the tube when the tube is inserted into said opening, the center line of the cross-section of the rib passing through said tip and the center point of the rib base forming an acute angle with the axis longitudinal of said opening, the vertex of said angle pointing to the interior of said opening, said rib and the portion of the body of the fitting surrounding said rib being made of one piece and the rib base adjoining said body being provided on the side facing toward said opening with an axially extending annular slot which extends approximately through half the cross-sectional width of the rib base.

4,097,077

CLOSURE LATCH

James S. Gahrs, Cupertino, Calif., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 5, 1976, Ser. No. 739,101
Int. Cl.[2] E05C *3/26*
U.S. Cl. 292—216 **3 Claims**



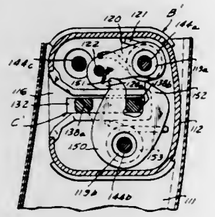
1. A closure latch comprising in combination, a bolt movable between latched and unlatched positions, detent means for maintaining the bolt in the latched position, outside operating means, locking means incuding a locking lever for selectively coupling and uncoupling the outside operating means and the detent means, an inside operator, means coupling the inside operator to the outside operating means, and means interconnecting the inside operator and the locking means for operating the locking means to selectively couple the inside operator to the detent means upon operation of the inside operator.

4,097,078

DOOR LOCK FOR AUTOMOTIVE VEHICLE

Albert Tack, and Friedrich Gabel, both of Wuppertal, Germany, assignors to Firma Tack & Gabel, Wuppertal, Germany

Continuation-in-part of Ser. No. 514,894, Oct. 15, 1974, Pat. No. 3,997,202, which is a continuation of Ser. No. 330,488, Feb. 8, 1973, abandoned. This application Mar. 9, 1976, Ser. No. 665,261
Claims priority, application Germany, Feb. 8, 1972, 72046130[U]
Int. Cl.[2] E05C *3/26*
U.S. Cl. 292—216 **7 Claims**



1. A door-lock assembly for an automotive vehicle provided with a post on the vehicular frame and a door having a panel with a post-confronting surface, comprising:

a key member fixedly mounted on said post;

a keeper on said post-confronting surface of said panel at the level of said key member, said keeper having an outer wall spaced from said surface and formed with a keyway receiving said key member upon closure of the door;

a plurality of fastening elements securing said keeper to the door, said fastening elements penetrating said panel and traversing the space between said wall and said surface;

detent means in said space engageable with said key member, said detent means including a swingable catch fulcrumed on one of said fastening elements; and

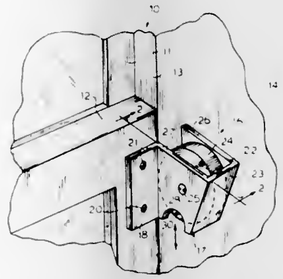
control means secured to said door for alternately locking and releasing said catch.

4,097,079

WINDOW LOCKING APPARATUS

Jean Louis Flynn, P.O. Box 1868, Deland, Fla. 32720

Filed Feb. 28, 1977, Ser. No. 772,726
Int. Cl.[2] E05C *19/04*
U.S. Cl. 292—239 **3 Claims**



1. A window locking mechanism comprising in combination:

bracket means having a flanged portion attachable to a window and having a supporting portion protruding over a window frame, when said flanged portion is attached to a window, said supporting portion having one angled side, and a supporting pin attached thereto; at least one disc shaped locking member rotably supported in said supporting portion on said supporting pin of said bracket means and being linearly shiftable therein, whereby said locking disc member will wedge between said angled member of said supporting portion of said bracket means and a window frame when said flanged portion is attached to a window having an opening force applied thereagainst; said locking member having a large center opening, larger than said supporting pin to thereby allow said disc to rotate on said supporting pin and to be lifted linearly thereon; and said bracket means supporting portion having an arcuate portion formed therein with said locking member protruding thereinto so that an operator's finger can lift the locking member for disengaging the window locking mechanism.

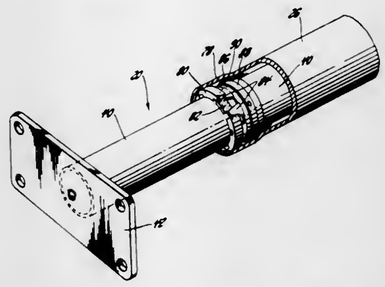
4,097,080

TELESCOPING ENERGY ABSORBER WITH ANTI-ROTATIONAL INTERLOCK FOR VEHICLE BUMPERS

Ronald G. Petry, Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 28, 1977, Ser. No. 781,551
Int. Cl.[2] B60R *19/06*
U.S. Cl. 293—85 **3 Claims**

1. An energy absorbing system for a vehicle comprising a vehicle frame having left and right longitudinally extending side rails, a pair of telescoping energy absorber units for said side rails, each of said energy absorber units comprising a first tubular part secured to an associated side rail and a second tubular part telescopically mounted with respect to said first tubular part and projecting longitudinally outwardly beyond one end of said associated side rail, a substantially rigid and laterally extending bumper beam spanning one end of said side rails and operatively connected to said second tubular part of each of said energy absorber units to thereby interconnect said side rails, said first tubular part having a plurality of axially projecting teeth, said second tubular part has a plurality of axially projecting teeth secured thereto adapted to mesh with



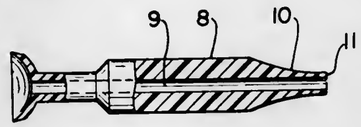
the axially projecting teeth of said first part, yieldable means urging said tubular parts to an extended position with respect to each other whereby said axially projecting teeth of said first part engage the axially projecting teeth of said second part to lock said tubular parts against relative rotation to thereby minimize independent oscillatory movement of said side rails and increase the torsional rigidity of said frame until said teeth of said first and second parts are disengaged by the telescopic collapsing movement of said tubular parts with respect to each other in response to impact of said bumper beam causing said bumper beam to move toward said side rails.

4,097,081

DEVICE FOR INSERTING AND REMOVING CONTACT LENSES

Robert C. England, 6710 C.R. 191, Bellevue, Ohio 44811

Filed Jul. 14, 1977, Ser. No. 815,679
Int. Cl.[2] A61F *9/00*
U.S. Cl. 294—1 CA **7 Claims**



1. A device for inserting and removing contact lenses comprising:

an elongated cylindrical body of resilient material having a forward end and a distal end;

a resilient suction cup coaxial with, and carried by, the body at said forward end and having a concave face facing forwardly of the body;

said body having a through axial duct of small diameter relative to the diameter of the cup, and connected at its forward end with the central portion of said cup and opening at its rear end through the rearmost portion of the distal end of the body;

characterized in that:

said body has a coaxial tapered portion tapering from a location spaced from the distal end to the distal end;

said duct is coaxial with said tapered portion;

said rearmost portion of the distal end of the body is in the form of a relatively small annular contact area surrounding the rear open end of the duct and which can be engaged by one finger of the hand of a user to seal the distal end of the duct while the body is held between the thumb and another finger of said hand;

the taper of said tapered portion, relative to the diameter of the duct, being such that the tapered portion can be compressed to a degree to reduce materially the size and volumetric capacity of the duct, thereby to render more effective the suction created by flexure and self-restoration of the cup resulting from the cup first being pressed against the lens in a direction toward the eye and moved in the opposite direction for withdrawing the lens from the eye by squeezing the tapered portion lightly radially between the thumb and said other finger of the user's hand and holding the tapered portion in squeezed condition while the body is held between said thumb and said other finger and the duct sealed at least near to its distal end.

4,097,082

SANITARY PICKUP DEVICE FOR ANIMAL FECES

Michael J. Orofino, 2 Brookside Dr., Baldwin, N.Y. 11510

Filed Mar. 29, 1977, Ser. No. 782,375
Int. Cl.[2] A01K *29/00*
U.S. Cl. 294—19 R **10 Claims**

1. A portable device for picking up animal droppings and collecting those droppings into a wrapper comprising:

a frame;

a pair of blades pivotally mounted on said frame and each having side edges, an upper edge and a bottom edge;

a blade operating hinge having a pair of arms each having an upper edge and a lower edge with said lower edges each being hingeably connected to a blade top edge;

an operating rod hingeably connected to said hinge upper edges and being movably connected to said frame so that movement of said rod with respect to said frame causes said blade upper edges to move via movement of said hinge, said blades being mounted on said frame to be caused to tilt toward and away from each other by the movement of said upper edges; and

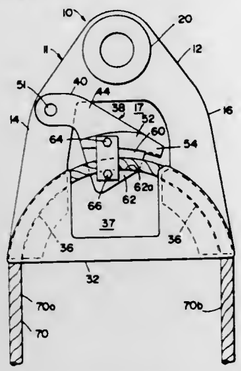
a flexible band positioned to encircle said blades, said band being located adjacent said blade bottom edges to be moved off said blades when said blades are tilted to move said bottom edges toward each other to close the wrapper positioned between said blades.

4,097,083

ADJUSTABLE LIFTING THIMBLE

William H. Schwartz, Novato, Calif., assignor to Roberton & Schwartz, Inc., San Francisco, Calif.

Filed Jun. 15, 1977, Ser. No. 806,741
Int. Cl.[2] B66C 1/12
U.S. Cl. 294—78 A **11 Claims**



1. A thimble for lifting a load attached to both ends of a rope, comprising:

a. a frame having means for supporting the rope between the ends thereof, said frame being relatively shiftable along the rope; and

b. means, pivotally mounted to said frame for automatically pivoting when a load is lifted to forceably contact the rope to prevent the relative shifting thereof, said pivoting means including means having a first groove shaped to conform to the circumference of the rope for pressing on the upper rope surface and means defining a passage for receiving the rope therethrough, said receiving means having a surface on which the rope forceably bears downwardly when a load is lifted to pivot said pivoting means and lower said pressing means onto the rope within said first groove.

4,097,084

LIFTING GRAB FOR CYLINDRICAL OBJECTS

John S. Russell, Pittsfield, Me., assignor to Russkraft, Inc., Pittsfield, Me.

Filed Mar. 18, 1977, Ser. No. 779,141
Int. Cl.[2] B66C 1/62
U.S. Cl. 294—104 **8 Claims**

1. A lifting grab for cylindrical objects comprising in combination,

a hook member for surrounding closely about a circumferential arc an angle of more than one-quarter of the circumference of said cylindrical object of a predetermined diameter,

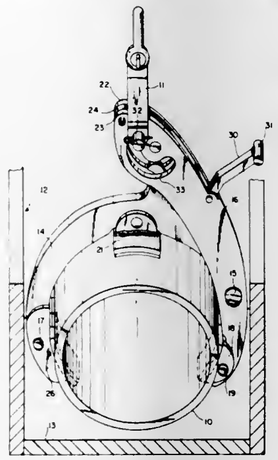
a clamp member pivoted off center at a pivot position near one end of the hook member with a shorter portion continuing from said hook member closely about the circumference of said cylindrical objects therewith together to encompass closely about said cylindrical objects a grasping circumferential arc of more than half its circumferential span and with a longer portion extending to an extremity lifting portion substantially located on a vertical diameter through an encompassed said cylindrical object which substantially bisects said grasping arc,

a set of at least two cylinder grasping pads pivoted at pad pivot positions near the respective ends of said hook and clamp members when placed in said grasping arc and having a facing curvature substantially conforming to the outer circumference of said cylindrical objects whereby the pads pivot on the ends of said clamp and hook members when the clamp and hook members are lowered vertically over the horizontal diameter of said cylindrical object thereby to maintain said clamp and hook members at a closer distance away from the circumference of the cylindrical object than possible with stationary pads,

and whereby when said clamp member is lifted vertically by said lifting portion the pads pivot about their said pivot positions and the clamp member pivots at its pivot position thereby causing said pads to grasp said cylindrical object below a horizontal diameter thereof,

a cam slot in said clamp member near said extremity lifting portion,

a shackle coupled to said cam slot to move therein over a range of at least two positions wherein said clamp member



comprises a pair of spaced plate members each with a registering said cam slot, said shackle is coupled by a shackle pin extending through both plates,

a tongue member extending from said hook member to engage and hold shackle pin when said lifting grab is in an open position just clearing the diameter of said cylindrical object with said pads, wherein the hook member is located at substantially a line on the center of gravity of said clamp member thereby to permit vertical movement down over said cylindrical object without force or movement thereof, wherein said tongue member comprises a C-shaped hook into which the shackle pin may be inserted and removed by movement within said cam slot.

4,097,085

TRACTOR

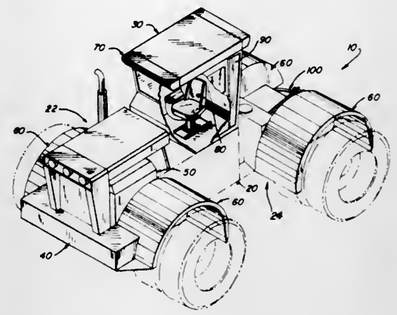
Arnold Eugene Nelson, Havre, Mont., assignor to Harmon's Northern Mfg., Inc., Havre, Mont.

Filed Aug. 10, 1976, Ser. No. 713,102
Int. Cl.[2] B62D 27/00
U.S. Cl. 296—28 C **21 Claims**

1. An improvement to a tractor having an air conditioned cab over the operator, said improvement comprising:

means for cooling the air in said cab, and

a dome-shaped roof formed under the top of said cab, said roof having a plurality of downwardly directed holes formed in uniform distribution therein, said holes being receptive of said cooled air from said cooling means for



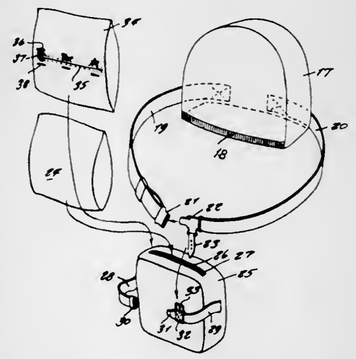
uniformly directing said air through the roof of said cab and downwardly over said operator.

4,097,086

BUS CHAIR PILLOW SLEEPING DEVICE

M. Louise Hudson, 3544 Brenton Ave. - Apt. B, Lynwood, Calif. 90262

Filed Jun. 27, 1977, Ser. No. 810,421
Int. Cl.[2] A47C 7/62
U.S. Cl. 297—217 **3 Claims**



1. A bus chair pillow sleeping device for use by travelers in vehicles, comprising, in combination, a support assembly and a pillow assembly, said support assembly being supportable upon a backrest of a passenger chair, said support assembly having said pillow assembly attached thereto; said support assembly including a hood for fitting over an upper end of said chair backrest, a pair of straps secured at their one ends to a rear side of said hood, opposite ends of said straps being engagable together, and incorporating means for attachment to said pillow assembly, said means comprising a latch tongue on an end of one said strap having a short strap extending at right angle therefrom that engages said pillow assembly.

4,097,087

CHAIR WITH ADJUSTABLE BACK SUPPORT CUSHION

Marco F. Garavaglia, 867 Briarcliff Dr., Grosse Pointe Woods, Mich. 48236

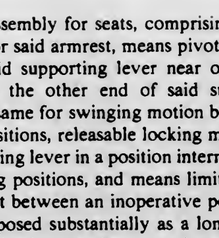
Filed May 13, 1977, Ser. No. 796,838
Int. Cl.[2] A47C 3/00
U.S. Cl. 297—284 **9 Claims**

1. In a back assembly for a chair, the combination comprising:

(a) a back portion;

(b) a transversal lumbar support cushion;

(c) means for adjustably mounting said transversal lumbar support cushion on said back portion for selective adjustment up and down longitudinally of the back portion and toward and away from said back portion; and,



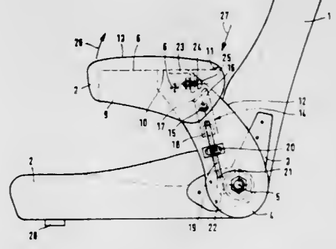
(d) a centrally disposed, longitudinal spine support cushion fixedly mounted on said back portion in a position above the transversal lumbar support cushion and extending to the top end of the back portion.

4,097,088

ARM REST ASSEMBLY FOR A SEAT, PARTICULARLY A DRIVER'S SEAT

Hermann Meiller, Amberg, Germany, assignor to Willibald Grammer, Amberg, Germany

Filed Nov. 3, 1977, Ser. No. 848,121
Claims priority, application Germany, Aug. 13, 1977, 7725186[U]
Int. Cl.[2] A47C 7/54
U.S. Cl. 297—217 **10 Claims**



1. An armrest assembly for seats, comprising an armrest, a supporting lever for said armrest, means pivotably connecting said armrest to said supporting lever near one end thereof, hinge means near the other end of said supporting lever adapted to mount same for swinging motion between first and second limiting positions, releasable locking means adapted to secure said supporting lever in a position intermediate said first and second limiting positions, and means limiting pivotal motion of said armrest between an inoperative position at which said armrest is disposed substantially as a longitudinal extension of said supporting lever and an operative position at which said armrest extends transversely to said supporting lever when the latter is in its said intermediate position.

4,097,089

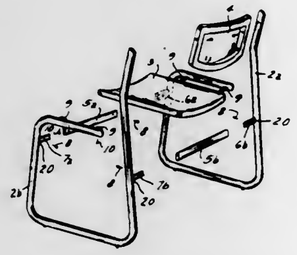
CHAIR ASSEMBLY FOR AN INCREMENTAL PLATING HAVING A TELESCOPING SLEEVE-LIKE CONSTRUCTION

Warren D. Petersen, St. Charles, Ill., assignor to Burd, Inc., Howell Division, St. Charles, Ill.

Filed Nov. 8, 1976, Ser. No. 740,025
Int. Cl.[2] A47C 1/12
U.S. Cl. 297—447 **11 Claims**

1. A chair frame which comprises a pair of tubular end frames each formed from a single piece of bent metal tubing of generally C shape with a bottom horizontal front to rear por-

tion, an upstanding rearwardly sloping front leg portion at the front end of the bottom portion, a rearwardly extending horizontal seat support portion at the upper end of said front leg portion terminating in a free end, a forwardly sloping upstanding rear leg portion at the rear end of the horizontal bottom portion projecting above the free end of said horizontal seat supporting portion and inclined rearwardly at its top end to form a back support portion, tubular studs welded to said front and rear leg portions of each end frame and projecting laterally therefrom, the studs on one end frame being in mirror image relation with the studs on the other end frame, said tubular studs being crimped into a flattened configuration with front and rear side walls abutted together between the arcuate top and bottom portions of the tubes, front and rear tubular



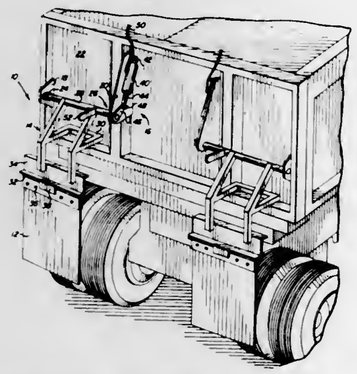
stretchers between said end frames having hollow ends telescoped over the respective crimped studs on the front and rear leg portions of said frame in snug engagement with the arcuate top and bottom portions of the studs and abutted against the inner faces of said leg portions, screws extending through the back sides of said tubular stretchers threaded into both of the abutted side walls of said crimped studs, said rearwardly extending horizontal portions on the upper ends of the front legs of each end frame having flange members projecting in the same directions as said studs on the frame members, a seat secured on said flanges spanning the space between the end frames, and a back member mounted on the rearwardly inclined portions of the upstanding rear legs of said end frames in spaced relation above said seat member.

4,097,090

FLAP RETRACTION SYSTEM

Cecil Payne, 1515 E. Bilby Rd., Tucson, Ariz. 85706, and Paul E. Payne, 1415 Maxmillian Pl., Tucson, Ariz. 85704, assignors to Cecil Payne; Paul Payne and Paula Fletcher, all of Tucson, Ariz., part interest to each

Filed Jun. 10, 1977, Ser. No. 805,282
Int. Cl.[2] B62D *25/16*
U.S. Cl. 298—15 G **10 Claims**



1. A retractable flap system for a dump truck including a dump box and a tail gate pivotally coupled to the upper portion of the rear end of the dump box, the tail gate having an outer side and a bottom, said flap retractor comprising in combination:

(a) a flap having first and second ends;

(b) attachment means for attaching said flap to the outer side of the tail gate, said attachment means having a first end pivotably coupled to the outer side of the tail gate and a second end coupled to the first end of said flap; and

(c) actuator means coupled to the outer side of the tail gate and to said attachment means for rotating said attachment means and thereby raising and lowering said flap between a first position wherein the first end of said flap lies entirely below the tail gate and a second position wherein the first end of said flap is elevated above the bottom of the tail gate;

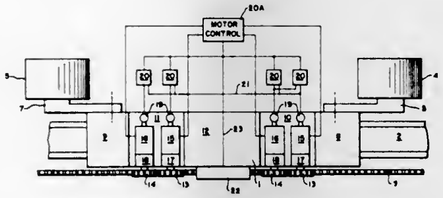
whereby said flap can be elevated with respect to the tail gate prior to dumping operations to prevent damage to said flap.

4,097,091

METHOD AND APPARATUS FOR SECURING MINING MACHINES EMPLOYED ON INCLINED OR STEEP SEAMS

Volker Knorr, Sprockhovel, Germany, assignor to Gebr. Eickhoff Maschinenfabrik und Eisengiesserei m.b.H., Bochum, Germany

Filed May 23, 1977, Ser. No. 799,400
Claims priority, application Germany, May 19, 1976, 2622218
Int. Cl.[2] E21C *29/22*
U.S. Cl. 299—1 **9 Claims**



1. A method for automatically braking a mining machine movable along a conveyor by means of a plurality of gearwheels which engage a rack extending along the conveyor and are driven by separate motors on the mining machine; which comprises measuring the rotational speeds of the motors, comparing said rotational speeds, and actuating a brake device to stop movement of the mining machine when the ratio of the speeds of the motors varies.

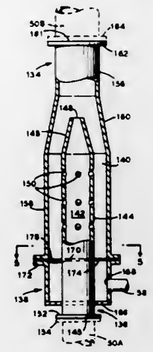
4,097,092

DISPERSER

Walter Christian Lapple, Alliance, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.

Continuation of Ser. No. 636,859, Dec. 2, 1975, abandoned. This application Mar. 9, 1977, Ser. No. 776,040
Int. Cl.[2] B65G *53/28*
U.S. Cl. 302—25 **2 Claims**

1. In combination with a system for conveying gas entrained particles, the system including a disperser comprising tubular-walled inlet and outlet members, the inlet and outlet members having at least portions thereof concentrically disposed and spaced from one another to form an annular channel therebetween, plate means closing the bottom of the annular channel, the inlet member defining a central channel for admitting gas entrained particles to the disperser, the outlet member having at least one wall opening, and the inlet member having a plurality of wall openings located above the wall opening of the outlet member, and means communicating with the outlet member wall opening for supplying a pressurized gas to the



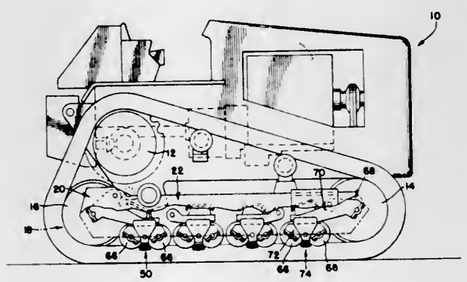
annular channel to disperse the gas entrained particles exiting from said channel.

4,097,093

TRACK GUIDING MEANS FOR A TRACK-TYPE VEHICLE

Robert L. Shelby, Chillicothe; James T. Duke, and Duane L. Parker, both of Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 26, 1976, Ser. No. 735,480
Int. Cl.[2] B62D *55/16*
U.S. Cl. 305—22 **10 Claims**



1. Apparatus in combination with a track-type vehicle having a track frame and a track assembly mounted on the track frame, said apparatus comprising:

first arm means mounted on the track frame for positioning said apparatus adjacent to the track assembly;

second arm means pivotally mounted on the first arm means and otherwise independent of the track frame for pivoting relative to the first arm means;

roller means rotatably mounted on the second arm means for engaging the track assembly in rolling contact; and

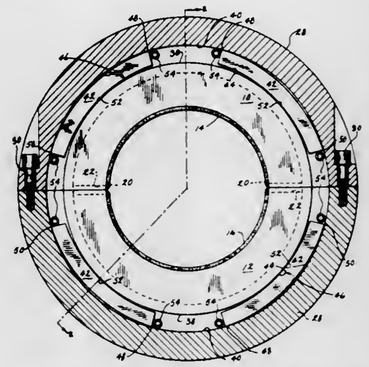
guide means mounted on said first arm means and positioned in straddling relationship relative to a link assembly of the track assembly to limit lateral movement of the track assembly relative to the first arm means, said first arm means comprising first and second link members pivotally mounted on the track frame, and wherein the guide means comprise a first plate fixed to the first link member, a second plate fixed to the second link member, and first and second elongated members secured to the first and second plates and disposed along either side of the track assembly.

4,097,094

JOURNAL BEARING ASSEMBLY WITH FLEXIBLE SUPPORT AND VISCOUS DAMPING

Willis W. Gardner, Waukesha, Wis., assignor to Waukesha Bearings Corporation, Waukesha, Wis.

Filed Aug. 24, 1976, Ser. No. 717,297
Int. Cl.[2] F16C *17/02*
U.S. Cl. 308—9 **9 Claims**



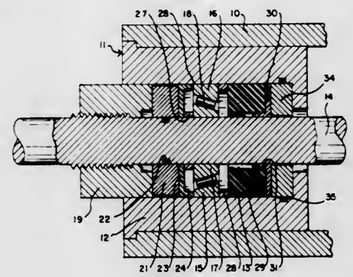
1. An anti-vibration journal bearing with flexible support and viscous damping characteristics and in which the flexible support function is provided separately from the viscous damping function, said bearing comprising annular bearing means for rotatably supporting a shaft, an annular bearing housing surrounding said annular bearing means, means for holding said annular bearing means and said annular bearing housing against relative rotation, a variable clearance space between certain adjacent annular surfaces of said bearing means and housing, and means for introducing oil into said clearance space to provide viscous damping for said bearing means, and spring elements physically separate from the annular bearing means and positioned between certain adjacent other annular surfaces of said annular bearing means and said annular housing for resiliently supporting said annular bearing means within said housing.

4,097,095

PERMANENTLY LUBRICATED BEARING CARTRIDGE

Aaron Zimmer, 6476 Monitor St., Pittsburgh, Pa. 15217

Filed May 12, 1977, Ser. No. 796,143
Int. Cl.[2] F16C *13/02*
U.S. Cl. 308—20 **3 Claims**



1. A lubricated anti-friction bearing cartridge adapted to fit within a conveyor roll shell comprising a housing, a bearing including coaxial inner and outer bearing races spaced apart to provide a bearing cavity between their bearing surfaces, anti-friction elements disposed between those races, sealing means at each end of those races spaced from them so as to provide a lubricant reservoir at each end of the races and to prevent leakage of fluid out of those reservoirs, and means exerting

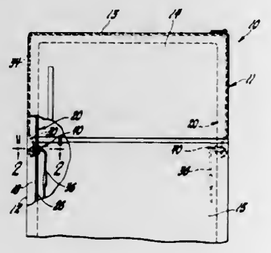
axial pressure on one race, whereby when the lubricant reservoirs are filled to less than their maximum capacity and the bearing is rotated under load the lubricant fluid is thrown outward by centrifugal force and circulates between reservoirs across the inner surface of at least a portion of the outer race in one direction and in the opposite direction through other portions of the bearing.

4,097,096

REFRIGERATOR HEATER TUBE GROMMET

Donald P. Kochendorfer, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 16, 1977, Ser. No. 807,159
Int. Cl.² F25B *41/00*
U.S. Cl. 312—214 **2 Claims**



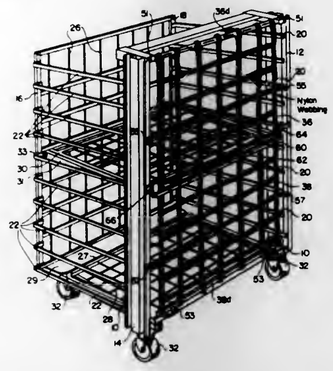
1. In a refrigerator cabinet including an outer shell and an inner liner having an opening, insulation foamed-in-place within the space between the shell and liner, and a rigid tube located in the space between the shell and liner for shielding an insulated electrical conductor, an improved grommet for interconnecting said tube, conductor and liner and for accommodating some misalignment of the tube with respect to said grommet, said grommet being formed as an integral member comprising, an outer sleeve section having spaced apart exit and entrance open ends, an inner socket section having a bore for receiving said rigid tube therein and having spaced apart exit and entrance ends, and a frusto-conical shaped rigid tube lead-in section interconnecting the entrance ends of said outer sleeve and inner socket sections, said outer sleeve section having a pair of axially spaced circumferential flanges formed at the exit end of said outer sleeve section and sized to provide sufficient engagement with the outer and inner surfaces of the liner around said liner opening to prevent leakage of the foamed insulation thereby, said socket section positioned by the interconnection of its entrance end with said lead-in section in concentrically spaced relation within said outer sleeve section, whereby said socket section is located axially intermediate the spaced apart ends of said outer sleeve section, the inner surface of said socket section having a plurality of axially spaced inwardly projecting concentric sealing flanges sized to form a press fit sufficiently tight seal with the rigid tube to prevent leakage of the foamed-in-place insulation thereby, the exit end of said socket section having an inwardly projecting rigid stop flange defining a circumscribing shoulder seating and stopping one end of the rigid tube, thereby obviating any contact by the insulated conductor with the end of the tube, said stop flange having flexible centering means extending inwardly therefrom to define a reduced opening for centering the insulated conductor as it passes therethrough, the interconnection of said socket section with said lead-in section being sufficiently yieldable to permit said inner socket section to move out of concentrically spaced relation with said outer sleeve section while seating said one end of the rigid tube so as to compensate for misalignment of the rigid tube with respect to said grommet.

4,097,097

BULK MAIL CONTAINER

Robert M. Hosko, Stroudsburg, Pa., assignor to Banner Metals Division of Intercole automation, Inc., Compton, Calif.

Filed Sep. 2, 1977, Ser. No. 830,053
Int. Cl.² B62B *11/00*; A47B *55/02*; B62B *3/02*
U.S. Cl. 312—250 **2 Claims**



1. A container for bulk mail, and the like, comprising: a lower horizontal frame having a rear member, an open front, and side members which diverge outwardly from the rear member; a plurality of spaced and parallel upright posts mounted on the horizontal frame at the front and rear thereof; an intermediate shelf of generally rectangular configuration having a rear end and a forward end; means pivotally mounting the rear end of the intermediate shelf to the posts at the rear of said horizontal frame to permit the intermediate shelf to be upwardly turnable from a generally horizontal load-supporting position to an upright position; a lower shelf of generally rectangular configuration having a rear end and a forward end; means pivotally mounting the rear end of the lower shelf to said horizontal frame to permit the lower shelf to be upwardly turnable from a generally horizontal load-supporting position to an upright position; support means on each side of the container for releasably supporting said first restraining bar a first restraining bar removably attached to the front of the container and extending thereacross at an intermediate position thereon; flexible webbing having its midsection attached to said first restraining bar and extending upwardly and downwardly therefrom to enclose the front of said container; two further restraining bars respectively attached to said webbing at the upper and lower ends thereof; and support means mounted at the upper and lower ends of the container for releasably supporting said further restraining bars all said restraining bars and flexible webbing forming separately openable upper and lower gates.

4,097,098

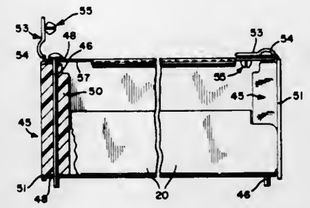
BUMPER LOCK FOR DISHWASHING MACHINE RACK SUPPORT

Virgil L. Fields, Troy, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed Jul. 22, 1977, Ser. No. 818,051
Int. Cl.² A47B *57/04, 88/04*
U.S. Cl. 312—311 **3 Claims**

1. In an improved track system for a dishwashing machine having a tank defining a cleansing chamber, a rack within said chamber having a bottom portion and parallel spaced side portions, elongated tracks extending adjacent said side portions of said rack, each said track including longitudinally extending guideways one on each side of the track, roller means mounted on said tank and received within one of said guideways of each said track and roller means mounted on each said side portion of said rack and received within the other said guideway of the corresponding said track, and a bumper member mounted on each end of each said track, the improvement comprising

a retaining tab formed as an integral extension to said bumper member,



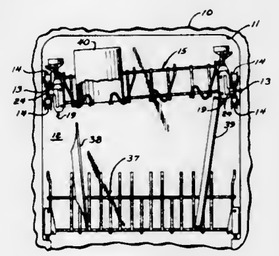
and a lock part on said tab engaged through a hole in said track.

4,097,099

DISHWASHER RACK SUPPORTING AND ADJUSTING APPARATUS

Raymond William Spiegel, Stevensville, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 29, 1976, Ser. No. 756,531
Int. Cl.² A47B *88/00, 95/00*
U.S. Cl. 312—311 **10 Claims**



1. In an apparatus for supporting articles in a dishwasher including an open dishrack having a pair of opposite sides comprising spaced members, rack supporting and adjusting apparatus comprising:

a pair of housings each mounted on one of said opposite sides of said dishrack;

a pair of arms extending in tandem from within each said housing and carrying spaced wheels engaging a supporting guide track that forms a part of said dishwasher;

fulcrum means within said housing for supporting each of said arms for arcuate movement thereof and thus of the said wheels, each arm having an end within the housing comprising a sector gear each lying on an arc substantially concentric with said fulcrum, said sector gears being spaced apart substantially the width of a worm gear;

a worm gear within said housing between and engaging both said sector gears for simultaneous movement thereof on rotation of said worm gear; and

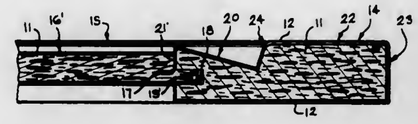
means mounting said worm gear within said housing for externally controlled rotational movement thereof thereby adjusting the arcuate positions of said pair of arms substantially simultaneously.

4,097,100

PANEL ASSEMBLY

Myrl Sauder, Archbold, Ohio, assignor to Sauder Woodworking Co., Archbold, Ohio

Filed Jan. 19, 1977, Ser. No. 760,648
Int. Cl.² A47B *43/00*
U.S. Cl. 312—257 A **8 Claims**



1. A panel assembly comprising,

a center panel of a core material having a thin layer attached to at least one surface thereof,

four frame members next to the sides of said center panel, each of said four frame members including an inner reverse taper portion and an integral outer portion, said inner reverse taper portion having a thicker section disposed adjacent said center panel and a thinner portion adjacent said integral outer portion,

each of said four frame members comprising a core material having a thin surface layer attached to at least one surface thereof,

said four frame members having abutting and connected ends forming a four sided frame,

said four sided frame defining a continuous connector means on its inner periphery,

the outer periphery of said center panel defining mating means received by said continuous connector means for securing and holding said center panel in a self supporting relationship, relative to said four sided frame,

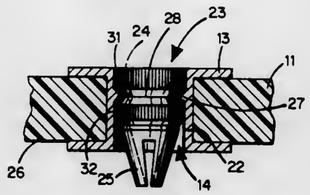
said continuous connector means and said mating means comprising at least one continuous groove and at least one projection received by said groove.

4,097,101

ELECTRICAL INTERCONNECTION BOARDS WITH LEAD SOCKETS MOUNTED THEREIN AND METHOD FOR MAKING SAME

Richard C. Holt, Fairhaven, Mass.; Nell F. Damon, Manville, R.I., and Richard J. Hanlon, Attleboro, Mass., assignors to Augat Inc., Attleboro, Mass.

Filed Nov. 22, 1976, Ser. No. 744,134
Int. Cl.² H05K *1/12*
U.S. Cl. 339—17 C **8 Claims**



1. An electrical interconnection device comprising:

a flat generally rectangular sheet of electrically insulative material;

electrically conductive material secured in discrete areas on at least one side of said sheet, said sheet having a multiplicity of holes therethrough, at least some of said holes normally intercepting one of said areas of electrically conductive material;

electrically conductive plating material on the inside surfaces of at least some of said holes thereby forming plated-

through holes, said plating material being electrically interconnected with said respective intercepted discrete areas of electrically conductive material; and

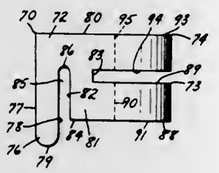
a substantially rigid lead socket force fitted into at least some of said plated-through holes, said socket having a generally cylindrical body portion, said body portion having a roughened surface, whereby upon force-fitting insertion of said socket, some of said plating material in said plated-through hole is displaced by said body portion, each said lead socket being formed with an axial opening therethrough and a plurality of flexible fingers normally converging toward one another at one end and a tapered opening at the other end, the top of said lead socket surrounding said tapered opening being below the surface of said electrically conductive material on said sheet, said tapered opening being adapted to receive an electronic component lead and said fingers being adapted to frictionally engage said lead as it projects through said lead socket.

4,097,102

TELEPHONE CONNECTOR BLOCK HAVING ELECTRICAL CLIP INTERCONNECTING MEANS

Paul V. De Luca, Port Washington, and Albert Atun, Valley Stream, both of N.Y., assignors to Porta Systems Corp., Syosset, N.Y.

Filed Jun. 22, 1977, Ser. No. 808,897
Int. Cl.[2] H01R *7/04, 31/08*
U.S. Cl. 339—19 **4 Claims**



4. In a combination electrically conductive elongated pin and a flexible electrical conductor in interconnected relation thereto, the improvement comprising: improved clip means interconnecting said pin and said conductor, said clip including a first member of generally planar configuration and having an elongated slot in the plane thereof, the width of which corresponds to the diameter of said conductor means, said clip having a second member including first and second discreet circular portions in mutually spaced relation, a first portion of which is of internal diameter slightly greater than the internal diameter of said second portion, the diameter of said second portion corresponding to the effective width of said pin, whereby said first portion may serve as an alignment guide upon the engagement with said pin, and said second portion may serve a clamping function, the conductor receiving mouth of said slot and the pin entrance opening in said first portion facing in the same direction.

4,097,103

BUSWAY PLUG ASSEMBLY

Werner A. Krause, Plantsville, Conn., assignor to General Electric Company, New York, N.Y.

Filed May 18, 1977, Ser. No. 798,193
Int. Cl.[2] H01R *7/08*
U.S. Cl. 339—22 B **9 Claims**

1. A busway plug for making an electrical connection with a plurality of taps individually electrically connected to the various busbars of a busway and extending laterally outward from the busway; said plug comprising, in combination:

A. an enclosure;

B. means for mounting said enclosure in juxtaposition with the busway;

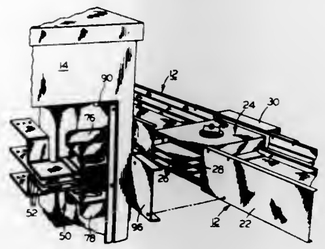
C. a plurality of conductive straps disposed wholly within said enclosure, a different one of said straps associated with each busway tap;

D. means forming a window in said enclosure through which the busway taps protrude when said enclosure is juxtaposed with the busway;

E. a joint mounted within said enclosure, said joint including

1. a pair of opposed pressure plates,

2. an array of insulators disposed between said pressure plates,



3. a pair of conductive splice plates disposed between adjacent pairs of insulators, an associated strap and busway tap being received between each splice plate pair;

4. means forming registered openings in said pressure plates, insulators and splice plates, and

5. a clamping bolt extending through said openings; and

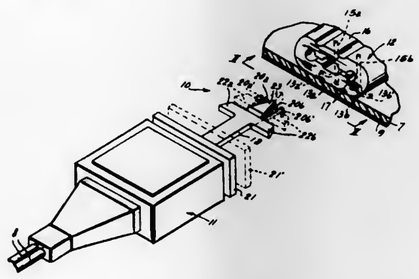
F. means forming an opening in said enclosure to provide access for torquing said bolt to clamp said pressure plates together pursuant to simultaneously perfecting discreet electrical joints between associated ones of said straps and busway taps.

4,097,104

ELECTRICAL CONNECTION SYSTEM

Robert J. Furey, Valdosta, Ga., and Lawrence J. Stupay, Endicott, N.Y., assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Aug. 4, 1976, Ser. No. 711,456
Int. Cl.[2] H01R *13/62*
U.S. Cl. 339—74 R **14 Claims**



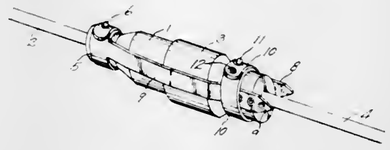
1. An electrical connection system for connecting to a thin metal plate, comprising: a contact member having a tunnel section with electrically conductive contact pillars retaining within the tunnel section, extensions of said contact pillars forming staple-like attachment arms extending outwardly from said tunnel section; and a thin metal plate upon which said contact member is mounted, said staple-like attachment arms extending through said metal plate and being deformed against said metal plate to draw said contact member against the thin metal plate.

4,097,105

HARNESS FOR PLUG AND SOCKET

Floyd A. Zumwalt, Rte. 2 Box 140G, McMinnville, Oreg. 97128

Filed Feb. 4, 1977, Ser. No. 765,863
Int. Cl.[2] H01R *13/54*
U.S. Cl. 339—75 P **2 Claims**



1. A harness for attachment to and retention of various sized electrical plug and socket combinations in coupled engagement, said harness comprising,

a primary member of flexible construction including a ring forming member for placement adjacent one end of a plug and socket combination,

elongate flexible members integral at one of their ends with said ring forming primary member and extending outwardly therefrom in a substantially perpendicular manner, said members flexible throughout their length to follow plug and socket contours, said elongate members having segments of reduced crossection whereby a predetermined tensile load applied to said elongate members will cause same to sever at said segments allowing plug and socket separation by manual pulling on the plug or socket in emergency situations,

a secondary member also of flexible construction and adapted for placement adjacent the other end of the plug and socket combination, and

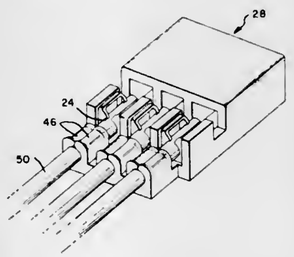
interengageable means carried by end segments of the elongate members and by said secondary member enabling coupling of the primary and secondary members at selected distances from one another whereby coupled plugs and sockets of various sizes and shapes may be retained against accidental separation.

4,097,106

TERMINAL HOUSING HAVING AN INTEGRAL STRAIN RELIEF

William Roderick Over, Harrisburg, and Joseph Agusta Wise, Mechanicsburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 4, 1975, Ser. No. 565,283
Int. Cl.[2] H01R *13/38*
U.S. Cl. 339—99 R **4 Claims**



1. A housing for an electrical terminal, which comprises:

a. a housing of non-conductive material having a passageway for receiving the contact portion of the electrical terminal and a cavity axially positioned behind the passageway for receiving the wire engaging means of the electrical terminal; and

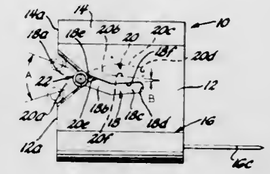
b. a strain relief member unitary with and of the same non-conductive material as the housing and axially positioned behind the cavity, said strain relief member having a channel therethrough for receiving the wire which may be connected to the terminal with the sidewalls of the channel adapted to be cold-formed around the wire in retaining engagement therewith.

4,097,107

INSULATION DISPLACEMENT TERMINAL

Harold G. Hawkins, Bristolville, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 8, 1976, Ser. No. 748,486
Int. Cl.[2] H01R *11/20*
U.S. Cl. 339—97 R **10 Claims**



1. An insulation displacement terminal for piercing the outer insulation of an insulated electrical wire to make contact with the central conductive core comprising:

a unitary sheet metal body having a pair of end plate portions juxtaposed in a closely spaced parallel relationship,

a central spring portion interconnecting parallel laterally extending bottom edges of the plate portions and resisting relative movement of the plate portions in a direction transverse to their interconnected bottom edges, each of said end plate portions including a slot which has an outer open end at a free side edge of its respective plate and an inner closed end spaced therefrom,

said slots each including an outer energizing portion and an inner scissors portion, each of said outer energizing portions being aligned in part with the other and having an edge angled with respect to an edge of the other for scraping a conductor core of an insulated electrical wire and moving said end plate portions relative to each other against the bias of the spring portion responsive to movement of a conductor core of an insulated electrical wire along said edges toward said inner scissors portion,

each of said inner scissors portions having an edge angled with respect to an edge of the other for moving a scraped conductor core of an insulated electrical wire received in said scissors portions from said outer energizing portions along said last mentioned edges and biasing it against the inner closed ends of said slots responsive to relative movement between said end plate portions under the bias of said spring portion.

4,097,108

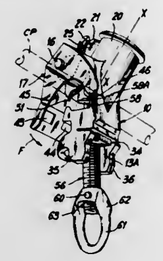
HOT LINE CLAMPS

Marcel Prodel, Arnac Pompadour, France, assignor to Sicame, Arnac Pompadour, France

Continuation of Ser. No. 546,753, Feb. 3, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 772,955
Int. Cl.[2] H01R *13/00*
U.S. Cl. 339—109 **8 Claims**

1. An electrical clamp for connecting a branch conductor to a main conductor, comprising a rigid generally U-shaped body having a pair of opposed legs, means for securing a branch conductor on said body, a flap member rockably mounted about one leg of said U-shaped body between an open position for enabling the clamp to be received on a main conductor and a closed position for maintaining the clamp in place on the main conductor, resilient means biasing the flap member toward the open position, a pair of camming surfaces on said

flap member disposed one on either side of said one leg and adapted to cooperate with the main conductor when the clamp is received on the main conductor for rocking said flap member to the closed position before tightening the hold on the main conductor, threaded pressure applying means threadedly received in one leg of said body and in unobstructed facing relation with the other leg of said body for movement towards and away from said body for movement towards and away from said other leg for respectively tightening and loosening the hold of the clamp on the main conductor with the main



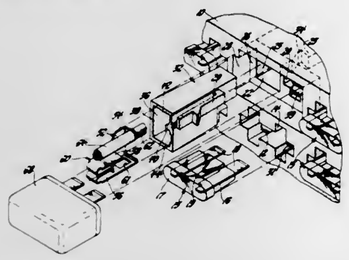
conductor in direct clamping contact with said one leg and said pressure applying means, and an operating member for applying force for rocking said member to its closed position and disposed on said threaded pressure applying member having a first mode of operation for exerting an axial force through said threaded pressure applying member to said flat member, for automatically rocking the latter to its closed position and a second mode of operation for turning the threaded pressure applying member for tightening and loosening its hold on the main conductor.

4,097,109

ACCESSORY ELECTRICAL CONNECTOR

William E. Cross, Brookfield, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 27, 1977, Ser. No. 810,409
Int. Cl.[2] H01R *13/12, 19/40*
U.S. Cl. 339—147 R **4 Claims**



1. An electrical accessory connector for a mounted terminal block having a front opening cavity adjacent an available terminal carried by the mounted terminal block comprising:

a connector body insertable into the front opening cavity of the terminal block, said connector body having a longitudinal cavity having a front opening,

an accessory terminal which is shaped for insertion into the longitudinal cavity via the front opening, said accessory terminal being disposed in the longitudinal cavity and having a body portion, a contact portion which extends from the body portion in a longitudinal direction toward the front opening and which is in lateral alignment with the available terminal when the connector body is disposed in the front opening cavity of the terminal block, and an attachment portion which is spaced from said contact portion in a transverse direction, and

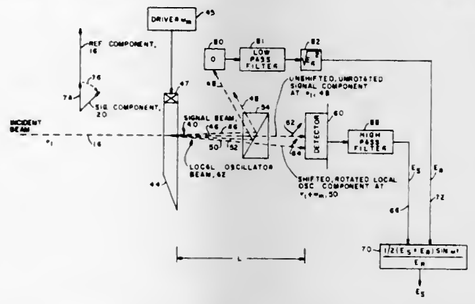
an electrical lead having one end mechanically and electrically secured to the accessory terminal by the attachment portion, said lead extending from the attachment portion in a longitudinal direction past said contact portion and out of the connector body cavity via the front opening whereby upon disposition of the connector body in the cavity of the terminal block, the accessory terminal and the available terminal are adapted to receive an electrical device to establish electrical continuity for the electrical lead through the terminal block.

4,097,110

DEPOLARIZATION MEASUREMENT BY OPTICAL HETERODYNE

Charles Carey, Burlington, Mass., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Apr. 27, 1977, Ser. No. 791,365
Int. Cl.[2] G02F *1/11;* **G01J** *4/04*
U.S. Cl. 350—149 **13 Claims**



1. Apparatus for measuring depolarization of a coherent incident beam of light comprising:

a traveling wave/shear wave modulator interposed in the path of said beam for providing an unshifted, unrotated signal beam and a frequency shifted local oscillator beam rotated so that its direction of polarization matches that of said signal beam;

means for selecting said unshifted unrotated signal beam and said shifted rotated local oscillator beam; and

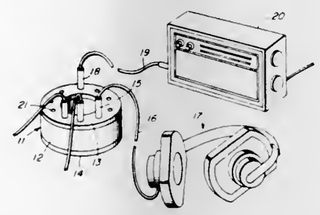
means for optically heterodyning the selected beams and producing an electrical signal representing the result of the heterodyning.

4,097,111

ELECTRICAL CONNECTOR

Roger A. Martin, Swampscott, Mass., assignor to The Murdock Corporation, Chelsea, Mass.

Filed Jun. 1, 1976, Ser. No. 691,565
Int. Cl.[2] H01R *17/18*
U.S. Cl. 339—183 **2 Claims**



1. A distributing station for an audio device whereby the signal coming from the audio device (**20**) can be fed to a plurality of listening devices, such as head sets, (**17**) by detachably connecting plugs (**15**) to said distributing station, comprising:

(a) a rigid, one piece, integral insulating frame (**12**) formed with side walls (**26, 27**) defining open top and bottom

portions, a web (**28**) extending transversely of and connecting said side walls intermediate said top and bottom portions, and a plurality of plug guide apertures (**31**) in said web each surrounded by a receptacle defining wall (**29**) formed on the bottom and top surfaces of said web and extending from said top to said bottom portions;

(b) two identical, resilient conductive plastic members (**13, 14**) free of metal and mounted across said open portions and having a plurality of orifices (**21**) aligned with said apertures, each of said members having integral, resilient gripping fingers (**23**) aligned with each of said orifices, and each of said members being supported upon said side walls and said receptacle defining walls;

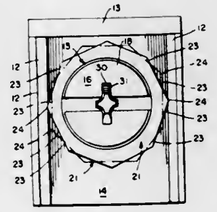
(c) whereby, when a plug is inserted in an aligned set of apertures and orifices, the plug is conductively gripped by said resilient fingers to form an electrical connection therewith.

4,097,112

TILTING TERMINAL CLAMP ASSEMBLY

Donald Richard Veldman, Oak Lawn, Ill., and Howard S. Langdon, 1250 Hill Rd., Winnetka, Ill. 60093, assignors to Howard S. Langdon, Winnetka, Ill.

Continuation-in-part of Ser. No. 719,897, Sep. 2, 1976, abandoned. This application May 4, 1977, Ser. No. 793,444
Int. Cl.[2] H01R *9/10*
U.S. Cl. 339—246 **5 Claims**



1. A tilting terminal clamp comprising a threaded shank having a head at one extremity and a lead point at the other extremity, said head being configured to cooperate with a tool whereby the shank may be rotated into or out of a threaded aperture,

a clamping plate substantially centrally apertured to loosely and tiltably receive said shank, said plate having a generally polygonal perimeter with said perimeter being equipped with 6, 8 or 10 flat sides and corners adapted to engage the sidewalls of a standard terminal body pocket receiving said clamp to prevent rotation of said clamping plate while at the same time avoiding the need for carefully orienting said plate within a terminal pocket, and

means for retaining said plate on said shank adjacent said head.

4,097,113

ELECTRICAL CONNECTORS FOR PORTABLE ELECTRONIC PHYSIOLOGICAL INSTRUMENTS HAVING SEPARABLE FIRST AND SECOND COMPONENTS

Stephen L. McKelvy, Woodinville, Wash., assignor to Physio-Control Corporation, Redmond, Wash.

Filed Sep. 3, 1976, Ser. No. 720,148
Int. Cl.[2] A61N *1/36*
U.S. Cl. 339—256 R **4 Claims**

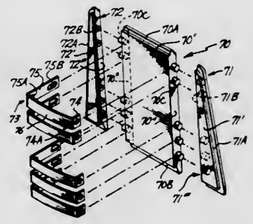
1. An improved electrical connector, for an electronic physiological instrument which is contained within a housing having an exterior housing surface, the housing also having a cut away portion defining a housing aperture connector comprising:

(a) a central contact support member of insulating material, said central contact support member having a substantially rectangular, substantially planar front surface and a pair of opposite, substantially parallel side surfaces bounding said front surface,

(b) first and second contact retaining members, each of insulating material, and each having a substantially planar front surface and an adjoining side surface complementary to one of said pair of side surfaces of said central contact support member,

(c) a plurality of metallic, leaf spring contacts, each of said contacts being formed into a substantial U-shape and thereby having a central, bowed contact portion, and adjoining first and second legs, each of said legs having extending therethrough an aperture, and electrical terminal means being provided on one of said legs,

(d) a plurality of projections formed and extending from the side surfaces of one of said central contact support member or said first and second contact retaining members, said plurality of projections being spaced from each other, and a corresponding plurality of recesses formed in the



side surfaces of the other of said central contact support member or said first and second contact retaining members, said plurality of recesses being spaced apart from each other,

(e) said first and second contact retaining members being secured to said central contact support member, with each one of said plurality of projections passing through one of said apertures in one of said plurality of contacts and being received in a corresponding one of said plurality of recesses to form a connector assembly, said plurality of projections and said plurality of recesses being located so that said front surfaces of said central contact support member and said first and second contact retaining members are substantially coplanar in said connector assembly; and,

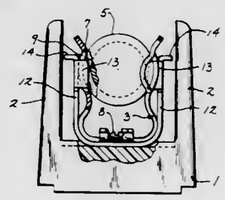
(f) means adapted to mount said connector assembly in the housing aperture so that said front surfaces of said central contact support member and said first and second contact retaining members are substantially flush with the exterior housing surface.

4,097,114

FUSE HOLDER WITH SEPARATE REJECT SPRING

Roger Henwood Motten, Jr., Bowling Green, Ohio, assignor to Marathon Electric Manufacturing Company, Wausau, Wis.

Filed Apr. 28, 1977, Ser. No. 791,795
Int. Cl.[2] H01H *85/24*
U.S. Cl. 339—259 F **1 Claim**



1. A reject device for a fuse clip located in a fuse holder for use with ferrule type fuses having a grooved ferrule on one end

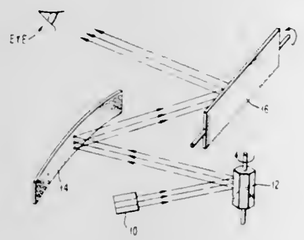
of the fuse to insure that only ferrule type fuses are accepted in the holder, which comprises a separate reinforcing spring assembled around the fuse clip with the clip having slots therein in opposite sides of the walls of the clip and located below the upper ends of the clip, means securing the assembled clip and spring to the base of the fuse holder, inwardly turned horizontally aligned abutments provided adjacent the upper end of the reinforcing spring and of a construction complementary to a groove in a ferrule type fuse which upon assembly with the fuse clip extend inwardly of the clip through the respective slots to dispose the abutments inside the clip and thereby lodge the abutments in the annular groove of a ferrule type fuse when the latter is inserted in the clip, and flange means at the upper ends of the reinforcing spring extending horizontally outwardly therefrom to engage the walls of the holder upon spreading of the fuse clip when a ferrule type fuse is inserted and limit displacement of the abutments inside of the clip to thereby provide for acceptance of only a ferrule type fuse.

4,097,115

OPTICAL SCANNING DEVICE FOR PRODUCING A MULTIPLE LINE SCAN USING A LINEAR ARRAY OF SOURCES AND A TEXTURED SCANNED SURFACE

Richard Lawrence Garwin, Scarsdale, and James Lewis Levine, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1976, Ser. No. 742,935
Int. Cl.² G02B *27/17*; H04N *3/34, 3/08, 9/14*
U.S. Cl. 350—6.7 **8 Claims**



1. An optical scanning system for producing a multiple line two-dimensional array of display points comprising:
at least one modulated light source,
a display screen having a textured surface for providing a controlled light scattering,
a first light deflecting means periodically rotating about an axis for scanning said at least one modulated light from said light source source and deflecting said light in a first linear direction across said display screen to produce a display of at least one row of display spots,
and a second light deflecting means periodically rotating about an axis orthogonal to said first deflecting means for scanning said light on said display screen in a second direction to produce a two-dimensional display of spots representative of said at least one modulated light source.

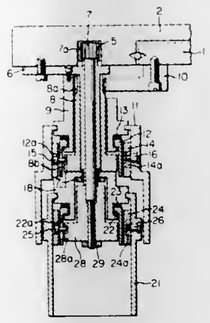
4,097,116

MICROSCOPE STAGE

Noboru Kuroha, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Nov. 5, 1976, Ser. No. 739,335
Claims priority, application Japan, Nov. 10, 1975, 50-133968
Int. Cl.² G02B *21/26*
U.S. Cl. 350—86 **7 Claims**

1. A microscope stage device comprising a first stage slidable in one direction with respect to the stationary portion of the main body of a microscope, a first rotatable member rotatably supported on a shaft secured to said first stage and threadably engaged with said stationary portion so as to move said first stage upon rotation of said first rotatable member, a second stage provided on said first stage for sliding movement in a direction perpendicular to the direction of sliding movement of said first stage, a second rotatable member rotatably supported on said shaft and threadably engaged with said second stage so as to move said second stage, and a pair of operating handles mounted for rotation about said shaft to individually operate each of said first and said second rotatable member, the improvement residing in:
first and second transmission means provided between one



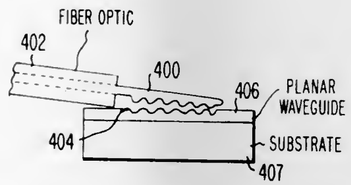
of said pair of handles and said first rotatable member and between the other handle and said second rotatable member, respectively, to adjust the amount of movement of each of said stages caused by rotation of each of said handles so that for angular rotation of each of said handles within a predetermined angle of rotation, each of said stages corresponding to each of said handles is moved for fine adjustment and for rotation of each of said handles beyond said predetermined angle of rotation, each of said stages corresponding to each of said handles is moved for coarse adjustment.

4,097,117

OPTICAL COUPLER HAVING IMPROVED EFFICIENCY

Clyde Carl Neil, Levittown, Pa.; Jacob Meyer Hammer, Lawrenceville, and Robert Alfred Bartolini, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,353
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96.17 **5 Claims**



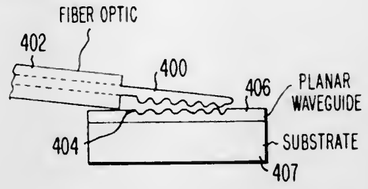
4. In apparatus comprising a planar optical waveguide having a diffraction grating disposed on its surfacae and a fiber-optic core having a coupling portion thereof optically coupled by phase-matched evanescent fields to said planar optical waveguide through said diffraction grating; the improvement therein:
wherein said coupling portion of said core has a contacting surface which is substantially a negative replica of the undulating surface of said diffraction grating, and
wherein said contacting surface of said coupling portion of said core is positioned to substantially fill the crevices of said undulating surface of said diffraction grating.

4,097,118

OPTICAL WAVEGUIDE COUPLER EMPLOYING DEFORMED SHAPE FIBER-OPTIC CORE COUPLING PORTION

Jacob Meyer Hammer, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,354
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96.17 **3 Claims**



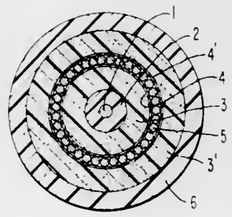
1. A method for increasing the optical efficiency with which a) each of a plurality of different modes of multimode light traveling in a first transmission medium comprising a multimode fiber-optic core having an initially cylindrical shape, and b) light having a given modal characteristic traveling in a second transmission medium comprising a planar optical waveguide cooperatively disposed with respect to a coupling portion of said core, can be coupled between said two transmission media by phase-matched evanescent fields, said method comprising the step of:
flattening out said initially cylindrical shape of said coupling portion of said fiber-optic core in a direction substantially perpendicular to the plane of said planar optical waveguide and fanning out said initially cylindrical shape of said coupling portion of said fiber-optic core in a direction substantially parallel to the plane of said planar optical waveguide to deform said coupling portion of said fiber-optic core into a predetermined spatulate shape that provides more efficient optical coupling by phase-matched evanescent fields of multimode light wave energy between said coupling portion of said fiberoptic core and said planar optical waveguide by forcing said modes of multimode light into a modal distribution similar to said given modal characteristic.

4,097,119

OPTICAL FIBER CABLE

Hiroyuki Kumamaru; Hiromu Shioyama, and Masao Hoshikawa, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 6, 1975, Ser. No. 584,663
Claims priority, application Japan, Jun. 7, 1974, 49-65202
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96.23 **13 Claims**



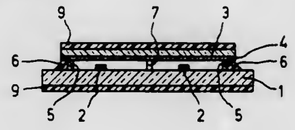
1. An optical fiber cable comprising:
a plurality of bundles of optical fibers,
a strengthening member extending lengthwise along the cable,
low friction thin, polymeric tape slipping layers on respective sides of said bundles of optical fibers to permit slipping movement between said optical fibers and said low friction layers to prevent breakage of said optical fibers under applied stress to said cable,
cushion layers disposed on the side of the low friction layers remote from said bundles of optical fibers, and
protection layers underlying the radially innermost cushion layer and overlying the radially outermost cushion layer.

4,097,120

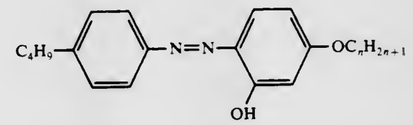
LIQUID CRYSTALLINE COMPOUNDS AND MIXTURES

Jan vanderVeen, and Theodorus Cornelis Jozef Maria Hegge, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 531,087, Dec. 9, 1974, Pat. No. 3,984,392.
This application Jul. 22, 1976, Ser. No. 707,530
Claims priority, application Netherlands, Dec. 13, 1973, 7317074
Int. Cl.² C09K *3/34*; G02F *1/13*
U.S. Cl. 350—350 **1 Claim**



1. An orientation-type liquid crystal display cell having a layer of a liquid crystal material disposed between a pair of electrodes, at least one of which is transparent, wherein said liquid crystal material consists essentially of at least one compound of the formula



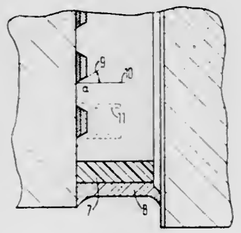
wherein n is 6 or 7.

4,097,121

LIQUID-CRYSTAL DISPLAY WITH BISTABLE CHOLESTERIC LIQUID-CRYSTAL LAYER AND METHOD OF MAKING THE SAME

Miroslav Tauer, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sep. 14, 1976, Ser. No. 723,151
Claims priority, application Germany, Sep. 22, 1975, 2542166
Int. Cl.² G02F *1/13*
U.S. Cl. 350—333 **11 Claims**



1. A liquid crystal display for the representation of visual images comprising two carrier plates having therebetween in a hermetically sealed arrangement, a layer of cholesteric liquid crystal with a homeotripic wall orientation, each of said carrier plates having a conductor array on its inner surface facing the

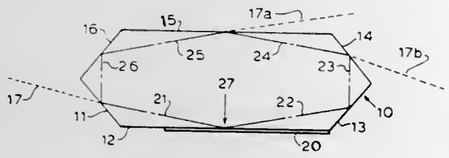
other, said liquid crystal having at least in a certain frequency range a positively anisotropic susceptibility, and at field strengths equal to or greater than a first threshold value E_{cn} taking on a homeotropically-nematic texture, in which it remains as long as the applied field is greater than a second lower threshold value E_{nc}, said conductor arrays having at least one separately operable conductor, the electrodes of at least one of the two carrier plates having a dielectric layer thereon, the dielectric constant of which is smaller than that of the LC layer, said dielectric layer being so dimensioned relative to the associated electrode that marginal portions of the latter are exposed, respective marginal portions defining a plurality of picture segments, with said marginal portions defining a marginal zone each of which operatively encircles a respective display segment, which marginal zone during operation of the liquid crystal display, each have a minimum field strength E_n, equal or greater than E_{cn}, in the liquid-crystal layer, and simultaneously a holding field strength E_h, lower than E_{cn}, at the location of the picture segment enclosed by the marginal zone, during operation of the liquid crystal display, the marginal edges of the combined electrode and dielectric layers forming an approximately flat edge wall composed of the lower electrode edge and the upper aligned dielectric edge, such edge wall being inclined in the form of a beveled edge whereby the electrode edge extends outwardly beyond the dielectric edge.

4,097,122

LIGHT OPTIC DATA HANDLING SYSTEM

Joseph T. McNaney, 8548 Boulder Dr., La Mesa, Calif. 92041

Filed Dec. 23, 1976, Ser. No. 753,735
Int. Cl.² G02F *1/34*
U.S. Cl. 350—353 **3 Claims**



1. A light optic data handling system comprising:
a. means for providing a beam of light;
b. means for directing said beam of light along a primary optical path within said system including an array of light reflecting surfaces, each surface presenting a length dimension and each angularly oriented so as to establish an optical relationship one with respect to the other for allowing said beam to be directed along said path forming a helix of plural revolutions, the optical center of said beam of each revolution thereof displaced a predetermined distance one with respect to the other in a side-by-side relationship in the direction of said length dimension, said distance less than a cross sectional dimension of the beam in the direction of said length dimension so as to provide a multiple overlapping of light of said beam along said path and a reflecting of light, simultaneously, from different portions of said beam toward a light output position of said system.

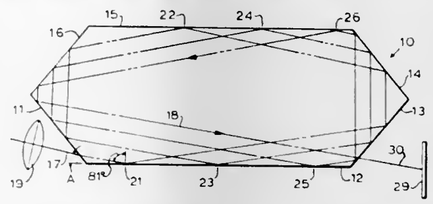
4,097,123

LIGHT BEAM POSITION CONTROL SYSTEM

Joseph T. McNaney, 8548 Boulder Dr., La Mesa, Calif. 92041

Filed Jan. 31, 1977, Ser. No. 764,408
The portion of the term of this patent subsequent to Jun. 25, 1994, has been disclaimed.
Int. Cl.² G02F *1/16*
U.S. Cl. 350—353 **3 Claims**

1. In a light beam position control system:
(a) a source of light;
(b) an array of light reflecting surfaces;
(c) means for directing light from said source along an input path toward said array of surfaces and thereupon along an optical path within said array extending to a light emitting surface of said array, said light input path optically related through said array to a light output path stemming from said emitting surface, said reflecting surfaces of said array each presenting a length dimension, said emitting surface extended along said length dimension and coinciding with a predetermined one of said reflecting surfaces, each surface of said array angularly oriented one with respect to the other for allowing light directed along said optical path to follow a helix of plural revolutions while undergoing a series of light reflections therein and for allowing



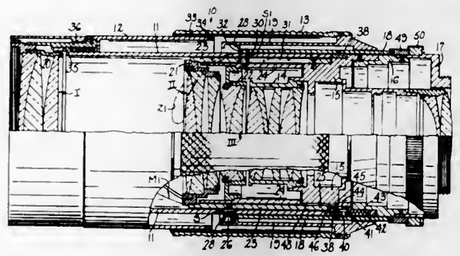
said light during a predetermined one of said revolutions to be directed toward said emitting surface at an angle of incidence thereon for effecting a frustrating of a reflection of light therefrom;
(d) means for directing light from said source along a first optical path within said array of surfaces so as to allow said light to be reflected toward and incident upon a first light output position along said light emitting surface; and
(e) means for redirecting light from said source from said first optical path to and along a second optical path within said array of surfaces so as to allow said light to be reflected toward and incident upon a second light output position along said light emitting surface.

4,097,124

ZOOM LENS

Rinzo Watanabe, and Masatoshi Shimojima, both of Tokyo, Japan, assignors to Vivitar Corporation, Santa Monica, Calif.

Continuation-in-part of Ser. No. 258,816, Jun. 1, 1972, Pat. No. 3,784,285. This application Dec. 28, 1973, Ser. No. 429,348
Int. Cl.² G02B *15/18*
U.S. Cl. 350—187 **16 Claims**



1. A variable focal length lens of the type including a front focusing lens group and first and second axially movable lens groups for varying the equivalent focal length of the lens, comprising an elongated cylindrical member, a sleeve-like operating member disposed about said cylindrical member adapted to move axially with respect to said cylindrical member for varying the focal length and rotatably with respect thereto for focusing, focusing means threadably mounting said front group to said cylindrical member for focusing movement, means connecting said focusing means to said operating member so that rotation of said operating member produces rotation of said focusing means on said mounting, said connecting means permitting axial movement of said operating member with respect to said cylindrical member without rotation of

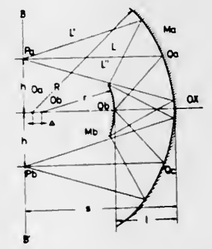
said focusing means, first and second guide slots defined in said cylindrical member, each having axial and tangential directional components, a first mounting member for said first lens group in said cylindrical member and having a first pin extending therefrom through said first guide slot, an axial slot defined in said first mounting member, a mounting member for said second lens group within said first mounting member, a second pin extending from said second mounting member through said axial slot into said second guide slot, and an annular channel defined in said operating member and receiving said first pin therein.

4,097,125

IMAGE FORMING OPTICAL SYSTEM

Akiyoshi Suzuki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 1, 1976, Ser. No. 701,946
Claims priority, application Japan, Jul. 2, 1975, 50-82115
Int. Cl.² G02B *5/10*
U.S. Cl. 350—294 **6 Claims**



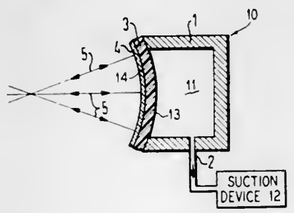
1. An image forming optical system comprising;
(a) a concave mirror;
(b) a convex mirror having a smaller radius of curvature than that of said concave mirror and arranged in face-to-face relation with said concave mirror at a location such that the center of curvature of said convex mirror is spaced from that of said concave mirror toward said concave mirror, and
(c) said concave mirror comprising means for reflecting radiation incident on said optical system to said convex mirror and for reflecting said radiation from said convex mirror out of said optical system in a direction generally opposite that of said radiation incident on said optical system.

4,097,126

OPTICAL LAYER DEVICE WITH REFLECTING SURFACE ON COLLODION FOIL

Hans Mahlein, and Walter Rauscher, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 25, 1976, Ser. No. 689,924
Claims priority, application Germany, Jun. 10, 1975, 2525863
Int. Cl.² G02B *5/10, 1/10*
U.S. Cl. 350—295 **1 Claim**



1. An optical layer device for use as a mirror in a tunable laser comprising a holder, a substrate of an elastic deformable material having a surface of a predetermined curvature in an undeformed condition, said substrate being a collodion foil having a thickness in the range of between 0.05 and 0.2 mm, said surface being provided with a reflecting surface layer comprising at least one layer of material selected from a group consisting of dielectric and metallic materials, said substrate having a periphery sealed to said holder to mount the substrate thereon, and means for selectively deforming the substrate to change the predetermined curvature of said surface in a predetermined spherical or aspherical fashion so that the optical layer device functions as a variable reflector.

4,097,127

MIXED LIQUID CRYSTALLINE TEXTURE FORMATION

Werner E. L. Haas, Webster, and Gary A. Dir, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 2, 1977, Ser. No. 773,448
Int. Cl.² G02F *1/13*
U.S. Cl. 350—332 **6 Claims**

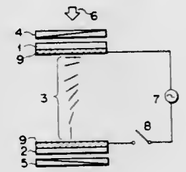
1. A method of forming a mixture of the Grandjean and focal-conic textures of the cholesteric mesophase, comprising:
(a) providing a liquid crystalline material in a texture selected from the group consisting of the Grandjean texture and the focal-conic texture of the cholesteric mesophase;
(b) applying an electrical field across said liquid crystalline material within the cholesteric-to-nematic electrical field range of said liquid crystalline material thereby transforming said liquid crystalline material from the cholesteric mesophase to the nematic mesophase; and
(c) decreasing the magnitude of said applied electrical field over a period of time effective to transform said liquid crystalline material from the nematic mesophase to said mixture of the Grandjean and focal-conic textures of the cholesteric mesophase.

4,097,128

LIQUID CRYSTAL COLOR DISPLAY DEVICES

Shoichi Matsumoto, Yokohama; Masahiro Kawamoto, Kamakura, and Kiyoshi Mizunoya, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Apr. 20, 1976, Ser. No. 678,553
Claims priority, application Japan, Apr. 24, 1975, 50-49155; Oct. 9, 1975, 50-121269; Oct. 9, 1975, 50-121270; Oct. 9, 1975, 50-121271; Oct. 9, 1975, 50-121272
Int. Cl.² G02F *1/13*
U.S. Cl. 350—335 **16 Claims**



1. A liquid crystal color display device which comprises at least one liquid crystal cell formed of first and second substrates, at least one of which is transparent and both of which are coated with first and second electrodes, at least one of which is transparent and an nematic liquid crystal interposed between the first and second substrates, the surface of the first substrate being so treated as to cause the molecules of the nematic liquid crystal to be orientated parallel with the substrate surface and the surface of the second substrate being so treated as to cause the molecules of the nematic liquid crystal to be orientated perpendicular to the substrate surface; at least

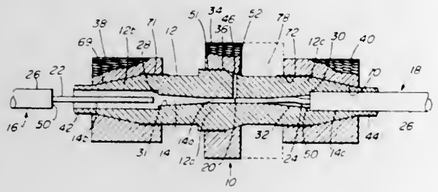
one polarizer; and means for varying the birefringence of the nematic liquid crystal.

4,097,129

COUPLING DEVICE FOR PROTECTIVELY JACKETED FIBERS

Charles K. Wellington, Westford, and Mark L. Dakss, Waltham, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed May 25, 1976, Ser. No. 689,753
Int. Cl.[2] G02B *5/16*
U.S. Cl. 350—96.15 **18 Claims**



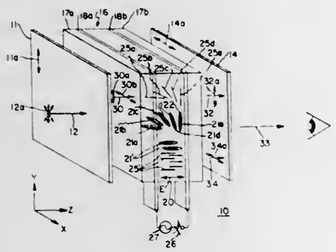
1. A device for coupling a pair of protectively jacketed optical fibers in axial alignment comprising:
- a resiliently compressible body for holding a pair of opposing fibers in end-to-end abutment in an abutment region, the body receiving the fiber pair through opposite ends of a fiber-receiving bore formed axially therethrough, the bore having an oversized cross-section with respect to the cross-sections of the received fibers, wherein the bore includes an inner portion for receiving bared ends of the fiber pair and a pair of outer portions for receiving the jacketed portion of the fibers; and
- body compression means for forming a plurality of fiber-engaging areas along the bore wall in the abutment region to exert a lateral aligning force on the abuttingly held fiber tips, and wherein the body compression means includes first means for symmetrically reducing the cross-section of the inner bore portion to a fiber-engaging dimension and second means for reducing the cross-section of the outer bore portions to a jacket-engaging dimension.

4,097,130

MULTI-COLORED LIQUID CRYSTAL DISPLAYS

Herbert S. Cole, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 11, 1977, Ser. No. 776,603
Int. Cl.[2] G02F *1/13*
U.S. Cl. 350—335 **16 Claims**



1. A transmissive display for selectively imparting one of a plurality of colors to visible light transmitted in a first direction therethrough, comprising:
- a first polarization member having an axis of polarization positioned in a second direction substantially perpendicular to said first direction; a second polarization member having an axis of polarization positioned in a third direction substantially perpendicular to both said first and second directions, said second polarization member absorbing light in a region about a first wavelength in the visible spectrum when the light is polarized with its electric field vecto parallel to the axis of polarization of said second polarization member;
- a liquid crystal cell positioned between said first and second polarization members and along the optical path in said first direction therebetween, said cell being actuable between first and second conditions of molecular orientation; and
- means contained within said cell for absorbing visible light in a region about a second wavelength different from said first wavelength, only when said cell is actuated to said first condition of molecular orientation; said means allowing transmission of light through said cell substantially without absorption when said cell is actuated to said second condition.

4,097,131

REFLECTIVE TYPE LIQUID CRYSTAL DISPLAY

Mitsuru Nishiyama, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 24, 1976, Ser. No. 744,775
Claims priority, application Japan, Nov. 28, 1975, 50-163399[U]
Int. Cl.[2] G02F *1/13*
U.S. Cl. 350—338 **4 Claims**

1. A reflective type liquid crystal display comprising:
first and second support plates;
- a segmented reflective electrode deposited on said first support plate;
- a transparent electrode deposited on said second support plate;
- a reflective coating deposited on said second support plate in a region except the region corresponding to said reflective electrode;
- an intermediate layer of insulator material interposed between said transparent electrode and said reflective coating, said intermediate layer being capable of preventing a chemical reaction about the interface between said transparent electrode and said reflective coating; and
- a liquid crystal composition sandwiched between said first and said second support plates.

4,097,132

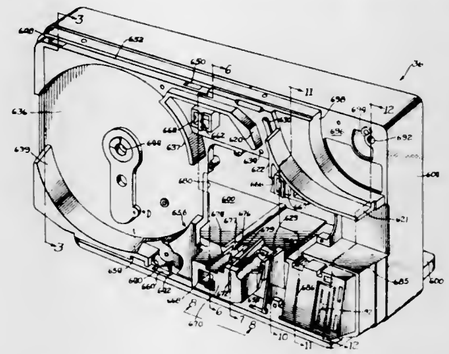
PROJECTOR MOLDED CHASSIS

Raymond W. H. Kim, Skokie; Robert A. Klein, Mt. Prospect; Edward H. Lodge, Wilmette; Arthur L. Lueders, Mundelein, and James G. Woodier, Morton Grove, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Feb. 18, 1977, Ser. No. 770,254
Int. Cl.[2] G03B *17/02*
U.S. Cl. 352—242 **15 Claims**

1. A housing for mounting mechanical and electrical components to provide a motion picture projector that utilizes a manually shiftable controller assembly positionable in a plurality of positions for selecting operational modes, the housing comprising a unitary molded structure including:
- a generally rectangular base;

- an upstanding edgewall extending from said base and defining a mounting body having front and rear surfaces:
- a strengthening flange substantially circumscribing said upstanding edgewall;
- a lip disposed around at least portions of the perimeter of said strengthening flange for interfitting with a rear housing cover;
- means for defining a film path on said front surface of said edgewall between a supply assembly position and a take-up assembly position wherein said film path includes a plurality of non-aligned path portions, said film path arranged to pass through a shuttle assembly position and a gate assembly position intermediate the take-up and supply assembly positions; and
- means for defining operational mode positions of the controller assembly, said operational mode position defining means comprising detent positions defined at the upper and lower extremities of an H-shaped pattern and at the extremes of the center cross-bar of the H-shaped pattern.

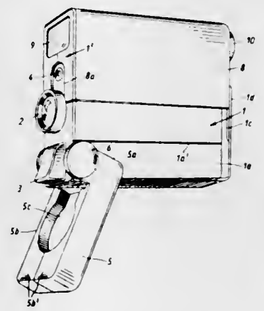


4,097,133

CINEMATOGRAPHIC CAMERA

Otto Stemme, Munich; Peter Lermann, Narring, and Gabriele Ehgartner, Pullach, all of Germany, assignors to AGFA-Gevaert AG, Leverkusen, Germany

Filed Feb. 28, 1977, Ser. No. 772,970
Claims priority, application Germany, Mar. 12, 1976, 2610515
Int. Cl.[2] G03B *17/00*
U.S. Cl. 352—243 **19 Claims**



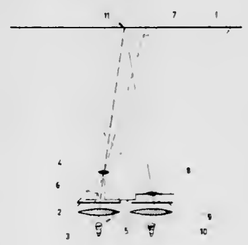
1. A cinematographic camera, comprising a collapsible camera housing having a first section provided with a viewfinder and a second section provided with a photographic lens, one of said sections being a movable section mounted for telescoping displacement relative to the other section between a retracted and an extended position in which said viewfinder is respectively blocked and unblocked by said second section; a movable third section forming a handgrip mounted on said camera housing for displacement between a retracted and an extended position in which it respectively hugs and projects outwardly from said camera housing; and means responsive to displacement of one of said movable sections from the retracted position thereof by releasing the other movable section for displacement to its extended position.

4,097,134

PROJECTION DEVICE

Hans G. Jerie, 15, Demmerskamp, Lonneker, Netherlands

Filed Feb. 24, 1976, Ser. No. 661,003
Int. Cl.[2] G03B *21/00, 21/20, 21/26, 21/14*
U.S. Cl. 353—11 **8 Claims**



1. A projection device comprising:
- a projection screen presenting a surface defining an image projection area;
- means defining a first area to be occupied by a first diapositive carrying a pictorial representation of a given subject;
- a first optical system arranged to project an image of the entirety of the first area onto said screen in a manner such that the image fills substantially the entire image projection area;
- means defining a second area to be occupied by a second diapositive carrying a pictorial representation of the same subject, and to the same scale, as the first diapositive;
- a second optical system producing a greater magnification than said first optical system and arranged to project an image of a portion constituting a fractional part of the second area onto said screen in a manner such that the image of such portion fills substantially the entire image projection area; and
- a transparent runner movable parallel to the first and second areas and provided with a window located adjacent the first area and corresponding in size to a portion of the first area, said runner carrying at least part of said second optical system at a location relative to said window such that the location of the portion of the first area which is adjacent said window corresponds to the location of the portion of said second area which said second optical system is arranged to project on said screen.

4,097,135

APPARATUS FOR AUDIO VISUAL PRESENTATION OF MUSIC

Richard R. Castor, 164 Roselawn Cres., Fairport, N.Y. 14450

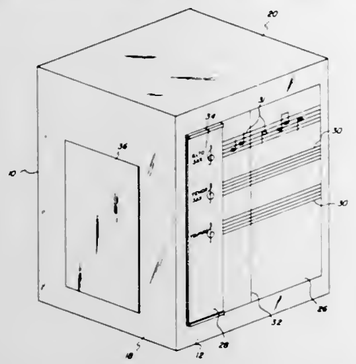
Filed Jan. 12, 1977, Ser. No. 758,593
Int. Cl.[2] G03B *31/04*; G09B *15/02*
U.S. Cl. 353—15 **5 Claims**

1. Apparatus for audio-visual presentation of music comprising in combination:
- a. a projection screen having indicia thereon representative of a note play marker;
- b. a film strip having recorded thereon a musical composition having measures of equal length and notes which are spaced within said measures according to their beat value;
- c. a projector having an advance mechanism for successively projecting on said projection screen a plurality of

visual images of the musical composition recorded on the filmstrip;

d. a tape recorder;

e. a two channel tape operatively carried by said recorder and including a first channel having a programmed master signal recorded thereon and a second channel having a plurality of synchronizing signals recorded thereon at predetermined intervals which are representative of a desired musical tempo, said tape recorder being con-



structed and arranged to produce a first output in accordance with said programmed master signal and a second output in accordance with said synchronizing signals;

f. an audio-speaker having its input connected to said first output of said recorder; and

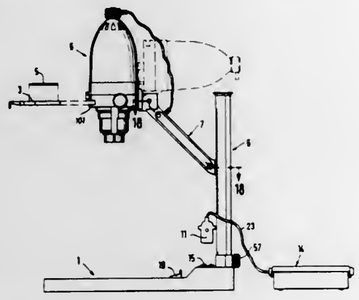
g. control means having its input connected to said second output of said recorder and its output connected to said advance mechanism to cause said projector to display successive visual images of said composition in accordance with said synchronizing signals.

4,097,136

PROJECTOR FOR VISUAL IMAGES

Jose Manuel Alonso Astarloa, Bilbao, Spain, assignor to Iberastron, S.L., Bilbao, Spain

Filed Oct. 21, 1976, Ser. No. 734,697
Int. Cl.² G03B *21/22, 27/52;* H01R *9/00*
U.S. Cl. 353—71 **4 Claims**



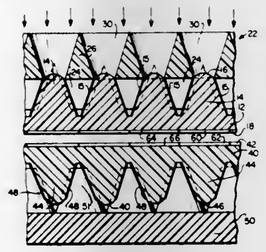
1. A projector for visual images comprising a base, a column connected to said base, an adjustable arm positionable along said column and a projector body carried by said arm, said column having the general configuration of a channel, with the legs of said channel being resiliently spreadable, the end of said arm joining with said column including connection means for engagement within the channel of said column, said connection means being positionable within said column upon rotation of said connection means 90°, said connection means being rotatable after insertion 90° to return to its original position, said resiliency of said legs serving at least in part to locate said arm, a first annular member extending upwardly from said base and a second annular member surrounding said first annular member and defining a space between said first and second annular members, said column being insertable in said space for supporting said column on said base, clamping means acting between said annular members and said column for securing said column with respect to said base, conductor means mounted internally of said first annular member, and said column including conductive plates engaged with said conductor means when said column is mounted to said base.

4,097,137

MICROFICHE HAVING INTEGRAL INDEXING MEANS

George J. Yevick, Leonia, N.J., assignor to Izon Corporation, Stamford, Conn.

Filed Apr. 9, 1975, Ser. No. 566,406
Int. Cl.² G03B *23/08*
U.S. Cl. 353—120 **3 Claims**



1. A microfiche assembly, including a microfiche defined by a transparent sheet adapted to carry stored micro optical information over its area, one surface of said sheet including a plurality of lenses, the improvement comprising an alignment member having optical apertures therethrough and also carrying regularly arranged downwardly extending positioning nodules having valleys therebetween, the microfiche carrying a plurality of regularly arrayed upstanding positioning nodules positioned in the valleys between the said complementary regularly arrayed downwardly extending positioning nodules integral with said alignment member, the tips of said upstanding nodules defining said lenses, at least some of said lenses being optically aligned with the optical apertures of the alignment member, said optical apertures located in said valleys of said downwardly extending nodules whereby the two sets of positioning nodules align the microfiche with respect to the alignment member.

4,097,138

PHOTOCONDUCTIVE BELT INCREMENTING APPARATUS

William Kingsley, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 27, 1976, Ser. No. 718,247
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 DR **5 Claims**

1. An apparatus for incrementing a photoconductive belt to advance unused portions thereof to an operative location as used portions advance to an inoperative location, including:

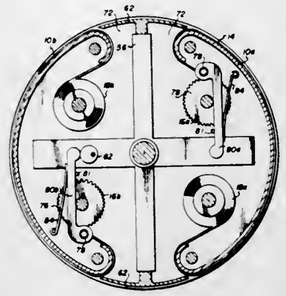
a support frame comprising at least a pair of segments;

at least a pair of supply stations having the unused portions of the photoconductive belt stored therein, each of said supply stations being associated with one of the segments of said support frame;

at least a pair of receiving stations having the used portions of the photoconductive belt stored therein, each of said receiving stations being associated with one of the segments of said support frame; and

means for advancing automatically incremental portions of the photoconductive belt from each of the supply stations

to each of the receiving stations with one surface of the photoconductive belt being in contact with the exterior portion of each segment of said support frame during movement thereof from said supply station to said receiving stations, said advancing means comprising a gear connected to said receiving station, a pinion meshing with



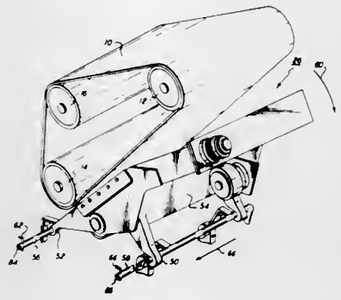
the gear, an actuating bar having one end portion thereof coupled to the pinion, and a cam engaging the other end of the actuating bar to periodically pivot the actuating bar so as to rotate the pinion meshing with the gear, thereby advancing an incremental portion of the photoconductive belt from the supply station to the receiving station.

4,097,139

REPRODUCING MACHINE HAVING INTERCHANGEABLE DEVELOPER HOUSINGS

Oscar G. Hauser, Rochester; Thomas Meagher, and Frederick R. Ruckdeschel, both of Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 30, 1976, Ser. No. 728,102
Int. Cl.² G03G *15/01*
U.S. Cl. 355—4 **23 Claims**



1. A reproducing machine, including:

a member arranged to have successive latent images recorded thereon,

first means for developing at least one of the latent images recorded on said member with particles of a first color;

second means for developing the other latent images recorded on said member with particles of a second color;

first means for moving said first developing means from an operative position in communication with the latent images to an inoperative position external to the reproducing machine; and

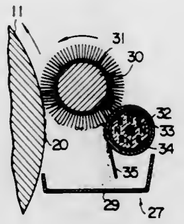
second means for moving said second developing means from the inoperative position external to the reproducing machine to the operative position in communication with the latent images after said first moving means moves said first developing means to the inoperative position.

4,097,140

METHOD AND APPARATUS FOR CLEANING TONER IN ELECTROPHOTOGRAPHIC COPYING MACHINES

Kohji Suzuki, Kawasaki, and Kazuaki Tagawa, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 22, 1976, Ser. No. 707,615
Claims priority, application Japan, Jul. 22, 1975, 50-89501
Int. Cl.² G03G *21/00*
U.S. Cl. 355—15 **8 Claims**



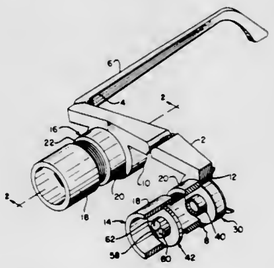
1. A method of cleaning toner from the surface of a photosensitive member in an electrophotographic copying machine of the dry, transfer type in which a magnetic toner is used as a developer, comprising the steps of: providing a rotatable cylindrical brush adjacent the surface of said photosensitive member to remove magnetic toner attached to the surface of the photosensitive member and transfer it to said brush by a mechanical rubbing action; transferring magnetic toner which attaches to the cylindrical brush onto a non-magnetic sleeve located adjacent the cylindrical brush and internally housing a magnet; providing relative rotation between the magnet and the sleeve; and scraping off any magnetic toner which attaches to the sleeve by a separator which is located adjacent the surface of the sleeve.

4,097,141

OPTICAL OBJECTIVES USING APERTURED RETRODIRECTIVE REFLECTORS

David A. Warner, 100 Memorial Dr., Cambridge, Mass. 02142

Continuation-in-part of Ser. No. 568,939, Apr. 17, 1975, abandoned. This application Mar. 16, 1977, Ser. No. 778,212
Int. Cl.² G02B *17/00, 23/06*
U.S. Cl. 350—27 **17 Claims**



1. An optical system comprising:

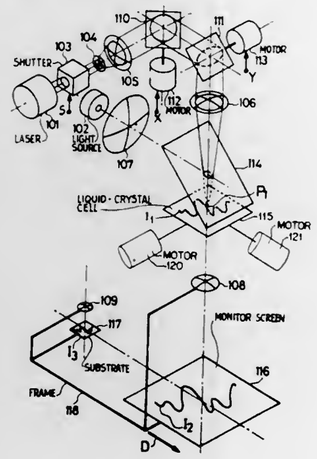
a corrected lens mounted coaxially in front of a truncated retrodirective reflector, said lens having a reflective central portion so positioned as to receive light reflected from the truncated retrodirective reflector and redirect the light through the truncated portion of the retrodirective reflector.

4,097,142

OPTICAL PATTERN TRACER

Paul Cyril Moutou; Michel Hareng, and Serge Le Berre, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Dec. 14, 1976, Ser. No. 750,456
Claims priority, application France, Dec. 19, 1975, 75 39184
Int. Cl.[2] G03B *29/00, 27/70*
U.S. Cl. 355—45 **4 Claims**



1. An apparatus for tracing under the control of a set of external control signals a pattern onto a substrate coated with a photo-sensitive product, which comprises:

a liquid crystal cell;

means for recording an enlarged copy of said pattern onto said cell under the control of said external control signals; said recording means comprising a light source for emitting a beam comprising substantially infrared radiations, means for deflecting said beam along two seaprate directions, delivering a deflected beam, means for focusing said deflected beam onto said cell, and means for occulating said beam;

first means for optically projecting said enlarged copy on a reduced scale onto said substrate;

a monitoring screen; and

second means for optically projecting said enlarged copy on a far more enlarged scale onto said monitoring screen; said substrate said monitoring screen, and said first and second projecting means being secured to a frame movable between a monitoring position and a tracing position.

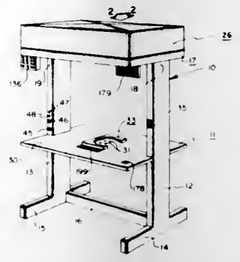
4,097,143

STEP-AND-REPEAT CAMERA

Vernon G. Buchanan, Salt Lake City, and Carl E. Rhoades, Lindon, both of Utah, assignors to Microfilm Service Corporation, Salt Lake City, Utah

Filed Dec. 13, 1976, Ser. No. 750,007
Int. Cl.[2] G03B *27/42, 27/60, 27/62*
U.S. Cl. 355—53 **5 Claims**

1. Photographic structure including, in combination, a table, camera structure spacedly disposed above said table, and a copyboard lock-positioned in a first discrete position on said table in registry with said camera structure and provided with fixed means for enabling upward translational movement of, horizontal 90° rotational displacement of, and downward return of said copyboard to a second, locked, discrete position of said copyboard relative to said table, one of said table and said copyboard having a set of plural protrusions adjacent ones of which are equally spaced, the remainder of said table and copyboard having a set of holes equal in number with and identical in pattern to and positioned to receive all of said



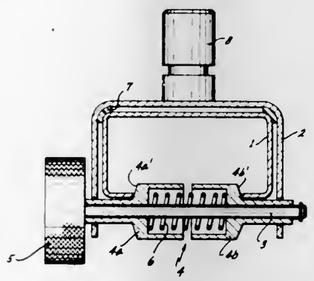
protrusions for any position of said copyboard on said table, one of said sets comprising said fixed means.

4,097,144

ADJUSTMENT DEVICE FOR PHOTOGRAPHIC ENLARGING OR REPRODUCING APPARATUS

Claus Prochnow, Brunswick, Germany, assignor to Rollei-Werke Franke & Heidecke, Brunswick, Germany

Filed Nov. 17, 1976, Ser. No. 742,710
Claims priority, application Germany, Nov. 28, 1975, 2553556
Int. Cl.[2] G03B *27/52;* A47G *29/00*
U.S. Cl. 355—63 **12 Claims**



1. Device for displacing a body along a guiding column particularly suitable for the projection head of an enlarging or reproducing apparatus, said device comprising:

a. a guiding column including a pair of guiding surfaces extending along the column;

b. a sleeve substantially surrounding said guiding column, having an opening located over said pair of guiding surfaces;

c. a shaft mounted on said sleeve across said opening with its axis of rotation extending tangent to said guiding column in a plane perpendicular to the direction of extension of said guiding column;

d. a pair of friction wheels disposed on said shaft, at least one thereof being axially moveable on the shaft and extending through the opening in said sleeve to roll along said guiding column, each wheel having a lateral surface normally respectively held in rolling contact with a guiding surface of said pair; said guiding surface and said lateral surface forming an acute angle with each other; and,

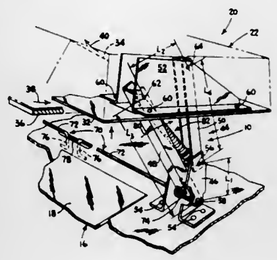
e. means for exerting axial forces on said wheels of the pair to force their lateral surfaces against the guiding surfaces of said guiding column, whereby said shaft is wedged outwardly from said column pulling said sleeve more tightly around said column.

4,097,145

MEANS FOR SELF-POSITIONING PLATEN COVERS

Harry E. Luperti, Wilton, and Robert E. Manna, Newtown, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jan. 3, 1977, Ser. No. 756,348
Int. Cl.[2] G03B *27/62*
U.S. Cl. 355—75 **12 Claims**



1. In a copier including framework and a platen on which respective documents of different thickness may be placed for copying purposes, and means for covering said platen, self-positioning apparatus comprising:

a. linkage means for movably supporting said covering means, said linkage means adapted to permit movement of said covering means between a predetermined position adjacent to said platen for holding respective documents of minimal thickness in contact with said platen and various positions away from said platen for holding respective documents of greater thickness in contact with said platen;

b. resilient means for urging said covering means away from said platen, said resilient means including torsion bar means biased to urge said covering means away from said platen, said resilient means including coil spring means cooperative with said linkage means and said torsion bar means for balancing said covering means at respective levels of elevation with respect to said platen; and

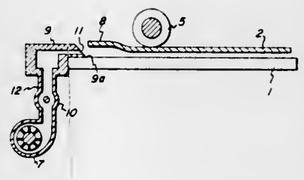
c. latching means for releasably holding said covering means in said predetermined position.

4,097,146

ORIGINAL HANDLING SYSTEM AND PROCESS

Yusuke Sasamori, Ebina, Japan, assignor to Rank Xerox, Ltd., London, England

Filed Nov. 26, 1976, Ser. No. 745,516
Claims priority, application Japan, Dec. 18, 1975, 50-170021
Int. Cl.[2] G03B *27/62;* B65H *9/04*
U.S. Cl. 355—75 **5 Claims**



1. In a reproducing apparatus comprising:

means for discharging an original from an exposure station after exposure; said exposure station comprising: an exposure platen; fixed stop means having a stop surface for engaging an edge of said original for determining the position of said original on said exposure platen; and means for projecting an image of said original at said platen onto a photosensitive body; said discharging means including means for feeding said original in a desired direction off said platen and over said fixed stop means; the improvement, wherein, said apparatus further includes:

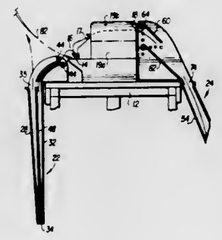
means for flowing air against said edge of said original and across said platen in a direction opposed to said desired direction in which said original is fed off said platen, said means for flowing air forming an air layer between said exposure platen and said original for lifting said edge of said original so that it can be discharged over said fixed stop means.

4,097,147

PRINT MACHINE FRAME

J. Milton Portewig, 405 E. Laburnum Ave., Richmond, Va. 23222

Filed Jun. 1, 1977, Ser. No. 802,392
Int. Cl.[2] G03B *27/30, 27/02*
U.S. Cl. 355—106 **7 Claims**



1. A tray assembly to be used with a print machine, of a type having an exposure portion, said exposure portion including a first inlet for receiving original traces and print paper sheets and a first outlet for ejecting said original traces and print-paper sheets from said exposure portion, and a developing portion, said developing portion including a second inlet for receiving exposed print paper sheets and a second outlet for ejecting developed print-paper sheets, said tray assembly including:

an originals/print-paper tray; and

a copies tray;

said originals/print-paper tray defining a relatively flat envelope for holding originals to be copied and print paper on which said copies will be printed in a substantially vertical orientation, said envelope having a mouth at one edge thereof through which originals and print paper can be inserted into and removed from said envelope, said originals/print-paper tray including a mounting means for mounting said originals/print-paper tray adjacent to said print machine to have a substantially vertical orientation, said envelope mouth facing upwardly adjacent said first and second inlets of said print machine, said envelope being of a size for holding said originals and print paper with top edges thereof being adjacent said mouth;

said copies tray defining a relatively flat copies envelope for receiving and holding said copies in an orientation tending toward a vertical, said copies envelope having a mouth at one edge thereof through which said copies can be received from said print machine and removed from said copies envelope by an operator, said copies tray including a mounting means for mounting said copies tray adjacent said print machine to have an orientation tending toward the vertical with said copies-envelope mouth facing upwardly adjacent said second outlet.

7. A method of making copies of large sheets with a print machine of the type having an exposure portion, said exposure portion including a first inlet for receiving original traces and print paper sheets and a first outlet for ejecting said original traces and print-paper sheets from said exposure portion, and a developing portion, said developing portion including a second inlet for receiving exposed print paper sheets and a second

outlet for ejecting developed print-paper sheets, said method comprising the steps of:

placing the originals in a substantially vertically-oriented envelope having a mouth opening upwardly adjacent to said inlets of said print machine, said originals facing said print machine;

placing a stack of print paper in said originals/print-paper envelope on the opposite side of said originals from the print machine;

extracting an original to be copied and a sheet of print paper from said originals/print-paper envelope simultaneously and feeding the lower edge of said original and said sheet of print paper together into said first inlet of said print machine;

upon its ejection from said first outlet, guiding said original back into said originals/print-paper envelope; and

upon its ejection from said first outlet, guiding said print paper into said second inlet; and,

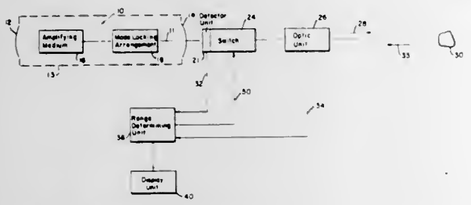
upon its ejection from said second outlet, guiding said print paper into a separate, substantially vertical copies envelope.

4,097,148

MODE LOCKED LASER RANGE FINDER

Stephen M. Fry, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 24, 1976, Ser. No. 744,531
Int. Cl.² G01C *3/08*; G01P *3/36*
U.S. Cl. 356—5 **9 Claims**



1. A laser range finder comprising:

a mode locked laser having a cavity for providing mode locked laser pulses oscillating in said cavity along an optical path;

switching means positioned external to said cavity in said optical path for passing at least one of said laser pulses therethrough;

optical means positioned in said optical path for transmitting at least one of said laser pulses passed through said switching means toward an object, and including first pulse detector means for detecting a pulse returned from said object;

second pulse detector means positioned between said cavity and said switching means for detecting said laser pulses coming from said cavity; and

counting means coupled to said first pulse detector means and said second pulse detector means for providing range counts during a counting interval.

4,097,149

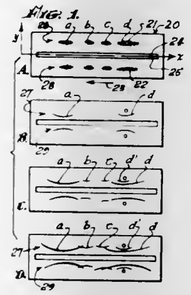
QUANTITATIVE PROTEIN ANALYSIS BY IMMUNODIFFUSION

Frederick J. Aladjem, and Padmasini K. Ayengar, both of Pasadena, Calif.

Filed Feb. 3, 1975, Ser. No. 546,351
Int. Cl.² G01N *27/26*
U.S. Cl. 356—72 **16 Claims**

1. Method of obtaining a quantitative measurement of the concentration of a protein in an antigen sample which has been subjected to immunoelectrophoresis including the steps of producing selective protein migration by electrophoresis in one dimension in a thin layer of supporting medium, and subjecting the antigen sample after said migration to immunodiffusion with an antibody source containing an antibody specific to said protein, the protein and antibody diffusing into reactive contact in another dimension through an area of said medium layer intially free of both antigen and antibody and reacting to form an elongated precipitation zone; said method comprising

scanning the zone by optical means under dark field illumination, at a selected time following initiation of said diffusion, along a plurality of generally parallel mutually spaced scan paths which cross the zone transversely to develop electrical intensity signals representing the intensity of the scattered light at a series of positions on each scan path, said positions being distributed partly within the zone and partly outside the zone,



deriving from said intensity signals for a plurality of said positions within the zone an electrical sum signal representing the sum of the effective excess of each of the intensities within the zone over intensities outside the zone,

and comparing the resulting sum signal with a set of reference sum signals derived from corresponding measurements of reference zones produced by equivalent immunoelectrophoresis of a plurality of reference antigen solutions containing respective known concentrations of said protein,

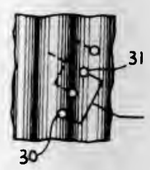
thereby providing a quantitative measure of the concentration of said protein.

4,097,150

OPTICAL DETECTION WEIGHING SYSTEM

Bosco Wu, Trumbull, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jul. 23, 1976, Ser. No. 708,444
Int. Cl.² G01B *23/36, 9/02*
U.S. Cl. 356—72 **8 Claims**



1. An optical detection weighing system, comprising:

a tare support means for supporting an article to be weighed through a weighing range, said tare support means being substantially rigid so that displacement of the tare support means through the weighing range will not be substantially visually apparent; and

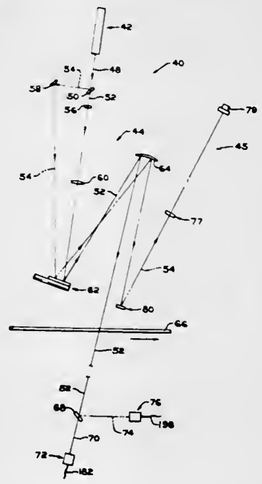
an optical detector for determining the extent of the tare support means displacement, the detector including a first optical grating and a second optical grating, said first optical grating being fixed to the tare support means and being displaceable therewith through said weighing range, said second optical grating being operatively fixed with respect to the displacement of the first optical grating and said tare support means, the optical detector further including a light source means, the optical gratings being positioned with respect to each other and said light source means for modulating light from said light source means to provide an optical interference pattern having at least one moire-type fringe, and photodetector means diposed adjacent the optical gratings to detect an optical shift in one moire-type fringe in response to displacement of the tare support means, and provide an electrical output proportional to the optical shift of said moire-type fringe, said optical gratings and said photodetection means being constructed to operate in a generally linear, repeatable portion of a cyclic moire fringe output throughout the weighing range, whereby the weight of an article may be determined.

4,097,151

METHOD OF AND APPARATUS FOR LOCATING B TYPE AND POINT TYPE DEFECTS IN A GLASS RIBBON

Hugh E. Shaw, Jr., New Kensington, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 16, 1976, Ser. No. 667,325
Int. Cl.² G01N *21/00, 21/16*
U.S. Cl. 356—73 **13 Claims**



1. In a method of inspecting a glass for point type and B type defects wherein the method includes the steps of directing a beam of light toward the glass to pass the beam of light through the glass as a transmitted beam of light; and displacing the beam of light and glass relative to one another to pass the beam of light through the glass along a scan path, the improvement comprising the steps of:

splitting the transmitted beam of light into a first scanning light beam and a second scanning light beam;

passing a generally rectangular portion of the first scanning light beam having a length greater that its width to (1) minimize ratio of light to dark areas of the first scanning light beam caused by point type defects and (2) maximize ratio of light to dark areas of the first scanning light beam caused by B type defects;

sensing intensity variations of the generally rectangular portion of the first scanning light beam to determine B type defects in the glass;

passing a generally rectangular portion of the second scanning light beam having a length less than the length of the rectangular portion of the first scanning light beam to (1) minimize ratio of light to dark areas of the second scanning light beam caused by B type defects and (2) maximize ratio of light to dark areas of the second scanning light beam caused by point type defects; and

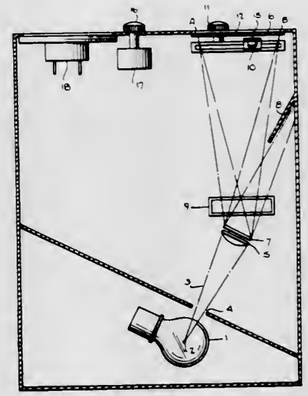
sensing intensity variations of the rectangular portion of the second scanning beam to determine point type defects.

4,097,152

SPECTROPHOTOMETER WITH VISUAL SPECTRUM DISPLAY

Stanley J. Kishner, Pomona, N.Y., assignor to Kollmorgen Corporation, Hartford, Conn.

Filed Aug. 25, 1976, Ser. No. 717,587
Int. Cl.² G01J *3/42*
U.S. Cl. 356—96 **1 Claim**



1. A spectrophotometer for providing, simultaneously, a measurement of sample transmittance at any desired visible wavelength and a display of the visible transmittance spectrum of the sample comprising:

(a) an incandescent lamp having a linear filament;

(b) a lens for focusing the light produced by said filament;

(c) a transmissive diffraction grating responsive to said light focused by said lens for dispersing said light into its component wavelengths and illuminating said sample with said dispersed light;

(d) a diffusing viewing screen for displaying the dispersed light transmitted by said sample;

(e) a photoconductive photodetector located proximate to and below said display and slightly closer to said diffraction grating than said screen for simultaneously, selectively sensing a portion of the spectrum of said dispersed light transmitted by said sample and displayed on the upper portion of said screen;

(f) means for indicating which portion of the spectrum of said dispersed light transmitted by said sample is being sensed by said photodetector; and

(g) means for providing a visual indication of the sample transmittance.

4,097,153

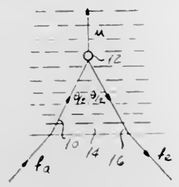
METHOD AND APPARATUS FOR MEASURING THE ELECTROPHORETIC MOBILITY OF SUSPENDED PARTICLES

Joseph DeRemigis, New Market, Canada, assignor to Sentrol Systems Ltd., Downsview, Canada

Filed May 17, 1976, Ser. No. 686,835
Int. Cl.² G01N *21/00*; G01P *3/36*; B01K *5/00*; G01B *9/02*
U.S. Cl. 356—103 **25 Claims**

1. In an apparatus for measuring the electrophoretic mobility of particles suspended in a fluid medium including a source of coherent electromagnetic radiation, means for directing source radiation upon said suspended particles to produce scattered radiation dependent in frequency on the velocity of said particles in a certain direction, a radiation detector, means for

coupling source radiation and scattered radiation to said detector, said detector providing a heterodyne signal, and analyzer means for determining the spectral composition of said heterodyne signal, the improvement comprising means for applying to the suspended particles respective first and second electric



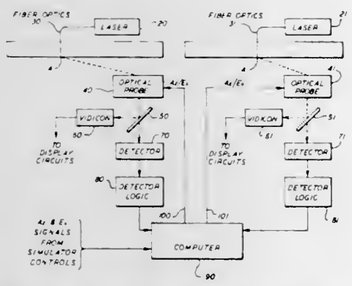
fields in said direction over first and second measuring intervals, the magnitudes of said applied fields in said direction being constant over the duration of said measuring intervals, and comparison means for determining changes in the spectral composition of said heterodyne signal between said first and second measuring intervals.

4,097,154

PRECISE POINTING ALIGNMENT OF OPTICAL PROBES

David L. Peters, Whitney Point, and Philip R. Marr, Sr., Vestal, both of N.Y., assignors to The Singer Company, Binghamton, N.Y.

Filed Sep. 21, 1976, Ser. No. 725,165
Int. Cl.[2] G01B *11/26;* **G09B** *9/08*
U.S. Cl. 356—152 **17 Claims**



1. In a camera/model display system comprising two model boards, each with its own optical probe and with means to control the positioning of said optical probes, apparatus to enhance the positioning of said probes to allow each to precisely view desired points on their respective model boards with the same perspective comprising:

a. a laser having a characteristic light signature distinguishable from that of the lighting used to illuminate said model boards;

b. means to communicate said laser light to a desired point on each model board from which point said light is emitted;

c. means to distinguish said laser light from the light output of each optical probe as said probes view their respective model boards;

d. means to locate the relative positions of said laser light within the field of view of each of said optical probes; and

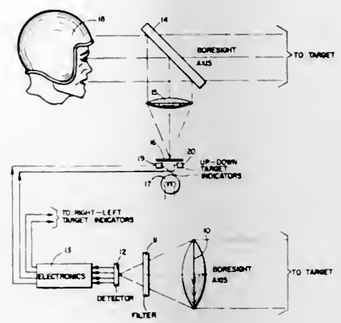
e. means to correlate said locations and to generate a differential control signal to apply to at least one of said optical probes, said differential control signal enhancing the operation of said means of controlling the position of said probes and being operative only when there is a difference in the relative positions of said laser light within the field of view of each of said optical probes.

4,097,155

TARGET LOCATING SYSTEM

Quentin D. Appert, Tustin, Calif., assignor to Rockwell International Corporation, Anaheim, Calif.

Filed Jul. 24, 1967, Ser. No. 656,987
Int. Cl.[2] G01B *11/26;* **G02B** *23/10*
U.S. Cl. 356—152 **9 Claims**



1. In a target locating system wherein a target is illuminated by a pulsed laser illuminator, operating at a preselected fixed pulse rate, by a forward observer, means for use by a remote observer for determining the direction of said target comprising, in combination:

means for receiving and detecting the pulsed laser illumination reflected from that target, said means being sensitive to the direction of incidence of said reflection illumination with respect to a reference axis; and

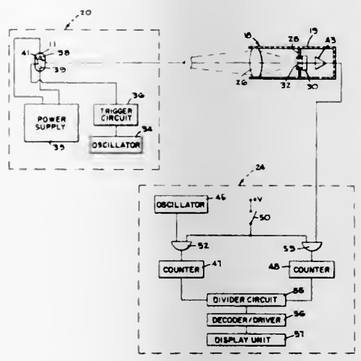
means responsive to said direction sensitive means for generating a visual indication of the direction of said target with respect to said reference axis, said visual indication generating means comprising means for preventing said visual indication from responding to light pulses whose repetition rate is different from said fixed pulse rate, whereby said remote observer may position said direction sensitive means to align said reference axis with the line of sight to said target.

4,097,156

REAL-TIME SYSTEM FOR AUTOMATICALLY MEASURING THE PERFORMANCE OF WEAPONS

Arnold L. Garber, and Hans H. Cremer, both of San Jose, Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Feb. 11, 1977, Ser. No. 767,729
Int. Cl.[2] G01B *11/26;* **F41F** *27/00*
U.S. Cl. 356—152 **10 Claims**



6. A real-time system for automatically evaluating the performance of a weapon by measuring the percentage of time that the weapon is trained on a target, said system comprising:

a flash lamp mounted on said target;

means for energizing said lamp so that said lamp flashes at a predetermined rate;

photodetector means mounted at said weapon;

means for directing flashes of radiant energy from said flash lamp to said photodetector means when and only when said weapon is aimed at said target, said photodetector means having means for developing a signal pulse for each of said flashes of energy received;

signal generating means positioned at said weapon for developing oscillator pulses having a frequency substantially equal to the frequency of said lamp flashes;

first counting means for counting the number of oscillator pulses generated during the time period that said weapon is being evaluated; and

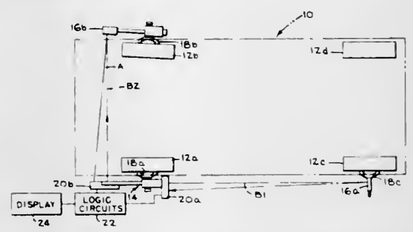
second counting means for counting the number of signal pulses developed by said photodetector means during said evaluation time period.

4,097,157

VEHICLE WHEEL ALIGNER FOR MEASURING FRONT WHEEL TOE WITH RESPECT TO THE REAR WHEEL AXIS OF ROTATION

Melvin H. Lill, San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Mar. 2, 1977, Ser. No. 773,639
Int. Cl.[2] G01B *11/26*
U.S. Cl. 356—152 **6 Claims**



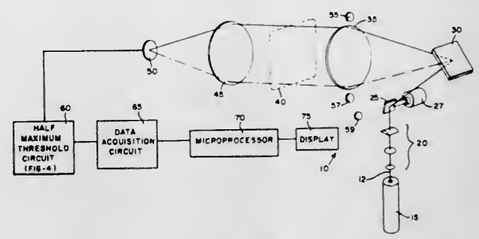
1. Apparatus for measuring the front wheel toe angles of a motor vehicle having pairs of front and rear wheels, said apparatus comprising alignment means adapted to be mounted upon one of said front wheels of the vehicle in a predetermined position with respect to the axis of rotation of said one front wheel, a mirror adapted to be mounted upon the rear wheel of said vehicle on the same side of the vehicle as said one front wheel, said mirror being mounted in a predetermined position with respect to the axis of rotation of said rear wheel, said alignment means including means for projecting a beam of light to said mirror, said alignment means further including means for receiving the reflected beam of light from said mirror and for calculating the toe angle of said one front wheel relative to said axis of rotation of said rear wheel in accordance with the position of the received light beam, means mounted upon one of the front wheels of the vehicle for projecting a beam across the front of the vehicle toward the other front wheel of said vehicle, means mounted upon said other front wheel of said vehicle for projecting a beam across the vehicle toward said one front wheel, means responsive to the positions of said projected beams for providing a signal proportional to the total toe angle between said two front wheels of the vehicle, means connected to said last named means for calculating the total toe angle between said two front wheels of the vehicle, and logic means connected to both of said calculating means for subtracting the toe angle of said one front wheel from the total toe angle and for providing an output reading of the toe angle of the other of said front wheels with respect to said axis of rotation of said rear wheel.

4,097,158

HALF-MAXIMUM THRESHOLD CIRCUIT FOR OPTICAL MICROMETER

Jack T. Dehait, Dayton, Ohio, assignor to Systems Research Laboratories, Inc., Dayton, Ohio

Filed Jan. 6, 1977, Ser. No. 757,218
Int. Cl.[2] G01B *11/08*
U.S. Cl. 356—160 **10 Claims**



1. In an optical micrometer wherein a beam of light is scanned across an article placed within a zone of measurement and wherein the time of interruption of the beam is a function of the size of the article, a method for determining accurately when the beam crosses the edges of the article including the steps of

generating a first set of electrical signals representing the intensity of the beam after it passes through the zone of measurement including a full-amplitude real time signal and a half-amplitude real time signal,

generating a second set of signals delayed in time from the first set of signals including a full-amplitude delayed signal and a half-amplitude delayed signal,

sensing when the beam is obscured by the article by comparing said full-amplitude real time signal and said half-amplitude delayed signal to produce a first output signal,

sensing when the beam emerges from the outer edge of the article by comparing said half-amplitude real time signal and said full-amplitude delayed signal to produce a second output signal,

delaying the first output signal by the amount of the time delay, and

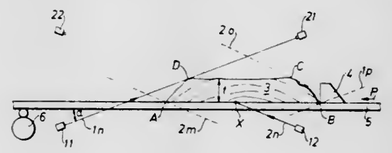
combining the delayed first output signal and the second output signal to provide a composite output signal which represents the size of the article within the zone of measurement.

4,097,159

METHOD OF, AND DEVICE FOR EFFECTING CONTACT-FREE MEASUREMENT BY OPTICAL SCANNING

Per Strandberg, Vesteras, Sweden, assignor to Kockums Automation AB, Vesteras, Sweden

Filed Aug. 6, 1976, Ser. No. 712,179
Claims priority, application Sweden, Oct. 15, 1975, 7511507
Int. Cl.[2] G01B *11/04*
U.S. Cl. 356—167 **22 Claims**



1. A method of optically scanning an object which in its cross-section shows a first edge limited by a first pair of corner points, and a second edge and a third edge issuing from the first and second corner points of the first pair respectively and terminating by a first and a second corner points of a second

pair respectively, comprising the steps of: moving in a direction at least approximately parallel with the said first edge the object relative a scanning-and-sensing-system comprising at least two emitters emitting scanning rays and at least two scanning ray receivers;

aligning the scanning ray receivers with the scanning rays for producing electrical signals whenever the respective scanning ray is obturated and whenever the obturation subsequently is relieved;

producing electrical signals with a position indicator for indicating the said relative movement;

subtending a smaller angle with the scanning rays with the direction of transport than the said second and third edges;

evaluating, in correlation with the electrical signals received from the position indicator, the electrical signal received when a first scanning ray is obturated as the indication of a first corner point in the said first pair and when the second scanning ray is obturated as a first corner point in the said second pair and when the obturation of the said first scanning ray is relieved as the second corner point in the said second pair and when the obturation of the said second scanning ray is relieved as the second corner point in the said first pair.

4,097,160

METHOD FOR INSPECTING OBJECT DEFECTION BY LIGHT BEAM

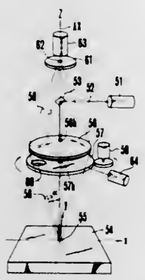
Masamichi Yataki, Tama; Hideyo Takahata, Yokohama, and Norio Simomura, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 609,945, Sep. 3, 1975, abandoned. This application Apr. 4, 1977, Ser. No. 784,328

Claims priority, application Japan, Oct. 7, 1974, 49-115323; Oct. 2, 1974, 49-113610; Sep. 6, 1974, 49-1102679

Int. Cl.² G01N *21/32, 21/48*

U.S. Cl. 356—237 **1 Claim**



1. A method for inspecting a defect of an object comprising the steps of:

projecting a narrow beam to the object, whereby a scattered light beam takes place from the spot on the object projected with the beam;

scanning this scattered light beam for inspection along a certain predetermined circular line to obtain a serial DC output signal when a defect does not exist at the scanned spot and to obtain a serial AC output signal when a defect exists at the scanned spot; and

detecting whether there exists a defect or not by determining whether the output signal is DC or AC.

4,097,161

COUPLING WITH OVERLOAD SAFETY DEVICE

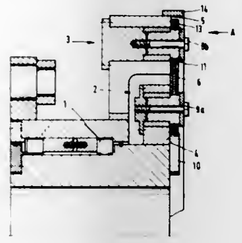
Hermann Weiss, Kaarst, and Hans Wellkamp, Wittlaer, both of Germany, assignors to Atec-Weiss KG, Kaarst, Germany

Filed Jun. 16, 1977, Ser. No. 807,339

Claims priority, application Germany, Sep. 11, 1976, 2640989

Int. Cl.² F16D *9/00*

U.S. Cl. 403—2 **7 Claims**



1. A coupling apparatus employing two coaxially held coupling halves connected to one another by a tension member having a predetermined breaking point, said tension member secured to one coupling half at one end and is radially and tangentially displaced to the other end of the tension member which is secured to the other coupling half, said apparatus including: a movable element (**6c**, **6d**) of said tension member positioned at both sides of a predetermined breaking point (**7**) of said tension member, holding means (**9a**, **9b**, **11**) disposed in proximity to said tension member which limit the swinging of the movable elements (**6c**, **6d**) of said tension member by centrifugal forces acting thereon after the tension member (**6**) has broken; a stop means (**10**) carried by a coupling half (**2**) associated with a first moveable element (**6c**) of said tension member (**6**), being provided in the path of movement of a second movable element (**6d**) of the tension member (**6**), whereby the second movable element (**6d**) is adapted to swing out of the path of movement of the first movable element (**6c**) of said tension member (**6**).

4,097,162

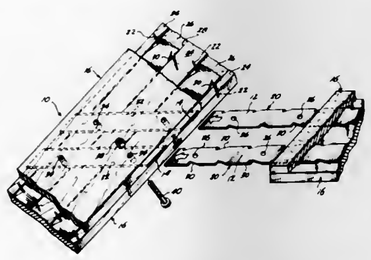
MORTISE AND TENON JOINT

Sir Walter Lindal, Suite 1201, 1120-8th Ave., Seattle, Wash. 98101

Filed Jul. 26, 1976, Ser. No. 708,409

Int. Cl.² B25G *3/00*

U.S. Cl. 403—264 **28 Claims**



1. A construction member comprising a pair of mutually opposing, normally strip-like bodies of wood or other fastener impalable material, which are abutted face to face with one another along a common axis to form the main body of the member, and define an elongated, axially extending slot at the interface therebetween which extends substantially full length of the member and opens at corresponding axial ends of the bodies of fastener impalable material, said slot having defining surfaces thereof which are mutually opposed to one another on the bodies across the interface, and there being an elongated strip of metal-like reinforcing material interposed in the slot face to face with said surfaces and extending lengthwise of the slot substantially the full length thereof, said metal-like strip having integral tooth-like fasteners on the longitudinally extending edges thereof which are impaled in the bodies of fastener impalable material at the aforesaid surfaces of the slot to rigidly interconnect the bodies across the interface, said bodies of fastener impalable material substantially co-terminating with one another at the aforesaid axial ends thereof, and a portion of said metal-like strip projecting from the slot beyond said axial ends of the bodies of fastener impalable material to form a tenon on that end of the member.

4,097,163

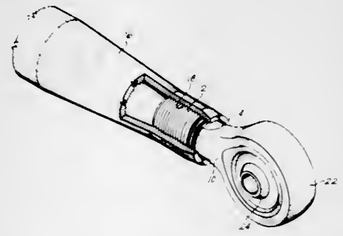
METHOD OF SWAGE JOINING A ROD END TO A TUBE AND THE PRODUCT THEREOF

Douglas K. Dubuque, Lynnwood, Wash., assignor to Tyee Aircraft, Inc., Everett, Wash.

Filed Jan. 10, 1977, Ser. No. 757,950

Int. Cl.² F16B *29/00*

U.S. Cl. 403—274 **1 Claim**



1. A combination swage-joined steel rod end having external, imprinted, screw threads, having major and minor diameters, extending from a free end portion toward an inner end portion thereof and terminating in a plurality of parallel grooves extending into and crosswise of said screw threads to provide axially spaced rows of grooves which rows are normal to the axis of said steel rod, having a depth not greater than the minor diameter of said screw threads, and positioned in the rod adjacent the said inner end portion of said rod; and a relatively softer metallic tube threadedly connected to said rod end and swaged to the rod end by the flow of metal from said tube to said rod end at the area of said grooves in said screw threads.

4,097,164

TERMINALS ON WIRE ROPE AND STRAND

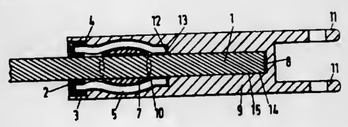
Robert Edward Campbell, Doncaster, England, assignor to Bridon Limited, England

Continuation of Ser. No. 499,652, Aug. 22, 1974, abandoned. This application Jul. 12, 1976, Ser. No. 704,298

Claims priority, application United Kingdom, Aug. 28, 1973, 40491/73

Int. Cl.² F16G *11/02*

U.S. Cl. 403—284 **4 Claims**



1. A terminal assembly for underformed wire rope or strand, including in combination:

elongated terminal body means having an open end and a first longitudinal bore portion therein extending substantially intermediate the length of said terminal body means, said first bore portion being adapted to receive and engage the rope or strand upon insertion therein, said terminal body means further having a second longitudinal bore portion integral to said first longitudinal bore portion and extending to said open end of said terminal body means and

a plurality of separate and spaced deformable damping member means each comprised of an elongated plastic and resilient material positioned within said second longitudinal bore portion and adapted to surround the rope or strand as the undeformed rope or strand is passed through said second longitudinal bore portion into said first longitudinal bore portion, such that when said terminal body means is radially compressed inwardly, said first bore portion engages and compacts the undeformed rope or strand directly over the whole of its circumference and length within the first longitudinal bore portion thereby preventing the rope or strand from being withdrawn from the terminal body means and said second bore portion engages said plastic and resilient material of said deformable damping member means to cause the same to engage the undeformed wire rope or strand thereby dissipating transverse and longitudinal vibrations transmitted along the rope or strand towards the terminal assembly.

4,097,165

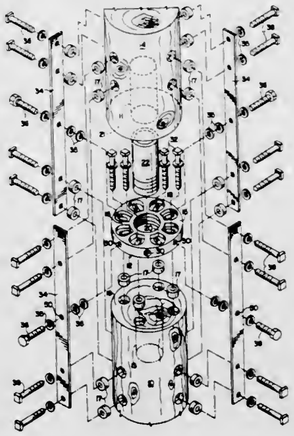
POLE TOP EXTENSION BRACKET

Jackson C. Quayle, 10225 Darrow Rd., Twinsburg, Ohio 44087

Continuation-in-part of Ser. No. 680,290, Apr. 26, 1976, Pat. No. 4,032,244. This application Apr. 29, 1977, Ser. No. 792,130

Int. Cl.² F16B *7/00*

U.S. Cl. 403—286 **8 Claims**



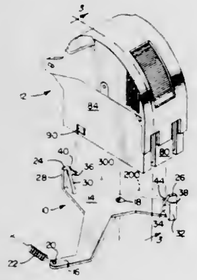
1. A bracket for connecting a top extension pole member to an existing pole member each having an end portion comprising: a metal plate having parallel planar surfaces and a centrally located shaft member extending perpendicularly outwardly therefrom to be received in at least one corresponding center bore provided in one of said pole members; apertures provided through said plate; first sleeves matingly embedded in the end portion of the existing pole member concentrically aligned with said apertures; relatively large fastening means passing through said apertures and through said sleeves into the top of said existing pole to attach and hold said metal plate thereon; strap members positioned vertically along the outer surfaces of said pole members and said plate with apertures therein; second sleeves matingly embedded in said outer surfaces of said pole members concentrically aligned with said strap apertures; fastening means to secure said straps to the periphery of said plate; and fastening means passing through said strap apertures and said second sleeves into said pole members to secure said strap members to said pole members to

form a unified pole structure capable of resisting significant shear and bending moment stresses.

4,097,166
LATCH FOR FILM CARTRIDGE

Reid J. Stava, Fairport, N.Y., assignor to The Singer Company, New York, N.Y.

Filed Sep. 20, 1976, Ser. No. 724,882
Int. Cl.[2] B25G *3/18*
U.S. Cl. 403—321 **8 Claims**

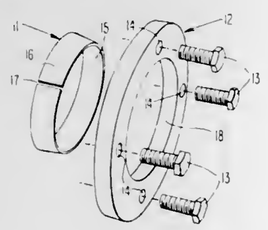


1. A latch detachably engageable with a film strip cartridge of the type having at least a pair of side walls and an aperture in each of said side walls comprising:
- a plate portion rotatably supported on a support means and having an axis of rotation substantially normal to the plate;
- a first tab located on a first area of said plate;
- a second tab located on a second area of said plate, opposite from said first area;
- said tabs facing in opposite directions;
- at least first and second spaced, opposed, parallel walls defining a cartridge restraint means;
- said first sidewall having a first access port for said first tab;
- said second sidewall having a second access port for said second tab;
- whereby rotation of said plate portion in a first direction causes said first tab to enter said first access port, and said second tab to enter said second access port;
- and rotation of said plate portion in the second direction, opposite from said first direction, causes said first tab to retract from said first access port, and said second tab to retract from said second access port.

4,097,167
THRUST COLLAR

Andrew Stratienko, 8503 Elliston Dr., Philadelphia, Pa. 19118

Filed Mar. 7, 1977, Ser. No. 775,174
Int. Cl.[2] B25G *3/20*
U.S. Cl. 403—374 **11 Claims**



1. A thrust retaining device for positive axial securing of a part on a smooth shaft, comprising:
- a contractible inner collar ring for retaining thrust and having an inner surface for gripping the outer surface of the shaft when contracted, an outer surface which is axially inclined, and an end surface for positioning against the part to be secured;
- an outer collar ring to be placed over and for contracting the inner collar ring, the outer collar ring having an inner surface which is axially inclined at the same angle as the outer surface of the inner collar ring for engaging that surface, the end surface of the inner collar ring extending beyond the outer collar ring when the thrust retaining device is installed on the shaft, at least one of the axially inclined surfaces of the inner and outer collar rings having a stable anti-friction material preventing metal to metal contact thereon, and the inner and outer collar rings complying with following condition:

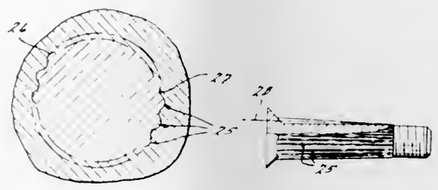
$$f > \tan(\alpha+\phi)$$

where:
- f is the coefficient of starting friction of the inner collar ring on the surface of the shaft,
- α is the angle of inclination of the axially inclined surface,
- ϕ is the frictional angle of the axially inclined surface, the coefficient of starting friction of the axially inclined surface being tan ϕ, and
- loading screw means attached to the outer collar ring for applying axial force in the direction of the inner surface axial inclination, whereby the outer ring slides relative to the inner ring and causes the inner ring to contract and grip the shaft.

4,097,168
PRESTRESSED CONNECTION AND FASTENER THEREFOR

Paul V. Pagel, Fullerton, Calif., assignor to Microdot Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 616,131, Sep. 24, 1975, Pat. No. 4,012,884, which is a continuation of Ser. No. 182,535, Sep. 21, 1971, abandoned. This application Mar. 21, 1977, Ser. No. 779,846
The portion of the term of this patent subsequent to Mar. 22, 1994, has been disclaimed.
Int. Cl.[2] B25G *3/36*
U.S. Cl. 403—388 **4 Claims**

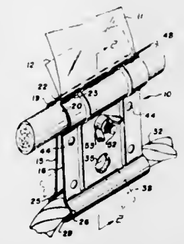


1. A bolt for forming a controlled radially prestressed connection between a plurality of members formed of material relatively softer than the material of said bolt, said members having aligned bolt-receiving bores defining a right circular surface of revolution, said bolt including a head and having an elongated shank having a nominal conical surface of revolution, said shank having circumferentially spaced arcuate continuously undulating axially extending alternate convex lobes, the crests of which define said conical surface of revolution, and concave grooves, the number of said convex lobes divided by a nominal circumference of the shank portion of said bolt resulting in a number in the range of 14 to 32, a radius of said bolt divided by the radius of said convex lobes resulting in a number within the range of 2 to 5, corresponding portions of the crests and roots of said convex lobes and concave grooves being spaced radially outwardly and inwardly, respectively, substantially the same distance from said conical surface of revolution, said convex lobes effecting a radially outward compression of the material surrounding said bores to prestress said material to a degree sufficient to cause controlled plastic flow of said material circumferentially and radially inwardly into the concave grooves of said bolt to preclude excessive prestress of the material surrounding said bores, the maximum angle of metal flow being tangent to the arc of said convex lobes and concave grooves at the point of transition therebetween.

4,097,169
CLAMP ARRANGEMENT AND SYSTEM FOR SHEET MATERIAL

Clifford G. Kelly, #2-10492 135th St., Surrey, British Columbia, Canada (V3T 4C5)

Continuation of Ser. No. 620,110, Oct. 6, 1975, abandoned. This application Oct. 7, 1976, Ser. No. 730,371
Int. Cl.[2] F16B *2/02*
U.S. Cl. 403—391 **11 Claims**

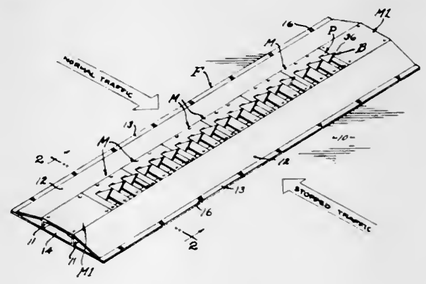


1. A clamp arrangement for securing sheet material to a base, comprising a clamp having a pair of jaw plates with opposed grooves therein to act as jaws for receiving a rod with a sheet extending therearound and placed between the jaw plates, and clamping means for drawing the plates together to cause said jaws to grip the rod and thereby secure the sheet to said rod, said grooves being of a predetermined cross section to enclose a space therebetween shaped to receive a rod of substantially the same cross section, and said clamping means comprising a bolt secured to one of said plates and extending through a hole in the other of said plates, a locking bar mounted for rotation on the bolt adjacent said other plate, restraining means on the bolt to prevent movement of said bar outwardly along the bolt, and a protuberance on said adjacent plate near the bolt, said bar being rotatable on the bolt from a position clear of the protuberance, at which time the jaws are open, to a locking position on the protuberance to move the jaws towards each other to grip a rod and sheet therebetween.

4,097,170
MODULAR TRAFFIC CONTROLLER

Harry D. Dickinson, 1681 Larco Way, Glendale, Calif. 91202

Filed Feb. 18, 1977, Ser. No. 769,940
Int. Cl.[2] E01F *13/00*
U.S. Cl. 404—6 **18 Claims**

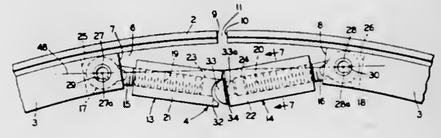


1. An above-grade vehicle traffic controller permitting traffic flow in one direction while preventing traffic flow in the opposite direction, and including:
- a low profile support to be transversely superimposed upon a pavement surface over which vehicular traffic is to pass and comprising, a pair of spaced rails secured to said pavement surface, there being an upwardly open channel between said secured rails;
- and a plurality of modules selectively replaceable in a series along the rails and including barrier modules comprising, a slotted mounting plate secured to and extending between the rails, a barrier blade assembly journaled on spaced trunnions depending into said channel between the rails and with at least one barrier blade depressible through the mounting plate slotted therefor, and spring means extending from a lever point on the barrier blade assembly to the mounting plate and yieldingly urging the barrier blade assembly into stopped engagement with the mounting plate to be visibly exposed thereabove for vehicle control.

4,097,171
MANHOLE COVER SUPPORT RING

Raymond L. Fier, 5323 Pin Oak Ave. NW., Massillon, Stark County, Ohio 44646

Filed Sep. 16, 1977, Ser. No. 833,805
Int. Cl.[2] E02D *29/14*
U.S. Cl. 404—26 **20 Claims**



12. A manhole assembly including:
- a. a manhole frame adapted to be placed below a pavement surface, said frame having a generally vertically extending inner conical surface defining a manhole opening, and an annular horizontal surface extending inwardly from said conical surface;
- b. ring means having a generally vertically extending conical flange and an annular ledge mounted on the bottom of said conical flange and extending inwardly therefrom, said flange and ledge being split at a common point on their periphery forming a gap between spaced ends of said flange and ledge;
- c. lever means pivotally mounted on the ring means and extending between and operatively engageable with the spaced ends of the ledge for expanding the ring means outwardly upon movement of the lever means from an open position to a closed position;
- d. the ring means being supported on the horizontal surface of the manhole frame, with the ring means flange being in abutting engagement with the conical surface of said manhole frame when the lever means is in closed position; and
- e. a circular manhole cover lying within the conical flange of the ring means and being supported on the ledge of the ring means, vertically raising the cover above the horizontal surface of the manhole frame.

4,097,172
COLD-PATCHING

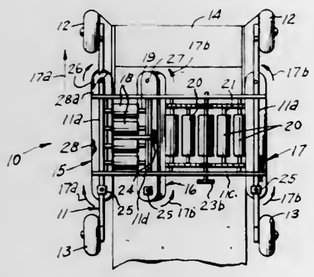
Gerald W. Burkhart, Monaca, Pa., assignor to Arco Polymers, Inc., Philadelphia, Pa.

Filed Dec. 21, 1976, Ser. No. 753,052
Int. Cl.[2] E01C *7/35*
U.S. Cl. 404—75 **8 Claims**

5. The method of repairing by cold patching a deteriorated pavement surface area which comprises:

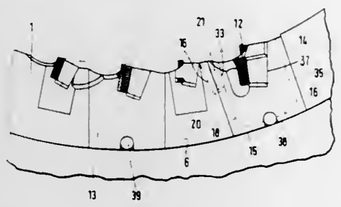
a. applying polystyrene dissolved in a volatile solvent to the deteriorated pavement area,
b. applying polystyrene dissolved in a volatile solvent to the cold patch material,
c. placing the treated cold patch material in the treated cavity of the deteriorated area,
d. applying pressure to said patched area,
e. allowing the solvent to volatilize and leaving deposited therethrough the polystyrene, whereby said deteriorated area and the cold patch applied thereto are interconnected by said polystyrene throughout the patch and the surrounding area to securely connect the cold patch material to the surrounding area.

4,097,173
SELF PLACING AUTOMATIC FORM
John R. Tout, 3530 Platt Ave., Fresno, Calif. 93702
Filed Sep. 23, 1977, Ser. No. 836,046
Int. Cl.² E01C *11/28*
U.S. Cl. 404—98 **4 Claims**



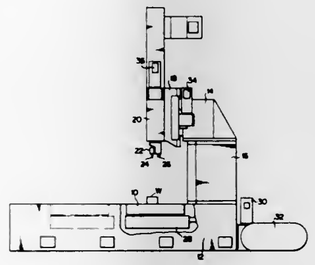
1. A self-placing automatic form machine, comprising a frame supported upon traction wheels, a concrete-mix hopper secured to one end of said frame, three self-placing form units secured to said frame for finishing the concrete mix, a plurality of parallel, spaced-apart rollers secured within said frame for engagement with the concrete mix, and a plurality of laterally moving rollers for finishing the concrete mix.

4,097,174
MILLING CUTTER
Werner Heinlein, Lichtenau, Germany, assignor to Hans Heinlein, Zirndorf bei Nuremberg, Germany
Filed Nov. 8, 1976, Ser. No. 740,077
Claims priority, application Germany, Sep. 4, 1976, 2639890
Int. Cl.² B26D *1/12*
U.S. Cl. 407—46 **7 Claims**



1. A milling cutter form milling workpieces, the cutter comprising:
a hub having an annularly extending circularly arched groove and a plurality of recesses therein;
a plurality of interchangeable inserts each having a circularly arched edge, each insert being mounted in one of said recesses with its said circularly arched edge resting in said annularly extending circularly arched groove;
clamping means for holding said inserts in said recesses;
a plurality of cutting elements mounted in said interchangeable inserts;
special recesses for inserts with outside guides provided in said hub and extending over its width;
inserts provided with U-shaped, finely machined, especially ground guides fitting over edges of said special recesses, one of said edges of at least one of said special recesses being provided with at least one step and
a wedge guided in said step.

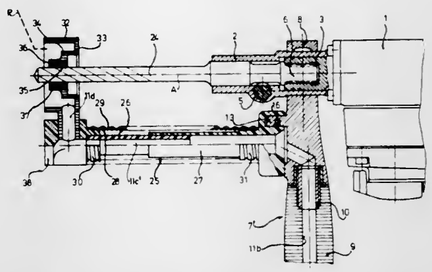
4,097,175
MACHINE FOR DRILLING HOLES IN RIGHT-ANGULAR WORK SURFACES
Yoshihiro Tsukiji, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan
Filed Jan. 5, 1977, Ser. No. 757,057
Int. Cl.² B23B *39/14, 41/00*
U.S. Cl. 408—23 **12 Claims**



1. In a machine tool, in combination, a table, a crossrail extending parallel to the surface of said table, a carriage mounted on said crossrail for movement therealong, means for moving said carriage along said crossrail, a ram mounted on said carriage for movement toward and away from said table, said ram being further movable with said carriage along said crossrail, means for moving said ram toward and away from said table, a toolhead pivotally mounted on that end of said ram which is disposed opposite to said table, a toolholder rotatably supported by said toolhead for rotation about an axis lying in a plane parallel to said crossrail and at right angles with the surface of said table, means for imparting rotation to said toolholder, a rotary cutting tool supported by said toolholder for simultaneous rotation therewith, said toolhead being pivotable relative to said ram about an axis at right angles with said crossrail and parallel to the surface of said table, and means for pivoting said toolhead relative to said ram wherein said tool has a first operative position such that its axis is perpendicular to the plane of said table and said tool has a second operative position such that its axis is at an angle other than a right angle with respect to the plane of said table.

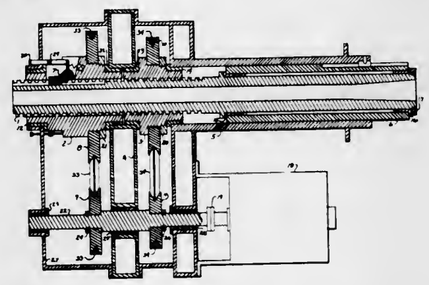
4,097,176
PARTICLE-ASPIRATING ACCESSORY FOR A HAMMER DRILL
Karl Wanner, Echterdingen; Wilbert Reibetanz, Leinfelden; Manfred Bleicher, Leinfelden, and Herbert Wiesner, Leinfelden, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Filed Sep. 22, 1976, Ser. No. 725,446
Claims priority, application Germany, Oct. 28, 1975, 2548100
Int. Cl.² B23B *51/06*
U.S. Cl. 408—56 **5 Claims**

1. In combination with a boring implement having a chuck adapted to hold a tool having an axis, an accessory comprising:
a collar surrounding said chuck;
an elongated handle fixed on said collar and having an outer end turned away from said collar and from said implement, whereby said implement can be stabilized by means of said handle;
structure forming a throughgoing passage extending from said tool through said handle to said outer end thereof and including
a nipple extending in a direction parallel to said axis with said passage opening at said nipple in said direction,
a cup open away from said implement at said tool and having an interior connected to said passage, and



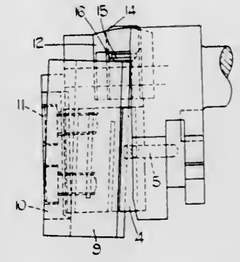
a telescoping tube extending between said cup and said nipple and formed of a pair of telescoping tube sections, a compression spring braced between said sections, and a tubular cuff connected to both of and surrounding said sections; and
means including a flexible conduit having an end portion attached to and in line with said handle at said outer end for drawing gas and particles from said tool through said passage.

4,097,177
POWER HEAD DRILLING AND TURNING UNIT
Ross A. Close, 3831 Glenbrook Rd., Fairfax, Va. 22031
Filed Mar. 11, 1977, Ser. No. 776,637
Int. Cl.² B23B *47/18*
U.S. Cl. 408—132 **1 Claim**



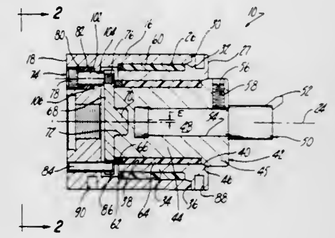
1. A drilling and turning power head comprising
a box beam frame,
a spindle including an externally threaded portion at one end and means to accomodate a work holder at the other end,
means mounting said spindle on said frame for both rotatable and axial movement,
an internally threaded feed hub mounted for rotation on said frame and adapted to cooperate with the externally threaded portion of said spindle to form a thread connection,
a drive hub mounted for rotation on said frame and adapted to be releasably attached to said spindle,
a motor-driven drive shaft rotatably mounted on said frame generally parallel with said spindle,
means including first and second pulleys for drivingly connecting said drive shaft with said feed hub and said drive hub, said means being so adapted that said drive hub is rotated faster than said feed hub to effect axial feed of said spindle, and
means including a ring actuated dog for disconnecting said drive hub from said spindle so that continued rotation of said feed hub will cause the threaded connection between said feed hub and said spindle to reverse the feed and retract the spindle.

4,097,178
DIEHEAD CHASER CARRIER
Denis Alfred Newell, Coventry, England, assignor to Alfred Herbert Limited, Coventry, England
Filed May 28, 1976, Ser. No. 690,837
Claims priority, application United Kingdom, Jun. 11, 1975, 24931/75
Int. Cl.² B23B *51/00, 51/14*; B26D *1/12*
U.S. Cl. 408—151 **16 Claims**



9. The combination of a carrier and a holder for a chaser element maintainable on a die head for securing the chaser element at a required helix angle to a workpiece, said holder comprising an elongated body having a longitudinal recess for receiving and aligning the chaser element with respect to the workpiece, said body being deformable at least in part transversely to said recess, and clamp means for securing said holder to said carrier and simultaneously deforming said body to secure said chaser element in said recess.

4,097,179
CUTTING TOOL HOLDER
Richard C. Gersch, 617 June Ct., Traverse City, Mich. 49684
Filed Jun. 21, 1976, Ser. No. 698,264
The portion of the term of this patent subsequent to Oct. 11, 1994, has been disclaimed.
Int. Cl.² B23B *29/034*
U.S. Cl. 408—151 **21 Claims**



1. A cutting tool holder, comprising:
a hub member having a mounting end and an outwardly extending end, said hub member having an axis and an axial bore formed in its outwardly extending end,
a cylindrical bushing adapted to fit within the hub bore and having an inner bore formed therethrough eccentric to the axis of the hub member,

a bar holder having a shank portion disposed in said eccentric bore and adapted to support a cutting bar having a cutting edge,

means for securing said bar holder in said eccentric bore while permitting rotation of the bushing in said hub member whereby rotation of said bushing in said hub member alters the radial distance of the cutting edge of said cutting bar from said axis of said hub,

a first tubular cylindrical bearing sleeve constructed of a compressible polymer and disposed within said hub bore between said hub member and said bushing, and

a second tubular cylindrical bearing sleeve constructed of a compressible polymer and disposed in said eccentric bore between said bushing and the shank of said bar holder.

9. A cutting tool holder, comprising:

a hub member having a mounting end and an outwardly extending end, said hub member having an axis and an axial bore formed in its outwardly extending end,

a cylindrical bushing adapted to fit within the hub bore and having an inner bore formed therethrough eccentric to the axis of the hub member,

a bar holder having a shank portion disposed in said eccentric bore and adapted to support a cutting bar having a cutting edge,

means for securing said bar holder in said eccentric bore while permitting rotation of the bushing in said hub member whereby rotation of said bushing in said hub member alters the radial distance of the cutting edge of said cutting bar from said axis of said hub,

a first cylindrical bearing sleeve constructed of a compressible material and disposed within said hub bore between said hub member and said bushing whereby substantially the entire outer periphery of said first bearing sleeve flatly abuts against the hub bore and whereby substantially the entire inner periphery of said first bearing sleeve flatly abuts against the outer periphery of said bushing, and

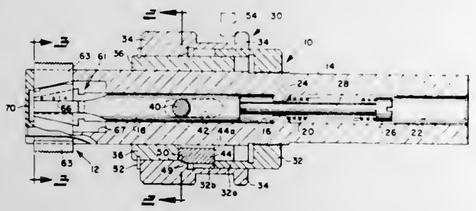
a second tubular cylindrical bearing sleeve constructed of a compressible material and disposed in said eccentric bore between said bushing and the shank of said bar holder whereby substantially the entire outer periphery of said second bearing sleeve flatly abuts against the eccentric bore and whereby substantially the entire inner periphery of said second bearing sleeve flatly abuts against the outer periphery of said bar holder.

4,097,180

CHASER CUTTING APPARATUS

James A. Kwieraga, Durham, Conn., assignor to TRW Inc., Cleveland, Ohio

Filed Feb. 10, 1977, Ser. No. 759,955
Int. Cl.² B23G *5/16*
U.S. Cl. 408—154 **9 Claims**



1. An apparatus for producing threads or other configurations comprising:

an elongated body;

a plunger member mounted for axial movement in said body and having inclined camming surfaces;

at least one chaser member seated on each of said camming surfaces for sliding movement relative thereto; and,

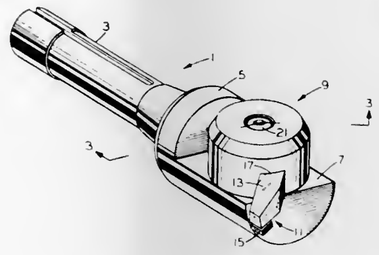
spring clip means extending generally radially outwardly from adjacent each camming surface, each clip means having a laterally extending resilient free end portion engaging an associated chaser and applying to said associated chaser a biasing force having a component acting to maintain said associated chaser in contact with its respective camming surface.

4,097,181

ROTARY CUTTING TOOL

Ted J. Fisher, 1322 Barhart Rd., Poplar Bluff, Mo. 63901

Filed Mar. 7, 1977, Ser. No. 774,782
Int. Cl.² B23B *27/00, 51/00*
U.S. Cl. 408—187 **3 Claims**



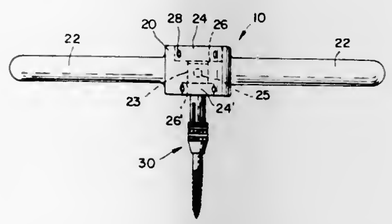
1. A rotary cutting tool having a shank, a generally cylindrical head at one end of the shank constituting its forward end, said head having a flat bed portion formed by a notch extending rearwardly from the forward end of the head, said notch having a width approximately equal to the diameter of the head and a depth approximately equal to one-half said diameter, and means for mounting a bit on the bed portion, said mounting means comprising a clamp generally cylindrical in shape for carrying the bit, said clamp being mounted on the bed portion by a threaded fastener extending through an axial hole in the clamp and into a tapped bore in the bed portion, the clamp being rotatable with respect to the bed portion for angular adjustment of the bit relative to the bed portion, said clamp having a groove therein offset and separate from said axial hole and extending completely across one face of the clamp with said bit being axially slidable in the groove to different extended positions, said groove having a depth less than the thickness of the bit such that the bit projects from the open side of the groove for engagement with said bed portion whereby on tightening said fastener the clamp is drawn toward the bed portion thereby rigidly to clamp the bit in said groove against the bed portion in any predetermined adjusted angular and extended position.

4,097,182

COMBINATION TAP AND DIE WRENCH

Edward M. Rolnick, North Dartmouth, Mass., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Aug. 22, 1977, Ser. No. 826,797
Int. Cl.² B23B *31/10;* **B23G** *5/04*
U.S. Cl. 408—239 R **6 Claims**



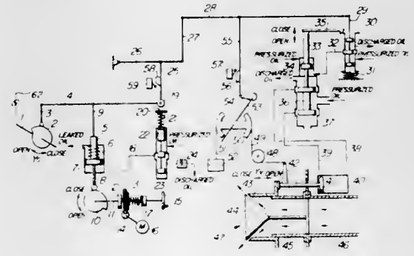
1. A combination tap and die wrench having a center portion and a pair of opposite arm portions extending outwardly from the center portion, said center portion including a pair of opposed flat surfaces with a central aperture extending through the thickness thereof from one of said surfaces to the opposite surface, and at least one receptacle on each of said surfaces about said central aperture, wherein said central aperture is adapted to receive and positively retain tapping apparatus and wherein each of said receptacles is adapted to receive and positively retain a threading die therein.

4,097,183

METHOD OF AND APPARATUS FOR CONTROLLING BY-PASS VALVE

Daumantas Namikas, Walnut Creek, Calif., and Takao Kuwabara, Hitachi, Japan, assignors to Bechtel International Corporation, San Francisco, Calif. and Hitachi, Ltd., Tokyo, Japan

Filed Jul. 9, 1976, Ser. No. 704,031
Int. Cl.² F01D *19/00*
U.S. Cl. 415—1 **13 Claims**



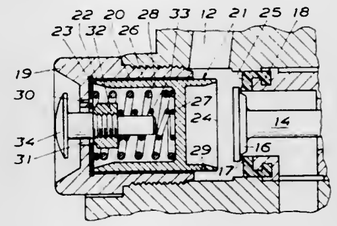
1. A method of controlling a by-pass valve for use in combination with a penstock by means of a flow rate regulating device for regulating a quantity of water flowing through said penstock, said method comprising the steps of cooperatively opening or closing said by-pass valve in response to the operation of said flow rate regulating device to maintain the total quantity of water passing through said flow rate regulating device and said by-pass valve constant when said by-pass valve is opened, and closing said by-pass valve at a sufficiently slow speed not to induce an increase in water pressure within said penstock during the normal condition of operation in which said flow rate regulating device is opened at a stable opening degree.

4,097,184

PRESSURE OPERATED VALVE

Gunnar Christer Hansson, Stockholm, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Jul. 6, 1976, Ser. No. 702,984
Claims priority, application Sweden, Jul. 11, 1975, 7507972
Int. Cl.² F01D *17/00;* **G05D** *16/10;* **F16K** *31/12*
U.S. Cl. 415—49 **16 Claims**



1. Pressure operated valve for automatic shut-off of a pneumatic circuit, comprising:

a housing (**19**) connected to a pressure air source,

a valve body (**21**) movable within said housing between an open and a closed position, and having an area (**24**) facing the closing direction and an area (**22**) facing the opening direction,

a first passage means (**29**) continuously connecting the closing direction facing area (**24**) of the valve body (**21**) to the pressure air source when the valve body (**21**) is in both its open and closed positions,

spring means (**28, 33**) continuously biasing the valve body (**21**) toward its closed position,

a second passage means (**26**) which connects the opening direction facing area (**22**) of the valve body (**21**) to the pressure air source only when the valve body (**21**) occupies its closed position,

means defining a pressure chamber in communication with said opening direction facing area (**22**) of the valve body (**21**) for receiving pressure air via said second passage means (**26**) and for building up pressure from said pressure air source when said valve body (**21**) occupies its closed position after being open so as to stabilize said valve body (**21**) in said closed position after being open, and

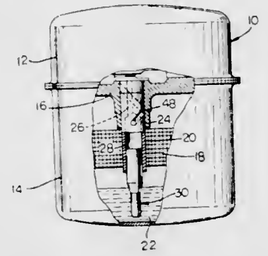
said valve body including means (**22**) for closing said second passage means (**26**) when said valve body (**21**) occupies its open position.

4,097,185

LUBRICATING DEVICE

Rudolf H. Wolf, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Sep. 13, 1976, Ser. No. 722,641
Int. Cl.² F04B *39/02*
U.S. Cl. 415—88 **2 Claims**



1. A pick-up tube, especially for use for supplying lubricant to lubricant passage means in a hermetic device which includes a fluid sump and a vertically disposed rotary shaft above the fluid level in the sump, said tube comprising: a larger diameter upper cylindrical portion open at the upper end and adapted for being fitted into a central bore in the shaft, said tube having a smaller diameter lower cylindrical portion adapted to be immersed in fluid in the sump and a tapering axial region connecting the upper and lower cylindrical portions, an inlet port extending axially into the lower end of said lower cylindrical portion, and an impeller blade disposed substantially diametrially inside said lower cylindrical portion.

4,097,186

MULTI-STAGE RING TYPE CENTRIFUGAL PUMPS WITH INDUCER MEANS

Allan R. Budris, Nutley, N.J., assignor to Worthington Pump, Inc., Mountainside, N.J.

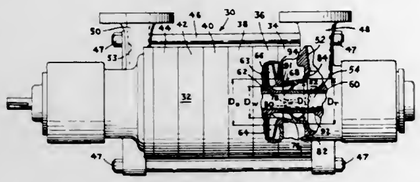
Filed Nov. 18, 1976, Ser. No. 742,899
Int. Cl.² F04D *29/44;* **F01D** *5/22*
U.S. Cl. 415—143 **27 Claims**

1. In a multi-stage ring type centrifugal pump,

a. pump casing means,

b. said pump casing means having an inlet for fluid to be pumped, and an outlet for pumped fluid,

c. a pump shaft rotatably mounted in said casing,
d. a plurality of serially arranged pumping stages having impellers therein connected to and driven by said pump shaft, said pump casing inlet and said pump shaft constructed to accomodate a removable first impeller and diffuser stage of said serially arranged pumping stages,
e. inducer means in said pump casing means removably associated with said shaft and with said pump casing inlet and occupying a position normally occupied by said first impeller and diffuser stage,



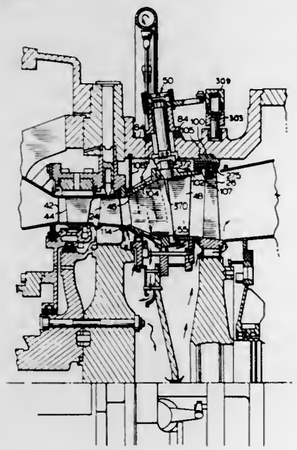
f. said inducer means having an inducer inlet in communication with said inlet for the pump and having an inducer outlet disposed to deliver pumped fluid to the suction eye of the impeller of the adjacent one of the plurality of serially arranged pumping stages, and
g. said plurality of serially arranged pumping stages connected to deliver pumped fluid to the outlet in said pump casing means.

4,097,187

ADJUSTABLE VANE ASSEMBLY FOR A GAS TURBINE

John Korta, Stoney Creek, Canada, assignor to Westinghouse Canada Limited, Hamilton, Canada

Filed Jun. 17, 1976, Ser. No. 697,021
Claims priority, application Canada, Oct. 14, 1975, 237568
Int. Cl.² F01B *25/10*; F01D *17/16, 9/04*
U.S. Cl. 415—161 **2 Claims**



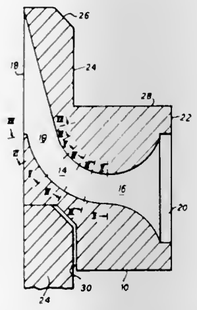
1. A vane assembly for a gas turbine engine the casing of which engine is provided with at least three spaced circumferential key grooves on the interior surface thereof to receive and anchor said vane assembly in place, said vane assembly being of arcuate shape and having inner and outer shroud sections being coupled together by a pair of stationary vanes to form an integral unit, a pair of rotatable vane members, each having an integral shaft means formed therein to provide a suitable axis of rotation for each vane, said inner and outer shroud sections being provided with suitable bearing means to receive said shaft means of said rotatable vanes, said rotatable vanes being mounted in nesting relationship with said stationary vanes in the bearings provided in said inner and outer shroud sections, a central projection means formed on said outer shroud section acts as a first locking member by keying said vane assembly into a first key groove on the interior of said casing, second and third arcuate locking members being keyed into second and third key grooves in the interior of said turbine casing, said second and third members also being keyed into a pair of key slots provided in said outer shroud, said key slots provided in said outer shroud being on opposite sides of and spaced apart from said central projection means, said vane assembly being located in said turbine casing such that the axis of rotation of each rotatable vane extends in a radial direction and passes through said first key groove.

4,097,188

NOZZLE INSERT FOR A TURBINE

Terence Owen Forster, 14 Stamford Rd., Exton, Oakham, Leics., England

Filed Apr. 13, 1977, Ser. No. 786,968
Claims priority, application United Kingdom, Apr. 15, 1976, 15458/76
Int. Cl.² F01D *9/02*
U.S. Cl. 415—202 **14 Claims**



1. A nozzle insert for a turbine said insert having a turbine blade-confronting surface, a working fluid passageway extending through said insert, an inlet and an exit to said passageway, said exit being a rectangular opening in said turbine blade-confronting surface, said passageway having an arcuate section adjacent said inlet and a rectilinear section adjacent said centre line through the rectilinear section of the passageway making an acute angle with said turbineblade confronting surface.

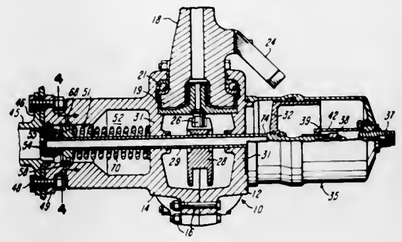
4,097,189

AIRCRAFT PROPELLER AND BLADE PITCH CONTROL SYSTEM

W. Benjamin Harlamert, Piqua, Ohio, assignor to Hartzell Propeller, Inc., Piqua, Ohio

Filed Sep. 20, 1976, Ser. No. 725,008
Int. Cl.² B64C *11/38*
U.S. Cl. 416—46 **20 Claims**

1. An aircraft propeller and control system comprising a propeller hub adapted to be driven by an engine and supporting a plurality of angularly disposed adjustable pitch propeller blades, means including a hydraulic fluid cylinder connected to adjust the pitch of said blades, means for supplying hydraulic fluid to said cylinder and including a fluid pressure responsive relief valve having means for relieving the pressure of the hydraulic fluid supplied to said cylinder when the pressure exceeds a predetermined pressure limit corresponding to a pitch position of said blades, a movable pitch control member adapted to be located within the aircraft cabin, and said relief valve having a pressure member connected to move with said control member for infinitely varying said pressure limit of said relief valve within a predetermined range for changing the pitch of said blades.

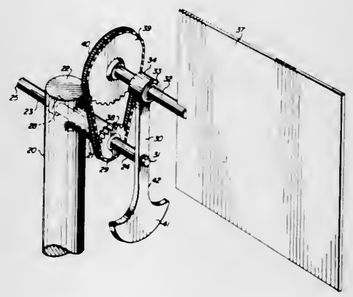


4,097,190

WIND MOTOR

Herbert O. White, 4242 E. Wilshire Dr., Phoenix, Ariz. 85008

Continuation-in-part of Ser. No. 641,390, Dec. 17, 1975, abandoned. This application Oct. 21, 1976, Ser. No. 734,390
Int. Cl.² F03D *3/02*
U.S. Cl. 416—117 **10 Claims**



1. A wind motor for receiving the force of the wind and for translating the generally linear movement thereof to rotary motion, said wind motor comprising:
(a) a stationary frame;
(b) a crank member including
(i) a crank shaft journalled in said frame for rotation about a first axis, and
(ii) a crank arm extending radially from said crank shaft;
(c) a wind blade carried by said crank arm and rotatable about a second axis spaced from and parallel to said first axis;
(d) timing means for maintaining a predetermined ratio between the speed of rotation of said wind blade about said second axis and the speed of said crank shaft about said first axis; and
(e) balance means rotatable in response to rotation of said crank member for dynamic balance of the moving mass of said wind motor,
whereby said wind motor is self-contained, single blade, modular unit.

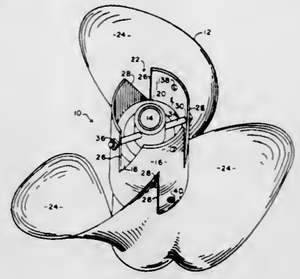
4,097,191

OUTBOARD HUB

Bennie Genuardi, Tampa, Fla., assignor to Irving Navarre, Tampa, Fla.

Filed Mar. 24, 1977, Ser. No. 780,770
Int. Cl.² B63H *1/20*
U.S. Cl. 416—170 R **10 Claims**

1. An auxiliary hub device for use in combination with the propeller of an outboard drive marine engine, said auxiliary hub device comprising: sleeve means configured and dimensioned for sliding engagement with the hub of said propeller; a plurality of blade notches formed in said sleeve means on at least one end defining the periphery thereof, each of said notches being configured and dimensioned to receive a corresponding one of the blades of said propeller therein; and lock means operatively disposed on the end of said sleeve means opposite from said blade notches, whereby said auxiliary hub device may be secured to the propeller drive shaft in locking, interconnecting relation between said drive shaft and said propeller.

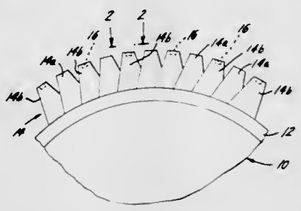


4,097,192

TURBINE ROTOR AND BLADE CONFIGURATION

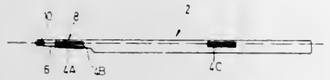
Mark R. Kulina, Franklin Lakes, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Jan. 6, 1977, Ser. No. 757,302
Int. Cl.² F01D *5/10*
U.S. Cl. 416—175 **5 Claims**



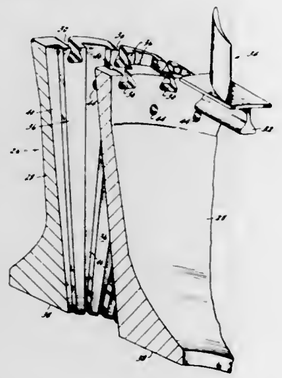
1. A rotor for turbines, compressors or the like comprising an annular portion and a plurality of circumferentially-spaced blades each secured at one end to and projecting from said annular portion with the other end of said blades being free of any contact with each other, certain of said blades having means differentiating said blades from the remainder of said blades to provide two sets of blades in which, except for said differentiating means, the blades of each set are similar to the other blades of said set except for differences resulting from manufacturing tolerances such that, because of said differentiating means, the average of the natural frequencies of vibration of one of said two sets of blades differs from the corresponding average of the other set of said blades by a minimum percentage at least equal to the percentage spread of the natural frequencies of vibration of said blades resulting from manufacturing tolerances but no more than about 15%.

4,097,193
ELASTOMERIC DAMPING ARRANGEMENT
Klaus Brünsch, Weidach, and Emil Weiland, Hohenbrunn, both of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Germany
Filed Dec. 17, 1976, Ser. No. 751,698
Claims priority, application Germany, Dec. 24, 1975, 2558709
Int. Cl.[2] B64C *11/20*
U.S. Cl. 416—224 **13 Claims**



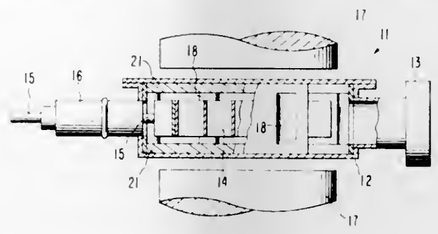
1. An elastomeric damping arrangement providing a damping force for a structural member having a given surface contour and being capable of vibrating in response to dynamic deformations, especially for an airfoil, comprising damping layer means, cover layer means, and means operatively interconnecting said layer means to each other in a surface contact fashion, to form an integral structure arranged in intimate contact with the structural member solely in regions thereof subject to said dynamic deformations and to said vibrations, said integral structure merging smoothly into said surface contour of said structural member in said dynamic deformation regions, said cover layer means being made of a high strength material having a high unidirectional rigidity which is effective in the direction of said damping force, said damping layer means being made of a viscoelastic material.

4,097,194
REDUNDANT DISC
William N. Barack, Morrow; Charles H. Gay, Jr., Loveland; Stephen W. Beekman, Fairfield, and Paul A. Domas, Cincinnati, all of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.
Filed Mar. 22, 1976, Ser. No. 668,971
Int. Cl.[2] F01D *5/02*
U.S. Cl. 416—244 A **13 Claims**



1. A rotatable disc comprising: a pair of, generally parallel plates for rotation about a common axis, each plate including a plurality of angularly spaced lands projecting axially from a face thereof and extending in a generally radial direction along the face, the lands of each plate intermeshing in alternating relationship with grooves formed between pairs of lands of the adjacent plate to prevent relative circumferential displacement of adjacent plate sectors; and means for tightly joining the plates together such that each land is in abutting contact with the adjacent plate; and wherein each plate is redundantly sized such that in the event of structural failure of one plate, the remaining intact plate can support the load of the failed plate.

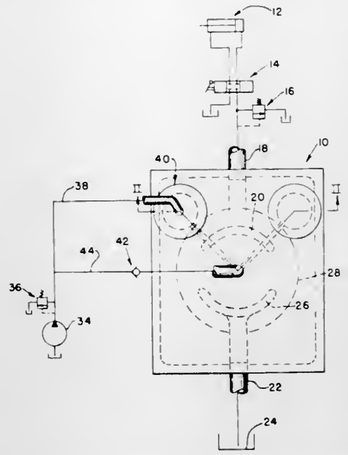
4,097,195
HIGH VACUUM PUMP
Eugene F. Hill, Belmont, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.
Continuation of Ser. No. 549,217, Feb. 12, 1975, abandoned, which is a continuation of Ser. No. 367,025, Jun. 4, 1973, abandoned. This application Oct. 10, 1975, Ser. No. 621,329
Int. Cl.[2] F04B *37/02;* **H01J** *19/70*
U.S. Cl. 417—49 **12 Claims**



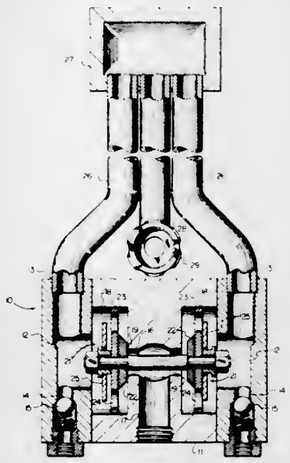
1. In a sputter-ion vacuum pump comprising an evacuable chamber including cathode and anode members each positioned within said chamber, means for maintaining a magnetic field within the region between said cathode and anode members, lead means for introducing an electrical potential difference between said cathode and anode members, whereby a plasma can be formed to cause gas ions to bombard said cathode member; the improvement comprising said cathode member being made from an alloy, said alloy comprising a major constituent selected from elements in Group IV B of the conventional long form of the Periodic Chart of the Elements and a minor constituent selected from elements in other than Group IV B of said Periodic Chart, which minor constituent is an amount that causes the transition temperature for the transformation from the hexagonal close-packed crystal lattice form to the body-centered cubic crystal lattice form for said alloy to be lowered from the corresponding transition temperature for said major constituent alone.

4,097,196
PILOT OPERATED PRESSURE COMPENSATED PUMP CONTROL
Cyril W. Habiger, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Jun. 1, 1976, Ser. No. 692,178
Int. Cl.[2] F04B *1/30*
U.S. Cl. 417—222 **6 Claims**

1. In a pump having a pump body, a swash plate the rotational position of which controls the displacement of said pump and means mounting said swash plate for rotation about an axis generally centrally thereadjacent, an improvement for controlling an output from said pump, comprising:
- means internal of said pump body and acting between said pump body and said swash plate for biasing said swash plate toward a zero displacement position corresponding to a minimum displacement of said pump; and
- means responsive to discharge pressure of said pump reaching a first magnitude for overriding said biasing means and rotating said swash plate towards a full displacement position corresponding to a maximum displacement of said pump, said overriding means comprising servo valve means within said pump body and pilot pump means acting to initially shift said servo valve means to allow discharge pressure to be applied in opposition to said biasing means.



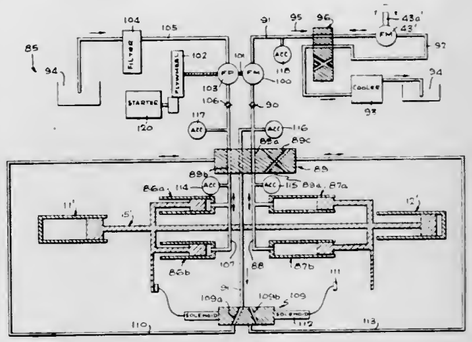
4,097,197
LIQUID PRESSURE INTENSIFIER
Joe Edward West, 11426 Goodnight La., Dallas, Tex. 75229
Filed Aug. 16, 1976, Ser. No. 714,355
Int. Cl.[2] F04F *7/02;* **F04B** *23/00*
U.S. Cl. 417—227 **8 Claims**



1. A high pressure intensifier for liquids comprising:
- a housing having an intensifying chamber therein, said chamber being provided with an inlet, a low pressure outlet, and a high pressure outlet;
- a valve in said chamber positioned to block flow through said low pressure outlet upon closure thereof;
- means for closing said valve when the velocity of liquid flow therepast reaches a selected value;
- means for opening said valve;
- a ram tube connected to said inlet and extending linearly away therefrom;
- and a reaction ram tube connected to the ram tube at its end remote from said housing, said reaction ram tube extending parallel to and lying closely adjacent said ram tube, and extending back toward said housing and terminating adjacent thereto in a liquid inlet;

said reaction ram tube being substantially equal to said ram tube in length and diameter.

4,097,198
INTERNAL COMBUSTION ASSISTED HYDRAULIC ENGINE
Allen R. Herron, 26235 Ravenhill Rd., Canyon Country, Calif. 91351
Continuation-in-part of Ser. No. 506,992, Sep. 18, 1974, Pat. No. 3,995,974. This application Nov. 15, 1976, Ser. No. 741,881
Int. Cl.[2] F04B *17/00, 23/06, 27/08, 49/00*
U.S. Cl. 417—245 **9 Claims**

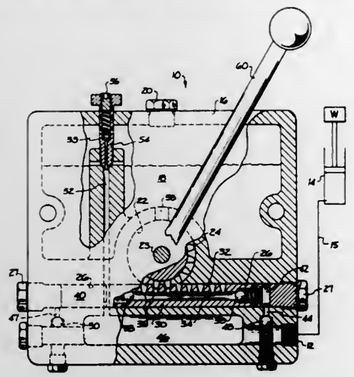


1. A hydraulic engine comprising:
- first and second sets of hydraulic cylinders, the pressurized fluid outlet of each cylinder being connectable to a common output line, the pistons of all cylinders being mechanically attached to a common shaft,
- chamber assisted means for reciprocating said shaft alternately to pressurize the hydraulic fluid in said first and second sets, and
- hydraulic fluid supply means including:
  - a hydraulic fluid reservoir,
  - a pump for pumping hydraulic fluid from said reservoir to all of the hydraulic cylinders in the set that is not currently being pressurized,
  - a motor driven by pressurized hydraulic fluid from said output line, and
  - a flywheel connected to said pump and to said motor.

4,097,199
DOUBLE ACTING RACK AND GEAR-DRIVEN PISTON PUMP
James R. Dole, and Benjamin F. Blaine, both of Hutchinson, Kans., assignors to Arrow Machine, Inc., Hutchinson, Kans.
Filed Oct. 14, 1976, Ser. No. 732,495
Int. Cl.[2] F04B *49/00, 21/04*
U.S. Cl. 417—286 **7 Claims**

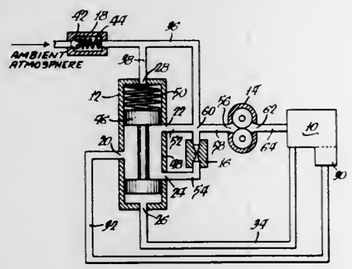
1. A hand-driven hydraulic pump and reservoir adapted to drive fluid motors comprising:
- a housing;
- an oil reservoir and a pump discharge port in the housing;
- at least one cylinder bore in the housing;
- a piston positioned in the bore forming two separate cylinder chambers one at each end thereof, a plurality of gear teeth disposed longitudinally on said piston forming a rack, a longitudinal passage through the piston supplying both cylindrical chambers and providing the sole inlet for the cylinder chambers;
- a pinion gear mounted in the housing engaging said rack for driving the piston in a reciprocal motion;
- handle means connected to said pinion gear;
- first passage means in the housing connecting each cylinder chamber to the pump discharge port;
- first check valve means positioned in each of the first pas-

sage means blocking flow from the discharge port to each separate cylinder chamber;
second passage means connecting the reservoir to each of the cylinder chambers through said longitudinal passage;
second check valve means positioned in each of the second



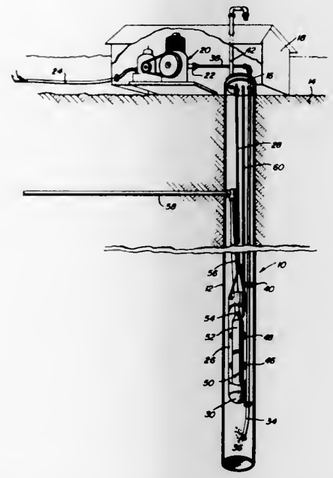
passage means blocking flow from each of the cylinder chambers to the reservoir;
and
relief valve means connecting the pump discharge port to reservoir which can be opened to allow return flow to the reservoir.

4,097,200
SELF-PRESSURIZATION SYSTEM FOR GEARBOXES AND THE LIKE
Stephen S. Baits, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.
Filed Jan. 3, 1977, Ser. No. 756,498
Int. Cl.[2] F04B *49/08*
U.S. Cl. 417—302 **11 Claims**



11. For use with gear boxes, constant speed drives and the like employing a housing, a self-pressurization system comprising:
a pump having an intake port and a discharge port connected to the housing;
a first conduit open to the atmosphere communicating with said intake port;
a source of liquid; and
a valve responsive to a pressure differential between the housing and the atmosphere having an inlet and a pair of outlets, a second conduit between said source of liquid and said inlet, a third conduit having an orifice between one outlet and said intake port, a fourth conduit between the other outlet and said intake port, said valve providing communication between said second and third conduits when the housing pressure relative to atmospheric pressure decreases to a predetermined amount so that air from atmosphere flows through said first conduit to said intake port, said valve providing communication between said second and fourth conduits when the housing pressure relative to atmospheric pressure increases to said predetermined amount so that air flow is prevented to said intake port.

4,097,201
COMBINED WELL PUMP HOUSING AND AERATION MEANS
Gerald F. Nussbaum, R.R. 6, Defiance, Ohio 43512
Filed Jan. 2, 1976, Ser. No. 645,999
Int. Cl.[2] F04B *47/00*
U.S. Cl. 417—360 **9 Claims**

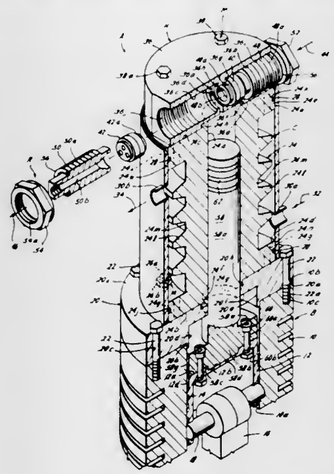


1. In combination with a water well of the type subject to contamination by sulphur gas and including an upper end communicated with ambient above ground air, a closed bottom container disposed in said well below the water level therein, a water pump disposed within said container, said pump including a water intake below the upper portion of said pump and a water outlet, a water line in said well having an inlet end connected to said outlet, and said container including an upwardly opening water inlet spaced above said intake, a compressed air outlet disposed in said well below said container, and air pump and compressed air conduit means operative to pump ambient above ground air down into said well under pressure, said air conduit means being communicated with said air outlet.

4,097,202
AUXILIARY COMPRESSOR ASSEMBLY
Billy Frank Price, 7752 Braniff St., Houston, Tex. 77061
Filed Jun. 21, 1976, Ser. No. 698,107
Int. Cl.[2] F04B *21/00, 39/00;* **F16J** *11/00*
U.S. Cl. 417—454 **14 Claims**

1. An auxiliary compressor assembly for use in providing large volumes of high pressure compressible fluid adapted to be mounted with a conventional compressor having a piston mounted for reciprocal movement in a cylinder, comprising:
an auxiliary cylinder having a bore formed therethrough;
said auxiliary cylinder having a first end surface and a second end surface formed at opposite ends of said auxiliary cylinder;
said auxiliary cylinder being positioned with said first end surface of said auxiliary cylinder mounted on and adjacent to the conventional compressor cylinder and with said bore of said auxiliary cylinder aligned with the bore of the conventional compressor cylinder;

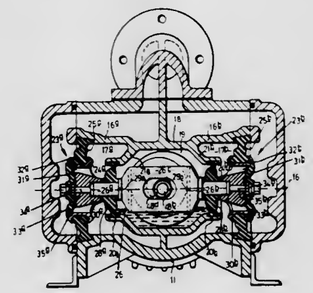
a head removably mounted on said second end surface of said auxiliary cylinder;
said head having an intake valving chamber formed therein for receiving fluid to be compressed in said auxiliary cylinder and a discharge valving chamber formed therein for discharging compressed fluid from said auxiliary cylinder through said head;
valve means removably mounted with said head for regulating the intake and discharge of compressible fluid, said valve means including:
an intake valve unit mounted in said intake valving chamber allowing intake of compressible fluid into said auxiliary cylinder and preventing discharge outwardly thereof; and,
a discharge valve unit mounted in said discharge valving



chamber allowing discharge of compressed compressible fluid from said auxiliary cylinder through said head and preventing intake of compressible fluid therethrough;
said valve units reversible such that said intake valving chamber may act as said discharge valving chamber and said discharge valving chamber may act as said intake valving chamber upon respective reverse mounting of said intake valve unit in said intake valving chamber and reverse mounting of said discharge valve unit in said discharge valving chamber;
first releasable mounting means for releasably mounting said first end surface of said auxiliary cylinder with the conventional compressor cylinder; and,
second releasable mounting means for releasably mounting said second end surface with said head.

4,097,203
RECIPROCATING PISTON PUMP
Timothy John Selwood, Minstead, near Cadnam; Martin John Shelley Axtell, Lymington; John David Burton, St. Mary Bourne, near Andover, all of England; Peter Richard Selwood, deceased, late of Southampton, England; by Timothy John Selwood, executor, Minstead, near Cadnam, and by Martin John Shelly Axtell, executor, Lymington, both of England, assignors to William R. Selwood Limited, Eastleigh, England
Filed Apr. 14, 1976, Ser. No. 676,884
Claims priority, application United Kingdom, Apr. 15, 1975, 15368/75; Mar. 6, 1976, 9070/76
Int. Cl.[2] F04B *43/02, 21/04*
U.S. Cl. 417—480 **8 Claims**

1. In a pump composed of a body including at least two pumping chambers aligned along an axis, each of said chambers communicating at its opposite ends respectively with a pump inlet and a pump outlet, two actuators each disposed in a respective pumping chamber and reciprocable longitudinally of the pumping chamber axis, each actuator having a relatively rigid main central portion and a peripherally extending elastic sealing ring retained in a clearance space in non-sliding fluid-tight engagement between the main central portion and a lateral wall of the pumping chamber, valve means for each of the actuators controlling the flow of fluid through an associated one of the chambers from th inlet to the outlet, and drive means for reciprocating the actuators, the improvement wherein:
a. said pump further comprises a connecting member extending between, and joining, said main central portions of said actuators and forming with said main central portions a substantially rigid unit;
b. said unit is supported, for movement along said pumping chamber axis, solely by resilient means including at least said sealing rings and providing greater resistance to displacement of said unit in a direction radial to said pumping chamber axis than to displacement longitudinally of said

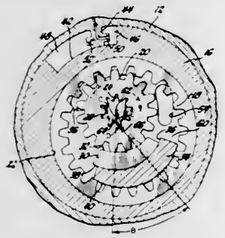


pumping chamber axis, to provide for high speed reciprocation of said unit;
c. said connecting member is provided with contact faces presented in opposite directions towards one another along said pumping chamber axis, said contact faces being of planar form and extending at right angles to the pumping chamber axis;
d. said drive means includes a rotary member mounted for rotation about a drive axis and having a part moved eccentrically with respect to said drive axis;
e. said eccentrically moved part is of circular form in a plane at right angles to said drive axis and is received between said contact faces, the diameter of said eccentrically moved part being only slightly less than the axial spacing between said contact faces;
f. said eccentrically moved part comprises a bearing having inner and outer races and intermediate rolling elements; and
g. said outer race as a peripherally extending outer surface which is crowned.

4,097,204
VARIABLE DISPLACEMENT GEAR PUMP
Walter E. Palmer, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.
Continuation of Ser. No. 678,295, Apr. 19, 1976, abandoned.
This application Apr. 22, 1977, Ser. No. 789,802
Int. Cl.[2] F04C *15/04, 1/06*
U.S. Cl. 418—19 **2 Claims**

1. An internal-external gear pump comprising a stationary housing; a drive shaft; an internal gear drivingly connected with said drive shaft and rotatably disposed in said housing for rotation about an axis coincident with the axis of said drive shaft; a control ring rotatably mounted in said housing on an axis eccentric to said internal gear; an external gear rotatably supported in a

cylindrical opening of said control ring for rotation about an axis coincident with the axis of said cylindrical opening, the axis of the external gear being eccentric to both said internal gear and said control ring, said external gear having a larger pitch diameter than said internal gear and said gears being in meshing engagement whereby said external gear is driven by said internal gear; the axis of said internal gear, said external gear and said control ring being aligned in a single plane disposed longitudinally of the axis of rotation of said drive shaft when the eccentricity between said internal gear and said external gear is maximum; a stationary arcuate sector portion integral with said housing disposed in the space between said gears substantially opposite the mesh point of said gears and



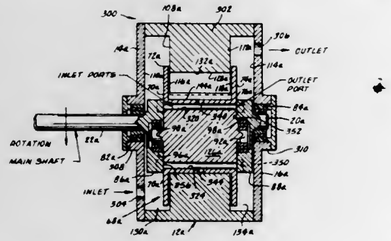
having an inner radius substantially equal to and disposed adjacent the outer radius of said internal gear and an outer radius eccentric to its inner radius; an arcuate control sector portion integral with said control ring disposed in the space between said gears adjacent the outer periphery of said stationary sector portion, having an inner radius substantially equal to the outer radius of said stationary sector portion and an outer radius substantially equal to and disposed adjacent the inner radius of said external gear; and means for rotating said control ring, control sector and external gear through an arc about the axis of said control ring relative to said stationary housing whereby the eccentricity between said gears is altered so that the fluid displaced by the meshing gears varies as the eccentricity is altered.

4,097,205

ORBITAL PUMP WITH INLET AND OUTLET THROUGH THE ROTOR

Edward L. Miles, 1960 Port Claridge Pl., Newport Beach, Calif. 92660

Filed Jan. 18, 1977, Ser. No. 760,273
Int. Cl.² F01C *1/02, 19/00, 21/08, 21/12*
U.S. Cl. 418—61 R **10 Claims**



1. An orbital-type pump or the like, which comprises:

(a) a generally cylindrical housing having a circumferential wall portion and opposing first and second transverse end walls and having therebetween an annular wall member, inwardly projecting from the circumferential wall portion,

(b) a generally spool shaped rotor having a central portion and first and second transverse ends which include, respectively, first and second outwardly projecting annular flanges,

said rotor being configured and disposed in the housing to have side surfaces of said first and second flanges in close proximity to corresponding first and second transverse side surfaces of the annular wall member, respectively, an inlet plenum being formed intermediate the housing first end wall and the rotor first end and first side surface, an outlet plenum being formed between the housing second end wall and the rotor second end and the second side surface, and a central chamber being formed between the inlet and outlet plenums,

(c) a drive shaft journalled for axial rotation in the housing, at least a portion of the shaft extending to axial ends of the rotor,

(d) connecting means for axially rotatably connecting the rotor to the drive shaft with an axial rotational axis of the rotor radially displaced from the rotational axis of the shaft to thereby cause the central portions of the rotor to orbit about the central chamber when the rotor rotates relative to the drive shaft axis,

(e) a plurality of vanes radially slidably mounted in the rotor, said vanes dividing the central chamber into a plurality of subchambers which change volume as the rotor orbits about the drive shaft axis,

(f) means defining a plurality of passages through the rotor communicating between the inlet and outlet plenums and the subchambers, each passage communicating with a different one of the subchambers and having an inlet end at the first rotor end and an outlet end at the second rotor end, and

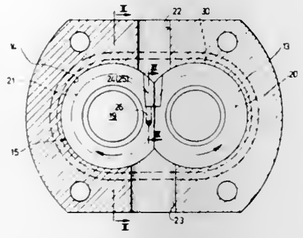
(g) flow control means associated with the drive shaft for causing closing of the inlet ends of preselected ones of the passages at first preselected rotor orbital positions and for causing closing of the outlet ends of preselected ones of the passages at second preselected rotor orbital positions.

4,097,206

GEAR PUMP OR MOTOR WITH BYPASS THROTTLE PASSAGE TO PREVENT CAVITATION

Erich Schonherr, Stuttgart, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Nov. 18, 1976, Ser. No. 743,289
Claims priority, application Germany, Dec. 2, 1975, 2554105
Int. Cl.² F01C *19/08, 21/00;* **F03C** *3/00;* **F01C** *1/16*
U.S. Cl. 418—78 **10 Claims**



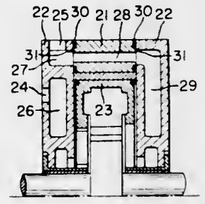
1. A gear pump or motor comprising a housing having a chamber bounded by a circumferential wall and two opposite end walls; a high pressure channel extending through said circumferential wall and having an inner end communicating with said chamber; a low pressure channel extending opposite said high pressure channel through said circumferential wall and likewise communicating at an inner end with said chamber; a pair of meshing external gears mounted in said chamber for rotation about axially parallel shafts, each of said gears having two opposite axial end faces, the flanks of the gear teeth of the two gears engaging each other between the inner ends of said channels along lines and forming between the engaging lines interstices increasing in the region of the inner end of said low pressure channel and decreasing in the region of the inner end of said high pressure channel; means mounting said shafts for rotation and engaging said opposite end faces of said gears; and a throttle passage in one of said mounting means having an inlet end in a region of said chamber which is under high pressure and an outlet end in the region of an interstice increasing in volume during rotation of the gears and which is sealed off by the engaging flanks from said high and low pressure channels.

4,097,207

CASING FOR LIQUID-COOLED ROTARY PISTON ENGINES

Kuniaki Kakui, Aki, Japan, assignor to Toyo Kogyo Co., Ltd., Japan

Filed Oct. 28, 1976, Ser. No. 736,326
Claims priority, application Japan, Mar. 15, 1976, 51-29561
Int. Cl.² F01C *21/06, 21/10*
U.S. Cl. 418—83 **4 Claims**



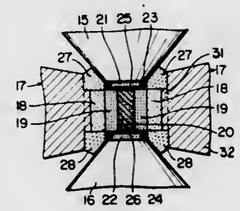
1. Casing for liquid-cooled rotary piston engine which comprises a rotor housing made of aluminum based alloy and having an inner wall of trochoidal configuration, a pair of side housings made of cast iron and secured to the opposite sides of the rotor housing at mating surfaces thereof to define a cavity of trochoidal configuration for receiving a substantially polygonal rotor therein, each of said side housings having cooling-liquid passage means opening to said mating surface at a plurality of locations, said rotor housing having cooling-liquid passage means opening to each of said mating surfaces at locations corresponding to locations of the openings of the passage means in said side housing and connected with the corresponding passage openings in the side housings, the cooling-liquid passage means formed in the rotor housing having a diametrical dimension at the opening in the mating surface smaller than that of the corresponding passage in the side housing so that a shoulder is formed at junction of each passage opening in the rotor housing with that of the side housing by an aluminum based alloy surface projecting into the opening.

4,097,208

ULTRAHIGH PRESSURE APPARATUS FOR DIAMOND SYNTHESIS

Hiroshi Ishizuka, No. 19-2, Ebara 6-chome, Shinagawa-ku, Tokyo, Japan

Continuation-in-part of Ser. No. 646,168, Jan. 2, 1976, abandoned. This application Jul. 7, 1977, Ser. No. 813,709
Int. Cl.² B30B *11/32*
U.S. Cl. 425—77 **3 Claims**



1. An ultrahigh pressure apparatus for diamond synthesis or the like which comprises:

(1) a pair of opposed frustoconical punches with a flat end surface;

(2) an annular die made of a very hard metallic material and placed between said punches;

(3) a hollow cylinder made of a sintered alumina to be free of pores having an inner diameter substantially equal to that of the flat end surface of the punches;

(4) a pair of gaskets around and adjacent to the flank of said punches which gaskets each having an outer diameter larger than that of said hollow cylinder;

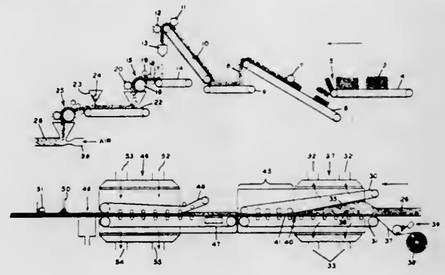
said die having at the middle portion thereof a substantially concentric cylindrical projection of an axial length equal to that of said hollow cylinder so that the bore is tightly fitted to the gaskets and the hollow cylinder.

4,097,209

APPARATUS FOR FORMING A MINERAL WOOL FIBERBOARD PRODUCT

John R. Garrick, and Richard E. Kottmeyer, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Mar. 23, 1977, Ser. No. 780,419
Int. Cl.² B29C *13/00*
U.S. Cl. 425—82.1 **3 Claims**



1. An apparatus for forming a mineral wool fiberboard product comprising:

(a) means for separating mineral wool fibers and means for intimately mixing said fibers with a thermosetting powdered binder,

(b) means for entraining said mixture of fibers and binder in an air stream including means for directing said air stream into a mat-forming zone formed by converging upper and lower forming wires,

(c) means for exhausting air through said forming wires whereby the fiber and binder mixture is collected as two layers on the forming wires with the two layers becoming consolidated at the nip opening formed between the converging wires, and

(d) compacting and heating means whereby the mat of fibers and resin is compacted and cured to form a mineral fiberboard product,

said exhaust system behind said wires being adjustable whereby the upper outer layer of fibers and binder initially formed on said wires is comprised of a layer of binder and predominantly fine fibers.

4,097,210

SYSTEM IN AN INDUSTRIAL POLYEXPANSION PROCESS

Federico Hernando Romanillos, Canarias, 46, Madrid, Spain

Continuation of Ser. No. 477,042, Jun. 6, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 646,367

Claims priority, application Spain, Aug. 22, 1973, 418.110; Oct. 3, 1973, 419.306

Int. Cl.[2] B29D *27/04*

U.S. Cl. 425—89 **13 Claims**

1. In an apparatus for a polyexpansion process:

(a) a discharge stage having a base and side walls for receiving an expandable liquid material;

(b) a self-regulating surface to prevent a crowning effect of the resulting foamed material positioned in the zone where the liquid material is adapted to commence expanding, said self-regulating surface comprising:

(i) a plurality of elements each of which is rigid in a direction normal to the longitudinal movement of the foam, and

(ii) means for mounting each said element, said means for mounting being a double pivot whereby each said element is freely movable in the horizontal and vertical directions in response to pressure exerted thereof by the expanding liquid material;

(iii) said means for mounting being located down stream of said discharge stage; and

(c) a separating material freely positioned between the foamed material and the self-regulating surface.

4,097,211

Patent Not Issued For This Number

4,097,212

PELLETIZER

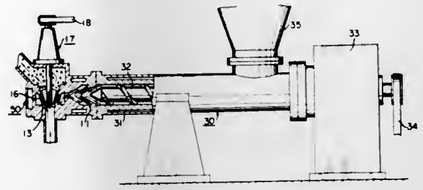
Yukimas Morishima, Kure; Minoru Yoshida, and Hideo Masuda, both of Hiroshima, all of Japan, assignors to The Japan Steel Works, Ltd., Tokyo, Japan

Filed Dec. 15, 1975, Ser. No. 641,157

Claims priority, application Japan, Jul. 25, 1975, 50-90303

Int. Cl.[2] B29C *17/14*

U.S. Cl. 425—313 **1 Claim**



1. A pelletizer of the type having an underwater cutter comprising

a horizontally located extruder unit having a housing within which a rotatable extruder screw is mounted with its axis extending longitudinally thereof to force material strands therealong;

a vertically located cutter unit including a rotatable cutter mounted therewithin and having its axis extending at right angles to said extruder unit axis, said cutter having driving means connected therewith and located directly thereabove so that said cutter is rotatable to cut the strands into pellets to be directed vertically upwards;

said cutter having a plurality of blades the outer edges of which are each shaped as a truncated cone extending upwardly and outwardly to provide an inclination of said outer edges with respect to said cutter unit axis;

said cutter unit including a housing surrounding said cutter, said cutter housing comprising a housing wall and a die wall with said housing wall being connected to an end of said extruder unit housing;

said die wall defining a chamber surrounding said cutter blade edges and spaced a predetermined uniform distance therefrom, said die wall extending upwardly and outwardly to form a first chamber area located upwardly from said blades that is of a larger size than a second chamber area located to surround said blades, said die wall formed to have the same inclination as said blade edge inclination;

a drive shaft connected to said cutter and extending upwardly therefrom, said cutter and drive shaft movable upwardly into said first chamber area to prevent clogging of pellets and said cutter and drive shaft movable downwardly into said second chamber area to regulate the size of the gap between said blades and said die wall;

a plurality of die nozzles extending generally horizontally through said die wall to open into said second chamber area, said nozzles spaced vertically and provided to extrude the material therethrough from said extruder unit into said cutter unit and heating means provided in said die wall comprising a pair of jackets spaced respectively above and below adjacent to said outer edges of said cutter, said jackets connected to flow passages with a heating medium passing therethrough.

4,097,213

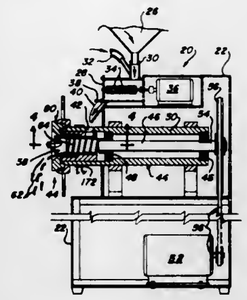
MECHANISM FOR ADJUSTING AN EXTRUSION DIE IN CEREAL GRAIN EXTRUDER APPARATUS

Kenneth H. McComb, and Timothy I. McComb, both of Denver, Colo., assignors to Dorsey-McComb Distributors, Inc., Denver, Colo.

Filed Feb. 28, 1977, Ser. No. 772,743

Int. Cl.[2] B29F *3/04*

U.S. Cl. 425—376 B **9 Claims**



1. An extruder apparatus for extruding a plurality of strands of gelatinous cereal grain material which thereafter form curled cereal grain food product, comprising, in combination:

a housing means;

an auger member mounted for rotation in an axially stationary position in said housing means, said auger member having helical groove means for moving cereal grain meal material from an inner axial position to an outer axial and discharge position and for operatively changing cereal grain meal into a gelatinous material upon rotation of said auger member;

a forming die member mounted in an axially stationary position adjacent the outer axial end of said auger member for rotation with said auger member, said forming die member having a frustroconically shaped outer die surface and a plurality of grooves formed in the outer die surface, the grooves extending generally in an axial direction;

a female die member mounted in a rotationally stationary position circumjacent at least a portion of said forming die member, said female die member having a frustroconically shaped inner die surface generally complimentary in shape to the outer surface of said forming die member, the inner die surface having a plurality of grooves formed therein and generally extending in an axial direction;

the inner and outer die surfaces of said forming and female die members respectively defining an annular extrusion orifice through which a plurality of strands of the gelatinous material are extruded, the strands being formed at least in part by the grooves; and

adjustment means operatively associated with said female die member for moving said female die member axially with respect to said forming die member to adjust the width of the annular extrusion orifice between the frustroconical die surfaces of said forming die member and said female die member to insure the change of cereal grain meal into the gelatinous material and regulate the extrusion of strands of gelatinous material from the annular extrusion orifice.

4,097,214

PARISON EXTRUSION HEAD

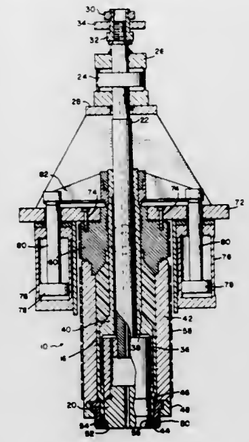
John Shao-Tze Hsu, Nashua, N.H., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Dec. 8, 1976, Ser. No. 748,685

Int. Cl.[2] B29D *23/04*

U.S. Cl. 425—466 **4 Claims**

1. An extrusion head for extruding a parison comprising: a housing having a plastic inlet and a plastic outlet; a plastic accumulating chamber in the housing for receiving the plastic from the plastic inlet; a longitudinally movable shooting mandrel located in said chamber, said shooting mandrel having at least two longitudinal portions of different cross section, with the larger cross section being less than the cross section of the chamber, the positions of the plastic inlet, plastic outlet, and shooting mandrel being such that when the shooting mandrel is



in the chamber full position, the larger cross section is at its closest point to the plastic outlet and furtherest point from the plastic inlet; program mandrel means operatively associated with said outlet for controlling the shape of the parison leaving the plastic outlet; and means operatively associated with said shooting mandrel for moving the shooting mandrel from the chamber full position to the chamber empty position to extrude the plastic from the chamber in the form of a parison.

4,097,215

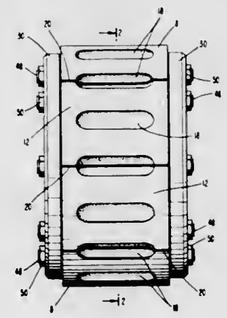
SEGMENTED BRIQUETTING ROLL

Karl R. Komarek, Chicago, Ill., assignor to K. R. Komarek, Inc., Elk Grove Village, Ill.

Filed May 12, 1977, Ser. No. 796,233

Int. Cl.[2] B29C *1/00, 3/02*

U.S. Cl. 425—471 **8 Claims**



1. A briquetting roll, comprising:

(a) a central core having two sides and being a substantially radially symmetrical polygonal prism having a diameter greater than its length and being adapted for rotation about its axis;

(b) each planar surface of the periphery of said polygonal core having at least one transverse groove;

(c) a plurality of end-to-end removable mold segments

around the periphery of said core, each of said mold segments comprising:

(1) an arcuate top working surface;

(2) a flat bottom surface opposite said working surface being in substantial contact and substantially coterminous with one of the planar surfaces of the periphery of said core, said bottom surface having at least one transverse groove substantially complementing one of said grooves in the coterminous planar surface of said core to form a transverse keyway;

(3) two opposite end walls connecting said top working surface and said bottom surface, said end walls diverging with respect to each other relative to said bottom surface; and

(4) two opposite side walls connecting said top working surface and said bottom surface;

(d) two annular retaining rings, one on each side of said central core, each spanning the interface between said mold segments and the periphery of said central core to secure said mold segments to said central core, said retaining rings having a plurality of spaced, centrally located holes coaxial with said keyways;

(e) means on each side of said core proximate its periphery and on each side wall of each of said mold segments proximate its bottom surface for detachably connecting said retaining ring; and

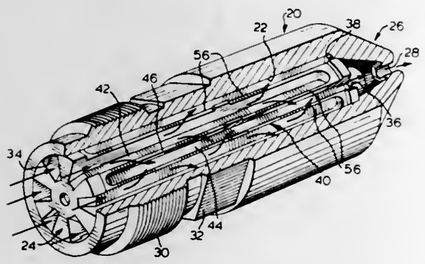
(f) affixing means passing through said retaining ring holes and said keyways for drawing said two annular retaining rings together to effect secure attachment of said mold segments to said central core and for aligning and preventing movement of said mold segments relative to the periphery of said central core.

4,097,216

FILTER FOR LIQUIDS

Ladislao W. Putkowski, Scarborough, Canada, assignor to Magna International Inc., Downsview, Canada

Filed Mar. 11, 1977, Ser. No. 776,811
Int. Cl.² B01D *35/02*
U.S. Cl. 425—568 **3 Claims**



1. An injection nozzle for a plastic injection moulding machine, the nozzle comprising:

a body of generally cylindrical form having:

an internal passageway which extends from an inlet end of said body to an outlet end of the body and through which plastic material can flow from said inlet end to said outlet end when the nozzle is in use, said passageway including a plastic injection opening at said outlet end of the body and a cylindrical filter chamber defined by a cylindrical inner surface portion of said body, one end of said chamber opening into said inlet end of said body and the opposite end of said chamber communicating with said plastic injection opening in the body;

an external surface which includes a generally conical surface portion at said outlet end of the body, tapering towards said plastic injection opening; an externally screw threaded portion adjacent said inlet end of the body, by which the nozzle can be secured in an injection moulding machine; and a plurality of flats adjacent said screw threaded portion at the side thereof remote from said inlet end of the body, by which the body can be turned for securing the nozzle in the machine;

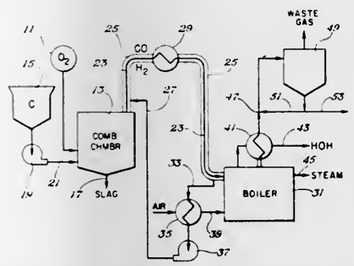
and a filter element removably received in said filter chamber and having an outer surface disposed closely adjacent said cylindrical inner surface portion of said body, said outer surface being defined by a plurality of slots which extend generally longitudinally of the filter element in circumferentially spaced positions and a corresponding plurality of intervening lands, each slot having a blind inner end and an outer end which opens into an end of the element and the slots being arranged so that alternate slots open at their outer ends at said inlet end of the body and define with said inner surface portion of the filter chamber, inlet flow channels for plastic material flowing through said body in use, while the intervening slots communicate with said plastic injection opening and similarly define outlet flow channels for said plastic material, the lands between the slots being longitudinally relieved to define filtering gaps which provide liquid communication between adjacent flow channels and which are dimensioned to prevent particles in said plastic material above a pre-determined size passing from said inlet flow channels to said outlet flow channels.

4,097,217

METHOD FOR CONVERTING COMBUSTOR FROM HYDROCARBONACEOUS FUEL TO CARBONACEOUS FUEL

Leonard J. Keller, Dallas, Tex., assignor to The Keller Corporation, Dallas, Tex.

Filed Dec. 9, 1976, Ser. No. 748,939
Int. Cl.² F23D *11/44*
U.S. Cl. 431—11 **5 Claims**



1. A method of converting a hydrocarbon-fired combustor to burn a carbonaceous fuel comprising the steps of:

a. providing an oxygen-enriched first combustion supporting gas to a primary combustion chamber;

b. burning the carbonaceous fuel in the presence of said first oxygen-enriched combustion supporting gas in said primary combustion chamber to produce a high temperature, combustible product gas comprising carbon monoxide and hydrogen and a molten slag that contains materials that would in a normal lower temperature combustion process be pollutants and pass out with the waste gases;

c. withdrawing said slag from said primary combustion chamber;

d. isolating and cooling said product gas with an inert gas that will not support combustion and simultaneously heating said inert gas;

e. passing the cooler product gas to said originally hydrocarbon-fired combustor;

f. passing the heated said inert gas in heat exchange relationship with a second combustion supporting gas to heat said second combustion supporting gas and simultaneously cool said inert gas;

g. passing the heated said second combustion supporting gas to said previously hydrocarbon-fired combustor and burning said product gas in said combustor to produce waste gases;

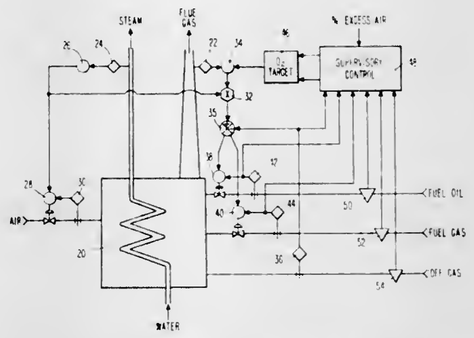
such that the atmospheric polutants in the waste gases are reduced by having removed said slag, and the danger of explosion is reduced by said inert gas isolating said product gas.

4,097,218

MEANS AND METHOD FOR CONTROLLING EXCESS AIR INFLOW

John W. Womack, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 9, 1976, Ser. No. 740,325
Int. Cl.² F23H *1/02*
U.S. Cl. 431—76 **11 Claims**



1. A control system for operating apparatus including a combustion zone and an exhaust flue and operable to derive variable amounts of heat energy from an off-gas fuel having a first heating value and an auxiliary fuel having a second heating value substantially greater than said first heating value, comprising:

sensor means disposed in flow relation with the exhaust flue for identifying the percentage of molecular oxygen in the system exhaust gases and outputting a flue oxygen signal;

first flow rate sensing means disposed in flow relationship with the fuels flowing to the combustion zone for developing signals representing the flow rate of said fuels;

second flow rate sensing means disposed in flow relationship with air flowing to the combustion zone for developing signals representing the flow rate of the air;

analyzing means in flow relationship with said off-gas fuel for outputting signals representing the relative percentages of the constituents of the fuels including the inert constituents of said off-gas fuel;

supervisory control means coupled to said flow rate sensing means and to said analyzing means and responsive to signals representing said flow rates and fuel constituents for outputting a target signal representing the proportion of molecular oxygen in the system exhaust gases which corresponds to the presence of a predetermined proportion of excess air in the combustion zone;

controller means responsive to said sensor means and said supervisory control means for developing a setpoint signal; and

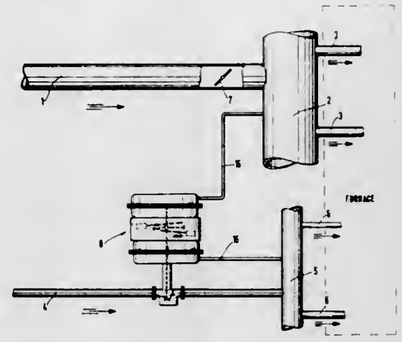
a ratio station for controllably varying the relative amounts of fuel and air flowing to the combustion zone in response to the setpoint signal.

4,097,219

SETTABLE REGULATOR DEVICE FOR GAS/AIR MIXTURE RATIOS

Oswald Prowald, Hoechen, Germany, assignor to Gerlach-Werke GmbH, Homburg, Germany

Filed Nov. 17, 1975, Ser. No. 632,785
Int. Cl.² F16K *31/365;* F23N *1/02;* G05D *11/02*
U.S. Cl. 431—90 **15 Claims**



1. A device for setting and automatically regulating the mixture ratio of a mixture of first and second gases supplied to an industrial furnace comprising:

(a) a first diaphragm pressure gauge comprising a first diaphragm mounted in a first housing;

(b) a second diaphragm pressure gauge having a second diaphragm mounted in a second housing; said second diaphragm pressure gauge being coaxial with said first diaphragm pressure gauge;

(c) an adjustable gas ratio setting mechanism for setting the ratio of said first and second gases supplied to said furnace and disposed between said first and second diaphragm pressure gauges;

(d) first conduit means for connecting one side only of said first diaphragm pressure gauge with a supply of a first gas for a furnace, said one side being remote from said gas ratio setting mechanism;

(e) second conduit means for connecting one side only of said second diaphragm pressure gauge with a supply of a second gas for a furnace, said one side being remote from said gas ratio setting mechanism;

(f) a first member mounted on said first housing for movement with said first diaphragm and extending freely from said first diaphragm pressure gauge to said gas ratio setting mechanism;

(g) a second member mounted on said second housing for movement with said second diaphragm and extending freely from said first diaphragm pressure gauge to said gas ratio setting mechanism;

(h) means for operatively connecting said gas ratio setting mechanism and said first and second members for movement together;

(i) first gas valve means comprising a body through which a first gas is supplied to a furnace and a valve member moveable in said body to regulate the flow of a first gas therethrough;

(j) valve actuating means for actuating said valve member comprising an actuating arm operatively connected to said first diaphragm on the side thereof remote from said gas ratio setting mechanism for movement with said first diaphragm and connected to said valve member such that said valve member is moved by movement of said first diaphragm.

(k) a third diaphragm mounted on said valve body and positioned to be acted on one side thereof by a first gas regulated by said valve member, and the other side of said third diaphragm being open to said remote side of said first

diaphragm pressure gauge, said other side being positioned to be acted on by a supply of a first gas supplied by said first conduit means; and

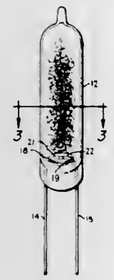
(l) means operatively connecting said third diaphragm and said valve actuating arm for movement therewith whereby a change in pressure in a first gas supplied to said valve body and acting on said valve member is opposed by such change in pressure acting on said third diaphragm.

4,097,220

FLASH LAMP ARRAY HAVING SHORTING LAMPS

Paul T. Coté, Cleveland Heights, and Lewis J. Schupp, Chesterland, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 16, 1976, Ser. No. 724,014
Int. Cl.² F21K *5/02*
U.S. Cl. 431—95 A **4 Claims**



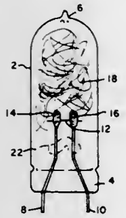
1. A shorting type of flash lamp comprising an elongated bulb containing combustible material and having a pair of lead-in wires sealed through a base of said bulb, the inner end regions of said lead-in wires being bent transverse to the length of said bulb and positioned in mutual side-by-side spaced apart relationship over said base, and a single mass of primer material contained in said bulb over said base thereof and bridging across and completely covering the bent end regions of the lead-in wires, said primer material being a type which leaves a relatively low resistance residue after the lamp is flashed.

4,097,221

PHOTOFLASH LAMP WITH COMBUSTIBLE FILAMENT

John W. Shaffer, and Emery G. Audesse, both of Williamsport, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Nov. 25, 1974, Ser. No. 526,642
Int. Cl.² F21K *5/02*
U.S. Cl. 431—95 R **8 Claims**



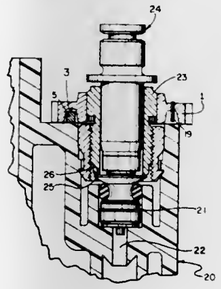
1. A photoflash lamp comprising:
an hermetically sealed, light-transmitting envelope;
a quantity of combustible fill material located in said envelope;
a combustion-supporting gas in said envelope; and
ignition means disposed in said envelope in operative relationship with respect to said combustible fill material, said ignition means including a pair of lead-in wires extending into said envelope, and a combustible filament having a substantially constant cross-section of the order of one square mil attached to and extending between said lead-in wires within said envelope, the sale material of said filament being selected from the group consisting of zirconium, hafnium, titanium, uranium, thorium, and the rare earth metals, and alloys comprised principally of one or more materials of said group.

4,097,222

ADJUSTMENT DEVICE FOR LIQUEFIED GAS LIGHTERS

Edmond L. J. Faudemay, Annecy-le-Vieux, France, assignor to S.T. Dupont, Paris, France

Filed Mar. 19, 1976, Ser. No. 668,558
Claims priority, application France, Mar. 21, 1975, 75 08909
Int. Cl.² F23Q *2/00*
U.S. Cl. 431—143 **8 Claims**



1. In a liquefied gas lighter including a valve well formed therein, adjustable valve means secured in said valve well for controlling the flow of liquefied gas, a rotatable valve adjustment member operatively connected to said adjustable valve means, at least one fixed stop on said lighter, an adjustment mechanism rotatable with said valve adjustment member and including at least one movable stop intended to interact with said fixed stop in order to limit rotation of said adjustment mechanism, whereby to limit the range of flow control of the liquefied gas; the improvement in which said adjustment mechanism comprises a milled wheel provided with an annular groove having an end wall, into which said fixed stop fits with clearance, said movable stop being formed in said end wall of said groove.

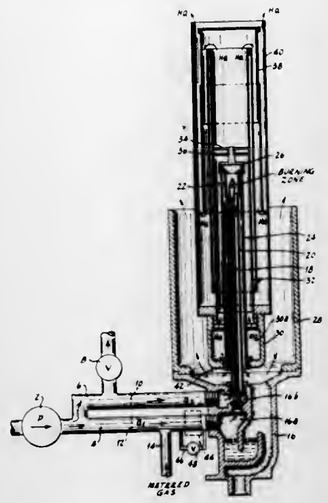
4,097,223

FLASH-TUBE IGNITION SYSTEM

John J. Garnier, Hales Corners, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Oct. 4, 1976, Ser. No. 729,354
Int. Cl.² F23C *3/10*
U.S. Cl. 431—191 **8 Claims**

1. A combustible fuel gas burner assembly comprising:
feeder tube means;
supply means feeding air and gas to one end of said feeder tube means for combustion at the other end of said feeder tube means to form a burning zone thereat;
an exhaust tube having an inlet at said burning zone for carrying away the products of said combustion and, in the absence of said combustion, for carrying away the mixture of said air and gas;
means for varying the ratio of air to gas in said mixture in said exhaust tube such that the flame propagation speed of said mixture in said exhaust tube changes through a spectrum of values at least one of which is greater than the flow velocity of said mixture in said exhaust tube;
an ignition source spaced from said burning zone for igniting said mixture in said exhaust tube when said flame propagation speed is greater than said flow velocity, whereby said exhaust tube also serves as a flash-tube through which a flame travels from said ignition source to said burning zone;



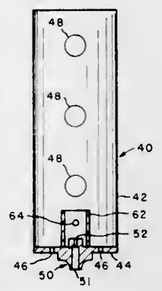
said feeder tube means and said exhaust tube being stationary with respect to each other during variance of said ratio of air to gas.

4,097,224

STEAM GENERATING APPARATUS AND GAS BURNER

Ralph D. Cooksley, 346 Barbour Rd., New Britain, Conn. 06053

Filed Mar. 15, 1976, Ser. No. 677,178
Int. Cl.² F23D *15/02, 13/40*
U.S. Cl. 431—352 **5 Claims**



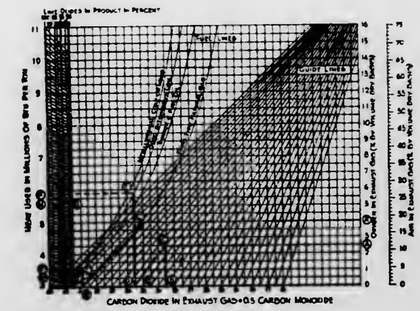
1. A gas burner which comprises a base including means for connection to an associated source of a supply of a fluid fuel, a first tubular sleeve of generally circular cross section having one end affixed to said base in fluid communication with said means for connection, and a second tubular sleeve of generally circular cross section coaxial with said first sleeve and having a diameter large than said first sleeve disposed with one end thereof affixed to said base and having the other end extending beyond the other end of said first sleeve to provide an annular spacing therebetween extending upwardly from said base, each of said sleeves having apertures extending therethrough into the cavity defined therewithin and spaced from said other end thereof, said base having a plurality of axially extending apertures therethrough opening into said annular spacing.

4,097,225

PROCESS AND APPARATUS FOR CALCINING LIMESTONE

Terence Arthur Rourke, Upper Long Beach Rd., R.R. 3, Nelson, British Columbia, Canada (VIP5P6)

Continuation of Ser. No. 658,576, Feb. 17, 1976, Pat. No. 4,031,183, which is a continuation-in-part of Ser. No. 559,193, Mar. 17, 1975, abandoned. This application Jan. 17, 1977, Ser. No. 760,112
Int. Cl.² F27B *1/26*
U.S. Cl. 432—96 **7 Claims**



1. An apparatus for the production of calcined lime comprising:
a refractory lined vertical shaft provided with material feed means and gas exhaust means;
cooler means in communication with the lower end of said vertical shaft and provided with means to withdraw calcined lime from said apparatus;
means for admitting air continuously into said cooler;
a plurality of injector means spaced around said shaft in a horizontal plane spaced from said lower end thereof for introducing fuel into said shaft; and
means for supplying fuel at a pressure between 2000 and 15000 psi to each of said injector means in a predetermined sequence at a pulsed rate between 100 and 500 injections per injector per minute, said injections occuring in a time period between 0.02 and 0.2 seconds with a time period of 0.1 to 0.5 seconds between injections, the time period between injections being longer than the time of the injections.

4,097,226

FURNACE FOR PRACTISING TEMPERATURE GRADIENT ZONE MELTING

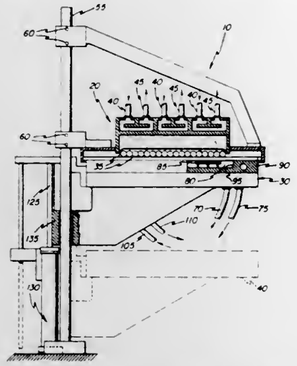
Carl A. Erikson, Schenectady; John O. Fielding, Ballston Lake; Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 26, 1976, Ser. No. 735,513
Int. Cl.² F24J *3/00*
U.S. Cl. 432—120 **25 Claims**

1. An apparatus for the simultaneous processing of one or more bodies of semiconductor material by temperature gradient zone melting, said apparatus comprising:
a closable work chamber for receiving said semiconductor bodies for processing;
a radiative heat source facing internally of said work chamber, said heat source comprising a first closure member for said work chamber;
a heat sink provided with a multiplicity of closely packed radiation attenuating cavities disposed in a major surface thereof facing internally of said work chamber and located opposite to, and facing, said heat source whereby when radiation is emitted from said heat source to said cavities the radiation is repeatedly reflected within the interiors of said cavities to the extent of substantially

complete attenuation, said heat sink comprising a second closure member for said work chamber;

said closure members defining at least in part said work chamber and at least one of said closure members being



movable to allow access to the interior of said work chamber, and

means disposed in said work chamber for supporting said bodies of semiconductor material.

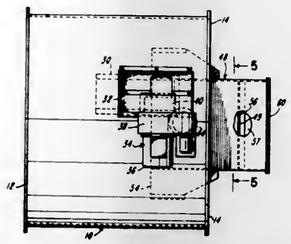
4,097,227

AIR MOVING DEVICE WITH OIL FIRED HEATING APPARATUS

James A. Brock, Sidney, Ohio, assignor to Aerovent, Inc., Piqua, Ohio

Filed Jun. 14, 1976, Ser. No. 695,473
Int. Cl.² F27B *17/00*
U.S. Cl. 432—187 **24 Claims**

16. Apparatus for flowing heated air in direct contact with cereal grains, tobacco and like material for drying or curing thereof, including means for generating and directing a forced flow of air, said means operating against a static pressure varying with the restriction to flow imposed by said materials, means for heating the flowing air including means defining a combustion chamber positioned in said forced air flow and providing an outlet from said chamber through which products of combustion escape to join said forced air flow against the resistance of said static pressure, means for pressurizing said combustion chamber using air supplied thereto for com-



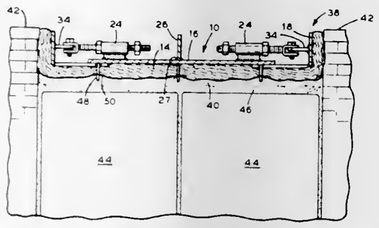
bustion, and means for varying the pressurization of said chamber in correspondence with variations in the static pressure.

4,097,228

FURNACE COVER

Denys Reginald Rosling, Graniteville, S.C., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,341
Int. Cl.² F27D *1/18*
U.S. Cl. 432—250 **7 Claims**



1. A cover for sealing a furnace opening comprising a metal backing, panels disposed about the perimeter and extending transversely of the backing, flexible insulation material lining and overlappingthe backing and panels, and means connected to the panels and backing for adjustably moving the panels and the insulation material associated therewith in the direction of the perimeter of the furnace opening to bring about sealing contact of the insulation with the perimeter of the opening.

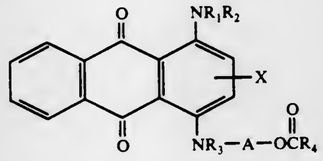
4,097,229

METHODS FOR DYEING OR PRINTING USING AMINO-ANTHRAQUINONE REACTIVE DISPERSE DYES

Stefan Koller, Ramlinsburg; Urs Karlen, Magden; Werner Kneubuhler, Bockten, and Raymond Defago, Riehen, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Division of Ser. No. 689,985, May 26, 1976, Pat. No. 4,044,029.
This application Mar. 1, 1977, Ser. No. 773,403
Int. Cl.² D06P *1/38;* **C09B** *1/16*
U.S. Cl. 8—1 A **12 Claims**

1. In the method for the dyeing or printing of organic fiber material selected from the group of synthetic polyamide, natural polyamide and mixtures thereof which comprises contacting the said fiber with a dyestuff therefor, the improvement according to which the dyestuff is a reactive disperse dye of the formula



wherein

R_1 represents hydrogen or alkyl,

R_2 represents hydrogen, alkyl, cycloalkyl, aralkyl or substituted or unsubstituted phenyl,

R_3 represents hydrogen or alkyl,

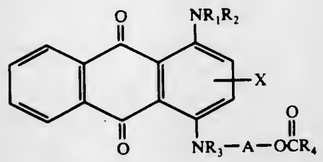
R_4 represents an alkyl radical of 1 to 6 carbon atoms which is substituted in α-position, or in α- and β-position, by halogen, or represents an α,β-unsaturated alkene radical which can be substituted in α- or β-position by halogen,

A represents an alkylene or cycloalkylene radical which optionally contains oxygen or sulphur,

X represents hydrogen, chlorine, bromine, cyano or $COOR_5$, and

R_5 represents alkyl.

2. In the dry heat transfer dyeing or printing process which comprises bringing an organic fiber material selected from the group of synthetic polyamide, natural polyamide and mixtures thereof into contact with the treated face of a carrier sheet containing at least one sublimable dyestuff, subjecting the material and carrier while in contact to a heat treatment to effect dyestuff transfer, and separating the material from the carrier sheet, the improvement according to which at least one sublimable dyestuff is a reactive disperse dye of the formula



wherein

R_1 represents hydrogen or alkyl,

R_2 represents hydrogen, alkyl, cycloalkyl, aralkyl or substituted or unsubstituted phenyl,

R_3 represents hydrogen or alkyl,

R_4 represents an alkyl radical of 1 to 6 carbon atoms which is substituted in α-position, or in α- and β-position, by halogen, or represents an α,β-unsaturated alkene radical which can be substituted in α- or β-position by halogen,

A represents an alkylene or cycloalkylene radical which optionally contains oxygen or sulphur,

X represents hydrogen, chlorine, bromine, cyano or $COOR_5$, and

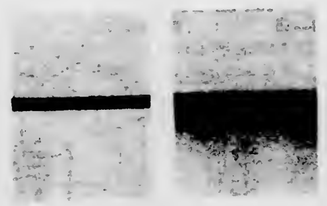
R_5 represents alkyl.

4,097,230

METHOD FOR TRANSFERRING HEAT-TRANSFERABLE DYES

M. Akram Sandhu, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 8, 1976, Ser. No. 730,884
Int. Cl.² D06P *5/00;* **C08G** *63/12*
U.S. Cl. 8—2.5 A **15 Claims**



1. In a method for transferring a heat-transferable dye by vaporization and diffusion into a receiving substrate, the improvement comprising diffusing the heat-transferable dye into a dye receiving element comprising a transparent layer containing an amorphous, solvent soluble, aromatic polyester comprising at least 30 mole percent of its recurring units comprised of the condensation of aromatic diol having the general formula:

HO—AR—X—AR—OH

or the condensation residue of aromatic dicarboxylic acid having the general formula:

HOOC—AR—X—AR—COOH

wherein AR is an aromatic radical and X is a saturated gem-bivalent radical having a saturated polycyclic three-dimensional structure that includes a saturated bicyclic atomic bridged hydrocarbon ring member.

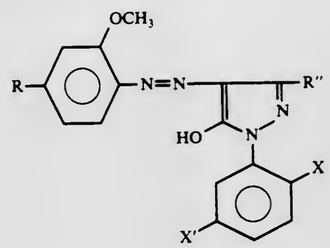
4,097,231

METAL-CONTAINING POLYPROPYLENE DYED WITH MONOAZO 1-ARYL-3-ALKYL-5-PYRAZOLONES

Raouf Botros, Beech Creek, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Filed Mar. 23, 1977, Ser. No. 780,405
Int. Cl.² C09B *27/00, 45/00*
U.S. Cl. 8—41 D **5 Claims**

1. Dyed metal-containing polypropylene fibers, the dye being of the structure:



where

R is H or alkoxy of 1–4 carbons,

R″ is alkyl of 1–4 carbons,

X is H, chloro or bromo, and

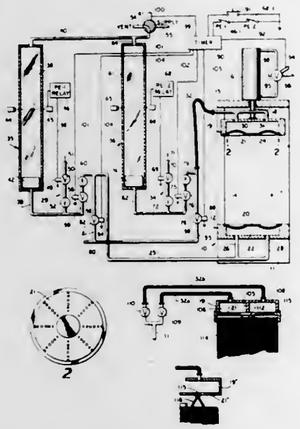
X′ is H, chloro or bromo;

and the metal of said metal-containing polypropylene fibers being selected from the group consisting of chromium, cobalt, nickel, aluminum and zinc.

4,097,232
METHOD AND APPARATUS FOR TREATMENT OF YARN IN PACKAGE FORM

Edward J. Negola, Atlanta, and Jerald Brown, Jasper, both of Ga., assignors to Glen Head, Inc., Jasper, Ga.

Continuation-in-part of Ser. No. 628,374, Nov. 3, 1975, abandoned, which is a continuation-in-part of Ser. No. 541,127, Jan. 15, 1975, abandoned. This application Dec. 4, 1975, Ser. No. 636,701
Int. Cl.² D06P 5/22; D06B 11/00
U.S. Cl. 8—65 19 Claims



1. The process of treating a mass of yarn in package form comprising the steps of infusing a yarn treating agent into selected portions of the outer surface of said package, and introducing a heated fluid under pressure into said selected portions.

4. The method of treating a mass of yarn in package form to create repeating sequences of contiguous lengths of yarn having differing dye susceptibility comprising the steps of infusing a dye acceptance modifier into selected portions of the outer surface of said package, and subjecting said selected portions of said package to a heated fluid under pressure to cause said modifier to at least partially penetrate said package.

4,097,233
BASIC DYE COMPOSITION

Masaoki Takahashi, Tokyo, and Michio Fumishi, Fukuyama, both of Japan, assignors to Nippon Kayaku Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 424,699, Dec. 14, 1973, abandoned. This application Jun. 24, 1976, Ser. No. 699,501
Claims priority, application Japan, Dec. 16, 1972, 47/126522
Int. Cl.² C09B 67/00
U.S. Cl. 8—83 5 Claims

1. A basic dye composition consisting essentially of a finely dispersed difficultly soluble dye complex salt consisting essentially of one or more anionic dispersants which are selected from the group consisting of (a) a condensate of formaldehyde with naphthalenesulfonic acid, (b) a condensate of formaldehyde with methylnaphthalenesulfonic acid (c) Lignin sulfonic acid and (d) sodium and ammonium lauryl sulfate and one or more water-soluble basic dyes and optionally water, said composition having been prepared by a process consisting essen-

4,097,234
METHOD FOR PREPARING DISPERSION OF COLLAGEN FIBER

Takeshi Sohde, Chiba; Astuko Gotoh, Ichikawa; Kuniharu Iwamoto, Sohka, and Yasushi Okamoto, Ichikawa, all of Japan, assignors to Nippi, Incorporated, Tokyo, Japan

Filed Dec. 10, 1976, Ser. No. 749,307
Int. Cl.² C14C 3/00
U.S. Cl. 8—94.19 9 Claims

1. A method of preparing an aqueous dispersion of collagen fibers which comprises:

(a) soaking a material including bundles of collagen fibers in an aqueous solution 0.3 to 1.0 normal with respect to NaOH, and containing 10% to 20% Na_2SO_4 by weight and 0.05 to 0.3 mole per liter of an organic base until a portion of the telpeptides is removed from the collagen molecules in said bundles,

(1) said bundles having a length greater than 5 mm when being soaked in said solution,

(2) a length of said bundles greater than 5 mm being maintained during said soaking;

(b) washing the soaked material with water;

(c) grinding the washed material until said fiber bundles have a length of 5 to 70 mm;

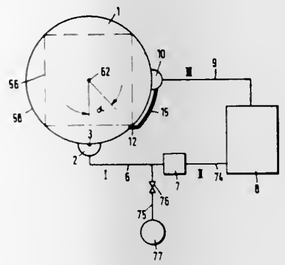
(d) tanning the ground fiber bundles; and

(e) comminuting the tanned fiber bundles in an aqueous medium at a pH of 2.0 – 4.0 or 9.0 to 11.0 until an aqueous dispersion of collagen fibers having a length of at least 2 mm is formed.

4.097,235
AUTOCLAVE AND AUTOCLAVE SYSTEM

Hermann Stock, Neümunster, Germany, assignor to Firma Hermann Stock, Neümunster, Germany

Filed May 25, 1976, Ser. No. 689,914
Claims priority, application Germany, Jun. 5, 1975, 2524909
Int. Cl.² A23L 1/00, 3/14; A61L 3/00, 3/02
U.S. Cl. 21—93 17 Claims



1. An autoclave, for use in sterilizing articles and using a heated liquid as the sterilizing medium and which comprises

a vessel having a cylindrical shell, which has a horizontal central axis,

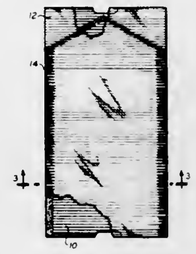
a row of outlet openings extending through said shell and communicating with the interior of said vessel, said outlet openings being spaced apart along the lowermost generatrix of said shell,

a row of inlet openings for supplying the heated liquid extending through said shell communicating with the interior of said vessel and spaced apart along a second generatrix of said shell, which second generatrix is angularly spaced about said shell from said lowermost generatrix by a central angle about the central axis of said shell in the range of 20° to 50°, and

4,097,236
METHOD OF DETECTING HEAT SEAL BREAKS AND PACKAGE THEREOF

William P. Daly, White Plains, N.Y.; Robert P. Lewis, Oceanport, N.J., and Oliver L. Pouliot, Oradell, N.Y., assignors to Faser Industries, Saddle Brook, N.J.

Filed Jan. 24, 1977, Ser. No. 762,066
Int. Cl.² B65D 73/00; G01M 3/00; G01N 19/08
U.S. Cl. 23—230 L 6 Claims

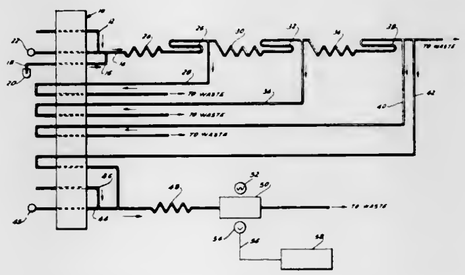


1. Method of detecting a break in a heat seal between a paper member and a clear plastic member in a sterilizable package which comprises providing a paper member dyed a dark color which is sufficiently porous to permit gas or steam sterilization but is impervious to bacteria, heat sealing the clear plastic member directly to the dyed paper member in the desired heat seal area, thereafter visually examining the heat seal to detect if the previously clear plastic member takes on a translucent appearance in the area of the heat seal which translucent appearance provides a distinct color contrast and indicates a broken seal.

4,097,237
DETERMINATION OF CELLS IN BLOOD

Bruce J. Oberhardt, Hartsdale, and Jack Olich, Mahopac, both of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Mar. 4, 1977, Ser. No. 774,560
Int. Cl.² G01N 21/02, 31/02, 31/22, 33/16
U.S. Cl. 23—230 B 11 Claims



1. A method for determining the volume of red cells in a blood sample comprising:

flowing along a conduit a predetermined volume of said sample;

introducing a known volume of an agglutinating agent and a predetermined volume of a dye into said conduit, said agglutinating agent being characterized by a relatively high positive charge, said dye being of a material not present in blood samples of the type being determined, said dye also being of known concentration and water

mixing at least said sample and agglutinating agent while flowing along said conduit to agglutinate the red cells;

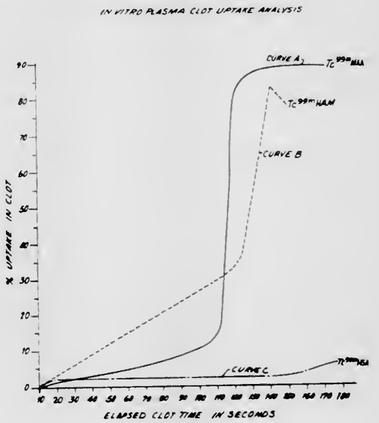
decanting the agglutinated red cells from said conduit; and

colorimetrically measuring the concentration of said dye in the plasma flowing along said conduit.

4,097,238
METHOD OF ANALYZING BLOOD PLASMA CLOTTING

Sheldon J. Ashley, 147-15 84th Rd., Jamaica, N.Y. 11355

Filed Jun. 3, 1977, Ser. No. 803,070
Int. Cl.² G01N 33/16
U.S. Cl. 23—230.3 8 Claims



1. A method of analyzing blood plasma clotting, comprising the steps of

citrating platelet-rich blood plasma;

adding a Tc^{99m} tagged particulate to the plasma;

counting the radioactivity of an aliquot of the citrated plasma with added particulate thereby providing the pre-clot count;

adding calcium chloride solution to initiate the clotting process;

adding an anticoagulant to the solution after the formation of a clot to terminate the clot reaction;

washing the residual clot in a normal saline solution;

resuspending the washed clot in a saline solution; and

recounting the radioactivity of the resuspended clot to provide the post-clot count and the clotting time.

4,097,239
TWO-FLAME BURNER FOR FLAME PHOTOMETRIC DETECTION

Paul L. Patterson, Walnut Creek, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 28, 1977, Ser. No. 772,710
Int. Cl.² G01J 3/48; G01N 31/12
U.S. Cl. 23—232 R 29 Claims

1. A method for analyzing a chemical substance, said method comprising the steps of:

introducing said chemical substance into a hydrogen-rich

4,097,232

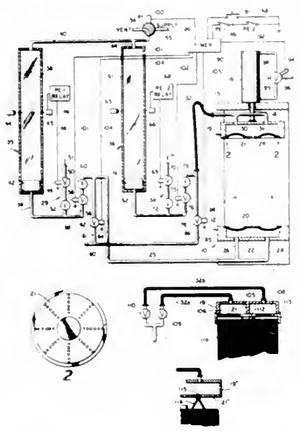
METHOD AND APPARATUS FOR TREATMENT OF YARN IN PACKAGE FORM

Edward J. Negola, Atlanta, and Jerald Brown, Jasper, both of Ga., assignors to Glen Head, Inc., Jasper, Ga.

Continuation-in-part of Ser. No. 628,374, Nov. 3, 1975, abandoned, which is a continuation-in-part of Ser. No. 541,127, Jan. 15, 1975, abandoned. This application Dec. 4, 1975, Ser. No. 636,701

Int. Cl.[2] D06P 5/22; D06B 11/00

U.S. Cl. 8—65 19 Claims



1. The process of treating a mass of yarn in package form comprising the steps of infusing a yarn treating agent into selected portions of the outer surface of said package, and introducing a heated fluid under pressure into said selected portions.

4. The method of treating a mass of yarn in package form to create repeating sequences of contiguous lengths of yarn having differing dye susceptibility comprising the steps of infusing a dye acceptance modifier into selected portions of the outer surface of said package, and subjecting said selected portions of said package to a heated fluid under pressure to cause said modifier to at least partially penetrate said package.

4,097,233

BASIC DYE COMPOSITION

Masaoki Takahashi, Tokyo, and Michio Fumishi, Fukuyama, both of Japan, assignors to Nippon Kayaku Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 424,699, Dec. 14, 1973, abandoned. This application Jun. 24, 1976, Ser. No. 699,501

Claims priority, application Japan, Dec. 16, 1972, 47/126522

Int. Cl.[2] C09B 67/00

U.S. Cl. 8—83 5 Claims

1. A basic dye composition consisting essentially of a finely dispersed difficultly soluble dye complex salt consisting essentially of one or more anionic dispersants which are selected from the group consisting of (a) a condensate of formaldehyde with naphthalenesulfonic acid, (b) a condensate of formaldehyde with methylnaphthalenesulfonic acid (c) Lignin sulfonic acid and (d) sodium and ammonium lauryl sulfate and one or more water-soluble basic dyes and optionally water, said composition having been prepared by a process consisting essentially of the step of dissolving or suspending 1 part of water-soluble basic dye in water, mixing 1 to 15 parts said anionic dispersant with the solution and optionally drying if the basic dye composition is intended to be powder.

4,097,234

METHOD FOR PREPARING DISPERSION OF COLLAGEN FIBER

Takeshi Sohde, Chiba; Astuko Gotoh, Ichikawa; Kuniharu Iwamoto, Sohka, and Yasushi Okamoto, Ichikawa, all of Japan, assignors to Nippi, Incorporated, Tokyo, Japan

Filed Dec. 10, 1976, Ser. No. 749,307

Int. Cl.[2] C14C 3/00

U.S. Cl. 8—94.19 9 Claims

1. A method of preparing an aqueous dispersion of collagen fibers which comprises:

(a) soaking a material including bundles of collagen fibers in an aqueous solution 0.3 to 1.0 normal with respect to NaOH, and containing 10% to 20% Na_2SO_4 by weight and 0.05 to 0.3 mole per liter of an organic base until a portion of the telpeptides is removed from the collagen molecules in said bundles,

(1) said bundles having a length greater than 5 mm when being soaked in said solution,

(2) a length of said bundles greater than 5 mm being maintained during said soaking;

(b) washing the soaked material with water;

(c) grinding the washed material until said fiber bundles have a length of 5 to 70 mm;

(d) tanning the ground fiber bundles; and

(e) comminuting the tanned fiber bundles in an aqueous medium at a pH of 2.0 – 4.0 or 9.0 to 11.0 until an aqueous dispersion of collagen fibers having a length of at least 2 mm is formed.

4,097,235

AUTOCLAVE AND AUTOCLAVE SYSTEM

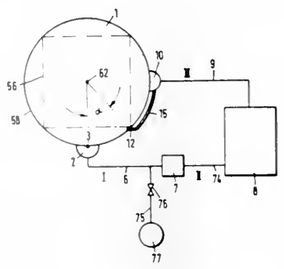
Hermann Stock, Neümunster, Germany, assignor to Firma Hermann Stock, Neümunster, Germany

Filed May 25, 1976, Ser. No. 689,914

Claims priority, application Germany, Jun. 5, 1975, 2524909

Int. Cl.[2] A23L 1/00, 3/14; A61L 3/00, 3/02

U.S. Cl. 21—93 17 Claims



1. An autoclave, for use in sterilizing articles and using a heated liquid as the sterilizing medium and which comprises

a vessel having a cylindrical shell, which has a horizontal central axis,

a row of outlet openings extending through said shell and communicating with the interior of said vessel, said outlet openings being spaced apart along the lowermost generatrix of said shell,

a row of inlet openings for supplying the heated liquid extending through said shell communicating with the interior of said vessel and spaced apart along a second generatrix of said shell, which second generatrix is angularly spaced about said shell from said lowermost generatrix by a central angle about the central axis of said shell in the range of 20° to 50°, and

means located exteriorly of said shell for receiving liquid from said outlet openings, for heating the liquid and for returning the heated liquid to said inlet openings for circulation within said shell.

4,097,236

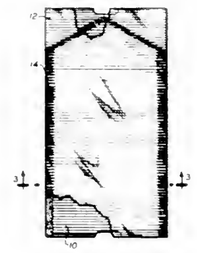
METHOD OF DETECTING HEAT SEAL BREAKS AND PACKAGE THEREOF

William P. Daly, White Plains, N.Y.; Robert P. Lewis, Oceanport, N.J., and Oliver L. Pouliot, Oradell, N.Y., assignors to Faser Industries, Saddle Brook, N.J.

Filed Jan. 24, 1977, Ser. No. 762,066

Int. Cl.[2] B65D 73/00; G01M 3/00; G01N 19/08

U.S. Cl. 23—230 L 6 Claims



1. Method of detecting a break in a heat seal between a paper member and a clear plastic member in a sterilizable package which comprises providing a paper member dyed a dark color which is sufficiently porous to permit gas or steam sterilization but is impervious to bacteria, heat sealing the clear plastic member directly to the dyed paper member in the desired heat seal area, thereafter visually examining the heat seal to detect if the previously clear plastic member takes on a translucent appearance in the area of the heat seal which translucent appearance provides a distinct color contrast and indicates a broken seal.

4,097,237

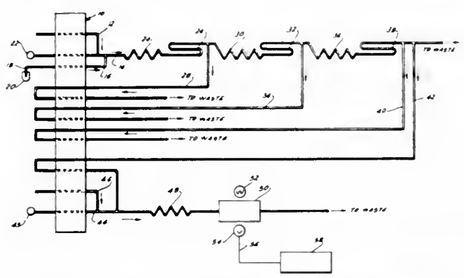
DETERMINATION OF CELLS IN BLOOD

Bruce J. Oberhardt, Hartsdale, and Jack Olich, Mahopac, both of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Mar. 4, 1977, Ser. No. 774,560

Int. Cl.[2] G01N 21/02, 31/02, 31/22, 33/16

U.S. Cl. 23—230 B 11 Claims



1. A method for determining the volume of red cells in a blood sample comprising:

flowing along a conduit a predetermined volume of said sample;

introducing a known volume of an agglutinating agent and a predetermined volume of a dye into said conduit, said agglutinating agent being characterized by a relatively high positive charge, said dye being of a material not present in blood samples of the type being determined, said dye also being of known concentration and water soluble and characterized by (1) not penetrating said cells, (2) not forming a precipitate with said agglutinating agent or with soluble components of said sample, and (3) not lysing said cells or altering the volume of said cells;

mixing at least said sample and agglutinating agent while flowing along said conduit to agglutinate the red cells;

decanting the agglutinated red cells from said conduit; and

colorimetrically measuring the concentration of said dye in the plasma flowing along said conduit.

4,097,238

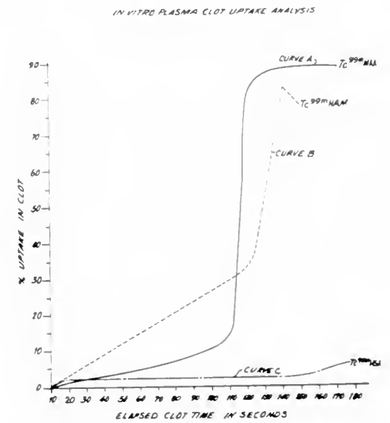
METHOD OF ANALYZING BLOOD PLASMA CLOTTING

Sheldon J. Ashley, 147-15 84th Rd., Jamaica, N.Y. 11355

Filed Jun. 3, 1977, Ser. No. 803,070

Int. Cl.[2] G01N 33/16

U.S. Cl. 23—230.3 8 Claims



1. A method of analyzing blood plasma clotting, comprising the steps of

citrating platelet-rich blood plasma;

adding a Tc^{99m} tagged particulate to the plasma;

counting the radioactivity of an aliquot of the citrated plasma with added particulate thereby providing the pre-clot count;

adding calcium chloride solution to initiate the clotting process;

adding an anticoagulant to the solution after the formation of a clot to terminate the clot reaction;

washing the residual clot in a normal saline solution;

resuspending the washed clot in a saline solution; and

recounting the radioactivity of the resuspended clot to provide the post-clot count and the clotting time.

4,097,239

TWO-FLAME BURNER FOR FLAME PHOTOMETRIC DETECTION

Paul L. Patterson, Walnut Creek, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 28, 1977, Ser. No. 772,710

Int. Cl.[2] G01J 3/48; G01N 31/12

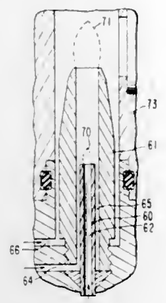
U.S. Cl. 23—232 R 29 Claims

1. A method for analyzing a chemical substance, said method comprising the steps of:

introducing said chemical substance into a hydrogen-rich first flame,

passing combustion products and excess hydrogen from said first flame into a second flame via a conduit structure having a substantial thermal conductance such that said

conduit structure, in operation, does not contribute to the coloration of said second flame, and



detecting the presence in said second flame of a color that is indicative of the presence of a particular constituent in said chemical substance.

4,097,240

PROCESS FOR THE PRODUCTION OF A DIAGNOSTIC AGENT FOR THE DETECTION OF KETONES

Wolfgang Hirsch, Wunstorf, Germany, assignor to Riedel-de Haen Aktiengesellschaft, Seelze, Hanover, Germany

Filed Feb. 9, 1977, Ser. No. 767,028
Claims priority, application Germany, Feb. 11, 1976, 2605221
Int. Cl.² G01N *33/16*
U.S. Cl. 23—253 TP **6 Claims**

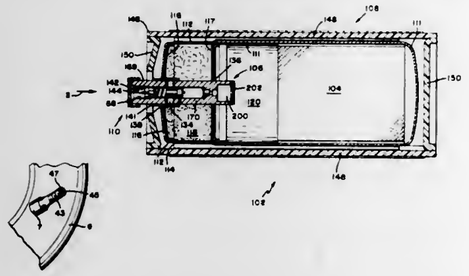
1. In a process for the production of a diagnostic agent for the detection of ketones, consisting of an absorbent carrier impregnated with sodium nitroferricyanide, an alkaline buffer substance and a water-soluble lower amino acid by impregnating the carrier in the first stage with an aqueous solution of the amino acid and tetrasodium ethylenediamine tetraacetate as buffer, drying the carrier, impregnating it in a second stage with a solution of sodium nitroferricyanide in a solvent mixture containing methanol as one component, and drying the carrier again, the improvement which comprises using a solvent mixture consisting of methanol and an organic solvent miscible with methanol which is not dimethyl formamide.

4,097,241

PYROTECHNIC TIRE INFLATOR

Eugene F. Garner, and Brian K. Hamilton, both of Canyon Country, Calif., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 4, 1974, Ser. No. 520,506
Int. Cl.² B01J *7/00*
U.S. Cl. 23—281 **7 Claims**



1. A light, portable, miniaturized tire inflator for inflating a tire without a source of stored gas, the tire having an inlet valve having a valve stem, the inflator adapted to fit in a limited space, such as in a tire well for a deflated space-saving tire in a trunk of an automobile, and adapted to be carried or held in one hand, comprising:

a pyrotechnic material to generate a low temperature, substantially non-toxic, tire-inflating gas upon combustion to inflate a tire; said pyrotechnic material including by weight: about 1% to about 5% of a fuel; about 40% to about 60% of an inorganic oxidizer; and about 35% to about 55% of a combined binder and coolant:

a pressure vessel exterior of a tire to hold said pyrotechnic material, said pressure vessel having a first end and a second end; said pressure vessel including a canister having a cylindrical shape, a first end corresponding to said first end of said pressure vessel and a second end corresponding to said second end of said pressure vessel, said first end of said canister being open and having an outer edge; and a canister cap, a portion of which is adapted to fit within the outer edge of said first end of said canister; said pyrotechnic material compacted in the shape of a cylinder and having a coating of an inhibitor on the outer surface of the pyrotechnic material between the pyrotechnic material and the walls of said canister and on an outer surface of an end of the pyrotechnic material, said inhibitor delaying burning of said outer surfaces of the pyrotechnic material; said canister cap including: a first place disposed within said canister cap and having apertures for permitting passage of said inflating gas; a coolant bed to cool the inflating gas as the gas passes through the coolant bed; and a second plate disposed in said canister cap, said second plate having apertures for permitting passage of said inflating gas; said coolant bed being disposed between said second plate and said first plate; said pressure vessel further including an over pressure relief means for release of excess pressure in the pressure vessel; and an ignitor mechanism located at said first end of said pressure vessel to ignite and cause said pyrotechnic material to burn; said ignitor mechanism including: an ignitor body having a substantially cylindrical shape and a longitudinal bore, said ignitor body extending through said canister cap and into a portion of said canister; an actuator tube having a downstream end and an upstream end, said actuator tube disposed within a portion of said longitudinal bore of said ignitor body, said actuator tube being movable within said longitudinal bore by a tire valve; a shear pin disposed in said ignitor body substantially radially to said longitudinal bore of said ignitor body and adapted to be broken by said actuator tube when said actuator tube is moved by a tire valve; a coil spring disposed inside a portion of said actuator tube in a compressed condition, said coil spring being released from said compressed condition when said shear pin is broken, thereby allowing said coil spring to expand; a plunger having a downstream end and an upstream end, said plunger driven by said coil spring when said coil spring expands; a firing pin; a primer adapted to be actuated by said firing pin by impact of said firing pin upon said primer; an intermediate ignition material, adapted to be ignited by said primer, and a main ignition charge adapted to be ignited by said intermediate ignition material, said main ignition charge adapted to cause combustion of said pyrotechnic material; and

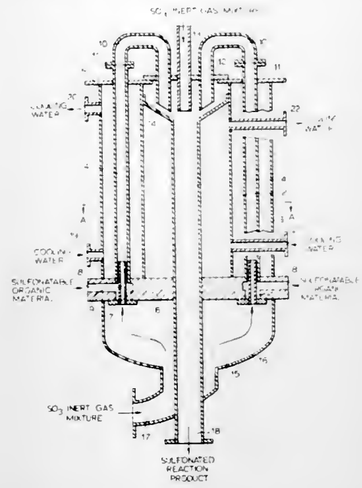
a nozzle mounted on said first end of said pressure vessel, said nozzle being adapted to be connected directly to a tire valve, said nozzle having a downstream end and an upstream end, said nozzle including: a well at the downstream end of said nozzle, said downstream end of said nozzle having means to connect said nozzle directly to a tire valve; and a stem depressor for depressing a valve stem of a tire valve to allow inflating gas to pass through the valve into the tire, said stem depressor extending through a bore in the upstream end of the nozzle.

4,097,242

SULFONATION APPARATUS

Keiichi Tsuto; Kanji Majima, and Shigeyasu Imamura, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Division of Ser. No. 704,613, Jul. 12, 1976, Pat. No. 4,086,256.
This application Apr. 22, 1977, Ser. No. 789,873
Claims priority, application Japan, Jul. 21, 1975, 50-89069
Int. Cl.² C07C *143/24*; B01J *1/00*; F28D *7/12*
U.S. Cl. 23—283 **7 Claims**



1. An apparatus for reacting a liquid organic reactant with sulfur trioxide gas, comprising:

a plurality of individual, parallel, vertically positioned, hollow, cylindrical, first-stage reaction tubes, each of said tubes being of circular cross-section and each of said tubes having at the lower end thereof a central inlet for feeding a stream of a mixture of sulfur trioxide gas and inert gas upwardly into the central region of the tube at the lower end thereof and an outer annular inlet surrounding said central inlet and isolated therefrom for feeding an annular stream of said liquid organic reactant upwardly onto the circular internal wall of the tube at the lower end thereof, said inlets for each tube terminating adjacent the lower end of the tube and the remainder of the tube being open to permit concurrent, upward, parallel flow and contact between said streams to effect the reaction whereby in each of said reaction tubes an annular rising thin film of said liquid organic reactant is formed on the tube wall by said gas stream and the sulfur trioxide in said gas stream reacts with said liquid organic reactant;

means for cooling the external surface of each of said first-stage reaction tubes along substantially the entire length thereof to remove the exothermic heat of reaction generated therein by reaction between said organic reactant and said sulfur trioxide;

a single, vertically positioned, hollow, cylindrical, second-stage reaction tube of circular cross-section having an inlet at the upper end thereof, an outlet at the lower end thereof and means for cooling the external surface of said second-stage reaction tube along the length thereof to remove the exothermic heat of reaction generated therein;

each of said first-stage reaction tubes having a conduit extending from the upper end thereof to the inlet of said second-stage reaction tube so that the entireties of the gas and liquid streams exiting from all of the first-stage reaction tubes are fed into the inlet of said second-stage reaction tube and are combined therein;

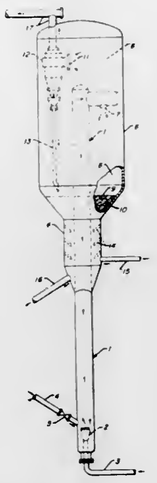
and a further inlet pipe extending to the central portion of the inlet of said second-stage reaction tube for supplying thereto an additional, downwardly flowing stream of a mixture of sulfur trioxide gas and inert gas, whereby the combined liquid streams from all of said first-stage reaction tubes form an annular falling thin film on the wall of said second-stage reaction tube and the sulfur trioxide gas in said additional stream reacts with previously unreacted liquid organic reactant to complete the sulfonation thereof.

4,097,243

HYDROCARBON-FEED DISTRIBUTOR OF INJECTING HYDROCARBON FEED

David B. Bartholic, Watchung, N.J., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 4, 1976, Ser. No. 738,991
Int. Cl.² B01J *8/18*
U.S. Cl. 23—288 S **16 Claims**



1. A hydrocarbon-feed distributor for injecting a hydrocarbon-feed into contact with a fluidizable catalyst under conversion conditions in a lower end of a vertically disposed riser reactor conduit having a lower end, cylindrical inside and outside walls, a reception vessel, the upper portion of said conduit extending into said vessel, the lower end thereof extending below said vessel, a hydrocarbon-feed inlet means entering said conduit at said lower end and a regenerated-catalyst inlet means passing through said walls at a distance downstream from said hydrocarbon-feed inlet means, said distributor comprising:

(a) a truncated cone having a small-diameter end connected to said hydrocarbon-feed inlet means and a large diameter end;

(b) a circular plate fitted into said large-diameter end, said plate having one or more first holes and a plurality of second holes passing through said plate; and,

(c) one or more first nozzles having a first inlet means fitted into said first hole and an outlet means positioned to direct hydrocarbon-feed upwardly toward the axial center line of and into and through said riser reactor conduit; and,

(d) a plurality of second nozzles having second inlet means fitted into said second hole and having second outlet means positioned to direct hydrocarbon-feed downstream of said second outlet means and impinge against said inside wall.

4,097,244

PROCESS FOR REMOVING SULFUR FROM COAL

Emmett H. Burk, Jr., Glenwood; Jin S. Yoo, South Holland, and John A. Karch, Chicago, all of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Filed Dec. 13, 1976, Ser. No. 749,952
Int. Cl.[2] C10L 9/10; C10B 57/00
U.S. Cl. 44—1 R 33 Claims

1. A process for reducing the sulfur content of coal comprising the steps of:
1. contacting coal particles with an aqueous solution of iron complexing agent, and an oxidant to preferentially oxidize at least a portion of the sulfur in the coal;
2. thermally treating the oxidized sulfur-containing coal at elevated temperatures to reduce the sulfur content of the coal; and
3. recovering coal particles of reduced sulfur content.

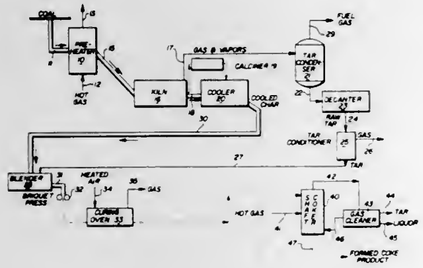
21. A process for reducing the sulfur content of coal comprising the steps of:
1. contacting coal particles with an aqueous solution of iron complexing agent, and an oxidant to preferentially oxidize at least a portion of the sulfur in the coal;
2. subjecting the oxidized sulfur-containing coal to a base thermal treatment comprising heating an aqueous slurry of the coal and base to elevated temperature to reduce the sulfur content of the coal; and
3. recovering coal particles of reduced sulfur content.

4,097,245

METHOD FOR PRODUCING CARBONACEOUS MATERIAL

Michael O. Holowaty, Crown Point, Ind., assignor to Inland Steel Company, Chicago, Ill.

Filed Mar. 1, 1976, Ser. No. 662,449
Int. Cl.[2] C10L 5/16, 5/40; C10B 45/02
U.S. Cl. 44—23 25 Claims



1. In a method for producing a carbonaceous shape composed of carbonaceous material derived from particulized coal and a hydrocarbonaceous binder, wherein said method includes briquetting and coking steps, the additional steps comprising:
preheating said particulized coal in a preheating stage to a preheating temperature which drives off moisture without driving off volatile vapors and gases from said coal;
heating the preheated coal, in a single heating stage, from said preheating temperature to a temperature above 1400° F (760° C), to drive off volatile vapors and gases from said coal, without combusting said coal, and to produce a carbonaceous material;
and capturing the gases driven off during said heating step;
said heating step being conducted prior to said briquetting and coking step;
said heating step being conducted in the absence of extraneous gas so that said captured gases consist essentially of the volatile vapors and gases driven off from said coal undiluted with extraneous gas;
said method comprising a plurality of steps, including said above-recited steps, which cooperate to avoid producing a carbonaceous material having a size and shape characteristic of expansion without retraction.

4. In a method as recited in claim 1 and comprising:
removing said carbonaceous material from said heating stage;
and briquetting said carbonaceous material with a hydrocarbonaceous binder after its removal from said single heating stage;
no subsequent heating being performed after said heating step and prior to said briquetting step.

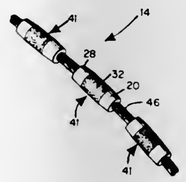
11. In a method as recited in claim 1 and comprising the further steps of:
briquetting said carbonaceous material;
curing said briquettes in a curing zone;
and coking said cured briquettes in a coking zone downstream of said curing zone and in communication therewith;
said curing and coking steps being conducted as a single continuous operation without cooling between the curing and coking steps.

4,097,246

METHOD OF MAKING AN ABRASIVE WIRE FOR SAWING STONE

Norman R. Olson, Worcester, Mass., assignor to Olson Manufacturing Company, Holden, Mass.

Filed Jul. 1, 1976, Ser. No. 701,518
Int. Cl.[2] C04B 31/16
U.S. Cl. 51—309 R 10 Claims



1. In a conventional method of making an abrasive wire for sawing stone, said conventional method comprising the following steps:
(a) forming a support element of malleable metal into a shape comprising two contiguous, axially aligned, cylindrical portions, the first portion having a larger diameter and the second portion having a smaller diameter;
(b) positioning the support element into the bore of a die, the bore having the same diameter as that of the first portion of the support element;
(c) inserting a quantity of abrasive powder containing a mixture including diamond grit and a sinterable metal binder into the bore of the die, the abrasive powder being positioned around the second portion of the support element;
(d) compressing the abrasive powder axially towards the first portion of the support element, a part of the second portion of the support element protruding axially beyond the compressed abrasive powder;
(e) sintering the abrasive powder to produce a solid abrasive body;
(f) affixing the solid abrasive body to the support element;
(g) forming a central axial bore through the support element;
(h) inserting a length of flexible wire rope through the support element bore; and
(i) affixing the support element to the wire rope; the improvement to said foregoing conventional method comprising: affixing the solid abrasive body to the support element by deforming the part of the second portion of the support element protruding axially beyond the compressed abrasive powder, said deformed second portion part having the same diameter as that of the first portion.

4,097,247

ISOTOPE SEPARATION PROCESS

James B. Anderson, Hamden, Conn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 10, 1972, Ser. No. 298,431
Int. Cl.[2] B01D 57/00
U.S. Cl. 55—17 10 Claims

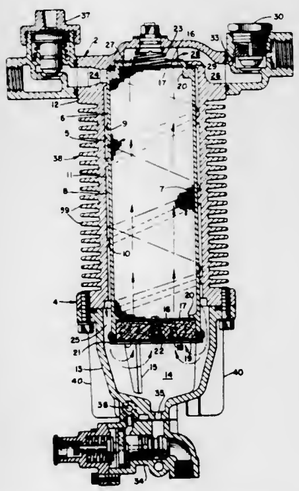
1. A method for the separation of species of different weight or different molecular size contained in a gas mixture, comprising the steps of:
introducing a low-molecular-weight stopping gas in the form of a jet into a vacuum chamber;
expanding said gas mixture through a nozzle to form a gas mixture jet directed to impinge upon said stopping gas jet to effect spatial separation of said different species of said gas mixture within said stopping gas jet; and
dividing said stopping gas jet downstream from the point of impingement of said gas mixture jet into separate streams which are respectively enriched in the separated species of said gas mixture.

4,097,248

METHOD FOR DECONTAMINATING COMPRESSED GAS

Virgil L. Frantz, Salem, Va., assignor to Graham-White Sales Corporation, Salem, Va.

Filed May 15, 1974, Ser. No. 469,957
Int. Cl.[2] B01D 53/04
U.S. Cl. 55—33 3 Claims



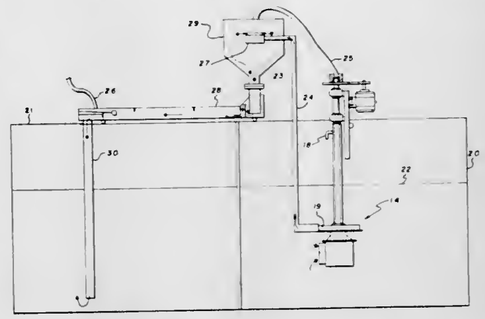
1. A method of adsorbing an entrained component from and cooling compressed gas supplied by a compressor during pumping cycles thereof, comprising containing in a heat conductive container a desiccant adapted to selectively adsorb said component, so passing said gas in a laterally confined path around said container as by partly converting kinetic energy of said gas into centrifugal force to concentrate heat from said gas and container on an outer confine of said path, externally dissipating said heat from said outer confine for cooling said gas and container and therethrough maintaining said desiccant in a temperature range of substantially optimum adsorption efficiency for said component, passing said cooled gas through said desiccant for adsorbing said component, and during idling cycles of said compressor discharging contaminants separated by said centrifugal force from said gas while preventing gas from said compressor from entering said confined path.

4,097,249

METHOD OF FLUID DEGASSING

Victor Quin Phillips; Phil Harmon Griffin, and Martin James Sharki, all of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 27, 1976, Ser. No. 754,853
Int. Cl.[2] B01D 19/00
U.S. Cl. 55—41 10 Claims



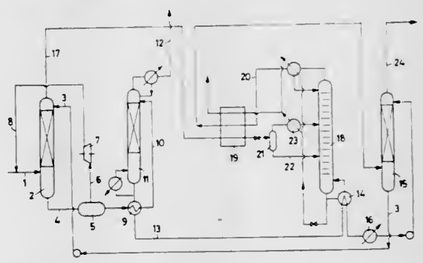
1. A method of removing a substantial amount of entrained gas from a viscuous fluid such as drilling mud, said method comprising:
introducing the fluid into a fluid pump and pressurizing the introduced fluid;
discharging the pumped fluid through a conduit and into a spray vessel;
spraying the fluid outward from a deflector in the spray vessel in a 360° radial spray pattern having a central opening;
creating a vacuum in the spray vessel by said spraying step;
flowing the sprayed fluid into a discharge outlet of the spray vessel;
discharging said fluid into a closed degassing vessel;
moving said fluid through an extended length of the degassing vessel while maintaining a fluidic barrier to gas flow between the extended length of the degassing vessel and the spray vessel; and,
discharging the fluid from the degassing vessel and collecting the gas removed from the fluid in the degassing vessel.

4,097,250

METHOD FOR THE PURIFICATION OF NATURAL GAS HAVING A HIGH CONTENTS OF ACIDIC GASES

Giorgio Pagani, Milan; Gianfranco Guerreri, and Bruno Peri, both of San Donato Milanese (Milan), all of Italy, assignors to Snamprogetti, S.p.A., Milan, Italy

Filed Mar. 4, 1977, Ser. No. 774,626
Claims priority, application Italy, Mar. 5, 1976, 20900 A/76
Int. Cl.[2] B01D 19/00
U.S. Cl. 55—48 8 Claims



1. The method of purifying natural gas having a high content of acidic gases, comprised of a sulfurous compound and CO_2, in a series of stages which include:

a first stage which comprises, desulfurizing the gas to be purified by feeding said gas and a selective solvent for said sulfurous compound to a desulfurization column so that the sulfurous compound is absorbed by said solvent, recovering the solvent and material absorbed thereby as bottom product from the desulfurization column and withdrawing desulfurized gas including natural gas and CO_2 from the head of the desulfurization column;

a second stage which comprises, regenerating the selective solvent recovered in the bottom product of said first stage by feeding said bottom product to a stripping column so that the sulfurous compound is stripped from the solvent therein, withdrawing said sulfurous product from the head of the stripping column, and recovering regenerated solvent from the stripping column as bottom product;

a third stage which comprises, removing the major fraction of the CO_2 from the desulfurized gas withdrawn from the desulfurization column in the first stage by feeding said desulfurized gas to a separation column so that said gas is subjected to a low temperature distillation whereby liquid CO_2 is separated from said desulfurized gas and wherein the necessary refrigeration is supplied by evaporating liquid CO_2 separated in said distillation, withdrawing liquid CO_2 from the separation column as bottom product, and recovering natural gas and the balance of the CO_2 from the head of the separation column;

a fourth stage which comprises, purifying the natural gas withdrawn from the head of the separation column in said third stage by feeding said head product from the third stage and said regenerated selective solvent recovered as bottom product in the second stage to an absorption column so that CO_2 in said third stage head product is absorbed by said regenerated selective solvent, recovering purified natural gas from the absorption column as head product, and withdrawing selective solvent and absorbed OO_2 from said absorption column as bottom product; and

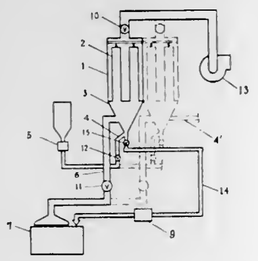
recycling said fourth stage bottom product to the first stage desulfurization column.

4,097,251

METHOD OF FILTERING A STICKY MATERIAL-CONTAINING EXHAUST GAS

Takao Murayama, Yokoyama; Seiichi Shimizu, Tokyo, and Takeo Miyakawa, Kawasaki, all of Japan, assignors to Taisei Kensetsu Kabushiki Kaisha & Tokyo Gas Co., Ltd., Tokyo, Japan

Filed Mar. 17, 1977, Ser. No. 778,421
Claims priority, application Japan, Apr. 14, 1976, 51-41990
Int. Cl.[2] B01D *46/00*
U.S. Cl. 55—97 **8 Claims**



1. A method of treating a sticky material-containing exhaust gas to remove the sticky material therefrom, which comprises introducing a mixture of pulverized coal and/or coke particles, at least 60% by weight of which have particle sizes of 0.3mm or less, into the bottom of a hopper by means of a supply pipe connected to the bottom of said hopper, said hopper being positioned below, and integrally connected with, a bag-house containing at least one bag-filter, to cause a vertical rotary flow of pulverized coal and/or coke particles in said hopper and to gradually deposit and form a protective layer of pulverized coal and/or coke having a minimum thickness of at least 1.0mm on the surface of each bag-filter, and

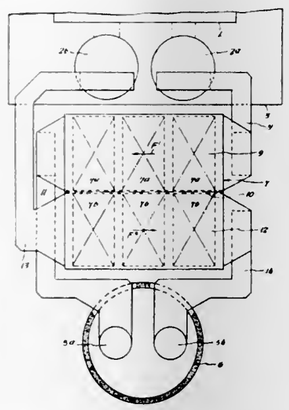
introducing the sticky material-containing exhaust gas into said hopper in a manner such that the gas passes through said protective layer while said protective layer captures and retains the sticky material.

4,097,252

ELECTROSTATIC PRECIPITATOR

Franz-Josef Kirchhoff, Olpe, and Joachim Brandt, Rothemuhle, both of Germany, assignors to Apparatebau Rothemuhle Brandt & Kritzler, Rothemuhle, Germany

Filed Apr. 5, 1976, Ser. No. 673,589
Claims priority, application Germany, Apr. 5, 1975, 2514956
Int. Cl.[2] B03C *3/01*
U.S. Cl. 55—135 **12 Claims**



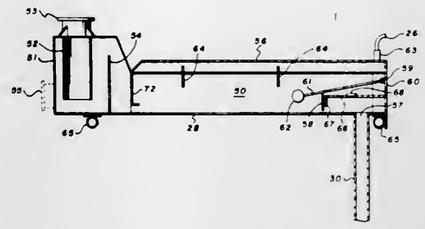
7. A horizontal-flow electrostatic filter interconnected between a boiler house of a steam generating plant and a chimney for treating the gas output of the boiler house and including ducting for passing treated gas to the chimney of the plant, the filter comprising a housing defining a plurality of separate horizontally extending gas-flow chambers each terminating at longitudinal ends of the housing, each chamber containing a plurality of arrays of collection and discharge electrodes which define a plurality of electrostatic precipitation fields arranged in series for the passage therethrough sequentially of gas in each chamber in parallel directions, input duct means for each chamber for bringing the gas output of the boiler house to the chambers and dividing it among them, said input duct means being at one longitudinal end of the housing for one of the chambers and at the other longitudinal end of the housing for another of the chambers, and output duct means for bringing the treated gas from the chambers to be reunited in the chimney, output duct means for the one of the chambers being at the other longitudinal end of the housing and output duct means for the other of the chambers being at the one end of the housing whereby the directions of glow through the chambers are parallel and opposite and the gas output of the boiler house is treated in a plurality of substantially equal streams totalling the said output, one stream to each chamber.

4,097,253

MUD DEGASSER TROUGH

Victor Quin Phillips; Phil Harmon Griffin, and Martin James Sharki, all of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 27, 1976, Ser. No. 754,855
Int. Cl.[2] B01D *19/00*
U.S. Cl. 55—169 **11 Claims**



1. A degassing trough for removing gas bubbles entrained in viscuous fluids such as drilling mud, said trough comprising:

an enclosed inlet section having an inlet opening therein;

a flow section connected to said inlet section and being relatively airtight;

a restricted flow opening between said inlet and flow sections arranged to maintain a liquid barrier against open communication of gas between said two sections;

gas discharge means in said flow section; and,

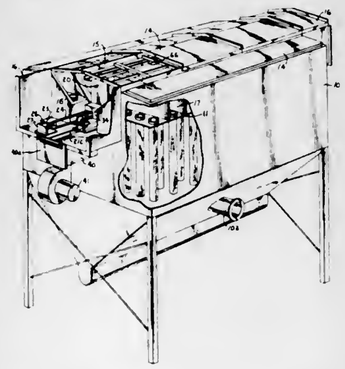
fluid discharge means in said flow section.

4,097,254

BAGHOUSE WITH DOUBLE PASS TRAVELING PURGE HEAD

Richard D. Noland, 1900 W. 47th Pl., Suite 308, Shawnee Mission, Kans. 66205

Filed Jun. 13, 1977, Ser. No. 806,188
Int. Cl.[2] B01D *46/04*
U.S. Cl. 55—294 **10 Claims**



1. Apparatus for separating particulate matter from a gas stream, said apparatus comprising:

a housing;

a substantially horizontal partition disposed interiorally of said housing, thereby defining a first chamber above said partition and a second chamber beneath said partition, said partition having a plurality of openings therethrough;

an inlet conduit connected to said second chamber for directing a particulate laden gas stream into said second chamber;

an outlet conduit communicating with said first chamber to exhaust gas therefrom;

a plurality of filters disposed in said second chamber and having open ends secured to said openings through said partition, said filters being arranged in two parallel, spaced apart banks;

a plurality of vertical dividers arranged in said first chamber above said two banks of filters to thereby define compartments having mouths opening centrally of said first chamber;

a movable cleaning head disposed within said first chamber between said banks of filters and having an air delivery conduit adapted to matingly register with and seal against said compartment mouths;

drive means coupled to said cleaning head to move said head longitudinally forward and backward within said first chamber between said banks of filters;

pressurized air supply means connected to said cleaning head to supply pressurized cleaning air thereto;

valve means mounted on said cleaning head to normally restrict flow of cleaning air from said delivery conduit and intermittently operable to transmit a burst of cleaning air through said delivery conduit; and

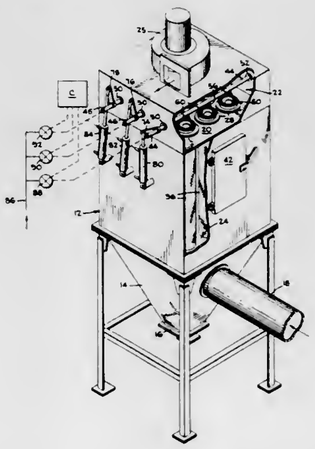
can discharge control means positioned and arranged with respect to said valve means to cause said valve means to transmit a burst of cleaning air through said delivery conduit each time said delivery conduit aligns with a compartment mouth of one bank of filters as said cleaning head travels through said first chamber in one direction and to cause said valve means to transmit a burst of cleaning air through said delivery conduit each time said delivery conduit aligns with a compartment mouth of the second bank of filters as said cleaning head travels through said first chamber in the opposite direction.

4,097,255

GAS FILTER CLEANING APPARATUS

Alfonso A. Samolis, 329 Carnaritas Way, Danville, Calif. 94526

Filed Apr. 4, 1977, Ser. No. 784,154
Int. Cl.[2] B01D *46/04*
U.S. Cl. 55—294 **3 Claims**



1. In a gas filter of the type including at least one porous element having a hollow interior and a circular outlet communicating with the hollow interior, means for directing contaminated gas to the exterior of said element for flow radially through said element, into the interior and means communicating with the outlet for conducting filtered gas therefrom, improved apparatus for periodically producing a reverse blast to dislodge contaminates from the exterior of said element comprising a nozzle, means for supporting said nozzle adjacent said outlet for pivotal movement about an axis spanning the outlet between an active position at which the nozzle is directed toward said interior and a passive position at which the nozzle is pivoted about said axis away from said outlet, a venturi

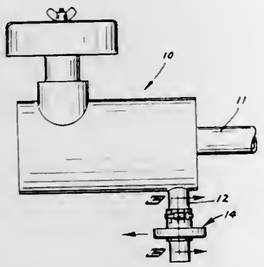
having an opening aligned with said nozzle, means for mounting said venturi to said supporting means for pivotal movement in unison with said nozzle, said venturi including a substantially impervious member having a marginal portion substantially congruent to said outlet so as substantially to seal said outlet when in said active position, said marginal portion having a radius of curvature relative to said axis to afford movement of said venturi between said active and passive positions, said venturi defining a central opening substantially coaxial with said nozzle, and a sleeve portion surrounding said central opening and extending toward said outlet, said sleeve portion terminating in an orifice disposed radially inward of said marginal portion to avoid interference of movement of said venturi between said active and passive positions, and means for supplying compressed gas to said nozzle in the active position.

4,097,256

POWERED CONTAMINANT DISCHARGE EVACUATOR IN CONNECTION WITH AIR CLEANER

Lewis A. Borsheim, Fargo, N. Dak., assignor to Melroe Industries, Inc., Fargo, N. Dak.

Filed May 20, 1977, Ser. No. 798,857
Int. Cl.² B01D *41/00*
U.S. Cl. 55—429 **9 Claims**



1. A positive discharge evacuating apparatus, having in combination

a housing,

receiving means within said housing including,

an annular chamber having an outlet,

a passage within said housing about said chamber having an outlet,

a discharge passage within said housing about said last mentioned passage having a discharge outlet,

said outlet of said first mentioned passage and of said chamber being misaligned circumferentially,

discharge means carried by said housing cooperating with and being complementary to said receiving means comprising,

an impeller,

driving means carried by said housing driving said impeller,

a hub portion of said impeller being disposed into said chamber,

said hub portion having a pair of oppositely disposed discharge chutes which alternately provide communication between said chamber and said discharge passage,

vanes carried by said impeller upstanding therefrom disposed in said first mentioned passage,

a plurality of vanes carried by said impeller upstanding therefrom disposed in said discharge passage,

a pair of opposed spaced pairs of said vanes in said first mentioned passage define pockets respectively alternately in register with said outlet of said chamber, and

said other vanes of said other mentioned passage and said vanes of said discharge passage obstructing communication between said outlet of said chamber and said outlet of said discharge passage when one of said discharge chutes of said chamber communicates with said discharge passage.

4,097,257

GLASS MOLDING PROCESS WITH MOLD LUBRICATION

Richard G. Davey, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 563,895, Mar. 31, 1975, abandoned.
This application Oct. 12, 1976, Ser. No. 731,591
Int. Cl.² C03B *39/00*
U.S. Cl. 65—26 **5 Claims**

1. In a method for forming glass articles comprising forming formable glass into a parison by contact with a glass-forming, cavity-defining surface of a blank mold and subsequently forming said parison into said final article by contact with a glass-forming, cavity-defining surface of a blow mold and wherein said forming of said parison and said forming of said final article is done without relative rotation of the respective molds and glass, and wherein said glass-forming, cavity-defining, surface of said blank mold is a solid film lubricant layer of graphite dispersed in a thermoset cured organopolysiloxane binder, the improvement comprising increasing the effective glass forming life of said layer by spraying onto said solid film lubricant layer prior to glass formation effective lubricating amounts of a mixture comprising lubricating oil and effective lubricating amounts of graphite said mixture containing about 0.34% to about 6.8% by weight of said graphite.

4,097,258

OPTICAL FIBER

Susumu Horikawa, Fussa; Kenji Nakagawa, Tokorozawa, and Yoshito Nogami, Saitama, all of Japan, assignors to Hoya Glass Works, Ltd., Tokyo, Japan

Continuation of Ser. No. 578,785, May 19, 1975, abandoned.
This application Jun. 16, 1976, Ser. No. 696,657
Claims priority, application Japan, May 17, 1974, 49-55207
Int. Cl.² C03C *13/00, 15/00*
U.S. Cl. 65—31 **4 Claims**

1. In a method for preparing the core glass of an optical fiber comprising:

heat treating a starting glass to cause phase separation,

leaching with an acid to obtain a porous glass with low concentration of Mn, Fe, Co, Ni, Cu and Cr, and

sintering the porous glass into a dense, transparent glass, wherein said starting glass is composed mainly of SiO_2, Na_2O, B_2O_3 and GeO_2 and said heat-treating causes phase separation of an $Na_2O—B_2O_3$ rich phase and said leaching with an acid removes said $Na_2O—B_2O_3$ rich phase and a porous glass composed mainly of $SiO_2—GeO_2$ is obtained; the improvement comprising said acid being a polyhydric and/or polycarboxylic organic acid such that undissolved Ge does not remain in the pores of the porous SiO_2 GeO_2 glass during said acid leaching.

4,097,259

FEEDER CONDUITS FOR A GLASS FURNACE WITH HEATING ELECTRODES

Jean Albert Brax, Chalon sur Saone, France, assignor to Saint Gobain Industries, Neuilly-sur-Seine, France

Filed Sep. 16, 1977, Ser. No. 833,956
Claims priority, application France, Oct. 29, 1976, 76 32789
Int. Cl.² C03B *5/02*
U.S. Cl. 65—327 **20 Claims**

1. Apparatus for conveying molten glass from a forehearth to a glass forming machine comprising:

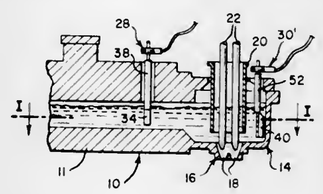
a. an elongated conduit having an inlet connected to the forehearth for reception of molten glass therefrom;

b. a bowl-shaped container having an inlet communicating with said elongated conduit for reception of molten glass therefrom, said container having in its bottom an orifice for withdrawing the molten glass therefrom;

c. a vertical cylinder disposed within the container and above the orifice, said cylinder and a side wall of the container opposite the inlet of the container defining a semi-annular channel therebetween, said cylinder being rotatable about its longitudinal axis for stirring the molten glass and effecting a flow of glass through said semi-annular channel;

d. a first electrode inserted in the molten glass upstream of said cylinder and substantially extending through the entire height of the molten glass;

e. a second electrode inserted in the molten glass within the semi-annular channel and substantially extending through the entire height of the molten glass, said first and second electrodes being offset from a vertical plane passing through the center of said elongated conduit and the center of said cylinder; and



f. means for energizing said first and second electrodes to produce an electric current flow through the molten glass between said electrodes to heat the molten glass therebetween.

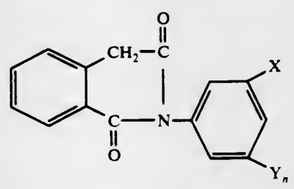
4,097,260

2-SUBSTITUTED-1,3(2H,4H)-ISOQUINOLINEDIONES AS PLANT GROWTH REGULANTS

John J. D'Amico, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 28, 1975, Ser. No. 636,012
Int. Cl.² A01N *9/22*
U.S. Cl. 71—94 **5 Claims**

1. A method of regulating the growth of leguminous plants which comprises treating said plants with an effective non-lethal amount of a compound having the formula



wherein X and Y are selected from the group consisting of trifluoromethyl, methoxy and chloro; and *n* is 0 or 1.

4,097,261

METHOD AND COMPOSITIONS FOR CONTROLLING WATERHYACINTH

Kenneth Edward Conway; Thomas Edward Freeman, and Raghavan Charudattan, all of Gainesville, Fla., assignors to Abbott Laboratories, North Chicago, Ill.

Filed May 13, 1977, Ser. No. 796,565
Int. Cl.² A01N *9/00*
U.S. Cl. 71—66 **10 Claims**

1. A mycoherbicide concentrate for the preparation of compositions effective to control waterhyacinth, said concentrate comprising: the microorganism *Cercospora rodmanii* Conway adsorbed on an agronomically acceptable carrier.

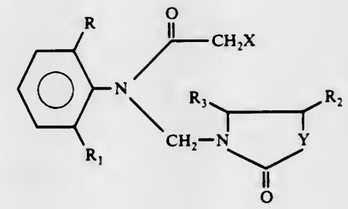
4,097,262

HERBICIDAL ACETAMIDES

Jiin-Duey Cheng, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 22, 1977, Ser. No. 789,961
Int. Cl.² A01W *9/12, 9/22;* C07D *236/04, 277/04*
U.S. Cl. 71—90 **40 Claims**

1. A compound of the formula



where

R is alkyl or alkoxy of 1 to 4 carbon atoms;

R_1 is hydrogen or alkyl of 1 to 3 carbon atoms:

R_2 is hydrogen or methyl;

R_3 is hydrogen or methyl;

X is chlorine or bromine; and

Y is oxygen or sulfur.

11. A composition for the control of undesirable vegetation consisting essentially of a herbicidally effective amount of a compound of claim 1 and at least one of (a) a surface-active agent and (b) a solid or liquid diluent.

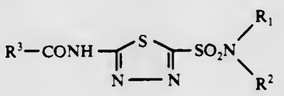
4,097,263

5-ACYLAMINO-1,3,4-THIADIAZOLE-2-SULFONAMIDES AND USE AS HERBICIDES

Joel L. Kirkpatrick, Overland Park, Kans., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Nov. 22, 1976, Ser. No. 743,543
Int. Cl.² A01N *9/16;* C07D *91/62*
U.S. Cl. 71—90 **3 Claims**

1. The method of selectively combating unwanted vegetation in the presence of crop plants comprising applying pre- or post-emergently an effective amount of compound having the structural formula



in which R^1 and R^2 are selected from hydrogen and lower alkyl, alkenyl, alkylene and alkoxy structures and together possess a total of 1 to 6 carbon atoms when R^3 is ethyl, propyl, isopropyl, cyclopropyl, methoxy or tert-butyl.

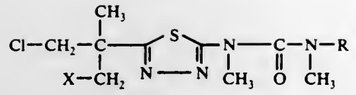
4,097,264

CHLORO-TERT.BUTYL-1,3,4-THIADIAZOLEUREA HERBICIDES AND USE TO COMBAT UNWANTED VEGETATION

Joel L. Kirkpatrick, Overland Park, and Jr. Doyle, Leawood, both of Kans., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed May 14, 1973, Ser. No. 360,204
Int. Cl.² A01N *9/12*
U.S. Cl. 71—90 **2 Claims**

1. The method of combating unwanted vegetation comprising the step of applying to the area in which the vegetation is unwanted an effective amount of a compound having the structural formula



in which X is H and R is CH_3.

4,097,265

3,5-DIMETHYL-2-THIENYLCARBOXANILIDE AND 3,5-DIMETHYL-2-THIENYL-(N-HALOALKYLTHIOCARBOXANILIDE) HERBICIDES

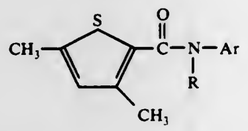
John W. Kobzina, Walnut Creek, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 645,159, Dec. 30, 1975, abandoned, which is a continuation of Ser. No. 570,339, May 21, 1975, Pat. No. 3,948,633, which is a division of Ser. No. 383,751, Jul. 30, 1973, Pat. No. 3,892,775. This application Jan. 31, 1977, Ser. No. 764,125

Int. Cl.² A01N 9/12; C07D 63/16

U.S. Cl. 71—90 **9 Claims**

1. A compound of the formula



wherein R is hydrogen and Ar is phenyl or 2-fluorophenyl.

4,097,266

MICROSPHERE OF SOLDER HAVING A METALLIC CORE AND PRODUCTION THEREOF

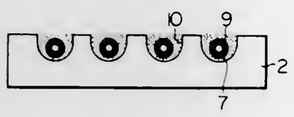
Eikichi Takahashi, Matsudo; Toshihiko Taguchi, Showa; Kazuo Fujikura, Mooka, and Toshihisa Sudo, Tokyo, all of Japan, assignors to Senju Metal Industry Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1975, Ser. No. 645,395

Claims priority, application Japan, Jan. 24, 1975, 50-10223

Int. Cl.² B22D 23/08

U.S. Cl. 75—0.5 R **16 Claims**



1. A microsphere of solder comprising a metallic core grain and a solder coating thereon, which is prepared by melting at least one solder grain at a temperature higher than the melting point of the solder grain but lower than the melting point of the metallic core grain, and in the presence of the metallic core grain and a flux, to envelop the metallic core grain with a solder coating, the thickness of the solder coating being more than 20 microns.

5. A process for producing a microsphere of solder comprising a metallic core grain and a solder coating thereon, comprising preparing a predetermined number of solder grains and a metallic core grain, heating the grains in the presence of a flux at a temperature higher than the melting point of the solder grains, but lower than the melting point of the metallic core grain to envelop the metallic grain with a coating of solder.

4,097,267

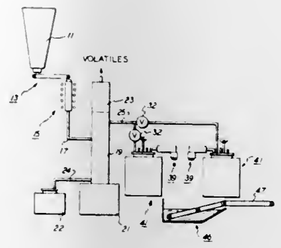
PURIFICATION AND REALLOYING OF ARSENIC/SELENIUM ALLOYS

Gary P. Baccaro, Fairport, and James F. Seitz, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 5, 1977, Ser. No. 812,869

Int. Cl.² B22D 23/08

U.S. Cl. 75—0.5 B **8 Claims**



1. A method for the reclamation of arsenic containing selenium scrap which comprises:

(a) feeding the scrap to a premelter and heating it to a temperature sufficiently high to cause its liquefaction;

(b) feeding the melted scrap into a fractional distillation column to thereby repeatedly vaporize and condense the arsenic/selenium;

(c) removing low boiling impurities from the scrap in the fractional distillation column and recovering substantially pure liquid selenium from the column;

(d) providing a liquid arsenic/selenium master alloy containing from about 10 to 20% arsenic, said alloy having been prepared by the vapor/liquid combination of arsenic and selenium in the proper proportions;

(e) combining the liquid arsenic/selenium master alloy with the liquid selenium obtained from the fractional distillation column in the proportion required to form a new arsenic/selenium alloy containing the desired amount of arsenic;

(f) shotting the new arsenic/selenium alloy into a non-reactive liquid medium to form discrete solid particles of said alloy.

4,097,268

METHOD OF TREATING MOLTEN FERROUS MATERIAL WITH COMPOSITE RODS CONTAINING CA

Tohei Ototani, and Yasuji Kataura, both of Sendai, Japan, assignors to Tohei Ototani, Sendai, Japan

Division of Ser. No. 598,477, Jul. 23, 1975, Pat. No. 4,035,892, which is a continuation-in-part of Ser. No. 374,431, Jun. 28, 1973, abandoned. This application Feb. 29, 1977, Ser. No. 771,701

Claims priority, application Japan, Jun. 30, 1972, 47/65757; Dec. 27, 1972, 48/1615

The portion of the term of this patent subsequent to Jul. 19, 1994, has been disclaimed.

Int. Cl.² C21C 7/02, 7/06

U.S. Cl. 75—57 **4 Claims**

1. A method for treating molten metal which comprises feeding a compressed and deformed composite calcium clad material of a solifified core encased in a sheath continuously to the bottom of a molten metal bath, said composite clad material consisting of

1. a core consisting essentially of

A. a material selected from the group consisting of metallic calcium, calcium aluminum alloy and mixtures thereof, and

B. at least one element selected from the group consisting of aluminum and rare earth metals encased in

2. a sheath of iron or alloy thereof, the core being 10–90% by weight based on the composite material, said clad material having been subjected to mechanical compression and deformation prior to being fed into the molten bath.

4,097,269

PROCESS OF DESULFURIZING LIQUID MELTS

Wolfgang Holzgruber, Bruck an der Mur, Austria, assignor to INTECO Internationale Technische Beratung Gesellschaft m.b.H., Bruck an der Mur, Austria

Continuation of Ser. No. 645,326, Dec. 30, 1975, abandoned. This application Dec. 21, 1976, Ser. No. 753,017

Claims priority, application Austria, Jan. 14, 1975, 245/75; Feb. 10, 1975, 993/75

Int. Cl.² C21C 7/02

U.S. Cl. 75—58 **10 Claims**

1. A process characterized by rapid desulfurization of steel melts whose oxygen available for reaction is less than 0.01% comprising:

raising the temperature of the melt above 1500° C;

injecting a desulfurizing slag into the melt by means of a non-oxidizing carrier gas;

said slag being in a finely divided state and having been prepared by mixing, on a percent weight basis, 10 to 60% CaO, 10 to 70% CaF_2, 0 to 40% Al_2O_3, a maximum of 20% SiO_2 and a maximum of 5% heavy metal oxides, melting the mixture and then cooling the melt to prepare a prefused slag and then comminuting the prefused slag into the finely divided state, said slag having a liquidus temperature such that the particles thereof become liquid at a temperature at least 150° C below that of the steel melt and the particles of the slag being sufficiently small such that they become liquid substantially immediately on contacting the melt;

the injection being carried out in a manner to produce a fine dispersion of the slag particles in the melt.

4,097,270

REMOVAL OF MAGNESIUM FROM AN ALUMINUM ALLOY

Mannige Vikram Rao, Princeton Junction; Bernard H. Coyle, Jr., Voorhees, and Peter C. J. Gallagher, Hightstown, all of N.J., assignors to N L Industries, Inc., New York, N.Y.

Filed Jun. 3, 1977, Ser. No. 803,185

Int. Cl.² C22B 21/06

U.S. Cl. 75—68 R **23 Claims**

1. A process for reducing the amount of magnesium metal from an aluminum alloy containing magnesium which comprises reacting the aluminum alloy containing magnesium metal with silica having a chemically reduced surface layer to form silicon metal which dissolves in the aluminum alloy and magnesium oxide, and removing the magnesium oxide from said aluminum alloy.

4,097,271

HYDROMETALLURGICAL PROCESS FOR RECOVERING COPPER AND OTHER METAL VALUES FROM METAL SULPHIDES

Godefridus M. Swinkels, Rossland; Edward F. G. Milner, Warfield, and Roman Michael Genik-Sas-Berezowsky, Edmonton, all of Canada, assignors to Cominco Ltd., Vancouver and Sherritt Gordon Mines Limited, Toronto, both of, Canada

Filed Nov. 12, 1976, Ser. No. 741,280

Claims priority, application Canada, Dec. 11, 1975, 241806

Int. Cl.² C22B 15/08, 11/04

U.S. Cl. 75—104 **19 Claims**

1. A process for the recovery of non-ferrous, ferrous and precious metal values and sulphur from concentrates containing metal sulphides which comprises the steps of:

(1) subjecting said concentrates to a leach at a temperature in the range of about 80° to 110° C under autogenous pressure with lixiviant containing ferric chloride, cupric chloride and chlorine to form a leach solution containing cuprous chloride and a leach residue;

(2) treating said leach solution with gaseous butadiene at a temperature in the range of about −35° to +40° C under autogenous pressure to form a precipitate of cuprous chloride-butadiene addition compound and residual solution;

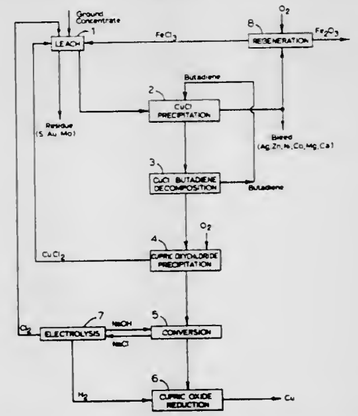
(3) decomposing precipitated addition compound at a temperature of up to about 80° C. at atmospheric pressure for the separate recovery of cuprous chloride and butadiene;

(4) returning recovered butadiene to step (2);

(5) slurrying recovered cuprous chloride and treating the slurry with an oxygen-bearing gas at a pressure in the range of about atmospheric to 250 psi and at a temperature in the range of about 50° to 150° C to form a precipitate of cupric oxychloride and a solution containing cupric chloride;

(6) returning solution containing cupric chloride to step (1);

(7) electrolyzing brine solution for formation of sodium hydroxide solution, hydrogen gas and chlorine gas;



(8) converting precipitated cupric oxychloride to cupric oxide and brine solution with an approximately stoichiometric amount of formed sodium hydroxide solution at a temperature in the range of about 80° C to the boiling point of the reaction mixture, under autogenous pressure, to give a final pH in the range of 7 to 11;

(9) returning brine solution to step (7);

(10) reducing cupric oxide to metallic copper with formed hydrogen gas;

(11) passing formed chlorine gas to step (1);

(12) treating residual solution from step (2) with an oxygen-bearing gas at a partial pressure of oxygen in the range of from about 100 to 200 psi and at a temperature in the range of from about 135° to 165° C for the regeneration of ferric-chloride and the simultaneous precipitation of anhydrous ferric oxide; and

(13) returning regenerated ferric chloride to step (1).

4,097,272

WINNING NICKEL AND COBALT WITH MERCAPTIDE EXTRACTANTS AND CARBON MONOXIDE STRIP

Alkis S. Rappas, Bedford, and J. Paul Pemsler, Lexington, both of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Sep. 8, 1977, Ser. No. 831,502

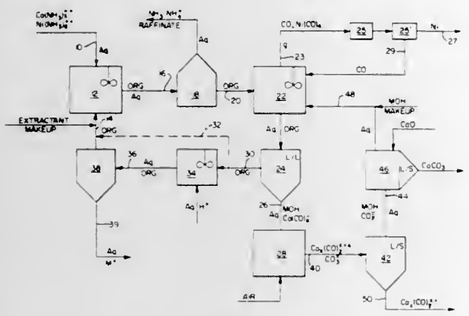
Int. Cl.² C22B 23/04; C01G 51/02, 53/02; C07C 149/00

U.S. Cl. 75—119 **18 Claims**

16. A process for separating cobalt and nickel values from an aqueous solution containing ions of said metals, said process comprising the steps of:

A. providing an extractant comprising a water immiscible organic solvent containing solubilized mercaptide anion capable of reacting with cobalt and nickel to form water insoluble mercaptides;

B. contacting the extractant with the aqueous solution to produce a mixture of cobalt mercaptide and nickel mercaptide in said extractant;
C. separating the aqueous raffinate solution resulting from step B from the mercaptide loaded extractant;
D. contacting the extractant containing the mercaptides with an aqueous alkaline solution and carbon monoxide to strip cobalt and nickel values therefrom and to produce gaseous $Ni(CO)_4$ and a water soluble salt of carbonyl cobaltate;



E. separating the metal depleted extractant produced in step D and recycling the extractant to step B;
F. isolating the nickel carbonyl gas produced in step D and decomposing the nickel carbonyl to produce substantially pure nickel metal and carbon monoxide; and
G. isolating an aqueous phase containing carbonyl cobaltate salts produced in step D and oxidizing the carbonyl cobaltate to water insoluble cobalt carbonyl compounds.

4,097,273

ARSENIC/SELENIUM RECOVERY

Wolfgang H. H. Gunther, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 5, 1977, Ser. No. 794,282
Int. Cl.² C22B *33/00*
U.S. Cl. 75—121 **10 Claims**

1. A method for the recovery of arsenic/selenium alloys which comprises:
a. dissolving an arsenic/selenium alloy containing from about 2 to about 36 weight percent arsenic in an aqueous solution of morpholine, piperidine or a primary or secondary amine of the formula:

$$R_2-\underset{\displaystyle R_1}{\underset{|}{N}}-H$$

wherein R_1 is an aliphatic group containing from 1 to 4 carbon atoms and R_2 is either H or an aliphatic group containing from 1 to 4 carbon atoms, and
b. evaporating the resulting solution to dryness to thereby recover the arsenic/selenium alloy.

4,097,274

METHOD OF MAKING SUPERHARD ARTICLES

Valentin Nikolaevich Bakul, ulitsa Kirova 34a, kv. 12; Igor Ivanovich Bilyk, ulitsa Radomyshlskaya 32, korpus 2, kv. 60; Dolores Khaimovna Bronshtein, ulitsa Scherbakova 45, kv. 8; Ivan Fedorovich Vovchanovsky, ulitsa Bulvar Lesi Ukrainki 5, kv. 119, and Nekhemian Veniaminovich Tsypin, ulitsa Dorogozhitskaya 26, kv. 59, all of Kiev, U.S.S.R.

Continuation of Ser. No. 519,273, Oct. 30, 1974, abandoned. This application May 19, 1976, Ser. No. 688,002
Int. Cl.² B22F *1/04*
U.S. Cl. 75—201 **2 Claims**

1. A method of producing a superhard article comprising the steps of: charging a mixture of diamond grains less than 1 mm in size and a hard-alloy matrix material into a graphite press mould with the diamond grains being evenly distributed throughout the hard-alloy matrix material; heating the mixture under a pressure of from 50 to 100 kg/cm² to 1,200° C at a rate of from 1,000° to 1,100° C per minute by passing high frequency currents through the press mould; maintaining the mixture in the press mould at 1,200° C for less than 2 minutes to preclude graphitization and dissolution of the diamond grains; heating the mixture under a pressure of from 100 to 200 kg/cm² to a sintering temperature less than 1,800° C at a rate of from 3,000° to 10,000° C per minute by simultaneously passing a current through the mixture and passing high frequency currents through the press mould; and maintaining the mixture in the press mould at the sintering temperature for a period of from 2 to 3 seconds.

4,097,275

CEMENTED CARBIDE METAL ALLOY CONTAINING AUXILIARY METAL, AND PROCESS FOR ITS MANUFACTURE

Erich Horvath, Friedrich-Eckkard-Str. 21, 8 Munich 81, Germany

Continuation of Ser. No. 376,354, Jul. 5, 1973, abandoned. This application May 5, 1976, Ser. No. 683,305
Int. Cl.² B22F *3/12*
U.S. Cl. 75—203 **11 Claims**

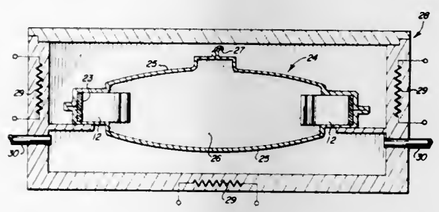
1. A process for making a sintered carbide-metal alloy containing submicronic carbide particles comprising the steps of:
forming a mixture of a carbide-forming charge selected from the group consisting of the dimetallic carbides, hydrides, eta carbides and elemental metals of groups 4a, 5a and 6a of the periodic table and their mixtures and a binding metal powder selected from the group consisting of iron, cobalt, nickel and their mixtures;
converting said carbide-forming charge to a carbide or carbides having a crystal structure different than the crystal structure of the carbide-forming charge by subjecting the carbide-forming charge-binder metal mixture to a gaseous carbon containing carburizing atmosphere at a temperature of 700 to 1100° C; and
liquid-phase sintering the thus formed carbide-binder metal to wet and split the carbide to form submicronic carbide particles.

4,097,276

LOW COST, HIGH TEMPERATURE TURBINE WHEEL AND METHOD OF MAKING THE SAME

Lyle D. Six, Phoenix, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Jul. 17, 1975, Ser. No. 596,695
Int. Cl.² B22F *3/00, 3/14*
U.S. Cl. 75—208 R **4 Claims**



1. A method of manufacturing turbine wheels of the type having a plurality of blades radiating from a central hub comprising the steps of:
a. providing a ring of alternately arranged blades and spacers, said blades being preformed with each having a foot portion projecting into the central region of the ring and with shoulder surface areas on said foot portions facing outwardly from the central region;
b. securing the blades and spacers together to retain them in ring forming order;
c. substantially completely enclosing the assembly of blades, spacers, and securing means in a heat softenable container;
c. filling the central region around the foot portions of the blades with a powdered heat softenable material;
e. evacuating and sealing the container;
f. heating the container and contents to soften the container and the powdered material; and
g. applying isostatic pressure to the exterior of the container inwardly to collapse the container from substantially all sides and to compact the heated powdered material therein into a unitary mass around and completely enveloping the foot portions of the blades to form inwardly facing shoulders of the compacted heated powdered material opposite to and interlocking with the shoulder surface areas of said foot portions to intersecure the blades and the compacted heated powdered material.

4,097,277

PHOTOSENSITIVE MEMBER HAVING LAYER OF VINYL CARBAZOLE POLYMER CONTAINING ANTIMONY CHALCOGEN COMPOUND OF ANTIMONY AND SULFUR

Yoshio Takasu, Tokyo, and Eiichi Kondo, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Japan

Continuation of Ser. No. 436,747, Jan. 25, 1974, abandoned. This application Dec. 13, 1976, Ser. No. 749,974
Claims priority, application Japan, Jan. 31, 1973, 48-13140
Int. Cl.² G03G *5/06*
U.S. Cl. 96—1.5 R **14 Claims**

1. An electrophotographic photosensitive member comprising an electrically-conductive substrate and a photoconductive layer which consists essentially of an organic photoconductive polymer selected from the group consisting of homopolymers of at least one vinylcarbazole monomer and copolymers thereof containing more than 50% of the vinylcarbazole monomer, said polymer having dispersed therein from 1 to 30 parts by volume, per 100 parts by volume of said polymer, of an antimony chalcogen compound consisting essentially of antimony and sulfur.

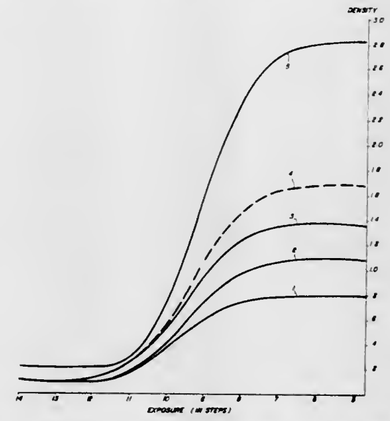
4,097,278

REDOX AMPLIFICATION PROCESS EMPLOYING A COMBINATION OF OXIDIZING AGENTS

Vernon L. Bissonette, Brockport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 609,880, Sep. 2, 1975, abandoned. This application Oct. 8, 1976, Ser. No. 730,914
Int. Cl.² G03C *7/16, 7/00, 5/32, 5/24*
U.S. Cl. 96—22 **53 Claims**

36. A method of forming a multicolor dye image in a photographic element comprised of a support and, coated thereon, at least three layer units each comprised of at least one silver halide emulsion layer containing a developable latent image pattern, each of said layer units being primarily responsible to a different one of the blue, green and red portions of the visible spectrum, the blue-sensitive layer unit containing a yellow-dye-forming color coupler, the green-sensitive layer unit containing a magenta-dye-forming color coupler and the red-sensitive layer unit containing a cyan-dye-forming color coupler, comprising:
developing a silver image in each of the three layer units corresponding to the latent image pattern thereof;
with a first aqueous alkaline processing solution performing a first redox reaction in each of the layer units by
bringing a cobalt(III) complex, which permanently releases ligands upon reduction, and a reducing agent together and into contact with the element containing the silver image pattern in each layer unit, wherein the cobalt(III) complex and the reducing agent are chosen so that they are essentially inert to oxidation-reduction in the absence of the silver image, and
permitting the selective reaction of the cobalt(III) complex and the reducing agent at the site of the silver image pattern within each layer unit to produce cobalt(II) as an immobile reaction product in a pattern conforming to the silver image pattern in each layer unit; and
thereafter, with a second aqueous alkaline processing solution performing a second redox reaction by



bringing into mutual contact a peroxide oxidizing agent, the immobile cobalt(II) reaction product and a dye-image-generating reducing agent capable of producing a dye-image-generating reaction, wherein the peroxide oxidizing agent and the dye-image-generating reducing agent are chosen so that they are essentially inert to oxidation-reduction in the absence of a catalyst, and
permitting the selective reaction of the peroxide oxidizing agent and the dye-image-generating reducing agent in a pattern conforming to the silver image pattern in each of the layer units to permit a corresponding dye image to be formed therein.

4,097,279

PROCESS FOR PREPARING AN IDENTIFICATION CARD

Edwin Nelson Whitehead, 6208 Tally Ho La., Alexandria, Va. 22307

Continuation-in-part of Ser. No. 431,803, Jan. 8, 1974, abandoned, which is a continuation of Ser. No. 223,649, Feb. 4, 1972, abandoned. This application Jul. 11, 1974, Ser. No. 487,757
Int. Cl.² G03C *5/04, 11/12*
U.S. Cl. 96—27 R **41 Claims**

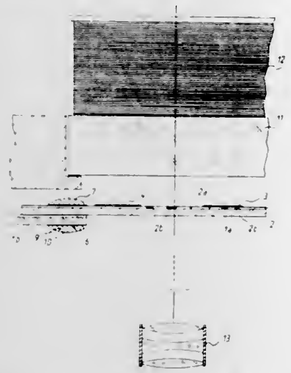
1. A process, utilizing the following raw materials (a) backing means having a heat-sealable surface, (b) a bonding material that is photosensitive and becomes harder upon exposure to light, and (c) a transparent heat-sealable cover, said surface, said bonding material and said cover being compatible in that they may be merged and caused to flow together to form one integral construction when adequate heat and pressure are applied to them, for producing identification cards, comprising: applying said bonding material to said surface of said backing means in a configuration that conforms to the picture to be included as a part of the identification card, the process including applying particulate material to the bonding material, placing the transparent heat-sealable cover over the bonding material and said surface, and applying heat and pressure to cause the materials comprising said surface, said bonding material and said coating to flow together to form an integral identification card with improved alter-proof characteristics.

4,097,280

WEB WITH OVERLAYS FOR USE IN DOCUMENT PRESENTATION DEVICES OF COPYING MACHINES AND METHOD OF MAKING THE SAME

Annemarie Mannhardt, Munich; Rudolf Eppe, Taufkirchen, and Josef Pfeifer, Unterhaching, all of Germany, assignors to AGFA-Gevaert AG, Leverkusen, Germany

Continuation of Ser. No. 482,475, Jun. 24, 1974, abandoned. This application Aug. 9, 1976, Ser. No. 712,960
Claims priority, application Germany, Jun. 23, 1973, 2332008
Int. Cl.[2] G03C *5/06;* **B32B** *31/00, 3/00*
U.S. Cl. 96—44 **13 Claims**



1. Elongated web for use in a document presentation device in a document reproducing machine having a copying aperture over which an original document to be reproduced is placed, comprising a flexible transparent carrier foil of synthetic plastic material having portions movable into register with the copying aperture and at least one overlay of heat-weldable opaque synthetic plastic sheet material heat-welded to at least one portion of said carrier and serving to conceal information which it is not desired to expose through said copying aperture.

11. A method of affixing overlays which consist of heat-weldable opaque synthetic plastic foil material to a transparent web-like foil-material carrier which also consists, at least in part, of heat-weldable synthetic plastic material and is movable lengthwise in a document presentation device of a document reproducing machine to place selected portions thereof into register with a copying aperture which is overlapped by an original document to be reproduced, comprising the steps of heating the opaque overlays to an elevated temperature at which they are capable of heat-bonding with the foil material of said carrier, and pressing the thus heated opaque overlays against one side of the transparent foil-material carrier so that they become heat-bonded thereto and mask the transparent portions of said carrier to which they are bonded.

4,097,281

HEAT DEVELOPABLE PHOTOGRAPHIC MATERIAL AND PROCESS COMPRISING TRANSITION METAL CARBONYL COMPOUNDS

Sylvia Alice Gardner, Rochester, and Mark Lelental, Penfield, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 17, 1977, Ser. No. 842,836
Int. Cl.[2] G03C *5/24, 1/00*
U.S. Cl. 96—48 HD **33 Claims**

1. A heat developable, photographic element comprising a support having thereon, in reactive association,

(a) a photosensitive, transition metal carbonyl compound, wherein said transition metal is selected from transition elements in groups Vb, VIb, VIIb and VIII of the Periodic Table

(b) an oxidation-reduction image-forming combination comprising:

(i) an organotellurium (II) or (IV) compound as an oxidizing agent, with

(ii) a reducing agent, and

(c) a binder.

4,097,282

ANIONIC IMINO-CONTAINING POLYMERIC ADHESIVES FOR PHOTOGRAPHIC MATERIALS

John Michael Noonan; Robert Charles McConkey, and Michael John Hanrahan, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 15, 1976, Ser. No. 732,628
Int. Cl.[2] G03C *1/76, 1/48, 1/40, 1/78*
U.S. Cl. 96—73 **25 Claims**

15. An image transfer unit comprising:

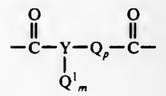
a photographic element comprising a support having thereon at least one photographic silver halide layer;

at least one layer comprising an adhesive comprising a water-soluble polyester which comprises:

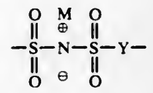
A. a glycol component comprising one or more diols said glycol component comprising at least 50 mole percent of an aliphatic diol selected from the group consisting of HO—R—H wherein R is $—CH_2CH_2O)_n$, and

wherein n is an integer from 1 to 4; and

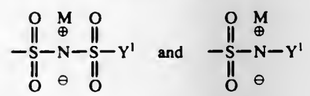
B. an acid component comprising greater than 15 and up to about 35 mole percent of at least one dicarboxylic acid having an iminosulfonyl moiety having the formula



wherein m and p are integers whose sum equals 1; Q is defined by the formula



Q^1 is selected from the group consisting of



wherein Y is arylene or arylidene; Y^1 is selected from the group consisting of aryl and alkyl; and M is solubilizing cation; and from about 65 to about 85 mole percent of one or more other diacids;

an image-receiving layer;

means containing an alkaline processing composition adapted to discharge its contents within said unit;

a neutralizing layer for neutralizing said alkaline processing composition; and

a barrier layer which is permeable to the alkaline processing composition after a predetermined time, the barrier layer being located between the neutralizing layer and the photosensitive silver halide layer.

23. The image transfer unit of claim 15 comprising:

a. a photographic element comprising a transparent support having thereon the following layers in sequence; an image-receiving layer; an alkaline solution-permeable, light-reflective layer; an alkaline solution-permeable opaque layer; a red-sensitive silver halide emulsion layer having a ballasted redox cyan dye releaser associated therewith; a green-sensitive silver halide emulsion layer having a ballasted redox magenta dye releaser associated therewith; and a blue-sensitive silver halide emulsion layer having a ballasted redox yellow dye releaser associated therewith;

b. a cover sheet superposed over said blue-sensitive silver halide emulsion layer and comprising a transparent support coated with said neutralizing layer and said barrier layer; and

c. a rupturable container containing said alkaline processing composition and an opacifying agent, said container being so positioned during processing of said unit that a compressive force applied to said container will effect a discharge of the container's contents between said cover sheet and said blue-sensitive silver halide emulsion layer.

4,097,283

WATER-SOLUBLE COMPOSITION ADMIXTURE OF COPOLYMER HAVING ETHYLENIC UNSATURATION IN SIDE CHAIN AND ANTHRAQUINONE PHOTOSENSITIZER

Takateru Asano, Saitama, and Keiko Ito, Ichikawa, both of Japan, assignors to Fuji Chemicals Industrial Company Limited, Tokyo, Japan

Filed Dec. 15, 1975, Ser. No. 640,925
Claims priority, application Japan, Dec. 28, 1974, 50-1418
Int. Cl.[2] G03C *1/68, 1/70*
U.S. Cl. 96—115 R **7 Claims**

1. A water-soluble, photosensitive resin composition comprising a mixture of

(a) a water-soluble unsaturated copolymer having an ethylenic unsaturated bond in the side chain obtained by reacting a prepolymer which is formed by addition polymerization of 40–95 mol% of an unsaturated amide compound, 5–10 mol% of an unsaturated carboxylic acid or salts thereof and each 0–30 mol% of at least one vinyl monomer which is co-polymerizable with the unsaturated amide and unsaturated carboxylic acid or salts thereof selected from the group consisting of vinyl acetate, vinyl propionate, styrene and alkyl-, hydroxyalkyl- or aminoalkylesters of unsaturated carboxylic acid, with an ethylenic unsaturated compound having an oxirane ring under heating in the presence of a polymerization inhibitor, and

(b) a water soluble anthraquinone sulfonic acid, anthraquinone carboxylic acid or salts thereof as photosensitizer, the amount of the ingredient (b) being 0.5 - 20% with respect to the weight of the ingredient a).

4,097,284

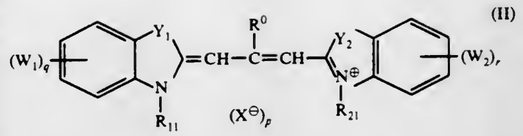
METHOD FOR SUPERSENSITIZING SILVER HALIDE PHOTOGRAPHIC EMULSIONS

Tadaaki Tani, Minami Ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Continuation-in-part of Ser. No. 635,546, Nov. 26, 1975, abandoned. This application Oct. 27, 1976, Ser. No. 736,047
Claims priority, application Japan, Nov. 26, 1974, 49-136908; Germany, Nov. 26, 1975, 2553082
Int. Cl.[2] G03C *1/14*
U.S. Cl. 96—126 **14 Claims**

1. A method for spectrally sensitizing a silver halide photographic emulsion, which is characterized by the presence of the combination of

(1) a trimethinecyanine dye of formula (II):



(II)

wherein Y_1 and Y_2 each represents a sulfur atom, a selenium atom, or an oxygen atom; R_{11} and R_{21} each represents an alkyl group, a hydroxyalkyl group, a carboxyalkyl group, a sulfoalkyl group or a sulfoalkoxyalkyl group where any alkyl moiety has 1 to 8 carbon atoms; W_1 and W_2 each represents an alkyl group containing 1 to 4 carbon atoms, a phenyl group, an aralkyl group, an alkoxy group containing 1 to 4 carbon atoms, a hydroxy group, a halogen atom, a cyano group, a carboxy group, an alkoxycarbonyl group, the alkyl moiety thereof having up to 4 carbon atoms, or a trifluoromethyl group; q and r each represents zero or an integer ranging from 1 to 4; R^0 represents a hydrogen atom, an alkyl group containing up to 4 carbon atoms, a hydroxyalkyl group, a carboxyalkyl group, a cyano group, an aralkyl group or a phenyl group; p represents 0 or 1 and $X^\ominus$ represents an inorganic or organic acid anion which forms a salt together with the dye moiety, wherein when the dye moiety forms an internal salt p is 0 and in other cases p is 1, and

(2) a nitrogen-containing heterocyclic compound free of any acidic groups and having at least one mercapto group, which is capable of producing a silver salt which is less soluble in water than silver chloride upon reaction with silver ion, the combination being present in said emulsion in a supersensitizing amount, said heterocyclic compound comprising a heterocyclic ring selected from the group consisting of a 1, 2, 4-triazole ring, a 1, 3, 4-thiadiazole ring and a triazolotriazole ring, said nitrogen-containing heterocyclic compound having an acid dissociation constant pKa of 3.5 or more.

4,097,285

DIRECT-POSITIVE PHOTOGRAPHIC SILVER HALIDE EMULSION CONTAINING NOVEL DYE

Akira Tanaka, and Akio Yoshida, both of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Feb. 17, 1977, Ser. No. 769,570
Int. Cl.[2] G03C *1/16, 1/28*
U.S. Cl. 96—132 **8 Claims**

1. A direct-positive photographic fogged silver halide emulsion characterized by containing at least one cyanine dye in which the position 2 or 4 of a 1,8-naphthyridine ring is joined through the position 2 of a thiazole ring through a methine linkage, said dye being present in an amount sufficient to sensitize said emulsion.

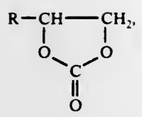
4,097,286

METHOD OF DEPOSITING A METAL ON A SURFACE

Robert Vincent Dafter, Jr., Ewing Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 670,496, Mar. 25, 1976, Pat. No. 4,021,314. This application Jan. 31, 1977, Ser. No. 764,330
Int. Cl.[2] C23C *3/00*
U.S. Cl. 106—1.11 **8 Claims**

5. An electroless metal deposition catalyst comprising a hydrosol obtained by mixing together, in an acidic aqueous medium, a salt of a noble metal and an organic compound, capable of reacting therewith to form said hydrosol, selected from the group consisting of (a) an organic carbonate having a structural formula of



where R is a member selected from the group consisting of an alkyl radical and a hydrogen atom, (b) ethylene glycol and (c) 1,3 dioxane, and heating the resultant mixture having a pH of from 0.3 ranging up to a value of less than 4.0, and wherein said organic compound is present in an amount of at least 50 volume percent.

6. The catalyst as defined in claim 5 wherein R is H.

7. The catalyst as defined in claim 5 wherein R is CH_3.

8. The catalyst as defined in claim 5 wherein said noble metal salt comprises a salt of palladium.

4,097,287

INORGANIC FILM FORMING COMPOSITION FOR COATING

Hitoshi Ito, and Hideo Kogure, both of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Japan

Filed Sep. 2, 1976, Ser. No. 719,728

Claims priority, application Japan, Sep. 4, 1975, 50-106524; Apr. 8, 1976, 51-39666

Int. Cl.² C09D *5/08*

U.S. Cl. 106—14.14 **15 Claims**

1. An inorganic film forming composition particularly adapted for use as a coating over a zinc rich coating which consists essentially of:

(A) colloidal silica dispersed in water in an amount of about 10-50% by weight as SiO_2;

(B) at least one water soluble organic amine selected from the group consisting of monoethanolamine, diethanolamine, isopropanolamine, ethylenediamine, isopropylamine, diisopropylamine, morphorine, triethanolamine, diaminopropane and aminoethyl ethanolamine in a weight ratio of amine to silica of 1:100 to 2:1;

(C) at least one powdery aluminum compound selected from the group consisting of aluminium oxide, aluminum hydroxide, aluminum silicate, potassium aluminium silicate, calcium aluminum silicate, calcined products of other metallic oxides and inorganic pigments treated by aluminum compounds on the the surface thereof, in a weight ratio of SiO_2 to powdery aluminum compound of 1:50 to 5:1;

(D) powdery glass having an average particle size of 1 to 100 microns;

(E) up to 15 weight percent based on the weight of the water of at least one water soluble amino acid selected from the group consisting of glycine, alanine, aminobutyric acid, valine, norleucine, norvaline and serine;

(F) up to 10% by weight based on the weight of water of thiourea;

(G) up to 55% by weight based on the weight of water of urea; and

(H) up to a molar ratio to silica of 1:50 of at least one water soluble salt of a transition metal or potassium, sodium or ammonium salt of said transition metal wherein said transition metal selected from the group consisting of chromium, molybdenum, tungsten, iron, cobalt, manganese and vanadium.

4,097,288

HEAT SENSITIVE RECORDING COMPOSITION CONTAINING A COMPLEXED PHENOLICS AND A SPIROPYRAN OR LEUCO LACTONE

William R. Lawton, 6651 Jewett-Holmwood Rd., Orchard Park, N.Y. 14127

Filed Feb. 25, 1977, Ser. No. 772,084

Int. Cl.² C09D *11/00*

U.S. Cl. 106—21 **13 Claims**

1. A heat sensitive recording composition comprising

a binder,

a chromogenic compound reactive with a phenol at elevated temperatures to develop a color contrasting visibly with the normal color of said compound, said chromogenic compound being selected from the group consisting of lactone type leuco dyes and spiropyran type leuco dyes, and

a hydrogen-bonded molecular complex of a phenol selected from Table III of the specification and a complexing agent selected from the group consisting of amines and amides, said complex being in stable, unreactive form below 50° C and dissociable into a phenol and an amine or amide by heating above a dissociation temperature in the range of from about 50° to 220° C.

4,097,289

INK WITH ESTER ADDITIVE PROVIDING EASY WIPE OFF OF INK MARKINGS

Hans Joachim Hofmann, and Axel Jankewitz, both of Nuremberg, Germany, assignors to Schwan-Bleistift-Fabrik Schwanhausser & Company, Nuremberg, Germany

Filed Mar. 15, 1976, Ser. No. 666,900

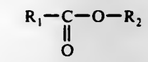
Claims priority, application Germany, Mar. 22, 1975, 2512734

Int. Cl.² C09D *11/08, 11/10, 11/14, 11/16*

U.S. Cl. 106—26 **4 Claims**

1. In an ink containing a readily volatile organic solvent, an ink binder based on a natural or synthetic resin or a cellulose derivative and dyestuff distributed in said binder, the improvement for providing for easy wipe off of writing or markings produced from the ink, comprising:

the presence in said ink of from 2 to 20% by weight of the ink, of an ester compound of the general formula:



wherein one of R_1 and R_2 is a saturated aliphatic hydrocarbon radical having 10 to 22 carbon atoms and the other of which is selected from the group consisting of a cyclopentyl, cyclohexyl and saturated aliphatic hydrocarbon radicals having from 2 to 10 carbon atoms.

4,097,290

BALL-POINT INSTRUMENTS WRITING WITH IMPROVED TRANSITORIALLY ERASABLE TRACE AND INK COMPOSITIONS THEREFOR

Frank Andrew Muller, West Los Angeles, and Henry Peper, Jr., Pacific Palisades, both of Calif., assignors to The Gillette Company, Boston, Mass.

Continuation of Ser. No. 496,046, Aug. 9, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,896

Int. Cl.² C08L *93/00;* **C09D** *11/06, 11/08, 11/10*

U.S. Cl. 106—30 **3 Claims**

1. In a ball-point writing instrument containing an ink capable of depositing an intensely colored trace by writing with its ball on paper, said trace being capable of erasure by the use of a pencil eraser, said ink consisting essentially of between 15% and 45%, by weight, of natural rubber or rubber which essentially duplicates the chemical structure of natural rubber, said rubber being dissolved in a mixture of (a) a volatile low boiling organic solvent having a boiling point less than 180° C and exhibiting 100% evaporation within 60 minutes, said volatile low boiling solvent rapidly increasing the viscosity of the ink in the trace to minimize the penetration of the paper by the ink, and (b) a high boiling organic liquid solvent having a boiling point of greater than 300° C, said vaporizable organic solvent being present in an amount of between 10% and 50%, by weight, and said high boiling organic liquid solvent being present in an amount of between 15% and 30%, by weight, and from 12% to 30%, by weight, of pigment particles uniformly dispersed in the rubber solution.

4,097,291

CORE AND MOLD MATERIALS FOR DIRECTIONAL SOLIDIFICATION OF ADVANCED SUPERALLOY MATERIALS

Irvin C. Huseby, Schenectady, and Frederic J. Klug, Amsterdam, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 9, 1977, Ser. No. 775,763

Int. Cl.² B22C *9/10;* **B22D** *21/00;* **C04B** *35/44;* **B28B** *7/34*

U.S. Cl. 106—38.9 **10 Claims**

1. A ceramic article useful in the casting and directional solidification of advanced superalloy materials consisting essentially of

a two-phase mixture of a material which is one selected from the group consisting of $La_2O_3 \cdot 11Al_2O_3 + LaAlO_3$, $La_2O_3 \cdot 11Al_2O_3 + Al_2O_3$ and $MgAl_2O_4 + Al_2O_3$;

the material is characterized by a microstructure of a plurality of microcracks emanating from approximately a first interface of two different phases and extending at least part way through one phase towards a second interface between two different phases;

the article has a predetermined amount of porosity which is greater than about 10 percent by volume and no greater than about 70 percent by volume, and

at least some of the pores are interconnected.

4,097,292

CORE AND MOLD MATERIALS AND DIRECTIONAL SOLIDIFICATION OF ADVANCED SUPERALLOY MATERIALS

Irvin C. Huseby, Schenectady, and Frederic J. Klug, Amsterdam, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 9, 1977, Ser. No. 775,759

Int. Cl.² B22C *9/10;* **B22D** *21/00;* **B28B** *7/34;* **C04B** *35/44*

U.S. Cl. 106—38.9 **6 Claims**

1. A ceramic article useful in the casting and solidification of advanced superalloy materials consisting essentially of

at least one ceramic material selected from the group consisting of $3Y_2O_3 \cdot 5Al_2O_3$, $Y_2O_3 \cdot Al_2O_3$ and $2Y_2O_3 \cdot Al_2O_3$, and

the article has a minimum porosity content of about 10 percent by volume.

4,097,293

METHOD FOR MANUFACTURING HEAT-RESISTANT REINFORCED COMPOSITE MATERIALS

Katsutoshi Komeya, Kawasaki, and Hiroshi Inoue, Kawaguchi, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Continuation of Ser. No. 270,543, Jul. 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 31,345, Apr. 23, 1970, abandoned. This application Jul. 26, 1976, Ser. No. 708,354

Claims priority, application Japan, Apr. 30, 1969, 44-32734; May 2, 1969, 44-33552; United Kingdom, Apr. 28, 1970, 20413/70

Int. Cl.² C04B *35/52, 35/70*

U.S. Cl. 106—43 **8 Claims**

1. A method for manufacturing heat-resistant reinforced composite materials having a fibrous structure which comprises:

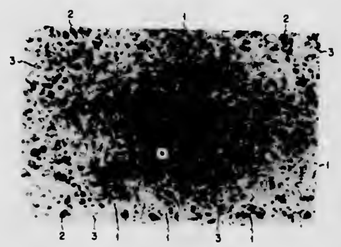
A. providing a mixture of:

(a) 99.8 to 90 percent by weight of a first component selected from the group consisting of nitrides and carbides of aluminum, silicon and boron and mixtures thereof, said first component being 0.2 to 3.0 microns in average particle size, and

(b) 0.2 to 10 percent by weight of a second component selected from the group consisting of oxides of scandium, yttrium and elements of the lanthanum series and mixtures thereof, said second component being 0.1 to 2.0 microns in average particle size,

B. molding said mixture by pressure into a desired form, and

C. sintering the molded mass without application of pressure thereon in at least one gas selected from the group consisting of nitrogen, ammonia and inert gas at a temperature as specified below with respect to the first component contained in said mixture:



aluminum nitride — 1600° to — 2200° C

silicon nitride — 1500° to — 1900° C

boron nitride — 1700° to — 2200° C

aluminum carbide — 1700° to — 2300° C

silicon carbide — 1600° to — 2200° C

boron carbide — 1800° to — 2200° C

7. A heat resistive, reinforced article formed of composite material which consists essentially of fibrous crystals of a first component as defined in claim 1 and an amorphous matrix of garnet containing said second component element formed by the method of claim 1.

4,097,294

PREPARATION OF CERAMICS

Roy W. Rice, Alexandria; Kenneth J. Wynne, Falls Church, and William B. Fox, Alexandria, all of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 23, 1976, Ser. No. 716,729

Int. Cl.² C04B *35/56, 35/58*

U.S. Cl. 106—43 **6 Claims**

1. A method for preparing a ceramic which comprises:

heating a polymer of the general formula: $[C_2B_{10}H_{10}R_2Si(R_2SiO)_n]_x$ wherein R is selected from the class consisting of alkane, alkene, alkyne, aryl, alkylaryl groups having from 1 to 10 carbon atoms and halogenated derivatives thereof, n is an integer from 1 to 10, and x is greater than 4, to a temperature from 700° to 2000° C with a heating rate not exceeding 100° C/hr. in an inert atmosphere;

maintaining said polymer at said temperature for at least 1 hour; whereby said polymer converts to a ceramic, and

cooling said resulting ceramic to room temperature.

4,097,295

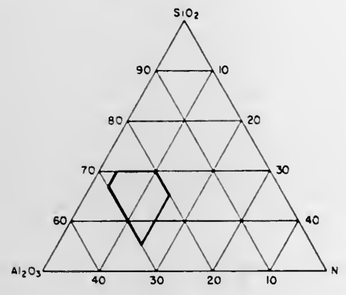
SILICA-ALUMINA-NITROGEN CONTAINING GLASSES FOR PRODUCTION OF GLASS-CERAMICS

Kenneth Chyung, Elmira, and Raja R. Wusirika, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 735,313, Oct. 26, 1976, which is a continuation-in-part of Ser. No. 664,263, Mar. 5, 1976, abandoned. This application Oct. 20, 1977, Ser. No. 843,872

Int. Cl.[2] C03C *3/04, 3/08*

U.S. Cl. 106—52 2 Claims



1. A thermally crystallizable glass consisting essentially, by weight, of about 40–80% SiO_2, 3.5–17% N, said SiO_2 and N constituting at least 50% by weight of the glass composition, and at least 15% M_xO_y, wherein M_xO_y consists of about 10–40% Al_2O_3 and 5–25% of at least one oxide selected from the group consisting of the alkali metal oxides, the oxides of the elements of Group IIA and IIB of the Periodic Table, and B_2O_3.

4,097,296

LOW-TEMPERATURE DEVITRIFIABLE SEALING COMPOSITION

Walter B. Thomas, III, Horseheads, and Christopher H. Welker, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 28, 1977, Ser. No. 781,845

Int. Cl.[2] C03C *3/22, 3/12, 3/10*

U.S. Cl. 106—53 2 Claims

1. A low-temperature devitrifiable sealing composition compatible with color television picture tube glass, said composition consisting of a zircon component and a devitrifiable glass component and including 2–6 parts zircon by weight for each 100 parts of devitrifiable glass by weight, wherein the devitrifiable glass component has a composition consisting essentially, in parts by weight, of about:

77.4 ± 2.0 parts PbO
10.2 ± 1.0 parts ZnO
8.9 ± 1.0 parts B_2O_3
2.6 ± 0.25 parts SiO_2
0.17 ± 0.10 parts MgO
0.22 ± 0.10 parts BaO, and
0.35 ± 0.10 parts F

said sealing composition exhibiting a sealing temperature of about 410°–425° C. and providing a devitrified seal having a thermal expansion mismatch value against 98 expansion color television glass which is within the range of −125 to 0 ppm at room temperature and does not change more than about 40 p.p.m. over the 350°–200° C. temperature range.

4,097,297

BARRIER COATINGS

Frederick J. Keene, Medford Lakes, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 7, 1975, Ser. No. 602,753

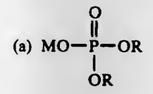
Int. Cl.[2] C08L *1/18;* C09J *3/04*

U.S. Cl. 106—177 3 Claims

1. A coating composition consisting essentially of a non-aqueous solution of:

(A) 25–99.5 parts by weight, based on the weight of (A) plus (B) plus (C), of nitrocellulose film-forming polymer;

(B) 0.5–10 parts by weight, based on the weight of (A) plus (B) plus (C), of a fluorochemical surface tension modifier selected from the group consisting of:



(a) $MO-\overset{\overset{O}{\|}}{\underset{\underset{OR}{|}}{P}}-OR$

where

M = H or cation;

R = H, $CH_2CH_2(CF_2CF_2)_nF$ or mixtures thereof, and no more than one R can be H;

and

n = 3–8; and

(b) an anionically, cationically or non-ionically N-substituted perfluoroalkyl sulfonamide; and

(C) 0–75 parts by weight, based on the weight of (A) plus (B) plus (C), of a plasticizer.

4,097,298

COATING COMPOSITION HAVING A WATER-DILUTABLE MALEINIZED OIL BASE

Hartmut Haeufler, Aldingen, and Gerhard Günther, Ettlingen, both of Germany, assignors to AKZO N.V., Arnheim, Netherlands

Filed Jan. 19, 1976, Ser. No. 650,351

Claims priority, application Netherlands, Jan. 22, 1975, 7500737

Int. Cl.[2] C08L *91/00*

U.S. Cl. 106—243 11 Claims

1. A water-dilutable maleinized oil based coating composition containing a binder made up of 10–90% by weight of the water-dilutable maleinized oil and 90–10% by weight of a solid particulate polyester which contains halogen-containing polycarboxylic acid in an amount whereby the solid particulate polyester contains a halogen in an amount equivalent to 5 to 35% by weight of chlorine, the percentages by weight of the two components being calculated on the sum of the solvent-free weights thereof, said maleinized oil containing from 10–40% by weight of residues from an α-β-ethylenically unsaturated dicarboxylic acid.

4,097,299

ELEMENTAL SULFUR HAVING IMPROVED IMPACT RESISTANCE

Eugene Ribello Bertozzi, Yardley, Pa., assignor to Thiokol Corporation, Newtown, Pa.

Filed Aug. 13, 1976, Ser. No. 714,162

Int. Cl.[2] C07G *17/00;* C08G *75/10*

U.S. Cl. 106—287.32 9 Claims

1. A composition of matter which is a copolymer comprising the product of the reaction in the molten state of elemental sulfur and from 2 to 50 parts per hundred of a liquid polyformal-polysulfide polymer having terminals non-oxidatively curable by sulfur.

4,097,300

INORGANIC PIGMENTS AND PROCESS FOR PREPARING SAME

Luigi Balducci; Dino Sarti, and Fausto Gerelli, all of Alessandria, Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Jul. 18, 1977, Ser. No. 816,889

Claims priority, application Italy, Jul. 20, 1976, 25495/76

Int. Cl.[2] C09C *1/36*

U.S. Cl. 106—299 6 Claims

1. A coloured pigment based on titanium compounds characterized in that it consists of the crystalline phases rutile TiO_2, perovskite $CaTiO_3$ and trigonal $CoTiO_3$; it contains 2 to 12% by weight of cobalt and 4 to 20% by weight of calcium, based on the weight of the total TiO_2, and it has a dominant wave length λ_D comprised between 530 and 560 mμ.

4,097,301

STABLE CHLORIDE PROCESS ANATASE SLURRIES

Hans-Achim Dietmar Wildt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 30, 1977, Ser. No. 782,738

Int. Cl.[2] C09C *1/36*

U.S. Cl. 106—300 4 Claims

1. In a process for the production of anatase titanium dioxide pigment by (1) oxidizing titanium tetrachloride in th vapor phase to form anatase titanium dioxide pigment and (2) combining the anatase titanium dioxide pigment from the oxidation reactor with water to form an aqueous slurry,

the improvement for producing highly concentrated slurry having stable viscosity comprising adding to said aqueous slurry, consisting essentially of from 600 g/l to 1400 g/l of anatase titanium dioxide pigment, from 0.03 to 0.45% by weight of an inorganic aluminum compound selected from sodium aluminate and aluminum trichloride, calculated as Al_2O_3 and based on the weight of the titanium dioxide pigment.

4,097,302

FLATTING AGENTS

Howard Joseph Cohen, and Francis Michael Vojik, both of Baltimore, Md., assignors to SCM Corporation, New York, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,276

Int. Cl.[2] C09C *3/10, 7/12;* C09D *5/00, 7/02*

U.S. Cl. 106—312 8 Claims

1. In a process for producing a silica flatting agent, wherein a silica hydrogel is treated with from 3.5 to 14.5 parts of a water insoluble inert wax by blending together a silica hydrogel with a wax selected from the group consisting of synthetic wax and microcrystalline wax, the improvement which consists essentially of adding to the silica in a dry process free of water dispersion or emulsification a mixture of waxes consisting of (a) 0.5 to 3.5 percent of a synthetic wax, and (b) 3–11 percent of a microcrystalline wax, wherein the percentages are based on treated hydrogel product, and the ratio of a:b is 1:1.5 to 1:12.

4,097,303

BATCH-TYPE CENTRIFUGE

Helmut Korsch, Cremlingen-Weddel, Germany, assignor to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

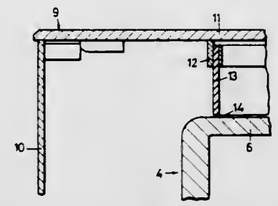
Filed Dec. 29, 1976, Ser. No. 755,331

Claims priority, application Germany, Jan. 23, 1976, 7601807[U]

Int. Cl.[2] B04B *15/00*

U.S. Cl. 127—19 6 Claims

1. A periodically operating batch type centrifuge comprising a centrifugal basket having a cylindrical shell with liquid drain holes and a vertical axis of revolution, said basket further comprising upper and lower end flanges directed radially inwardly toward the axis of rotation of the basket, said upper end flange defining a central filling opening and sugar discharge means surrounded by said lower end flange, housing means in which the centrifugal basket is mounted for rotation, said housing means serving as a collecting space for receiving liquids drained through the liquid drain holes by centrifugal forces when the basket is rotated, said housing means having a wall with an inner surface facing said upper flange, said centrifuge further comprising a cylindrical ring of an elastic, non-rigid material, and means fixedly mounting said cylindrical,



elastic ring coaxially of said basket above said upper end flange with the lower end of said cylindrical, elastic ring spaced a small distance from said upper end flange and radially outwardly of said central filling opening, said mounting means comprising annular means securing said cylindrical, elastic ring in such a position to divert any liquid travelling radially inwardly on said inner surface of said wall and to direct such liquid radially outwardly along said upper end flange.

4,097,304

CLEANING COKE OVEN DOORS

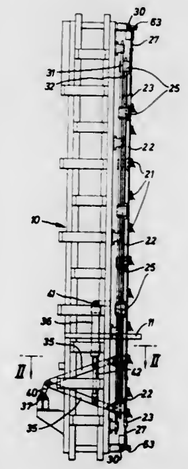
George Taylor, Middlesbrough, England, assignor to British Steel Corporation, London, England

Filed Nov. 3, 1976, Ser. No. 738,628

Claims priority, application United Kingdom, Nov. 10, 1975, 46408/75

Int. Cl.[2] B08B *1/00, 3/02, 7/04*

U.S. Cl. 134—6 13 Claims



1. A method of removing tarry deposits from an elongated narrow sealing surface of a generally rectangular coke oven door, the sealing surface extending continuously about the peripheral side and end areas of the inner surface of the door, comprising

simultaneously scraping the side portions of the sealing surface with bladed elements while directing a moving, high pressure, fan-shaped liquid jet of water or an aqueous cleaning solution at the lower end area of the seal surface, the bladed elements and the jet being reciprocated along

the seal surface, the jet being oriented so its long dimension always extends across the narrow width of the seal surface, and the jet being directed to intersect the seal surface at an acute angle.

5. A cleaning machine for a vertical rectangular coke oven door having a peripheral sealing surface, said surface comprising two side portions joined by upper and lower end portions, the machine including movable carrier means adapted to traverse at least a portion of the door sealing surface, and spaced scapers carried on the movable carrier means, said scrapers each having a pivoted blade urged by resilient biassing means towards the sealing surface of the door, and wherein the edge of each blade leads the pivot axis in the scraper direction and lies outwardly of the scraper assembly so that on encountering a hard deposit the blade tends to be pushed outwardly to press more firmly into the deposit.

4,097,305

METHOD FOR REMOVING BOT EGGS FROM ANIMAL HAIR

Peter J. Chiesa, Jr., Coatesville, and Meredith S. Ott, Hatfield, both of Pa., assignors to Bickmore, Inc., Hudson, Mass.

Continuation of Ser. No. 558,328, Mar. 14, 1975, abandoned. This application Feb. 22, 1977, Ser. No. 770,635

Int. Cl.² A01K *13/00*; B08B *1/00*

U.S. Cl. 134—6 **5 Claims**

1. A method for removing bot eggs from animal hair, which method comprises applying to the hair to soften the cement by which the eggs are adhered to the hair, a thickened aqueous solution containing at least about 2% of an amphoteric surfactant selected from the class consisting of imidazoline surfactants and betaine surfactants and having a hydrophobic C_7 to C_{12} hydrocarbyl group, the solution having a viscosity of at least about 1000 centistokes at ambient temperature, and then scraping the hair having the softened adherents.

4,097,306

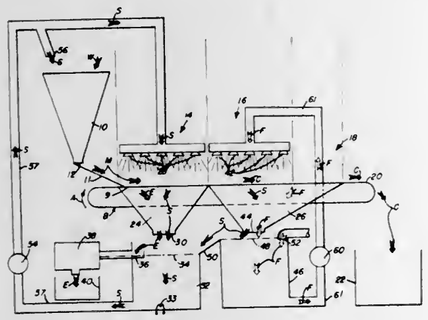
METHOD OF CLEANING SWARF

Lyle Carman, Mason, Ohio, assignor to Prab Conveyors, Inc., Kalamazoo, Mich.

Filed Aug. 9, 1976, Ser. No. 712,498

Int. Cl.² B08B *3/08, 7/04*

U.S. Cl. 134—10 **21 Claims**



1. A method for removing cutting fluid residues from particulate swarf which comprises the steps of

contacting said particulate swarf with an aqueous non-ionic detergent solution having a detergent concentration of about 1 to about 5 percent by weight to form an admixture of said swarf and said detergent solution containing detergent in an amount sufficient to emulsify said residues, said detergent solution being alkaline and containing a water-soluble detergent and an oil-soluble detergent;

forming a bed of said particulate swarf bearing the emulsified residues;

removing the emulsified residues from said particulate swarf by passing through the formed bed a fluid stream at a rate sufficient to entrain therein the emulsified residues and to cleanse the particulate swarf; and

recovering the cleansed particulate swarf.

4,097,307

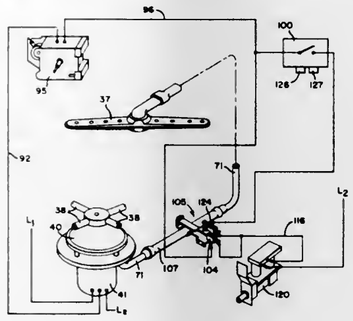
FILL CONTROL FOR AN AUTOMATIC DISHWASHER

Paul B. Geiger, Piqua, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed Dec. 17, 1976, Ser. No. 751,684

Int. Cl.² B08B *3/02*

U.S. Cl. 134—10 **16 Claims**



13. A method of washing dishes in an automatic dishwasher providing an automatic cycle having several time periods in each of which liquid is introduced into, recirculated within, and then drained from the dishwasher for washing and rinsing a load of dishes contained therein, comprising:

(a) introducing liquid into the dishwasher at the beginning of each such time period,

(b) recirculating the liquid by means of a recirculating pump as the liquid is being introduced into the dishwasher,

(c) sensing the amount of output of the recirculating pump, and

(d) continuing to introduce the liquid into the dishwasher while the sensed output is below the predetermined output which is less than the maximum output of which the recirculating pump is capable, to introduce only the minimum quantity of liquid needed to partially close the pump intake to cause the recirculating pump to aspirate the proper ratio of liquid and air into its input to cause the pump to develop the predetermined output, the quantity of liquid being a function of the size, the nature of the soil, and other conditions of the particular load of dishes present at the beginning of each time period, and ordinarily varying from one time period to the next during the course of washing a load of dishes.

15. A method of washing dishes in an automatic dishwasher providing an automatic cycle having several time periods in each of which liquid is introduced into, recirculated within, and then drained from the dishwasher for washing and rinsing a load of dishes contained therein, comprising:

(a) sensing the pressure of the liquid at a predetermined location as it is being recirculated within the dishwasher,

(b) introducing the liquid into the dishwasher at the start of at least one designated period as long as the sensed pressure is below a first pressure to introduce sufficient liquid into the dishwasher to cause the same to develop the first pressure with as little liquid as needed therefor,

(c) recirculating the liquid within the dishwasher at the first pressure during this designated dishwasher period, and

(d) recirculating the liquid within the dishwasher at a second pressure different from the first pressure during a subsequent designated dishwasher period to provide different recirculation pressures during certain periods of the automatic cycle of the automatic dishwasher.

4,097,308

GLASS ENCLOSED SOLAR CELL PANEL

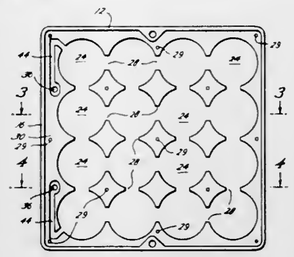
William Richard Klein; Carl Leroy Kotila, and Ira Leslie Krams, all of Houston, Tex., assignors to Tideland Signal Corporation, Houston, Tex.

Filed Aug. 17, 1977, Ser. No. 825,312

Claims priority, application United Kingdom, Apr. 28, 1977, 17893/77

Int. Cl.² H01L *31/04*

U.S. Cl. 136—89 H **12 Claims**



4. A solar cell panel comprising,

a top molded glass plate having a downwardly directed sidewall extending around the outer periphery,

a bottom molded glass plate positioned beneath and within the downwardly directed sidewall of the top plate with the outer periphery of the bottom plate being closely adjacent the inside of the sidewall of the top plate for providing a downwardly directed opening to the compartment formed between the top and bottom plates,

a plurality of recesses molded in the bottom of the top plate or the top of the bottom plate for receiving solar cells whereby the thickness of the compartment is minimized,

a solar cell positioned in each of the plurality of recesses,

potting compound having an index of refraction similar to the index of refraction of glass filling the compartment, and

electrical connections to said solar cells sealably extending through the bottom plate.

4,097,309

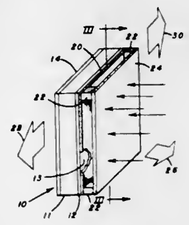
THERMALLY ISOLATED SOLAR CELL CONSTRUCTION

William E. Horne, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 31, 1977, Ser. No. 764,383

Int. Cl.² H01L *31/06*

U.S. Cl. 136—89 PC **12 Claims**



1. A solar radiation converter comprising:

means for converting electromagnetic wave energy into electrical energy, said means including a substrate of semiconductive material of one type conductivity forming a P-N junction with a layer of semiconductive material of the opposite type conductivity, said means having a receiver surface adapted for exposure to electromagnetic wave energy for conversion to electrical power, said means including electrical interconnect means adhered to a surface thereof distinct from said receiver surface,

a first cover plate covering at least one of said surfaces of said means,

a second cover plate covering said first cover plate in an outwardly, spaced-apart relation,

one of said first and second cover plates being adapted to absorb and radiate incident electromagnetic wave energy with a wavelength above 5 microns, and

standoff members interposed between said first and second cover plates in a manner to form a gap therebetween to define a thermal isolation barrier.

4,097,310

METHOD OF FORMING SILICON SOLAR ENERGY CELLS

Joseph Lindmayer, 6919 Blaisdell Rd., Bethesda, Md. 20034

Continuation of Ser. No. 583,274, Jun. 3, 1975, abandoned. This application Jun. 16, 1977, Ser. No. 807,299

Int. Cl.² H01L *31/00*

U.S. Cl. 136—89 SG **6 Claims**

1. A method of improving the electron generating efficiency of a silicon solar energy cell while forming same from an individual wafer of silicon having at least one dimension larger than the corresponding dimension of the cell, comprising treating the wafer to produce at a surface thereof a junction at which electrons are generated when the surface is exposed to light, and thereafter using a dicing saw having a diamond blade rotating at least at 5,000 r.p.m. and cutting the individual treated wafer at and through said surface junction to form a cell having at least one dimension less than that of said wafer and improved electron generating efficiency when said surface is exposed to light.

6. A silicon solar energy cell formed by the practice of the method of claim 1.

4,097,311

ABSORPTION SURFACE OF SOLAR COLLECTOR

Toshihiro Ishibashi; Kinya Horibe; Masaharu Ishida, and Youzi Sano, all of Kosai, Japan, assignors to Yazaki Sogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 18, 1976, Ser. No. 715,309

Claims priority, application Japan, Sep. 22, 1975, 50-113747

Int. Cl.² C23F *7/04*

U.S. Cl. 148—6.21 **14 Claims**

12. A process for manufacturing the selective absorption surface of the solar collector, in which the stainless steel having a mirror-like surface having a roughness of Ra of less than 0.07 μ or Rz of less than 0.2 μ determined according to the method of ISO Recommendation R 468, and the metal composition comprising; 0.001 – 0.15 wt % of C, 0.005 – 3.00 wt % of Si, 0.005 – 10.00 wt % of Mn, 11.00 – 30.00 wt % of Cr, 0.005 – 22.00 wt % of Ni, optionally 0.75 – 5.00 wt % of Mo, and the balance being Fe, is chemically oxidized in an acidic bath consisting of 150 – 800 g/l of sulfuric acid and a compound selected from the class consisting of 100 – 400 g/l of sodium, 100 – 400 g/l of potassium bichromate or 40 – 700 g/l of chromium trioxide, at the temperature of 50° C to the boiling point, a dipping time of 3 – 40 minutes to form the oxide film at a thickness of 500 to 2,000 A.

4,097,312
PRETREATMENT FOR THE RESISTANCE WELDING OF ALUMINUM

Geoffrey A. Dorsey, Jr., Danville, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Continuation-in-part of Ser. No. 709,026, Jul. 7, 1976, which is a continuation-in-part of Ser. No. 610,966, Sep. 8, 1975, Pat. No. 4,004,951, which is a continuation-in-part of Ser. No. 593,092, Jul. 3, 1975, abandoned. This application Aug. 13, 1976, Ser. No. 714,155

Int. Cl.[2] C23F *7/06*

U.S. Cl. 148—6.27 **16 Claims**

1. A method of preparing an aluminum workpiece for the resistance welding thereof comprising

(a) developing a freshly oxidized surface on the aluminum workpiece having a surface resistance of at least 25 but less than about 500 microhms; and

(b) stabilizing the freshly oxidized aluminum surface by treating with a hot aqueous alkaline solution having a pH of about 8-10 and containing at least one part per million of a long chain aliphatic carboxylic acid having from 12-22 carbon atoms or an equivalent carboxylate compound.

4,097,313
METHOD OF RECOVERY OF FERROMAGNETIC METAL OR ALLOY PARTICLES BY USING A MAGNETIC DRUM

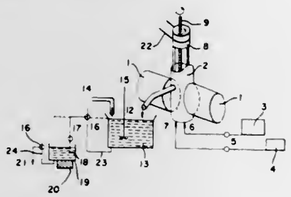
Yasumichi Tokuoka; Kazumasa Fukuda, and Akihiko Hosaka, all of Tokyo, Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan

Filed Nov. 22, 1976, Ser. No. 744,116

Claims priority, application Japan, Dec. 8, 1975, 50-1416160

Int. Cl.[2] H01F *1/02*

U.S. Cl. 148—105 **5 Claims**



1. In a process for preparing ferromagnetic metal or alloy particles which comprises reducing ferromagnetic metal ions in a solution with a reducing agent to obtain a slurry of ferromagnetic metal or alloy particles and separating the said particles from said slurry, the improvement which comprises:

separating said particles from said slurry by attracting said particles on a magnetic drum;

washing said particles;

recovering said particles from said magnetic drum.

4,097,314
METHOD OF MAKING A SAPPHIRE GATE TRANSISTOR

Kenneth Mansfield Schlesier, Stockton; Carl William Benyon, Jr., Trenton, and Joseph Michael Shaw, East Windsor Township, Mercer County, all of N.J., assignors to RCA Corp., New York, N.Y.

Filed Dec. 30, 1976, Ser. No. 755,965

Int. Cl.[2] H01L *21/225*

U.S. Cl. 148—188 **10 Claims**

1. A method of making an improved complementary field effect transistor pair comprising the steps of:

(a) forming a pair of laterally spaced semiconductor islands of N type and P type conductivity adjacent an insulating substrate;

(b) coating the islands with an aluminum oxide layer at a first known temperature;

(c) coating the aluminum oxide layer with a polycrystalline silicon layer;

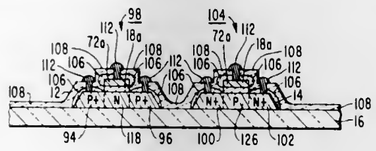
(d) coating the polycrystalline silicon layer with a doped oxide;

(e) heating the coated polycrystalline silicon layer at a second temperature less than said first temperature for a preselected period to drive the dopant from the doped oxide into the polycrystalline silicon layer;

(f) removing the doped oxide;

(g) depositing an undoped oxide adjacent the polycrystalline silicon layer;

(h) defining said undoped oxide into a mask for gates;



(i) removing portions of the polycrystalline silicon layer and the aluminum oxide layer uncovered by the masks;

(j) forming a layer of N-doped oxide adjacent the P type island;

(k) forming another layer of P-doped oxide adjacent the N type island;

(l) heat treating both islands simultaneously at a third temperature no greater than said second temperature for a predetermined period;

(m) removing all oxides;

(n) oxidizing the wafer at a fourth temperature less than said third temperature for an oxidation period; and

(o) annealing the islands in hydrogen at a fifth temperature less than said first temperature.

4,097,315
MAGNETIC ORIENTATION OF CASTING POWDER GRANULES

William H. Gardner, Lavale, Md.; Donald H. Graham, Fort Ashby, W. Va., and George M. Williams, Cumberland, Md., assignors to Hercules Incorporated, Wilmington, Del.

Filed Mar. 21, 1968, Ser. No. 715,131

Int. Cl.[2] C06B *45/00*

U.S. Cl. 149—2 **11 Claims**

1. A granule of propellant casting powder having incorporated therein a magnetic material having a magnetic susceptibility of at least about $0.1/4\pi$, said magnetic material being incorporated in said granule of propellant casting powder in an amount sufficient to orient the propellant casting powder granule in the desired direction when said granule of propellant casting powder is subjected to an applied magnetic field.

4,097,316
METHOD FOR GELLING NITROPARAFFINS IN EXPLOSIVE COMPOSITIONS

John J. Mullay, Hazelton, Pa., assignor to Atlas Powder Company, Tamaqua, Pa.

Filed Mar. 15, 1977, Ser. No. 777,694

Int. Cl.[2] C06B *45/00*

U.S. Cl. 149—2 **49 Claims**

1. A process for preparing an explosive gel composition which comprises an inorganic nitrate and a nitroparaffin comprising:

(a) forming an aqueous solution comprising an inorganic nitrate;

(b) adding a nitroparaffin to said aqueous solution;

(c) adding a polymeric thickening agent for nitroparaffins selected from the group consisting of cellulose acetate, cellulose acetate butyrate, cellulose acetate propionate, polymers of methyl, ethyl and butyl methacrylate, copolymers of vinylidene chloride and acrylonitrile, and mixtures thereof to said aqueous solution while agitating to form a nigroparaffin gel dispersed within said aqueous solution;

(d) gelling said aqueous solution by adding an effective amount of an aqueous gelling agent.

4,097,317
DESENSITIZING AGENT FOR COMPOSITIONS CONTAINING CRYSTALLINE HIGH-ENERGY NITRATES OR NITRITES

Joel M. Schnur, Springfield, Va.; Richard S. Miller, Crofton, Md.; James P. Sheridan, Burke, and A. D. Britt, Alexandria, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 25, 1977, Ser. No. 781,278

Int. Cl.[2] C06B *45/34, 25/34, 45/06*

U.S. Cl. 149—7 **6 Claims**

1. In a method for desensitizing a composite energetic composition with high-energy nitrate or nitrite crystals the improvement which comprises coating said crystals, prior to compounding said composition, with saligenin in a crystal-to-saligenin weight ratio from 1820:1 to 600:1.

4,097,318
METHOD FOR SEALING PLASTIC-METAL LAMINATES

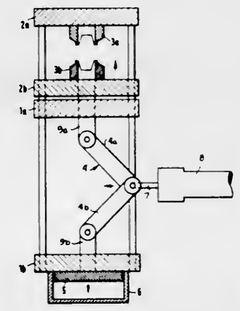
Hans Joachim Olschewski, Berlin, Germany, assignor to FKF Berlin Fleischwaren-und Konserven- Fabrik Schulz & Berndt GmbH and Co., KG, Germany

Filed May 10, 1976, Ser. No. 684,942

Claims priority, application Germany, May 9, 1975, 2521234; Aug. 26, 1975, 2538316

Int. Cl.[2] B29C *27/00*

U.S. Cl. 156—69 **5 Claims**



1. A process for sealing the plastic layers of two plastic-metal laminates comprising the steps of:

heating and pressing together the laminates to place the plastic layers of said laminates in contact;

rapidly increasing the pressure to a predetermined value with which the laminates are pressed together;

maintaining the predetermined pressure for a predetermined period; and

releasing the pressure from said laminates,

wherein the period for rapidly increasing the pressure to the predetermined value is less than 20% of the total interval between the start of pressure increase and the start of pressure release.

4,097,319
METHOD OF MANUFACTURING A COMPOSITE FOAMED POLYOLEFIN SHEET

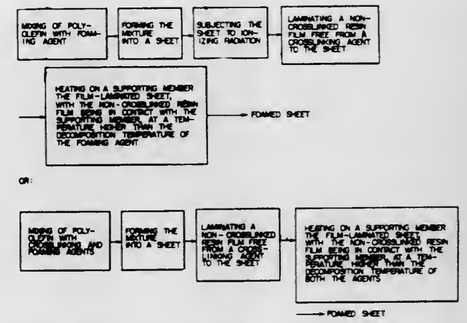
Hayao Shimokawa, Ebina; Makoto Nakamuri; Hideyo Ueno, both of Hiratsuka; Isamu Namiki, Yokohama, and Naonori Shiina, Tokyo, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1976, Ser. No. 660,855

Claims priority, application Japan, Feb. 26, 1975, 50-23681

Int. Cl.[2] B29D *27/00*

U.S. Cl. 156—79 **13 Claims**



1. A method of manufacturing a composite foamed polyolefin sheet which comprises the steps of laminating a film of noncross-linked thermoplastic resin free from a crosslinking agent to at least one surface of a crosslinked polyolefin base sheet containing a thermally decomposable foaming agent or a polyolefin base sheet containing a foaming agent and a crosslinking agent, and carrying out thermal foaming of said film-laminated sheet by heating said sheet on a supporting member under atmospheric pressure with the non-crosslinked resin film laminated to the sheet being in contact with the supporting member.

4,097,320
METHOD OF MANUFACTURING A DOUBLE GLASS PANEL UNIT

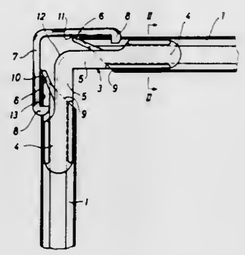
Harald Otto Christian Brauer; Knud Sejr Jensen; Torben Andreasen, all of Korsor; Hilmer Jensen, Skaelskor; Mogens Greve, and Peter Kürstein, both of Korsor, all of Denmark, assignors to Scanglas A/S, Korsor, Denmark

Filed Apr. 5, 1977, Ser. No. 784,908

Claims priority, application Denmark, Apr. 12, 1976, 1694/76

Int. Cl.[2] C03C *27/00;* **E06B** *3/24*

U.S. Cl. 156—109 **3 Claims**



1. A method of manufacturing a double glass panel unit having at least two glass panels between which a spacer frame is arranged consisting of straight, rigid rail means having a hollow profile, the rail means being mitre cut at their ends and joined edge against edge and held in position by angular coupling members, the arms of which are inserted in the cavities of the rails, and a seal being provided by injecting sealing material

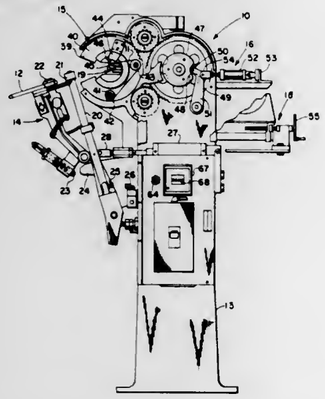
in corner cavities, each of which is limited by an outwardly facing surface of the coupling member and the inner walls of the rail means, wherein a layer of adhesive is applied to surfaces of the rail means facing the glass panels before the latter are mounted on the frame, said rail means being arranged and held in a position in which in each corner of the spacer frame a distance is provided between the inclined end surfaces of the rail means by the use of a coupling member having a strap adapted to engage holes in the rail means when the rail means are in spaced relationship, and the adhesive is applied to the rail means in this position, whereafter the rail means are pushed together so that the inclined surfaces will abut each other before the sealing material after mounting of the glass panels is pressed into the corner cavities, said strap being torn off after the adhesive supplying operation.

4,097,321

MACHINE FOR SPIRALLY WRAPPING A CONTINUOUS ELEMENT AROUND AN ANNULAR TIRE BEAD

Emmett J. Kelly, and Leonard R. Smith, both of Topeka, Kans., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 16, 1976, Ser. No. 714,862
Int. Cl.² B29H *17/32*
U.S. Cl. 156—136 **10 Claims**



10. Method of positioning a rotatable winding shuttle, in a closed tire bead ring wrapping machine, relative to bead holding and rotating means comprising driving the shuttle in rotation about its own axis at a predetermined angular speed, counting the revolutions of said shuttle while in said rotation, actuating braking means in response to a first predetermined number of the so-counted revolutions thereby decellerating said shuttle, and then actuating latching mechanism having a cooperable cam and a cushioned cam follower to stop and position said shuttle, relative to said bead holding and rotating means, and allowing said cam to override said cam follower if said cam is rotating faster than a predetermined speed.

4,097,322

MANUFACTURE OF RIGID ELONGATE MEMBERS OF RESIN BONDED REINFORCING ELEMENTS

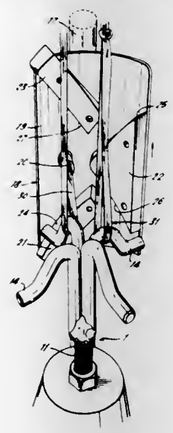
David James Greene, Opy, and Colin Alfred Pearson, Wembley, both of England, assignors to BICC Limited, London, England

Filed Feb. 4, 1977, Ser. No. 765,587
Claims priority, application United Kingdom, Feb. 4, 1976, 4390/76
Int. Cl.² B65H *81/00*
U.S. Cl. 156—149 **14 Claims**

1. A method of manufacturing a substantially rigid elongate member of resin bonded reinforcing elements which comprises:

(a) feeding at least one resin impregnated reinforcing element through an apertured guide, which guide is transversely spaced from the common axis of two hook means each mounted stationary in space with one substantially vertically above and spaced from the other and each rotatable about their common axis, and securing one end of the reinforcing element to one of said two hook means;

(b) causing the apertured guide to travel in a direction substantially parallel to the common axis of said hook means to and beyond one hook means, the guide engaging and effecting partial rotation of the hook means about said common axis with respect to the guide as the guide approaches the hook means, reversing the direction of travel of the guide to wind the reinforcing element over the hook means, and repeating the aforesaid steps at each



hook means alternately to form a plurality of elongate loops of reinforcing elements;

(c) cutting the reinforcing element and securing the free end of the element to one of said plurality of loops and one of said hook means;

(d) rotatably driving at least one of said hook means with respect to the other hook means about their common substantially vertical axis to twist the elongate loops to such an extent as to form a skein in which the helically twisted resin impregnated reinforcing elements are held under tension between the two hook means; and

(e) curing the skein of resin impregnated reinforcing elements to form a substantially rigid elongate member.

4,097,323

BUTT-SPLICER

Joseph Irma De Roeck, St. Katelijne-Waver, and Lucien Antoine Christiaen, Wilrijk, both of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Filed Jun. 2, 1976, Ser. No. 692,146
Claims priority, application United Kingdom, Jun. 4, 1975, 24140/75
Int. Cl.² B65H *19/08*
U.S. Cl. 156—159 **7 Claims**

1. A butt-splicer apparatus for butt-joining a fresh web to a running web without interruption of the motion of the running web, said apparatus comprising:

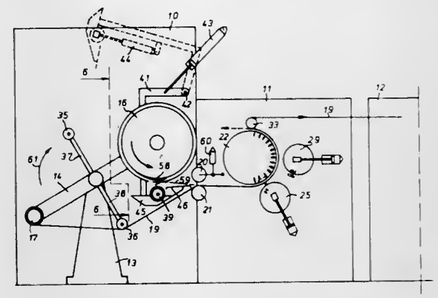
a rotatable cylindrical web-supporting roller having perforations around its periphery and means for creating a vacuum in at least a segmental portion of its periphery,

guide means for guiding said running web at least during a splicing operation along a path which extends into tangential contact with a point on the peripheral path of said roller and then wraps downstream from said tangential point around a predetermined arcuate portion equal to at least about 90° of the roller periphery, whereby the running web is biased against the roller periphery by the

running tension therein, said arcuate portion including said segmental portion in which said vacuum is created,

means for delivering the leading end of the fresh web into the convergence between the said web-supporting roller and the immediately upstream region of the running web while said running web is passing through said path wrapped around said roller, whereby the fresh web end is engaged and held between the tensioned running web and the contiguous arcuate roller peripheral portion to advance the same,

a rotatable cutter disposed adjacent the web-supporting



roller periphery at a locus within said predetermined arcuate portion, said cutter being operable to be brought into pressing contact with the running web surface to cut both webs generally transversely along a common line while both are supported on the roller surface, and

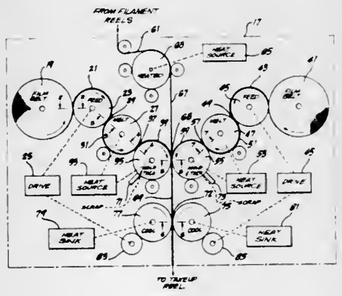
a rotatable tape applicator which is disposed adjacent the web-supporting roller peripheray at a locus downstream of said cutter but within said predetermined arcuate portion of said periphery, said applicator being operable to be brought into pressing contact with the exposed surfaces of the margins of both webs adjacent said common cutting line to apply a tape splice thereto.

4,097,324

METHOD AND APPARATUS FOR MAKING AN ELONGATED LATTICE STRUCTURE

Leroy L. Emmel, 1800 Wallace Ave., Apt. R, Costa Mesa, Calif. 92627

Filed Apr. 4, 1977, Ser. No. 784,603
Int. Cl.² B29D *3/00*; B29C *27/02*
U.S. Cl. 156—179 **11 Claims**



1. A method for making a lattice supported filament structure comprising the steps of:

applying heat to a first film belt to melt said first film belt;

molding the heated first film belt into a lattice structure having a plurality of joined elongated members connected with periodically spaced cross-strips therebetween, each of said joined elongated members having a depression molded therealong adapted to receive and engage an elongated filament;

applying heat to a plurality of elongated filaments to heat said elongated filaments to a temperature above the melting point of said joined elongated members of said lattice structure;

bringing each of said plurality of elongated filaments into engagement with one of said depressions molded along one of said elongated members of said lattice structure;

applying pressure to the lattice combination of the heated elongated filaments engaged with said joined elongated members of said lattice structure to enable the transfer of heat from said elongated filaments to said elongated members to melt said elongated members adjacent said elongated filaments and adhere said elongated filaments to said elongated members of said lattice structure; and

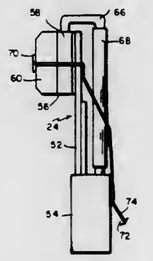
applying pressure and removing heat from said lattice combination to solidify said elongated members of said lattice structure adhered to said elongated filaments.

4,097,325

LABEL-APPLYING APPARATUS FOR APPLYING THERMOPLASTIC LABELS

Edward A. Schnier, Hubbardston, Mass., assignor to A-T-O Inc., Cleveland, Ohio

Filed Oct. 15, 1973, Ser. No. 406,334
Int. Cl.² B65C *3/08*
U.S. Cl. 156—215 **13 Claims**



1. The method of applying thermoplastic labels to containers comprising vacuum picking dry thermoplastic labels one at a time from a stack of dry labels, transferring the dry labels to a place of application to a container, while making the transfer heating a portion of the label to render said portion tacky, pressing the tacky portion of the label against the container at the place of application and then while moving the container along a predetermined path away from said place of application heating the entire area of the label to make it adhesive and pressing it against the container.

4,097,326

POWER ACTUATED LAMINATING MACHINE

Joe D. Giulie, and Leslie E. Worcester, both of Palo Alto, Calif., assignors to Permax, Palo Alto, Calif.

Filed Apr. 5, 1977, Ser. No. 784,680
Int. Cl.² B30B *15/34*
U.S. Cl. 156—366 **6 Claims**

1. A laminating machine for use with pre-fabricated laminating packets wherein said packets have a pair of heat sealable sheets connected together at one edge with a tear-off tab at the point of connection, said tear-off tab having a generally straight end with a plurality of notches in said end, comprising in combination:

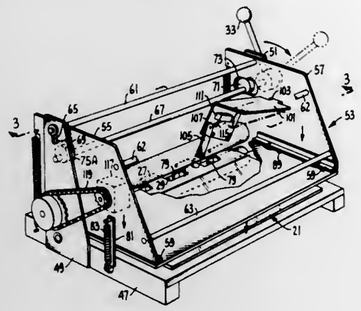
a. upper and lower flat heating elements;

b. upper and lower rollers adjacent the exit end of said heating elements and spaced therefrom;

c. stop fingers located between said heating element and said rollers, said fingers being adapted to engage the tab between the notches whereby portions of said tear off tab on

said packet extend beyond said fingers and between said rollers;

d. means for bringing said heating elements and said rollers together to engage the heat sealable portion of a laminating packet between the heating elements and the tab between said rollers and simultaneously move said fingers out of contact with said packet;



e. means for maintaining said packet between said heating elements for time sufficient to soften the laminating sheets; and

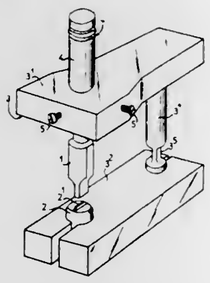
f. motor means for rotating said rollers to pull said packet between said rollers to complete the laminating operation.

4,097,327

APPARATUS TO APPLY VIBRATIONS TO PARTIALLY OR COMPLETELY THERMOFUSIBLE ARTICLES

Philipe Calemard, L'Etrat-Loire, France, assignor to Station Service-Textile F. Calemard et Cie S.A., Saint-Etienne, France

Filed Mar. 5, 1976, Ser. No. 664,415
Claims priority, application France, Mar. 13, 1975, 75 08478
Int. Cl.[2] B29C *27/08*; B32B *31/00*
U.S. Cl. 156—515 **17 Claims**



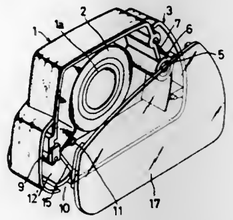
1. Ultrasonic apparatus for operation on material which is at least partially thermofusible, said apparatus comprising ultrasonic generator means including a low frequency generator, an electroacoustic transducer coupled to said generator, a sonotrode coupled to said transducer and constituting a working tool, a counter tool having an upper surface facing said sonotrode, such that the material to be operated on can be transported between the sonotrode and the counter tool, and support means for said transducer, sonotrode and counter tool, said support means comprising an aperiodic support member, said counter tool comprising a base and a projection on said base having an edge of substantially reduced width in relation to said base to constitute a counter bearing impact surface for said working tool permitting simultaneous cutting of the material and fusion of the resulting selvedges at the cut edges, said support member having a recess with a shape corresponding to the base of said counter tool, said base being slidably and demountably mounted in said recess in alignment with said sonotrode, said support member including a lower portion having said recess and an upper portion carrying said sonotrode and to which said transducer is secured.

4,097,328

TAPE CUTTER

Sakae Urushizaki, c/o Nishidotonbori Corpo, No. 4-1, 5-chome, Nishidotonbori-dori, Nishi-ku, Osaka-shi, Osaka-fu, Japan

Filed Sep. 6, 1977, Ser. No. 830,793
Claims priority, application Japan, Mar. 9, 1977, 52-29083
Int. Cl.[2] B32B *31/00*; B44C *7/00*
U.S. Cl. 156—523 **1 Claim**



1. A tape cutter for adhesive tape comprising:

a body,

a swing member pivoted on said body to be pivotable about one end thereof, urged upwardly by a spring, to hold an adhesive tape roll rotatably,

a tape press roller rotatably pivoted on the bottom of said swing member at the other end thereof, said tape press roller and the leading edge of said adhesive tape adapted to protrude through an opening in the bottom of said body when said swing member is pivoted down,

a disc rotatably pivoted on said body to be disposed between the side plates of said body and of said swing member and to be rotatable as said swing member is pivoted up and down, and

a blade mounted on said disc to cut the adhesive tape when the swing member is released to pivot up.

4,097,329

PROCESS FOR THE PRODUCTION OF MONOCRYSTALLINE SILICON RODS

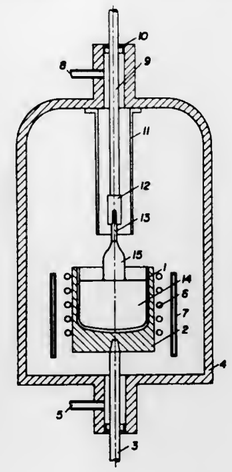
Horst Stock, Burghausen, and Adalbert Ellbrunner, Seibersdorf, both of Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik Grundstoffe mbH, Burghausen, Germany

Filed Sep. 13, 1976, Ser. No. 722,236
Claims priority, application Germany, Oct. 27, 1975, 2548046
Int. Cl.[2] B01J *17/18*
U.S. Cl. 156—617 SP **2 Claims**

1. In a Czochralski process for the production of a monocrystalline silicon rod of the type wherein the rod is vertically withdrawn from a silicon melt in a single drawing chamber under reduced pressure by means of a vertically-movable drawing spindle which is at least partially disposed within said chamber and which is slidably received within a concentrically-arranged sealing gasket mounted on said chamber to enhance hermetic sealing thereof, the improvement comprising:

passing a stream of protective gas into said chamber during the drawing operation by introducing it into the open, upper end of a vertically disposed tube of substantial length which is mounted within said chamber above said melt and which concentrically surrounds the drawing spindle and the growing silicon rod and has a radial width of about 5 to 60mm to provide sufficient annular clearance and which has a lower, open end which is between 150 and 350 mm above the surface of the melt such that the protective gas flows along the spindle and silicon rod in the direction of the melt surface, so as to prevent diffusion of reaction gases from the melt to the spindle surface and

subsequent deposition thereon which, in turn, would be stripped therefrom by said sealing gasket and fall into the melt therebelow, said protective gas being passed through



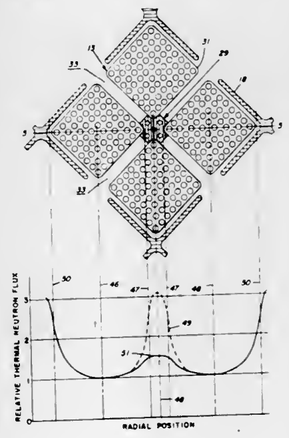
said chamber in an amount between 300 and 800 Nl/hour and said drawing operation taking place at a reduced pressure of between 1 and 100 Torr.

4,097,330

INSTRUMENTATION ASSEMBLY FOR NUCLEAR REACTOR

John P. Neissel, San Jose; Harry H. Hendon, Saratoga, and James H. Terhune, San Jose, all of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jan. 10, 1977, Ser. No. 758,171
Int. Cl.[2] G21C *17/10*
U.S. Cl. 176—19 R **20 Claims**



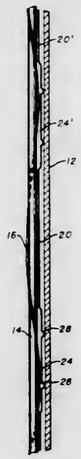
1. A neutron detector assembly for use in a fluid moderated thermal neutron reactor core wherein said core includes a plurality of replaceable fuel assemblies of substantially square cross section shape and wherein said fuel assemblies are positioned in spaced relation to provide gaps for fluid moderator therebetween, comprising: an elongated solid moderator-displacing member adapted for positioning in said core between the corners of an adjacent four of said spaced fuel assemblies, said member extending through said core for a length at least equal to the active height of said core, said member having transverse cross section dimensions equal to the diagonal distance between the corners of said four fuel assemblies less a tolerance required for insertion, removal and thermal expansion of said fuel assemblies whereby the moderator in the space between said corners of said adjacent four fuel assemblies is substantially completely displaced to thereby depress and flatten the neutron flux therebetween, said moderator-displacing member being formed with at least one longitudinal passage for receiving a neutron detector for monitoring the neutron flux in said space over the power range of operation of said core, said moderator-displacing member being formed of a metal selected such that said transverse cross section dimensions thereof are less than one-fourth of the reciprocal of the slowing-down power of said metal for fast neutrons and less than one-half of the reciprocal of the macroscopic absorption cross of said metal for thermal neutrons.

4,097,331

COOLANT MASS FLOW EQUALIZER FOR NUCLEAR FUEL

Paul R. Betten, Windsor, Conn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 2, 1976, Ser. No. 646,010
Int. Cl.[2] G21C *3/08*
U.S. Cl. 176—81 **9 Claims**



1. In a fuel assembly for a nuclear reactor, the fuel assembly including a coolant duct and a bundle of elongated parallel fuel rods positioned within the duct, the fuel rods each being provided with a spirally wound external spacer member, the fuel assembly having a plurality of sides defined by straight wall portions of the coolant duct, the improvement comprising:

a corrugated sleeve positioned within said coolant duct between the fuel rods and the inner wall of the duct, said sleeve having a shape commensurate with the interior shape of the duct and comprising:

a liner defining member, the liner defined by said member having a plurality of sides oriented generally parallel to the coolant duct inner walls immediately adjacent thereto;

a plurality of vertically spaced inwardly displaced portions of said liner defining member, said inwardly displaced liner portions having a parallelogram shape, the frequency of occurrence and length of said inwardly displaced liner portions being determined by the pitch of the spirally wound spacer members, said inwardly displaced liner portions occurring in regions where the spacer member on the peripheral fuel rods of the fuel rod bundle are on the sides of the fuel rods disposed away from the coolant duct wall whereby said inwardly displaced liner portions are vertically displaced on

adjacent sides of the liner and closely approach the peripheral fuel rods; and

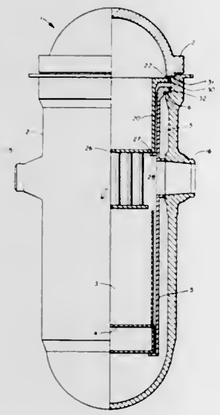
spring means on said liner defining member, said spring means permitting expansion of the liner toward the coolant duct.

4,097,332

HOLDDOWN STRUCTURE FOR A NUCLEAR REACTOR CORE

John Francis Gibbons, and Daniel John McLaughlin, both of Windsor, Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 13, 1976, Ser. No. 749,860
Int. Cl.² G21C *13/02*
U.S. Cl. 176—87 **6 Claims**



1. In a nuclear reactor vessel, a structure for applying a holddown force to the core support barrel, including,

an internal ledge formed on the upper end of the vessel,

a core support barrel positioned down and within the vessel,

a flange formed on the upper end of the core support barrel and arranged to engage the internal ledge of the vessel to hang the barrel from the ledge,

a closure for the reactor vessel and means for seating the closure on the upper end of the vessel with a predetermined force,

and a holddown barrel arranged in the vessel to extend from the closure to a seat on the core support barrel, the seat being located a substantial distance below the internal ledge.

4,097,333

ENZYMATIC METHOD OF PRODUCING GLUCOSE FROM ETHYLENE TREATED CELLULOSE

Arthur H. Freytag, Longmont, and James C. Linden, Loveland, both of Colo., assignors to The Great Western Sugar Company, Denver, Colo.

Filed Jun. 22, 1977, Ser. No. 808,812
Int. Cl.² C12D *13/02;* **C12B** *3/06*
U.S. Cl. 195—33 **9 Claims**

1. A method of producing glucose through the enzymatic hydrolysis of cellulosic material, comprising contacting the cellulosic material with a sufficient amount of ethylene to enhance the production of glucose and hydrolyzing at least a portion of the cellulosic material to glucose in the presence of cellulose.

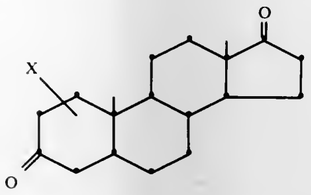
4,097,334

PROCESS FOR THE PREPARATION OF ANDROSTANE-3,17-DIONE DERIVATIVES

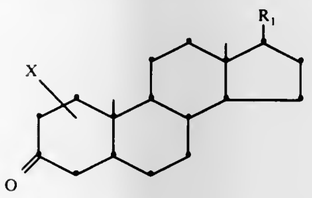
Alfred Weber; Mario Kennecke; Rudolf Müeller; Ulrich Eder, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Dec. 17, 1976, Ser. No. 751,672
Claims priority, application Germany, Dec. 19, 1975, 2558089
Int. Cl.² C07B *29/00*
U.S. Cl. 195—51 G **10 Claims**

1. A process for the preparation of an androstane-3,17-dione compound of the formula



wherein X is 1,2-methylene or 1- or 2-methyl, comprising fermenting; in the absence of 4 androstene-3,17-dione degradation inhibitors, a sterol of the formula



wherein X is as above and R_1 is a saturated or unsaturated hydrocarbon sterol side chain of 8–10 carbon atoms with a micro-organism culture capable of degrading the sterol side chain.

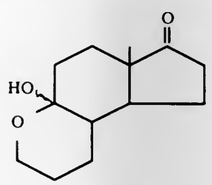
4,097,335

MICROBIAL TRANSFORMATION OF STEROIDS

Thomas R. Pyke, Portage, and Marion P. Salmond, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 14, 1977, Ser. No. 768,025
Int. Cl.² C07B *29/02*
U.S. Cl. 195—51 S **17 Claims**

1. A process for preparing a compound of the formula



I

which comprises cultivating Mycobacterium fortuitum NRRL B-8129 in an aqueous nutrient medium at a pH of 3.0 to 6.0 under aerobic conditions in the presence of a steroid with or without a 17-alkyl side chain containing from 2 to 10 carbon atoms, inclusive and recovering said compound from the cultivated medium.

4,097,336

REAGENT SYSTEM FOR BETA-AMYLASE ASSAY

Kenneth J. Pierre; Ker-Kong Tung, and Henriette Nadj, all of Vista, Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Continuation-in-part of Ser. No. 657,976, Feb. 13, 1976, Pat. No. 4,036,697. This application Jan. 11, 1977, Ser. No. 758,518
Int. Cl.² G01N *33/00*
U.S. Cl. 195—99 **6 Claims**

1. A reagent system for a beta-amylase assay comprising:

(a) a polysaccharide having glucose molecules primarily connected through alpha 1,4 linkages;

(b) phosphate ions;

(c) maltose phosphorylase;

(d) a co-enzyme selected from a group consisting of β-nicotinamide-adenine dinucleotide, β-nicotinamide-adenine dinucleotide phosphate, and mixtures thereof;

(e) glucose-6-phosphate dehydrogenase;

(f) β-D-phosphoglucomutase; and

(g) mutarotase;

wherein the above are present in amounts such that the beta-amylase to be assayed is rate-limiting.

4,097,337

BACTERIAL CULTURE MEDIUM

Thomas Anthony Krenitsky, Chapel Hill, and Stanley Robert Morris Bushby, Durham, both of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Jan. 27, 1976, Ser. No. 652,770
Claims priority, application United Kingdom, Jan. 27, 1975, 3445/75
Int. Cl.² C12K *1/10*
U.S. Cl. 195—100 **7 Claims**

1. A composition which is usable for testing the susceptibility of bacteria to anti-folate agents comprising a bacterial growth medium in combination with purified thymidine phosphorylase enzyme of bacterial origin wherein the concentration of thymidine phosphorylase enzyme in the growth medium is from 2 to 200 units of enzyme activity/ml of medium.

4,097,338

FLUORIMETRIC DEMONSTRATION AND DETERMINATION OF A REDUCED COENZYME OR DERIVATIVE IN AN AQUEOUS SYSTEM

Aarne Ilmari Konttinen, Helsinki, Finland; Bastiaan Cornelis Goverde, and Peter Silvester Lambertus Janssen, both of Oss, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed Jan. 21, 1976, Ser. No. 651,101
Claims priority, application Netherlands, Jan. 28, 1975, 7500951
Int. Cl.² G01N *31/14*
U.S. Cl. 195—103.5 R **7 Claims**

1. A method for the determination of a reduced co-enzyme selected from the group consisting of NADH and NADPH in an aqueous system by fluorometric means, comprising the steps of

preparing an aqueous sample containing said reduced co-enzyme wherein said aqueous sample contains as fluorescence intensifiers therefor (a) a water-miscible organic liquid or a mixture of such liquids, and (b) a dispersion of a water-insoluble material added thereto, said water-insoluble material selected from the group consisting of a metal carbonate, a metal sulphate, a metal phosphate, a metal silicate, a metal oxide, and a protein material obtained by precipitation of a protein in situ by the addition of another protein or a polypeptide to said aqueous sample for the precipitation of said water-insoluble material where no protein, or only enzyme protein, is present, and

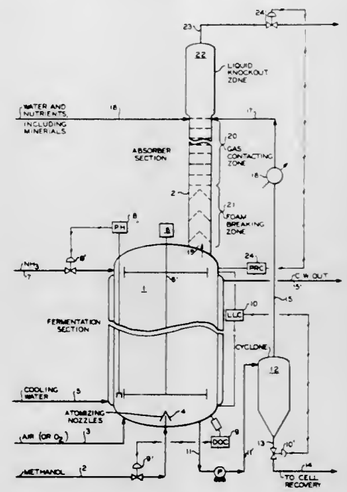
measuring specifically the fluorescence of said reduced co-enzyme in said sample.

4,097,339

FERMENTATION APPARATUS

Stanley J. Marwil, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 18, 1976, Ser. No. 742,817
Int. Cl.² C12B *1/00*
U.S. Cl. 195—142 **10 Claims**



1. A fermentation apparatus for improved oxygen utilization adapted for the continuous aqueous aerobic fermentation of a microorganism, comprising a fermentation section with an upper contiguous absorber section communicating therewith and adapted to the passage of gaseous effluent from the upper area of said fermentation section into the lower portion of said absorber section,

wherein said fermentation section is adapted to contain liquid aqueous ferment and comprises means for receiving a molecular oxygen-containing gas positioned in the lower portion of said fermentation section below the normal liquid level of said aqueous liquid ferment, means adapted for receiving a carbon energy source material and a nitrogen source material,

means for withdrawing aqueous fermentation liquor rich in cellular material from said fermentation section,

means for separating cellular material from said rich aqueous fermentation liquor, leaving lean fermentation liquor,

means for cooling said lean fermentation liquor,

wherein said absorber section comprises, in sequence relative to said fermentation section, a foam-breaking zone, a gas-contacting zone, a liquid knock-out zone of substantially expanded diameter relative to said gas-contacting zone and sufficient to substantially reduce the linear gas velocity of gases exiting said gas-contacting zone, gas-venting means at the upper area of said knockout zone,

means for recycling said cooled lean fermentation liquor to said gas-contacting zone, and

means for feeding make-up water and nutrients to said absorber section.

4,097,340

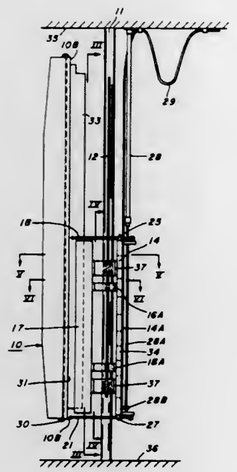
APPARATUS FOR CLEANING COKE OVEN DOORS

Erich Pries, Bochum, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Aug. 24, 1977, Ser. No. 827,286
Int. Cl.² C10B *43/08;* **B08B** *3/02*
U.S. Cl. 202—241 **5 Claims**

1. Apparatus for cleaning the regions of coke oven doors between a surrounding sealing edge and a refractory door plug, comprising a frame vertically reciprocable along the end of a coke oven door which carries said sealing plug, a first pair

of nozzles carried on the upper portion of said frame and arranged to force fluid into the upper portions of those regions of the coke oven door between a surrounding sealing edge and the door plug, and a second pair of nozzles carried on the lower portion of said frame and arranged to force fluid into the lower portions of those regions of the coke oven door between said surrounding sealing edge and the door plug, said nozzles being pivotal about generally vertical axes such that the first



pair of nozzles can be pivoted inwardly when they reach the upper edge of the coke oven door upon upward movement of the frame to clean the region between the upper edge of the door plug and the upper horizontally-extending portion of the sealing edge, the second pair of nozzles being pivotal inwardly when they reach the lower edge of the coke oven door upon downward movement of the frame to clean the region between the lower edge of the door plug and the lower horizontally-extending portion of the sealing edge.

4,097,341

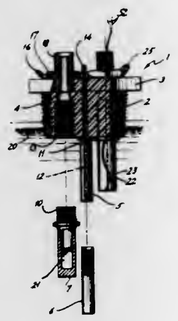
MEASURING CORROSION RATE UNDER SPECIFIED HEAT TRANSFER CONDITIONS

Charles E. Schell, Levittown; Dennis C. Deegan, Glenside, and Donald F. Jacques, Cornwells Heights, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Division of Ser. No. 644,201, Dec. 24, 1975. This application Mar. 7, 1977, Ser. No. 774,723

Int. Cl.² G01N *27/46*

U.S. Cl. 204—1 T **6 Claims**



1. A method of measuring corrosion rate of a surface which is exposed to a corrodant fluid under specified heat transfer conditions, said method comprising:

inserting probe housing means having a reference electrode, an auxiliary electrode, and a first hollow test electrode at least partially into the fluid, the test electrode containing heat transfer fluid with a heat transfer coefficient similar to that of the test electrode,

heating the first hollow test electrode with electrical heating means having an electrical input, the heating means being at least partially submersed in the heat transfer fluid,

sensing a first temperature of the heat transfer fluid along an inside wall of the heated test electrode,

sensing a second temperature of the corrodant fluid adjacent to an outside wall of the heated test electrode,

instantaneously measuring the corrosion rate of the test electrode using corrosion rate meter means connected to the reference, auxiliary, and heated test electrodes, and

electronically feeding the first and second sensed temperatures and the electrical input to the heating means to a U-meter and instantaneously measuring therein the heat transfer coefficient across the test electrode.

4,097,342

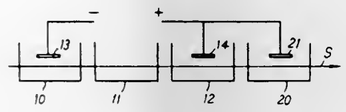
ELECTROPLATING ALUMINUM STOCK

William Ernest Cooke; John Hodgson, both of Kingston, Canada, and Mitsuo Sasaki, Tondabayshi, Japan, assignors to Alcan Research and Development Limited, Montreal, Canada

Continuation of Ser. No. 578,324, May 16, 1975, abandoned. This application Dec. 14, 1976, Ser. No. 750,352

Int. Cl.² C25D *5/44, 7/06, 17/00*

U.S. Cl. 204—28 **5 Claims**



1. A process for the production of metal-plated, elongated aluminum stock which comprises passing the aluminum stock continuously (1) during a minor part of a minute through a hot acid electrolytic cleaning bath containing an electrolyte having a high dissolving power for aluminum oxide, said bath consisting essentially of an aqueous, acid solution selected from the group consisting of: 20 to 50% H_3PO_4 and 10 to 25% H_2SO_4, 75% H_3PO_4 and 5% HNO_3, and 80% by volume H_2SO_4 plus 25 grams per liter CrO_3; and subsequently (2) through an electroplating bath containing a metal plating electrolyte, the first-mentioned bath having a cathode electrode immersed therein and the second-mentioned bath having an anode electrode immersed therein, whereby to render the stock anodic in the first bath; the composition and temperature of the solution of the first bath being sufficient for removal of anodic oxide from the aluminum essentially as rapidly as it forms in the first electrolytic treatment, and said first treatment in the hot acid bath being effective to clean the aluminum during its passage therethrough and to deliver the stock with an essentially bare aluminum surface; and electric current, from a supply, for electrolytic cleaning in the first bath and for plating the stock with metal in the second bath being passed from said anode successively through the second bath, the stock and the first bath, to the cathode, without sliding or rolling contacts between the stock and the electrical supply.

4,097,343

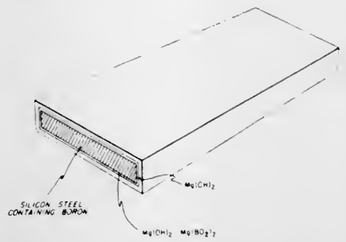
COATED SILICON-IRON PRODUCT AND PROCESS THEREFOR

Ronald H. Arendt, and Matthew J. Curran, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 7, 1977, Ser. No. 774,807

Int. Cl.² C25D *5/10, 5/50, 9/04*

U.S. Cl. 204—37 R **8 Claims**



1. The method of producing grain-oriented silicon-iron sheet which comprises the steps of providing a finegrained primary-recrystallized silicon-iron sheet containing 2.2 to 4.5 percent silicon, between about three and 50 parts per million boron, and between about 15 and 95 parts per million nitrogen in the ratio to boron of one to 15 parts per part of boron, electrolyzing a solid MgO containing aqueous solution consisting essentially of magnesium acetate and magnesium metaborate and containing magnesia with the silicon-iron sheet being arranged as the cathode in said solution and the said solution being at a temperature of at least about 65° C and thereby covering the sheet with a boron-containing adherent electrically-insulating but relatively thin coating of $Mg(OH)_2$, and then electrolyzing a solid MgO-containing aqueous solution consisting essentially of magnesium acetate with the resulting coated sheet arranged as the cathode in the said magnesium acetate solution and thereby covering the boroncontaining $Mg(OH)_2$ coating with a substantially thicker $Mg(OH)_2$ coating, and thereafter subjecting the resulting double-coated sheet to a final heat treatment to develop (110) secondary recrystallization texture in the silicon-iron sheet.

4,097,344

ELECTROCHEMICAL COUPLING OF PERFLUOROALKYL IODIDES

Robert Finley Drury, Roosevelt, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 29, 1976, Ser. No. 700,967

Int. Cl.² C25B *3/02*

U.S. Cl. 204—59 R **10 Claims**

1. A process of preparing perfluoroalkanes comprising anodically coupling at least one compound of the formula $R_f^1R_f^2CFI$ wherein R_f^1 and R_f^2 are each independently fluorine or a perfluoroalkyl radical containing from 4 to 40 carbon atoms in a liquid carboxylic acid in the presence of a small amount of carboxylate ion.

4,097,345

$NA_5GDSI_4O_{12}$ AND RELATED RARE EARTH SODIUM ION CONDUCTORS AND ELECTROLYTIC CELLS THEREFROM

Robert Day Shannon, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 15, 1976, Ser. No. 732,748

Int. Cl.² C25D *5/00, 17/00;* H01M *4/36;* H01B *1/00*

U.S. Cl. 204—59 AM **42 Claims**

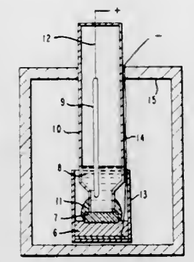
1. The method of conducting sodium ions utilizing a composition having (a) the formula $Na_{5-x}\square_xGd_{1-y-x}M_yM'_xSi_{4-z}Ge_zO_{12}$ wherein

M is yttrium or at least one of the rare earths other than Gd,

M' is Zr^{4+}, Hf^{4+}, or Th^{4+},

$\square$ is a sodium vacancy to preserve charge neutrality,

x is 0 to about 0.5 when Zr^{4+} or Hf^{4+} is included in M' and 0 to about 0.1 when Th^{4+} is included in M',



y is 0 to 1, and

z is 0 to 4, with the proviso that $y+x$ is no more than 1, and

(b) the crystal structure of the rhombohedral $Na_5YSi_4O_{12}$-type with the space group symmetry $R\bar{3}c$.

4,097,346

ELECTROCHEMICAL OXIDATION OF DIACETONE-L-SORBOSE TO DIACETONE-L-KETOGULONIC ACID

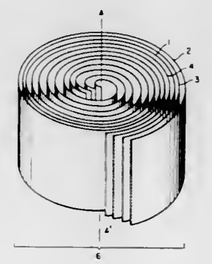
Peter Murday Robertson, 19 Bruttenerstrasse, Oberwil, Switzerland

Continuation-in-part of Ser. No. 559,605, Mar. 18, 1975, Pat. No. 4,040,938. This application Feb. 7, 1977, Ser. No. 766,517

Claims priority, application Germany, Apr. 1, 1974, 2415784; Jan. 30, 1975, 2503819

Int. Cl.² C25B *3/02, 3/04*

U.S. Cl. 204—80 **10 Claims**

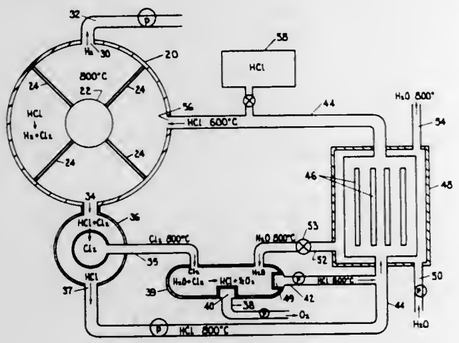


1. Process for producing diacetone-L-ketogulonic acid by passing a solution of diacetone-L-sorbose through an electrochemical cell, in which said cell includes at least one electrode roll formed by spiralling a deformable sandwich arrangement of electrode layers and spacing layers for preventing direct electrical contact between them, said electrode layers being made of an electrically conductive material, at least one of the spacing layers being ion-permeable and the electrodes and spacing layers having shapes and material structures which cooperate with each other to enable electrolyte flow through said electrode roll or rolls, while applying electrical current whereby to bring about oxidation of said diacetone-L-sorbose at the anode of said electrochemical cell, said anode having an active surface for the said oxidation, and recovering the diacetone-L-ketogulonic acid from said electrolyzed solution.

4,097,347
ELECTROLYTIC RECOVERY OF METALS
Elliot L. Packer, 1015 Prospect Ave., Plainfield, N.J. 07060
Filed Aug. 23, 1976, Ser. No. 716,828
Int. Cl.[2] C25C *1/20*; C25D *5/42*
U.S. Cl. 204—109 6 Claims

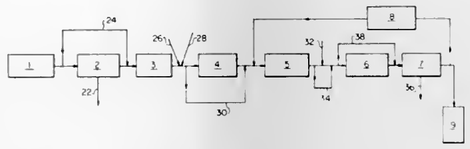
1. A metal recovery process for recovering those precious metals that are soluble in aqua regia from an ionic solution by an electrolytic process comprising the steps of:
selecting a cathode made of a material inert to aqua regia, said cathode being composed of metals from the group consisting of titanium and tantalum,
sand blasting the surface of said cathode,
preplating the surface of said cathode with a thin layer of a conductive adherent metal to provide a coated cathode having a coat that is substantially impervious to hydrogen,
inserting said coated cathode into a solution of a precious metal that is soluble in aqua regia,
electrolytically recovering said precious metal on said cathode, and
dissolving said precious metal and said coat of conductive adherent metal from said cathode by use of aqua regia.

4,097,348
METHOD AND APPARATUS FOR PRODUCING HYDROGEN
Henry J. Gomberg, Ann Arbor, Mich., assignor to Texas Gas Transmission Corporation, Owensboro, Ky.
Continuation of Ser. No. 479,025, Jun. 7, 1974, abandoned. This application Apr. 8, 1976, Ser. No. 675,136
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—157.1 H 12 Claims



1. A method of producing hydrogen for use as an ingredient of hydrogen based fuels which comprises:
(a) introducing a quantity of gaseous HCl into a first chamber;
(b) subjecting such quantity simultaneously to heat and radiation to dissociate the HCl into H_2 and Cl_2;
(c) separating the gases by removing the H_2 and introducing the hot Cl_2 into a secondary chamber;
(d) introducing H_2O at about 800° C into said secondary chamber to form HCl; and
(e) transferring said HCl to said first chamber and initiating a second and subsequent similar cycles.

4,097,349
PHOTOCHEMICAL PROCESS FOR FOSSIL FUEL COMBUSTION PRODUCTS RECOVERY AND UTILIZATION
Stephen Zenty, 193 Talbott St., Rockville, Md. 20852
Filed Mar. 31, 1976, Ser. No. 672,124
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—158 R 9 Claims

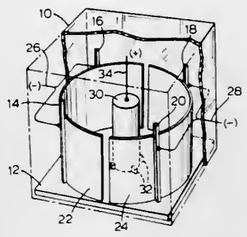


1. A process for treatment of a gaseous mixture containing NO_x and SO_2 wherein X is 1 or 2, which comprises:
a. addition of reactive olefinic hydrocarbon and oxygen to said mixture in sufficient quantity to form an enriched mixture favorable to free radical formation and photochemical conversion of said NO_x and SO_2,
b. irradiation of said enriched mixture with electromagnetic radiation having a wave length of from about 1500A to about 7500A to form free radicals and produce particulate formation, and
c. separation of particulate material from said irradiated mixture.

4,097,350
ACTINIC RADIATION CURABLE COMPOSITIONS
Stephen D. Pastor, Edison; Martin M. Skoultchi, Somerset, and Henry R. Hernandez, Somerville, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.
Continuation-in-part of Ser. No. 453,817, Mar. 22, 1974, abandoned. This application Jun. 19, 1975, Ser. No. 588,398
Int. Cl.[2] C08F *2/46*
U.S. Cl. 204—159.23 9 Claims

1. An actinic radiation curable prepolymeric composition of matter characterized by the presence of terminal unsaturation consisting essentially of the reaction product of:
(a) from about 1.0 to about 48.0 mole percent of a hydroxyalkyl ester of an alpha, beta unsaturated carboxylic acid, wherein the alkyl group of the ester moiety contains from 2 to 20 carbon atoms, and the acid moiety contains from 3 to 4 carbon atoms;
(b) from about 1.0 to about 48.0 mole percent of at least one polymerizable free-radical initiator activatable by actinic radiation and selected from the group consisting of tetrachlorophthalic anhydride, tetrabromophthalic anhydride and 1,4,5,6,7,7-hexachloro-5-norbornene-2,3-dicarboxylic anhydride and mixtures thereof;
(c) from about 1.0 to about 48.0 mole percent of at least one nonhalogenated cyclic anhydride containing from 4 to 10 carbon atoms; and
(d) from about 1.0 to about 48.0 mole percent of at least one epoxide containing 2 to 8 carbon atoms and selected from the group consisting of epoxyalkyl acrylates and methacrylates and alkylene oxides.

4,097,351
PREPARATION OF METAL ALLOY COATINGS ON IRON SUBSTRATES
William F. Caley, Halifax, and Spero N. Flengas, Willowdale, both of Canada, assignors to The Governing Council of the University of Toronto, Toronto, Canada
Filed Feb. 3, 1977, Ser. No. 765,154
Int. Cl.[2] C25D *13/02*
U.S. Cl. 204—181 N 9 Claims

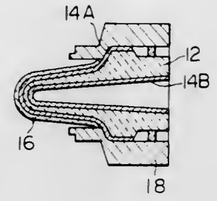


1. A process of applying integrated metallic coatings to ferrous metal substrates, which comprises:
forming a colloidal suspension of at least one metal oxide selected from the group consisting of nickel oxide, chromium oxide and mixtures thereof, in powder form, in an aqueous medium containing suitable dispersant;
immersing in said colloidal suspension a ferrous metal substrate and anodically polarizing the substrate;
electrophoretically depositing a film containing said at least one metal oxide from the colloidal suspension onto said ferrous metal substrate anode;
drying the film deposited on the ferrous metal substrate anode to remove a substantial amount of water therefrom;
and heating the deposited firm containing said metal oxide in the presence of hydrogen at temperatures of from about 1000° C to about 1500° C so as to reduce the deposited metal oxide to metal and form an integrated coating of said metal on said substrate by diffusion.

4,097,352
ELECTRODEPOSITION OF COMPOSITIONS CONTAINING SULFONIUM RESINS AND CAPPED POLYISOCYANATES
Joseph F. Bosso, Lower Burrell, and Marco Wismer, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.
Division of Ser. No. 594,152, Jul. 8, 1975, Pat. No. 4,038,232, which is a continuation of Ser. No. 316,596, Dec. 19, 1972, abandoned. This application Apr. 11, 1977, Ser. No. 786,538
Int. Cl.[2] C25D *13/06*
U.S. Cl. 204—181 C 9 Claims

1. A method of coating a conductive substrate serving as a cathode which comprises passing electric current between an anode and said cathode in electrical contact with the water-dispersed composition comprising an aqueous dispersion comprising:
(A) a ternary sulfonium salt group solubilized synthetic organic resin containing free hydroxyl groups, said organic resin produced by reacting:
(1) an epoxy group-containing organic material having a 1,2-epoxy equivalency of greater than 1, and
(2) a sulfide-acid mixture, said sulfide-acid mixture being used in an amount to provide sufficient quaternary sulfonium groups to solubilize said resin, said sulfide being selected from the group consisting of aliphatic, mixed aliphatic-aromatic, aralkyl and cyclic sulfides; and
(B) a capped, organic polyisocyanate stable at ordinary room temperature in the presence of said resin (A) and reactive with said resin (A) at elevated temperatures.

4,097,353
ARTICLE AND METHOD OF FORMING POROUS COATING ON ELECTRODE LAYER OF CONCENTRATION CELL TYPE OXYGEN SENSOR
Katsuhiro Kishida, Yokohama; Hiroshi Takao, Kamakura; Kimmochi Togawa, and Kazuo Matoba, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan
Filed Jun. 10, 1976, Ser. No. 694,698
Claims priority, application Japan, Jun. 10, 1975, 50-69173
Int. Cl.[2] G01N *27/26*
U.S. Cl. 204—195 S 9 Claims



1. A method of forming a porous coating on an electrode layer of an oxygen sensor, said sensor comprising a layer of a solid oxygen-ion electrolyte for use in a combustion engine exhaust gas, said layer of said solid electrolyte having first and second sides and having first and second electrode layers formed on said first and second sides respectively; said first electrode layer being in communication with said exhaust gases, said second layer being in communication with a reference gas, said porous coating being formed only on said first electrode layer which is exposed to, and in communication with, said exhaust gases, said method comprising the steps of:
applying fine particles of a heat-resistant and chemically stable first material onto the surface of the electrode layer to form a porous layer by plasma-spraying said fine particles, said first material being selected from the group consisting of alumina, spinel, alumina cement, beryllia, zirconia, nickel oxide, silicon carbide, boron carbide and boron nitride;
applying a dispersion of fine particles of a heat-resistant and chemically stable second material in a liquid onto said porous layer to impregnate said porous layer with said dispersion, said dispersion containing at least one compound selected from the group consisting of alumina and silica; and
baking the impregnated porous layer to fix said particles of said second material to said porous coating, said fine particles and said dispersion being applied such that the total pore volume in the porous coating after the completion of the baking step ranges from between about 0.09 to 0.16 cm^3 per one gram of the porous coating.

4,097,354
CONTINUOUS PROCESS FOR ELECTROLYTIC REFINING AND ELECTROWINNING OF ELEMENTS AND COMPOUNDS
Marco V. Ginatta, Corso Alberto Pico, 35, Turin, Italy
Filed May 11, 1976, Ser. No. 685,305
Claims priority, application Italy, May 12, 1975, 68194 A/75; Apr. 26, 1976, 68012 A/76
Int. Cl.[2] C25C *1/12, 1/18, 7/02*
U.S. Cl. 204—206 16 Claims

1. An apparatus for the continuous electrolytic refining and extraction of metals, metalloids, elements, compounds and alloys, which comprises:
a tank;
an electrolyte, contained within said tank;
continuous cathode means;
continuous anode means;

first transfer means for supporting and moving said continuous cathode means along a predetermined path between one end of said tank and an opposite end of said tank, said continuous cathode means being at least partially submersed in said electrolyte between said ends of said tank; and

second transfer means for supporting and moving said con-

tinuous anode means along a path within said tank which is parallel to said predetermined path of said continuous cathode means, wherein each submersed portion of said continuous anode means moves in a direction of travel opposite the direction of travel of an adjacent portion of said continuous cathode means, between said ends of said tank, said anode means being at least partially submersed in said electrolyte.

4,097,355

WATER STERILIZATION APPARATUS

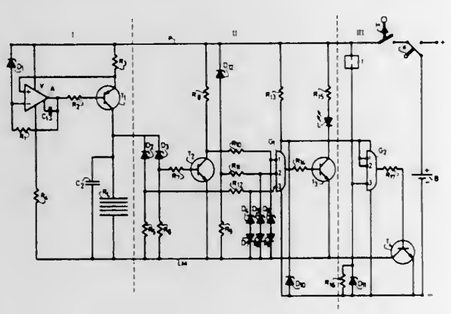
Wolfgang Fischer, Konigsburg, Germany, assignor to Sachs Systemtechnik, Schweinfurt am Main, Germany

Filed Jun. 8, 1977, Ser. No. 804,559

Claims priority, application Germany, Jun. 14, 1976, 2626570

Int. Cl.² C02B *1/82*; C25B *15/00*

U.S. Cl. 204—228 **12 Claims**



1. Water sterilization apparatus, comprising in combination, a water purification cell having an internal resistance varying as a function of the conductivity of water passing therethrough, said purification cell being effective only when the voltage thereacross has an amplitude in a range between a predetermined minimum amplitude and a predetermined maximum amplitude and requiring a substantially constant current for proper sterilization of said water; a constant current source connected to said water purification cell for furnishing said constant current; and monitoring means for monitoring the voltage across said water purification cell and furnishing a fault signal when said voltage is outside said range.

4,097,356

CHLORINE GENERATOR

Dow Yates, 212 Westwood Dr., Friendswood, Tex. 77546

Filed Sep. 8, 1977, Ser. No. 831,485

Int. Cl.² C25C *7/00*

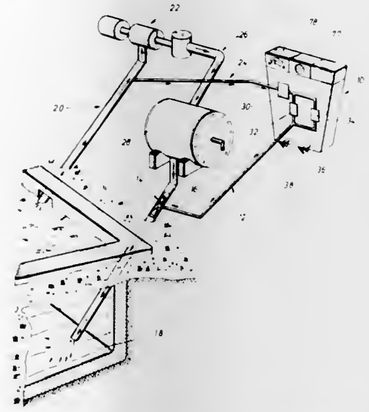
U.S. Cl. 204—237 **9 Claims**

1. A chlorine generator comprising:

a. a housing with separate anode and cathode compartments containing, respectively, an anode and cathode electrode therein, said housing separated by a fluorinated polymeric ion-permeable membrane to define said anode and cathode compartments, with said anode compartment adapted for receiving sodium chloride and water and said cathode compartment adapted for receiving water;

b. a timer electrically connectable to an external power source for timing activation of said generator and further connected to a power supply for controlling the passage of a direct current through said electrodes;

c. a chlorine aspirator in communication with said anode compartment for receiving chlorine generated in said



anode compartment and a hydrogen aspirator in communication with said cathode compartment for receiving hydrogen generated in said cathode compartment;

d. a conduit in fluid communication with said chlorine aspirator and said hydrogen aspirator;

e. a pressure gauge in said anode compartment for measuring the gas pressure of the chlorine produced by said chlorine generator, with said pressure gauge electrically connected to said power supply and operable in response to a chlorine pressure below a predetermined level to deactivate said generator.

4,097,357

METHOD AND DEVICE FOR REGENERATING ZINC

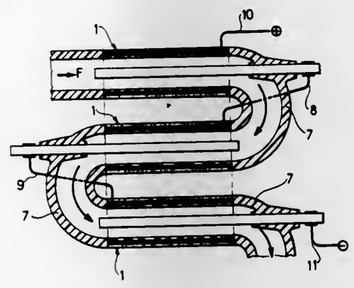
Jean Jacquelin, Marolles en Hurepoix, France, assignor to Compagnie Generale d'Electricite S.A., Paris Cedex, France

Filed Jul. 21, 1976, Ser. No. 707,732

Claims priority, application France, Jul. 21, 1975, 75 22661; Dec. 3, 1975, 75 36967; Jun. 3, 1976, 76 16842; Jun. 3, 1976, 76 16843; Jun. 9, 1976, 76 17455

Int. Cl.² C25C *1/16, 7/02*

U.S. Cl. 204—252 **22 Claims**



1. A device for regenerating zinc from an alkaline zincate solution, said device comprising: a duct, a negative electrode disposed substantially along the axis of said tubular duct, means

for conveying said solution for regeneration within said duct, said duct being constructed from a porous insulating hydrophilic material to allow the alkaline solution to infiltrate but preventing zinc particles dissociated from the negative electrode from passing therethrough; a positive electrode disposed in the form of a layer on the outer surface of the tubular duct, said positive electrode being constructed from a porous conductive material containing inter alia nickel to cause oxygen to be released to the exterior; and a layer of a porous water-repellent material containing inter alia porous sintered polytetrafluoroethylene being disposed on the outer surface of the positive electrode, to cause oxygen to be released to the exterior but preventing the solution from seeping therethrough.

4,097,358

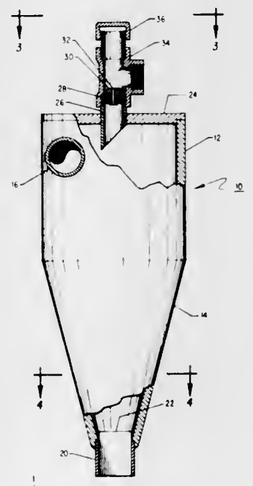
APPARATUS FOR RELEASE OF AN ENTRAINED GAS IN A LIQUID MEDIUM

Russell M. Wiseman, Mentor, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Aug. 30, 1976, Ser. No. 718,833

Int. Cl.² C25B *9/00*; B01D *47/00*

U.S. Cl. 204—270 **8 Claims**



1. A device for the release of an entrained gaseous substance from a liquid comprising: a cylindrical top section; a conical bottom section attached to said cylindrical top section at the larger diameter conjugate plane of said conical bottom section which is equal in diameter to said cylindrical top section; a feed line for the liquid near the top of said cylindrical top section and attached thereto in a tangential fashion so as to communicate with the interior of the device; a planar top attached to the top of said cylindrical top section; tubing extending through said planar top so as to communicate with the interior of the device; at the exterior end of said tubing, a plug sealingly engaged therein with the center drilled and tapped to receive an orifice containing bolt; said bolt having a gas release orifice of sufficient size as to allow the escape of the gaseous substance while severely restricting the flow of the liquid therethrough; an outlet for the liquid of the same diameter as the feed line attached to said conical bottom section at the smaller diameter conjugate plane of said conical bottom section which is equal to the diameter of said outlet to communicate with the interior of the device; and a planar baffle attached to the interior wall of said outlet so as to protrude slightly into said conical bottom section for arresting the circular motion of the liquid.

4,097,359

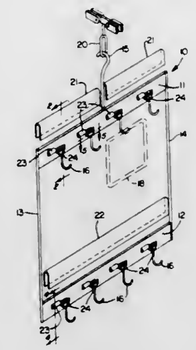
WORKPIECE-SUPPORTING RACK

Walter E. Davitz, Columbus, Ohio, assignor to White Castle System, Inc., Columbus, Ohio

Filed Jun. 24, 1977, Ser. No. 809,904

Int. Cl.² B05C *11/00*; C25D *17/08*; A47F *5/08*; B05C *11/16*

U.S. Cl. 204—297 W **3 Claims**



1. A rack supporting workpieces during coating operations comprising:

(a) an essentially open border frame of electrically conductive material including at least one transverse member provided with relatively spaced apart, hookreceiving socket means thereon;

(b) a plurality of electrically conductive, workpiece-supporting hooks detachably and electrically engaged with the socket means of the transverse member of said frame;

(c) removable cover means for covering the engaged portions of said hooks and socket means; and

(d) an electrically conductive connector carried by said frame for suspending it from and establishing electrical connection with an overhead carrier.

4,097,360

QUENCHING PYROLYSIS REACTOR EFFLUENT STREAMS

Stuart Sack, Upland, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Jun. 25, 1976, Ser. No. 700,047

Int. Cl.² C10G *11/02*

U.S. Cl. 208—8 **16 Claims**

1. A continuous process for recovery of values contained in a feed stream containing a solid carbonaceous material comprising the steps of:

(a) directly contacting under turbulent flow conditions in a cocurrent, entrained flow quench zone at least a portion of the feed stream with a stream containing volatilized hydrocarbons resulting from pyrolysis of the solid carbonaceous material to simultaneously preheat the feed stream and rapidly quench the volatilized hydrocarbons;

(b) separating a stream containing the preheated solid carbonaceous material from the volatilized hydrocarbons;

(c) pyrolyzing the stream containing preheated solid carbonaceous material in a pyrolysis zone maintained at a temperature higher than the temperature of the quench zone by contact with a particulate solid source of heat to yield a pyrolysis product stream containing condensible volatilized hydrocarbons and a carbon containing particulate solid residue;

(d) separating volatilized hydrocarbons from the carbon containing particulate solid residue;

(e) passing at least a portion of the separated volatilized hydrocarbons to the quench zone to directly contact carbonaceous material in the feed stream;

(f) withdrawing at least a portion of the carbon containing particulate solid residue as product; and
(g) separating values from the volatilized hydrocarbons by condensing hydrocarbons therefrom.

4,097,361

PRODUCTION OF LIQUID AND GASEOUS FUEL PRODUCTS FROM COAL OR THE LIKE

Robert A. Ashworth, Strongsville, Ohio, assignor to Arthur G. McKee & Company, Independence, Ohio

Filed Aug. 24, 1976, Ser. No. 717,102
Int. Cl.[2] C10G *1/08;* C10J *3/62*
U.S. Cl. 208—10 **26 Claims**

1. A multistage process for conversion of solid carbonaceous feed material to valuable liquid and gaseous products comprising passing a slurry of the particulate feed in a hydrocarbon oil solvent with hydrogen at high temperature and pressure through a reaction zone of a hydroextraction unit maintained under hydrocracking conditions to provide for coal dissolution, withdrawing liquid and gaseous effluent streams from the reaction zone including unconverted feed material, a fraction comprising a solvent oil being separated from the liquid effluent and continually recycled for mixing with the incoming particulate feed, the amount by weight of recycled solvent oil being greater than the amount of particulate feed and sufficient to dissolve most of the particulate feed, feeding that portion of the effluent stream from said hydroextraction unit containing the heavier oils and unconverted feed material to the reaction zone of a pyrolysis unit containing a fluidized bed of char and agglomerated ash particles to effect thermal cracking, withdrawing oil and gas from the residue of char and ash produced in said pyrolysis unit, feeding the char and agglomerated ash from said pyrolysis unit to the reaction zone of an ash-agglomerating char gasification unit and reacting it with an oxygen-containing gas and steam exothermically to produce fuel gas while generating heat and causing agglomeration of ash particles, and recycling the hot agglomerated ash from said gasification unit to the reaction zone of said pyrolysis unit to transfer heat to said reaction zone and to catalyze the cracking reactions therein.

4,097,362

METHOD FOR ENHANCING DISTILLATE LIQUID YIELD FROM AN ETHYLENE CRACKING PROCESS

Joel Drexler McKinney; Raynor T. Sebulsky, both of Pittsburgh, and Francis Edmund Wynne, Jr., Allison Park, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jul. 12, 1976, Ser. No. 704,392
Int. Cl.[2] C10G *37/02, 9/32;* C07C *11/04*
U.S. Cl. 208—78 **8 Claims**

1. A combination catalytic and thermal cracking process comprising catalytically cracking a relatively high boiling relatively high sulfur hydrocarbon feed oil comprising a 650° F.+ heavy gas oil or residual oil in the presence of entrained zeolite cracking catalyst at a temperature between about 900° and 1,100° F. and recovering catalytically cracked effluent including catalytically cracked liquid product, separating said catalytically cracked liquid product into a catalytically cracked residue liquid containing slurried catalyst particles and a catalytically cracked distillate liquid; thermally and non-catalytically cracking a lower boiling and lower sulfur hydrocarbon feed oil to produce ethylene in the presence of entrained catalytically inert hot solids and a gaseous diluent at a temperature between about 1,300° and 2,500° F. and recovering a thermally cracked effluent including gaseous products and thermally cracked liquid product, injecting said catalytically cracked residue liquid containing slurried catalyst particles into said thermally cracked effluent to thermally quench said thermally cracked effluent, recovering coke-laden solids from said thermally cracked effluent, passing said coke-laden solids to a coke burner, separating said thermally cracked liquid product into a thermally cracked residue liquid containing catalytically cracked residue liquid and slurried solids and a thermally cracked distillate liquid; and passing said thermally cracked residue slurry liquid containing catalytically cracked residue liquid and slurried solids to said coke burner for combustion as burner fuel.

4,097,363

THERMAL CRACKING OF LIGHT GAS OIL AT HIGH SEVERITY TO ETHYLENE

Joel Drexler McKinney; Raynor T. Sebulsky, both of Pittsburgh, and Francis Edmund Wynne, Jr., Allison Park, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jul. 12, 1976, Ser. No. 704,465
Int. Cl.[2] C10G *37/02, 9/32;* C07C *11/04*
U.S. Cl. 208—78 **19 Claims**

1. A process for producing ethylene by thermally cracking a hydrocarbon feed at least 90 volume percent of which comprises a light gas oil fraction of a crude oil boiling between 400° and 650° F. comprising passing said hydrocarbon feed, a diluent gas, and entrained inert hot solids through a cracking zone at a temperature between 1,300° and 2,500° F. for a residence time of 0.05 to 2 seconds, the weight ratio of diluent gas to feed oil being at least 0.3, the cracking severity corresponding to a methane yield of at least 12 weight percent based on said feed oil, and quench cooling said product immediately upon leaving said cracking zone to a temperature below 1,300° F. so that the ethylene yield is greater than the methane yield on a weight basis.

4,097,364

HYDROCRACKING IN THE PRESENCE OF WATER AND A LOW HYDROGEN PARTIAL PRESSURE

Clark J. Egan, Piedmont, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 586,673, Jun. 13, 1975. This application Mar. 24, 1976, Ser. No. 669,779
Int. Cl.[2] C10G *13/04;* B01J *11/40*
U.S. Cl. 208—111 **5 Claims**

1. A process for hydrocracking high-boiling hydrocarbons boiling in the range from 400° to 1000° F to form lower-boiling hydrocarbons boiling in the range from 80° to 700° F, which comprises contacting said high-boiling hydrocarbons, in a reaction zone, in a feedstock containing from 4 to 15 weight percent water and containing straight-chain olefins and oxygen-containing water precursors including CO and CO_2 and from about 1 to 20 weight percent of oxygen-containing organic compounds, based on said feedstock, said feedstock containing less than 5 ppm sulfur, by weight, and greater than 55 weight percent of water and oxygen-containing water precursors, with a hydrocracking catalyst including a Group VIB or Group VIII metal supported on a refractory cracking base at hydrocracking conditions including a partial pressure of hydrogen of from 50 to 450 psi and a temperature of from 450° to 750° F, to convert 75 to 99 percent of said oxygen-containing organic compounds to hydrocarbons, to convert said high-boiling hydrocarbons to said lower-boiling hydrocarbons, and to convert a substantial portion of said straight-chain olefins to isoparaffins and paraffins.

4,097,365

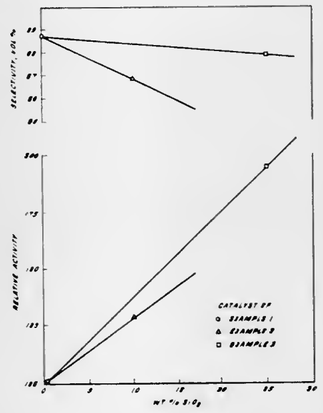
HYDROCRACKING PROCESS AND CATALYST FOR PRODUCTION OF MIDDLE DISTILLATE OILS

John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 668,039, Mar. 18, 1976, Pat. No. 4,062,809. This application Mar. 28, 1977, Ser. No. 781,536
Int. Cl.[2] C10G *13/06;* B01J *27/04*
U.S. Cl. 208—111 **8 Claims**

1. A process for hydrocracking a mineral oil feedstock boiling predominantly above about 700° F to produce a middle distillate product boiling in the range of about 300°-700° F,

which comprises contacting said feedstock plus added hydrogen, and under hydrocracking conditions, with a catalyst comprising a molybdenum and/or tungsten first component plus a nickel and/or cobalt second component supported on a heterogeneous support consisting essentially of about 10–50 weight-percent of a finely divided cracking component dispersed in an



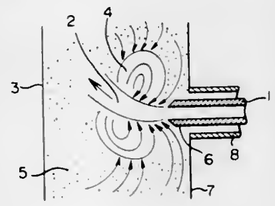
alumina matrix, said cracking component being a silica-alumina cogel or copolymer containing about 50–96 weight-percent SiO_2, said hydrocracking conditions being correlated so as to give at least about 50 volume percent conversion of feedstock boiling above 700° F to liquid products boiling below 700° F.

4,097,366

METHOD FOR PREVENTING THE FORMATION OF COKE DEPOSITS IN A FLUIDIZED BED REACTOR

Tsunemitsu Tanaka, Yokohama; Tetsuo Nakagawa, Fujisawa; Shiro Abiko, Tokyo, and Norio Kaneko, Yokohama, all of Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo and Chiyoda Chemical Engineering & Construction, both of, Japan

Continuation-in-part of Ser. No. 666,070, Mar. 11, 1976, abandoned. This application Sep. 8, 1977, Ser. No. 831,673
Claims priority, application Japan, Mar. 1, 1975, 50-28681
Int. Cl.[2] C10G *11/18*
U.S. Cl. 208—127 **5 Claims**



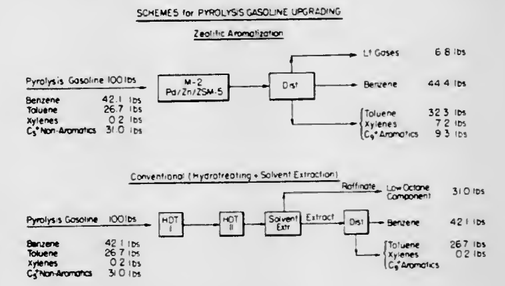
1. In the process of thermally cracking a heavy hydrocarbon oil by feeding said oil into a fluidized bed reactor as a high-velocity atomized gas stream by blowing said oil therein from a gas-mixing type nozzle along with an atomizing gas and carrying out the thermal cracking of the oil at above 500° C in the substantial absence of oxygen, said fluidized bed containing heat transfer particles therein fluidized by means of a fluidizing gas, the improvement which comprises blowing in a particle-free inert gas to the eddying part formed in the environs of said atomized gas steam in said fluidized bed reactor at a velocity sufficient to block the formation of eddies, thereby preventing the accumulation of coke deposits on the outside wall of said nozzle and the walls of the fluidized bed reactor in the vicinity of said nozzle, said heavy hydrocarbon oil, atomizing gas and particle-free inert gas being introduced into the fluidized bed reactor at a point above the point wherein the fluidizing gas is introduced into the reactor.

4,097,367

CONVERSION OF OLEFINIC NAPHTHA

Werner O. Haag, Lawrenceville, and Tracy J. Huang, Trenton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 25, 1977, Ser. No. 818,632
Int. Cl.[2] C10G *35/06*
U.S. Cl. 208—135 **8 Claims**



1. A process for upgrading of pyrolysis gasoline and other olefinic naphthas which contain olefins which comprises contacting said naphtha at severe conditions of 900° to 1200° F, a pressure of atmospheric to 400 pounds per square inch and weight hourly space velocity of 0.3 to 30 with a catalyst composite of zinc and at least one metal selected from the groups consisting of IB and VIII of the Periodic Table in intimate association with a porous crystalline aluminosilicate zeolite having a silica to alumina ratio of at least 12 and a constraint index between 1 and 12.

4,097,368

HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 576,924, May 12, 1975, Pat. No. 3,998,724. This application Oct. 18, 1976, Ser. No. 734,473
Int. Cl.[2] C10G *35/08, 13/02;* C07C *5/28;* B01J *11/08*
U.S. Cl. 208—139 **24 Claims**

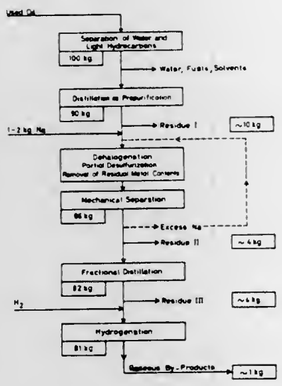
1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 2.5 wt. % nickel, about 0.05 to about 5 wt. % cobalt and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, nickel, and catalytically available cobalt are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal and nickel are present in the elemental metallic state; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

4,097,369

PROCESS FOR RECLAIMING USED HYDROCARBON OILS

Eckhard Ebel; Hans-Rudolf Kobel, and Ernst Widmer, all of Bern, Switzerland, assignors to Adolf Schmids Erben Aktiengesellschaft, Bern, Switzerland

Filed Feb. 27, 1976, Ser. No. 661,857
Claims priority, application Germany, Feb. 28, 1975, 2508713
Int. Cl.² C10M *11/00*
U.S. Cl. 208—180 **17 Claims**



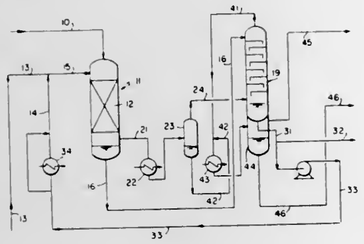
1. In a process of reclaiming used hydrocarbon oils from which water and light hydrocarbons have been removed by distillation and wherein the oils are prepurified either by coagulation, adsorption, a combination of coagulation and adsorption, by filtration, or by vacuum distillation, with subsequent fractional distillation and after-treatment, the improvement which comprises subjecting the prepurified product to dehalogenation, partial desulfurization, and removal of residual metal contents prior to the fractional distillation and after-treatment by contacting said prepurified oil with an agent selected from the group consisting of alkali metals and alkali metal hydrides.

4,097,370

HYDROTREATING OF PYROLYSIS GASOLINE

Ari A. Minkkinen, Mountain Lakes, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Apr. 14, 1977, Ser. No. 787,506
Int. Cl.² C10G *23/00*
U.S. Cl. 208—255 **7 Claims**



1. In a process for hydrotreating pyrolysis gasoline wherein fresh feed pyrolysis gasoline, hydrogen-containing gas and recycle hydrotreated effluent are contacted in a hydrotreating zone, a hydrotreated effluent is withdrawn from the hydrotreating zone and a portion of the hydrotreated effluent is recycled to the hydrotreating zone, the improvement comprising:

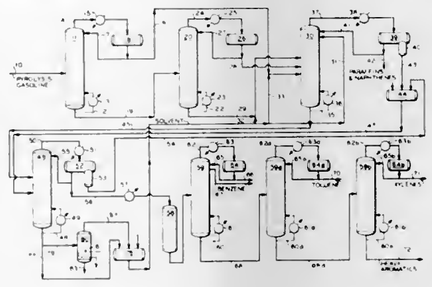
operating said hydrotreating zone at a total pressure of from 200 to 400 psig and a log mean hydrogen partial pressure of from 135 to 260 psig; and separating from at least said portion of the hydrotreated effluent recycled to the hydrotreating zone, at least 5 mole percent of C_5 and lighter hydrocarbons to provide in said hydrotreating zone said log mean hydrogen partial pressure at said total pressure.

4,097,371

SEPARATION OF FLUID MIXTURES

Victor A. Giroux, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 21, 1976, Ser. No. 725,306
Int. Cl.² B01D *3/40*; C10G *7/00*
U.S. Cl. 208—313 **9 Claims**



1. A method of separating a pyrolysis gasoline which contains benzene, toluene, xylenes, paraffins and naphthenes, which method comprises:

fractionating the pyrolysis gasoline to obtain a first stream rich in benzene, a second stream rich in toluene and a third stream rich in xylenes, the amounts of paraffins and naphthenes in said streams being determined by the boiling points of the paraffins and naphthenes;

passing said first stream to an extractive distillation column at a first location intermediate the top and bottom thereof;

passing said second stream to said extractive distillation column at a second location intermediate the top and bottom thereof, said second location being above said first location;

passing said third stream to said extractive distillation column at a third location intermediate the top and bottom thereof, said third location being above said first and second locations;

introducing into said extractive distillation column at a location above said third location a solvent which selectively absorbs aromatics in preference to paraffins and naphthenes;

withdrawing a raffinate stream from said extractive distillation column, said raffinate stream containing a major portion of the paraffins and naphthenes present in said pyrolysis gasoline; and

withdrawing an extract stream from said extractive distillation column, said extract stream containing a major portion of the benzene, toluene and xylenes present in said pyrolysis gasoline.

4,097,372

METHOD FOR IMPROVING CLAY BRIGHTNESS UTILIZING MAGNETIC SEPARATION

Alan J. Nott, Crantock near Newquay, England, assignor to Anglo-American Clays Corporation, Sandersville, Ga.

Continuation-in-part of Ser. No. 513,154, Oct. 8, 1974, Pat. No. 3,974,067. This application Jul. 8, 1976, Ser. No. 703,566
The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.
Int. Cl.² B03B *1/00*
U.S. Cl. 209—3 **8 Claims**

1. A method for brightening a kaolin clay comprising:

forming an aqueous dispersion of said clay and blunging and conditioning said dispersion to dissipate at least 10 hp-hrs of energy per ton of solids, at least said conditioning step being conducted in the presence of a collector agent comprising a complex phosphate ester or salt thereof, of a non-ionic surface active compound; said phosphate ester being selected from the group of mono-esters, di-esters, and mixtures thereof; said non-ionic surface active compound being the condensation product of an organic hydroxy compound of from 8 to 50 carbon atoms selected from the group consisting of alkyl phenols and alkanols with at least one mole of an alkylene oxide having from 2 to 3 carbon atoms, the non-ionic surface active compound containing a maximum of about 50% by weight of alkylene oxide based upon the weight of the non-ionic surface active compound;

subjecting the resultant blunged and conditioned slurry to a froth flotation treatment to remove titaniferous impurities; and

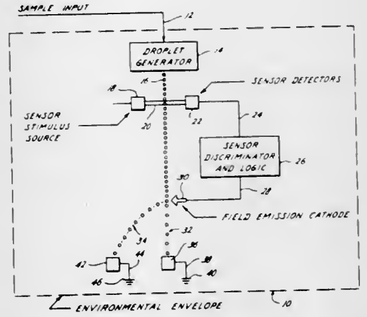
subjecting the product from said froth flotation treatment to a wet magnetic separation to further increase the brightness of said clay by removal of discoloring contaminants in addition to said titaniferous impurities, by passing said product through a slurry-pervious ferromagnetic matrix positioned in a high intensity magnetic field, the retention time in said field being at least 15 seconds, and the said field being maintained at an average field intensity of from 7 to 22 kg.

4,097,373

HIGH SPEED PARTICLE SORTER USING A FIELD EMISSION ELECTRODE

John Caldwell Allred, 1300 Antigua La., Houston, Tex. 77058

Filed Mar. 23, 1977, Ser. No. 780,281
Int. Cl.² B07C *5/342*
U.S. Cl. 209—111.5 **13 Claims**



1. An apparatus for analyzing and sorting small particles on the basis of preselected parameters of combinations of preselected parameters comprising

generating means for segregating one of said particles in at least one liquid droplet;

sensing means downstream of said generating means for sensing the presence and absence of said preselected parameter of said particle;

flow means for passing said particles from said generating means to close proximity of a field emission cathode, said cathode being located downstream of said sensing means;

discrimination means responsive to said sensing means and functionally connected to said field emission cathode for selectively establishing a high potential electric field on said field emission cathode when said particle is closely adjacent said cathode if said sensed particle displays said preselected parameter; and

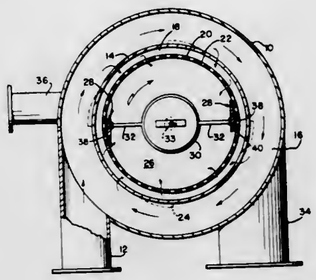
collection means located downstream of said field emission cathode for receiving said particles.

4,097,374

SCREENING APPARATUS HYDROFOIL

Douglas Leonard Young, Lennoxville, Canada, assignor to Canadian Ingersoll-Rand Co. Ltd., Montreal, Canada

Filed Jan. 26, 1977, Ser. No. 762,475
Int. Cl.² B07B *1/52*
U.S. Cl. 209—379 **4 Claims**



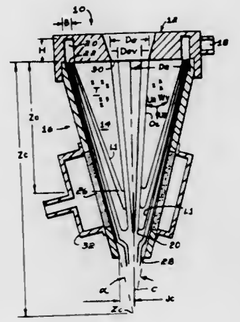
1. In combination with a screening apparatus for screening a liquid suspension containing desirable fiber and undersirable contaminants: a cylindrical screen plate having a curved outer feed surface and a radially inner accepts surface and adapted to prevent contaminants from going through the screen plate while passing acceptable fibers; at least one rotatable element positioned adjacent said inner accepts surface; said element having a leading edge, a trailing edge, and a radial outer surface comprising a circumferentially curved portion conforming to the inner accepts surface of the screen plate, and a substantially flat surface on said radial outer surface and radially inward from said curved portion, said curved portion and said substantially flat portion being interconnected by a wall and said substantially flat surface extending to the leading edge of the element; and means for rotating the element in a position close enough to the inner accepts surface of the screen plate to minimize the possibility of fibers or contaminants wedging between the curved portion of the element and the screen plate.

4,097,375

HYDROCYCLONE SEPARATOR

Arvid A. Molitor, Elgin, Ill., assignor to Luhring Chicago Industries, Des Plaines, Ill.

Filed Jan. 31, 1977, Ser. No. 763,808
Int. Cl.² B01D *13/00*
U.S. Cl. 210—23 H **10 Claims**



1. A method for separating a solvent from a solute, the improvement comprising introducing solute-containing solvent in tangential manner into a conical chamber adjacent the base thereof, to impart a spiral path of flow to said solute-containing solvent, and passing said spirally moving solute-containing solvent over porous media defining at least a portion of

said conical chamber, and passing solvent outwardly through said porous media for separation from solute said porous media being of the type to permit the flow of solvent therethrough while preventing the passage of said solute.

4,097,376

PROCESS FOR THE PURIFICATION OF INDUSTRIAL EFFLUENTS

Hans Wegmuller, Riehen, and Jaroslav Haase, Basel, both of Switzerland, assignors to CIBA-GEIGY Corporation, Ardsley, N.Y.

Division of Ser. No. 575,279, May 7, 1975, Pat. No. 4,025,428, which is a division of Ser. No. 356,853, May 3, 1973, abandoned.
This application Feb. 24, 1977, Ser. No. 771,596
Claims priority, application Switzerland, May 10, 1972, 00712/72
Int. Cl.² C02B *1/60;* C02C *5/08*
U.S. Cl. 210—36 **8 Claims**

1. A process for purifying industrial effluents containing residual substances comprising dyestuffs, optical brighteners, dyeing auxiliaries, detergents, tanning agents or mixtures thereof, which comprises bringing said effluents into contact with a cellulosic absorbent pretreated with

(a) a water soluble basic aminoplast, and

(b) a polyanionic polymer.

4,097,377

METHOD OF PURIFICATION OF WASTE WATER BY TREATMENT WITH ZIRCONIUM SALT

Buichiro Ayukawa, Musashino, Japan, assignor to Shikoku Paper Mfg. Co., Ltd., Japan

Division of Ser. No. 519,866, Nov. 1, 1974, Pat. No. 3,997,439.
This application Dec. 22, 1975, Ser. No. 643,499
Claims priority, application Japan, Nov. 7, 1973, 48-125118
The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.
Int. Cl.² C02C *5/04;* C02B *1/20*
U.S. Cl. 210—50 **32 Claims**

1. A method of purification of waste water containing sewage including living sewage, food sewage, foam forming detergents, phosphates, carboxymethyl cellulose, lignin, sewage from mines, a dye, clay and colloidal aluminum, comprising coagulating and precipitating suspended substances and colloidal dispersed particles, and precipitating non-colloidal dissolved, low molecular weight, substances by adding an aqueous solution of $ZrOCl_2.8H_2O$ to the said waste water, adjusting the pH to 4.5-6.8 to form water insoluble precipitates or chelates thereof and removing said precipitates and chelates.

4,097,378

MULTIPLE EFFECT EVAPORATION OF WATER FROM WATER CONTAINING COMBUSTIBLE SLUDGES

John Craig St. Clair, Box 216 Rte. 5, London, Ohio 43140

Continuation of Ser. No. 618,048, Sep. 30, 1975, abandoned. This application Mar. 22, 1977, Ser. No. 780,064
Int. Cl.² B01D *12/00*
U.S. Cl. 210—67 **4 Claims**

1. A process for recovering combustible solids of vegetable origin from water wet combustible concentrated solids, comprising the steps of:

(a) pumping both water wet combustible solids and a preheated water insoluble liquid that is also a liquid at the condition of pressure and temperature in each of steps mentioned in this claim to a vapor and liquid contacting vessel,

(b) feeding a stream containing steam to said vapor and liquid contacting vessel and mechanically mixing the steam just mentioned and the concentrated solids and the water insoluble liquid mentioned in step (a),

(c) withdrawing at least a first stream comprising water, said water insoluble liquid and said solids, from the vapor and liquid contacting vessel mentioned in steps (a) and (b),

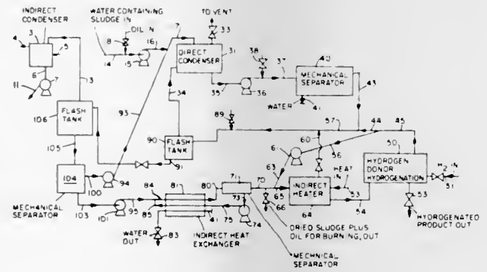
(d) pumping said first stream, mentioned in step (c), to a first mechanical separator.

(e) mechanically separating said first stream mentioned in step (d) into a stream consisting essentially of water and a second stream comprising water, water insoluble liquid and said solids, whereby said second stream is substantially reduced in water content relative to said first stream,

(f) feeding said second stream, mentioned in step (e), to a first flash tank and flashing said second stream to a first reduced pressure within said first flash tank, thereby to yield an overhead stream comprising steam and a third stream comprising water, water insoluble liquid and said solids, whereby said third stream is further substantially reduced in water content relative to said second stream,

(g) feeding said third stream, mentioned in step (f), to a second flash tank and flashing said third stream to a second reduced pressure, whereby said reduced pressure is lower than said first reduced pressure, mentioned in step (f), thereby to yield an overheated stream comprising steam and a fourth stream comprising water, water insoluble liquid and said solids, whereby said fourth stream is further substantially reduced in water content relative to said third stream,

(h) feeding said fourth stream, mentioned in step (g) to a second mechanical separator,



(i) mechanically separating said fourth stream, mentioned in step (h), into a stream comprising said water insoluble liquid and a fifth stream comprising said solids and said water insoluble liquid, whereby the water insoluble liquid content of said fifth stream is substantially reduced relative to the water insoluble liquid content of said fourth stream,

(j) withdrawing at least a portion of said fifth stream, mentioned in step (i), as product. Passing at least another portion of said fifth stream to a heat exchange zone wherein this last mentioned portion of the first stream is first heated and then mixed with the second stream, which was mentioned as produced in step (e), before the second stream passes to the first flash tank as mentioned in step (f),

(k) recycling said water insoluble liquid stream mentioned in step (i) to a point in said process downstream of said first mechanical separator, as mentioned in step (d), as upstream of said first flash tank, said water insoluble liquid stream being at least part of the water insoluble liquid stream mentioned in step (a),

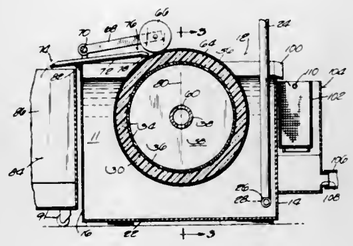
(l) And hydrogenating solids, while contained, in a portion of the fifth liquid stream, with the formation of a hydrogenated water insoluble fraction being formed which is at least partially recycled to the process as the water insoluble liquid previously mentioned.

4,097,379

SELF-CLEANING FILTER ASSEMBLY

Richard J. Shelstad, 2131 N. Summit, Milwaukee, Wis. 53212

Filed Oct. 25, 1977, Ser. No. 844,592
Int. Cl.² B01D *33/06*
U.S. Cl. 210—167 **15 Claims**



1. A self-cleaning filter assembly comprising

a collecting tank for receiving a quantity of a liquid containing suspended substances

a hollow drum rotatably mounted in said collecting tank for movement through liquid contained in said collecting tank and including a plurality of perforations in the outer periphery thereof;

a pliable filter material disposed about the outer periphery of said drum for filtering suspended substances from the liquid passing therethrough, the filtered liquid subsequently passing through said drum perforations into the interior of said drum;

a layer of porous, resilient material, capable of absorbing a portion of the filtered liquid passing through said filter material, interposed said filter material and the outer periphery of said drum;

means for rotating said drum;

squeezing means adapted to bear against the outer surface of said filter material and compress said resilient material as said drum is rotated so that a portion of the filtered liquid retained in said resilient material is forced back through said filter material and serves as a back wash for dislodging filtered substances collected on said filter material,

collecting means located adjacent said squeezing means for collecting the back wash liquid containing the dislodged substances; and

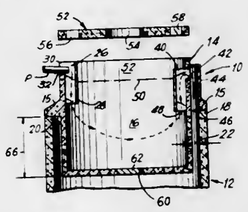
means for discharging the filtered liquid from the interior of said drum.

4,097,380

SEPTIC TANK-LEACHING POOL ARRANGEMENT

Karl Carlson, Kings Park, N.Y., assignor to Anthony J. Scotto, Smithtown, N.Y.

Filed Apr. 22, 1976, Ser. No. 679,514
Int. Cl.² B01D *43/00*
U.S. Cl. 210—170 **7 Claims**



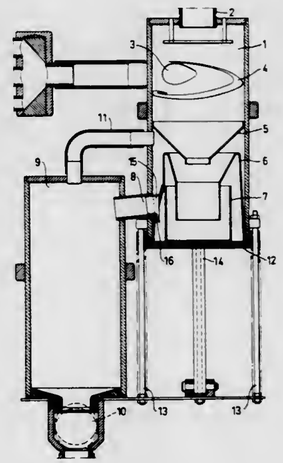
1. A septic tank for use with a leaching pool having an upper wall edge, said septic tank comprising: a cylindrical portion of precast concrete, said cylindrical portion defining therein a chamber for the storage and treatment of raw sewage and having an upper edge wherein are provided inlet and outlet openings in substantially diametrally opposed relation; a support ring on and positioned concentrically about said cylindrical portion for mounting said septic tank on the upper wall edge of the leaching pool and such that an annular space is formed between the septic tank and leaching pool; an inlet baffle supported on said cylindrical portion internally thereof at said inlet opening and having an open top end and an open bottom end and a vertical channel therethrough for the passage of raw sewage from said inlet opening into said chamber, said inlet baffle opening at said top end through said inlet opening for the receipt of raw sewage; an outlet baffle supported on said cylindrical portion internally thereof at said outlet opening and a vertical channel therethrough for directing treated liquid sewage from said chamber via said outlet opening to the leaching pool, said outlet baffle opening laterally through said outlet opening for the discharge of sewage from the septic tank to the leaching pool via said annular space and a cover on said cylindrical portion for obturating the said cylindrical portion, said cover having a pair of viewing openings formed therein in vertical alignment with said open top ends of said inlet baffle and said outlet baffle whereby inspection of the channels of the baffles may be carried out; said septic tank further comprising a plurality of positioning haunches spaced about the circumference of said cylindrical portion, each of said positioning haunches being generally triangular members connected to said cylindrical portion and to the bottom of said support ring, each of said positioning haunches having a width less than the width of said support ring, so that the support ring when positioned on the upper edge of the leaching pool is automatically centered thereon.

4,097,381

SEPARATOR WITH THROW-AWAY CONTAINER

Bo Ritzler, Sodertalje, Sweden, assignor to AB Filtrator, Sodertalje, Sweden

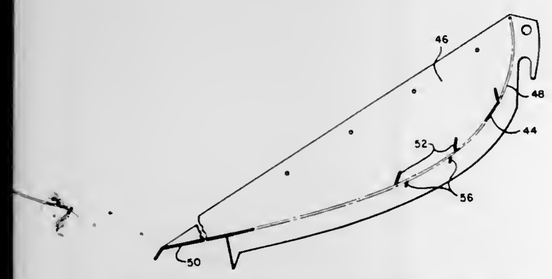
Filed Feb. 25, 1977, Ser. No. 772,105
Claims priority, application Sweden, Feb. 27, 1976, 7602722
Int. Cl.² B01D *21/26*
U.S. Cl. 210—259 **4 Claims**



1. A device for separating solid particles from a fluid carrying the particles comprising a substantially cylindrical separation chamber having an upper portion including a feed opening for receiving the fluid carrying the particles, an air evacuation opening for providing a vacuum to said separation chamber, and a lower portion having a drainage opening through which the fluid may be drained; a funnel-shaped member secured to the separation chamber disposed between the feed opening and the drainage opening; an exchangeable collecting vessel for collecting and retaining the particles, said collecting vessel having an inlet opening located below the funnel-shaped mem-

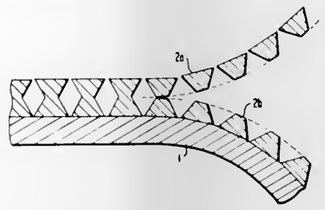
ber and an outlet having a self-closing resilient membrane thereacross; and means for piercing said resilient membrane and for sealably engaging it with the drainage opening.

4,097,382
DEWATERING SCREEN
Ronald DeWayne Cruea, Carlisle, Ohio, assignor to The Black Clawson Company, Middletown, Ohio
Filed Mar. 28, 1977, Ser. No. 781,729
Int. Cl.[2] B01D *35/28*
U.S. Cl. 210—456 **11 Claims**



1. An apparatus for separating particles from a liquid slurry comprising:
- screening means formed of a plurality of parallel spaced horizontally disposed bar-shaped members aligned to form the generatrices of a concave screening surface over which the liquid slurry flows from a top end to a bottom end thereof;
- guide means defining a vertical guide surface abutting each side of said screening means for substantially the entire length thereof for maintaining the flow of liquid slurry on said concave surface of said screening means from said top end to said bottom end thereof;
- a plurality of spaced ridge-shaped flow disruption means secured to each guide surface adjacent said abutting screening means with lower end portions of each said disruption means in contact with said screening means and extending along and in contact with each said guide surface for a sufficient distance to span the maximum thickness of the liquid slurry passing over said concave surface of said screen at the position where each said disruption means is secured, the width of said disruption means perpendicular to said guide surface being sufficient to divert a substantial portion of the liquid slurry that would otherwise flow on said concave surface of said screening means adjacent said guide surfaces into said central portion of the flow of slurry so that it will be subjected to the screening action of said screening means;
- input means for delivering the liquid slurry to said top end of said concave surface of said screening means;
- collecting means disposed along the back side of said screening means for capturing the portion of the liquid slurry which passes through said screening means; and
- output means for receiving from said bottom end of said screening means the portion of the liquid slurry which does not pass through said screening means.

4,097,383
PROCESS FOR PRODUCTION OF MICROPOROUS SHEET
Sumio Ohtani; Nobuo Hiratsuka, and Masaru Horiguchi, all of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan
Continuation of Ser. No. 581,062, May 27, 1975, abandoned.
This application Mar. 14, 1977, Ser. No. 777,481
Claims priority, application Japan, May 24, 1974, 49-58472
Int. Cl.[2] B01D *39/14;* **B32B** *31/18*
U.S. Cl. 210—500 M **23 Claims**



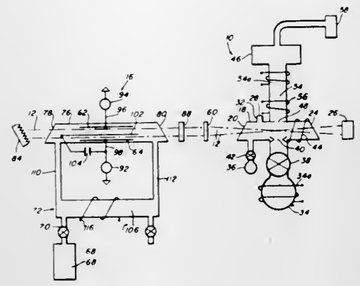
1. A microporous membrane filter produced by the steps consisting of bonding a microporous sheet directly to a plate, said microporous sheet having larger pores at its interior than at either of its original surfaces and; splitting the sheet along a plane perpendicular to the thickness direction of the sheet by a peeling operation into two microporous membrane sheets, wherein one sheet is retained on said plate and the other sheet is peeled from the retained sheet and; removing the retained sheet from the plate, said filter being either the peeled microporous membrane sheet or the microporous membrane sheet removed from said plate, said filter having a pore size at its peeled surface larger than the pore size at its original surface.

9. A process for producing a microporous membrane filter which consists of

bonding a microporous sheet directly to a plate said sheet having larger pores at its interior than at either of its original surfaces; splitting the sheet along a plane perpendicular to the thickness direction of the sheet by a peeling operation into two microporous membrane sheets, wherein one sheet is retained on said plate and the other sheet is peeled from the retained sheet, said sheet peeled from the retained sheet having larger pores at the surface formed by peeling than at the opposite original surface and being suitable for use as a microporous membrane filter.

4,097,384
PROCESS FOR URANIUM ISOTOPE SEPARATION
John H. Coleman, Locust Valley, N.Y., and Tobin J. Marks, Evanston, Ill., assignors to Northwestern University, Evanston, Ill. and Plasma Physics Corporation, Locust Valley, N.Y.
Filed Mar. 22, 1976, Ser. No. 668,829
Int. Cl.[2] B01J *1/10;* **B01K** *1/00*
U.S. Cl. 250—527 **11 Claims**

1. Apparatus for separating isotopes of a metallic element to provide an iostopically-enriched product, said apparatus comprising:
- reaction chamber means for retaining a chemical composition including a plurality of isotopic species of the metallic element,
- valve means for controlling introduction of the chemical composition into said reaction chamber means,
- means for controlling atmospheric composition within said reaction chamber means,
- temperature control means to regulate the temperature interiorly of said reaction chamber means,
- generator menas including power supply means for producing a beam of radiated energy,
- means including electrode means to direct said beam to impinge upon said chemical composition contained in said chamber means to interact with and to modify properties



of said chemical composition so as to facilitate the separation of isotopic components thereof.

4,097,385
FIRE-PROOFING SEALING ELEMENTS
Wulf von Bonin, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Jan. 13, 1976, Ser. No. 648,850
Claims priority, application Germany, Jan. 30, 1975, 2503712
Int. Cl.[2] C09K *3/28*
U.S. Cl. 428—35 **3 Claims**

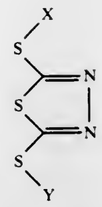
1. A fire-proofing sealing material comprising a flexible tube impermeable to water, resistant to aqueous alkali and enclosing an aqueous alkali metal silicate in the form of a solution or a gel.

4,097,386
LUBRICATING OIL ADDITIVE COMPOSITION
Warren Lowe, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Filed Apr. 1, 1976, Ser. No. 673,063
Int. Cl.[2] C10M *1/48, 3/42, 5/24, 7/46*
U.S. Cl. 252—32.7 R **12 Claims**

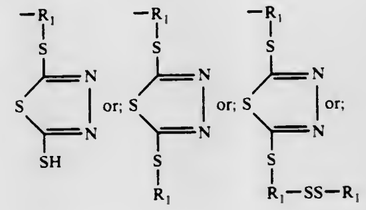
1. An additive composition for use in crankcase lubricating oils comprising:
- (1) an oil-soluble antioxidant selected from aromatic or alkyl sulfides and polysulfides, sulfurized olefins, sulfurized carboxylic acid esters, and sulfurized ester-olefins, and
- (2) an oil-soluble tertiary amine of the formula $(R)_3N$, wherein each R is independently C_3-C_{10} alkyl.

4,097,387
OLEFIN-DIMERCAPTO-THIADIAZOLE COMPOSITIONS AND PROCESS
Gunter Caspari, Wheaton, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.
Filed Sep. 3, 1976, Ser. No. 720,266
Int. Cl.[2] C10M *1/38, 3/32*
U.S. Cl. 252—47.5 **50 Claims**

1. A lubricating oil composition having anti-wear properties comprising a major proportion of lubricating oil and an effective amount of an oil soluble additive, said additive comprising the oil soluble reaction product of an olefin; lithium, sodium or potassium 2,5-dimercapto-1,3,4-thiadiazole or mixtures thereof; and a sulfur compound selected from the group consisting of S_2Cl_2, SCl_2, S_2Br_2, SBr_2, R—S—Cl, R—S—Br, and mixtures thereof, wherein R comprises C_1-C_{100} hydrocarbyl or bromo, chloro or hydroxy substituted hydrocarbyl and said additive comprises,



wherein X comprises R_1 — SS — R_2; R_1 comprises C_6-C_{100} hydrocarbyl or bromo, chloro or hydroxy substituted hydrocarbyl, and R_2 comprises R_1 or



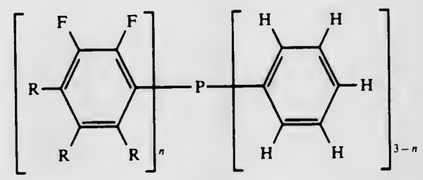
and Y comprises H or X.

4,097,388
LINEAR FLUORINATED POLYETHER LUBRICANT COMPOSITIONS CONTAINING PERFLUOROALKYLETHER SUBSTITUTED PHOSPHINES
Carl E. Snyder, Jr., Trotwood, and Christ Tamborski, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Oct. 12, 1976, Ser. No. 731,483
The portion of the term of this patent subsequent to Mar. 8, 1993, has been disclaimed.
Int. Cl.[2] C10M *1/10*
U.S. Cl. 252—49.9 **9 Claims**

1. A lubricant composition comprising (1) a base fluid consisting essentially of a mixture of linear fluorinated polyethers having the following formula:

$$R_fO(CF_2CF_2O)_m(CF_2O)_nR_f$$

wherein R_f is CF_3 or C_2F_5, m and n are integers whose sum is between 2 and 200 and the ratio of n to m is between 0.1 and 10; and (2) a corrosion-inhibiting amount of a perfluoroalkylether substituted aryl phosphine having the following formula:



wherein one of the R's is a perfluoroalkylether group, two of the R's are fluorine, and n is 1, 2 or 3.

4,097,389

NOVEL AMINO ALCOHOL REACTION PRODUCTS AND COMPOSITIONS CONTAINING THE SAME

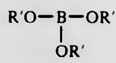
Harry J. Andress, Jr., Wenonah, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 494,789, Aug. 5, 1974, abandoned. This application Jul. 19, 1976, Ser. No. 706,411

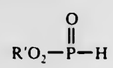
Int. Cl.[2] C10M *1/32*

U.S. Cl. 252—51.5 A **12 Claims**

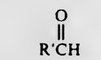
1. A product prepared by reacting, at a temperature of from about 100° to about 200° C., one mole of alkenylsuccinic acid, anhydride or acyl halide with from 0.05 to 5 moles of a hydroxylated primary amine selected from the group consisting of 1-amino-2-hydroxypropane, 1-amino-3-hydroxypropane, 1-amino-2,3-dihydroxypropane, 1-amino-2,3,4-trihydroxybutane, 1-(hydroxymethyl)aminoethane, tris(hydroxymethyl)-aminomethane, 1,1-bis (hydroxymethyl)aminoethane and 1-(hydroxymethyl)benzylamine and reacting the resulting product with a reactant selected from the group consisting of (1) from about 1 to about 2 moles per mole of said product of a boron compound of the formula



in which each R′ is individually selected from the group consisting of hydrogen and a C_1–C_{20} alkyl, aralkyl or aralkyl group, (2) from about 1 mole to about 2 moles per mole of said product of an organophosphonate of the formula

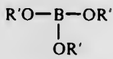


in which R′ is individually selected from the group consisting of hydrogen and a C_1–C_{20} alkyl, arayl, aralkyl or alkaryl group (3) or from about 1 mole to about 2 moles per mole of said product of an aldehyde of the formula

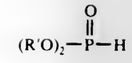


in which R′ is selected from the group consisting of hydrogen and a C_1–C_{20} alkyl, aryl, aralkyl or alkaryl, the reaction of the boron, phosphonate or aldehyde with said product taking place at from about 50° to about 250° C.

7. An organic fluid composition comprising a major proportion of a mineral lubricating oil, a synthetic lubricating oil, a grease prepared from these or a normally liquid hydrocarbon fuel and a detergent amount of a product prepared by reacting one mole of alkenylsuccinic acid, anhydride or acyl halide with from 0.05 to 5 moles of a hydroxylated primary amine selected from the group consisting of 1-amino-2-hydroxypropane, 1-amine-3-hydroxypropane, 1-amine-2,3-dihydroxypropane, 1-amino-2,3,4-trihydroxybutane, 1-(hydroxymethyl-)aminoethane, tris(hydroxymethyl)-aminomethane, 1,1-bis(hydroxymethyl)aminoethane and 1-(hydroxymethyl) benzylamine and reacting the resulting product with a reactant selected from the group consisting of (1) from about 1 to about 2 moles per mole of said product of a boron compound of the formula



in which each R′ is individually selected from the group consisting of hydrogen and a C_1–C_{20} alkyl, aralkyl or aralkyl group, (2) from about 1 mole to about 2 moles per mole of said product of an organophosphonate of the formula



in which R′ is individually selected from the group consisting of hydrogen and a C_1–C_{20} alkyl, arayl, aralkyl or alkaryl group or (3) from about 1 mole to about 2 moles per mole of said product of an aldehyde of the formula

in which R′ is selected from the group consisting of hydrogen and a C_1–C_{20} alkyl, aryl, aralkyl or alkaryl, the reaction of the boron, phosphonate or aldehyde with said product taking place at from about 50° to about 250° C.

4,097,390

COMPOSITION FOR MINERAL CONCENTRATE DEWATERING DURING FILTRATION

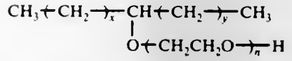
Samuel Shang-Ning Wang, Cheshire, and Morris Eugene Lewellyn, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jul. 20, 1977, Ser. No. 817,408

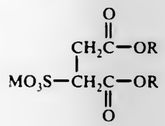
Int. Cl.[2] C09K *3/00*

U.S. Cl. 252—60 **10 Claims**

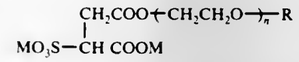
1. A dewatering aid for mineral concentrates comprising (1) from about 5 to about 98.9 weight percent of an ethoxylated secondary alcohol of the structure



wherein *n* is an integer of about 1 to 10 and *x* and *y* are integers such that their sum is equal to about 7 to 23; (2) from about 1 to about 94.9 weight percent of a dialkylsulfosuccinic acid or salt thereof of the structure



wherein R is an alkyl group of about 8 to 20 carbon atoms and M is a hydrogen, alkali metal or ammonium ion; and (3) from about 0.1 to about 10 weight percent of a mono(ethoxylated alcohol) carboxylate ester of a sulfosuccinic acid or salt thereof of the structure



wherein R is an alkyl group of about 8 to 26 carbon atoms, *n* is an integer of about 1 to 10 and M is a hydrogen, alkali metal or ammonium ion.

4,097,391

LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHIC OFFSET MASTERS

Elias P. Moschovis, and John L. Gilson, both of Morton Grove, Ill., assignors to A. B. Dick Company, Niles, Ill.

Filed Oct. 24, 1975, Ser. No. 625,773

The portion of the term of this patent subsequent to Dec. 6, 1994, has been disclaimed.

Int. Cl.[2] G03G *9/12*

U.S. Cl. 252—62.1 L **8 Claims**

1. A liquid composition for treatment of the surface of an offset master for development of a latent electrostatic image which is oleophilic, ink receptive, and water repellent, and in which the imaged surface is treated with a conversion solution for rendering the non-imaged portions of the master surface ink repellent, water receptive and hydrophilic, the improvement wherein the liquid composition which, in addition to a water repellent, ink receptive, oleophilic toner, is formulated to contain an amine selected from the group consisting of morpholine, N-ethyl morpholine and N-methyl morpholine.

4,097,392

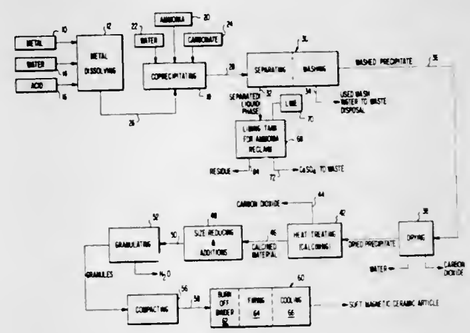
COPRECIPITATION METHODS AND MANUFACTURE OF SOFT FERRITE MATERIALS AND CORES

Alex Goldman, Pittsburgh, and Alfred M. Laing, Butler, both of Pa., assignors to Spang Industries, Inc., Butler, Pa.

Filed Mar. 25, 1975, Ser. No. 561,833

Int. Cl.[2] C01G *49/08*

U.S. Cl. 252—62.62 **30 Claims**



1. Wet process for producing a material, consisting essentially of metal carbonates and metal hydroxides, for conversion into pulverant ferrimagnetic material compactable into soft ferrite components consisting essentially of ferric oxide and at least one divalent metal oxide, comprising the steps of

(a) producing a precipitate and a liquid phase by

(i) forming an aqueous metal ion solution of ferrous ions and divalent ions of at least one other metal in which the divalent metal ions of said at least one other metal are selected from the group consisting of $Mn^{++}Zn^{++}$, Ni^{++}, and Mg^{++};

(ii) providing a solution containing carbonate ions and hydroxide ions in which the source of carbonate ions is selected from the group consisting of ammonium bicarbonate, ammonium carbonate, sodium carbonate, and potassium carbonates,

(iii) reacting said metal ion solution with said solution containing carbonate ions and hydroxide ions to coprecipitate ferrous carbonate and said other divalent metal ions as metal carbonates and to concurrently coprecipitate ferrous hydroxide and said other divalent metal ions as metal hydroxides, essentially without converting ferrous ions to ferric ions;

(iiii) controlling such coprecipitation to select a desired ratio between carbonate groups and hydroxide groups in the coprecipitated material, with the carbonate groups being at a level to facilitate separation of coprecipitated particles from the liquid phase and the hydroxide groups being at a level to maintain sufficient residual hydroxide groups to extend solid-state reactivity of coprecipitated particles for grain growth and densification purposes until a final heat treatment of a pressure compacted component;

(b) separating said coprecipitated material from the liquid phase, and

(c) drying said separated coprecipitated material.

4,097,393

SILICONE-HYDROCARBON COMPOSITIONS

Robert Alton Cupper, Ridgefield, Conn., and Richard Welty Shiffler, Briarcliff Manor, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,386

Int. Cl.[2] C10M *3/44, 1/50*

U.S. Cl. 252—78.3 **5 Claims**

1. A composition of matter consisting essentially of (A) dimethyl siloxane oil having a viscosity of from about 10 to about 100 centistokes at about 25° C and consisting essentially of siloxy units of the formula R_2SiO and end-blocking siloxy units of the formula $R_3SiO_{0.5}$ wherein R represents a methyl radical, and (B) naphthenic oil having a Saybolt seconds universal viscosity at 100° F of from 30 to 500, and a viscosity-gravity constant of at least 0.84; wherein the proportions of components of (A) to (B) ranges from about 70:99 percent by volume of (A) to about 30:1 percent by volume of (B), and wherein said proportions of (A) and (B) are selected such that said components (A) and (B) remain miscible with each other at about −40° F for at least 72 hours.

5. A process for transmitting force from the brake pedal means of a vehicle through hydraulic line means connected to master brake cylinder means and to activated means comprising substantially filling said hydraulic means, said master brake cylinder means and said activated means with a composition of matter as defined in claim 1.

4,097,394

ETCHING LIQUID FOR ETCHING ALUMINUM

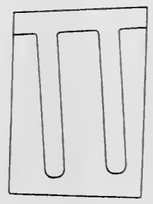
Gijsbertus Gerlach, and John Joseph Kelly, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 607,557, Aug. 25, 1975, abandoned. This application May 2, 1977, Ser. No. 792,641

Claims priority, application Netherlands, Sep. 3, 1974, 7411645

Int. Cl.[2] C09K *13/02;* **C23F** *00/00*

U.S. Cl. 252—79.5 **6 Claims**



1. An etching solution for selectively etching layers at least 100 μ thick of aluminum and alloys of aluminum, said solution having a pH of at least 11.5 and being an aqueous solution of at least one alkaline material selected from the group consisting of alkali metal carbonates and alkali metal hydroxides in an amount of from 0.1 to 2 mole/l, a soluble ferricyanide in an amount of from 5 g/l to saturation, the molar ratio of hydroxide to ferricyanide being at most equal to 1 and a soluble salt of a phosphorus acid derived from trivalent or pentavalent phosphorous oxide selected from the group consisting of ortho-

phosphates, metaphosphates, polyphosphates, pyrophosphates and phosphites in an amount sufficient to reduce undercutting.

4,097,395

MOLD AND MILDEW REMOVAL COMPOSITION AND METHOD OF MANUFACTURE

Dan E. Posey, and Benjamin Mosier, both of Houston, Tex., assignors to Chempro Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 720,986, Sep. 7, 1976, abandoned, which is a continuation of Ser. No. 388,660, Aug. 15, 1973, abandoned. This application Jan. 17, 1977, Ser. No. 759,747

Int. Cl.² C11D *3/065, 3/48*

U.S. Cl. 252—106 **12 Claims**

1. A concentrate which when added to water and an oxidizing agent produces a reactive mixture capable of killing and removing mold and mildew consisting essentially of the following constituents:

Constituent	Range in % by weight
Water	93.30 - 87.65
Sodium metasilicate	0.60 - 0.90
Sodium tripolyphosphate	2.50 - 3.50
Sodium alkyl benzene sulfonate detergent	0.10 - .80
Polyethoxylated nonyl phenol	0 - 0.15
Sodium-o-phenylphenolate	0.50 - 1.50
Acetic acid (glacial)	2.00 - 5.50

4,097,396

SOAPS AND DETERGENTS CONTAINING ALPHA-OXY(OXO)SULFIDES AS PERFUMES

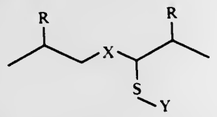
William J. Evers, Red Bank; Howard H. Heinsohn, Jr., Hazlet, both of N.J.; Edward J. Shuster, Brooklyn, N.Y., and Frederick Louis Schmitt, Holmdel, N.J., assignors to International Flavors & Fragrances, Inc., New York, N.Y.

Division of Ser. No. 723,534, Sep. 15, 1976, Pat. No. 4,065,408. This application Jul. 28, 1977, Ser. No. 819,986

Int. Cl.² C11D *3/50, 9/44*

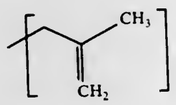
U.S. Cl. 252—132 **5 Claims**

1. A perfumed article comprising at least one compound having the structure:



wherein R is one of hydrogen or methyl and X is a ketone group having the structure:

and Y is selected from the group consisting of methyl, methallyl having the structure:



1-propyl, 2-methyl-1-propyl and acetyl, and a soap or detergent.

4,097,397

DRY CLEANING DETERGENT COMPOSITION

Hiroshi Mizutani, Yachiyo; Masaru Tamura, Sakura, and Katsumi Saegusa, Funabashi, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Jun. 24, 1977, Ser. No. 809,524

Claims priority, application Japan, Oct. 27, 1976, 51-128966

Int. Cl.² C11D *3/26, 7/32*

U.S. Cl. 252—153 **11 Claims**

1. A dry cleaning detergent composition consisting essentially of (A) from 10 to 30 percent by weight of an alkanolamine salt of a linear alkylbenzenesulfonic acid having 10 to 14 carbon atoms in the alkyl group and wherein said alkanolamine is a monoalkanolamine, dialkanolamine or trialkanolamine having 2 or 3 carbon atoms in the alkanol group, (B) from 30 to 50 percent by weight of a dialkyl ester of sulfosuccinic acid having 8 or 9 carbon atoms in the alkyl group, (C) from 2 to 20 percent by weight of an adduct of 1 to 7 moles of an alkylene oxide having 2 or 3 carbon atoms to a higher fatty acid alkanolamide prepared from a fatty acid having from 10 to 18 carbon atoms and a monoalkanolamine or dialkanolamine having 2 or 3 carbon atoms in the alkanol group, and (D) the balance is essentially an organic dry cleaning solvent.

4,097,398

CONSTANT BOILING ADMIXTURES

William Milton Hutchinson, deceased, late of Bartlesville, Okla., and by Florence M. Hutchinson, executrix, Claremore, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 690,807, May 27, 1976, Pat. No. 4,039,465, which is a division of Ser. No. 602,353, Aug. 6, 1975, Pat. No. 4,024,086. This application Mar. 31, 1977, Ser. No. 783,243

Int. Cl.² C11D *7/50, 7/30;* **C23G** *5/02*

U.S. Cl. 252—162 **3 Claims**

1. A substantially constant boiling admixture of (A) 1,1,2-trifluoroethane and (B) 1,2-dichloro-1,1,2,2-tetrafluoroethane wherein said (A) represents about 41.6 weight percent and said (B) about 58.4 weight percent at substantially atmospheric pressure.

4,097,399

PROCESS FOR PREPARING AN OXYALKYLATED PRODUCT

Arthur L. Austin, Southgate; William W. Levis, Jr., Wyandotte; Louis C. Pizzini, Trenton, and Robert J. Hartman, Southgate, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 425,524, Dec. 17, 1973, Pat. No. 3,957,922. This application Jun. 25, 1975, Ser. No. 590,332

Int. Cl.² C07F *9/145;* **C08G** *71/04*

U.S. Cl. 252—182 **6 Claims**

1. Process for preparing an oxyalkylated product which comprises

1. providing a mixture containing
   a. a phenol, at least in an amount sufficient to form a complex with an aluminum or iron substance in the mixture,
   b. a non-phenolic active hydrogen compound having 2 to 8 active hydrogens per molecule and having an average molecular weight below about 10,000,
   c. a substance containing aluminum or iron which will form a complex with phenol, and
   d. an organic acid anhydride, at least one of which components (a), (b), and (d) is halogenated,
2. heating the mixture to a temperature in the range of from about 80° C. to about 250° C., and
3. oxyalkylating the heated mixture by adding thereto sufficient alkylene oxide having from 2 to 12 carbon atoms to form an oxyalkylated polyol product.

4,097,400

FLAMEPROOF POLYURETHANES

Joachim Wortmann, Turnich; Franz-Josef Dany, and Joachim Kandler, both of Erftstadt Lechenich, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 527,444, Nov. 26, 1974, abandoned. This application Apr. 9, 1976, Ser. No. 675,533

Claims priority, application Germany, Nov. 30, 1973, 2359700

Int. Cl.² C08K *5/51;* **C08G** *18/14*

U.S. Cl. 252—182 **2 Claims**

1. A homogenized mixture for the production of flameproof polyurethanes or polyurethane foams by reacting the said mixture with polyisocyanates, the said mixture containing a polyhydroxyl compound of high molecular weight, water, a catalyst, surfactants and ammoniumpolyphosphate as flameproofing substance, the ammonium polyphosphate having the general formula:

$$H_{(n-m)+2}(NH_4)_mP_nO_{3n+1}$$

in which n stands for a whole number averaging a numerical value of between about 600 to about 800, and the ratio of m : n being approximately 1 : 1.

4,097,401

THERMODYNAMICALLY STABLE PRODUCT FOR PERMANENT STORAGE AND DISPOSAL OF HIGHLY RADIOACTIVE LIQUID WASTES

Walter Guber, Leopoldshafen; Jaroslav Saidl; Paul Daruschy, both of Karlsruhe, and Werner Hild, Hochstetten, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Oct. 30, 1975, Ser. No. 627,310

Claims priority, application Germany, Jul. 30, 1975, 2534014

Int. Cl.² G21F *9/34*

U.S. Cl. 252—301.1 W **7 Claims**

1. A thermodynamically stable microcrystalline glass ceramic or glass ceramic-like product for permanent disposal and storage of highly radioactive wastes in a manner harmless to the environment or the biocycle, comprising:

(a) a solidifying matrix containing the components of a borosilicate glass including, by weight of the thermodynamically stable product, 35 to 50% SiO_2, 3 to 6% TiO_2, 5 to 10% Al_2O_3, 3 to 6% B_2O_3, 0 to 5% Na_2O;

(b) a plurality of nucleation agents, including, by weight, 3 to 6% MgO, 8 to 10% Li_2O and 3 to 6% K_2O; and

(c) 20 to 30% by weight of waste fission and corrosion products; said thermodynamically stable product is producible by a process with a highest process temperature used of 1200° C or less.

4,097,402

NUCLEAR FUEL ASSEMBLY AND PROCESS

Willard T. Grubb, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 29, 1976, Ser. No. 700,736

Int. Cl.² G21C *3/42*

U.S. Cl. 252—301.1 R **16 Claims**

1. For use in a nuclear reactor, an oxide composition nuclear fuel material in compacted pellet form containing at least one fissionable isotope and an amount of a metallic material selected from the group consisting of gold, silver and palladium and mixtures thereof effective to immobilize substantially all cadmium resulting from nuclear fission chain reactions of the nuclear fuel material through a reaction between the said cadmium and the said metallic material and thereby prevent cadmium embrittlement of nuclear fuel cladding at reactor operation temperatures.

4,097,403

OIL-IN-WATER EMULSION AND EMULSIFYING OR SOLUBILIZING AGENT COMPOSITION USEFUL THEREIN

Hisao Tsutsumi, Sakura; Shizuo Hayashi, Sugitomachi; Hirokazu Nakayama, and Toshinao Ukena, both of Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Jan. 21, 1977, Ser. No. 760,962

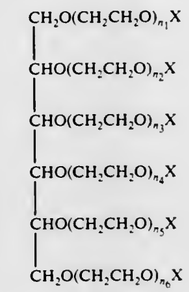
Claims priority, application Japan, Feb. 5, 1976, 51-11525

Int. Cl.² B01J *13/00*

U.S. Cl. 252—312 **10 Claims**

1. An emulsifying or solubilizing composition, consisting essentially of

I. from 58 to 95 percent by weight of a surface active agent having the formula



wherein the sum of n_1 to n_6 is from 10 to 100 and, on the average, from 3 to 6 of the X's are branched saturated acyl groups having from 11 to 21 carbon atoms and the balance of the X's are hydrogen,

II. from 0.5 to 2.5 percent by weight of an alkali metal salt of a linear or branched fatty acid having from 11 to 21 carbon atoms,

III. from 2.5 to 6.0 percent by weight of a linear or branched fatty acid having 11 to 23 carbon atoms, and

IV. from 2 to 35 percent by weight of a branched saturated fatty acid ester of polyethylene glycol having an average molecular weight of 150 to 2000, wherein the branched saturated fatty acid ester moiety has from 11 to 21 carbon atoms.

7. An oil-in-water emulsion containing as an emulsifier for the oil phase, an effective emulsifying amount of a composition as claimed in claim 1.

4,097,404

PROCESS FOR PROVIDING ENCAPSULATED TONER COMPOSITION

Robert Warren Brown, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 29, 1973, Ser. No. 327,528

Int. Cl.² B01J *13/02*

U.S. Cl. 252—316 **8 Claims**

1. A method of providing encapsulated toner materials comprising dissolving a polymer in a monomer other than the monomer of said polymer which polymer is incompatible with the polymer of the monomer employed to form a solution said polymer being referred to as polymer A; dispensing said solution in a continuous phase; polymerizing the monomer so that polymer A forms a solvent-rich phase which forms the wall of the encapsulated toner material and the resulting polymer being referred to as polymer B forms a solvent-poor phase which becomes the core of the encapsulated toner material, said polymer A, the monomer and polymer B having a very limited solubility in the continuous liquid phase employed for polymerization.

4,097,405

PARTICULATE THICKENING AGENT

Ronald E. Watts, Harlow, England, assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Jul. 8, 1976, Ser. No. 703,363

Claims priority, application United Kingdom, Jul. 14, 1975, 29490/75

Int. Cl.[2] B01J *13/00;* C08K *3/36*

U.S. Cl. 252—316 10 Claims

1. A thickener comprising particulate matter of less than 425 microns, said particulate matter comprising silica particles of from 7×10^{-3} to 6 μ bonded to an acrylic polymeric material comprising on a dry basis, from 14 to 40% by weight of said particulate matter and capable of hydrogen bonding and being sufficiently hydrophilic to be dispersible in water or other aqueous liquids, said silica having a large surface area and being capable of aggregating because of hydrogen bonding when dispersed in water.

4,097,406

GLYCOL AND SILICATE-BASED SURFACTANT COMPOSITION

Robert N. Scott, Wallingford, and Thomas A. Knowles, Cheshire, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Jan. 8, 1976, Ser. No. 647,355

Int. Cl.[2] B01F *17/54*

U.S. Cl. 252—351 28 Claims

1. A process for preparing a glycol and silicate-based surfactant composition which comprises:

(a) preparing a silicate-based component by:

(i) reacting together, at a temperature of about 40° to 200° C,

(1) a silicon tetrahalide selected from the group consisting of silicon tetrachloride, silicon tetrabromide, and silicon tetraiodide, and, per every mole of said silicon tetrahalide (2) about 0.2 to 2.0 moles of water and (3) at least about one mole of an alcohol represented by the formula R_1OH wherein R_1 is alkyl of 2 to 20 carbon atoms or aryl of 6 to 14 carbon atoms, the reaction yielding a product made up of a volatile portion and a non-volatile portion, and

(ii) at a temperature of about 65° to 320° C and in the presence of a transesterification catalyst, reacting the non-volatile portion of the product of step (i) with a polyether alcohol having a molecular weight of about 500 to 5,000 and represented by the formula $R_2(C_nH_{2n}O)H$ wherein R_2 is alkyl of 1 to 10 carbon atoms and the moiety $(C_nH_{2n}O)$ represents a polyoxyalkylene chain consisting of from about 10 to 100% by weight of oxyethylene units, and, correspondingly, about 90 to 0% of oxypropylene units, oxybutylene units or a mixture of oxypropylene and oxybutylene units, said polyether alcohol being employed in a molar proportion ranging from about 0.006 to about 1.1 moles per every mole of said silicon tetrahalide which is used in step (i), with the proviso that the molar proportion of said polyether alcohol is no more than about 55% of the molar proportion of alcohol consumed in the reaction of step (i); and

(b) combining the silicate-based component obtained with a glycol component having the general formula:

$$R_3O\text{—}\left(\text{—}(CH_2\text{—}\underset{\displaystyle R_4}{\underset{|}{CH}}\text{—}O\text{—})_a(CH_2\text{—}CH_2\text{—}O)_b\right)_m H$$

wherein R_3 is hydrogen or an alkyl having about 1 to about 10 carbon atoms, R_4 is an alkyl having about 1 to about 4 carbon atoms, $a = 0$ to 1, $b = 0$ to 1, with the proviso that the sum of $a + b$ is greater than zero, and $m = 1$ to 17, said components being combined so as to produce a surfactant composition containing about 3 to about 60% by weight of glycol component, based on the total weight.

4,097,407

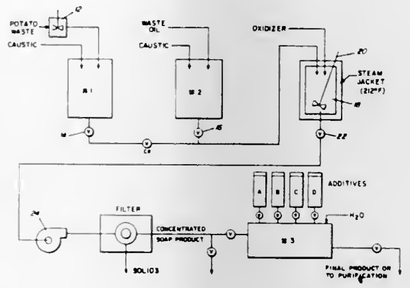
CLEANING COMPOSITION DERIVED FROM POTATO PROCESSING WASTES

Esthmel W. Ady, Richland, Wash., assignor to Larry Dale Ady, Kennewick, Wash.

Filed Apr. 4, 1975, Ser. No. 565,241

Int. Cl.[2] C11D *13/00, 9/38*

U.S. Cl. 252—370 14 Claims



1. A process for preparing a soap concentrate from potato processing wastes comprising the steps of:

(a) mixing pulverized starch-containing potato processing wastes with an alkali selected from the group consisting of sodium and potassium hydroxide in the presence of water to form a liquid potato digest;

(b) reacting a fatty acid source selected from the group consisting of animal fats and vegetable oils with an alkali selected from the group consisting of sodium and potassium hydroxide at a temperature in the range 135° - 150° F. to form a liquid soap;

(c) admixing said liquid soap and potato digest in a weight ratio of from 80:20 to 40:60 on a dry solids basis;

(d) heating said admixture in the presence of oxygen at a temperature in the range 180° - 212° F. for from 30 to 60 minutes to form a concentrated biodegradable cleaning composition;

(e) additionally heating the concentrated cleaning composition to about 150° F.;

(f) adding from one-half to one pound of dry caustic selected from the group consisting of sodium and potassium hydroxide for each ten pounds of concentrated cleaning composition;

(g) diluting the mixture resulting in (f) with water;

(h) boiling the resulting aqueous mixture; and,

(i) permitting the boiled mixture to cool and to separate into a solid soap portion and a liquid cleaner portion.

4,097,408

DIPEROXYESTER MIXTURE PREPARED BY REACTING DIHYDROPEROXIDES AND CARBONYLS

Jose Sanchez, Grand Island, N.Y., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Jan. 6, 1977, Ser. No. 757,179

Int. Cl.[2] B01J *31/02;* C08F *4/38*

U.S. Cl. 252—426 30 Claims

1. A method of preparing a diperoxyester mixture composition which comprises:

A. reacting 100 mole % of a dihydroperoxide having the structure:

$$HOO\text{—}\underset{\displaystyle CH_3}{\underset{|}{C}}\text{—}R\text{—}\underset{\displaystyle CH_3}{\underset{|}{C}}\text{—}OOH$$

wherein R is selected from the group consisting of an alkylene diradical of 2 to 4 carbons, an alkynylene diradical of 2 carbons, an alkadiynylene diradical of 4 carbons, 1,3 phenylene diradical and 1,4 phenylene diradical,

in the presence of 190 to 300 mole percent of a base with 180 to 220 total mole percent of at least two peroxyester forming carbonyl compounds selected from the group consisting of:

a) $R_1\text{—}\overset{\displaystyle O}{\overset{\|}{C}}\text{—}Y_1$

wherein

i. R_1 is selected from a primary alkyl, alkyloxy, aryl, aryloxy, primary alkenyl, alkenyloxy, or cycloalkoxy, and

ii. Y_1 is selected from chloride, bromide or

b) $R_1\text{—}\overset{\displaystyle O}{\overset{\|}{C}}\text{—}O\text{—};$ $R_2\text{—}\overset{\displaystyle O}{\overset{\|}{C}}\text{—}Y_2$

wherein

i. R_2 is selected from a primary aralkyl, cycloalkyl, cycloalkenyl or secondary alkyl, and

ii. Y_2 is selected from chloride, bromide or

c) $R_2\text{—}\overset{\displaystyle O}{\overset{\|}{C}}\text{—}O$ $R_3\text{—}\overset{\displaystyle O}{\overset{\|}{C}}\text{—}Y_3$

wherein

i. R_3 is selected from a tertiary alkyl, secondary and tertiary aralkyl, or tertiary cycloalkyl, 1-alkoxy-1-alkyl, 1-aryloxy-1-alkyl, a-aloxy-tertiary alkyl or a-aryloxy-tertiary alkyl, and

ii. Y_3 is selected from chloride, bromide or

$R_3\text{—}\overset{\displaystyle O}{\overset{\|}{C}}\text{—}O\text{—}.$

is 0, 1, 2, or 3, X is halogen and R is an alkyl group containing 1-6 carbon atoms at a temperature below 40° C, said catalyst having a magnesium concentration of from about 0.5 to 20% by weight based on the weight of the silica and magnesium compound together and a titanium concentration in the range of from about 0.01 to 20 wt. % based on the total weight of the catalyst.

4,097,409

PREPARATION OF TITANIUM CONTAINING CATALYST ON MAGNESIUM SUPPORT MATERIAL

John Gabriel Speakman, Bo'ness, Scotland, assignor to The British Petroleum Company Limited, London, England

Filed Dec. 1, 1976, Ser. No. 746,494

Claims priority, application United Kingdom, Dec. 4, 1975, 49813/75

Int. Cl.[2] C08F *4/02, 4/10*

U.S. Cl. 252—429 R 9 Claims

1. A process for the production of a supported Ziegler catalyst comprising treating: (a) a magnesium-containing support material obtained by heating at a temperature in the range of about 150°–1000° C a magnesium halide or a magnesium alkoxide with an inorganic oxide having surface hydroxyl groups, said inorganic oxide being silica or a silica composite containing at least 50% by weight of silica with (b) a halogen containing titanium compound of the formula $Ti(OR)_nX_{4-n}$ wherein n

---

4,097,410

HYDROCARBON CONVERSION CATALYST CONTAINING A CO OXIDATION PROMOTER

Elroy M. Gladrow, Baton Rouge, La., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Jun. 23, 1976, Ser. No. 698,902

Int. Cl.[2] B01J *29/06*

U.S. Cl. 252—455 Z 11 Claims

1. A hydrocarbon conversion catalyst which comprises particles of crystalline aluminosilicate zeolite containing rare earth metal and particles of an ultra-stable Y zeolite containing a CO oxidation promoter, which particles are dispersed in a porous oxide matrix to produce a catalyst containing 0.8 to 4.5 wt. % of a rare earth metal (as oxides) and 2 to 100 ppm of a CO oxidation promoter comprising a metal or a compound of a metal selected from Periods 5 and 6 of Group VIII of the Periodic Table, rhenium, chromium, manganese and combinations thereof.

4,097,411

CATALYST FOR PREPARATION OF ORTHO-ALKYLATED PHENOLS

Bernardus J. van Sorge, Selkirk, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 846,967, Aug. 1, 1969, abandoned. This application Jan. 22, 1976, Ser. No. 651,251

Int. Cl.[2] B01J *29/00, 21/10*

U.S. Cl. 252—457 9 Claims

1. A molded to shape catalyst comprising a mixture of a magnesium oxide bonded with a minor amount of silica, the catalyst having a surface area of at least 20 sq. meters per gram.

2. The catalyst of claim 1 where the silica comprises from 1 to 15% by weight of the catalyst.

4,097,412

CATALYST CARRIERS AND A PROCESS FOR THEIR PREPARATION

Alain Muller, Le Havre, France, assignor to Compagnie Francaise de Raffinage, Paris, France

Filed Dec. 7, 1976, Ser. No. 748,302

Claims priority, application France, Dec. 8, 1975, 75 37506

Int. Cl.[2] B01J *21/04, 23/28, 23/30, 23/74*

U.S. Cl. 252—465 54 Claims

1. Process of preparation of a catalyst carrier precursor comprising the following principal steps:

(a) hydrolysis of a solution of an organic aluminum salt in a first organic solvent by mixture with an aqueous solution of at least one water-soluble salt of at least one second metal selected from the group consisting of nickel, tungsten, molybdenum, and cobalt, producing a coprecipitated gel;

(b) drying of the gel obtained between 70° and 140° C;

(c) said gel, after drying, is steeped in a second organic solvent and then kneaded.

4,097,413

DESULFURIZATION PROCESS AND CATALYST

Howard D. Simpson, Irvine, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Dec. 17, 1976, Ser. No. 751,383
Int. Cl.[2] B01J *21/04, 23/88*
U.S. Cl. 252—465 **4 Claims**

1. A method for the manufacture of a hydrodesulfurization catalyst which comprises:

(1) comulling boehmite alumina with sufficient of an aqueous ammonium molybdate solution to provide about 18–30 weight-percent of MoO_3 in the finished catalyst;

(2) drying the composite from step (1) at temperatures below about 500° F to a water content of between about 20 and 40 weight-percent;

(3) intimately admixing the dried composite from step (2) with sufficient of a water-soluble cobalt salt to provide about 4–12 weight-percent of CoO in the finished catalyst, and with sufficient water to provide an extrudable paste;

(4) extruding the paste into extrudates having a diameter between about 1/20 and ¼ inch; and

(5) calcining the extrudates at a temperature which is (a) between about 900° and 1250° F and (b) correlated with the MoO_3 content of said catalyst so as to give a final surface area of at least m/0.14 m^2/g, where M is the weight-percent of MoO_3 in said catalyst.

4,097,414

MODIFIED ETHYLENE OXIDE CATALYST AND A PROCESS FOR ITS PREPARATION

Stanley B. Cavitt, Austin, Tex., assignor to Texaco Development Corp., New York, N.Y.

Filed Aug. 30, 1976, Ser. No. 719,042
Int. Cl.[2] B01J *23/04, 23/50*
U.S. Cl. 252—476 **31 Claims**

1. A cesium-modified, activated silver catalyst for the vapor phase epoxidation of ethylene with an oxygen-containing epoxidizing agent prepared by:

contacting a porous, inorganic, catalyst support material with an impregnating solution; and,

heating the impregnated support material at temperatures from about 50° C to 300° C to evaporate volatiles and activate said catalyst,

wherein said impregnating solution comprises an effective amount of a cesium salt in solution with a silver carboxylate amine complex of a silver carboxylate dissolved in a solubilizing amount of an amine-containing complexing agent selected from the group consisting of

(a) aliphatic diamines selected from the group consisting of N-alkyl substituted piperazines and C-alkyl substituted piperazines;

(b) aliphatic polyamines containing at least three amino moieties wherein at least one is primary or secondary; and

(c) aliphatic amino ethers containing at least one ether linkage and at least one amino moiety which is primary or secondary.

4,097,415

PRODUCTION OF IMPROVED ANODES FOR SOLID ELECTROLYTE CAPACITORS

Jean-Claude Moulin; Balint Escher, and Dominique Prince, all of Paris, France, assignors to Societe Lignes Telegraphiques et Telephoniques, Paris, France

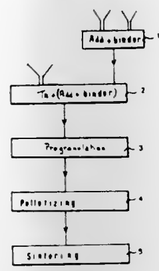
Filed Mar. 9, 1976, Ser. No. 665,287
Claims priority, application France, Mar. 3, 1975, 75 09029; Jun. 6, 1975, 75 17382
Int. Cl.[2] H01B *1/02*
U.S. Cl. 252—512 **10 Claims**

1. A method for producing anodes of film forming metal for dry electrolytic capacitors which comprises:

providing a quantity of powdered film forming metal to constitute an anode,

mixing said powder with a binder,

pressing the resulting mixture into a pellet,



introducing within said pellet an additive comprising a compound of an element selected from the group consisting of W, Mo, V and Hf with a non-metal element selected from the group consisting of O, S, Se and Te, and

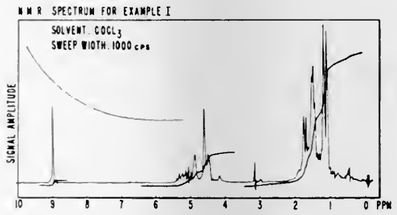
sintering the resulting pellet.

4,097,416

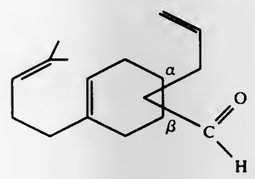
1-(2-PROPENYL)-3-(4-METHYL-3-PENTENYL)-Δ^3-CYCLOHEXENE-1-CARBOXALDEHYDE AND 1-(2-PROPENYL)-4-(4-METHYL-3-PENTENYL)-Δ^3-CYCLOHEXENE-1-CARBOXALDEHYDE, PERFUME COMPOSITIONS

John B. Hall, Rumson; Mark A. Sprecker, Sea Bright; Manfred Hugo Vock, Locust, all of N.J.; Edward J. Shuster, Brooklyn, N.Y.; Joaquin Vinals, Red Bank, and Robert M. Novak, Fords, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 741,088, Nov. 11, 1976, Pat. No. 4,068,012.
This application Aug. 24, 1977, Ser. No. 827,298
Int. Cl.[2] C11B *9/00*
U.S. Cl. 252—522 **2 Claims**



1. A perfume composition comprising a mixture of the compounds 1-(2-propenyl)-3-(4-methyl-3-pentenyl)-Δ^3-cyclohexene-1-carboxaldehyde and 1-(2-propenyl)-4-(4-methyl-3-pentenyl)-Δ^3-cyclohexene-1-carboxaldehyde defined by the structure:



wherein the carboxaldehyde moiety is bonded either at the alpha-carbon atom or the beta-carbon atom of the cyclohexenyl moiety and at least one adjuvant selected from the group consisting of natural perfume oils, synthetic perfume oils, alcohols, aldehydes, ketones, nitriles, esters and lactones.

2. A granular colored speckle in agglomerate form made by the process of claim 1.

4,097,417

PHOTOCURABLE ELECTROCONDUCTIVE COATING COMPOSITION

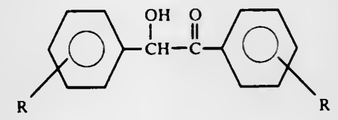
Stephen D. Pastor, Edison; Martin M. Skoultchi, Somerset, and Henry R. Hernandez, Somerville, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed May 2, 1974, Ser. No. 466,264
Int. Cl.[2] H01L *13/00;* **C08F** *8/00, 2/46*
U.S. Cl. 252—501 **11 Claims**

1. An actinic radiation cross-linkable coating composition of matter consisting essentially of:

(A) an acrylic monomer devoid of groups which inhibit free radical polymerization, having at least one terminal acrylate or substituted acrylate group,

(B) a photoactivatable freee radical polymerization initiator selected from the group consisting of 3-hydroxy-2-butanone, phenanthrene-quinone, polyhalogenated aromatic anhydrides, (C_1–C_4) benzoin ethers and benzoins of the formula:



where R is a member of the group consisting of hydrogen, halogen and C_1–C_{20} alkyl, said initiator being present as a separate species or in a chemical combination with said monomer, and

(C) a copolymerizable monomer which is an organic compound having at least one terminal ethylenically unsaturated group and selected from the group consisting of salts of allyl substituted quaternary ammonium compounds and alkali metal salts of acrylic, methacrylic and vinylbenzene sulfonic acids,

wherein at least one of said monomers in part A or part C contains more than one terminal ethylenically unsaturated group.

4,097,418

GRANULAR COLORED SPECKLES

Thomas Richard Rolfes, Wyoming, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 619,756, Oct. 6, 1975, abandoned, and a continuation-in-part of Ser. No. 598,523, Jul. 23, 1975, abandoned. This application Jan. 10, 1977, Ser. No. 758,361
Int. Cl.[2] C11D *3/065, 3/40, 11/00, 17/06*
U.S. Cl. 252—531 **2 Claims**

1. The method of making a low- or non-staining colored speckle which comprises agglomerating from 60 to about 85%, by weight of the granular colored speckle, of a granular, water-soluble, hydratable inorganic alkaline salt selected from the group consisting of sodium tripolyphosphate, sodium pyrophosphate, sodium orthophosphate, and mixtures thereof, with from about 15 to about 35% by weight of the granular colored speckle, of an aqueous anionic surfactant paste comprising from about 20 to about 50%, by weight, of an anionic surfactant selected from the group consisting of sodium alkylbenzene sulfonates having 10 to 14 carbons in the alkyl chain, sodium coconut alkyl sulfate, sodium tallow alkyl sulfate, the sodium salt of the sulfated condensation product of C_{10} to C_{18} alcohols having an average of 3 moles of ethylene oxide per mole of alcohol, and mixtures thereof, and having admixed in said paste from about 0.5 to about 10%, by weight of the granular colored speckle, of a coloring agent selected from the group consisting of phthalocyanine blue, phthalocyanine green, ultramarine blue, Polar Brilliant Blue, Rhodamine BM, Pontacyl Light Yellow 36 and mixtures thereof.

4,097,419

PROCESS FOR STABILIZED HIGH STRENGTH UREA-ALDEHYDE POLYMERS

William Percy Moore, Jr., Hopewell, Va., assignor to Waverly Chemical Co., Hopewell, Va.

Filed Sep. 26, 1977, Ser. No. 836,492
Int. Cl.[2] C08J *9/30, 9/12*
U.S. Cl. 260—2.5 F **4 Claims**

1. An improved process for producing stable urea-aldehyde insulating foams having properties of improved structural strength and low formaldehyde vapor emission, from two separate storable liquids, said process comprising: blending an air-foamed solution containing dialdehydes having two to eight molecular carbons, surfactant, and mineral acid, with a partially cured aqueous urea-formaldehyde resin containing between 1.3 and 1.5 mols of formaldehyde per mol of urea and about 50 percent total solids, so that the molecular aldehyde moieties supplied by the dialdehyde are between 0.2 and 0.4 times the number of aldehyde moieties supplied by formaldehyde, and the molecular ratio of total aldehyde moieties to urea is between 1.7 and 2.0; curing and drying the blended fluids at a pH between 2.0 and 3.5 at ambient conditions until the foam hardens.

4,097,420

METHOD FOR PREPARATION OF MACROPOROUS AMPHOTERIC ION EXCHANGERS WITH HIGHLY CROSSLINKED HYDROPHILIC POLYMERIC MATRIX

Otakar Mikeš; Petr Štrop, and Jiří Coupek, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Feb. 7, 1975, Ser. No. 548,095
Claims priority, application Czechoslovakia, Feb. 12, 1974, 978/74
Int. Cl.[2] C08F *2/18;* **B01D** *15/08*
U.S. Cl. 260—2.1 R **6 Claims**

1. A method for preparation of hydrophilic macroporous ion exchangers of amphoteric character for isolation and separation of biological materials, comprising the steps of polymerizing a mixture of (a) anionogenous monomers, selected from a group of compounds comprising sulfoalkyl methacrylates, sulfoalkyl acrylates, sulfoalkylacrylamides and sulfoalkylmethacrylamides, (b) cationogenous monomers, selected from a group of compounds comprising aminoalkyl acrylates, aminoalkyl methacrylates, aminoalkylacrylamides and aminoalkylmethacrylamides and their quaternary ammonium compounds, and (c) at least 10 mol % of crosslinking monomers of acrylate or methacrylate type, selected from group of compounds comprising alkylene diacrylates, alkylene dimethacrylates, oligoglycol and polyglycol diacrylates and dimethacrylates, bisacrylamides, bismethacrylamides and divinylbenzene, in the presence of inert organic compounds, selected from a group of alcohols, organic acids, amines and nitriles, in an aqueous dispersion phase.

4,097,421

FOAMABLE STRUCTURAL THERMOPLASTIC POLYESTER RESINS

Tai Ming Chang, Tallmadge, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 8, 1974, Ser. No. 458,747
Int. Cl.[2] C08J *9/00*
U.S. Cl. 260—2.5 N **15 Claims**

1. Foamable thermoplastic polyester moldable compositions having reduced melt viscosity compared with the original polyester resin comprising

(a) thermoplastic polyester resin homopolyesters selected from the group consisting of poly(ethylene terephthalate) and poly(tetramethylene terephthalate), copolyesters and

physical blends of homopolyesters and copolyesters of ethylene terephthalate and of tetramethylene terephthalate having crystalline melting points above about 300° F.,

(b) 0.05 to 15 parts by weight based on the weight of polyester resin of a melt viscosity reducing agent selected from the group consisting of esters of organic acids containing from 10 to 27 carbon atoms and alkali or alkaline earth metal salts of an organic acid having from 10 to 25 carbon atoms,

(c) 0.05 to 15 parts by weight based on the weight of the polyester resin of a hydrocarbyltetrazole which can be decomposed to release a gas harmless to the polyester, and

(d) 2 to 45 parts by weight of a reinforcing agent selected from the group consisting of glass fibers, potassium titanate fibers, aramid fibers, asbestos fibers and graphite fibers based on the combined weight of the polyester resin and the reinforcing agent.

4,097,422

INORGANIC-ORGANIC COMPOSITIONS

Peter Markusch, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 13, 1974, Ser. No. 469,253

Claims priority, application Germany, May 17, 1973, 2325090

Int. Cl.[2] C08G *18/12, 18/77;* **C08K** *3/36*

U.S. Cl. 260—2.5 AK **28 Claims**

1. A porous inorganic-organic composition obtained by reacting a mixture comprising:

(A) from 5-98% by weight of an organic polyisocyanate selected from the group consisting of

(i) organic polyisocyanates which contain ionic groups or groups capable of forming ionic groups in the presence of alkali, and

(ii) non-ionic-hydrophilic polyisocyanates prepared by reacting an excess of an organic polyisocyanate with an organic hydrophilic compound containing at least one group which is reactive with isocyanate groups,

(B) from 2-95% by weight of an aqueous silica sol containing about 20-60% by weight of said silica, and

(C) from 0-93% by weight of an inorganic water-binding component, said water-binding component being capable of absorbing water to form a solid or gel, all of said percents by weight of components (A), (B) and (C) being based on the total weight of components (A), (B) and (C), said composition being a solid/solid xerosol.

4,097,423

INORGANIC-ORGANIC COMPOSITIONS

Dieter Dieterich, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 446,558, Feb. 27, 1974, which is a continuation-in-part of Ser. No. 364,763, May 29, 1973, abandoned. This application Nov. 26, 1974, Ser. No. 527,476

Claims priority, application Germany, Jun. 3, 1972, 2227147; Mar. 2, 1973, 2310559; Nov. 30, 1973, 2359610; Nov. 30, 1973, 2359616; Jun. 14, 1974, 2435950

Int. Cl.[2] C08G *18/32;* **C08K** *3/34, 3/36, 3/40*

U.S. Cl. 260—2.5 AK **35 Claims**

1. An inorganic-organic composition obtained by reacting a mixture of

(A) from 5-98% by weight of an organic polyisocyanate,

(B) from 2-95% by weight of an aqueous alkali metal silicate solution containing about 20-70% by weight of said alkali metal silicate, and

(C) from 0-93% by weight of a water-binding component, said component being capable of absorbing water to form a solid or a gel,

wherein said percents by weight of (A), (B) and (C) are based on the total weight of (A), (B) and (C), with the proviso that when (C) is 0-20% by weight, component (A) contains 2-200 milliequivalent of ionic groups or groups capable of forming salt groups in the presence of alkali metal silicates per 100 grams of said organic polyisocyanate, and wherein said composition is a solid/solid xerosol.

6. The composition of claim 1 wherein an inert liquid boiling at temperatures from −25° to +50° C is included in the reaction mixture as a blowing agent in a quantity of up to 50% by weight and the reaction mixture is allowed to react to completion while foaming.

13. The composition of claim 1 wherein said composition is based on:

(A) 10-80% by weight of said organic polyisocyanate,

(B) 20-80% by weight of said aqueous alkali metal silicate solution, and

(C) 10-70% by weight of said water-binding component.

14. The composition of claim 13, wherein the reaction mixture contains a foam stabilizer.

4,097,424

PROCESS FOR THE PRODUCTION OF POLY(URETHANE SILICATE) RESIN AND FOAMS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 599,000, Jul. 7, 1975, which is a continuation-in-part of Ser. No. 71,628, Sep. 11, 1970, abandoned. This application Mar. 4, 1976, Ser. No. 663,924

Int. Cl.[2] C08G *18/14, 18/32, 18/38*

U.S. Cl. 260—2.5 A **14 Claims**

1. The process for the production of poly(urethane silicate) compositions which comprises the steps of:

(a) providing about 1 mol of silicic acid gel which has been air dried at 25° to 75° C; mols of silicic acid are calculated on the basis of the amount by weight of silicon dioxide in the silicic acid gel;

(b) mixing therewith from about 0.5 to about 2 mols of an organic diisocyanate selected from the group consisting of toluene-2,4-diisocyanate; toluene-2,6-diisocyanate; diphenylmethane-4,4'-diisocyanate; naphthalene-1,5-diisocyanate; hexamethylene diisocyanate; 3,3'-dimethyldiphenylmethane-4,4'-diisocyanate; meta-phenylene diisocyanate; triphenylmethane triisocyanate; dianisidine diisocyanate; xenylenediisocyanate; dichloroxenylene diisocyanate; naphthalene-1,5-diisocyanate; fluorene diisocyanate; and mixtures thereof;

(c) maintaining said mixture at a temperature of from about 20° to about 60° C; and

(d) agitating said mixture until a smooth creamy appearance is obtained.

2. The process according to claim 1 including the further steps of adding water and a catalyst to said mixture and heating said mixture to a temperature of from about 90° to about 150° C until said mixture expands in volume at least 3 times, forming a self-sustaining foam.

4,097,425

THERMOPLASTIC FORMABLE BLENDS, A FOAMING METHOD AND PRODUCTS MADE THEREBY

George E. Niznik, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 608,451, Aug. 28, 1975, abandoned. This application Mar. 22, 1976, Ser. No. 669,028

Int. Cl.[2] C08J *9/08, 9/10*

U.S. Cl. 260—2.5 N **32 Claims**

1. A substantially uniform injection moldable foamable blend comprising thermoplastic organic polymer and from 0.1% to 25% by weight of 5-phenyl-3,6-dihydro-1,3,4-oxadiazin-2-one.

4,097,426

CURING AGENTS FOR POLYURETHANE FOAMS AND ELASTOMERS AND PROCESS OF USE

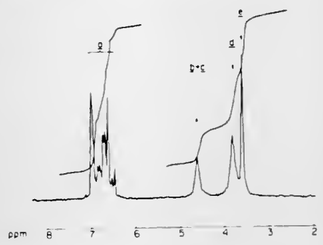
Wataro Koike; Masami Takayama, both of Shizuoka; Hideaki Ohashi, Fujieda, and Sadayoshi Matsui, Shimizu, all of Japan, assignors to Ihara Chemical Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 26, 1976, Ser. No. 735,101

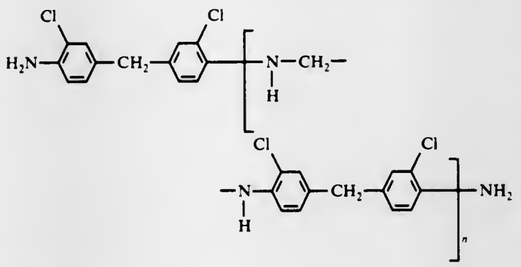
Claims priority, application Japan, Sep. 29, 1976, 51-117038

Int. Cl.[2] C08G *18/14, 18/32;* **C09K** *3/00*

U.S. Cl. 260—2.5 AM **13 Claims**



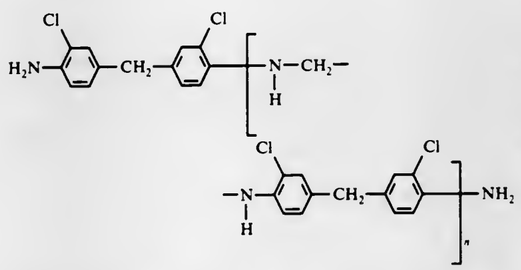
1. A curing agent for polyurethane which comprises a mixture which is solid at room temperature and has a melting point of at most 110° C of at least two compounds represented by the general formula:



wherein *n* stands for zero or a positive integer and is greater than zero in at least one of said compounds,

the compounds having been prepared by subjecting to dehydrocondensation 4, 4'-methylene-bis (2-chloroaniline) and formaldehyde in a mol ratio sufficient to produce a solid mixture of reaction products.

8. A process for the production of polyurethane which comprises reacting a mixture of a polyol and a polyisocyanate or a polyurethane prepolymer having terminal isocyanate groups with a curing agent in the presence of a blowing agent, characterized by using as said curing agent a mixture which is solid at room temperature and has a melting point of at most 110° C of at least two compounds represented by the general formula:



wherein *n* stands for zero or a positive integer and is greater than zero in at least one of said compounds,

said compounds having been prepared by subjecting to dehydrocondensation 4, 4'-methylene-bis (2-chloroaniline) and formaldehyde in a mol ratio sufficient to produce a solid mixture of reaction products.

4,097,427

CATIONIZATION OF STARCH UTILIZING ALKALI METAL HYDROXIDE, CATIONIC WATER-SOLUBLE POLYMER AND OXIDANT FOR IMPROVED WET END STRENGTH

Thomas Aitken, Chicago, Ill., and Wilfred D. Pote, Appleton, Wis., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Feb. 14, 1977, Ser. No. 768,114

Int. Cl.[2] C08L *3/02*

U.S. Cl. 260—9 **8 Claims**

1. An improved method for the cationization of starch which comprises cooking starch at a temperature and for a period of time to cause gelation and under alkaline conditions with a water soluble quaternary ammonium polymer in the presence of an oxidizing agent from the group consisting of ammonium persulfate, potassium persulfate, hydrogen peroxide, sodium hypochlorite, ozone, and t-butyl hydroperoxide.

4,097,428

FORTIMICIN C AND PROCESS FOR PRODUCTION THEREOF

Takashi Nara, Tokyo; Ryo Okachi; Mitsuyoshi Yamamoto, both of Machida; Yasuki Mori, Kawasaki; Moriyuki Sato, Machida; Masahiro Sugimoto, and Yoshiaki Shimizu, both of Shizuoka, all of Japan, assignors to Abbott Laboratories, North Chicago, Ill.

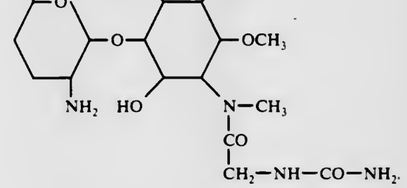
Division of Ser. No. 708,681, Jul. 26, 1976, Pat. No. 4,048,015. This application May 26, 1977, Ser. No. 800,925

Claims priority, application Japan, Aug. 1, 1975, 50-93182

Int. Cl.[2] C07D *309/22*

U.S. Cl. 260—345.9 R **2 Claims**

1. Fortimicin C, a composition of matter having an antibacterial activity, having the following structural formula:



4,097,429

THERMOPLASTICALLY PROCESSIBLE MOULDING COMPOUND OF CELLULOSE ESTERS AND ETHYLENE/VINYL ESTERS COPOLYMERS

Salah Elabd Elghani, Zarga, Jordan; Winfried Fischer, Cologne, and Richard Prinz, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 581,706, May 28, 1975, abandoned. This application May 24, 1976, Ser. No. 689,685

Claims priority, application Germany, May 29, 1974, 2426178

Int. Cl.[2] C08L *1/14*

U.S. Cl. 260—17 R **12 Claims**

1. An injection molded or extruded article of

(1) 1 to 99 percent by weight of at least one cellulose ester of a C_1-C_5-aliphatic carboxylic acid, the relative viscosity thereof being between 2.5 and 6.0,

(2) 99 to 1 percent by weight of an incompatible ethylene/vinyl ester copolymer containing 30 to 75 percent by weight

of vinyl esters of C_1-C_{18}-aliphatic or C_7-C_{11}-aromatic carboxylic acids and

(3) 0–50 percent by weight of a compatible ethylene/vinyl ester copolymer containing 75.1 to 98 percent by weight of vinylesters of C_1-C_{18}-aliphatic or C_7-C_{11}-aromatic carboxylic acids, the sum of components (1) to (3) being 100 percent by weight.

4,097,430

AQUEOUS POLYMERIC DISPERSIONS MADE THIXOTROPIC BY CERTAIN AMMONIUM OR POTASSIUM ZIRCONIUM CARBONATES

Raymond Francis Phillips, Cincinnati, Ohio, assignor to Magnesium Elektron Ltd., Swinton, England

Continuation of Ser. No. 500,735, Aug. 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 297,415, Oct. 12, 1972, abandoned. This application Aug. 12, 1976, Ser. No. 713,637

Claims priority, application United Kingdom, Oct. 22, 1971, 49144/71

Int. Cl.² C08L *1/28*

U.S. Cl. 260—17 R **13 Claims**

1. A method of making a thixotropic aqueous dispersion of a polymer or copolymer selected from the group consisting of alkyd resins and products obtained by polymerisation of at least one of vinyl esters, acrylic esters, methacrylic esters, styrene, acrylonitrile, ethylene and vinylidine chloride which comprises mixing with a dispersion of said polymer or copolymer

(1) an amount sufficient of an aqueous solution of ammonium zirconium carbonate to impart thixotropic properties to said dispersion, said solution containing 18-25% by weight of zirconium expressed as zirconium dioxide and having a molar ratio of carbonate to zirconium not greater than 2.05; and

(2) a water-soluble organic colloid containing an hydroxyl group.

4,097,431

AROMATIC COPOLYESTER COMPOSITION

Nakaba Asahara; Hiroyuki Takao, both of Uji, and Kenji Yasue, Kyoto, all of Japan, assignors to Unitika Ltd., Amagasaki, Japan

Filed Jul. 30, 1976, Ser. No. 710,050

Claims priority, application Japan, Jul. 30, 1975, 50-93300

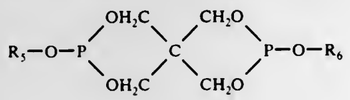
Int. Cl.² C08G *63/02*

U.S. Cl. 260—22 R **29 Claims**

1. A resin composition consisting essentially of:

(A) an aromatic copolyester derived from (a) a mixture of terephthalic acid and/or its functional derivative and isophthalic acid and/or its functional derivative, with the terephthalic acid unit/isophthalic acid unit mole ratio being about 9:1 to about 1:9, and (b) 2,2-bis(4-hydroxyphenyl)propane, or its functional derivative, and

(B) a phosphite compound of the general formula



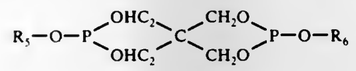
wherein R_5 and R_6, independently from each other, represent a hydrogen atom, an alkyl group having 1 to 22 carbon atoms, an aryl group having 6 to 16 carbon atoms, a cycloalkyl group having 6 to 12 carbon atoms, an arylalkyl group having 7 to 38 carbon atoms, an alkylaryl group having 7 to 38 carbon atoms a polyhydric phenol residue having 7 to 38 carbon atoms and 1 to 2 hydroxyl groups remaining, or a polyhydric alcohol residue having 2 to 22 carbon atoms and 1 to 2 hydroxyl groups remaining, or such residues where at least one of the hydroxyl groups is in the form of a phosphite ester.

9. A resin composition consisting essentially of

(A) an aromatic copolyester derived from (a) a mixture of terephthalic acid and/or its functional derivative and isophthalic acid and/or its functional derivative, with the terephthalic acid unit/isophthalic acid unit mole ratio being about 9:1 to about 1:9, and (b) 2,2-bis(4-hydroxyphenyl)propane,

or its functional derivative,

(B) a phosphite compound of the general formula



wherein R_5 and R_6, independently from each other, represent a hydrogen atom, an alkyl group having 1 to 22 carbon atoms, an aryl group having 6 to 16 carbon atoms, a cycloalkyl group having 6 to 12 carbon atoms, an arylalkyl group having 7 to 38 carbon atoms, an alkylaryl group having 7 to 38 carbon atoms, a polyhydric phenol residue having 7 to 38 carbon atoms and 1 to 2 hydroxyl groups remaining, or a polyhydric alcohol residue having 2 to 22 carbon atoms and 1 to 2 hydroxyl groups remaining, or such residues where at least one of the hydroxyl groups is in the form of a phosphite ester, and

(C) a salt formed between an organic carboxylic acid containing 2 to 22 carbon atoms and a metal of Groups I, II, III and IV of the Periodic Table.

4,097,432

FLAME AND SMOKE-SUPPRESSED VINYL CHLORIDE RESIN COMPOSITIONS

James D. Nichols, York, and Edwin J. Quinn, Lancaster, both of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

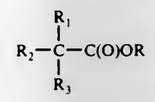
Filed Mar. 28, 1977, Ser. No. 781,677

Int. Cl.² C08K *5/10*

U.S. Cl. 260—23 XA **18 Claims**

1. A flame and smoke-retarded composition comprising a resinous polymer of vinyl chloride and a flame and smoke-suppressing amount of

(a) at least one compound of the formula



wherein R is C_1 to C_{18} linear or branched alkyl and R_1, R_2, and R_3 are the same or different and are hydrogen, C_1 to C_8 linear or branched alkyl or halogen; and

(b) an oxide, hydroxide or salt of iron (III), zinc or mixtures thereof.

4,097,433

HEAT-SEALABLE VINYLIDENE CHLORIDE COPOLYMER COATING COMPOSITION

William Paul Kane, Bon Air, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 20, 1976, Ser. No. 688,477

Int. Cl.² C08L *91/00*

U.S. Cl. 260—23 AR **9 Claims**

1. A heat-sealable coating composition comprising a copolymer of vinylidene chloride, at least one other ethylenically unsaturated monomer copolymerizable therewith, and at least 5 weight percent of methacrylonitrile, the copolymer containing at least about 88 weight percent vinylidene chloride, and, per 100 parts by weight of the total copolymer, 2.7 to 3.3 parts by weight of behenic acid, 0.4 to 0.6 part by weight of carnauba wax, 1.2 to 1.8 parts by weight of candelilla wax, 0.5 to 1.0 part by weight of stearamide, and 2.7 to 3.3 parts by weight of glyceryl monostearate.

4,097,434

ADHESIVE COMPOSITION

George T. Coker, Jr., Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 673,517, Apr. 5, 1976, abandoned. This application Sep. 1, 1976, Ser. No. 719,494

Int. Cl.² C08L *93/00*

U.S. Cl. 260—23.3 **4 Claims**

1. An adhesive composition comprising:

(a) 100 parts by weight of a block copolymer having at least two monoalkenyl arene polymer end blocks A and at least one elastomeric conjugated diene mid block B, said blocks A comprising 10–30% by weight of the copolymer;

(b) about 50 to about 200 parts by weight of a tackifying resin compatible with block B; and

(c) about 10 to about 100 parts by weight of a rubber compound oil plasticizer having a saturates content of less than about 15% by weight, an aromatics content of above about 55% by weight, a specific gravity of 0.9 to 1.1 and a viscosity at 212° F of 80 to 1,000 SSU.

4,097,435

GLASS-FILLED POLYCARBONATE OF IMPROVED DUCTILITY

Herbert L. Rawlings, and Arthur L. Baron, both of New Martinsville, W. Va., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed Apr. 11, 1977, Ser. No. 786,308

Int. Cl.² C08K *7/14, 5/10*

U.S. Cl. 260—28 R **11 Claims**

1. A polycarbonate molding composition comprising

(a) an aromatic polycarbonate resin,

(b) about 5 to 40% by weight, based upon the total composition, of glass fibers, and

(c) about 0.1 to 2% by weight, based upon the total composition, of an ester wax of montanic acid made by esterifying said acid with a fatty alcohol or a low molecular weight glycol, said alcohol or glycol having upto and including 26 carbon atoms.

4,097,436

HYDROLYZED VINYL ACETATE-VINYL ALKOXY SILANE POLYMERS

Robert Büning, Troisdorf-Sieglar, and Gerhard Bier, Troisdorf, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

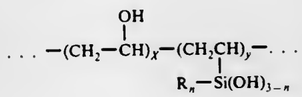
Continuation of Ser. No. 558,505, Mar. 14, 1975, abandoned. This application Jun. 11, 1976, Ser. No. 695,222

Claims priority, application Germany, Mar. 14, 1974, 2412292

Int. Cl.² C08F *216/06;* **C08L** *29/04*

U.S. Cl. 260—29.6 H **5 Claims**

1. A water soluble copolymer having recurring units of the formula



wherein

X and *y* may be equal or unequal to one another and independently represent a whole number of 1 or more and up to 2,000;

n equals 0 to 2; and

R represents hydrogen, aryl, cycloalkyl or a branched or unbranched saturated alkyl of 1 to 18 carbon atoms,

said polymer consisting essentially of the acidified saponified polymerization product of vinyl acetate and vinyl alkoxy silane alone or additionally with a monoethylenically unsaturated copolymer which is polymerizable with vinyl acetate, said polymer containing 0.1 to 20 weight percent vinyl alkoxy silane units based on the total weight of monomers, the vinyl acetate component being present in an amount of 1 to 2,000 units, the vinyl silane component being present in an amount of 1 to 2,000 units, the unacidified and unsaponified copolymer having a relative viscosity determined in a 1 weight percent solution in ethyl acetate at 20° C of 1.05 to 6, said polymer when dissolved in water and applied as an acidified solution to a substrate and dried forming a partially or fully water-insoluble sheet.

4,097,437

THIXOTROPIC AQUEOUS COATING COMPOSITION OF SOLUBILIZED POLYMER WITH DISPERSION OF QUATERNARY AMMONIUM CLAY IN ALIPHATIC HYDROCARBON

Bhimashanker Gopal Dhake, Livonia, Mich., assignor to M & T Chemicals Inc., Stamford, Conn.

Filed May 27, 1977, Ser. No. 801,224

Int. Cl.² C08J *3/08;* **C08K** *5/19, 9/04;* **C09D** *5/04*

U.S. Cl. 260—29.2 E **6 Claims**

1. A thixotropic aqueous coating composition comprising

(1) from 15 to 25%, based on the weight of said composition, of a film-forming, solubilized polymer,

(2) from 0.5 to 5%, based on the weight of said composition, of finely divided silica,

(3) sufficient water to achieve a concentration of nonvolatile materials of from 30 to 60%, based on the weight of said composition,

(4) from 0.5 to 5%, based on the weight of said composition, of a smectite type clay which has been modified by reaction with a quaternary ammonium salt of the general formula $R_2^1R_2^2N^{\oplus}X^{\ominus}$ wherein R^1 is alkyl and contains from 1 to 4 carbon atoms, R^2 is alkyl and contains from 12 to 20 carbon atoms and X is chlorine or bromine, said smectite clay being present as a dispersion in a water-immiscible liquid aliphatic hydrocarbon that constitutes from 1 to 10% of the total weight of said aqueous coating composition and boils within the range from 100° to 200° C.

(5) from 0.1 to 1%, based on the weight of said composition, of a monohydric alcohol of a molecular weight from 32 to 118, and

(6) from 0.5 to 5%, based on the total weight of said composition, of a cationic surfactant.

4,097,438

WATER-BASED LINERS FOR BEVERAGE CONTAINERS

Roger M. Christenson, Gibsonia, and Rudolf Maska, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 470,480, May 16, 1974, abandoned. This application Aug. 5, 1974, Ser. No. 494,688

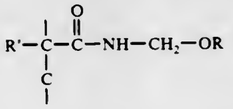
Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.4 UA **5 Claims**

1. A water-based coating composition for use as an internal sanitary liner for metal containers adapted for packing beverages, said composition especially adapted for spray application and consisting essentially of:

(A) from about 5 percent to about 60 percent by weight of an amine partially-neutralized interpolymer formed in the presence of a vinyl polymerization catalyst and in the absence of mercaptan, said interpolymer being comprised of:

(1) from about 5 percent to about 25 percent of acrylamide or methacrylamide in units of the structure



wherein R' is methyl or hydrogen and R is hydrogen or

butyl with at least 50 percent of the groups represented by R being butyl;

(2) from about 3 percent to about 25 percent of units formed from acrylic acid;

(3) from about 5 percent to about 75 percent of hardening monomer units derived from styrene; and

(4) from about 5 percent to about 75 percent of flexibilizing monomer units derived from ethyl acrylate;

wherein the acid groups of said interpolymer are partially neutralized with a sufficient amount of monomeric amine to solubilize the interpolymer but with an amount of amine which does not produce more than 0.764 milliequivalents of salt per gram of resin solids; and

(B) from about 40 percent to about 95 percent by weight of a liquid medium consisting of a mixture of water soluble or water miscible organic solvents in water wherein at least 60 percent by weight of the mixture is water.

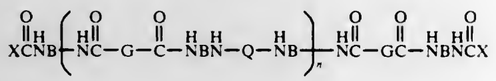
4,097,439

POLYURETHANE COATING COMPOSITION CURABLE BY ADDITION POLYMERIZATION

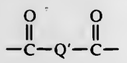
Thomas Robert Darling, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 8, 1977, Ser. No. 766,598
Int. Cl.² C08L *18/04*
U.S. Cl. 260—31.2 N **4 Claims**

1. A coating composition consisting essentially of (A) 5 to 70 percent by weight of the coating composition of at least one ethylenically unsaturated monomer capable of being polymerized by free radical polymerization, said monomer being at least a partial solvent for (B), and (B) 30 to 90 percent by weight of the coating composition of a polymer having a molecular weight of 2,000 to 20,000 and the formula



where G is a bivalent organic radical resulting from removal of terminal hydrogen groups from a diol, a diamine, or an aminoalcohol having a molecular weight of 300 to 3000, B is a bivalent organic radical having a molecular weight of about 80 to 400, Q is a bivalent organic radical having the formula



where Q′ is formed by removing two active hydrogens from a primary or secondary diamine having a molecular weight between 60 and 300, X is a monovalent organic radical formed by removal of an active hydrogen from an alcohol or a monoamine having a molecular weight of not greater than about 300, and containing at least one polymerizable ethylenic linkage, and *n* is the integer 1, 2, 3 or 4, said coating composition having a viscosity between about 1 and 3000 poises.

4,097,440

RESIN COMPOSITION

Michael J. Maximovich, Akron, and Gary L. Burroway, Doylestown, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 680,818, Apr. 28, 1976, Pat. No. 4,064,092, which is a continuation of Ser. No. 529,829, Nov. 4, 1974, abandoned. This application Aug. 23, 1977, Ser. No. 827,037
Int. Cl.² C08F *6/14*
U.S. Cl. 260—31.4 R **5 Claims**

1. A water reducible composition which comprises an admixture or solution of 100 parts of resin with about 50 to about 100 parts by weight of a coalescing solvent therefor comprising at least one solvent selected from ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol monobutyl ether, diethylene glycol monobutyl ether, diethylene glycol monoethyl ether acetate, diethylene glycol diethyl ether, ethylene glycol monomethyl ether acetate, methyl ethylketone, acetone, methyl propyl ketone and diacetone alcohol and about 5 to about 70 parts by weight of at least one compatible plasticizer characterized by having a melting point of about −40° C. to about 25° C., a boiling point of at least 95° C. and a solubility parameter of about 8 to about 16; where said resin has a Ring and Ball softening point in the range of about 100° C. to about 300° C., and is prepared by the method which comprises free radical aqueous emulsion polymerizing, in an aqueous medium having a pH in the range of about 2 to about 7, or free radical organic solution polymerizing a monomer mixture which comprises, based on 100 weight percent of monomers

(1) about 70 to about 85 weight percent of at least one hard segment hydrophobic enhancing monomer selected from styrene, α-methyl styrene, acrylonitrile, vinyl toluene, methyl methacrylate, vinyl chloride and vinylidene chloride,

(2) about 15 to about 25 weight percent of at least one soft segment hydrophobic enhancing monomer selected from at least one acrylate selected from methyl acrylate, ethyl acrylate, butyl acrylate, 2-ethylhexyl acrylate, laural acrylate, isodecyl methacrylate, butyl methacrylate, isobutyl methacrylate, at least one vinyl ether selected from ethyl, butyl, octyl, decyl and cetyl vinyl ether and/or at least one diene selected from 1,3-butadiene, isoprene and 2,3-dimethyl butadiene, provided that said dienes of monomer part (B) and said monomer part (A) vinyl chloride and vinylidene chloride are not mixed together and copolymerized, and

(C) about 3 to 10 weight percent of at least one hydrophilic enhancing organic acid selected from acrylic, methacrylic, fumaric, itaconic and maleic acid.

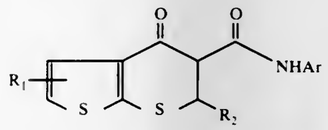
4,097,441

5,6-DIHYDRO-4-OXO-4H-THIENO[2,3-b]THIOPYRAN-5-CARBOXAMIDES

Jagadish C. Sircar, Dover; Stephen J. Kesten, Morris Plains, and Harold Zinnes, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 749,507, Dec. 10, 1976. This application Dec. 7, 1977, Ser. No. 858,233
Int. Cl.² C07D *495/04*
U.S. Cl. 260—332.2 A **2 Claims**

1. A compound of the Formula I:



I

wherein R_1 is hydrogen, halogen or lower alkyl; R_2 is hydrogen, lower alkyl or phenyl; and Ar is phenyl; or its pharmaceutically acceptable salts.

4,097,442

SANDABLE POLYURETHANE ADHESIVE COMPOSITION AND LAMINATES MADE THEREWITH

Alvin J. Kieft; Richard L. Cline, and Thomas G. Rabito, all of Ashland, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 21, 1977, Ser. No. 835,258
Int. Cl.² C08L *75/08*
U.S. Cl. 260—37 N **4 Claims**

1. A polyurethane adhesive that is sandable when cured, comprising a reaction mixture of

(a) about one mol of a reactive hydrogen containing polymeric material of 500 to about 3000 molecular weight selected from the class of polyester polyols and polyether polyols of 2 to 4 hydroxyls;

(b) about 2.5 to 7 mols of an isocyanate composition comprised of a mixture of toluene diisocyanate and methane di(phenylisocyanate); and

(c) a filler composed of about 50 to 200 parts by weight of silica platelets and about 50 to 200 parts of glass spherical particles, a plasticizer amount of a polyvinyl chloride plasticizer, a polyurethane catalyst and sufficient monomeric nitrogen containing tetraol of 200 to 1000 molecular weight to provide 0.5 to 1.0 mol of curative for each mol of excess isocyanate.

4,097,443

METHOD FOR MANUFACTURING FOUNDRY MOLDS

Masayuki Nakamura, and Setsuo Sanuki, both of Fujieda, Japan, assignors to Sumitomo Durez Company, Ltd., Tokyo, Japan

Filed Oct. 30, 1975, Ser. No. 627,413
Claims priority, application Japan, Nov. 1, 1974, 49-125508
Int. Cl.² C08K *3/36*
U.S. Cl. 260—38 **9 Claims**

1. A self-curing process for manufacturing foundry sand cores and molds which comprises preforming a mixture consisting essentially of the sand, resin consisting essentially of a phenol-formaldehyde resol resin and a volatile organic solvent for said resol resin selected from the group consisting of methanol, ethanol, propanol, acetone, methylethyl ketone, diacetone, ethyl acetate, butyl acetate, and mixtures thereof, the amount of resin being about 0.5 to 3 weight percent based on the weight of sand and the amount of solvent being about 0.2 to about 7 weight percent based on the weight of sand and evaporating the solvent from said preformed mixture at about 20° C. to about 50° C. to harden the resin and obtain the foundry mold composition.

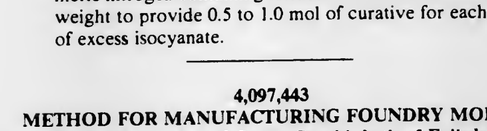
4,097,444

PROCESS FOR THE DYEING OF WATER-INSOLUBLE THERMOPLASTIC POLYMERS AND POLYCONDENSATES IN THE MASS

Wolfgang Teige, Kelkheim, Taunus, and Rudolf Schickfluss, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

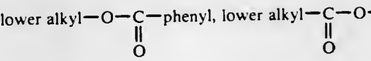
Filed Feb. 28, 1977, Ser. No. 772,573
Claims priority, application Germany, Mar. 2, 1976, 2608482
Int. Cl.² C08K *5/35*
U.S. Cl. 260—40 P **6 Claims**

1. Process for the dyeing of a water-insoluble thermoplastic polymer or polycondensate in mass, which comprises adding to the said thermoplastic material before the final molding thereof with an azlactone dyestuff of the formula (1)



(1),

in which A and B each represents phenyl, lower alkylphenyl, lower alkoxy-phenyl, chlorophenyl, nitrophenyl, cyanophenyl,



methylene-dioxy-phenylene or naphthyl, A and B being identical or different, E represents phenylene, lower alkyl-phenylene, di-lower alkoxy-phenylene, monochlorophenylene, dichlorophenylene, biphenylene or naphthylene, and *n* represents the integer 0 to 1, or with a mixture of dyestuffs of the said formula (1).

4,097,445

POLY(ESTER-AMIDE) HOT MELT ADHESIVES CONTAINING SPHEROIDAL METAL POWDERS

Joseph G. Martins, Ludlow, and Donald D. Donermeyer, Springfield, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Feb. 2, 1976, Ser. No. 654,490
Int. Cl.² C08K *3/08*
U.S. Cl. 260—40 R **20 Claims**

1. An adhesive composition comprising:

a. from about 60 to about 30 parts by weight of a poly-(ester-amide) block copolymer melting in the range of about 155° to about 225° C. having from about 30 to about 70 percent by weight of crystalline polyester segments derived from at least one aliphatic or alicyclic diol having from 2 to 10 carbon atoms and at least one alicyclic or aromatic dicarboxylic acid having from 8 to 20 carbon atoms, and from about 70 to about 30 percent by weight of amorphous polyamide segments derived from an aliphatic polycarboxylic acid containing at least 40 weight percent of a C_{18} to C_{54} polycarboxylic acid and an aliphatic or alicyclic primary diamine containing 2 to 10 carbon atoms; and

b. from about 40 to about 60 parts by weight of finely divided spheroidal metal powder selected from the group consisting of aluminum, iron, mild steel, stainless steel and zinc of particle size in the range of about 0.2 to about 150 microns.

4,097,446

REINFORCED INTERCRYSTALLINE THERMOPLASTIC POLYESTER COMPOSITIONS

Visvaldis Abolins, Delmar, and Fred F. Holub, Schenectady, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 185,886, Oct. 1, 1971, Pat. No. 4,013,613. This application Aug. 25, 1976, Ser. No. 717,533
Int. Cl.² C08K *3/40*
U.S. Cl. 260—40 R **27 Claims**

1. A reinforced intercrystalline normally rigid thermoplastic molding composition, consisting essentially of in combination,

(a) at least one high molecular weight normally crystalline polyester resin which very rapidly crystallizes from the melt,

(b) at least one high molecular weight normally crystalline, normally amorphous or normally partially crystalline and partially amorphous polymer in the concentration range of from 1 to 99 parts by weight of (a) to 99 to 1 parts by weight of (b); that is selected from the group consisting of:

polyethylene,
poly(methylpentene),
a copolymer of ethylene and ethyl acrylate, poly(vinyl chloride),
a copolymer of vinyl chloride and vinyl acetate, natural rubber,
a rubbery copolymer of butadiene and acrylonitrile,
a polyamide,
a polyimide,
a polyorganosiloxane,
a copolymer of a polyorganosiloxane and a vinyl aromatic monomer, an acrylic monomer or an aromatic carbonate, and
a siloxane-nitrogen copolymer containing amido, amideimido or imide groups; and

(c) a reinforcing amount of a reinforcing filler for said combination.

4,097,447

HIGH TENSILE STRENGTH POLYETHYLENE/LOW-HYDRATION ALUMINA COMPOSITES

Edward George Howard, Jr., Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 31, 1977, Ser. No. 783,453
Int. Cl.[2] C08K *3/10*
U.S. Cl. 260—42.14 **15 Claims**

1. A solid, particulate, polyethylene/low-hydration alumina composite which comprises

(a) 10–70% by weight of polyethylene having an inherent viscosity of at least 2, and

(b) 30–90% by weight of finely-divided, low-hydration alumina prepared by calcining alumina trihydrate having a weight-average equivalent spherical particle diameter of 0.1 to less than 50 μ at a temperature of at least 300° C for a time sufficient that the degree of hydration is reduced to not more than 0.8 H_2O, said low-hydration alumina having interacted at its surface a catalytically-effective amount of catalytically-active, transition metal compound, said polyethylene being polymerized onto the surface of said low-hydration alumina.

4,097,448

THERMOSETTABLE EPOXIDE-POLYANHYDRIDE COMPOSITIONS

William J. Heilman, Houston, Tex.; Frank C. Peterson, Joplin, Mo.; Mical C. Renz, and Leslie P. Theard, both of Houston, Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Mar. 4, 1977, Ser. No. 774,379
Int. Cl.[2] C08K *7/14;* **C08L** *63/00*
U.S. Cl. 260—42.18 **19 Claims**

1. A method of forming a handleable, thermosettable composition which comprises

forming a homogeneous liquid resin mixture substantially free of active hydrogen comprising

(a) about five to about 80 weight percent based on the total resin components of an olefinically unsaturated monomer selected from styrene, ring-substituted chloro-, bromo or lower alkylstyrenes, lower alkylacrylates, lower alkylmethacrylates, vinyl acetate, acrylonitrile, vinyl chloride, vinyl bromide and vinylidene chloride, and mixtures thereof,

(b) an anhydride component consisting of

(1) an olefinically unsaturated monoanhydride selected from maleic anhydride, chloromaleic anhydride, methylmaleic anhydride, ethylmaleic anhydride, dichloromaleic anhydride, dimethylmaleic anhydride, n-butylmaleic anhydride, phenylmaleic anhydride, diphenylmaleic anhydride, chloromethylmaleic anhydride, bromophenylmaleic anhydride and itaconic anhydride, the molar ratio of the olefinically unaturated monomer (a) to the olefinically unsaturated monoanhydride being from about 0.5:1 to about 8:1;

(2) a saturated polyanhydride comprising the copolymer having between two and about 500 repeating units and prepared from one to 10 mols of said olefinically unsaturated monomer (a) per mol of said unsaturated monoanhydride (b) (1) or prepared from equimolar amounts of said unsaturated monoanhydride (b) (1) and one or more two to 20 carbon 1-alkenes or halogen-substituted 1-alkenes; and

(3) a saturated monoanhydride selected from phthalic anhydride, hexahydrophthalic anhydride, methyltetrahydrophthalic anhydride, dodecenylsuccinic anhydride, chlorendic anhydride, and a mixture of methyl bicyclo (2.2.1)heptane-2,3-dicarboxylic anhydride isomers;

(4) the ratio of the anhydride equivalents of said olefinically unsaturated monoanhydride (1) to the sum of the total anhydride equivalents in the resin solution being from about 0.2:1 to about 1:1 and the ratio of anhydride equivalents in said saturated polyanhydride (2) to the anhydride equivalents in said saturated monohydride (3) being at least about 1:1;

(c) an epoxy component substantially free of active hydrogen consisting of

(1) a saturated monoepoxy compound having between three and about 20 carbon atoms, and

(2) an epoxy resin having a 1,2-epoxy equivalent value greater than one which is soluble in the resin solution or is capable of forming a homogeneous dispersion in the resin solution,

(3) the ratio of epoxy equivalents in the monoepoxy compound to the epoxy equivalents in the epoxy resin being greater than 1:1 and an A/E ratio of total anhydride equivalents to total energy equivalents in the resin solution of about 0.1:1 to about 2.5:1; and

(d) from about 0.01 to about 10 weight percent of an anhydride accelerator which is substantially inactive during the copolymerization reaction of said olefinically unsaturated monomer (a) and said anhydride (b); and

copolymerizing said olefinically unsaturated monomer (a) with said anhydride component (b) by free radical means at a temperature up to about 150° C. without substantial reaction of the anhydride groups with the epoxide present in the resin mixture whereby a handleable, thermosettable composition comprising a homogeneous mixture of polyanhydride molecules, epoxide molecules and anhydride accelerator is obtained.

4,097,449

HANDLEABLE, THERMOSETTABLE EPOXIDE-POLYANHYDRIDE COMPOSITIONS

William J. Heilman, Houston, Tex.; Frank C. Peterson, Joplin, Mo.; Mical C. Renz, and Leslie P. Theard, both of Houston, Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Mar. 4, 1977, Ser. No. 774,442
Int. Cl.[2] C08K *7/14;* **C08L** *63/00*
U.S. Cl. 260—42.18 **16 Claims**

1. A method of forming a handleable, thermosettable composition which comprises

forming a homogeneous liquid resin mixture substantially free of active hydrogen comprising

(a) about five to about 80 weight percent based on the total resin components of an olefinically unsaturated monomer consisting of

(1) one or more alkenes having from about 6 to about 18 carbon atoms and halogen derivatives thereof, and

(2) up to 90 mol percent of styrene, ring-substituted chloro-, bromo or lower alkylstyrenes, lower alkylacrylates, lower alkylmethacrylates, vinyl acetate, acrylonitrile, vinyl chloride, vinyl bromide or vinylidene chloride;

(b) an anhydride component consisting of

(1) an olefinically unsaturated monoanhydride selected from maleic anhydride, chloromaleic anhydride, methylmaleic anhydride, ethylmaleic anhydride, dichloromaleic anhydride, dimethylmaleic anhydride, n-butylmaleic anhydride, phenylmaleic anhydride, diphenylmaleic anhydride, chloromethylmaleic anhydride, bromophenylmaleic anhydride and itaconic anhydride, the molar ratio of the olefinically unsaturated monomer (a) to the olefinically unsaturated monoanhydride (b) (1) being about 1:1;

(2) a saturated polyanhydride comprising the copolymer having between two and about 500 repeating units and prepared from one to 10 mols of said olefinically unsaturated monomer (a) (2) per mol of said unsaturated monoanhydride (b) (1) or prepared from equimolar amounts of said unsaturated monoanhydride (b) (1) and one or more two to 20 carbon 1-alkenes or halogen-substituted 1-alkenes; and

(3) a saturated monoanhydride selected from phthalic anhydride, hexahydrophthalic anhydride, methyltetrahydrophthalic anhydride, dodecenylsuccinic anhydride, chlorendic anhydride, and a mixture of methyl bicyclo(2.2.1)heptane-2,3-dicarboxylic anhydride isomers;

(4) the ratio of the anhydride equivalents of said olefinically unsaturated monoanhydride (b) (1) to the sum of the total anhydride equivalents in the resin solution being from about 0.2:1 to about 1:1 and the ratio of anhydride equivalents in said saturated polyanhydride (b) (2) to the anhydride equivalents in said saturated monoanhydride (b) (3) being at least about 1:1;

(c) an epoxy component substantially free of active hydrogen selected from

(1) a saturated monoepoxy compound having between three and about 20 carbon atoms, or

(2) an epoxy resin having a 1,2-epoxy equivalent value greater than one which is soluble in the resin solution or is capable of forming a homogeneous dispersion in the resin solution, or a mixture of said saturated monoepoxy compound and said epoxy resin,

(3) said epoxy component having an A/E ratio of total anhydride equivalents to total epoxy equivalents in the resin solution of about 0.1:1 to about 2.5:1; and

(d) from about 0.01 to about 10 weight percent of an anhydride accelerator which is substantially inactive during the copolymerization reaction of said olefinically unsaturated monomer (a) and said anhydride component (b); and

copolymerizing said olefinically unsaturated monomer (a) with said anhydride component (b) by free radical means at a temperature up to about 150° C. without substantial reaction of the anhydride groups with the epoxide groups present in the resin mixture whereby a handleable, thermosettable composition comprising a homogeneous mixture of polyanhydride molecules, epoxide molecules and anhydride accelerator is obtained.

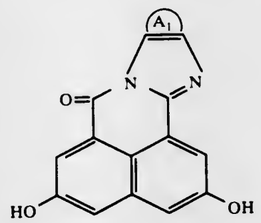
4,097,450

PERINONE COMPOUNDS AS COLORANTS FOR POLYOLEFINS

Theodor Papenfuhs, Frankfurt am Main, and Helmut Tröster, Konigstein, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 723,072, Sep. 14, 1976, abandoned, which is a continuation of Ser. No. 618,800, Oct. 2, 1975, abandoned. This application May 26, 1977, Ser. No. 800,895
Int. Cl.[2] C08K *5/34*
U.S. Cl. 260—42.21 **2 Claims**

1. In a process wherein a pigment is incorporated into a polyolefin, the improvement consisting essentially of employing as pigment a compound of the formula



wherein A_1 is phenylene which is unsubstituted or substituted by 1 or 2 substituents selected from fluorine, chlorine, bromine, lower alkyl, lower alkoxy, phenyl, phenoxy, hydroxy, benzyloxy, lower alkanoylamino, benzoylamino, lower alkylsulfonyl, nitro, nitrile, trifluoromethyl, carboxy, carbalkoxy of 2 to 5 carbon atoms and carboxylic or sulfonic acid amide which is unsubstituted or substituted at the nitrogen by 1 or 2 radicals selected from lower alkyl, phenyl or nitrophenyl.

4,097,451

FLAME-RETARDANT RESINOUS COMPOSITIONS

Donald A. Keyworth, Houston, Tex.; Eugene P. Di Bella, Piscataway, and Marvin Rosen, Warren, both of N.J., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Continuation-in-part of Ser. No. 423,565, Dec. 10, 1973, abandoned. This application Apr. 24, 1974, Ser. No. 463,566
Int. Cl.[2] C08K *5/02*
U.S. Cl. 260—45.7 R **8 Claims**

1. A flame-retardant resinous composition comprising a thermoplastic organic polymer selected from the group consisting of polyolefins and vinyl chloride polymers and a flame-retarding amount of 1,1,2,3,4,4-hexabromobutene-2.

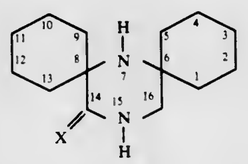
4,097,452

14-SUBSTITUTED 7,15-DIAZADISPIRO-[5.1.5.3]-HEXADECANES AS UV STABILIZERS

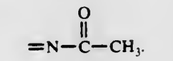
Norbert Mayer, Gersthofen; Gerhard Pfahler, Augsburg, and Hartmut Wiezer, Gersthofen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 16, 1977, Ser. No. 769,331
Claims priority, application Germany, Feb. 20, 1976, 2606819
Int. Cl.[2] C08K *5/34*
U.S. Cl. 260—45.8 N **7 Claims**

5. Plastics compositions consisting of a polyolefin, a chlorine-containing polyolefin, a polyacetal, polyester, polyurethane or epoxy resin and as stabilizer 0.1 – 5% by weight of the polymer of a compound of the formula



wherein X is = O, = NH or



4,097,453

PROCESS FOR THE PREPARATION OF ETHERIFIED ACETAL POLYMERS

Pierino Radici, Turate (Como); Sergio Custro, Gorla Maggiore (Varese), and Paolo Colombo, Saronno (Varese), all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 22, 1975, Ser. No. 642,811
Claims priority, application Italy, Dec. 20, 1974, 30831/74
Int. Cl.[2] C08K *5/42*
U.S. Cl. 260—45.9 P **19 Claims**

1. A method for the etherification of the unstable terminal hydroxyl groups of an acetal polymer, which comprises bringing said acetal polymer into contact with an etherification reagent selected from the group consisting of orthoesters, epoxides and acetals in the presence of 4-(p-toluenesulphonamide) diphenylamine as an additive stabilizer and subsequently etherifying said acetal polymer in a liquid reaction medium at a temperature of from 50° to 200° C wherein said additive is present in an amount of from 0.05 to 5 parts by weight of said liquid reaction medium.

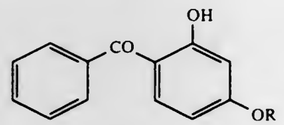
4,097,454

BENZOPHENONE BASE STABILIZING AGENT FOR POLYMERS AND POLYMERS STABILIZED THEREBY

Antonio Tozzi, Sasso Marconi, and Paolo Cassandrini, Bologna, both of Italy, assignors to Chimosa Chimica Organica S.p.A., Bologna, Italy

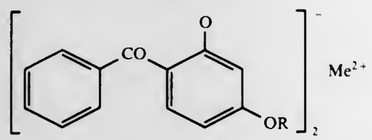
Continuation of Ser. No. 476,340, Jun. 4, 1974, abandoned. This application Jun. 10, 1976, Ser. No. 694,591
Claims priority, application Italy, Jun. 8, 1973, 50569
Int. Cl.[2] C08K *5/13*
U.S. Cl. 260—45.75 N 8 Claims

1. A stabilizer for polypropylene against the action of light, comprising a mixture containing substantially equal proportions of compounds of the formula



(1)

wherein R is a linear alkyl chain from 1 to 18 carbon atoms, with compounds of the formula



wherein Me is Ni or Co, and R is a linear alkyl chain from 1 to 18 carbon atoms.

6. A polypropylene stabilized with the stabilizer according to claim 1 by adding to it said stabilizer to the proportion of 0.05 to 1.5 weight % of said polymer.

4,097,455

MOULDING COMPOSITIONS OF MIXTURES OF HALOGEN-CONTAINING AND HALOGEN-FREE POLYFUNCTIONAL AROMATIC CYANIC ACID ESTERS

Claus Burkhardt; Karl-Heinrich Meyer, both of Krefeld, and Kurt Weirauch, Bergisch Gladbach, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 17, 1977, Ser. No. 778,713
Claims priority, application Germany, Mar. 23, 1976, 2612312
Int. Cl.[2] C08G *18/76*
U.S. Cl. 260—47 CB 6 Claims

1. Moulding compositions for the production of mouldings with fire-retarding properties comprising mixtures of

(A) 10 to 90% by weight of at least one polyfunctional, aromatic halogen-free cyanic acid ester or a prepolymer thereof which is still fusible or soluble in solvents, and

(B) 10 to 90% by weight of at least one polyfunctional, aromatic halogen-containing cyanic acid ester or a prepolymer thereof which is still fusible or soluble in solvents.

4,097,456

PREPARATION OF ACETYLENE-SUBSTITUTED POLYIMIDE OLIGOMERS AND POLYIMIDE POLYMERS

Walter P. Barie, Jr., Shaler Township, Allegheny County, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Mar. 28, 1977, Ser. No. 782,001
Int. Cl.[2] C08G *73/12*
U.S. Cl. 260—47 UA 22 Claims

1. A process for the preparation of an acetylene-substituted polyimide oligomer which comprises

reacting a stoichiometric excess of a dianhydride of an aromatic tetracarboxylic acid, or a lower alkyl diester of said aromatic tetracarboxylic acid, with an aromatic diamine to form an anhydride-capped polyamic acid or acid-ester-capped analog in the presence of at least a sufficient amount of a solvent consisting essentially of N-methyl-2-pyrrolidone to form a solution at elevated temperatures;

thereafter reacting said anhydride-capped polyamic acid or analog with an aminoarylacetylene compound in the presence of said solvent to produce an acetylene-terminated polyamic acid oligomer;

converting said acetylene-terminated polyamic acid oligomer to the corresponding polyimide in the continued presence of at least a portion of said solvent;

and thereafter recovering the desired acetylene-substituted polyimide oligomers substantially free of said solvent.

4,097,457

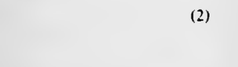
PROCESS FOR PREPARING HIGH MOLECULAR WEIGHT POLYCARBONATES

Takeaki Megumi, Sakai, and Shigeo Kondo, Toyonaka, both of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Dec. 3, 1975, Ser. No. 637,307
Claims priority, application Japan, Dec. 9, 1974, 49-141319
Int. Cl.[2] C08G *63/62*
U.S. Cl. 260—47 XA 14 Claims

1. A process for preparing a high molecular weight polycarbonate comprising

(A) reacting phosgene with a dihydroxydiarylalkane at a temperature of from 0° to 80° C in the presence of an acid acceptor and a solvent by adding a monohydric phenol and at least one member selected from the group consisting of compounds having the formulas



(2)

where R is a hydrocarbon residue having 1 to 10 carbon atoms selected from the group consisting of saturated aliphatic hydrocarbon residues, aliphatic hydrocarbon residues having an aromatic group substituent and alicyclic hydrocarbon residues; X is chloro or bromo; the quantity of monohydric phenol is from 0.1 to 5 mole percent, based on the dihydroxydiarylalkane; and the amount of compound according to Formulas (1) and (2) is from 0.5 to 100 mole percent, based on the dihydroxydiarylalkane, to produce a polycarbonate prepolymer having the chains terminated with residues of compounds (1) and/or (2) and an intrinsic viscosity of 0.01 to 0.40, determined with an Ostwald viscosimeter in methylene chloride at 25° C, and

(B) heating and melting under reduced pressure the prepolymer so formed to cause polycondensation thereof at a temperature of 220° to 320° C.

4,097,458

METHOD FOR PREPARING POLYPHENYLENE ETHERS

James G. Bennett, and Glenn D. Cooper, both of Delmar, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 26, 1973, Ser. No. 427,996
The portion of the term of this patent subsequent to Feb. 24, 1991, has been disclaimed.
Int. Cl.[2] C08G *65/44*
U.S. Cl. 260—47 ET 13 Claims

1. In a process for forming a polyphenylene ether by an oxidative coupling reaction in the presence of a catalyst which comprises a complexed metal ion and an amine, said process comprising passing an oxygen-containing gas through a reaction solution of a phenol and said catalyst, the improvement which comprises separating the catalyst from the polyphenylene ether by the addition of a sufficient amount of a complexing agent selected from the group consisting of biguanide, di-o-tolylbiguanide, dicyanodiamide and L-Arginine to produce a complexed catalyst mixture and the polyphenylene ether and thereafter separating the polyphenylene ether from said mixture.

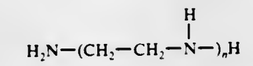
4,097,459

METHOD FOR PREPARING POLYPHENYLENE ETHERS

James G. Bennett, and Glenn D. Cooper, both of Delmar, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 26, 1973, Ser. No. 428,450
The portion of the term of this patent subsequent to Sep. 24, 1991, has been disclaimed.
Int. Cl.[2] C08G *65/44*
U.S. Cl. 260—47 ET 13 Claims

1. In a process for forming a polyphenylene ether by an oxidative coupling reaction in the presence of a catalyst which comprises a complexed metal ion and an amine, said process comprising passing an oxygen-containing gas through a reaction solution of a phenol and said catalyst, the improvement which comprises separating the catalyst from the polyphenylene ether by the addition of a sufficient amount of a complexing agent selected from compounds of the formula



and mixtures thereof wherein *n* is a positive integer of from 1 to 10, to produce a mixture of a complexed catalyst and the polyphenylene ether and thereafter separating the polyphenylene ether from said mixture.

4,097,460

POLY(ARYLACETYLENES) AND THERMOSET RESINS THEREFROM

Harold Jabloner, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 165,592, Jul. 23, 1971, abandoned. This application Jun. 12, 1972, Ser. No. 262,166
Int. Cl.[2] C08G *65/00, 67/00;* C08F *38/00*
U.S. Cl. 260—47 UA 10 Claims

1. A polyacetylenically unsaturated prepolymer consisting essentially of a polycyclotrimerization polymer of at least one polyacetylenically substituted aromatic compound selected from the group consisting of diethynylbenzene; diethynyltoluene; diethynylxylene; diethynylbiphenyl; 9,10-diethynylanthracene; 9,10-diethynylphenanthrene; di(ethynylphenyl)ether; 1-chloro-2,5-diethynylbenzene; 2,3,5,6-tetrachloro-1,4-diethynylbenzene; 4,4'-diethynyl-trans-azobenzene; diphenylbutadiyne; 2,2'-dichlorodiphenyldiacetylene; 4,4'-dichlorodiphenyldiacetylene; 4,4'-dibromodiphenyldiacetylene; di-p-tolyldiacetylene; di-α-naphthyldiacetylene; dibenzyldiacetylene; 1,4-bis(phenylethynyl)benzene; 1,3-bis(phenylethynyl)-benzene; 9,10-bis(phenylethynyl)anthracene; 1,3,5-triethynylbenzene; 1,2,4-triethynylbenzene; 1,3,5-tris(phenylethynyl)-2,4,6-triphenylbenzene; 1,2,4-tris(phenylethynyl)-3,5,6-triphenylbenzene; tris(ethynylphenyl)benzene and mixtures of at least one of said compounds with phenylacetylene, said prepolymer having a number average molecular weight of from about 900 to about 12,000, a ratio of aromatic protons to olefinic protons from about 2.4:1 to about 38:1 and containing from about 5 to about 20% terminal acetylenic groups by weight of the prepolymer.

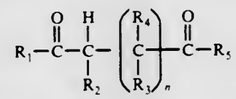
4,097,461

OXIDATIVE COUPLING OF ALKYLPHENOLS OR 1-NAPHTHOLS CATALYZED BY METAL COMPLEXES OF DIKETO COMPOUNDS

Thomas F. Rutledge, Wilmington, Del., assignor to ICI Americas Inc., Wilmington, Del.

Filed Dec. 3, 1976, Ser. No. 747,183
Int. Cl.[2] C08G *65/44*
U.S. Cl. 260—47 ET 18 Claims

1. A method of preparing a condensation product of an "alkylphenol", an "alkoxyphenol" or a "1-naphthol", by an oxidative coupling reaction said method comprising contacting a mixture of the phenol or naphthol with oxygen or oxygen containing gas in the presence of sufficient amount of alkaline material to sustain pH in the range of about 5–10 during the oxidative coupling reaction and a catalyst system comprising a cupric, manganous, cobaltous, or chromic metal complex of diketone or keto ester having the structural formula



wherein R_1 and R_5 may be independently linear, branched or cyclic alkyl or alkoxy or may be joined together to form a saturated or unsaturated cyclic compound; R_2, R_3 and R_4 may be independently hydrogen, halogen, alkoxy, alkyl, or aryl; and *n* is 0 or 1.

4,097,462

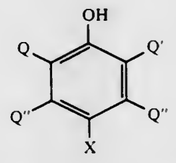
PROCESS FOR MAKING POLYPHENYLENE OXIDES

Walter Karl Olander, Clifton Park, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Filed Jan. 23, 1976, Ser. No. 651,682
The portion of the term of this patent subsequent to May 11, 1993, has been disclaimed.
Int. Cl.[2] C08G *65/44*
U.S. Cl. 260—47 ET 12 Claims

1. A process for the preparation of a polyphenylene oxide resin composition which comprises the steps of:

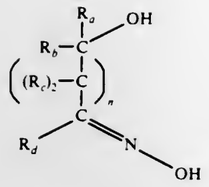
a. oxidatively coupling a phenolic monomer having the formula



wherein X is a substituent selected from the group consisting of hydrogen, chlorine, bromine and iodine, Q is a monovalent substituent selected from the group consisting of hydrocarbon radicals, halohydrocarbon radicals having at least two carbon atoms between the halogen atom and the phenol nucleus, hydrocarbonoxy radicals and halohydrocarbonoxy radicals having at least two carbon atoms between the halogen atom and the phenol nucleus; and Q' is as defined for Q, and in addition, halogen, and Q'' are each as defined for Q' and in addition hydrogen with the proviso that Q, Q' and Q'' are all free of a tertiary carbon atom in the presence of oxygen in a basic reaction medium to form a polyphenylene oxide resin in the presence of an organic solvent and a manganese (II) chelate complex of the formula:

(L)x Mn

wherein L is a ligand derived from a ω-hydroxyoxime of the formula



wherein R_a, R_b, R_c, R_d and n are selected from the group consisting of hydrogen, acyclic and cyclic organic radicals and n is a positive integer equal to 0 or 1, Mn is the transition metal manganese (II) and x is at leat equal to about 0.5;

b. adding an antisolvent to the reaction mixture of (a) to precipitate out the polymer and catalyst to obtain a polyphenylene oxide resin composition.

4,097,463

PROCESS FOR PREPARING HIGH ORTHO NOVOLAC RESINS

Harry M. Culbertson, Belchertown, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 10, 1977, Ser. No. 758,371

Int. Cl.[2] C08G *8/10*

U.S. Cl. 260—57 A **7 Claims**

1. In a process for the production of phenol-aldehyde novolac resins of the class which is characterized by having a preponderance of ortho/ortho methylene bridges and which is prepared by an acid reaction mixture containing a material selected from the group consisting of phenol and meta-alkylphenols in molar excess with a source of formaldehyde, conducting said reacting in the presence of a catalyst system comprising in combination:

(A) a divalent electropositive metal compound selected from the group consisting of oxides, hydroxides, organic acid salts, sulfonic acid salts, halogen acid salts and fluoroborate acid salts of said metals or mixtures thereof, and

(B) an acid material selected from the group consisting of halogen, fluoroboric and sulfonic acids and divalent metal salts of said acids or mixtures thereof, said catalyst system being at least partially soluble in said reaction mixture and being present amounts such that the pH of said reaction mixture is maintained at about 4 to 7, wherein the improvement comprises conducting said reacting under anhydrous conditions wherein said anhydrous conditions are provided by azeotropic distillation and removal of a water phase during said reacting, said reacting being carried out at a temperature of 115° to 145° C. with a molar ratio of phenol to formaldehyde of about 1.2:1 to 2.0:1 providing said novolac resin with about 80 to 95% ortho-ortho methylene bridges said novolac having a weight average molecular weight greater than 400.

4,097,464

2,6-DI-TERT-ALKYL-4-VINYLPHENOLS AS POLYMERIZABLE ANTIOXIDANTS

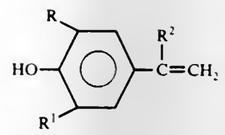
Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 3, 1975, Ser. No. 628,685

Int. Cl.[2] C08F *236/06, 36/06, 216/02*

U.S. Cl. 260—62 **6 Claims**

1. A process of preparing a self-stabilizing diene polymer comprising polymerizing in a free radical emulsion polymerization system a monomer system comprised of at least 40 parts by weight of diene monomer and 0.10 to 10 parts by weight of at least one phenolic monomer having the following structural formula



wherein R and R^1 are tertiary alkyl radicals containing from 4 to 8 carbon atoms and R^2 is selected from the group consisting of hydrogen and methyl and wherein all parts are parts by weight per 100 parts of total monomer.

4,097,465

LIQUID COATING COMPOSITIONS

Dieter Berger, Marl, Germany, assignor to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Filed May 14, 1976, Ser. No. 686,484

Claims priority, application Germany, May 17, 1975, 2522045

Int. Cl.[2] C08G *63/12*

U.S. Cl. 260—75 EP **11 Claims**

1. In an epoxy resin-based liquid varnish coating composition whose binder comprises one or more cyclic anhydrides of saturated and/or unsaturated aliphatic and/or cycloaliphatic dicarboxylic acids, or a mixture consisting essentially of carboxylic acid anhydrides of saturated and/or unsaturated aliphatic and/or cycloaliphatic and aromatic dicarboxylic acids, wherein the melting point of the anhydride or anhydride mixture is below 100° C., the improvement wherein the coating composition contains at most up to 25% volatile solvent, the binder is a mixture of A) glycidyl esters and B) one or more of said anhydrides, in a ratio such that the binder contains 0.7 - 1.5 anhydride equivalents per epoxide equivalent of glycidyl ester, wherein the glycidyl esters have 1.5 - 2.5 epoxide equivalents/mole, an epoxy number of 0.2 - 0.4 epoxide equivalents/100 g., a hydroxyl number of 20-130 mg. KOH/g. and a number average molecular weight of 450-800, and are prepared by glycidylating an esterification product containing free carboxyl groups with a molar excess of a 2,3-epoxyhaloalkane in the presence of an agent which splits off hydrogen halide, said esterification product having an acid number 220-350 mg. KOH/g., a hydroxyl number of 0-100 mg. KOH/g., an average molecular weight of 350-600 and an average degree of polymerization of 2.8 - 3.5 and wherein the esterification product is prepared by condensing a reaction mixture consisting essentially of:

(a) 100-50 molar percent of at least one aliphatic or cycloaliphatic diol wherein the hydroxyl functions are separated from each other by 2-12 carbon atoms and 0-2 of said carbon atoms are substituted by an oxygen atom which oxygen atoms when present are separated by at least 2 carbon atoms from each other and from the hydroxyl groups, and correspondingly 0-50 molar percent of at least one aliphatic polyol of 3-6 carbon atoms and 3 and 4 hydroxyl groups; and

(b) a mixture of 15-50 molar percent of at least one saturated aliphatic dicarboxylic acid of 4-12 carbon atoms or an intramolecular anhydride thereof, and correspondingly 85-50 molar percent of at least one aromatic or cycloaliphatic dicarboxylic acid other than terephthalic acid of 6-12 ring carbon atoms or an intramolecular anhydride thereof, or a corresponding mixture thereof and up to 30 molar percent of an aromatic polycarboxylic acid having 3 or more carboxyl groups or an intrmolecular anhydride thereof.

4,097,466

LIQUID COATING COMPOSITIONS

Dieter Berger, Marl, Germany, assignor to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Filed May 14, 1976, Ser. No. 686,483

Claims priority, application Germany, May 17, 1975, 2522044

Int. Cl.[2] C08G *63/12*

U.S. Cl. 260—75 EP **10 Claims**

1. In an epoxy resin based liquid varnish coating composition whose binder comprises one or more cyclic anhydrides of saturated and/or unsaturated aliphatic and/or cycloaliphatic dicarboxylic acids, or a mixture consisting essentially of carboxylic acid anhydrides of saturated and/or unsaturated aliphatic and/or cycloaliphatic and aromatic dicarboxylic acids, wherein the melting point of the anhydride or anhydride mixture is below 100° C., the improvement wherein the coating composition contains at most up to 25% volatile solvent and the binder is a mixture of A) glycidyl esters and B) one or more of said anhydrides, in a ratio such that the binder contains 0.7 -1.5 anhydride equivalents per epoxide equivalent of glycidyl ester, wherein the glycidyl esters have 1.6 - 2.8 epoxide equivalents/mole, an epoxy number of 0.1 - 0.35 epoxide equivalents/100 g., a hydroxyl number of 20-130 mg. KOH/g. and a number average molecular weight of 600-2000 and are prepared by glycidylating an esterification product containing free carboxyl groups with a molar excess of a 2,3-epoxyhaloalkane in the presence of an agent which splits off hydrogen halide, said esterification product having an acid number of 60-220 mg. KOH/g., a hydroxyl number of 0-100 mg. KOH/g., an average molecular weight of 550-1800 and an average degree of polymerization of 4.8-15, and wherein the esterification product is prepared by condensing a reaction mixture consisting essentially of:

(a) 100-50 molar percent of at least one aliphatic or cycloaliphatic diol wherein the hydroxyl functions are separated from each other by 2-12 carbon atoms and 0-2 of said carbon atoms are substituted by an oxygen atom which oxygen atoms when present are separated by at least 2 carbon atoms from each other and from the hydroxyl groups, and correspondingly 0-50 molar percent of at least one aliphatic polyol of 3-6 carbon atoms and 3 or 4 hydroxyl groups; and

(b) a mixture of 15-40 molar percent of at least one saturated aliphatic dicarboxylic acid of 4-12 carbon atoms or an intramolecular anhydride thereof, and correspondingly 85-60 molar percent of at least one aromatic or cycloaliphatic dicarboxylic acid other than terephthalic acid of 6-12 ring carbon atoms or an intramolecular anhydride thereof, or a corresponding mixture thereof and up to 30 molar percent of an aromatic polycarboxylic acid having 3 or more carboxyl groups or an intramolecular anhydride thereof.

4,097,467

PROCESS FOR THE PREPARATION OF A COPOLYMERIZABLE COMPOSITION

Lodewijk Roskott, Gorssel, and Arnold Schroeder, Deventer, both of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed Jun. 20, 1975, Ser. No. 588,993

Claims priority, application Netherlands, Jun. 21, 1974, 7408353

Int. Cl.[2] C08G *63/52;* C08L *67/06*

U.S. Cl. 260—75 UA **2 Claims**

1. In an improved process for the preparation of a copolymerizable composition containing an unsaturated polyester resin, a peroxide initiator and a metal accelerator, wherein the improvement comprises the step of incorporating in said composition as the peroxide initiator a peroxide composition consisting essentially of an alkylaldehyde peroxide which may be synthesized by reacting an alkylaldehyde with hydrogen peroxide, said alkyl aldehyde peroxide being selected from the group consisting of an unsubstituted alkylaldehyde peroxide, and alkyl-substituted alkyladlehyde peroxide, and an aryl-substituted alkylaldehyde peroxide, and said alkylaldehyde peroxide containing not more than 20 carbon atoms and at least 1.5 active oxygen atoms per carbonyl group of said alkylaldehyde.

4,097,468

PROCESS FOR PREPARING POLYESTERS

Leonard Evans James, Richmond; Laszlo Joseph Balint, Chester, and Stanley David Lazarus, Petersburg, all of Va., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Mar. 15, 1977, Ser. No. 777,819

Int. Cl.[2] C08G *63/18*

U.S. Cl. 260—75 M **8 Claims**

1. In a continuous process for the preparation of high molecular weight linear polyesters of terephthalic acid which comprises partially esterifying terephthalic acid with an alkylene glycol containing 2 to 10 carbon atoms per molecule under direct esterification conditions and then further esterifying and polycondensing the partially esterified product until there is obtained a polyester of the desired molecular weight, the improvement which comprises:

(a) continuously subjecting to conditions of direct esterification at a temperature of 270°-280° C. and a pressure of 100-150 psig a flowable, uniform dispersion comprised of (1) a paste consisting of said terephthalic acid, about 1.0 to 1.2 mols of said alkylene glycol per mole of terephthalic acid, and about 0.4 to 1.8 mols of water per mol of terephthalic acid, and (2) about 20 to about 40 parts by weight per part of paste of a partially esterified product of said terephthalic acid with said alkylene glycol, said partially esterified product having a reacted glycol to terephthalic acid mol ratio between 0.9 and 1.2 and a carboxyl conversion of about 70 to 80 percent, said partially esterified product being continuously recycled to the esterification zone at a temperature of 270°-280° C. and a pressure of 100-150 psig and said paste being continuously added thereto at a predetermined point in the recycle system;

(b) continuously withdrawing a portion of the partially esterified product from step (a) equivalent to the terephthalic acid added in step (a), and continuously reacting said portion of the partially esterified product with about 0.5 to 0.7 mol of said alkylene glycol per mol of terephthalic acid added in step (a), said reaction being carried out at a temperature of 270°-280° C. and a pressure of 90-100 psig, thereby producing an esterified product having a reacted glycol to terephthalic acid mol ratio between 1.4 and 1.6 and a carboxyl conversion of about 90 to 95 percent;

(c) continuously further esterifying the esterification product of step (b) at a temperature of 270°-280° C. and a pressure of 300 to 400 mm of Hg to produce an esterified product having a reacted glycol to terephthalic acid mol ratio between 1.1 and 1.2 and a carboxyl conversion of 97 to 99 percent; and

(d) continuously further esterifying and polycondensing the esterification product of step (c) at a temperature of 260°-300° C. and a pressure less than 300 mm Hg until there is obtained an improved polyester of the desired molecular weight, whereby the molecular weight distribution of said polyester is restricted so that the ratio of the weight average molecular weight to the number average molecular weight is less than 2.25.

4,097,469

PROCESS FOR PREPARING POLYAMIDES OF PACP

Robert S. Shue, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 15, 1976, Ser. No. 677,210

Int. Cl.[2] C08G *69/28*

U.S. Cl. 260—78 R **45 Claims**

1. A process for preparing a polyamide which comprises the steps of:

a. heating at least one (A) diamine and at least one (B) diacid

employing a molar ratio of diamine:diacid from about 2.75 percent molar excess of diamine to about 1.75 percent molar excess of diacid, employing an effective amount of a catalyst system comprising manganous hypophosphite and water, at elevated temperatures and pressures, and for a time sufficient, to obtain a prepolymer exhibiting an inherent viscosity in the range of about 0.6 to 0.95 as measured at 0.5 wt. % in m-cresol solution at 30° C, and

b. heating said prepolymer at elevated temperatures under substantially vacuum conditions for an effective time, thereby polycondensing said prepolymer to a polyamide product exhibiting an inherent viscosity higher than that of said prepolymer, and in the range of about 1 to 1.8,

wherein said (A) diamine is 2,2-bis(4-aminocyclohexyl)propane or methyl derivatives thereof wherein each cyclohexyl ring has 0–1 methyl group, and

wherein said (B) diacid is an alkane straight chain dicarboxylic acid selected from the group consisting of (B1) at least one C_8 to C_{12} diacid, and (B2) adipic acid and at least one C_8 to C_{12} diacid.

4,097,470

PREPARATION OF BIOGICALLY ACTIVE SUBSTANCES BEARING -NH_2 GROUPS IN A FORM RELEASABLE BY ENZYMATIC CLEAVAGE

Jaroslav Drobník; Jindřich Kopeček; Jiři Labský; Pavla Rejmanová; Josef Exner, and Jaroslav Kalal, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Jun. 9, 1975, Ser. No. 584,887

Claims priority, application Czechoslovakia, Apr. 25, 1974, 2958-74

Int. Cl.² C08F *16/28, 24/00, 210/00*

U.S. Cl. 260—78 A **9 Claims**

1. Polymeric form of a biologically active compound containing at least one —NH_2 group adapted for the protracted release of the biologically active compound by enzymatic cleavage of the polymer in vivo in the organism comprising a copolymer of 1) a compound in which said active compound is bonded by its —NH_2 group to the carboxylic group of an L-amino acid which in twin is bonded by its amino group to the terminal carboxylic group of the side chain of a substituted amide or ester of acrylic or methacrylic acid, said side chain containing a linear moiety containing at least three carbon atoms, with 2) a hydrophilic monomer selected from the group of N-alkylmethacrylamide, N-alkylacrylamide, N,N-dialkylacrylamide, wherein alkyl has 1 to 6 carbon atoms and may contain 1 to 3 OH groups, glycol methacrylate, glycol acrylate, and mixtures thereof.

4,097,471

POLYPEPTIDES WITH MORPHINE-LIKE ACTIVITY

Dimitrios Sarantakis, West Chester, and Larry Stein, Haverford, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed May 26, 1977, Ser. No. 800,678

Int. Cl.² C07C *103/52;* **A61K** *37/00*

U.S. Cl. 260—112.5 R **2 Claims**

1. A polypeptide of the formula:

H-Tyr-Gly-Gly-Phe-Leu-Thr-Ser-Glu-Lys-Ser-Gln-Thr-Pro-Leu-Val-Thr-OH

or a non-toxic salt thereof, all optically active amino acids being of the L-configuration.

4,097,472

N^2-ARYLSULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto; Akiko Hijikata, both of Kobe; Ryoji Kikumoto, Machida; Yoshikuno Tamao, Yokohama; Kazuo Ohkubo, Machida; Tohru Tezuka, Yokohama, and Shinji Tonomura, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo and Shosuke Okamoto, both of, Japan

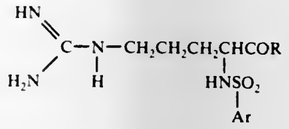
Continuation-in-part of Ser. No. 707,536, Jul. 22, 1976, Pat. No. 4,036,955, Ser. No. 723,474, Sep. 14, 1976, Ser. No. 728,051, Sep. 30, 1976, Ser. No. 671,436, Mar. 29, 1976, Pat. No. 4,066,758, and Ser. No. 671,568, Mar. 29, 1976, Pat. No. 4,049,645, said Ser. No. 671,436, and Ser. No. 671,568, each is a division of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Jan. 19, 1977, Ser. No. 760,676

The portion of the term of this patent subsequent to Jul. 19, 1994, has been disclaimed.

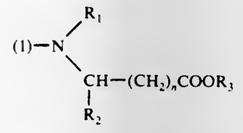
Int. Cl.² C07C *103/52;* **A61K** *37/00*

U.S. Cl. 424—177 **6 Claims**

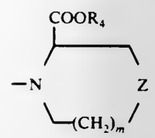
1. An N^2-arlysulfonyl-L-argininamide having the formula (I):



or a pharmaceutically acceptable salt thereof, wherein R is

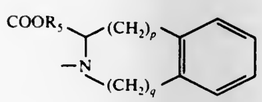


wherein R_1 is furfuryl, 3-furylmethyl, tetrahydrofurfuryl or tetrahydro-3-furylmethyl; R_2 is hydrogen, C_1 - C_{10} alkyl, carboxy, C_2 - C_{10} alkoxycarbonyl, phenyl optionally substituted with one or more C_1 - C_5 alkyl, C_1 - C_5 alkoxy or mixtures thereof, C_7 - C_{12} aralkyl or ring substituted benzyl wherein said substituent is C_1 - C_5 alkyl or C_1 - C_5 alkoxy; R_3 is hydrogen, C_1 - C_{10} alkyl, C_6 - C_{10} aryl, C_7 - C_{12} aralkyl or 5-indanyl; and *n* is o, 1 or 2,



(2)

where in R_4 is hydrogen, C_1 - C_{10} alkyl, C_6 - C_{10} aryl, C_7 - C_{12} aralkyl or 5-indanyl; Z is oxy, thio or sulfinyl; and *m* is 0 or 1, or



(3)

wherein

R_5 is hydrogen, C_1 - C_{10} alkyl, C_6 - C_{10} aryl, C_7 - C_{12} aralkyl or 5-indanyl; *p* is 0, 1 or 2; *q* is 0, 1 or 2: and $p + q$ is 1 or 2:

and Ar is naphthyl substituted with at least one substituent selected from the group consisting of halo, hydroxy, nitro, cyano, C_1 - C_{10} alkyl, C_1 - C_{10} alkoxy and C_2 - C_{20} dialkyamino, and at least one substituent selected from the group consisting of sulfoamino, carbamoyl, C_3 - C_{10} N,N-dialkylcarbamoyl, amino, C_1 - C_{10} alkylamino, mercapto, C_1 - C_{10} alkylthio, C_7 - C_{12} aralkyl, carboxyl, C_2 - C_{10} alkoxycarbonyl, C_2 - C_{10} carboxyalkyl, C_1 - C_{10} acylamino, C_2 - C_{10} alkylcarbonyl, C_1 - C_{10} hydroxyalkyl, C_1 - C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy, C_1 - C_5 alkoxy or mixtures thereof;

5,6,7,8-tetrahydronaphthyl substituted with at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1 - C_{10} alkyl, C_1 - C_{10} alkoxy, sulfoamino carbamoyl, C_3 - C_{10} N,N-diakylcarbamoyl, amino, C_1 - C_{10} alkylamino, mercapto, C_1 - C_{10} alkylthio, C_7 - C_{12} arakyl, carboxyl, C_2 - C_{10} alkoxycarbonyl, C_2 - C_{10} carboxyalkyl, C_1 - C_{10} acylamino, C_2 - C_{10} alkylcarbonyl, C_1 -C_{10} hydroxyalkyl, C_1 - C_{10} haloaklyl, oxo, and phenyl optionally substituted with at least one hydroxy; C_1 - C_5 alkoxy or mixtures thereof;

naphthoquinonyl, anthyrl, phenanthryl, pentalenyl, heptalenyl, azulenyl, biphenylenyl, αs - indacenyl, S-indacenyl, acenaphthylenyl, phenylcarbonylphenyl, phenoxyphenyl, benzofurayl, isobenzofuranyl, benzo [b] thienyl, isobenzothienyl oxanthrenyl, thianthrenyl, dibenzofuranyl, dibenzothienyl, phenoxathiinyl, indolyl, 1H-indazolyl, quinolyl, isoquinolyl, phthalazinyl, 1,8-naphthyridinyl, quinoxalinyl, quinazolinyl, cinnolinyl, carbazolyl, acridinyl, phenazinyl, phenothiazinyl, phenoxazinyl or benzimidazolyl group any of which is unsubstituted or substituted with one or more groups selected from the group consisting of halo, nitro, cyano, hydroxy, C_1 - C_{10} alkyl, C_1 - C_{10} alkoxy, C_2 - C_{20} dialkylamino, sulfoamino carbamoyl, C_3 - C_{10} N,N-dialkylcarbamoyl, amino, C_1 - C_{10} alkylamino, mercapto, C_1 - C_{10} alkylthio, C_7 - C_{12} aralkyl, carboxyl, C_2 - C_{10} alkoxycarbonyl, C_2 - C_{10} carboxyalkyl, C_1 - C_{10} acylamino, C_2 - C_{10} alkylcarbonyl, C_1 - C_{10} hydroxyalkyl, C_1 - C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy C_1 - C_5 alkoxy or mixtures thereof.

4,097,473

PRODUCTION OF SERUM ALBUMIN

Charles Lewis, Jr., Hazelwood, and James M. Schuck, Chesterfield, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 707,906, Jul. 22, 1976, abandoned. This application Aug. 26, 1977, Ser. No. 828,013

Int. Cl.² C07G *7/00*

U.S. Cl. 260—122 **13 Claims**

1. A method for the production of a serum albumin fraction in high yield and purity from admixture with other blood protein components comprising contacting the albumin-protein mixture with a resinous polymeric material selected from the group consisting of water-insoluble cross-linked polyelectrolyte copolymers of ethylene and maleic anhydride containing pendant dimethylaminopropyl functional groups at a pH of from about 5.0 to about 5.5 and at a temperature of from about 65° C to about 72° C for about 1 to about 4 hours and then adjusting the mixture to a pH of from about 3.5 to about 4.5 to selectively elute the desired albumin therefrom.

4,097,474

PROCESS FOR SULFURIZING NORBORNENYL COMPOUNDS

Herbert Frank Askew; Gerald John Joseph Jayne, both of Wokingham, and John Scotchford Elliott, Beaconsfield, all of England, assignors to Edwin Cooper and Company Limited, Bracknell, England

Continuation-in-part of Ser. No. 541,995, Jan. 17, 1975, abandoned, which is a division of Ser. No. 459,938, Apr. 11, 1974, Pat. No. 3,882,031. This application Mar. 8, 1976, Ser. No. 664,547

Claims priority, application United Kingdom, Apr. 12, 1973, 17728/73

Int. Cl.² C07G *17/00*

U.S. Cl. 260—139 **40 Claims**

1. A process for preparing a normally liquid, oil-soluble, metal-free, phosphorus-free substance by reacting sulfur with a compound selected from dimers of cyclopentadiene, methylcyclopentadiene and mixtures thereof, said by reacting being carried out in the absence of a solvent or in the presence of a non-polar solvent, the amount of sulfur reacted being 0.1–4 moles per mole of said compound.

4,097,475

DISPERSE MONO- AND BISAZO DYES DERIVED FROM 2-AMINO-4,5-DICYANOIMIDAZOLE

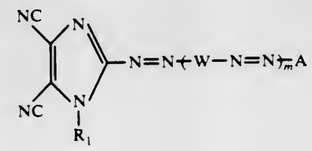
Daniel Shaw James, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 3, 1974, Ser. No. 457,640

Int. Cl.² C09B *29/36, 29/38, 31/04*

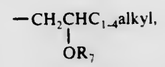
U.S. Cl. 260—157 **23 Claims**

1. An azo dye of the generic formula



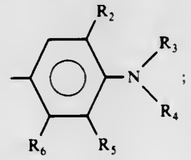
wherein

R_1 is C_{1-4}alkyl, —CH_2—CH=CH_2,

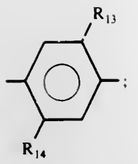


—$(CH_2)_nR_8$, C_{1-4}alkyleneCN, $C_2H_4OR_7$, —CH_2—CH=CH—R_8, —$C_2H_4CONH_2$, —$C_2H_4CONHC_{1-4}$alkyl, —$C_2H_4CON(C_{1-4}alkyl)_2$ and —$C_2H_4CO_2C_{1-4}$-alkyl;

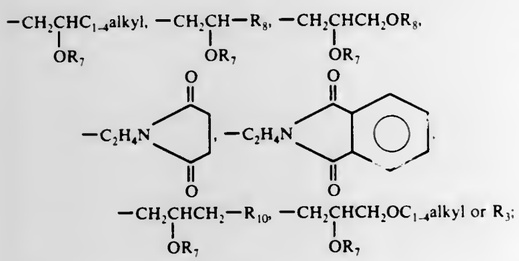
A is a coupling component selected from: a 5-or 6- membered heterocycle consisting of 5-aminopyrazole, 5-pyrazolone, barbituric acid, 6-hydroxypyrid-2-one, 4-hydroxycoumarin and 1,2-dialkylindole; a 1- or 2-naphthol group; and an aromatic amine of the formula



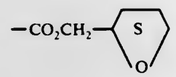
W is 1,4-naphthylene or



R_2 is H, F, Cl, C_{1-4}alkyl, OC_{1-4}alyl;
R_3 is cyclohexyl or C_{1-4}alkylene-R_9;
R_2 and R_3 together with the nitrogen atom optionally form a 6-membered ring optionally substituted with —OH, OC_2H_4CN or $OCOC_{1-5}$alkyl.
R_4 is H,



R_3 and R_4 together optionally form a 6-membered heterocyclic ring containing the nitrogen atom;
R_5 is H;
R_6 is H, F, Cl, Br, C_{1-4}alkyl, OC_{1-4}alkyl, OH, C_{1-4}hydroxyalkyl, $NHCOCH{=}CH_2$, $NHCOC_{1-4}$alkyl, $NHCOR_8$, $NHCO_2C_{1-4}$alkyl, $NHCONHC_{1-4}$alkyl, $NHSO_2C_{1-4}$alkyl, $NHSO_2R_8$, $NHCO_2R_8$, $NHCONHR_8$, $NHCOC_{1-4}$alkylene-R_{10}, $NHCOC_{1-4}$alkylene-OC_{1-4}alkylene-R_{10}, $NHCO_2C_{1-4}$alkyleneOC_{1-4}alkyl;
R_5 and R_6 together optionally form —CH=CH—CH=CH—;
R_7 is H or C_{1-4}acyl;
R_8 is phenyl or phenyl optionally substituted with 1-2 groups selected from Cl, Br, CN, CF_3, NO_2, C_{1-4}alkyl, OC_{1-4}alkyl, $N(C_{1-4}alkyl)_2$ and $NHCOC_{1-4}$alkyl;
R_9 is H, OH, CN, COC_{1-4}alkyl, $OCOCH{=}CH_2$, $OCOC_{1-4}$alkylene-R_{11}, $OCOR_8$, CO_2R_8, CO_2C_{1-4}alkylene-R_{12},



OC_{1-4}alkylene-R_{10}, $CONHC_{1-4}$alkylene-R_{11}, SO_2R_8, $OCONHC_{1-4}$alylene-R_{10}, $NHCOC_{1-4}$alkylene-R_{10}, $NHCONHR_8$, $NHCOR_8$ or R_8;
R_{10} is CN, OH, Cl, Br or R_7;
R_{11} is H, Cl, Br, OC_{1-4}alkyl or phenyl;
R_{12} is H, OH, OC_{1-4}alkyl, $OCOC_{1-4}$alkylene-R_{11} or $OCOR_8$;
R_{13} and R_{14} are independently H, C_{1-4}alkyl, C_{1-4}alkoxy or Cl;
m is 0 or 1; and
n is 1 to 3.

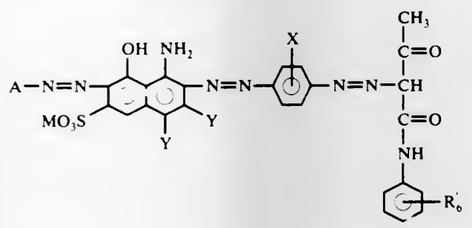
4,097,476

TRISAZO DYES HAVING A 2,7-(1-AMINO-3,6-OR 4,6-DISULFO-8-HYDROXYNAPHTHYLENE) RADICAL

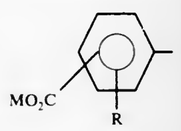
Heinz Wicki, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Jun. 10, 1975, Ser. No. 585,663
Claims priority, application Switzerland, Jun. 17, 1974, 8252/74
Int. Cl.[2] C09B *31/24;* D06P *1/06, 3/32*
U.S. Cl. 260—173 **43 Claims**

1. A compound of the formula



or a mixture thereof,
wherein A is sulfonaphthyl, substituted sulfonaphthyl, disulfonaphthyl, substituted disulfonaphthyl or



wherein R is hydrogen, hydroxy, C_{1-4}alkyl or C_{1-4}alkoxy, and
each substituent of substituted sulfonaphthyl and substituted disulfonaphthyl is independently hydroxy or C_{1-4}alkoxy,
X is hydrogen, chloro, C_{1-4}alkyl, C_{1-4}alkoxy, $—SO_3M$ or $—CO_2M$,
one Y is $—SO_3M$ and the other is hydrogen,
R_6' is hydrogen or C_{1-4}alkyl, and
each M is independently hydrogen or a non-chromophoric cation.

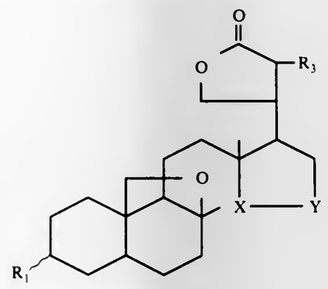
4,097,477

STEROID COMPOUNDS AND PROCESSES THEREOF

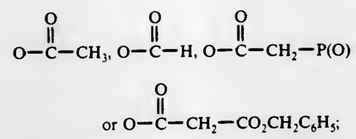
Gunther Kruger, St. Laurent, Canada, assignor to Steele Chemicals Co. Ltd., Pointe Claire, Canada

Continuation-in-part of Ser. No. 516,597, Oct. 21, 1974, abandoned. This application Jul. 9, 1976, Ser. No. 703,825
Claims priority, application Canada, Nov. 29, 1973, 186960
Int. Cl.[2] C07J *17/00, 19/00*
U.S. Cl. 260—239.57 **17 Claims**

1. A compound of the formula



wherein R_1 is H, OH, O, O-acyl,



and R_3 is selected from the group consisting of H, CO_2H, $CO_2CH_2C_6H_5$, CO_2CH_3, $CO_2CH_2CH_2OH$ and CN; X-Y is C=CH or an α-oxide; and the Δ2, Δ3, Δ4, Δ5(6), Δ7 and Δ20(22) dehydro analogs thereof.

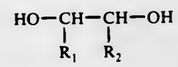
4,097,478

PROCESS FOR PREPARING PYRAZINES

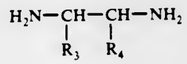
Kanji Sato, Fuji, Japan, assignor to Tokai Denka Kogyo Kabushiki Kaisha, Ohte, Japan

Filed Mar. 31, 1977, Ser. No. 783,172
Claims priority, application Japan, Sep. 20, 1976, 51-111717
Int. Cl.[2] C07D *241/04, 241/06*
U.S. Cl. 544—353 **7 Claims**

1. A process for preparing pyrazines characterized in that a diol represented by the formula



wherein R_1 and R_2 are each a hydrogen atom or a hydrocarbon radical selected from the group consisting of aliphatic, aromatic and alicylic hydrocarbon radicals, and a diamine represented by the formula



wherein R_3 and R_4 are each a hydrogen atom or a hydrocarbon radical selected from the group consisting of aliphatic, aromatic and alicyclic hydrocarbon radicals, are subjected to a gas phase contact reaction in the presence of a catalyst containing zinc or zinc in combination with at least one other metal selected from the group consisting of cobalt, nickel, iron, aluminum and chromium.

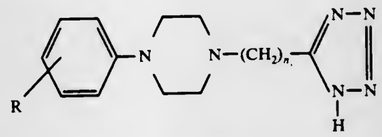
4,097,479

SYNTHESIS OF 5-SUBSTITUTED TETRAZOLES

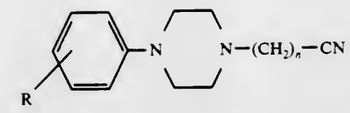
Theodore J. Leipzig, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Mar. 11, 1977, Ser. No. 776,619
Int. Cl.[2] C07D *403/06*
U.S. Cl. 544—366 **4 Claims**

1. In a method for the preparation of tetrazolyl compounds having the formula,



wherein and elsewhere in this claim R is a hydrogen atom, a halogeno, or a trifluoromethyl substituent and *n* is an integer of the set 1–4, by reacting a nitrile of the formula,



with an alkali-metal or ammonium azide in a polar organic solvent, in the presence of a catalyst, and at a temperature near to the boiling point of the solvent, the improvement comprising:
reacting the nitrile and the azide in an amine having a pK_b of from 2 to 6 and a boiling point of from 100° to 250° C as the solvent and in the presence of an acid-addition salt of the amine as the catalyst.

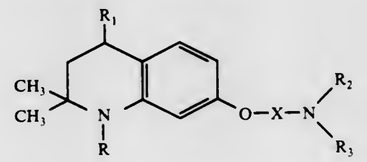
4,097,480

2,2-DIMETHYL-7-AMINE-ALKOXY-4-ARYLTETRAHYDROQUINALINE DERIVATIVES

Derek Victor Gardner, Bishops Stortford, England, assignor to Beecham Group Limited, United Kingdom

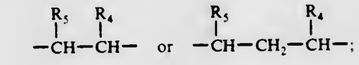
Filed Jun. 1, 1976, Ser. No. 691,866
Claims priority, application United Kingdom, Jul. 28, 1975, 31426/75
Int. Cl.[2] C07D *215/20;* A61K *31/47*
U.S. Cl. 260—286 R **9 Claims**

1. A compound of the formula (II):



(II)

or a pharmaceutically acceptable acid addition salt thereof wherein X is



R is hydrogen, methyl or ethyl; R_1 is phenyl, naphthyl or phenyl substituted by a member selected from the group consisting of fluorine, chlorine, bromine, methyl, methoxy and trifluoromethyl; R_2 is hydrogen or methyl; R_3 is hydrogen, methyl, ethyl or benzyl; R_4 is hydrogen or methyl; and R_5 is hydrogen or methyl.

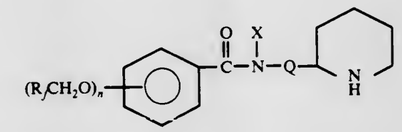
4,097,481

TERTIARY AMIDE DERIVATIVES OF PYRROLIDINE AND PIPERIDINE

Elden H. Banitt, Woodbury, Minn., and William E. Coyne, Hudson, Wis., assignors to Riker Laboratories, Inc., Northridge, Calif.

Filed Nov. 8, 1976, Ser. No. 739,613
Int. Cl.[2] C07D *211/32*
U.S. Cl. 260—293.77 **2 Claims**

1. A compound of the formula



wherein R_f is a perfluoroalkyl radical containing one to three carbon atoms, *n* is one to three, Q is methylene or methyl-

methylene and X is a cycloalkyl group containing five or six carbon atoms or a pharmaceutically acceptable salt thereof.

4,097,482

5-o-CYANOBENZYL-4,5,6,7-TETRAHYDRO-THIENO[3,2-c]PYRIDINE MALEATE

Armand Amselem, Toulouse, France, assignor to Centre d'Etudes Pour L'Industrie Pharmaceutique, Toulouse, France

Filed Jul. 9, 1976, Ser. No. 703,837
Claims priority, application France, Aug. 6, 1975, 75 24486
Int. Cl.² C07D *513/04*
U.S. Cl. 260—294.8 C **1 Claim**

1. 5-o-cyanobenzyl-4,5,6,7-tetrahydrothieno[3,2-c]pyridine maleate.

4,097,483

PYRAZOLO[1,5-A]PYRIDINES

Tsutomu Irikura, Tokyo, Japan, assignor to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Division of Ser. No. 623,311, Oct. 17, 1975, Pat. No. 4,028,370.
This application Aug. 31, 1976, Ser. No. 719,328
Claims priority, application Japan, Nov. 1, 1974, 49-126319
Int. Cl.² C07D *401/02*
U.S. Cl. 260—296 H **1 Claim**

1. 3-(β-ethoxy-α-methylpropionyl)-2-isopropylpyrazolo[1,5-a]pyridine.

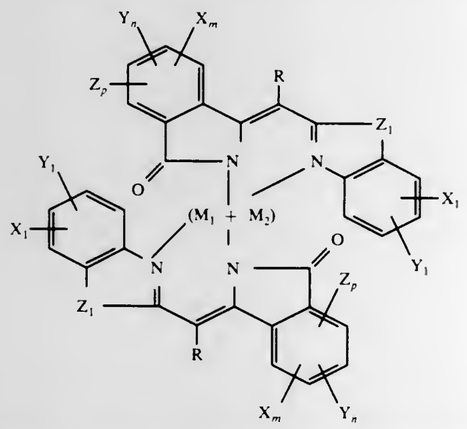
4,097,484

MIXED COMPLEXES OF METHINE DYES

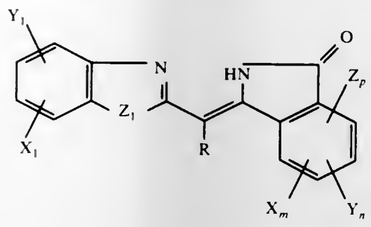
Alexander von Zelewsky, Givisiez; Christoph Frey, Aesch, and Francois L'Eplattenier, Therwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,888
Claims priority, application Switzerland, Oct. 17, 1974, 13920/74
Int. Cl.² C07F *3/06, 7/24, 15/04, 15/06*
U.S. Cl. 260—299 **7 Claims**

1. Mixed complexes of methine dyes of the formula



wherein M_1 represents zinc, cadmium, lead or manganese, M_2 represents cobalt, copper of nickel, R represents an organic radical selected from the group consisting of cyano, carbamoyl, methylcarbamoyl, phenylcarbamoyl, methoxycarbonyl, ethoxycarbonyl, phenoxycarbonyl, 2-benzimidazolyl, methyl, phenyl, 2-benzthiazolyl, or 2-benzoxazolyl, Z_1 represents an oxygen, a sulphur atom or an imino group, X_1 and Y_1 represent hydrogen, halogen atoms, alkyl, alkoxy, alkoxycarbonyl, alkylsulphonyl or alkylcarbamoyl groups of 1 to 6 carbon atoms, nitro, or carbamoyl, or the radicals X_1 and Y_1 form a fused benzene ring, X represents a hydrogen atom, Y represents a halogen atom and Z represents a nitro group or a group of the formula R_1Y_2—, wherein R_1 represents a hydrogen atom, an alkyl or cycloalkyl group of 1 to 6 carbon atoms, naphthyl, phenyl, p-chlorophenyl, and Y_2 represents an oxygen or a sulphur atom, m is 0 to 4, n is 0 to 4, p is 0 to 3, and the sum of $m+n+p$ must be 4, and wherein the atomic ratio of M_1:M_2 is between 5:95 and 95:5 prepared by metallizing an isoindolinone of the formula



wherein R, X, Y, Z, X_1, Y_1, Z_1, m, n and p are as defined above, with a mixture which consists of 5–95 molar percent of a salt selected from the group consisting of a formate, acetate or stearate of zinc, cadmium, lead or manganese and of 95–5 molar percent of a salt of cobalt, copper or nickel.

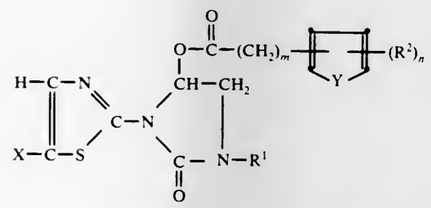
4,097,485

THIAZOLYLIMIDAZOLIDINONE ESTERS OF FURYL AND THIENYL SUBSTITUTED ACIDS

John Krenzer, Oak Park, and Chin Ching Wu, Libertyville, both of Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Filed Jun. 17, 1976, Ser. No. 697,294
Int. Cl.² C07D *285/12*
U.S. Cl. 260—306.8 D **9 Claims**

1. A compound of the formula



wherein X is selected from the group consisting of chlorine, bromine, fluorine, and lower alkylsulfonyl; R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and propargyl; m is an integer from 0 to 3; Y is selected from the group consisting of oxygen and sulfur; R^2 is selected from the group consisting of lower alkyl, chlorine, bromine, fluorine; and n is an integer from 0 to 2.

4,097,486

HERBICIDAL THIADIAZOLYLIMIDAZOLIDINONE ESTER

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Oct. 29, 1976, Ser. No. 736,913
The portion of the term of this patent subsequent to May 3, 1994, has been disclaimed.
Int. Cl.² C07D *285/12*
U.S. Cl. 260—306.8 D **1 Claim**

1. The compound 1-(5-trifluoromethyl-1,3,4-thiadiazol-2-yl)-3,4-dimethyl-5-acetyloxy-1,3-imidazolin-2-one.

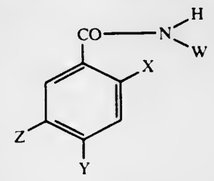
4,097,487

PYRROLIDINYL AND PIPERIDINYL BENZAMIDE DERIVATIVES

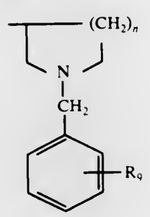
Masuo Murakami; Kozo Takahashi, both of Tokyo; Yasufumi Hirata, Ageo; Mutsuo Takashima, Kawagoe; Sumio Iwanami, Ageo; Osamu Hasegawa, Kamifukuoka; Yoshihisa Nozaki, Tokyo; Shiro Tachikawa, Omiya; Masaaki Takeda, Urawa, and Shinji Usuda, Matsudo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1976, Ser. No. 671,583
Claims priority, application Japan, Apr. 2, 1975, 50-39957; Dec. 17, 1975, 50-150948; Dec. 29, 1975, 51-156396; Dec. 27, 1975, 51-157835; Dec. 27, 1975, 51-157834; Dec. 29, 1975, 51-156394
Int. Cl.² C07D *207/16, 211/60*
U.S. Cl. 260—326.85 **13 Claims**

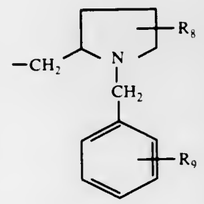
1. A benzamide compound represented by the formula:



wherein X represents a lower alkoxy group; Y represents a hydrogen atom, an amino group, or a mono- or di-lower alkyl amino group; Z represents a halogen atom, a lower alkylthio group, a lower alkylsulfinyl group, a lower alkylsulfonyl group, a sulfamoyl group, or a lower alkylsulfamoyl group; and W represents a 1-ethyl-5-phenyl-2-pyrrolidinylmethyl group, a 2-(2-phenyl-pyrrolidino) ethyl group or a group shown by the formulae:



and



R_8 represents a lower alkyl group; R_9 represents a hydrogen atom, a halogen atom, or a lower alkoxy group; and n represents 1 or 2, and the pharmaceutically acceptable nontoxic salts thereof.

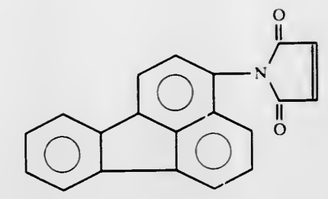
4,097,488

N-(3-FLUORANTHYL)MALEIMIDE; A FLUORESCENT REAGENT FOR THE STUDIES OF THIOL COMPOUNDS

Yuichi Kanaoka, Sapporo, Japan, assignor to Teika Seiyaku Kabushiki Kaisha, Toyama, Japan

Filed Feb. 24, 1977, Ser. No. 771,634
Claims priority, application Japan, Apr. 6, 1976, 51-38485
Int. Cl.² C07D *207/30*
U.S. Cl. 260—326.5 C **1 Claim**

1. A compound of the formula:



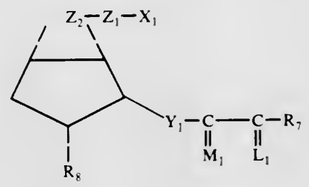
4,097,489

9-DEOXY-9α,6-NITRILO OR 6,9α-IMINO-PGF COMPOUNDS

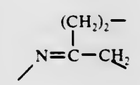
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jun. 17, 1977, Ser. No. 807,514
Int. Cl.² C07D *209/52*
U.S. Cl. 260—326.27 **52 Claims**

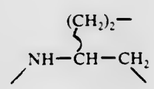
1. A prostacyclin analog of the formula



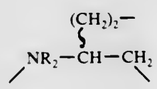
wherein
Z_2 is



(1)

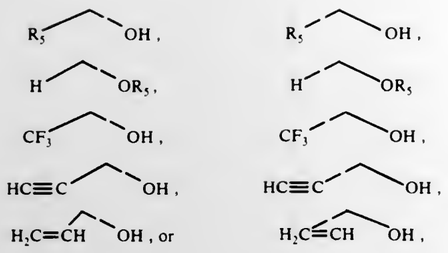


(2)

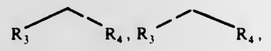


(3)

wherein
R_2 is alkyl of one to 4 carbon atoms, inclusive, or alkylcarbonyl of one to 4 carbon atoms, inclusive;
wherein Z_1 is
(1) $-(CH_2)_g-CH_2-CH_2-$,
(2) $-(CH_2)_g-CH_2-CF_2-$, or
(3) trans$-(CH_2)_g-CH=CH-$,
wherein
g is the integer zero, one, or 2;
wherein
R_8 is hydrogen, hydroxy, or hydroxymethyl;
wherein
Y_1 is
(1) trans—CH=CH—,
(2) cis—CH=CH—,
(3) $-CH_2CH_2-$,
(4) trans—CH=C(Hal)—, or
(5) —C≡C—
wherein
Hal is chloro or bromo;
wherein
M_1 is

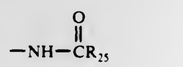


wherein
R_5 is hydrogen or alkyl with one to 4 carbon atoms, inclusive.
wherein
L_1 is

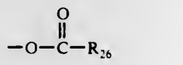


or a mixture of

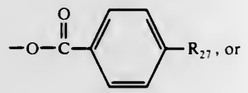
wherein
R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein
X_1 is
(1) $-COOR_1$ wherein R_1 is hydrogen; alkyl of one to 12 carbon atoms, inclusive; cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive; phenyl; phenyl substituted witth one, two, or three chloro or alkyl of one to 3 carbon atoms; phenyl substituted in the para position by



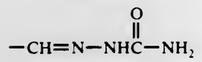
(a)



(b)



(c)

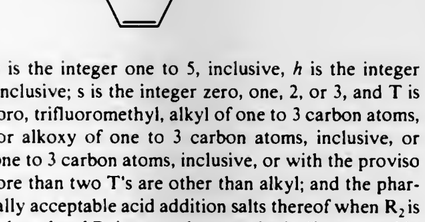


(d)

wherein R_{25} is methyl, phenyl, acetamidophenyl, benzamidophenyl, or $-NH_2$; R_{26} is methyl, phenyl, $-NH_2$, or methoxy; and R_{27} is hydrogen or acetamido, inclusive; or a pharmacologically acceptable cation;
(2) $-CH_2OH$; or
(3) $-COL_4$, wherein L_4 is
(a) amido of the formula $-NR_{21}R_{22}$, wherein R_{21} and R_{22} are
(i) hydrogen;
(ii) alkyl of one to 12 carbon atoms, inclusive;
(iii) cycloalkyl of 3 to 10 carbon atoms, inclusive;
(iv) aralkyl of 7 to 12 carbon atoms, inclusive;
(v) phenyl;
(vi) phenyl substituted with one, 2, or 3 chloro, alkyl of one to 3 carbon atoms, inclusive, hydroxy of one to 3 carbon atoms, inclusive, carboxy, alkoxycarbonyl of one to 4 carbon atoms, inclusive, or nitro;
(vii) carboxyalkyl of one to 4 carbon atoms, inclusive;
(viii) carbamoylalkyl of one to 4 carbon atoms, inclusive;
(ix) cyanoalkyl of one to 4 carbon atoms, inclusive;
(x) acetylalkyl of one to 4 carbon atoms, inclusive;
(xi) benzoylalkyl of one to 4 carbon atoms, inclusive;
(xii) benzoylalkyl substituted by one, 2, or 3 chloro, alkyl of one to 3 carbon atoms, inclusive, hydroxy, alkoxy of one to 3 carbon atoms, inclusive, carboxy, alkoxycarbonyl of one to 4 carbon atoms, inclusive, or nitro;
(xvii) hydroxyalkyl of one to 4 carbon atoms, inclusive;
(xviii) dihydroxyalkyl of one to 4 carbon atoms; or
(xix) trihydroxyalkyl of one to 4 carbon atoms; with the further proviso that not more than one of R_{21} and R_{22} is other than hydrogen or alkyl;
(b) carbonylamido of the formula $-NR_{23}COR_{21}$, wherein R_{23} is hydrogen or alkyl of one to 4 carbon atoms and R_{21} is as defined above; or
(c) sulphonylamido of the formula $-NR_{23}SO_2R_{21}$, wherein R_{21} and R_{23} are as defined above;

or

(d) hydrazino of the formula $-NR_{23}R_{24}$, wherein R_{24} is amido of the formula $-NR_{21}R_{22}$, as defined above;
wherein
R_7 is
(1) $-(CH_2)_m-CH_3$,



(1)
(2)
(3)

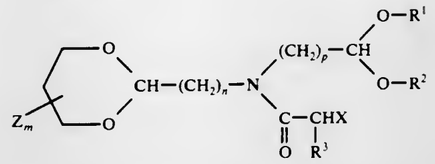
wherein m is the integer one to 5, inclusive, h is the integer zero to 3, inclusive; s is the integer zero, one, 2, or 3, and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, or with the proviso that not more than two T's are other than alkyl; and the pharmacologically acceptable acid addition salts thereof when R_2 is not alkylcarbonyl and R_1 is not a pharmacologically acceptable cation.

4,097,490
PYROGLUTAMIC ACID SALTS OF t-BUTYLAMINO-2,3-DIHYDROXYPROPANE
Donald F. Reinhold, North Plainfield, N.J., assignor to Merck & Co., Inc., Rahway, N.J.
Continuation of Ser. No. 615,941, Sep. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 532,547, Dec. 13, 1974, abandoned. This application Feb. 9, 1977, Ser. No. 767,183
Int. Cl.[2] C07D *207/28*
U.S. Cl. 260—326.45 **2 Claims**

1. R-pyroglutamic acid.R-1-t-butylamino-2,3-dihydroxypropane.

4,097,491
N-DIALKOXYALKYL-N-DIOXANALKYLENE-α-HALOALKANAMIDES
Roger D. Hotz, Evanston; Leonard J. Stach, Riverside, both of Ill., and Sidney B. Richter, Barberton, Ohio, assignors to Velsicol Chemical Corporation, Chicago, Ill.
Filed Jun. 10, 1977, Ser. No. 805,254
Int. Cl.[2] C07D *319/04*; A01N *9/24*
U.S. Cl. 260—340.7 **9 Claims**

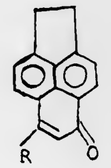
1. A compound of the formula



wherein Z is lower alkyl; m is an integer from 0 to 4; n and p are each integers from 1 to 2; R^1 and R^2 are each lower alkyl; R^3 is hydrogen or lower alkyl; and X is halogen.

4,097,492
PROCESS FOR THE PREPARATION OF NAPHTHALENE-1,4,5,8-TETRACARBOXYLIC ACID
Freimund Rohrscheid, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Continuation-in-part of Ser. No. 501,665, Aug. 29, 1974, abandoned. This application May 4, 1976, Ser. No. 683,039
Claims priority, application Germany, Aug. 31, 1973, 2343964
Int. Cl.[2] C07D *311/02*; C07C *51/33*
U.S. Cl. 260—345.2 **31 Claims**

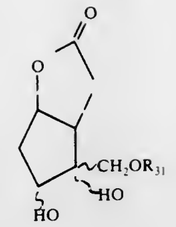
1. A process for the preparation of a mixture of naphthalene-1,4,5,8-tetracarboxylic acid and its anhydrides, which comprises oxidizing a peri-acenaphthindenone of the formula



where R is hydrogen or lower alkyl, in acetic, formic, proprionic, or butyric acid as a solvent present in a concentration of about 1 to 10 parts by weight per part of said indenone, with nitric acid in the absence of oxygen in an amount from about 7 to about 14 mols per mol of said indenone or with nitric acid in the presence of oxygen in an amount from 1 to about 6 mols per mol of said indenone, in the presence of an oxidation catalyst, said catalyst being present in an effective amount having a concentration on the order of about 0.2 to 40 mg-atom/l of said solvent at a temperature from above about 100° C to about 240° C, and isolating the reaction product obtained.

4,097,493
2,3,5α-TRIHYDROXY-2-HYDROXYMETHYL-1α-CYCLOPENTANE ACETIC ACID 5γ -LACTONE DERIVATIVES
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Division of Ser. No. 676,893, Apr. 14, 1976, Pat. No. 4,048,194. This application May 12, 1977, Ser. No. 796,098
Int. Cl.[2] C07D *307/77*
U.S. Cl. 260—343.3 P **2 Claims**

1. A thromboxane intermediate of the formula



wherein R_{31} is a hydroxy-hydrogen replacing group selected from the group consisting of R_9, R_{10}, and R_{34};
wherein R_9 is an acyl protecting group selected from the group consisting of
(a) benzoyl;
(b) benzoyl substituted with one to 5 alkyl of one to 4 carbon atoms, inclusive, phenylalkyl of 7 to 12 carbon atoms, inclusive, or nitro, with the proviso that not more than 2 substituents are other than alkyl, and that the total number of carbon atoms in the substituents does not exceed 10 carbon atoms, with the further proviso that the substituents are the same or different.
(c) benzoyl substituted with alkoxycarbonyl of 2 to 5 carbon atoms, inclusive;
(d) naphthoyl;
(e) naphthoyl substituted with one to 9, inclusive, alkyl of one to 4 carbon atoms, inclusive, phenylalkyl of 7 to 10 carbon atoms, inclusive, or nitro, with the proviso that not more than 2 substituents on either of the fused aromatic rings are other than alkyl and that the total number of carbon atoms in the substituents on either of the fused aromatic rings does not exceed 10 carbon atoms, with the further proviso that the various substituents are the same or different; and
(f) alkanoyl of 2 to 12 carbon atoms, inclusive;
wherein R_{10} is a blocking group selected from the group consisting of
(a) tetrahydropyranyl;
(b) tetrahydrofuranyl; and
(c) a group of the formula

$-C(OR_{11})(R_{12})-CH(R_{13})(R_{14})$,

wherein R_{11} is alkyl of one to 18 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl or phenyl substituted with one to 3 alkyl of one to 4 carbon atoms, inclusive, wherein R_{12} and R_{13} are alkyl of one to 4 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 alkyl of one to 4 carbon atoms, inclusive, or when R_{12} and R_{13} are taken together $-(CH_2)_a-$ or $-(CH_2)_b-O-(CH_2)_c$, wherein a is 3, 4, or 5, or b is one, 2, or 3, and c is one, 2, or 3, with the proviso that b plus c is 2, 3, or 4, with the further proviso that R_{12} and R_{13} may be the same or different, and wherein R_{14} is hydrogen or phenyl;
wherein R_{34} is an arylmethyl hydroxy-hydrogen replacing group selected from the group consisting of
(a) benzyl,
(b) benzyl substituted by one to five alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive, with the further proviso that the various substituents are the same or different,
(c) benzhydryl,
(d) benzhydryl substituted by one to ten alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive,
(e) trityl, and
(f) trityl substituted by one to 15 alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive.

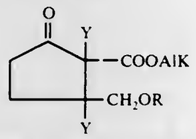
4,097,494

NOVEL CYCLOPENTANONES

Jean Buendia, Nogent-sur-Marne, and Jeanine Schalbar, Suresnes, both of France, assignors to Roussel Uclaf, Paris, France

Filed Nov. 19, 1976, Ser. No. 743,507
Claims priority, application France, Nov. 26, 1975, 75 36161
Int. Cl.² C07C *69/74;* C07D *309/12*
U.S. Cl. 260—345.8 P **3 Claims**

1. A compound of the formula



wherein AlK is alkyl of 1 to 4 carbon atoms, R is selected from the group consisting of hydrogen and α-tetrahydropyranyl and Ys are hydrogen.

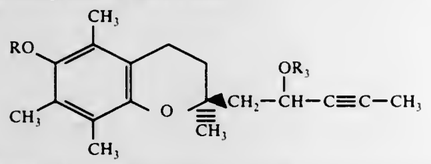
4,097,495

TETRAMETHYL-BENZYLOXY CHROMANS

Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 638,382, Dec. 8, 1975, Pat. No. 4,029,678, which is a continuation-in-part of Ser. No. 544,153, Jan. 27, 1975, Pat. No. 4,000,169. This application Feb. 22, 1977, Ser. No. 770,540
Int. Cl.² C07D *311/72*
U.S. Cl. 260—345.5 **1 Claim**

1. A compound of the formula:



wherein R is benzyl, benzhydryl or trityl; and R_3 is 3,5-dinitrobenzoyl, p-nitrobenzoyl or benzoyl.

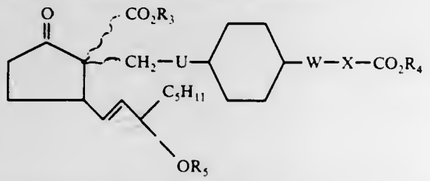
4,097,496

NOVEL CYCLOPENTANE DERIVATIVES

Milos Babej, Frankfurt am Main; Wilhelm Bartmann, Neuenhain, Taunus; Gerhard Beck, Frankfurt am Main, and Ulrich Lerch, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 480,319, Jun. 17, 1974, Pat. No. 3,984,459. This application Jun. 23, 1976, Ser. No. 698,842
Claims priority, application Germany, Jun. 19, 1973, 2331081
Int. Cl.² C07G *177/00*
U.S. Cl. 260—345.8 P **8 Claims**

1. A cyclopentane compound of the formula



wherein R_3 is alkyl of 1 to 5 carbon atoms; R_4 is hydrogen, alkyl of 1 to 5 carbon atoms, or a physiologically tolerable monovalent or polyvalent cation; R_5 is cycloalkyl of 5 to 8 carbon atoms wherein the $—CH_2—$ group in the 2-position is replaced by oxygen; U is $-(CH_2)_m-$where *m* is an integer from 0 to 5; W is a simple bond or

where R_8 and R_9 are the same or different and are hydrogen or alkyl of 1 to 5 carbon atoms; and X is $-(CH_2)_n-$wherein *n* is an integer from 0 to 5.

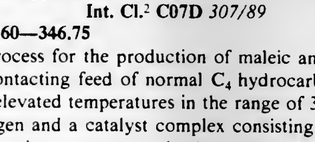
4,097,497

AMIDES OF 2-(3-DIBENZOFURAN) ALKANOIC ACIDS

Leo Berger, Montclair, and Robert August Schmidt, Wallington, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 548,658, Feb. 10, 1975, Pat. No. 4,022,805, which is a continuation-in-part of Ser. No. 448,853, Mar. 7, 1974, abandoned. This application Jan. 27, 1977, Ser. No. 763,446
Int. Cl.² C07D *307/91*
U.S. Cl. 260—346.71 **4 Claims**

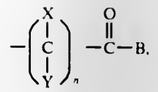
1. A compound of the formula



I

wherein R is hydrogen, halogen, hydroxy, cyano, lower alkyl, hydroxy-lower alkyl, lower alkoxy, alkanoyl of 1-7 carbon atoms, benzoyl, benzyloxy, lower alkylthio, trifluoromethyl, carbo-lower alkoxy, nitro, amino, mono-lower alkylamino, di-lower alkylamino, sulfamoyl, di-lower alkylsulfamoyl or difluoromethylsulfonyl; R_1 is halogen, cyano, lower alkyl, hydroxy-lower alkyl, lower alkoxy, alkanoyl of 1-7 carbon atoms, benzoyl, acetamido, benzyloxy, lower alkylthio, trifluoromethyl, hydroxy, carbo-lower alkoxy, nitro, amino, mono-lower alkylamino, di-lower alkylamino, sulfamoyl, di-lower alkylsulfamoyl or difluoromethylsulfonyl;

R_2 is



wherein B is amino, hydroxyamino, mono-lower alkylamino or di-lower alkylamino; Y is hydrogen and X is lower alkyl; and *n* is 1;

its enantiomers; or when R or R_1 is amino, mono-lower alkylamino or di-lower alkylamino, an addition salt thereof with a pharmaceutically acceptable acid.

4,097,498

PROCESS FOR PREPARING MALEIC ANHYDRIDE FROM C_4 HYDROCARBONS

Bruno J. Barone, and Ralph O. Kerr, both of Houston, Tex., assignors to Denka Chemical Corporation, Houston, Tex.

Division of Ser. No. 558,738, Mar. 17, 1975, Pat. No. 4,018,709. This application Sep. 20, 1976, Ser. No. 724,558
Int. Cl.² C07D *307/89*
U.S. Cl. 260—346.75 **8 Claims**

1. A process for the production of maleic anhydride comprising contacting feed of normal C_4 hydrocarbons in vapor phase at elevated temperatures in the range of 375° to 550° C with oxygen and a catalyst complex consisting essentially of principal active components in the atom ratios vanadium 1: phosphorus 0.90 to 1.3 Me0.005 to 0.4 wherein Me is a mixture of B and elements selected from the group consisting of Zn, Cr, U, W, Cd, Ni and Si and mixtures thereof.

4,097,499

1-[5-(4-CHLOROPHENYL)FURFURYLAMINO]-2-PROPANOL HYDROCHLORIDE

Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Aug. 1, 1977, Ser. No. 820,548
Int. Cl.² C07D *307/52*
U.S. Cl. 260—347.7 **1 Claim**

1. The compound 1-[5-(4-chlorophenyl)furfurylamino]-2-propanol hydrochloride.

4,097,500

N-METHYL-5-(4-NITROPHENYL)-N-(A-METHYL-PHENETHYL)FURFURYLAMINE HYDROCHLORIDE

Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jul. 25, 1977, Ser. No. 818,527
Int. Cl.² C07D *307/52*
U.S. Cl. 260—347.7 **1 Claim**

1. The compound N-methyl-5-(4-nitrophenyl)-N-(a-methyl-phenethyl)-furfurylamine hydrochloride.

4,097,501

USE OF COATED CATALYSTS IN THE PREPARATION OF MALEIC ANHYDRIDE

Serge R. Dolhyj, Parma; Ernest C. Milberger, Solon, and Sandra R. Evans, Cleveland, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed May 19, 1976, Ser. No. 687,827
Int. Cl.² C07D *307/60*
U.S. Cl. 260—346.74 **9 Claims**

1. In a process for the preparation of maleic anhydride by the reaction of benzene with air, and optionally steam, in the presence of an oxide catalyst which is useful in a fixed-bed reactor, the improvement comprising:

using a catalyst consisting of

(a) an essentially inert, at least partially porous support having a particle size of at least 20 microns, wherein said support has an outer surface, said support being selected from the group consisting of silica, alumina, silicon carbide, alumina-silica, titania and zirconia; and

(b) a coating consisting essentially of a catalytically active oxide material on said outer surface of said support which strongly adheres to said outer surface of said support, wherein said catalytically active oxide material contains at least an oxide of vanadium or an oxide of molybdenum, and wherein said catalyst is prepared by (1) contacting the support with a liquid to produce a partially wet support, said partially wet support being one that does not have the appearance of having liquid on the outer surface of said support; and (2) contacting said partially wet support with a powder of a catalytically active material to produce a support having a strongly adherent coating of said catalytically active material on the outer surface of said support.

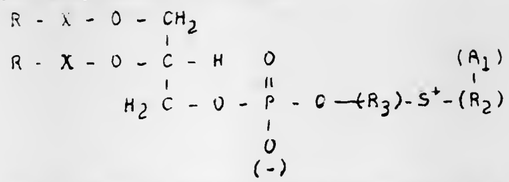
4,097,502

PHOSPHATIDYL SULFONIUM HYDROXIDE COMPOUNDS

Barry D. Sears, 43 Bay State Rd., Marblehead, Mass. 02215

Continuation-in-part of Ser. No. 731,132, Oct. 12, 1976. This application Feb. 22, 1977, Ser. No. 770,407
Int. Cl.² C08H *3/00*
U.S. Cl. 260—399 **10 Claims**

1. Synthetic phosphatidyl sulfonium [hydroxide] compounds represented by the formula:



wherein X is an acyl group (C=O) [or a carbon atom (C)]; R is a hydrocarbon radical; R_1 and R_2 are selected from the group of alkyl, alkylene, phenyl and benzyl radicals; and R_3 is a [C_1–C_{10} hydrocarbon] methyulene radical of from 1 to 10 carbon atoms.

10. The compounds of claim 1 selected from the group consisting of:

dioleoyl phosphatidyl-(methylethylene-S-diethyl)sulfonium;
dipalmitoyl phosphatidyl-(ethylene-S-dimethyl)sulfonium;
distearoyl phosphatidyl-(ethylene-S-diethyl)sulfonium;
oleoyl-palmitoyl phosphatidyl-(ethylene-S-dimethyl)-sulfonium;
dimyristoyl phosphatidyl-(tetramethylene-S-dipropylmethyl)sulfonium;
dipalmitoyl phosphatidyl-(trimethylene-S-dimethyl)sulfonium;
egg phosphatidyl-(trimethylene-S-dimethyl)sulfonium;
soybean phosphatidyl-(trimethylene-S-dimethyl)sulfonium; and
dipalmitoyl phosphatidyl-(tetramethylene-S-dimethyl)-sulfonium.

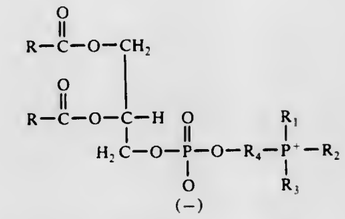
4,097,503

PHOSPHATIDYL PHOSPHONIUM HYDROXIDE COMPOUNDS

Barry D. Sears, 43 Bay State Road, Boston, Mass. 02215

Continuation-in-part of Ser. No. 731,132, Oct. 12, 1976. This application Feb. 22, 1977, Ser. No. 770,290
Int. Cl.² C08H *3/00*
U.S. Cl. 260—403 **10 Claims**

1. Synthetic phosphatidyl quaternary phosphonium compounds represented by the formula:



wherein R is a long-chain hydrocarbon radical; R_1, R_2 and R_3 are C_1–C_4 alkyl radicals, phenyl radicals or benzyl radicals; R_4 is a methylene radical of from 1 to 10 carbon atoms, except where R_4 is dimethylene and R_1, R_2 and R_3 are methyl radicals.

5. The compound of claim 1 selected from the group consisting of:

dioleoyl phosphatidyl-(methylethylene-P-triethyl)phosphonium;
dipalmitoyl phosphatidyl-(ethylene-P-dimethylethyl)phosphonium;
distearoyl phosphatidyl-(ethylene-P-dimethylethyl)phosphonium;
oleoyl-palmitoyl phosphatidyl-(ethylene-P-dimethylethyl)-phosphonium;
dimyristoyl phosphatidyl-(tetramethylene-P-dipropylmethyl)phosphonium;
dipalmitoyl phosphatidyl-(trimethylene-P-trimethyl)phosphonium;
egg phosphatidyl-(trimethylene-P-trimethyl)phosphonium;
soybean phosphatidyl-(trimethylene-P-trimethyl)phosphonium; and
dipalmitoyl phosphatidyl-(tetramethylene-P-trimethyl)-phosphonium.

4,097,504

11,12-SECOPROSTAGLANDINS

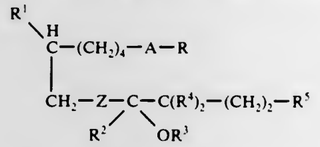
Edward J. Cragoe, Jr.; John B. Bicking, and Robert L. Smith, all of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 669,118, Mar. 22, 1976, Pat. No. 4,066,692, which is a continuation-in-part of Ser. No. 571,038, Apr. 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 389,901, Aug. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 302,365, Oct. 30, 1972, abandoned. This application Dec. 17, 1976, Ser. No. 751,501

Int. Cl.[2] C09F *5/00*; C11C *3/00*

U.S. Cl. 260—405 **9 Claims**

1. The compound having the following formula:



wherein R is carboxy, a carboxy salt having the formula $-COO^-Me^+$ wherein Me is a pharmaceutically acceptable cation derived from a metal or an amine, or derivatized carboxy having the formula -COOY wherein Y is alkyl having 1-10 carbon atoms, 1-succinimidoethyl, 1-(pivaloyloxy)ethyl, 2-acetamidoethyl, or diloweralkylamino-loweralkyl;

A is ethylene, trimethylene, α-methylethylene, β-methylethylene, α,α-dimethylethylene, or β,β-dimethylethylene;

R^1 is formyl, acetyl, propionyl, acryloyl, hydroxyacetyl, 3-hydroxypropionyl, hydroxymethyl, 1-hydroxyethyl, 1,2-dihydroxyethyl, 1,3-dihydroxypropyl, or 1-hydroxy-1-methylethyl;

Z is methylene, ethylene, trimethylene, tetramethylene, vinylene, or ethynylene;

R^2 is independently hydrogen or methyl;

R^3 is hydrogen or loweralkanoyl;

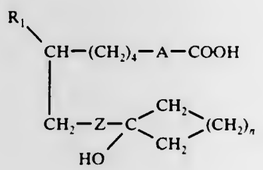
R^4 is selected independently from the group consisting of hydrogen and methyl; and

R^5 is lower alkyl of 1-4 carbon atoms joined with the R^2 methyl (with abstraction of hydrogen) to form a carbocyclic ring with from 6 to 9 members; or

R^5 is lower alkyl of 1-4 carbon atoms joined to the carbon atom bearing R^2 and OR^3 to form a carbocyclic ring with from 5 to 8 members.

2. The compound of claim **1** wherein R is carboxy or a pharmaceutically acceptable carboxy salt.

3. The compound of claim **2** which has the formula:



wherein R^1 is formyl, acetyl, propionyl, hydroxyacetyl, hydroxymethyl, 1-hydroxyethyl, or 1-hydroxy-1-methylethyl; A is ethylene, trimethylene, α-methylethylene, β-methylethylene,α,α-dimethylethylene, or β,β-dimethylethylene, Z is methylene, ethylene, trimethylene, vinylene or ethynylene, and *n* is an integer of 2 to 6.

4. 8-Acetyl-11-(1-hydroxycyclohexyl)undecanoic acid, the compound of claim **3** wherein A and Z are ethylene, R^1 is acetyl, and *n* is 3.

4,097,505

CIS-13-9-DEOXY-PGF$_2$ ANALOGS

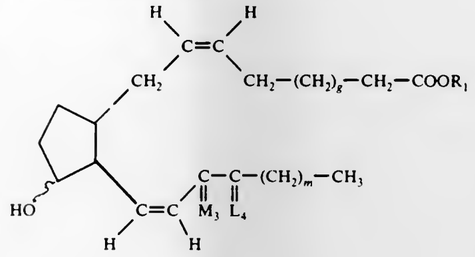
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,243, Sep. 17, 1975, Pat. No. 4,033,989. This application Apr. 11, 1977, Ser. No. 786,701

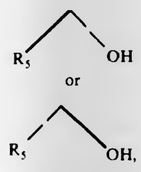
Int. Cl.[2] C07C *177/00*

U.S. Cl. 260—413 **27 Claims**

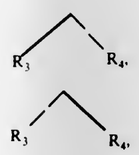
1. A prostaglandin analog of the formula



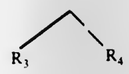
wherein *m* is one to 5, inclusive;
wherein M_3 is



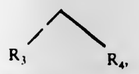
wherein R_5 and R_6 ae hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_4 is



or a mixture of

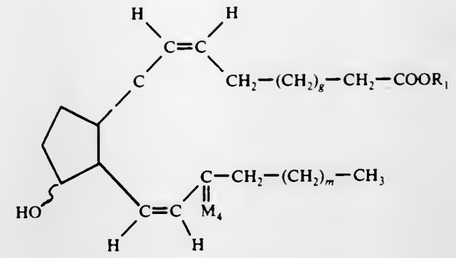


and

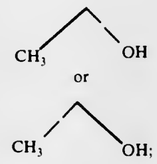


wherein R_3 and R_4 are hydrogen or methyl, being the same or different, with the proviso that one of R_3 and R_4 is methyl;
wherein R_1 is hydrogen, alkyl or one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein *g* is one, 2, or 3.

10. A prostaglandin analog of the formula

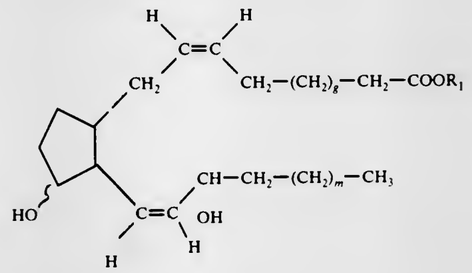


wherein *m* is one to 5, inclusive;
wherein M_4 is



wherein R_1 is hydrogen, alkyl or one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharamacologically acceptable cation; and wherein *g* is one, 2, or 3.

19. A prostaglandin analog of the formula



wherein m is one to 5, inclusive;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein g is one, 2, or 3.

4,097,506

CIS-13,9-DEOXY-PGF$_1$ COMPOUNDS

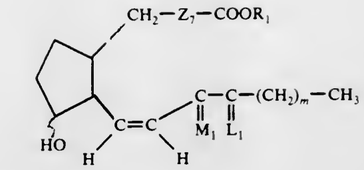
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,243, Sep. 17, 1975, Pat. No. 4,033,989. This application Apr. 11, 1977, Ser. No. 786,700

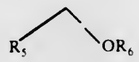
Int. Cl.[2] C07C *177/00*

U.S. Cl. 260—413 **9 Claims**

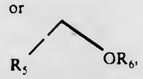
1. A prostaglandin analog of the formula



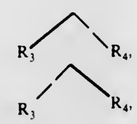
wherein
m is one to 5, inclusive;
wherein M_1 is



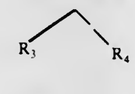
or



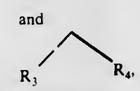
wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is



or a mixture of



and



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein Z_7 is:
(1) $-(CH_2)_3-(CH_2)_8-CF_2-$ or
(2) $-(CH_2)_3-(CH_2)_8-CH_2-$,
wherein *g* is one, 2, or 3.

4,097,507

PROCESS FOR SEPARATING STRAIGHT AND BRANCHED CHAIN SOAPS AND THEIR ACIDS

Lucien Person, Levallois Perret, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Dec. 28, 1976, Ser. No. 754,964

Claims priority, application France, Jan. 13, 1976, 76 00680

Int. Cl.[2] C11C *1/00*

U.S. Cl. 260—413 **8 Claims**

1. A process for separating straight and branched chain soaps comprising adding to a solution thereof a water-soluble lithium compound selected from a hydroxide, halide, sulfate, nitrate, and organic acid salt in at least an amount stoichiometrically sufficient to convert the straight chain soaps into the corresponding lithium salts, separating said lithium salts as a precipitate from said solution, acidifying said salts to recover straight chain organic acids and a lithium salt, and recovering branched chain organic acids from said solution.

4,097,508

CIS-4,5-DIDEHYDRO-13,14 DIHYDRO-9, DIOXY PGF COMPOUNDS

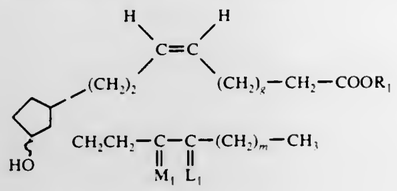
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,243, Sep. 17, 1975, Pat. No. 4,033,989. This application Apr. 11, 1977, Ser. No. 786,714

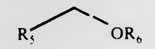
Int. Cl.² C07C *177/00*

U.S. Cl. 260—413 **12 Claims**

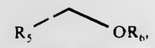
1. A prostaglandin analog of the formula



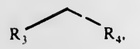
wherein *m* is one to 5, inclusive;
wherein M_1 is



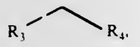
or



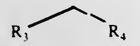
wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is



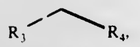
or



or a mixture of



and



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein *g* is one, 2, or 3.

4,097,509

DOUBLE-YLIDE METAL COMPLEXES

Hubert Schmidbaur, Garching, and Oswald Gasser, Munich, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 22, 1977, Ser. No. 780,130

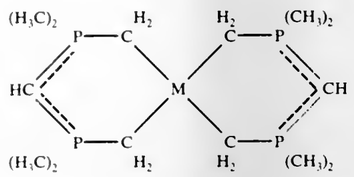
Claims priority, application Germany, Mar. 25, 1976, 2612644; Jan. 21, 1977, 2702326

Int. Cl.² C07F *1/12*

U.S. Cl. 260—430 **3 Claims**

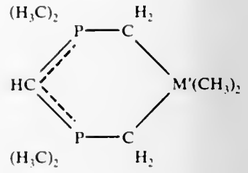
1. Bis-methyl-gold-bis-trimethylphosphano-methane of the formula: $[(CH_3)_3P]_2C(AuCH_3)_2$.

2. A double-ylide metal complex of the formula



in which M stands for magnesium, zinc, cadmium, nickel, palladium or platinum.

3. A double-ylide metal complex of the formula:



in which M' stands for boron, aluminum, gallium, indium, thallium or gold.

4,097,510

WATER-INSOLUBLE NICKEL-COMPLEX DISAZO METHINE COMPOUNDS

Theodor Papenfuhs, Frankfurt am Main, and Heinrich Volk, Bad Vilbel, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

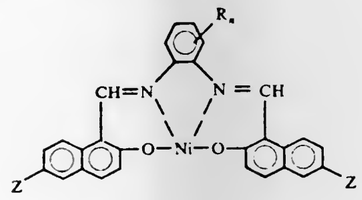
Filed Dec. 16, 1975, Ser. No. 641,252

Claims priority, application Germany, Apr. 9, 1975, 2515523

Int. Cl.² C07F *15/04*

U.S. Cl. 260—439 R **1 Claim**

1. A compound of the formula



wherein each R, which is the same or different, is halogen, lower alkyl, lower alkoxy, phenoxy, phenoxy substituted by 1 or 2 substituents selected from the group consisting of halogen, lower alkyl and lower alkoxy, hydroxy, cyano, trifluoromethyl, carboxy, carboxylic acid lower alkyl ester, lower alkanoyl, benzoyl or benzoyl substituted by 1 or 2 substituents selected from the group consisting of halogen, lower alkyl and lower alkoxy, *n* is 1, 2 or 3 and Z is hydrogen, halogen, lower alkoxy, nitro or cyano.

4,097,511

ORGANOFUNCTIONAL-SILICON MATERIALS

Abe Berger, Schenectady, N.Y., assignor to General Electric Company, Waterford, N.Y.

Continuation-in-part of Ser. No. 691,928, Dec. 20, 1967. This application Jul. 18, 1969, Ser. No. 843,214

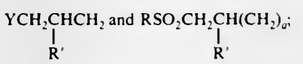
Int. Cl.² C07F *7/08, 7/10, 7/12*

U.S. Cl. 260—448.2 N **4 Claims**

1. Organofunctional-silicon hydrides having the formula:

$$QSiYY'H,$$

where Q is a monovalent radical selected from the class consisting of alkoxyalkyl, fluoroalkoxyalkyl, isocyanatoalkyl, methylthioalkyl, phenylthioalkyl,



R is a monovalent hydrocarbon radical free of aliphatic unsaturation; R' is selected from the class consisting of hydrogen and a lower alkyl radical of from 1 to 4 carbon atoms; Y is a halide radical; Y' is selected from the class consisting of Y and R; and *a* is an integer of from 1 to 5.

4,097,512

N-TETRACHLOROFLUOROETHYLTHIO-HALO-BENZOYL ANILIDES AND THEIR USE AS FUNGICIDES

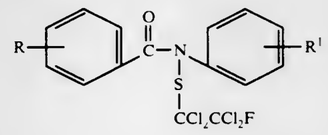
Hsiao-Ling Lam, El Cerrito, and Ferenc M. Pallos, Walnut Creek, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 613,642, Sep. 15, 1975, abandoned, which is a continuation of Ser. No. 537,240, Dec. 30, 1974, abandoned. This application Jan. 31, 1977, Ser. No. 764,258

Int. Cl.² C07C *69/00*; A01N *9/12*

U.S. Cl. 260—453RW **2 Claims**

1. A compound of the formula



in which R is chlorine, bromine, iodine or trifluoromethyl and R^1 is hydrogen, chlorine, bromine, iodine, trifluoromethyl, alkyl having 1 to 5 carbon atoms, alkoxy having 1 to 2 carbon atoms or alkylthio having 1 to 2 carbon atoms.

4,097,513

PROCESS FOR THE PREPARATION OF 2-FLUORO-2,2-DINITROETHYL ISOCYANATE

Alain G. Becuwe, Mennecy; Jean-Pierre G. Senet, Melun, and Claude M. Ucciani, Vert le Petit, all of France, assignors to Societe Nationale des Poudres et Explosifs, France

Filed Dec. 13, 1976, Ser. No. 749,892

Claims priority, application France, Dec. 23, 1975, 75 39426

Int. Cl.² C07C *118/02, 119/042*

U.S. Cl. 260—453 PH **6 Claims**

1. A process for the preparation of a solution of 2-fluoro-2,2-dinitroethyl isocyanate which comprises reacting phosgene with 2-fluoro-2,2-dinitro-ethylamine in solution in the absence of an added acid acceptor at a temperature of $-15° - +5°$ C to obtain 2-fluoro-2,2-dinitro-carbamyl chloride in the first step and then decomposing said carbamyl chloride in a second step in the absence of an added acid acceptor at a temperature between 20° and 50° C while passing through the solution a stream of an inert anhydrous gas.

4,097,514

PROSTAGLANDIN DERIVATIVES

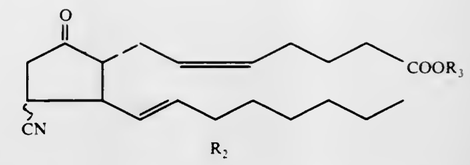
Donald P. Strike, St. Davids, and Wen-Ling Kao, Devon, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 384,769, Aug. 1, 1973, Pat. No. 3,845,042, which is a continuation-in-part of Ser. No. 282,200, Aug. 21, 1972, abandoned. This application Aug. 2, 1974, Ser. No. 494,151

Int. Cl.² C07C *121/46, 121/48*

U.S. Cl. 260—464 **2 Claims**

1. A compound of the formula:



wherein R_2 is hydrogen, acetoxy and tetrahydropyranyloxy and R_3 is hydrogen or lower alkyl.

4,097,515

PROCESS FOR THE MANUFACTURE OF CYANO-SUBSTITUTED STILBENE COMPOUNDS

Adolf Emil Siegrist, Basel, and Vincenzo Coviello, Marly, both of Switzerland, assignors to CIBA-GEIGY Corporation, Ardsley, N.Y.

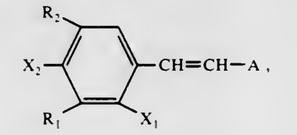
Division of Ser. No. 519,164, Oct. 30, 1974, Pat. No. 4,008,224. This application Sep. 16, 1976, Ser. No. 723,691

Claims priority, application Switzerland, Nov. 19, 1973, 16246/73; Nov. 19, 1973, 16247/73

Int. Cl.² C07C *121/60, 121/62, 121/75*

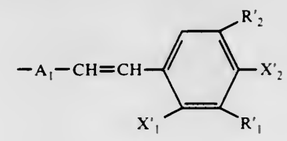
U.S. Cl. 260—465 G **11 Claims**

1. A process for the manufacture of cyano-substituted stilbene compounds of the formula



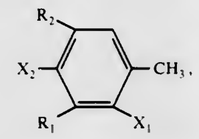
(I)

wherein either X_1 represents the cyano radical and X_2 represents hydrogen, chlorine or fluorine or together with R_1 represents a fused benzene ring, or X_2 represents the cyano radical and X_1 represents hydrogen, chlorine or alkyl with 1 to 4 carbon atoms or together with R_1 represents a fused benzene ring, R_1 represents hydrogen, chlorine, fluorine or alkoxy with 1 to 4 carbon atoms or together with X_1 or X_2 represents a fused benzene ring, R_2 represents hydrogen, chlorine, fluorine or alkoxy with 1 to 4 carbon atoms and A represents a phenyl, naphthyl, biphenyl, or stilben-4-yl radical, which is unsubstituted or substituted by chlorine and/or alkoxy with 1 to 4 carbon atoms or a radical of the formula



(II)

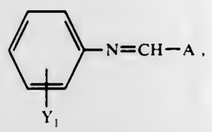
wherein either X'_1 represents the cyano radical and X'_2 represents hydrogen, chlorine or fluorine or X'_2 represents the cyano radical and X'_1 represents hydrogen, chlorine or alkyl with 1 to 4 carbon atoms, each of R'_1 and R'_2 independently represents hydrogen, chlorine, fluorine or alkoxy with 1 to 4 carbon atoms and A_1 represents 1,4-, 1,5- or 2,6- naphthylene, 1,4-phenylene or 4,4'-bisphenylene which comprises reacting a toluene derivative of the formula



(III)

wherein X_1, X_2, R_1 and R_2 have the meaning given above, with a Schiff's base of the formula

(IV)



wherein Y_1 represents chlorine or hydrogen, preferably in the 2-position, and A has the meaning given above, in dimethyl formamide and in the presence of sodium alcoholate at a temperature of 0 to 40° C.

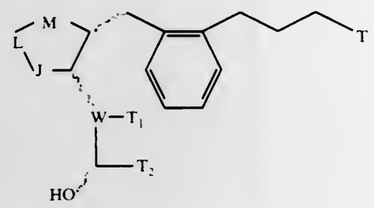
4,097,516

5,6-BENZO ANALOGUES OF PROSTAGLANDIN E

Robert Thomas Buckler, Edwardsburg, Mich., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Division of Ser. No. 671,423, Mar. 29, 1976. This application Apr. 20, 1977, Ser. No. 789,134
Int. Cl.² C07C *177/00*
U.S. Cl. 260—465 F **3 Claims**

1. A compound of the formula,



in which:
T is cyano;
M is carbonyl;
L is methylene;
J is methylene;
W is trans -CH=C-;
T_1 and T_2 are attached to adjacent carbon atoms;
T_1 is hydrogen only if T_2 is loweralkyl; and
T_2 is loweralkyl having 1-5 carbon atoms.

4,097,517

CLEAVAGE OF ALPHA-OXIMINOKETONES, ALDEHYDES AND ACETALS AND THEIR NITROSO ISOMERS

Milorad M. Rogic, Whippany; Timothy R. Demmin, Morris Plains, both of N.J., and Karl P. Klein, Alexandria, Va., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Sep. 10, 1976, Ser. No. 722,249
Int. Cl.² C07C *120/00*
U.S. Cl. 260—465.4 **13 Claims**

1. Process for cleavage, in an alpha-oximino-ketone, aldehyde or acetal, or in the monomeric or dimeric alpha-nitroso isomer of such compound, of the bond joining (a) the carbon atom bearing the oxime or nitroso group and (b) the carbonyl carbon atom or dialkoxy substituted carbon atom of an acetal of such carbonyl group, which process comprises: contacting said alpha-oximino ketone, aldehyde or dialkyl acetal having no substituents except permissibly alkyl and chloro, or the monomeric or dimeric alpha-nitroso isomer thereof with at least one reagent of the group consisting of ortho esters of carboxylic acids and reaction products of such ortho esters with Lewis acids — or maintaining a solution of an adduct of such ortho ester with such oximino compound — in an inert liquid electrophilic reaction medium for a time such that the cleavage reaction occurs at the prevailing temperature and pressure with formation of a cyano group and an ester group.

4,097,518

METHOD FOR THE CATALYTIC PRODUCTION OF ACRYLONITRILE

Sumio Umemura; Kyoji Ohdan; Taizo Uda; Tokuo Matsuzaki; Mikio Hidaka; Yasuo Nakamura, and Tsuruoka, Masao, all of Ube, Japan, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Oct. 19, 1976, Ser. No. 733,771
Int. Cl.² C07C *120/14*
U.S. Cl. 260—465.3 **18 Claims**

1. A method for the catalytic production of acrylonitrile by ammoxidation of propylene, comprising bringing at an elevated temperature, a reaction feed containing propylene, ammonia and molecular oxygen in the gas phase into contact with a catalyst consisting essentially of an oxide composition according to the formula:

$$Mo_aCo_bFe_cX_dO_e$$

wherein X represents at least one element selected from the group consisting of calcium, tungsten, chromium, zirconium, titanium, zinc, manganese and tin; the subscripts *a, b, c,* and *d* respectively represent the atomic ratios a:b:c:d, of the elements in the range of 12:(4 to 10):(1 to 6):(0.1 to 1.0); and the subscript *e* represents the number of oxygen atoms which satisfies the valence of the elements, the ratio a:e being in the range of 12:40 to 70.

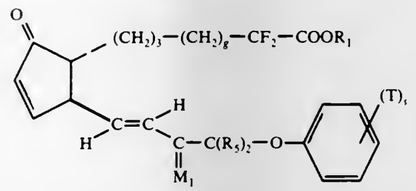
4,097,519

2,2-DIFLUORO-16-PHENOXY-PGA$_1$ ANALOGS

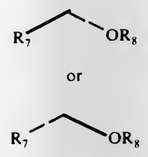
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 552,708, Feb. 25, 1975, Pat. No. 4,001,300. This application Sep. 17, 1976, Ser. No. 724,239
Int. Cl.² C07C *65/22, 177/00*
U.S. Cl. 560—53 **58 Claims**

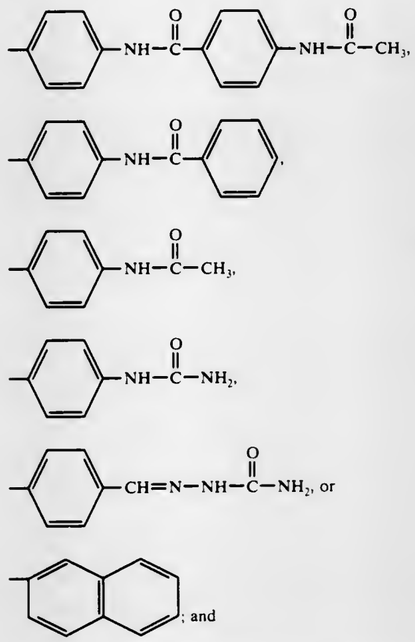
1. A compound of the formula



or a mixture comprising that compound and the enantiomer thereof,
wherein *g* is 2 to 4, inclusive;
wherein M_1 is



wherein R_7 and R_8 are hydrogen or methyl, with the proviso that one of R_7 or R_8 is methyl only when the other is hydrogen;
wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein *s* is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation,



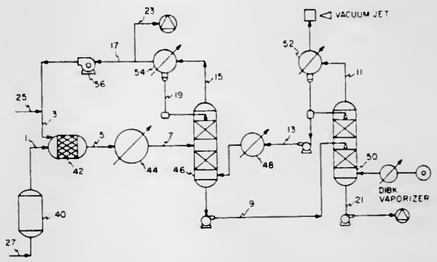
wherein R_5 is hydrogen or methyl, with the proviso that R_5 is methyl only when R_7 and R_8 are both hydrogen.

4,097,520

PREPARATION OF PERACETIC ACID BY OXIDATION OF ACETALDEHYDE

Gerald Holmes Slattery, Pasadena, Md., assignor to FMC Corporation, Philadelphia, Pa.

Continuation of Ser. No. 105,527, Jan. 11, 1971. This application Feb. 1, 1974, Ser. No. 438,949
Int. Cl.² C07C *179/12*
U.S. Cl. 260—502 A **3 Claims**



1. In the process of producing peracetic acid by the vapor-phase oxidation of acetaldehyde in a reaction zone, in which the reactants, acetaldehyde and oxygen, are mixed before introducing the reaction gas mixture into the reaction zone, which is maintained at a temperature of 100° to 230° C at a pressure of up to 50 pounds per square inch, and recovering the product peracetic acid by absorption in a liquid selected from the group consisting of acetone and ethyl acetate, the improvement which comprises: (a) mixing the reactants in a cylindrical mixer-explosion-suppression chamber containing aluminum or stainless steel packing whose passage diameter is less than the critical diameter of the reaction gas mixture, while maintaining the oxygen concentration at less than 10% by volume in said chamber and maintaining the reaction gas velocity in the explosion suppression chamber in excess of the flame velocity of the reaction gas mixture, and (b) introducing the mixed reaction gas mixture into the reaction zone, in which the oxygen concentration in the reaction zone is maintained at less than 10% by volume of the reaction gas mixture.

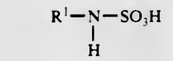
4,097,521

MANUFACTURE OF AMIDOSULFONIC ACIDS

Hans Rupert Merkle, Ludwigshafen, and Albrecht Müeller, Frankenthal, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

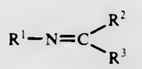
Filed May 13, 1977, Ser. No. 796,548
Claims priority, application Germany, Jun. 23, 1976, 2628195
Int. Cl.² C07C *143/86*
U.S. Cl. 260—513.6 **7 Claims**

1. A process for the manufacture of amidosulfonic acids of the formula



I

where R^1 is an aliphatic or cycloaliphatic radical, which comprises reacting a Schiff base of the formula



II

where R^1 has the above meanings and R^2 and R^3 may be identical or different and each is an aliphatic or cycloaliphatic radical or a furyl radical, and R^2 may also be hydrogen, with sulfur trioxide in a first stage and then reacting the adduct formed in the first stage with water in a second stage.

4,097,522

SYNTHESIS OF M-BENZOYL-HYDRATROPIC ACID

Leandro Baiocchi, Rome, Italy, assignor to Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A., Rome, Italy

Filed May 28, 1976, Ser. No. 690,832
Claims priority, application Italy, Jun. 5, 1975, 49925 A/75
Int. Cl.² C07C *65/20*
U.S. Cl. 260—517 **5 Claims**

1. A process for the production of m-benzoyl hydratropic acid which comprises (a) condensing 2-benzoyl cyclohexanone and a compound selected from the group consisting of pyruvic acid and its ester to obtain a reaction mixture containing as a reaction product 7-benzyol-3-methyl-2,4,5,6-tetrahydro-benzo[b]-furan-2-one, and then (b) heating the reaction mixture at a temperature of 200° to 230° C in the presence of a large excess of an acid catalyst.

4,097,523

LIQUID PHASE OXIDATION OF UNSATURATED ALIPHATIC ALDEHYDES TO UNSATURATED ALIPHATIC ACIDS

Jar-Lin Kao, Cherry Hill, N.J., and John Joseph Leonard, Springfield, Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jan. 12, 1977, Ser. No. 758,623
Int. Cl.² C07C *51/32, 57/04, 57/06, 57/08*
U.S. Cl. 260—530 N **13 Claims**

1. A process for the liquid phase oxidation of an α,β-unsaturated aliphatic aldehyde containing from 3 to 6 carbon atoms in an inert solvent solution to the corresponding unsaturated aliphatic carboxylic acid which comprises contacting said aldehyde with oxygen or an oxygen-containing gas at a

temperature of from about 0° C. to 100° C. and a pressure between about atmospheric and 1500 psig in the presence of from about 0.00001 to 0.5 mole of a thallium compound or mixture of thallium compounds selected from the group consisting of thallium triacetate, thallous acetate, thallium trihexanoate, thallium tripropionate, thallium acetylacetonate, thallic bromide, thallic chloride, thallic nitrate, thallic sulfate, thallic oxide, thallous iodide, thallous hydroxide, thallous chloride, thallous bromide, thallous carbonate, thallous sulfate, thallous nitrate and thallous perchlorate, per mole of said aldehyde to effect an in situ decomposition of intermediate peroxide compounds formed during the oxidation to said unsaturated aliphatic carboxylic acid.

4,097,524

PROCESS FOR THE PREPARATION OF FORMAMIDES

Haven Sylvester Kesling, Jr., Drexel Hill, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 27, 1976, Ser. No. 754,151
Int. Cl.[2] C07C *103/02*
U.S. Cl. 260—561 R **15 Claims**

1. A process for the preparation of formamides which comprises reacting a tertiary aliphatic, cycloaliphatic or heterocyclic amine with carbon monoxide in the presence of a sufficient amount of a copper compound catalyst to effect the carbonylation of the amine, an agent capable of oxidizing copper and a dehydrating agent.

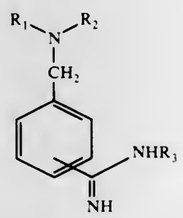
4,097,525

AROMATIC AMIDINES AS ANTIVIRAL AGENTS IN ANIMALS

Allen R. Kraska, East Lyme, and Rodney C. Schnur, Noank, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 769,854, Feb. 18, 1977, Pat. No. 4,066,696, which is a division of Ser. No. 708,180, Jul. 23, 1976, Pat. No. 4,025,555. This application Oct. 13, 1977, Ser. No. 841,832
Int. Cl.[2] C07C *123/00*
U.S. Cl. 260—564 R **7 Claims**

1. A compound of the structure



and the non-toxic acid addition salts thereof wherein
R_1 and R_2 are each alkyl of from 12 to 24 carbon atoms; and
R_3 is dimethylamino.

4,097,526

PREPARATION OF ORGANIC SULFONE COMPOUNDS

John Kai-Fai Chan, Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Feb. 10, 1977, Ser. No. 767,487
Int. Cl.[2] C07C *131/00*
U.S. Cl. 260—566 AC **27 Claims**

1. In a process for oxidizing an organic sulfide compound to its corresponding sulfone compound with a mixture of hydrogen peroxide and a carboxylic acid, the improvement which comprises conducting the reaction in the presence of a catalytically effective amount of a mineral or an organic sulfonic acid.

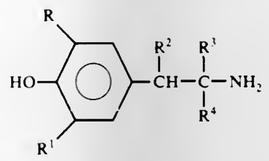
4,097,527

ANTIOXIDANTS AND PROCESS OF PREPARING SAID ANTIOXIDANTS

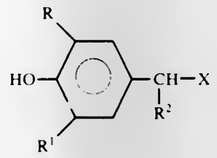
Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 9, 1971, Ser. No. 206,501
Int. Cl.[2] C07C *87/28*
U.S. Cl. 260—570.8 R **3 Claims**

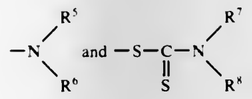
1. A process of preparing a compound having the following structural formula:



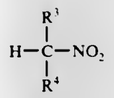
comprising (I) reacting, under basic conditions, a combination comprising (A) a phenolic compound having the following structural formula:



wherein X is selected from the group consisting of Cl, Br,



wherein R^5, R^6, R^7 and R^8 are alkyl radicals having 1 to 4 carbon atoms and (B) a nitroalkane having the following structural formula:



and (II) reducing the product of step (I), wherein R and R^1 are tertiary alkyl radicals having 4 to 8 carbon atoms, R^2 is selected from the group consisting of hydrogen and alkyl radicals having 1 to 6 carbon atoms, R^3 is selected from the group consisting of hydrogen and alkyl radicals having 1 to 6 carbon atoms and R^4 is an alkyl radical having 1 to 6 carbon atoms.

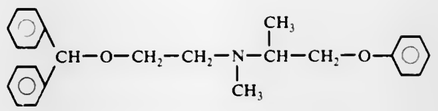
4,097,528

[N-(2-DIPHENYLMETHOXYETHYL)-N-(1-METHYL-2-PHENOXYETHYL)-N-METHYL] AMINE

Angel Lázaro Porta, and Antonio Ibáñez Paniello, both of Barcelona, Spain, assignors to Doctor Andreu, S.A., Spain

Filed Jul. 28, 1977, Ser. No. 819,900
Claims priority, application Spain, Aug. 5, 1976, 450.500; Aug. 5, 1976, 450.501; Aug. 5, 1976, 450.502; Aug. 5, 1976, 450.503
Int. Cl.[2] C07C *93/08*
U.S. Cl. 260—570 R **1 Claim**

1. [N-(2-diphenylmethoxyethyl)-N-(1-methyl-2-phenoxyethyl)-N-methyl] amine of the following structural formula:



(I)

and its pharmaceutically acceptable salts.

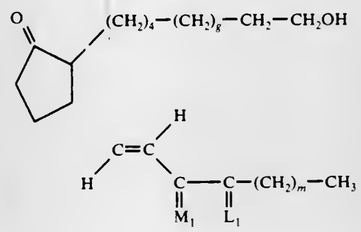
4,097,529

2-DECARBOXY-2-HYDROXYMETHYL-11-DEOXY-PGE$_1$ ANALOGS

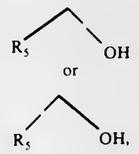
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,369, Jan. 28, 1976, Pat. No. 4,032,576. This application Apr. 6, 1977, Ser. No. 784,994
Int. Cl.[2] C07C *49/46, 49/80, 49/82*
U.S. Cl. 260—586 R **15 Claims**

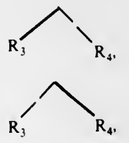
1. A prostaglandin analog of the formula



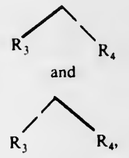
wherein M_1 is



wherein R_5 is hydrogen or methyl;
wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive;
with the proviso that at least one of R_3, R_4, and R_5 is methyl or at least one of R_3 and R_4 is fluoro.

4,097,530

PROCESS FOR THE PRODUCTION OF SQUARIC ACID

Manfred Schroeder, and Wolfgang Schaefer, both of Marl, Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Filed May 19, 1977, Ser. No. 798,546
Claims priority, application Germany, May 28, 1976, 2623836
Int. Cl.[2] C07C *45/00*
U.S. Cl. 260—586 P **7 Claims**

1. A process for the production of squaric acid, comprising reacting hexachlorocyclobutene with 70–96% by weight sulfuric acid at 80°–150° C.

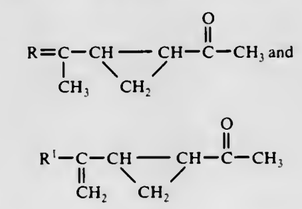
4,097,531

SUBSTITUTED CYCLOPROPANE PROCESS AND PRODUCT

James O. Bledsoe, Jr., and Walter E. Johnson, Jr., both of Jacksonville, Fla., assignors to SCM Corporation, New York, N.Y.

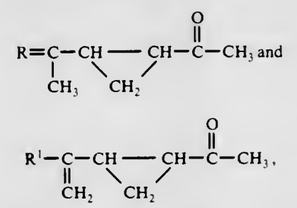
Continuation-in-part of Ser. No. 692,978, Jun. 4, 1976, abandoned. This application Apr. 11, 1977, Ser. No. 786,125
Int. Cl.[2] C07C *45/00, 49/61*
U.S. Cl. 260—586 R **12 Claims**

1. A substituted cyclopropane selected from the group represented by the following general structures:



where **R** is a monovalent alkyl or alkylene radical, and R^1 is hydrogen or **R**.

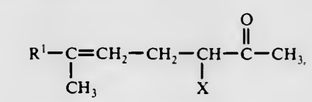
5. The process for making substituted cyclopropane represented by the following general structures:



(I)

(II)

where **R** is a monovalent alkyl or alkenyl radical, and R^1 is hydrogen or **R**, which comprises:
heating at about 100° to 250° C. in the presence of an alkaline earth metal carbonate and liquid glycol vehicle, a compound represented by



(III)

where **X** is a halogen atom, until said substituted cyclopropane is formed.

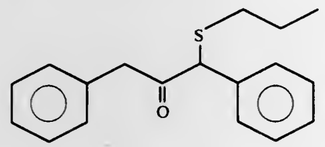
4,097,532

ALPHA-OXY(OXO)SULFIDES AND ETHERS

William J. Evers, Red Bank, and Howard H. Heinsohn, Jr., Hazlet, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 730,538, Oct. 7, 1976, Pat. No. 4,045,491.
This application Mar. 31, 1977, Ser. No. 783,485
Int. Cl.² C07C *49/76*
U.S. Cl. 260—590 D **1 Claim**

1. The compound having the structure:



4,097,533

LIQUID PHASE PROCESS FOR THE PRODUCTION OF AROMATIC ALDEHYDES

John A. Scheben, Erlanger, Ky., assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Nov. 19, 1976, Ser. No. 743,435
Int. Cl.² C07C *45/00*
U.S. Cl. 260—599 **10 Claims**

1. A process for the preparation of aromatic aldehydes which comprises contacting at a temperature of from about 140° to about 300° C toluene or a substituted toluene in which the substituent is lower alkyl or lower alkoxy in the liquid phase with oxygen in the presence of a catalyst comprising at least about 1% by weight of phosphoric acid and of water and a catalytically effective amount of palladium and at least about 0.01% by weight of a modifier selected from the group consisting of:

(a) compounds of the formula, R-Z in which R is alkyl, aryl, aralkyl or alkaryl of up to about 8 carbon atoms and Z is —SH, —SR′, —SSR′, R′SO—, R′SO_2— or

wherein R″ is H or lower alkyl and R′ has the same meaning as R;

(b) cyclic compounds containing a hetero sulfur atom selected from the group consisting of thiophene, phenothiazine, thiazole and benzothiophene and sulfones and sulfoxides thereof

(c) thiourea and N-lower alkyl thiourea;

(d) tertiary amines containing up to about 10 carbon atoms; and

(e) R_3PO_3 and R_3PO_4 wherein R has the same meaning as above,

said percents by weight being based on the weight of the supported catalyst.

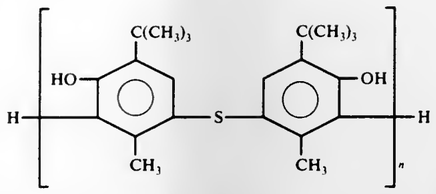
4,097,534

PROCESS FOR POLYMERIZING 4,4′-THIOBIS(6-TERT-BUTYL-M-CRESOL)

Richard H. Hirsch, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 16, 1976, Ser. No. 751,774
Int. Cl.² C07C *148/00*
U.S. Cl. 260—609 F **13 Claims**

1. Process for preparing a polymer of the formula



wherein n has an average value of from about 1.5 to about 10 by polymerizing 4,4′-thiobis(6-tert-butyl-m-cresol) which comprises reacting said cresol with oxygen at a molar ratio of from about 2 to about 3.2 and at a temperature of from about 20° C. to about 80° C. in the presence of a copper salt/amine complex catalyst and an inert diluent, the molar ratio of said cresol to said complex being from about 35 to about 45, the molar ratio of said cresol to said amine being from about 40 to about 53 and the molar ratio of said copper salt to said amine being from about 0.8 to about 1.4, said copper salt being selected from chloride, bromide, acetate, propionate, palmitate and benzoate, and said amine being selected from pyridine, cyclohexylamine, diethylamine, di-n-butylamine, n-butylamine, t-butylamine, t-octylamine and tetramethylethylene diamine.

4,097,535

PREPARATION OF ALDEHYDES FROM ALCOHOLS

Kang Yang; Kaye L. Motz, and James D. Reedy, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Jan. 31, 1977, Ser. No. 763,958
Int. Cl.² C07C *45/16*
U.S. Cl. 260—603 C **7 Claims**

1. In the method of preparing C_5 - C_{15} aldehydes from primary C_5 - C_{15} alcohols by passing alcohol and an oxygen-containing gas over silver catalyst at an elevated temperature the improvement comprising passing a the alcohol and an oxygen-containing gas through a pre-reactor zone, containing silver catalyst, and being at a temperature in the range of about 25° to about 300° C., and then passing the reactants through the reaction zone which is at a temperature of above 300° C. to about 600° C., said pre-reactor zone having a maximum temperature of at least from about 25° to 50° C. below the reaction zone temperature, said improved process being characterized further as providing a conversion of at least 90% with a selectivity of at least 85%.

4,097,536

PREPARATION OF A BLEACH

Robert Charles Patrick Cubbon, New Castle-U-Lyme; Peter John Russell, Eastham The Wirral; Robert Eric Talbot, Burtonwood, and David Thomas Woodbridge, Hitchin, all of England, assignors to Interox Chemicals Limited, London, England

Continuation-in-part of Ser. No. 683,817, May 6, 1976, abandoned. This application Apr. 26, 1977, Ser. No. 791,003
Claims priority, application United Kingdom, Nov. 18, 1975, 47388/75; Ireland, Nov. 1, 1976, 2426/76
Int. Cl.² C11D *7/38, 7/54, 7/18*
U.S. Cl. 260—610 R **16 Claims**

1. A process for the production of diphthaloyl peroxide comprising the steps of:

(i) forming a mobile slurry or paste containing aqueous hydrogen peroxide and particulate phthalic anhydride in a mole ratio of from 2:1 to 1:10;

(ii) maintaining the slurry or paste mobile and mixing the slurry or paste for a period of at least half an hour at a temperature of from ambient to 50° C, thereby forming particulate diphthaloyl peroxide and;

(iii) thereafter separating the diphthaloyl peroxide from the aqueous phase.

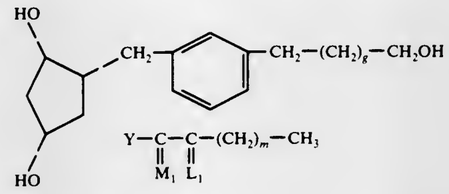
4,097,537

2-DECARBOXY-2-HYDROXYMETHYL-3,7-INTER-M-PHENYLENE-PGF$_{1\alpha}$COMPOUNDS

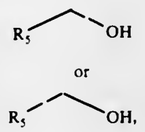
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419.
This application Mar. 17, 1977, Ser. No. 778,647
Int. Cl.² C07C *35/00*
U.S. Cl. 568—807 **22 Claims**

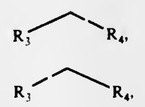
1. A prostaglandin analog of the formula



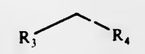
wherein Y is trans—CH=CH—;
wherein M_1 is



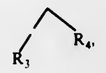
wherein
R_5 is hydrogen or methyl;
wherein L_1 is



or a mixture of



and



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and
R_4 is methyl only when the other is hydrogen or methyl; wherein g is one, 2, or 3; and wherein m is one to 5, inclusive.

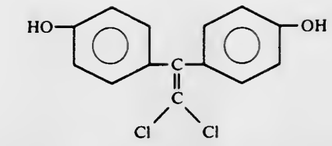
4,097,538

DEHYDROCHLORINATION OF A DIHYDROXYDIPHENYL TRICHLOROETHANE

Arnold Factor, Scotia; Michael R. MacLaury, Rexford, and Jimmy L. Webb, Ballston Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 23, 1977, Ser. No. 771,208
Int. Cl.² C07C *37/00*
U.S. Cl. 568—726 **3 Claims**

1. The process for dehydrohalogenating 1,1,1-trichloro-2,2-bis(4-hydroxyphenyl) ethane to form the dichloroethylene compound of the formula



which process comprises (1) treating the aforesaid trichloroethane with from 3 to 20 moles anhydrous liquid ammonia per mole trichloroethane thereby to form a substantially pure dichloroethylene compound of the above formula, (2) removing unreacted ammonia, (3) dissolving the reaction product in an amount of a methanol/water mixture whose pH has been adjusted to from 3 to 11 sufficient to dissolve both the formed ammonium chloride and the aforesaid dichloroethylene compound, (4) heating the mixture of ingredients and then allowing the mixture to cool until precipitation of the dichloroethylene compound is accomplished and (5) isolating the precipitated dichloroethylene compound.

4,097,539

PROCESS OF SCRUBBING POLYHYDROXY PHENOLS FROM GAS

Hans-Martin Stönner, Schwalbach, and Paul Wiesner, Oberursel, both of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jul. 10, 1974, Ser. No. 486,998
Claims priority, application Germany, Dec. 28, 1973, 2365064
Int. Cl.² C07C *37/34*
U.S. Cl. 568—751 **1 Claim**

1. A process for the recovery of phenols in admixture with diisopropyl ether serving as an extraction solvent which comprises the steps of:

(a) deriving from the pressure gasification of coal and gas containing in addition to monovalent and polyvalent phenols, ammonia, carbon dioxide, hydrogen sulfide, ammonia salts with chlorine and fluorine, fatty acids, dust, tars and oils as impurities;

(b) scrubbing the gas derived in step (a) with water to produce a scrubbing aqueous mixture containing some of said impurities and some of said phenols, thereby producing a precleaned gas;

(c) cooling the precleaned gas to remove impurities therefrom;

(d) condensing a phenolic fraction from the cooled precleaned gas and removing tar and oil from the resulting condensate, said condensate constituting an aqueous mixture relatively rich in monovalent phenols;

(e) extracting said aqueous mixture relatively rich in monovalent phenols with diisopropyl ether solvent to extract said monovalent phenols and form a further solvent consisting of monovalent phenols and diisopropyl ether;

(f) extracting the scrubbing aqueous mixture separately from the aqueous mixture relatively rich in monovalent phenols with the further solvent produced in step (d) to extract the polyvalent phenols in said further solvent and leaving monovalent phenols in said scrubbing aqueous mixture; and

(g) extracting monovalent phenol with fresh diisopropyl ether from said scrubbing aqueous mixture after step (f) and combining the resulting mixture of diisopropyl ether and monovalent phenol with the further solvent used in step (f).

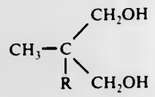
4,097,540

PROCESS FOR THE PREPARATION OF 2-ALKYL-2-METHYLPROPANE-1,3-DIOL

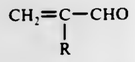
Otto Immel, Krefeld; Hans-Helmut Schwarz, Krefeld-Traar, and Oskar Weissel, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 8, 1977, Ser. No. 822,963
Claims priority, application Germany, Aug. 27, 1976, 2638733
Int. Cl.[2] C07C *29/14*
U.S. Cl. 568—862 14 Claims

1. A process for the preparation of a dihydric alcohol with the formula



wherein R represents an alkyl radical of 1 to 20 carbon atoms which comprises contacting a 2-alkylacrylaldehyde of the formula



wherein R has the meaning given above with formaldehyde and thereafter contacting the resultant reaction mixture with hydrogen in the presence of a hydrogenation catalyst.

4,097,541

PROCESS OF PRODUCING MAINLY MONOCYCLIC AROMATIC COMPOUNDS FROM UNUTILIZED CARBON RESOURCES MAINLY COMPOSED OF POLYCYCLIC AROMATIC COMPOUNDS

Tomoya Sakai, Nagoya, and Naoki Negishi, Tokyo, both of Japan, assignors to Kogyo Kaihatsu Kenkyusho (Industrial Research Institut), Tokyo, Japan

Continuation of Ser. No. 479,285, Jun. 14, 1974, abandoned. This application Aug. 13, 1976, Ser. No. 714,006
Claims priority, application Japan, Jun. 21, 1973, 48-69221; Mar. 13, 1974, 49-28046; Mar. 14, 1974, 49-28541; Mar. 14, 1974, 49-28542
Int. Cl.[2] C07C *1/20, 15/02*
U.S. Cl. 260—668 R 10 Claims

1. A method for decarbonylating an oxygen-containing condensed polycyclic aromatic hydrocarbon having at least one group selected from the group consisting of carbonyl, hydroxyl, and carboxyl which consists essentially of heating said oxygen-containing condensed polycyclic aromatic hydrocarbon at a temperature of from about 500° C to about 900° C under atmospheric pressure in contact with hydrogen and in the absence of a catalyst, to thereby stoichiometrically split off carbon monoxide.

4,097,542

PRODUCTION OF ALKYLBENZENES

Ivan James Samuel Lake, Middlesbrough, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 23, 1977, Ser. No. 827,098
Claims priority, application United Kingdom, Sep. 29, 1976, 40388/76
Int. Cl.[2] C07C *3/52*
U.S. Cl. 260—671 M 11 Claims

1. A process for effecting the alkylation of an aromatic hydrocarbon which comprises contacting an aromatic hydrocarbon with an alkylating agent under reaction conditions which are effective for accomplishing alkylation of the aromatic hydrocarbon and in the presence of a catalyst comprising zeolite nu-1 having a composition expressed by the formula

0.9 to 1.3 $R_2O : Al_2O_3 : 20$ to 150 $SiO_2 : 0$ to $40H_2O$

where R is one or more of hydrogen, ammonium, phosphonium of 1/n of a cation having a valency *n* and having an X-ray diffraction pattern when R is H substantially as shown in Table 1.

4,097,543

SELECTIVE DISPROPORTIONATION OF TOLUENE

Werner O. Haag, Lawrenceville, and David H. Olson, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 685,869, May 12, 1976, abandoned, and a continuation-in-part of Ser. No. 685,872, May 12, 1976, abandoned. This application Jan. 21, 1977, Ser. No. 760,893
Int. Cl.[2] C07C *3/62*
U.S. Cl. 260—672 T 19 Claims

1. A process for the selective production of paraxylene by disproportionation of toluene in the presence of a catalyst comprising a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12, which catalyst has undergone controlled precoking by exposing the same to a thermally decomposable organic compound at a temperature in excess of the decomposition temperature of said compound but less than about 1200° F., at a hydrogen to organic compound mole ratio of between 0 and 1 to deposit at least about 2 weight percent coke thereon and thereafter contacting toluene with the resulting coke-containing catalyst under disproportionation conditions including a temperature between about 800° F. and 1025° F. at a hydrogen to toluene mole ratio greater than 1 and up to about 10 and recovering a product mixture containing para-xylene in an amount greater than the thermodynamic equilibrium concentration thereof in the total xylenes produced.

4,097,544

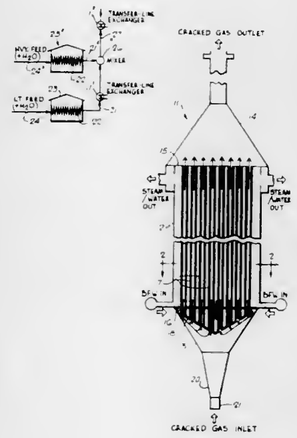
SYSTEM FOR STEAM-CRACKING HYDROCARBONS AND TRANSFER-LINE EXCHANGER THEREFOR

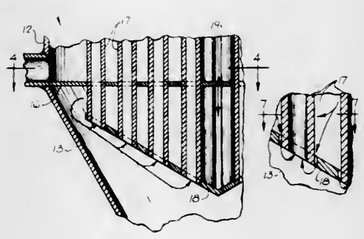
Robert J. Hengstebeck, Valparaiso, Ind., assignor to Standard Oil Company, Chicago, Ill.

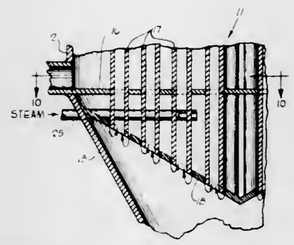
Filed Apr. 25, 1977, Ser. No. 790,329
Int. Cl.[2] C07C *3/30;* F28F *19/00*
U.S. Cl. 260—683 R 17 Claims

1. A transfer-line exchanger, useful in a system for steam-cracking hydrocarbons to produce ethylene, which comprises:
- a vertical tank having:
  - a cylindrical intermediate portion with side openings adjacent the top and bottom ends to withdraw and introduce, respectively, fluid coolant;
  - a conical bottom entrance end portion connected to the bottom end of said intermediate portion; and
  - a conical top exit end portion connected to the top end of said intermediate portion;
  - a horizontal top tube sheet having a number of openings and supported by said tank at the top end of said intermediate portion of said tank;
  - a horizontal bottom tube sheet having a number of openings corresponding to and in vertical alignment with said openings in said top tube sheet, said bottom tube sheet being supported in said tank at the bottom end of said intermediate portion of said tank;
  - a conical shield having its vertex below its base and supported within said conical bottom entrance end portion of said tank to provide an upper chamber between said shield and said bottom tube sheet and a lower chamber between said shield and the bottom part of said conical bottom entrance end portion, said shield having openings in vertical alignment with said openings in said tube sheets;
  - a number of vertical tubes in said openings of said top tube sheet and extending through said bottom tube sheet to said openings in said conical shield; and

- means to introduce steam into the chamber between said conical shield and said bottom tube sheet,
- said conical shield being constructed with respect to said tubes or said conical bottom entrance end portion so that steam introduced into said upper chamber between said conical shield and said bottom tube sheet can pass downwardly into said lower chamber in said conical bottom entrance end portion to mix with gas passing upwardly through said conical bottom entrance end portion of said tank before the gas passes upwardly through said tubes.







10. A system, as an apparatus, for steam-cracking hydrocarbons to produce a gaseous steam-cracked product containing ethylene, which comprises:
- a first furnace for steam-cracking a heavy hydrocarbon feed, said first cracking furnace having a pipe with an inlet for entrance of the heavy hydrocarbon feed with water and an outlet for gaseous cracked product;
- a second furnace for steam-cracking a lighter hydrocarbon feed, said second cracking furnace having a pipe with an inlet for entrance of the lighter hydrocarbon feed with water and an outlet for gaseous cracked product;
- a mixer having first inlet, a second inlet and an outlet, said first inlet being connected to said outlet of said pipe of said first furnace;
- a first transfer-line exchanger having an outlet connected to said second inlet of said mixer and an inlet connected to said outlet of said pipe of said second furnace; and
- a second transfer-line exchanger having an inlet connected to said outlet of said mixer,

whereby, in the use of the apparatus, the gaseous cracked product from the lighter hydrocarbon feed is cooled by passage through said first transfer-line exchanger and then mixed with the gaseous cracked product from the heavy hydrocarbon feed before that product from the heavy hydrocarbon feed is passed through the second transfer-line exchanger.

15. A system, as a process, for steam-cracking hydrocarbons to produce a gaseous steam-cracked product containing ethylene, which comprises:
- steam-cracking a heavy hydrocarbon feed at an elevated temperature to produce a first gaseous steam-cracked product containing ethylene;
- separately steam-cracking a lighter hydrocarbon at an elevated temperature to pro-uce a second gaseous steam-cracked product containing ethylene;
- cooling the second gaseous steam-cracked product by passing it through a transfer-line exchanger in indirect heat exchange relationship with an aqueous fluid coolant;
- mixing the cooled second gaseous steam-cracked product with the first gaseous steam-cracked product; and
- passing the mixture through a second transfer-line exchanger for indirect heat exchange relationship with aqueous fluid coolant.

4,097,545

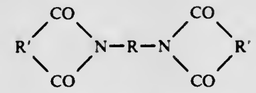
HEAT-RESISTANT THERMOSETTING POLYIMIDE RESIN WITH BIS-PHENOL-EPICHLOROHYDRIN REACTION PRODUCT

Keiichi Akiyama, Yokosuka; Junichi Kamiuchi, Yokohama; Itsuo Matsuda, Chofu, and Takara Fujii, Yokohama, all of Japan, assignors to Toshiba Chemical Products Co. Ltd., Tokyo, Japan

Division of Ser. No. 615,933, Sep. 25, 1975. This application Aug. 30, 1976, Ser. No. 718,931
Claims priority, application Japan, Sep. 25, 1974, 49-109505; Mar. 6, 1975, 50-27292; Mar. 6, 1975, 50-27293
Int. Cl.[2] C08L *63/02*
U.S. Cl. 260—830 P 8 Claims

1. A heat-resistant thermosetting resin composition consisting essentially of a reaction product of components (A), (B) and (C) wherein:

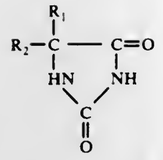
(A) is a mixture of (a) at least one N,N′-bisimide of unsaturated dicarboxlic acid expressed by the general formula:



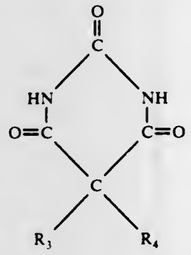
wherein R is a divalent radical having at least two carbon atoms and R′ is a divalent radical having a carbon-carbon double bond, and (b) about 30% by weight based on the total weight of (a) plus (b) of a reaction product of bisphenol with epichlorohydrin,

(B) is at least one selected from the group consisting of cyanuric acid, isocyanuric acid and tris (epoxy propyl) isocyanurate, and

(C) is at least one compound selected from the group consisting of pyromellitic diimide; benzophenone tetracarboxylic acid diimide; 2, 3, 5, 7-naphthalene-tetracarboxylic acid diimide; 3,3′, 4, 4′-diphenyltetra-carboxylic acid diimide; hydantoin or derivative of the formula:



wherein R_1 and R_2 may be the same or different and represent hydrogen or one to three carbon atom alkyl radicals, and barbituric acid or derivative of the formula:



wherein R_3 and R_4 may be the same or different and represent hydrogen or one to five carbon atom alkyl radicals.

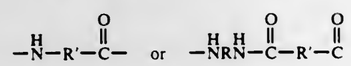
4,097,546

OZONE RESISTANT, CATIONIC DYEABLE NYLON CONTAINING LITHIUM, MAGNESIUM OR CALCIUM SALTS OF SULFONATED POLYSTYRENE COPOLYMERS

Robert Alden Lofquist, Richmond, Va., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Mar. 30, 1976, Ser. No. 671,789
Int. Cl.[2] C08L *77/00*
U.S. Cl. 260—857 UN **8 Claims**

1. In a method to make a fiber-forming synthetic linear polyamide having a repeating structure of



where R and R' are radicals of 3 to 13 carbon atoms, receptive to cationic dyes by the addition of a sulfonated polystyrene or salt thereof, said polyamide having from about 10 to about 60 amine gram equivalents per 10^6 grams of polymer and a ratio of less than ten sulfonate gram equivalents per amine gram equivalents, the improvement comprising

adding to said polyamide a water soluble salt selected from the group consisting of the lithium, magnesium and calcium salts of a sulfonated copolymer, said salt sulfonated to over 90 percent of the theoretical maximum of complete monosulfonation of each styrene residue moiety and having a pH of between about 3 and 8, said sulfonated copolymer is selected from the group consisting of a copolymer containing at least 50% by weight of styrene or vinyl toluene reacted with each other or at least one of the following monomers or their next adjacent homologs, acrylonitrile, acrylate esters, methacrylate esters, acrylic acid, methacrylic acid, butene, methyl vinyl ether, ethylene, propene, 2-pentene, 2-methyl propene, said salt has a molecular weight of from about 15,000 to about 300,000 and the concentration of sulfonates present in the polyamide containing the salt is between about 50 and about 150 gram equivalents per 10^6 *l grams polymer, and*

shaping said polyamide into a shaped article,

whereby said dyed polyamide article has highly improved resistance to fading of the cationic dye due to exposure to ozone.

4,097,547

STABILIZED POLYCARBONATES

Thomas H. Cleveland, and John V. Bailey, both of New Martinsville, W. Va., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.

Division of Ser. No. 165,300, Jul. 22, 1971, Pat. No. 3,733,296, which is a continuation-in-part of Ser. No. 342, Jan. 2, 1970, abandoned. This application Dec. 26, 1972, Ser. No. 318,323
Int. Cl.[2] C08K *3/26*
U.S. Cl. 260—860 **12 Claims**

1. A polycarbonate composition comprising in admixture an aromatic polycarbonate of a dihydric phenol and a carbonate precursor and 0.01 to about 5.0 weight percent, based on the total weight of the polycarbonate composition, of an alkaline earth carbonate selected from the group consisting of barium carbonate, strontium carbonate, and calcium carbonate; said aromatic polycarbonate being selected from the group consisting of (a) a polycarbonate of a halogen substituted dihydric phenol, (b) a copolycarbonate of an unsubstituted dihydric phenol and a halogen substituted dihydric phenol, (c) mixtures of (a) and (b) and (d) mixtures of a member selected from the group consisting of (a) and (b) with a polycarbonate of an unsubstituted dihydric phenol; said halogen being selected from the group consisting of bromine and chlorine and being a substituent on the aromatic hydroxyl bearing phenyl moiety.

4,097,548

POLYESTER-CONTAINING HOT MELT ADHESIVE COMPOSITION

Mohan V. Kulkarni, Ashland, and John Von Kamp, New London, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jun. 23, 1977, Ser. No. 809,479
Int. Cl.[2] C08L *67/06*
U.S. Cl. 260—873 **6 Claims**

1. A hot melt adhesive composition having a softening point of about 215° to 225° C., a Shore D hardness of at least 50 to 60; a Brookfield Thermoseal melt viscosity at 245° C. of 1000 to 1500 poises and comprised of about 9 to 30 percent by weight of a copolymer of ethylene and ethyl acrylate or methacrylate, about 40 to 45 percent by weight of a copolyester of a structure obtained by condensing terephthalic acid with a mixture of ethylene glycol and neopentyl glycol, about 50 to 55 percent by weight of a terpolyester of a structure obtained by condensing ethylene glycol with a mixture of terephthalic acid, isophthalic acid and azelaic acid.

4,097,549

POLYMER POLYBLEND COMPOSITION

Robert L. Kruse, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 29, 1975, Ser. No. 645,138
Int. Cl.[2] C08L *51/04*
U.S. Cl. 260—876 R **17 Claims**

1. An improved polymeric polyblend composition characterized by a blend of:

A. a polymer of at least one monoalkenyl aromatic monomer having dispersed therein an amount sufficient to toughen said polymer of

B. a diene rubber, said rubber being dispersed as crosslinked rubber particles being grafted with said monomer as polymer and having occluded therein said polymer, said particles having a weight average diameter of from about 0.5 to 10 microns, wherein said improvement comprises:

C. said rubber particles having a rubber moiety structured in a morphological form comprising rubber fibres or rubber sheets and mixtures thereof said polymeric polyblend being prepared by polymerizing continuously a solution of said monoalkenyl aromatic monomer and said diene rubber under catalytic conditions with back mixed agitation

to about 10 to 50% conversion; then discontinuing such agitation and continuing the polymerization of said solu-

tion until the monomer is substantially polymerized; then heating and separating said polyblend from said monomer.

4,097,550

COMPOSITION OF A RADIAL TELEBLOCK COPOLYMER AND A COPOLYMER OF A VINYL AROMATIC COMPOUND AND AN α,β UNSATURATED CYCLIC ANHYDRIDE

William Robert Haaf, Voorhesville; Gim Fun Lee, Jr., Albany, both of N.Y., assignors to General Electric Compnay, Pittsfield, Mass.

Filed Jun. 8, 1976, Ser. No. 693,895
Int. Cl.[2] C08L *51/00, 53/00*
U.S. Cl. 260—876 B **13 Claims**

1. A thermoplastic molding composition which consists essentially of, in intimate admixture:

(i) a copolymer of a vinyl aromatic compound and an α,β-unsaturated cyclic anhydride, and

(ii) a radial teleblock copolymer of a vinyl aromatic compound, a conjugated diene, and a coupling agent.

4,097,551

RUBBER MODIFIED DICARBOXYLIC ACID COPOLYMER BLENDS

Adolph V. DiGiulio, and Jack N. Bauer, both of Pittsburgh, Pa., assignors to Arco Polymers, Inc., Philadelphia, Pa.

Filed Dec. 20, 1976, Ser. No. 752,239
Int. Cl.[2] C08L *53/02*
U.S. Cl. 260—876 B **8 Claims**

1. A thermoplastic molding composition consisting essentially of a blend of

a. 5-15% by weight, based on total molding composition, of a block copolymer of

A. 2-50% by weight, based on block copolymer, of monovinyl aromatic monomer and

B. 50-98% by weight, based on block copolymer, of a conjugated diene monomer, and

b. 85-95% by weight, based on total molding composition, of a copolymer made by polymerizing

A. 60-95% by weight, based on copolymer (b), of a mixture of

(1) 4-35% by weight of an ethylenically unsaturated dicarboxylic acid moiety and

(2) 65-96% by weight of one or more monomers copolymerizable therewith selected from the group consisting of monovinyl aryl monomers, unsaturated nitriles, and acrylic monomers, in the presence of

B. 5-40% by weight, based on copolymer (b), of a diene rubber;

whereby the sum of the block copolymer (a) and the diene rubber (bB) is 9-50% by weight of the total molding composition.

4,097,552

NITROGENOUS POLYMER COMPOSITIONS

Gary L. Deets, Springfield, and Peter Shapras, Wilbraham, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Jun. 20, 1977, Ser. No. 807,870
Int. Cl.[2] C08K *3/06, 3/22*
U.S. Cl. 260—876 R **6 Claims**

1. A polymer composition comprising a nitrogenous polymer and from 2.5 to 20 percent by weight of an alkaline earth metal oxide and from 2.5 to 20 percent by weight of sulfur, all percentages being based on the polymer weight.

4,097,553

ACRYLIC GRAFT COPOLYMERS BLENDED WITH ACRYLIC RESINS

Ernest Richard Novak, Vienna, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 20, 1977, Ser. No. 808,396
Int. Cl.[2] C08L *51/00, 53/00*
U.S. Cl. 260—876 R **5 Claims**

1. A method of improving the handleability of a resilient, acrylic graft rubber composed of particles having an outer layer consisting essentially of an alkyl methacrylate polymer which has a glass transition temperature greater than 25° C. and the alkyl group has 1–4 carbon atoms, and at least one inner layer consisting essentially of a resilient acrylic copolymer that has a glass transition temperature of 25° C or less which comprises mixing the acrylic graft rubber while still in its emulsion polymerization medium with a solution of an ionizable salt in which the salt is present in an amount between about 1 and 100 gm/liter in an amount such that the resulting mixture contains between about 5 and about 25 times by weight as much acrylic graft rubber as ionizable salt, and, agitating the resulting mixture at a temperature between about 30°–70° C. until the graft rubber particles coagulate, then adding to the coagulated dispersion a dispersion of an alkyl methacrylate resin prepared by emulsion polymerization which has a glass transition temperature greater than 25° C. and the alkyl group has 1–4 carbon atoms, in an amount sufficient to result in the presence of between about 10 and 99% by weight acrylic graft rubber in the resulting mixture based on weight of rubber and said alkyl methacrylate resin, and agitating the resulting mixture at a temperature between about 60°–120° C., followed by isolating the coagulated materials.

4,097,554

PROCESS FOR PREPARING NOVEL POLYMER PARTICLES

Hiroshi Yui; Tetsuji Kakizaki; Hironari Sano; Masakazu Arai, and Hiroshi Matsui, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Japan

Filed Sep. 7, 1976, Ser. No. 720,761
Claims priority, application Japan, Sep. 8, 1975, 50-108739
Int. Cl.[2] C08F *255/02*
U.S. Cl. 260—878 R **17 Claims**

1. A process for preparing novel propylene polymer particles which comprises:

(a) preparing an aqueous suspension comprising 100 parts by weight of propylene polymer particles, about 5 to 200 parts by weight of a vinyl or vinylidene monomer, and about 0.01 to 1 part by weight, to 100 parts by weight of the monomer, of a radical polymerization initiator having a decomposition temperature of about 85° to 130° C for obtaining a half-value period of 10 hours;

(b) heating the resulting aqueous suspension under such conditions that substantially no decomposition of the

initiator takes place thereby to impregnate the propylene polymer particles with the monomer to such an extent that less than about 20% by weight of the monomer remains free in the liquid phase; and

(c) raising the temperature of the aqueous suspension to substantially complete the polymerization of the monomer.

4,097,555

TRANSPARENT POLYMERIC POLYBLEND

James R. Moran, Hampden, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed May 11, 1976, Ser. No. 685,240
Int. Cl.² C08F 291/02; C08L 51/00, 53/00
U.S. Cl. 260—880 R **14 Claims**

1. An improved transparent polymeric polyblend composition formed of diene, alkenyl aromatic, alkenyl nitrile and acrylate monomers having improved color, toughness and transparency comprising:

A. from about 70 to 98 percent by weight of a matrix terpolymer having from about 35 to 45 percent by weight of an alkenyl aromatic monomer, from about 15 to 25 percent by weight of an alkenyl nitrile monomer and from about 35 to 45 percent by weight of an acrylate monomer selected from the group consisting of alkyl acrylate and alkyl alkacrylate monomers, wherein the improvement comprises: having dispersed therein from 1 to 20 percent by weight of,

B. a block diene copolymer rubber as rubber particles having an average particle size of 0.30 to 1.5 microns, said rubber particle being grafted with and have occluded a terpolymer having a composition substantially that of said matrix terpolymer wherein said graft and occluded terpolymers are present in amounts of from 0.50 to 5.0 parts per part of said rubber.

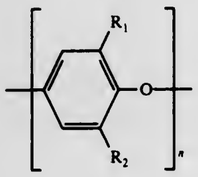
4,097,556

PPO-GRAFT COPOLYMER AND PROCESS FOR PRODUCING THE SAME

Kunio Toyama, Yokohama; Isamu Shimizu, Yamato; Takeo Imamura, Yokohama, and Atsuo Nakanishi, Kanagawa, all of Japan, assignors to Asahi-Dow Limited, Tokyo, Japan

Filed Feb. 7, 1977, Ser. No. 766,515
Claims priority, application Japan, May 24, 1976, 51-59053
Int. Cl.² C08L 51/08
U.S. Cl. 260—886 **19 Claims**

1. A graft copolymer comprising polyphenylene ether having styrene polymer segments grafted thereon improved in moldability, said styrene polymer segments being formed by melting and kneading continuously a mixture of (a) polyphenylene ether expressed by the general formula of:



wherein R_1 and R_2 represent an alkyl group having 1–4 carbon atoms or a halogen atom, respectively, and n represents the degree of polymerization and is 90–250, (b) a styrene polymer containing at least 80 weight % of styrene units and (c) styrene-containing monomers in the presence of a radical initiator at a temperature in the range from 160° to 300° C thereby to complete graft polymerization within a time ranging from 0.5 to 15 minutes.

4,097,557

METHOD OF PREPARING BLOCK POLYMERS

Robert E. Cunningham, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 6, 1973, Ser. No. 385,915
Int. Cl.² C08F 297/04
U.S. Cl. 260—880 B **7 Claims**

1. A method of preparing block polymers under solution polymerization conditions at temperatures from about −20° C to about 100° C, consisting of contacting (A) α-methyl styrene with an organo monolithium initiator to form a living polymer of poly-α-methyl styrene having a molecular weight from about 10,000 to about 40,000, subsequently adding a mixture consisting essentially of (B) a conjugated diene and (C) vinyl aromatic compound selected from the group consisting of styrene, vinyl toluene, p-(t-butyl)styrene and p-(ethyl)styrene, to form an ABC block polymer in which the molecular weight of the poly-α-methyl styrene block ranges from about 10,000 to about 40,000, the polyconjugated diene block ranges from about 40,000 to about 150,000 and the polyvinyl aromatic block ranges from about 40,000 to about 150,000.

4,097,558

RESIN BLEND FOR MAKING PLASTISOLS AND ORGANOSOLS

Leroy B. Kuhn, Easton, Conn., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 624,497, Oct. 21, 1975, abandoned, which is a division of Ser. No. 506,131, Sep. 18, 1974, Pat. No. 4,002,702, which is a continuation-in-part of Ser. No. 403,363, Oct. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 202,456, Nov. 26, 1971, abandoned. This application Apr. 7, 1977, Ser. No. 785,484
Int. Cl.² C08L 27/06
U.S. Cl. 260—899 **26 Claims**

1. A bulk handleable, dry, non-coagulated blend of vinyl chloride emulsion resin and vinyl chloride suspension resin adapted for use in preparing plastisols and organosols, said blend comprising:

(a) from about 30% to about 99%, by weight, of particles of vinyl chloride emulsion resin having an average diameter in the range of from about 0.1 to about 3.0 microns and a relative viscosity as determined as a 1%, by weight, solution in cyclohexanone at 25° C., of from about 1.5 to about 3.5; and

(b) from about 1% to about 70%, by weight, of particles of vinyl chloride suspension resin having an average particle diameter in the range of from about 5 to about 60 microns and a relative viscosity as determined as a 1%, by weight, solution in cyclohexanone at 25° C., of from about 1.5 to about 3.5, substantially all of the emulsion and suspension resin particles in the blend being in the form of a plurality of structures wherein a plurality of emulsion resin particles are in contact with at least one centrally positioned suspension resin particle.

4,097,559

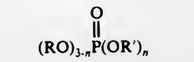
CHLOROALKYL POLYPHOSPHATES METHOD FOR MAKING SAME

Anthony Joseph Papa, Saint Albans, and Walter Warren Runyan, Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

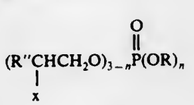
Filed Dec. 29, 1975, Ser. No. 644,789
Int. Cl.² C08K 5/52; C07F 9/09
U.S. Cl. 260—928 **20 Claims**

1. A process for producing polyphosphates which comprises

A. reacting an unsubstituted trialkylphosphate having the following structure:



wherein R is CH_3, C_2H_5, C_3H_7 or C_4H_9; R′ is a C_5 to C_{10} hydrocarbon chain and n is 0, 1 or 2 with a 2-haloalkyl phosphate having the following structure:



wherein x is Cl or Br; R″ is H, CH_3, CH_2Cl or CH_2Br; and R and n are defined above, in the presence of a catalyst, for a time and at a temperature sufficient to produce polyphosphate thermal condensates of the reactants, and

B. recovering said polyphosphate thermal condensates.

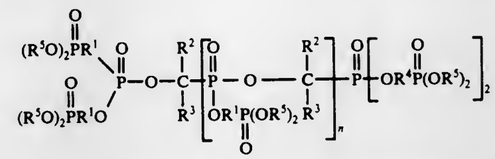
4,097,560

NOVEL PHOSPHORUS COMPOUNDS AND FLAME RETARDANT COMPOSITIONS CONTAINING SAME

Stanley Littman, Sharon, Mass., and Irving Touval, Edison, N.J., assignors to M & T Chemicals Inc., Stamford, Conn.

Filed Jun. 29, 1977, Ser. No. 811,050
Int. Cl.² C07F 9/28; C08K 5/53
U.S. Cl. 260—931 **22 Claims**

9. A flame retardant composition consisting essentially of (1) a substrate that, in turn, consists essentially of a natural or synthetic organic polymer, and (2) a flame retarding agent of the general formula



wherein R^1 and R^4 are each the same or different alkylene and contain from 1 to 12 carbon atoms, R^2 and R^3 are individually selected from the group consisting of hydrogen and alkyl containing from 1 to 12 carbon atoms, R^5 is alkyl and contains from 1 to 12 carbon atoms and n represents an integer having an average value of from 1 to about 50, wherein the amount of said flame retarding agent is sufficient to impart the desired level of flame retardancy to said substrate.

4,097,561

IDLE MIXTURE ADJUSTING DEVICE OF CARBURETOR

Chichitada Seki, Yokosuka, and Nobuo Furuhashi, Tokyo, both of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Jan. 12, 1977, Ser. No. 758,815
Claims priority, application Japan, Apr. 23, 1976, 5151735[U]
Int. Cl.² F02M 3/08
U.S. Cl. 261—41 D **7 Claims**

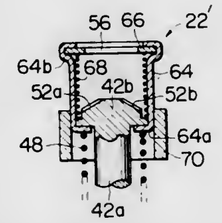
1. A Combination comprising:

An idle adjustment screw turnably and operatively installed in a carburetor of an internal combustion engine, for adjusting an air-fuel mixture supplied to the engine during idling of the engine when turned, said idle adjustment screw having a screw head formed with first engageable means;

a turning tool for turning the screw head of said idle adjustment screw, said turning tool having an end portion formed with second engageable means which is engageable with the first engageable means of said idle adjustment screw to turn said idle adjustment screw after the second engageable means engages with the first engageable means; and

a covering member for covering the screw head of said idle adjustment screw, said covering member including

a cylindrical member surrounding the screw head of said idle adjustment screw and secured to the body of the carburetor so that only its axial movement is permitted, said cylindrical member having an annular groove formed at one end thereof and a flange portion at the other end thereof, the flange portion being contactable to the bottom surface of the screw head of said idle adjustment screw,



a disc member turnably received at the annular groove of said cylindrical member the disc member having a slot formed through the wall thereof, the slot being generally in the shape which is produced by projecting the shape of the second engageable means on the surface of said disc member,

a first spring disposed inside of said cylindrical member to urge the disc member so that the movement of the disc member within the annular groove of said cylindrical member is restricted, and

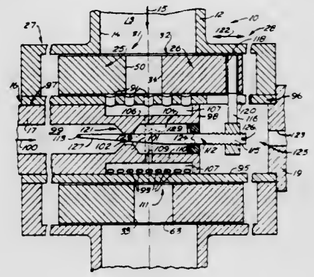
a second spring disposed between the body of the carburetor and the flange portion of said cylindrical member to urge the flange portion to contact the bottom surface of the screw head of said idle adjustment screw.

4,097,562

CARBURETOR

Douglas Hayward Blakeway, Burnaby, Canada, assignor to Blakeway Industries Ltd., North Vancouver, Canada

Continuation-in-part of Ser. No. 628,759, Nov. 4, 1975, abandoned. This application Jun. 13, 1977, Ser. No. 806,142
Int. Cl.² F02M 11/08
U.S. Cl. 261—41 B **28 Claims**



1. A carburetor for mixing air and fuel prior to combustion, the carburetor having a body with a throat having a throat central axis and a sidewall, the carburetor being characterized by:

(a) a fuel spray tube having jet means and extending into the throat generally normally to the throat axis and being adapted to receive fuel and to discharge fuel into the throat,

(b) a valve assembly having: a valve axis extending across

the throat and normally to the throat central axis, first and second sliding gate valve members, and complementary valve guide means to mount the valve members for generally transverse sliding along the valve axis between closed and wide open positions; each valve member having an inner portion having an inner edge disposed generally symmetrically about the valve axis and shaped to correspond to approximately one half of the sidewall of the throat in the wide open position, the valve members being adapted to cooperate with each other so that inner portions thereof overlap each other to close essentially the throat when in the closed position, and also to cooperate with the the jet means of the fuel spray tube so as to open and close the jet means as required,

(c) valve actuating means cooperating with the valve members to move the valve members concurrently in opposite directions between the respective open and closed positions in response to an operator control so that movement of the valve members controls the jet means,

(d) fuel metering means responsive to valve position to meter fuel prior to being discharged from the fuel spray tube,

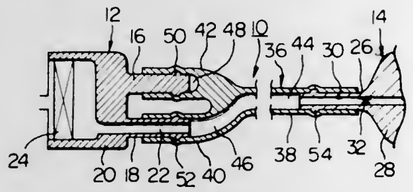
(e) fuel atomizing means cooperating with the jet means of the fuel spray tube, so that fuel metered by the metering means atomizes and there is discharged into the throat an acceptable fuel mixture for combustion for all valve positions.

4,097,563

ALTITUDE CORRECTION DEVICE OF A CARBURETOR

Haruo Yuzawa, Tokyo, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Jan. 8, 1976, Ser. No. 647,555
Claims priority, application Japan, Jan. 14, 1975, 50-6637
Int. Cl.² F02M *7/24*
U.S. Cl. 261—121 B **3 Claims**



1. Fuel supply apparatus and means to manually control the supply of supplemented air into a fuel passage thereof, comprising a hollow coupling member, a housing mounting a filter element and including a passage connector having an open axial passage and a solid connector, each adapted to optionally receive said hollow coupling member, one end of said hollow coupling member being mounted on one of said connectors, and the other end thereof being operatively connected to supply air to said fuel passage.

4,097,564

METHOD OF COATING FLEXIBLE SLEEVING

Wilbert M. Lair, Londonderry, N.H., assignor to Electronized Chemicals Corporation, Burlington, Mass.

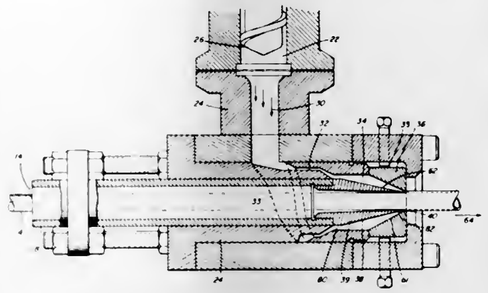
Filed Nov. 8, 1976, Ser. No. 739,718
Int. Cl.² B29F *3/08, 3/10*
U.S. Cl. 264—22 **8 Claims**

1. A process for coating continuous lengths of flexible sleeving with an electrically insulative resinous material comprising the steps of:

(a) passing the flexible sleeving through a preheating unit;

(b) heating the flexible sleeving in the preheating unit to an outside surface temperature insufficient to damage the flexible sleeving yet sufficient to aid extrudate bonding thereto between 500° and 800° F;

(c) passing the preheated flexible sleeving issuing from the preheating unit through a crosshead extrusion die assembly having a core tube, a tip, and a die, said core tube and tip defining a sleeving passage of greater diameter than the flexible sleeving, said die providing an inner diameter greater than that of the flexible sleeving and having substantially zero land length, said tip and said die defining an extrudate channel meeting said sleeving passage at an acute angle between said tip and said die;



(d) extruding an electrically insulative resinous material onto said flexible sleeving under conditions of very low radial pressure and comparatively high axial pressure in said crosshead extrusion die assembly; and

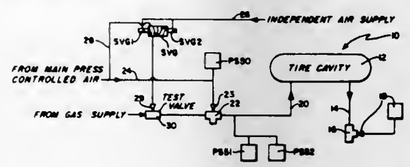
(e) cooling the coated, flexible sleeving issuing from said crosshead extrusion die assembly.

4,097,565

TIRE PRESS AND MOLD LEAKAGE CONTROL

Clarence R. Cole, Medina, and Robert L. Duncan, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 457,029, Apr. 1, 1974, Pat. No. 3,942,922. This application Nov. 28, 1975, Ser. No. 636,346
Int. Cl.² B29H *5/24*
U.S. Cl. 264—40.3 **2 Claims**



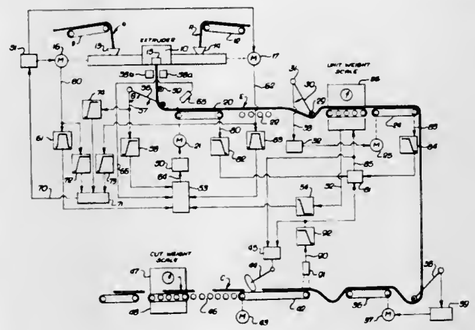
1. The method of preventing under-cure in curing a tire in an automatic succession of tires, the tire having a cavity, said curing being effected in a tire mold during a predetermined time cycle wherein the curing is effected by steam which supplies heat, and by inert gas which supplies pressure in said cavity, the pressure of said gas being greater than the pressure of said steam, the method comprising admitting steam into said cavity during a first part of said cycle, then stopping flow of steam into the cavity and admitting an inert gas during a second part of said cycle, during said second part of the cycle closing said cavity to flow communication into and out of the cavity while the cavity contains both steam and inert gas for a predetermined time period less than said second part of the cycle, monitoring the pressure in said cavity during said time period to detect a time rate of change of pressure in excess of a predetermined acceptable rate and extending said time cycle in response to detection of such time rate of change to said excess to compensate for reduction in the quantity of heat due to cooling of the steam by the inert gas and provide for complete cure of the tire.

4,097,566

EXTRUSION LINE CONTROL SYSTEM

Michael C. Bertin, Irvine; Richard L. Hicksted, Orange, and James M. Mitsuhashi, Los Angeles, all of Calif., assignors to Nucleonics Data Systems, Irvine, Calif.

Filed Jun. 1, 1977, Ser. No. 802,442
Int. Cl.² B29F *3/00*
U.S. Cl. 264—40.7 **40 Claims**



31. A method of controlling a rubber extrusion line having an extruder, a take away conveyor, a unit weight scale, and a skiver, with the extrudate moving in a continuous strip from the extruder onto the take away conveyor, past the unit weight scale to the skiver, including the steps of:

sensing the weight measured at the unit weight scale and producing a first signal varying as a function of the weight;

sensing the extrudate speed and swell at the output of the extruder and producing a second signal varying as a function of the speed and swell;

filtering the first signal substantially removing short term components thereof;

filtering the second signal substantially removing long term components thereof, where a long term component varies with a period of about 10 to about 60 minutes and a short term component varies with a period of about 2 to about 60 seconds; and

varying the speed of the take away conveyor as a function of the combination of the filtered first and second signals.

4,097,567

TITANIUM DIBORIDE SHAPES

Walter S. Cebulak, New Kensington, and John D. Weyand, Greensburg, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Aug. 25, 1976, Ser. No. 717,698
Int. Cl.² C04B *33/32, 35/64*
U.S. Cl. 264—65 **1 Claim**

1. The method comprising blending a mixture consisting of 90 parts by weight titanium diboride and 10 parts by weight boron nitride, cold isostatically pressing the blend to a shape at 60,000 pounds per square inch pressure, and sintering the shape at 1975° C in an inert atmosphere in the absence of pressure.

4,097,568

WALL CONSTRUCTION

Kevin M. Foley, Toledo; Harold A. Dewhurst, and Frank P. McCombs, both of Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 617,353, Sep. 29, 1975, Pat. No. 4,003,173. This application Aug. 30, 1976, Ser. No. 719,013
Int. Cl.² F16L *9/08*
U.S. Cl. 264—216 **5 Claims**

1. A method for producing a cylindrical wall comprising the steps of:

(a) applying a filler and cement to a continuously rotating cylindrical form;

(b) distributing glass fibers in random orientation and then adding phenol, formaldehyde, and at least one polyhydric phenolic compound alone or in combination with an amino compound while continuing the rotation of the form; and

(c) curing the resin.

4,097,569

MODIFIED VINYL ESTER RESIN AND PIPE MADE THEREFROM

William D. Waters, Tulsa, Okla., assignor to Youngstown Sheet and Tube Company, Youngstown, Ohio

Division of Ser. No. 589,539, Jun. 23, 1975, Pat. No. 4,018,250, which is a division of Ser. No. 428,118, Dec. 26, 1973, Pat. No. 3,928,491. This application Oct. 13, 1976, Ser. No. 732,034
Int. Cl.² B29C *5/04*
U.S. Cl. 264—255 **2 Claims**

1. The method for forming centrifugally cast pipe comprising:

inserting a sock of fibrous reinforcing material into the mold of a centrifugal casting machine;

injecting into said mold a quantity of a first thermosetting resin, said quantity being sufficient to substantially encapsulate said reinforcing material,

rotating said mold so as to distribute said injected first resin longitudinally of said mold throughout said reinforcing material to thereby form within said mold a cylindrical matrix of said first thermosetting resin and said fibrous reinforcing material,

injecting into the bore of said cylindrical matrix of said first thermosetting resin and said fibrous reinforcing material a second thermosetting resin comprising an admixture of (1) a neat thermosetting resin formed by reacting an epoxy resin, a carboxyl terminated elastomer selected from the group consisting of carboxyl terminated homopolymers and copolymers of conjugated dienes and an unsaturated monocarboxylic acid, with approximately one chemical equivalent of epoxy being provided for each chemical equivalent of carboxyl provided by said elastomer and said acid combined and (2) an ethylenically unsaturated monomer,

rotating said mold to distribute said second thermosetting resin longitudinally thereof to form an unreinforced inner liner for said pipe on the inner surface of said cylindrical matrix of said first thermosetting resin and said fibrous reinforcing material prior to the curing of said first thermosetting resin to thereby permit limited intermingling of said first and second thermosetting resins at their interface, and

applying heat to said mold while said mold is rotating to cure said first and second resins and to cross-link said first and second resins at their intermingled interface to thereby form an unreinforced inner lining of said second thermosetting resin for said pipe.

4,097,570

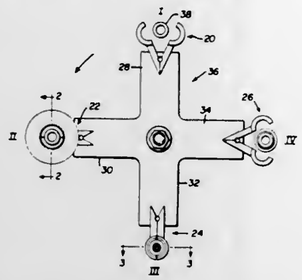
METHOD FOR MAKING PLASTIC ARTICLES

Andrew C. Dickson, and Robert F. Kontz, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Apr. 15, 1976, Ser. No. 677,095
Int. Cl.² B29C *17/02, 17/07*
U.S. Cl. 264—296 **8 Claims**

1. In a method of making a thermoplastic parison having an integral finish and an adjacent integral, annular supporting ring, the steps of: heating an end portion only of the parison to a deformable temperature; positioning the heated parison portion in a mold in general radial alignment with adjacent, annular, longitudinally spaced finish and supporting ring cavities; supporting one longitudinal end of the parison while axially displacing the other, remote parison end toward said one end to force at least a portion of the heated plastic material from

said heated end portion of the parison outwardly into at least one of the adjacent annular, longitudinally spaced cavities; and then supporting the other remote parison end while axially displacing said one parison end to force additional heated



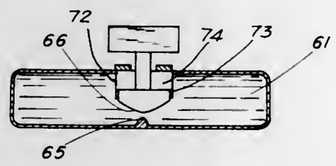
plastic material from said heated end portion of the parison into at least the other of the adjacent, annular, longitudinally spaced cavities to complete the formation of the integral finish and adjacent supporting ring on the parison.

4,097,571

METHOD FOR PRODUCING A FOLDABLE PLASTIC STRIP

Bernard K. Cox, R.R. 5, Box 293, Connersville, Ind. 47331

Division of Ser. No. 655,518, Feb. 5, 1976. This application Oct. 27, 1976, Ser. No. 735,974
Int. Cl.² B29F *1/00*
U.S. Cl. 264—296 **5 Claims**



1. A method of forming with an injection mold a plastic piece with a living hinge, comprising the steps of:

providing a mold having a cavity with two immovable mutually opposed surfaces and with a rib projecting into the cavity from one surface of the opposed surfaces and a push bar slidably mounted in a channel and mutually opposed from the rib, the push bar projecting into the cavity from the other surface of the opposed surfaces;

injecting liquid plastic into the mold to only partially fill the cavity therein;

moving the push bar within the channel through a space extending at least one-half the distance across the cavity in the direction of the one surface and the projecting rib, said moving forcing the liquid plastic to flow opposite the direction of the push bar toward the other surface and to completely fill the remaining portion of the cavity surrounding the channel, said moving thereby forming mutually opposed and aligned grooves in the plastic; and

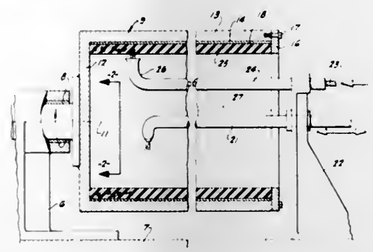
sealing the push bar relative to the channel to exclude the flow of liquid plastic behind the push bar and into the space through which the push bar travels during said moving.

4,097,572

METHOD OF FORMING A TUBULAR CONTAINER

Grant W. Walker, Sacramento, Calif., assignor to Energy Absorption Systems, Inc., Chicago, Ill.

Filed Aug. 9, 1976, Ser. No. 712,848
Int. Cl.² B29C *5/04*; B29D *3/02*
U.S. Cl. 264—310 **2 Claims**



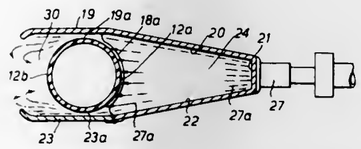
1. A method of forming a tubular container consisting of the steps of providing a drum rotatable about an axis and having a wall with an interior surface, disposing an axially split liner within said drum in contact with said wall surface, then rotating said drum and said liner in unison about said axis, then depositing a time-settable liquid matrix within said rotating liner to assume an annular shape and adding lengths of roving to said matrix while leaving the inner surface of said annular shape exposed to the air, then continuing rotation of said drum and liner and matrix and roving for a time until said matrix is at least partially set as a body able to maintain a stable annular shape, then stopping the rotation of said drum and liner and matrix and roving, then axially withdrawing said liner and said matrix and said roving in said maintained annular shape while continuing to leave the inner surface of said matrix exposed to the air, then slightly expanding and removing said liner from said matrix and said roving, and then replacing said removed liner in said drum.

4,097,573

METHOD FOR BENDING THERMOPLASTIC PIPES

Gunnar Parmann, Mathopen, Norway, assignor to Rieber & Son A/S, Bergen, Norway

Continuation of Ser. No. 547,371, Feb. 6, 1975, abandoned, which is a division of Ser. No. 321,028, Jan. 4, 1973, Pat. No. 3,884,612. This application Aug. 25, 1976, Ser. No. 717,674
Claims priority, application Norway, Jan. 12, 1972, 48/72
Int. Cl.² B29C *17/02*
U.S. Cl. 264—322 **11 Claims**



1. A method of bending thermoplastic pipe comprising the steps of

locating one end of the pipe in a fixed position,

blowing a flow of heat-transfer medium from only one side of the pipe onto and around a circumferential surface of a portion of the pipe spaced from said end to heat a first peripheral pipe section facing said flow while guiding the heat transfer medium towards an opposite peripheral pipe section to heat said opposite peripheral pipe section to a lesser extent than said first section,

internally reinforcing said heated portion of the pipe during heating with a removable reinforcing means, and

bending said heated portion of the pipe.

8. A method of bending thermoplastic pipes comprising the steps of

introducing a thermoplastic pipe into a heat transfer means and simultaneously engaging at least one end of said pipe with a locating means in a fixed position externally of the heat transfer means,

introducing a means into the pipe for internally reinforcing the pipe,

blowing a heat transfer medium from only one side of the pipe initially as a pressurized flow against a circumferential surface of a portion of the pipe to effect a preliminary uniform heating of said circumferential surface and thereafter increasing the pressure of the heating medium to heat a first section of the periphery of the pipe within the heat transfer means to a maximum extent while causing a boundary layer of the flowing medium to be displaced at a location on the periphery of the pipe between said first section and a second section of the periphery of the pipe to thus cause an enhanced whirl effect immediately adjacent said second section whereby said second section is heated to a lesser extent than said first section,

thereafter applying a bending force on the pipe, and

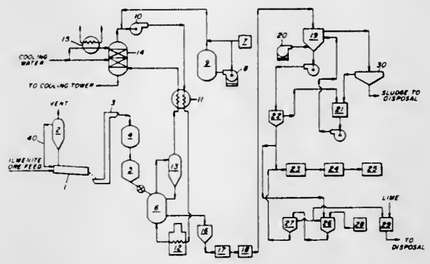
subsequently cooling the pipe after bending of the pipe is concluded.

4,097,574

PROCESS FOR PRODUCING A SYNTHETIC RUTILE FROM ILMENTITE

Robert G. Auger, Monroeville, and Edward F. Restelli, Jr., Oakmont, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Jun. 16, 1976, Ser. No. 696,596
Int. Cl.² C01G *23/04, 49/06, 49/02*
U.S. Cl. 423—74 **12 Claims**



1. Method of processing ilmenite to produce a synthetic rutile comprising subjecting the ilmenite or a concentrate thereof to gaseous oxidizing conditions to oxidize FeO therein to Fe_2O_3, exposing the ilmenite to a hydrogen atmosphere in a fluidized bed at a temperature of at least 1400° F to reduce iron therein to a solubilized metallic state, cooling the ilmenite thus reduced to below 1000° F in a nonoxidizing atmosphere, and contacting the reduced product with an aerated aqueous leach solution to dissolve and oxidize iron therein to an insoluble iron oxide physically separable from said leach solution and from residual insoluble reduced ilmenite product consisting at least substantially of TiO_2.

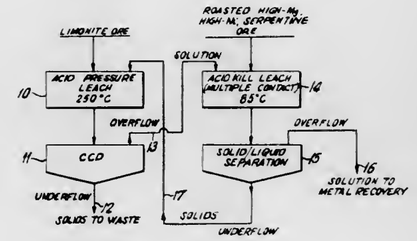
3. Method of claim 1 in which the aeration-leached ilmenite is subjected to an acid leach to remove traces of metallic iron and other metal oxides.

4,097,575

ROAST-NEUTRALIZATION-LEACH TECHNIQUE FOR THE TREATMENT OF LATERITE ORE

Eddie C. J. Chou, Arvada; Craig B. Barlow, Wheatridge, and Dale K. Huggins, Arvada, all of Colo., assignors to Amax Inc., Greenwich, Conn.

Filed Nov. 5, 1976, Ser. No. 739,244
Int. Cl.² C01G *53/10*
U.S. Cl. 423—150 **12 Claims**



1. In a method of leaching a low-magnesium nickel-containing oxide ore, wherein an oxide ore containing by weight at least about 0.8% nickel and magnesium ranging up to about 5% is leached in a sulfuric acid solution at an elevated temperature exceeding about 150° C and an elevated pressure exceeding about 150 psig for a time sufficient to leach substantially the nickel therefrom and form a pregnant liquor thereof of pH less than about 1 and a leached residue, and wherein said pregnant liquor is neutralized by adding thereto a raw high-magnesium nickel-containing serpentine silicate ore containing at least about 0.8% nickel and over 5% magnesium while at the same time leaching nickel from said serpentine ore, the improvement of enhancing the neutralization capability of said raw high-magnesium ore which comprises,

subjecting said raw high-magnesium serpentine ore to an oxidizing roast prior to said neutralization step at a temperature below the temperature at which forsterite recrystallizes,

said roasting temperature being below 820° C,

subjecting said pregnant liquor to neutralization at atmospheric pressure and a temperature not exceeding about 100° C by adding thereto an amount of said roasted ore to raise the pH to above 2 while leaching nickel from said high-magnesium ore and provide a residue thereof,

the rate of neutralization with roasted ore being faster than the rate using unroasted ore,

separating said neutralized pregnant liquor from said high-magnesium residue for the recovery of nickel therefrom,

recycling said high-magnesium residue back into the leaching process for mixing with fresh low-magnesium ore for leaching at said elevated temperature and pressure,

leaching said fresh low-magnesium ore together with said high-magnesium residue at said temperature exceeding about 150° C and said pressure exceeding about 150 psig to form leached solids thereof and said pregnant liquor of pH less than about 1 which is thereafter neutralized with said roasted high-magnesium ore,

and disposing of said leached solids.

4,097,576

REDUCTION CATALYST FOR REMOVAL OF NITROGEN OXIDES IN EXHAUST GAS

Takaaki Tamura, Tokyo; Norihiko Fujita, Musashinoshi; Chihiro Matsuura, Tokyo; Wataru Ito, Hachiojishi, and Naoki Negishi, Tokyo, all of Japan, assignors to Kogyo Kaihatsu Kenkyusho (Industrial Research Institut), Tokyo, Japan

Filed Mar. 4, 1976, Ser. No. 663,833
Claims priority, application Japan, Mar. 8, 1975, 50-28408
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—239 A 4 Claims

1. A method for reducing the NO_x in an NO_x containing exhaust gas which comprises: contacting said NO_x-containing exhaust gas with NH_3 in a mol ratio of NH_3:NO_x of from about 0.8 : 1 to 2 : 1 at a temperature of above about 200° C and at a space velocity of from about 10,000 to about 15,000 hr^{-1} in the presence of a catalyst comprising a naturally-occurring inorganic material consisting essentially of SiO_2, Al_2O_3, and H_2O containing 1 to 10% by weight of an alkali metal oxide and an alkaline earth metal oxide having an X-ray diffraction pattern as shown in Table A or Table B carrying thereon at least two metal ions added thereto in sequence with heat treatment after each sequential addition, said metal ions being selected from the group consisting of metals of Group Ib, Group IIb, Group VIII of the periodic Table, chromium, manganese and vanadium, said naturally-occurring inorganic material having been pretreated with hydrochloric acid prior to addition of said metal ions.

4,097,577

METHOD OF LOWERING INTRAOCULAR PRESSURE WITH ANTAZOLINE

Harry Salem, Elkins Park, and Domingo M. Aviado, Wynnewood, both of Pa., assignors to Cooper Laboratories, Incorporated, Parsippany, N.J.

Filed Aug. 12, 1976, Ser. No. 713,805
Int. Cl.[2] A01N *9/22*
U.S. Cl. 424—273 R 3 Claims

1. A method for reducing intraocular pressure in mammals having intraocular hypertension comprising topically administering to a mammilian eye an effective amount for reducing intraocular pressure of a composition comprising antazoline phosphate and a non-toxic, pharmaceutically acceptable, ophthalmological carrier.

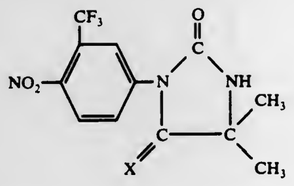
4,097,578

1-(3'-TRIFLUOROMETHYL-4'-NITROPHENYL)-4,4-DIMETHYL IMIDAZOLIDINES

Jacques Perronnet; Pierre Girault, both of Paris, and Claude Bonne, Bry-sur-Marne, all of France, assignors to Roussel Uclaf, Paris, France

Filed Oct. 21, 1976, Ser. No. 734,557
Claims priority, application France, Oct. 29, 1975, 75 33084
Int. Cl.[2] A61K *31/415;* C07D *233/72, 233/88*
U.S. Cl. 424—273 R 7 Claims

1. A compound of the formula



wherein X is selected from the group consisting of oxygen and imine.

5. A method of inducing antiandrogenic activity in warm-blooded animals comprising administering to warm-blooded animals an antiandrogenically effective amount of claim 1.

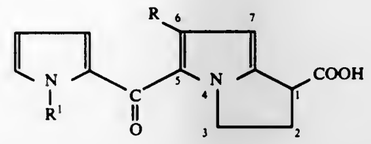
4,097,579

5-(2-PYRROYL)-1,2-DIHYDRO-3H-PYRROLO[1,2-a]PYRROLE-1-CARBOXYLIC ACID DERIVATIVES AND PROCESS FOR THE PRODUCTION THEREOF

Joseph Martin Muchowski, Sunnyvale, and Arthur Frederick Kluge, Los Altos, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Mar. 31, 1977, Ser. No. 783,090
Int. Cl.[2] C07D *487/04;* A61K *31/40*
U.S. Cl. 424—274 24 Claims

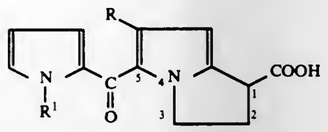
1. A compound selected from the group of those represented by the formula



and the individual (l)-acid and (d)-acid isomers thereof and the pharmaceutically acceptable, non-toxic alkyl esters having from one to twelve carbon atoms and salts thereof, wherein each of R and R^1 is independently hydrogen or a lower alkyl group having from 1 to 4 carbon atoms.

18. A composition for treating inflammation, pain or pyrexia in mammals consisting essentially of a pharmaceutically acceptable non-toxic excipient and a therapeutically effective amount of a compound represented by the formula

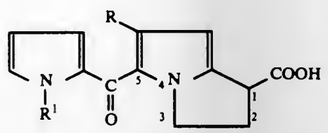
(A)



or the (l)-acid isomers of Formula (A), and the pharmaceutically acceptable, non-toxic alkyl esters having from one to twelve carbon atoms and salts thereof, wherein each of R and R^1 is independently hydrogen or a lower alkyl group having from 1 to 4 carbon atoms.

20. A composition for administration to a pregnant mammal to delay onset of parturition consisting essentially of a pharmaceutically acceptable non-toxic excipient and a thereapeutically effective amount of a compound represented by the formula

(A)



or the (l)-acid isomers of Formula (A), and the pharmaceutically acceptable, non-toxic alkyl esters having from one to twelve carbon atoms and salts thereof, wherein each of R and R^1 is independently hydrogen or a lower alkyl group having from 1 to 4 carbon atoms.

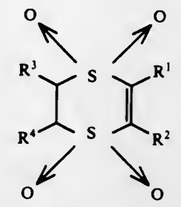
4,097,580

2,3-DIHYDRO-1,4-DITHIIN 1,1,4,4-TETROXIDE ANTIMICROBIALS

Arthur D. Brewer, Puslinch, Canada, and Robert A. Davis, Cheshire, Conn., assignors to Uniroyal, Inc., New York, N.Y. and Uniroyal Ltd., Guelph, Canada

Division of Ser. No. 481,010, Jun. 20, 1974, Pat. No. 4,004,018.
This application Nov. 18, 1976, Ser. No. 742,933
Int. Cl.[2] A01N *9/00*
U.S. Cl. 424—277 10 Claims

1. A method of controlling viruses comprising contacting said viruses with a viricidally effective amount of a 2,3-dihydro-1,4-dithiin 1,1,4-tetrooxide having the following structural formula:



wherein R_1, R_2, R_3, and R_4 are independently hydrogen, alkyl having 1 to 14 carbon atoms, aryl, aryl substituted with one to three substituents selected from the group consisting of lower alkyl, halogen, lower alkoxy, nitro, and aryl, alkoxymethyl wherein the alkyl group contains 1 to 8 carbon atoms, aryloxymethyl, alkylaminomethyl wherein the alkyl group contains 1 to 8 carbon atoms, or adjacent R's may be joined together as a chain of 3 to 4 methylene groups.

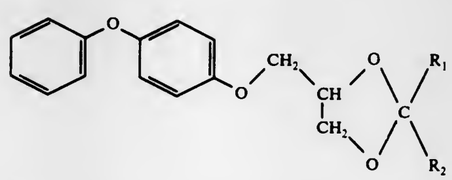
4,097,581

DIOXOLANE DERIVATIVES

Saleem Farooq, Aesch, and Friedrich Karrer, Zofingen, both of Switzerland, assignors to CIBA-GEIGY Corporation, Ardsley, N.Y.

Filed Dec. 7, 1976, Ser. No. 748,783
Claims priority, application Switzerland, Dec. 12, 1975, 16153/75; Dec. 24, 1975, 16783/75; Sep. 1, 1976, 11069/76; Nov. 19, 1976, 14584/76
Int. Cl.[2] A61K *31/335;* C07D *317/10;* A01N *9/28*
U.S. Cl. 424—278 18 Claims

1. A compound of the formula I



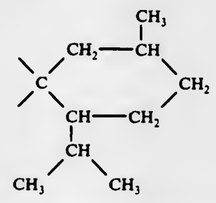
(I),

wherein

R_1 represents a C_1–C_7-alkyl, C_3–C_6-cycloalkyl, C_2–C_3-alkenyl, C_2–C_3-alkinyl, C_2–C_4-methoxyalkyl, chloromethyl or benzyl group,

R_2 represents a hydrogen atom or a C_1–C_6-alkyl group, or

R_1 and R_2 together represent the $—(CH_2)_n—$ group, in which n is 4 or 5, or together with the carbon atom to which they are attached represent the group



15. An insecticidal and acaricidal composition comprising as active ingredient an insecticidally and acaricidally effective amount of a compound of the formula I according to claim 1 together with a suitable carrier therefor.

16. A method of controlling insects and acarids which are harmful to animals and plants, which comprises applying to the locus thereof an insecticidally and acaricidally effective amount of at least one compound of the formula I according to claim 1.

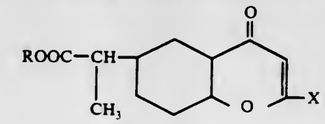
4,097,582

6',2-(2'-ARYLCHROMONYL) PROPIONIC ACIDS, AND ANALGESIC AND ANTI-INFLAMMATORY DERIVATIVES THEREOF

Philippe Briet; Jean-Jacques Berthelon; Jean-Claude Depin, all of Lyon, and Eugéne Boschetti, Venissieux, all of France, assignors to Lipha, Lyonnaise Industrielle Pharmaceutique, Lyon, France

Filed Nov. 12, 1975, Ser. No. 631,401
Claims priority, application France, Nov. 20, 1974, 74 38080, Oct. 10, 1974 France 75 31024
Int. Cl.[2] A61K *31/35;* C07D *311/02, 295/00*
U.S. Cl. 424—283 10 Claims

1. A carboxychromonyl compound having the formula



in which X is selected from the group consisting of phenyl, halophenyl, polyhalophenyl, lower alkylphenyl, and trihalomethylphenyl; and R is selected from the group consisting of hydrogen, lower alkyl, lower omega-hydroxyalkyl, morpholinoethyl and lower dialkylaminoalkyl, together with (a) salts of said compound with pharmaceutically acceptable acids when R is morpholinoethyl and lower dialkylaminoalkyl and (b) salts of said compound with pharmaceutically acceptable mineral and organic bases when R is hydrogen.

8. An analgesic and anti-inflammatory pharmaceutical composition which comprises (a) the carboxychromonyl compound claimed in claim 4 in an amount sufficient to provide analgesic and anti-inflammatory activity together with (b) a pharmaceutically acceptable diluent therefor.

4,097,583

PROCESS FOR THE PRODUCTION OF PHOSPHORUS PENTASULFIDE

Hermann Niermann, Erftstadt Bliesheim, and Franz Mainzer, Hurth, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 657,548, Feb. 12, 1976, abandoned, which is a continuation of Ser. No. 480,353, Jun. 18, 1974, abandoned. This application Mar. 14, 1977, Ser. No. 777,451
Claims priority, application Germany, Sep. 19, 1973, 2347062
Int. Cl.[2] C01B *25/14*
U.S. Cl. 423—303 3 Claims

1. In the process for the manufacture of phosphorus sulfides by reacting phosphorus with sulfur at elevated temperatures in a reaction zone surrounded by a heat exchanging material which receives and controls the reaction heat, which comprises maintaining in the reaction zone by heating and cooling, respectively, a temperature below the boiling and above the solidification point of the reaction mixture by causing a gas stream having the temperature necessary for heating and cooling, respectively, to flow around the reaction zone, conducting the gas stream so as to permit reversing the reaction zone substantially instantaneously from heating to cooling and vice versa, the gas stream for cooling being suction drawn past the reaction zone to create a sub-pressure with respect to the interior of the reaction zone for preventing the gas from penetrating the reaction zone whereby any liquid phosphorus sulfide escaping from the reaction zone is immediately solidified in the presence of the gas stream flowing around the reaction zone at a high velocity of flow, and the gas stream for heating comprising combustion and off-gases, being free from oxygen and originating from a mixture of a combustible and air, the improvement wherein the heat exchange in the bottom portion

of the reactor is effected by means of a system actuated and operated separately and independently from the heat exchange system surrounding the lateral walls of the reactor whereby the resulting formation of a final product is obtained which is homogeneous and contains as little as one to two ppm. of iron in comparison to much more ppm. of iron contaminent are obtained by the same reaction in a reactor which is the same as previously described, except that the heat exchange in the bottom portion is not effected by means of a heat exchange system which is actuated and operated separately and independently from the heat exchange system surrounding the lateral walls of the reactor; and whereby:

(a) the lateral walls of the reactor are heated by means of hot combustion gas for performing the reaction at low throughput conditions;

(b) both the bottom portion and the lateral walls of the reactor are cooled with air for performing the reaction at standard throughput conditions; and

(c) the bottom portion of the reactor is cooled with water and the lateral walls of the reactor are cooled with air for performing the reaction at high throughput conditions.

4,097,584

METHOD OF PRODUCING SILICON USEFUL FOR SEMICONDUCTOR COMPONENT MANUFACTURE

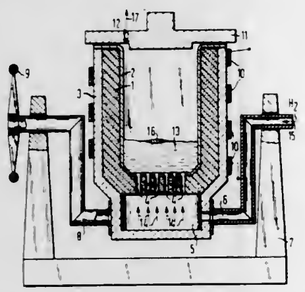
Konrad Reuschel, Vaterstetten, and Norbert Schink, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 19, 1977, Ser. No. 798,442

Claims priority, application Germany, May 25, 1976, 2623413

Int. Cl.² C01B *33/02, 35/08, 35/10, 25/06*

U.S. Cl. 423—348 **4 Claims**



1. A method of producing silicon having a boron and phosphorous content of less than 1 ppm so that such silicon can be utilized for manufacture of silicon components, comprising:

confining technical-grade silicon in a reaction chamber heated to a temperature in the range of 1420° to 1480° C. so as to produce a silicon melt within said chamber, said technical-grade silicon having an amount of boron and phosphorous therein greater than 1 ppm; and

providing a stream of hydrogen-containing gas having at least 0.1% water vapor, at least 1% hydrogen and an inert gas therein and controllably passing said stream through said silicon melt within the reaction chamber so that an amount of phosphorous escapes from such silicon melt as gaseous phosphorus hydrogen compound and is removed from said melt via exhaust gases from said reaction chamber and an amount of boron escapes from such silicon melt as boron oxide and is removed from said melt in a slag that forms on top of said silicon melt, which slag is removed.

4,097,585

PRODUCTION OF SULFUR FROM CLAUS PROCESS WASTE GAS

Herbert Fischer, Lollar, Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sep. 26, 1977, Ser. No. 836,464

Claims priority, application Germany, Oct. 25, 1976, 2648190

Int. Cl.² C01B *17/04*

U.S. Cl. 423—574 R **10 Claims**

1. In the process for producing sulfur wherein hydrogen sulfide contained in a feed gas is partially combusted to form sulfur and sulfur dioxide, the balance of the hydrogen sulfide is catalytically reacted with the sulfur dioxide at a low temperature to form sulfur, and the sulfur produced is separated from the residual exhaust gas, the improvement which comprises

(a) catalytically hydrogenating the residual exhaust gas with a hydrogen containing gas to form hydrogen sulfide from the sulfur and residual sulfur in such exhaust gas;

(b) simultaneously with step (a) catalytically hydrolyzing the carbon oxysulfide and carbon disulfide contained in the exhaust gas with steam to form hydrogen sulfide;

(c) oxidizing part of at least one of the hydrogen sulfide contained in the initial feed gas and the ultimate sulfur product with air in stoichiometric or slightly less amount to form sulfur dioxide;

(d) adding the sulfur dioxide produced in step (c) to the hydrogen sulfide-containing exhaust gas which has been subjected to steps (a) and (b) in an amount to establish a ratio of hydrogen sulfide to sulfur dioxide of about 2 : 1;

(e) catalytically reacting the hydrogen sulfide still contained in the exhaust gas after step (d) with sulfur dioxide at about 100° to 150° C to form sulfur, and recovering the sulfur; and

(f) regenerating the catalyst with an oxygen-free hot gas containing hydrogen sulfide.

4,097,586

IMMUNOCHEMICAL ASSAY METHOD

Stanley Joseph Gross, Encino, Calif., assignor to Biological Developments, Inc., Encino, Calif.

Continuation-in-part of Ser. No. 160,559, Jul. 7, 1971, Pat. No. 3,940,475, and Ser. No. 462,517, Apr. 19, 1974, said Ser. No. 160,559, is a division of Ser. No. 89,929, Nov. 16, 1970, abandoned, which is a continuation-in-part of Ser. No. 45,558, Jul. 11, 1970, abandoned, said Ser. No. 462,517, is a continuation-in-part of said Ser. No. 89,929, which is a continuation-in-part of said Ser. No. 45,558. This application Feb. 17, 1976, Ser. No. 658,180

The portion of the term of this patent subsequent to Feb. 24, 1993, has been disclaimed.

Int. Cl.² A61K *43/00*; G01N *33/00, 33/16*

U.S. Cl. 424—1 **22 Claims**

1. In a quantitative immunoassay for the presence of a target in a sample comprising producing a mixture of the sample, a known quantity of an antibody which is immunologically specific for the target, and a known quantity of a standard immunologically homologous to the target, so as to bind with said antibody competitively, one of said antibody and said standard having a covalently bonded derivative capable of emitting radiation from the mixture, providing for competitive antibody binding to take place and measuring the radiation emitted from a portion of the derivative, which radiation measurement is indicative of the relative proportions of target and standard binding with the antibody, and thus the amount of target present, the improvement comprising employing as the antibody, antibody raised by and specific to the hapten portion of a synthetic antigen comprising a plurality of hapten moieties covalently bound to a carrier, said moieties being immunologically homologous with the target and the hapten being bound by a —N=N— group coupled directly to an otherwise unsubstituted ring atom of the hapten.

4,097,587

1,3,8-TRIAZASPIRO[4.5]DECANE-2,4-DIONE POLYMER STABILIZERS

Nobuo Soma; Tomoyuki Kurumada, both of Tokyo, Japan; Heimo Brunetti, Reinach, and Jean Rody, Basel, both of Switzerland, assignors to Sankyo Company, Limited, Tokyo, Japan and CIBA-GEIGY Corporation, Ardsley, N.Y.

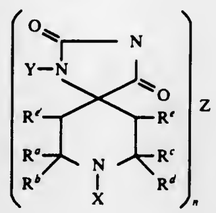
Filed May 19, 1976, Ser. No. 687,794

Claims priority, application Japan, May 28, 1975, 50-63851

Int. Cl.² C07D *471/10*; C08K *5/34*

U.S. Cl. 260—45.8 A **14 Claims**

1. A piperidine compound having the formula (I):



(I)

wherein

R^a represents methyl group;

R^b represents ethyl group;

R^c represents an alkyl group of 1 to 5 carbons;

R^d represents ethyl group;

or

R^c and R^d, together with the carbon atom to which they are attached, represent a cycloalkyl group of 5 to 7 carbons;

one of R^e and $R^{e'}$ represents hydrogen atom and the other of R^e and $R^{e'}$ represents a lower alkyl group of 1 to 4 carbons or an allyl group;

n is 1 or 2;

Y represents hydrogen atom or, when neither X nor Z represents hydrogen atom, Y represents hydrogen methyl group, ethyl group, allyl group or benzyl group;

X represents hydrogen atom, or an alkyl group of 1 to 4 carbons;

when $n = 1$:

Z represents hydrogen atom, an alkyl group of 1 to 18 carbons 2,3-epoxypropyl group, or phenyl group

when $n = 2$:

X represents an alkylene group of 1 to 10 carbons

and acid addition salts thereof wherein the acids are selected from the group consisting of sulphuric acid, hydrochloric acid or phosphoric acid; formic acid, acetic acid, valeric acid, stearic acid, oxalic acid, adipic acid, sebacic acid, maleic acid, benzoic acid, p-t-butylbenzoic acid, 4-hydroxy-3,5-di-t-butylbenzoic acid, salicylic acid or terephthalic acid; methanesulphonic acid or p-toluene-sulphonic acid; or phenylphosphonic acid.

4. A polymer composition stabilized against photo- and thermal-deterioration thereof wherein there is incorporated, in an amount sufficient to prevent said deterioration, a piperidine of claim 1.

4,097,588

MINERALIZING DENTAL MOUTHRINSE

Ronnie Stuart Levine, Leeds, England, assignor to National Research Development Corporation, London, England

Filed Mar. 8, 1976, Ser. No. 664,439

Claims priority, application United Kingdom, Mar. 11, 1975, 10044/75

Int. Cl.² A61K *7/18*

U.S. Cl. 424—52 **21 Claims**

1. A mouthrinse composition saturated with respect to brushite, said composition being in the form of a clear solution and wherein said composition has been prepared by adding solid brushite to water to provide a solution containing excess solid brushite at a temperature of from 0° to 15° C., separating said solution from excess brushite to provide a clear solution, and allowing said clear solution to come to an ambient temperature greater than 15° C.

4,097,589

NAIL POLISH

Albert Shansky, Norwalk, Conn., assignor to Del Laboratories, Inc., Farmingdale, N.Y.

Continuation-in-part of Ser. No. 654,153, Feb. 2, 1976, abandoned. This application Jul. 11, 1977, Ser. No. 814,439

Int. Cl.² A61K *7/043*

U.S. Cl. 424—61 **2 Claims**

1. A liquid nail polish for application to nails on a human, said nail polish constituting a composition essentially consisting of:

(A) nitrocellulose,

(B) a mixture of solvents for nitrocellulose comprising ethyl acetate, butyl acetate, toluene and butyl alcohol,

(C) a terpolymer of

(i) laurolactam,

(ii) caprolactam, and

(iii) hexamethylene diamine adipate,

(iv) in equimolecular proportions,

(D) a solvent for said terpolyer, comprising trichloroethane and ethyl alcohol,

(E) the nitrocellulose and the terpolymer being dissolved in the solvents for the nitrocellulose and for the said terpolymer,

(F) the dissolved terpolymer initially being of a particle size less than 80 microns,

(G) said dissolved terpolymer being present in an amount in the nail polish of from between 0.001% to 0.1% by weight of the composition which is effective to impart to the nails an improved flexural strength when the composition is applied as a coating thereon and permitted to dry.

4,097,590

METHODS AND COMPOSITIONS FOR TREATMENT OF BACTERIAL AND FUNGUS INFECTIONS OF THE SKIN

Geraldine Fay Weisz, 2240 Harmain Rd., Pittsburgh, Pa. 15235

Continuation-in-part of Ser. No. 598,635, Jul. 24, 1975, Pat. No. 3,996,350, which is a continuation-in-part of Ser. No. 537,969, Jan. 2, 1975, Pat. No. 3,995,029. This application Jul. 19, 1976, Ser. No. 706,444

The portion of the term of this patent subsequent to Nov. 30, 1993, has been disclaimed.

Int. Cl.² A01N *11/00*; C11D *3/48, 9/50*

U.S. Cl. 424—151 **9 Claims**

1. A composition for treating bacterial and fungus infections of the skin such as acne vulgaris and athlete's-foot comprising a mixture of about 0.05% to 1% of a wetting agent and the balance a water soluble fluoride.

4,097,591

N^2-ARYLSULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto; Akiko Hijikata, both of Kobe; Ryoji Kikumoto, Machida; Yoshikuni Tamao, Yokohama; Kazuo Ohkubo, Machida; Tohru Tezuka, Yokohama, and Shinji Tonomura, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo and Shosuke Okamoto, both of, Japan

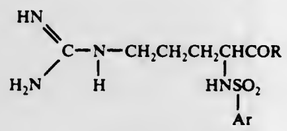
Continuation-in-part of Ser. No. 760,677, Jan. 19, 1977, which is a continuation-in-part of Ser. No. 638,985, Dec. 9, 1975, Pat. No. 4,055,636, Ser. No. 646,522, Jan. 5, 1976, Pat. No. 4,018,915, Ser. No. 649,219, Jan. 14, 1976, Pat. No. 4,018,913, Ser. No. 656,014, Feb. 6, 1976, Pat. No. 4,041,156, Ser. No. 656,870, Feb. 10, 1976, Pat. No. 4,046,876, Ser. No. 669,743, Mar. 24, 1976, Pat. No. 4,070,457, Ser. No. 671,436, Mar. 29, 1976, Pat. No. 4,066,758, and Ser. No. 703,704, Jul. 8, 1976, Pat. No. 4,069,323, said Ser. No. 671,436, is a division of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Mar. 10, 1977, Ser. No. 776,195

The portion of the term of this patent subsequent to Jan. 3, 1995, has been disclaimed.

Int. Cl.[2] A61K *37/00;* C07C *103/52*

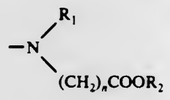
U.S. Cl. 424—177 **3 Claims**

1. An N^2-arylsulfonyl-L-argininamide having the formula (I)



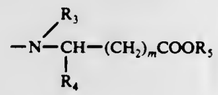
(I)

or a pharmeceutically acceptable salt thereof, wherein R is



(I)

wherein R_1 is C_2–C_{10} alkyl, C_3–C_{10} alkenyl, C_3–C_{10} alkynyl, C_2–C_{10} alkoxyalkyl, C_2–C_{10} alkylthioalkyl, C_2–C_{10} alkylsulfinylalkyl, C_1–C_{10} hydroxyalkyl, C_2–C_{10} carboxyalkyl, C_3–C_{10} alkoxycarbonylalkyl, C_1–C_{10} haloalkyl, C_7–C_{15} aralkyl, C_8–C_{15} α-carboxyaralkyl, C_3–C_{10} cycloalkyl or C_4–C_{10} cycloalkyl; R_2 is hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl or 5-indanyl; and *n* is an integer of 1,2 or 3; or



(2)

wherein R_3 is hydrogen, C_1–C_{10} alkyl, C_3–C_{10} alkenyl, C_3–C_{10} alkynyl, C_2–C_{10} alkoxyalkyl, C_2–C_{10} alkylthioalkyl, C_2–C_{10} alkylsulfinylalkyl, C_1–C_{10} hydroxyalkyl C_2–C_{10} carboxyalkyl, C_3–C_{10} alkoxycarbonylalkyl, C_1–C_{10} haloalkyl, C_7–C_{15} aralkyl, C_8–C_{15} α-carboxyaralkyl, C_3–C_{10} cycloalkyl or C_4–C_{10} cycloalkylalkyl; R_4 is C_1–C_5 alkyl, carboxy, C_2–C_{10} alkoxycarbonyl, phenyl, C_7–C_{12} aralkyl or ring substituted benzyl wherein said substituent is C_1–C_5 alkyl or C_1–C_5 alkoxy; R_5 is hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl or 5-indanyl; and *m* is an integer of 0, 1 or 2;

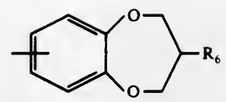
Ar is a phenyl or naphthyl group, either substituted with at least one substituent selected from the group consisting of sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamonyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxy, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy, or mixtures thereof;

a phenyl or naphthyl group, either substituted with at least one substituent selected from the group consisting of sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamonyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxy, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy, or mixutres thereof, and at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy and C_2–C_{20} dialkylamino;

an oxanthrenyl or dibenzofuranyl group substituted with at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy, C_2–C_{20} dialkylamino, sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxyl, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl, and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy, or mixtures thereof;

a C_7–C_{12} aralkyl, tetrahydronaphthyl, 1,2-ethylenedioxyphenyl, chromanyl, 2,3-ethylenedioxynaphthyl or xanthenyl group, any substituted with at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy, C_2–C_{20} dialkylamino, sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamonyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxyl, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl, oxo and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy, or mixtures thereof; a naphthoquinonyl, anthryl, phenanthryl, pentalenyl, heptalenyl, azulenyl, biphenylenyl, as-indacenyl, S-indacenyl, acenaphthylenyl, phenylcarbonylphenyl, phenoxyphenyl, benzofuranyl, isobenzofuranyl, benzo (b) thienyl, isobenzothienyl, thianthrenyl, dibenzothienyl, phenoxathiinyl, indolyl, 1H-indazolyl, quinolyl, isoquinolyl, phthalazinyl, 1,8-naphthridinyl, quinoxalinyl, quinazolinyl, cinnolinyl, carbazolyl, acridinyl, phenazinyl, phenothiazinyl, phenoxazinyl or benzimidazolyl group any of which is unsubstituted or substituted with one or more groups selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy, C_2–C_{20} dialkylamino, sulfoamino, carbamoyl C_3–C_{10} N,N-dialkylcarbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxyl, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10} hydroxyalkyl, C_1–C_{10} haloalkyl and phenyl optionally substituted with at least one hydroxy, C_1–C_5 alkoxy, or mixtures thereof;

a C_9–C_{16} cycloalkylphenyl, C_{10}–C_{18} cycloalkylalkylphenyl, C_9–C_{16} cycloalkyloxyphenyl, C_9–C_{16} cycloalkylthiophenyl, 9,10-dihydroanthryl, 5,6,7,8-tetrahydroanthryl, 9,10-dihydrophenanthryl, 1,2,3,4,5,6,7,8-octahydrophenanthryl, indenyl, indanyl, fluorenyl, acenaphthenyl, phenylthiophenyl, isochromanyl, 2,3-dihydrobenzofuranyl, 1,3-dihydroisobenzofuranyl, thioxanthenyl, 2H-chromenyl, 3,4-dehydro-1-isochromanyl, 4H-chromenyl, indolinyl, isoindolinyl, 1,2, 3,4-tetrahydroquinolyl or 1,2,3,4-tetrahydroisoquinolyl group any of which is unsubstituted or substituted with one or more groups selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy, C_2–C_{20} dialkylamino, sulfoamino, carbamoyl, C_3–C_{10} N,N-dialkylcarbamoyl, amino, C_1–C_{10} alkylamino, mercapto, C_1–C_{10} alkylthio, C_7–C_{12} aralkyl, carboxyl, C_2–C_{10} alkoxycarbonyl, C_2–C_{10} carboxyalkyl, C_1–C_{10} acylamino, C_2–C_{10} alkylcarbonyl, C_1–C_{10}hydroxyalkyl, C_1–C_{10} haloalkyl, oxo and phenyl optionally substituted with at least one hydroxyl, C_1–C_5 alkoxy, or mixtures thereof; or benzene ring-substituted



wherein R_6 is hydrogen, C_1–C_{10} alkyl or C_1–C_{10} alkoxy, and said substituent is at least one C_1–C_5 alkoxy or mixtures thereof.

4,097,592

O-[1-SUBSTITUTED-6-PYRIDAZINON(3)YL]-THIONOALKANEPHOSPHONIC ACID ESTERS FOR COMBATING INSECTS AND ACARIDS

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel; Lothar Rohe; Rolf Schröder, all of Wuppertal; Ingeborg Hammann, Cologne; Wolfgang Behrenz, Overath-Steinenbrueck, and Bernhard Homeyer, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

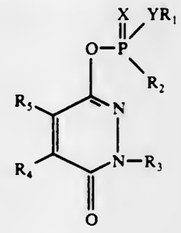
Filed Jul. 26, 1976, Ser. No. 708,669

Claims priority, application Germany, Aug. 5, 1975, 2534893

Int. Cl.[2] C07F *9/65;* A01N *9/36*

U.S. Cl. 424—200 **10 Claims**

1. An O-[1-substituted-6-pyridazinon(3)yl](thiono)(thiol)-alkanephosphonic acid ester of the formula



in which

R_1 and R_2 each independently is alkyl with 1 to 7 carbon atoms,

R_3 is alkyl, cyanoalkyl, alkylcarbonylalkyl, carbalkoxyalkyl, hydroxyalkyl, alkylthioalkyl or halogenoalkyl with 1 to 4 carbon atoms per alkyl radical, alkenyl or alkenyl with 3 to 5 carbon atoms, benzyl, benzyl carrying at least one substituent selected from halogen and alkyl with 1 to 3 carbon atoms, or phenyl, phenyl carrying at least one substituent selected from nitro, halogen, alkyl with 1 to 3 carbon atoms and carbalkoxy with 1 to 4 carbon atoms, or piperidinomethyl,

R_4 and R_5 each independently is hydrogen or alkyl with 1 to 3 carbon atoms, and

X and Y each independently is oxygen or sulfur.

9. A method of combating insects or acarids which comprises applying to the insects or acarids or to a habitat thereof an insecticidally or acaricidally effective amount of an ester according to claim 1.

4,097,593

O-ALKYL-S-[1,6-DIHYDRO-6-THIOXO-PYRIDAZIN-(1)-YL METHYL]-(THIONO)-(DI)-THIOL-PHOSPHORIC (PHOSPHONIC) ACID ESTERS AND ESTER-AMIDES AND NEMATICIDAL, INSECTICIDAL AND ACARICIDAL COMPOSITIONS THEREOF

Fritz Maurer; Hans-Jochem Riebel, both of Wuppertal; Ingeborg Hammann, Cologne, and Bernhard Homeyer, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

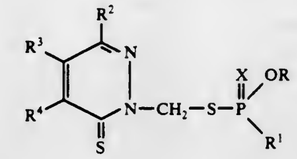
Filed Jan. 10, 1977, Ser. No. 758,242

Claims priority, application Germany, Jan. 28, 1976, 2603052

Int. Cl.[2] C07F *9/65;* A01N *9/36*

U.S. Cl. 424—200 **9 Claims**

1. An O-alkyl-S-[1,6-dihydro-6-thioxo-pyridazin-(1)-ylmethyl]-(thiono)-(di)-thiol-phosphoric(phosphonic) acid ester or ester-amide of the formula



in which

R is alkyl with 1 to 6 carbon atoms,

R^1 is alkyl, alkoxy, alkylmercapto or alkylamino with a maximum of 6 carbon atoms per alkyl chain,

R^2 is halogen, alkoxy with 1 to 5 carbon atoms or alkyl with 1 to 5 carbon atoms,

R^3 and R^4 each is hydrogen or conjointly form a fused benzene ring, and

X is an oxygen or sulfur atom.

8. A method of combating nematodes or insects and acarids which comprises applying to the nematodes or insects and acarids or to a habitat thereof a nematicidally or insecticidally or acaricidally effective amount of a compound according to claim 1.

4,097,594

MONO-5-SUBSTITUTED-3-CHLORO-4H-1,2,6-THIADIAZIN-4-ONE ANTIFUNGAL AGENTS

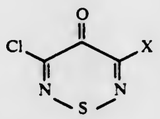
Clinton Joseph Peake; Wayne Nelson Harnish, both of Medina, and Bruce Lloyd Davidson, Middleport, all of N.Y., assignors to FMC Corporation, Philadelphia, Pa.

Filed Mar. 30, 1977, Ser. No. 782,860

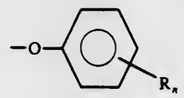
Int. Cl.[2] A01N *9/12*

U.S. Cl. 424—246 **5 Claims**

1. A method for control of fungal disease on plants comprising applying to the locus where control is desired an effective fungistatic or fungicidal amount of a compound having the formula:



in which X is halogen, phenoxy, naphthoxy or substituted phenoxy having the formula



wherein each R group is a substituent independently selected from the group consisting of lower alkyl, halo, hydroxy, lower alkoxy, nitro, cyano, amino, carboxyl, lower acyl, lower acylamino having 1-4 carbon atoms, lower alkoxycarbonyl, carboxy(lower)alkyl, lower alkylureido, phenylureido, trihalomethyl, cyano(lower)alkyl, phenyl(lower)alkoxycarbonyloxy, lower alkylaminocarbonyloxy, phenylaminocarbonyloxy, lower alkylthio, lower alkylsulfinyl and lower alkylsulfonyl, and wherein *n* has a value of 1 to 3 inclusive, except when each R is halogen, *n* has a value of 1 to 5 inclusive.

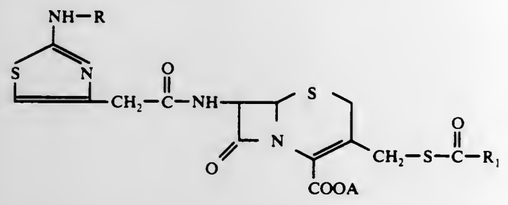
4,097,595

7-AMINO-THIAZOLYL ACETAMIDO CEPHALOSPORANIC ACIDS

René Heymés, Romainville, France, assignor to Roussel Uclaf, Paris, France

Filed Jan. 12, 1977, Ser. No. 758,634
Claims priority, application France, Jan. 14, 1976, 76 00843
Int. Cl.[2] C07D *501/36;* A61K *31/545*
U.S. Cl. 424—246 **15 Claims**

1. 7-amino-thiazolyl-acetamido-cephalosporanic acid compounds of the formula



wherein R is selected from the group consisting of hydrogen, tert.-butoxy carbonyl, trityl, benzyl, dibenzyl, trichloroethyl, carbobenzyloxy, formyl and phthaloxy, R_1 is selected from the group consisting of alkyl of 1 to 4 carbon atoms, furyl, thiazolyl, oxothiazolinyl, isothiazolyl, oxazolyl, imidazolyl, diazolyl, thiadiazolyl and tetrazolyl, and A is selected from the group consisting of hydrogen, alkali metal and equivalents of alkaline earth metals, magnesium and a non-toxic, pharmaceutically acceptable organic amine.

12. A method of combatting bacterial infections in warm-blooded animals comprising administering to warm-blooded animals an antibacterially effective amount of at least one compound of claim 1.

4,097,596

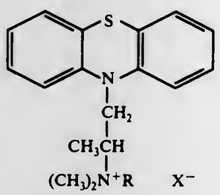
INHALATION THERAPY FOR RELIEVING BRONCHIAL SPASM USING QUATERNARY SALTS OF PROMETHAZINE

Albert J. Begany, Tucson, Ariz.; Marvin E. Rosenthale, Havertown, and Alphonse Dervinis, Wayne, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Nov. 2, 1976, Ser. No. 737,927
Int. Cl.[2] A61K *31/54*
U.S. Cl. 424—247 **16 Claims**

1. A method of relieving bronchial spasm and facilitating breathing in warm-blooded animals which comprises administering orally or nasally to a warm-blooded animal in need thereof, by aerosol route, an amount sufficient to relieve bronchial spasm and facilitate breathing in said warm-blooded animal of a composition comprising:

(a) a compound of the formula:



wherein R is cyclopropylmethyl or alkyl of from 1 to 4 carbon atoms; X is a pharmacologically acceptable anion; and

(b) a pharmacologically acceptable carrier.

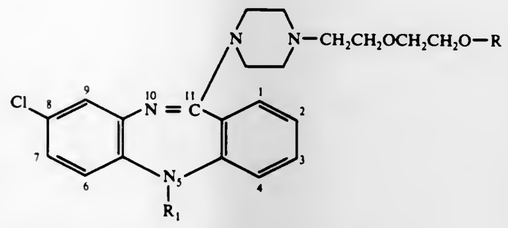
4,097,597

DIBENZO[B,E][1,4]DIAZEPINES

Bruce Wayne Horrom, Waukegan; Frederick Nelson Minard, Lake Bluff, and Harold Elmer Zaugg, Lake Forest, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Feb. 23, 1977, Ser. No. 771,216
Int. Cl.[2] A61K *31/55;* C07D *403/04*
U.S. Cl. 424—250 **18 Claims**

1. A compound of the structure

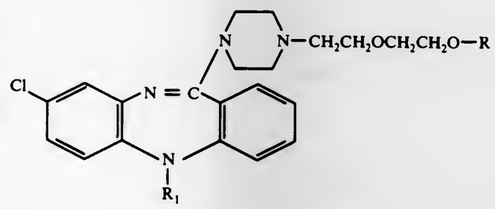


wherein R is H, loweralkyl, hydroxyloweralkyl or

where R_2 is an alkyl group of 1 to 15 carbon atoms; and R_1 is H or

where R_2 is an alkyl group of 1 to 15 carbon atoms.

7. A composition of long lasting activity in the treatment of schizophrenics comprising as the active component a compound of the formula



wherein R is H, loweralkyl, hydroxyloweralkyl or

where R_2 is an alkyl group of 1 to 15 carbon atoms; R_1 is H or

where R_2 is alkyl of 1 to 15 carbon atoms and a pharmaceutically acceptable carrier.

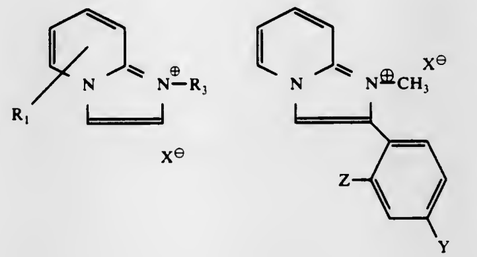
4,097,598

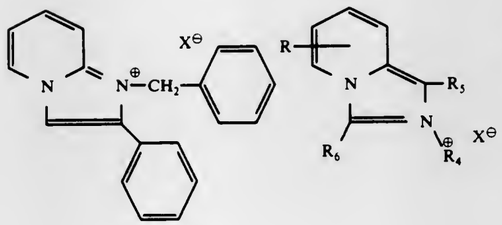
QUATERNARY SALTS AS HYPOGLYCEMIC AGENTS

Donald E. Kuhla, Gales Ferry, Conn., assignor to Pfizer Inc., New York, N.Y.

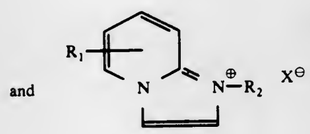
Division of Ser. No. 712,204, Aug. 6, 1976, Pat. No. 4,044,015, and a continuation-in-part of Ser. No. 609,914, Sep. 3, 1975, abandoned. This application Aug. 8, 1977, Ser. No. 822,746
Int. Cl.[2] A61K *31/435, 31/47*
U.S. Cl. 424—256 **31 Claims**

1. A method for reducing the blood-sugar level of a diabetic mammal which comprises orally or parenterally administering to said mammal a hypoglycemic amount of a compound of the formulae





and



wherein R is hydrogen or the carbon and hydrogen atoms completing a fused 6,7-benzo moiety; R_1 is hydrogen, chlorine, methoxy or benzyloxy; R_2 is furfuryl or 8-quinolylmethyl; R_3 is benzyl, α-naphthylmethyl, β-naphthylmethyl, β-phenethyl or substituted benzyl wherein the substituent is chloro, fluoro, bromo, dichloro, trifluoromethyl, cyano, methylsulfonyl, sulfamoyl, dimethylsulfamoyl, carbethoxy, phenyl or methoxy; R_4 is selected from the group consisting of alkyl having one to three carbon atoms, benzyl and substituted benzyl wherein said substituents are selected from the group consisting of chloro and dichloro; R_5 and R_6 are each selected from the group consisting of phenyl and hydrogen, provided that when R_5 and R_6 are each hydrogen, R_4 is selected from the group consisting of benzyl and substituted benzyl wherein said substituent is selected from the group consisting of chloro and dichloro; X is a pharmaceutically acceptable anion; Y is chlorine, bromine, hydrogen or methoxy; and Z is hydrogen or chlorine.

4,097,599

TRIAZOLES

John James Alexander Evans, East Brighton, and George Holan, Brighton, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Division of Ser. No. 522,626, Nov. 11, 1974, Pat. No. 4,038,405. This application Mar. 10, 1977, Ser. No. 776,187
Claims priority, application Australia, Nov. 13, 1973, PB5638
Int. Cl.[2] A01N *9/22;* C07D *249/08, 401/04*
U.S. Cl. 424—263 **6 Claims**

1. 3(5)-(4-Pyridyl)-5(3)-trifluoromethyl-1,2,4-triazole.

2. 3(5)-(2,3,6-Trichlorophenyl)-5(3)-trifluoromethyl-1,2,4-triazole.

3. 3(5)-(4-Nitrophenyl)-5(3)-trifluoromethyl-1,2,4-triazole.

4. A pest control composition comprising an acaricidally effective amount of a triazole compound as defined in claim 1 in admixture with a solid or liquid carrier material.

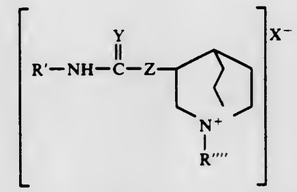
4,097,600

PHARMACEUTICAL COMPOSITION CONTAINING QUATERNARY AMMONIUM COMPOUNDS

Robert Andrew Bauman, New Brunswick, N.J., assignor to Colgate Palmolive Company, New York, N.Y.

Division of Ser. No. 659,618, Feb. 20, 1976, Pat. No. 4,007,281, which is a division of Ser. No. 134,827, Apr. 16, 1971, Pat. No. 3,956,479, which is a division of Ser. No. 712,968, Mar. 14, 1968, Pat. No. 3,621,048, which is a continuation-in-part of Ser. No. 578,981, Sep. 13, 1966, abandoned. This application Nov. 12, 1976, Ser. No. 741,580
Int. Cl.[2] A61K *31/445*
U.S. Cl. 424—267 **8 Claims**

1. A pharmaceutical composition comprising an effective amount of a chemical compound effective against gram positive microorganisms represented by the formula:



where R′ is selected from the group consisting of an alkyl group containing 1 to 22 carbon atoms, a phenyl group, a phenyl group substituted by an alkyl group containing 1 to 5 carbon atoms, a phenyl group substituted by an alkoxy group containing 1 to 5 carbon atoms and a phenyl group substituted by halogen selected from the group consisting of chlorine and bromine;

R′′′′ is selected from the group consisting of an alkyl group containing 10 to 22 carbon atoms, a phenyl group substituted by halogen selected from the group consisting of chlorine and bromine, a phenyl group substituted by an alkyl group containing 1 to 5 carbon atoms, and a phenyl group substituted by an alkoxy group containing 1 to 5 carbon atoms;

Y is selected from the group consisting of oxygen and sulfur;

Z is selected from the group consisting of oxygen and sulfur; and

X is a compatible anion;

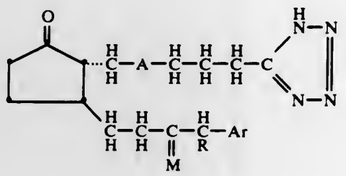
said compound being admixed with a pharmaceutically acceptable carrier.

4,097,601
BONE DEPOSITION BY 2-DESCARBOXY-2-(TETRAZOL-5-YL)-11-DEXOSY-16-ARYL PROSTAGLANDINS

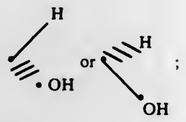
Thomas Ken Schaaf, Old Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Aug. 26, 1977, Ser. No. 827,935
Int. Cl.[2] A61K *31/41*
U.S. Cl. 424—269 7 Claims

1. In the treatment of bone disorders, a method to increase the amount of both the osteomineral deposit and the osteoid present within bone by administration to a subject in need of said treatment an effective amount of a prostaglandin having the structure



or the pharmacologically acceptable salts thereof wherein:
A is ethylene or cis-vinylene:
M is oxo,



R is hydrogen or methyl;
and Ar is phenyl or monosubstituted phenyl, said monosubstituent being fluoro, chloro, bromo, trifluoromethyl, methyl, methoxy and phenyl.

4,097,602
METHOD OF INHIBITING BLOOD PLATELET AGGREGATION

Melvin J. Silver, 6640 Wissahickon Ave., Philadelphia, Pa. 19119; John Bryan Smith, 40 Needlepoint Lane, both of Philadelphia, Pa. 08016, and Carol M. Ingerman, 40 Needlepoint La., Willingboro, N.J.

Continuation of Ser. No. 528,594, Nov. 29, 1974, abandoned. This application Aug. 24, 1976, Ser. No. 717,277
Int. Cl.[2] A61K *31/19, 31/20, 31/215*
U.S. Cl. 424—305 15 Claims

1. A method for inhibiting blood platelet aggregation comprising administrating to an individual disposed toward undesirable blood platelet aggregation from about 5–400 mg/kg of body weight of 8,11,14-eicosatrienoic acid, the ester thereof or a pharmaceutical acceptable salt thereof.

4,097,603
GASTRIC CYTOPROTECTION WITH NON-ANTISECRETORY DOSES OF PROSTAGLANDINS

André Robert, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sep. 6, 1977, Ser. No. 830,559
Int. Cl.[2] A61K *31/215, 31/19*
U.S. Cl. 424—305 7 Claims

1. A method of preventing non-NOSAC-induced gastric inflammatory disease in a human with high susceptibility to the acquisition of said disease, which comprises:
administering to said humans systemically a non-antisecretory dose of a gastric cytoprotective prostaglandin effective to prevent the development of said disease.

4,097,604
METHOD OF TREATING AND CONTROLLING GINGIVITIS

Geraldine H. Thiele, New Oxford, Pa., assignor to Oxford Hill, Ltd., New Oxford, Pa.

Continuation of Ser. No. 642,114, Dec. 18, 1975, and a continuation-in-part of Ser. No. 283,662, Aug. 25, 1972, Pat. No. 3,805,776, Ser. No. 283,663, Aug. 25, 1972, Ser. No. 123,830, Mar. 12, 1971, Pat. No. 3,767,812, and Ser. No. 113,362, Feb. 8, 1971, Pat. No. 3,741,204, said Ser. No. 642,114, is a continuation of Ser. No. 483,010, Jun. 25, 1974, Pat. No. 3,982,017, which is a continuation-in-part of Ser. No. 369,236, Jun. 12, 1973, Pat. No. 3,924,000, which is a continuation-in-part of Ser. No. 283,662, said Ser. No. 283,663, said Ser. No. 123,830, and said Ser. No. 113,362, said Ser. No. 283,662, said Ser. No. 283,663, and said Ser. No. 123,830, each is a continuation-in-part of said Ser. No. 113,362, said Ser. No. 283,662, and said Ser. No. 283,663, each is a continuation-in-part of said Ser. No. 123,830. This application Dec. 29, 1976, Ser. No. 755,400
Int. Cl.[2] A61K *31/20, 7/16*
U.S. Cl. 424—318 10 Claims

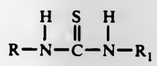
1. The method of treating and controlling gingivitis and related periodontal diseases of the gingival tissue which comprises contacting the diseased gingival tissue with a liquefied composition consisting essentially of (i) 0.5 to 10 percent by weight of a fatty acid salt prepared from an unsubstituted, unsaturated fatty acid having one double bond and from an alkali metal or an alkali metal compound or a basic alkali metal compound, said fatty acid having 14 to 22 carbon atoms; (ii) a liquid carrier; (iii) an effective amount of a buffering agent, and (iv) an effective amount of ethanol, the pH of said liquefied composition being between 9 and 11.

4,097,605
ALKYL THIOUREA MITICIDES

Llewellyn W. Fancher, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

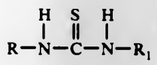
Continuation of Ser. No. 597,104, Jul. 18, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 742,157
Int. Cl.[2] A01N *9/12, 9/20;* C07C *157/09*
U.S. Cl. 424—322 37 Claims

1. A compound having the formula



wherein R is benzyhydryl, and R_1 is alkyl containing from 7 to 11 carbon atoms, inclusive.

5. A method of controlling mites consisting of applying to said mites a miticidally effective amount of a compound having the formula



wherein R is selected from the group consisting of benzhydryl, 3'-(2'-ethylhexoxy)-propyl, allyl, cyclohexyl, cycloheptyl, 1',3'-dimethylbutyl, and alkyl containing from 7 to 13 carbon atoms, inclusive; and where R is benzhydryl, R_1 is alkyl containing from 7 to 11 carbon atoms, inclusive; where R is 3'-(2-ethylhexoxy)-propyl, R_1 is alkyl containing from 1 to 12 carbon atoms, inclusive; where R is allyl, R_1 is alkyl containing from 9 to 13 carbon atoms, inclusive; where R is cyclohexyl, R_1 is dodecyl; where R is cycloheptyl, R_1 is heptyl; where R is 1'-3'-dimethylbutyl, R_1 is n-heptyl or dodecyl; where R is heptyl, R_1 is alkyl containing from 6 to 8 carbon atoms, inclusive; where R is octyl, R_1 is alkyl containing from 6 to 10 carbon atoms, inclusive; where R is nonyl, R_1 is alkyl containing from 3 to 9 carbon atoms, inclusive; where R is decyl, R_1 is alkyl containing from 3 to 7 carbon atoms, inclusive; and where R is undecyl, dodecyl, or tridecyl, R_1 is alkyl containing from 2 to 7 carbon atoms, inclusive.

4,097,606
APAP TABLET CONTAINING AN ALKALI METAL CARBOXYMETHYLATED STARCH AND PROCESSES FOR MANUFACTURING SAME

Leonard Chavkin, Mountainside, and F. Henry Merkle, Scotch Plains, both of N.J., assignors to Bristol-Myers Company, New York, N.Y.

Filed Oct. 8, 1975, Ser. No. 620,688
Int. Cl.[2] A61K *31/165, 47/00*
U.S. Cl. 424—324 25 Claims

1. As an article of manufacture, a tablet having a relatively high absorption rate for N-acetyl-p-aminophenol as measured by the blood plasma level of N-acetyl-p-aminophenol over time after ingestion comprising:
(a) from about 190 to 1000 milligrams of N-acetyl-p-aminophenol;
(b) from about 30 to 90 milligrams of a low substituted alkali metal carboxymethyl starch; and
(c) a non-toxic, pharmaceutically acceptable binder;
the ratio of N-acetyl-p-aminophenol to sodium alkali metal carboxymethyl starch, on a weight basis, being in the range of from about 5:1 to 10:1;
the quantity of binder present being in the range of from 0 to an amount no greater than the amount of N-acetyl-p-aminophenol contained in the tablet.

4,097,607
DETERRENT COMPOSITION, METHOD OF USING SAME, AND ARTICLE COATED THEREBY

Kenneth A. Larson, 225 Commerce Dr., Fort Collins, Colo. 80522

Filed Dec. 10, 1976, Ser. No. 749,303
Int. Cl.[2] A61K *31/11, 31/165*
U.S. Cl. 424—324 15 Claims

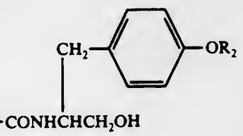
1. A deterrent for mammals comprising a carrier and an effective amount of cinnamic aldehyde wherein the carrier is an ointment which is substantially insoluble in water.

4,097,608
ANTI-ULCEROUS TYROSINE DERIVATIVES

Tosaku Miki; Yasuhiro Hosokawa; Tamotsu Miwa; Hiroshi Fujita; Masahide Asano, and Shunzo Aibara, all of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

Division of Ser. No. 639,117, Dec. 9, 1975, Pat. No. 4,025,644. This application Dec. 20, 1976, Ser. No. 752,511
Claims priority, application Japan, Dec. 18, 1974, 49-145133; Dec. 18, 1974, 49-145134; Apr. 2, 1975, 50-39959; Apr. 4, 1975, 50-41000
Int. Cl.[2] A61K *31/085, 31/165;* C07C *103/78*
U.S. Cl. 424—324 6 Claims

1. A compound of the formula:



wherein R_1 is phenyl or cycloalkyl and the phenyl may have at least one substituent selected from the group consisting of lower alkyl, lower alkoxy, halogen, amino and nitro; and R_2 is hydrogen or lower alkyl.

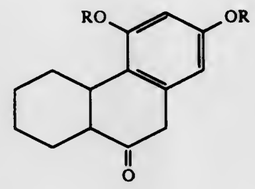
6. A method of treating ulcers in humans which comprises administering to said human a compound of claim 1 in an amount effective for treating said ulcers.

4,097,609
2,4-DISUBSTITUTED-4B,5,6,7,8,8A,9,10-OCTAHYDRO-9-OXO-PHENANTHRENES

Sandor Barcza, West Orange, N.J., and James B. Hendrickson, Cambridge, Mass., assignors to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 637,718, Dec. 4, 1975, Pat. No. 4,034,045, which is a continuation-in-part of Ser. No. 566,759, Apr. 10, 1975, abandoned, which is a continuation of Ser. No. 368,939, Jun. 11, 1973, abandoned. This application Mar. 2, 1977, Ser. No. 773,535
Int. Cl.[2] C07C *49/82;* A01N *9/24*
U.S. Cl. 424—331 5 Claims

1. A compound of the formula



where R represents hydrogen or lower alkyl having 1 to 4 carbon atoms.

4,097,610
PROCESS FOR MAKING FISHBAIT AND THE PRODUCT PRODUCED THEREBY

Ronald L. Morrison, 3719 NE. 74th Pl., Seattle, Wash. 98115, and John W. Dawson, Box 880, Long Beach, Wash. 98631

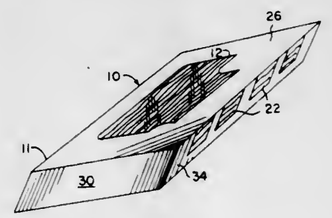
Filed Jan. 28, 1977, Ser. No. 763,543
Int. Cl.[2] A23L *1/325*
U.S. Cl. 426—1 9 Claims

1. A process for making fishbait from fish eggs, comprising the steps of:
(a) Mixing fish eggs, at least some of which are whole, with a slurry comprising a binder material, fish oil and fish egg residue to form a mixture;
(b) Spreading said mixture into a container;
(c) Brushing the exposed surface of the mixture in the container with oil; and
(d) Heating said mixture until it forms a soft, pliable, congealed mass, with the whole fish eggs being held in the now-solidified slurry, said congealed mass forming the fishbait, which may be conveniently cut into bait size portions.

4,097,611
SLICED FOOD PACKAGE WITH SIDE WINDOWS

Oscar E. Seiferth, and Calvin T. Royston, both of Madison, Wis., assignors to Oscar Mayer & Co. Inc., Madison, Wis.

Filed Mar. 15, 1973, Ser. No. 341,390
Int. Cl.[2] B65D *85/72;* B65B *25/06*
U.S. Cl. 426—121 3 Claims



1. A folding carton formed of paperboard and erectable from a flat sleeve or collapsed tube condition so as to have a top

panel which includes a window opening glazed with transparent film having relatively low resistance to wrinkling, a bottom panel and two sidewall panels with projecting unfolded end flaps on opposite ends of said panels by pivoting said panels along panel-interconnecting score lines, at least one sidewall panel having at least one window opening therein with each sidewall window opening extending all the way to one of its adjacent score lines which is interrupted by the presence of each window opening, said sidewall window opening or openings in aggregate being at least of such area that the material remaining in said side panel containing said window opening or openings will not provide sufficient residual stiffness to consistently initially fold or hinge only along said interrupted score line on erection from said flat or collapsed condition, and a relatively stiff substantially non-wrinkling piece of transparent window glazing material adhered to said sidewall containing said window opening or openings with one edge thereof substantially coincident with said interrupted score line, the stiffness of said piece of transparent window glazing material combined with the residual stiffness of said window sidewall panel to prevent folding or creasing of said window sidewall panel on erection except along said interrupted score line.

4,097,612

POTATO TREATMENT PROCESS

William Duncan Powrie, and Marvin Tung, both of Vancouver, Canada, assignors to Creston Valley Foods Ltd., Vancouver, Canada

Continuation-in-part of Ser. No. 531,166, Dec. 9, 1974, abandoned. This application Mar. 16, 1976, Ser. No. 667,460
Claims priority, application Canada, May 10, 1974, 199477
Int. Cl.[2] A23L *1/216*
U.S. Cl. 426—269 **16 Claims**

1. A process for treatment of raw white potatoes, which have previously been stored at temperatures of about 40° to 45° F, to improve their quality for subsequent thermal sterilization and storage in flexible containers without added liquid, which comprises immersing said stored potatoes, after they have been peeled, in whole or divided form, successively in:

(a) an aqueous solution containing

(1) 0.2 to 4% by weight of citric acid or sodium or potassium citrate, and

(2) 0.005 to 0.8% by weight of sulfur dioxide in free form or in the form of sodium or potassium sulfite, bisulfite or metabisulfite; said aqueous solution having a pH of 2.3 to 6.5, the immersion of the potatoes in said solution (a) being from about 1 minute at 190° F to 5 minutes at 110° F;

(b) an aqueous solution containing sodium or potassium pyrophosphate in a concentration of 0.5 to 1.5% by weight, the immersion of the potatoes in said solution (b) being from 15 seconds at 212° F to 60 seconds at 140° F; and

(c) an aqueous solution of a non-toxic alkaline earth metal salt in a concentration of 0.05 to 0.5% by weight, the immersion of the potatoes in said solution (c) being from 15 seconds at 212° F to 60 seconds at 140° F. and thereafter sealing the peeled potatoes, without added liquid, in a flexible storage container and subjecting the peeled potatoes in the flexible container to thermal sterilization.

4,097,613

PROCESS FOR PREPARING A PROTEIN FORTIFIED NATURAL CEREAL

William R. DeLauder, Manchester, Mo., and Ferdinand E. Spring, Davenport, Iowa, assignors to Ralston Purina Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 599,794, Jul. 28, 1975, abandoned. This application Dec. 22, 1976, Ser. No. 753,118
Int. Cl.[2] A23L *1/10*
U.S. Cl. 426—303 **6 Claims**

1. A process for the production of a particulate protein fortified, natural cereal product having a protein content of at least about 20% by weight comprising;

(a) forming a mixture of different, whole farinaceous grains, and a fortifying amount of a textured vegetable protein material having a protein content of above 30% by weight, said amount being sufficient to provide greater than a 20% protein content in the final product;

(b) coating said mixture with an oil prior to or following a coating with sweetening solution and

(c) drying said mixture at a temperature and period of time sufficient to provide a moisture content below about 5% by weight thereby providing a protein fortified natural cereal product.

4,097,614

METHOD OF REMOVING BITTER SUBSTANCES FROM BREWERS YEAST AND BREWERS YEAST AUTOLYSATES

Simon Michael West, Williamstown, Australia, assignor to Kraft Foods Limited, Port Melbourne, Australia

Filed Dec. 23, 1976, Ser. No. 753,688
Claims priority, application Australia, Dec. 24, 1975, 4395/75
Int. Cl.[2] C12C *11/28*
U.S. Cl. 426—422 **8 Claims**

1. A method for removing isohumulones from suspensions of brewers yeast and from brewers yeast autolysates, wherein the suspensions or autolysates are brought into contact with a composite adsorbent material which comprises adsorbent carbon particles and magnetic particles embedded in a porous matrix of organic polymeric material, the pore size of such matrix being within the range 2–30nm and such as to allow molecules of the isohumulones to enter freely into the interstitial structure of the matrix, but to exclude larger molecules which are to be retained in the suspension or solution being treated, and wherein the loaded composite adsorbent material is subsequently separated from the suspension or solution being treated.

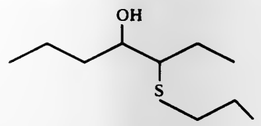
4,097,615

FLAVORING WITH 3-PROPYLTHIO-4-HEPTANOL

William J. Evers, Red Bank; Howard H. Heinsohn, Jr., Hazlet, and Manfred Hugo Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 730,537, Oct. 7, 1976, Pat. No. 4,044,164. This application Feb. 4, 1977, Ser. No. 765,833
Int. Cl.[2] A23L *1/226*
U.S. Cl. 426—535 **2 Claims**

1. A process for augmenting or enhancing the taste or aroma of a foodstuff comprising the step of adding to said foodstuff from about 0.1 ppm up to about 50 ppm by weight of said foodstuff of 3-propylthio-4-heptanol having the structure:



4,097,616

LOW TEMPERATURE SOFT CANDY PROCESS

Jean Pierre Guillou, Paris, and Georges Letourneau, Lagny, both of France, assignors to General Foods France, S.A., Montreuil-sous-Bois, France

Filed Jan. 12, 1977, Ser. No. 758,537
Claims priority, application France, Jan. 23, 1976, 76 01906
Int. Cl.[2] A23G *3/00*
U.S. Cl. 426—548 **4 Claims**

1. A process for making a soft candy containing a sweetener substantially completely in the crystalline state and which does not lose its crystallinity throughout the process which consists of the steps of

(a) admixing, at a temperature of from about 45° C. to about 60° C., to form a soft paste,

(1) from about 85% to about 90% by weight of the final product of a crystalline sweetener selected from the group consisting of an edible polyhydric alcohol, sucrose, glucose and mixtures thereof, all of said sweetener having a particle size of 100 microns or less, with

(2) a binder consisting of from about 4% to about 8% of an aqueous gelatin sol containing approximately 33% of gelatin by weight of the sol, and

(3) minor, but effective, amounts of food coloring, flavoring and edible aciduant,

(b) extruding the soft paste to form rods and/or sheets,

(c) cooling the extruded rods and/or sheets of soft paste to room temperature, and

(d) forming and shaping the cooled, extruded paste into candy units.

4,097,617

PHOSPHONITRILE FLUOROELASTOMER COATED CARRIER PARTICLES FOR USE IN ELECTROPHOTOGRAPHIC PROCESS

Pabitra Datta, Cranbury, N.J., assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio

Filed Sep. 7, 1977, Ser. No. 831,147
Int. Cl.[2] G03G *9/10, 9/14*
U.S. Cl. 427—14 **8 Claims**

7. A process for developing a latent electrostatic image which comprises

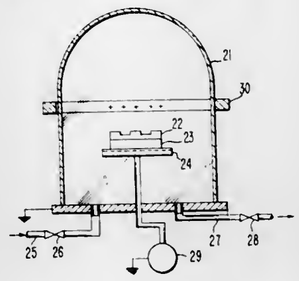
mixing an electroscopic powder with a carrier comprising a member selected from the group consisting of metallic particles and siliceous particles to the surface of which is adhered a phosphonitrile fluoroelastomer to impart opposite electrostatic charges to said electroscopic powder and said carrier, whereby said electroscopic powder is attracted to said carrier and transferring said electroscopic powder from said carrier to said latent electrostatic image.

4,097,618

METHOD OF TRANSFERRING A SURFACE RELIEF PATTERN FROM A POLY(1-METHYL-1-CYCLOPROPENE SULFONE) LAYER TO A NON-METALLIC INORGANIC LAYER

Eugene Samuel Poliniak, Willingboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 9, 1977, Ser. No. 775,862
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—41 **7 Claims**



1. A method for forming a surface relief pattern in a non-metallic inorganic layer which comprises:

a. dissolving poly(1-methyl-1-cyclopropene sulfone) in a solvent;

b. applying the resultant solution to the non-metallic inorganic layer to form a wet poly(1-methyl-1-cyclopropene sulfone) layer on the non-metallic inorganic layer;

c. exposing the wet layer to a modulated beam of electrons;

d. developing the exposed wet layer to form a surface relief pattern;

e. bombarding the developed surface with sufficient ions to substantially remove the wet layer and form the surface relief pattern in the non-metallic inorganic layer.

4,097,619

MANIFOLD CARBONLESS FORM AND PROCESS FOR THE CONTINUOUS PRODUCTION THEREOF

Gerald Titus Davis, and Dale Richard Shackle, both of Chillicothe, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed May 7, 1976, Ser. No. 684,460
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—44 **17 Claims**

1. A process for the continuous production of a manifold carbonless form having two or more surfaces coated with chromogenic material comprising:

(a) providing a plurality of continuous webs; each of said continuous webs having a first and second surface;

(b) advancing each web of said plurality of continuous webs at substantially the same speed, said plurality of continuous webs being spaced apart and being advanced in a cooperating relationship with one another;

(c) marking at least one surface of at least one web of said plurality of continuous webs with a pattern;

(d) applying a first non-aqueous, solvent-free coating of a first chromogenic material to at least a portion of said first surface of at least one web of said plurality of continuous webs, said first non-aqueous, solvent-free coating comprising said first chromogenic material dispersed in a hot melt suspending medium, said coating being heated to a temperature above the melting point of said hot melt suspending medium to permit fluid application of said first coating composition to said first surface;

(e) setting said first coating by means of temperature decrease;

(f) applying a second coating of a second chromogenic material to at least a portion of said second surface of at least one web of said plurality of continuous webs, said second coating comprising said second chromogenic material dispersed in a hot melt suspending media, said second coating being heated to a temperature above the melting point of said hot melt suspending media to permit fluid application of said second coating composition to said second surface, said second chromogenic material being reactive with said first chromogenic material to form a color;

(g) setting said second coating by means of temperature decrease;

(h) collating said plurality of continuous webs such that said first and said second chromogenic materials are in facing relationship to a coreactive chromogenic material; and

(i) placing said collated continuous webs in contiguous relationship to one another to create a manifold form.

4,097,620

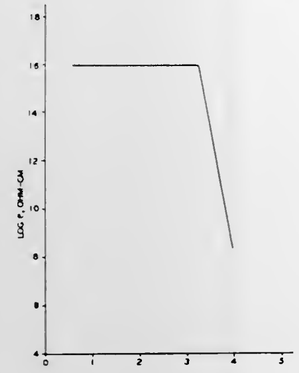
MAGNETIC TONER PARTICLE COATING PROCESS

Chin H. Lu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 2, 1977, Ser. No. 792,634
Int. Cl.[2] G03G *9/08;* H01F *1/11*
U.S. Cl. 427—127 **18 Claims**

1. A process of coating magnetic toner particles comprising neutralizing a fatty acid material selected from the group comprising fatty acids, fatty acid derivatives and mixtures thereof with ammonium hydroxide to form a water soluble ammonium compound in aqueous solution, adding particles to the solution,

heating the solution at below the boiling pont, filtering the solution, washing and drying to recover the coated particles



wherein said fatty acid material is present in an amount between about 0.1 and 10 weight percent of the particle.

4,097,621

METHOD FOR MANUFACTURING BIAS FABRIC

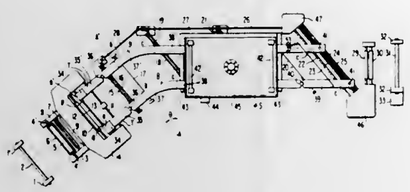
Kaname Shirasaka, Takatsuki; Yoshihiro Nakagami, Akashi; Takashi Tomiyori, Kobe; Masanori Ikemoto, Kobe, and Tsuneo Shaura, Kobe, all of Japan, assignors to Mitsuboshi Belting Ltd., Kobe, Japan

Division of Ser. No. 580,280, May 23, 1975, Pat. No. 4,034,702, which is a continuation-in-part of Ser. No. 404,566, Oct. 9, 1973, abandoned. This application Oct. 7, 1976, Ser. No. 730,393

Claims priority, application Japan, Oct. 9, 1972, 47-101417

Int. Cl.[2] D06C *3/02*

U.S. Cl. 427—173 **3 Claims**



1. A method for manufacturing a bias fabric comprising supplying a continuous running length of fabric having an initial width and orthogonally disposed warp and weft, gripping the opposed edges of said running length, feeding said fabric along a first straight path, changing the direction of said running length by moving opposite edges of said fabric simultaneously along identical spaced apart curved paths of equal arc length having radii greater than said initial width and disposed in the plane of said fabric to change the direction of the warp while maintaining the weft in the same direction and while preventing wrinkling or bunching of the fabric, maintaining said fabric at its predetermined width prior to changing the direction, feeding said fabric in a new direction along a second straight path subsequent to changing the direction, releasing the opposed edges of said running length of fabric diagonally of the second straight path and taking up said fabric.

4,097,622

Patent Not Issued For This Number

4,097,623

SHAPED ARTICLE OF CELLULOSE HYDRATE WITH A COATING OF PLASTIC MATERIAL OF CHEMICALLY MODIFIED PROTEIN AND PROCESS FOR THE PRODUCTION THEREOF

Klaus-Dieter Hammer, Mainz; Wolfgang Klendauer, and Martin Schröder, both of Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

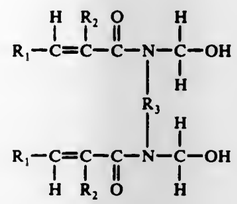
Filed Oct. 3, 1975, Ser. No. 619,225

Claims priority, application Germany, Oct. 7, 1974, 2447757

Int. Cl.[2] B05D *7/02, 7/22;* **A22C** *13/00*

U.S. Cl. 427—230 **24 Claims**

1. A process for coating the surface of a shaped article of cellulose hydrate with a layer of polymer material which comprises applying to the surface of a shaped article in the gel state and based on cellulose hydrate, a liquid layer of an aqueous solution of a chemically modified protein obtained by mixing an aqueous alkaline protein solution with an aqueous solution of N-methylol-acrylamide or N-methylolmethacrylamide or of the alkoxy derivatives thereof of aliphatic alcohols with 1 to 8 carbon atoms, particularly of organic, tetrafunctional, doubly unsaturated compounds of the general formula



in which

R_1 and R_2 are hydrogen or an alkyl group with 1 to 6 carbon atoms, and

R_3 is the group $-(CH_2)_n-$, n being an integer from 1 to 8, or the group

in which R_4 is an alkyl group with 1 to 18 carbon atoms, subjecting the liquid mixture to a dwell time, heating the coated shaped article at a temperature in the range between 80° and 120° C, which heat is sufficient to remove the water from the shaped article and to effect the chemical reaction between the reactive OH groups of the chemically modified protein and the OH groups of the cellulose hydrate forming the shaped article, and wetting the shaped article with water until it has a portion in the range between 8 to 12% by weight of water calculated on the total weight of the shaped article.

4,097,624

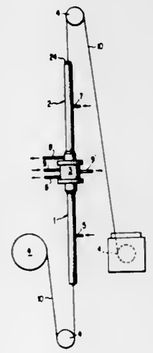
METHOD FOR THE METALLIZATION OF FIBERS

Hermann J. Schladitz, Munich, Germany, assignor to University of Virginia, Charlottesville, Va.

Division of Ser. No. 763,013, Jan. 27, 1977. This application Sep. 30, 1977, Ser. No. 838,063

Int. Cl.[2] B05D *3/04, 7/20*

U.S. Cl. 427—251 **8 Claims**



1. A method for decontaminating and subsequently metallizing a filament which comprises passing the filament through the inner tube of a first chamber for decontamination which comprises two concentric tubes having an annular space therebetween, the inner tube of which has a series of fine holes therein; wherein said inner tube is heated and said annular space contains an inert gas such that said gas flows through said holes in heated jet streams which impinge upon said filament, thereby heating and decontaminating said filament;

passing said heated and decontaminated filament into a second chamber for metallization also comprising two concentric tubes having an annular space therebetween, the inner tube of which has a series of fine holes therein; wherein said inner tube of said second chamber is heated and said annular space of said second chamber contains a gaseous, thermally decomposable metal compound such that said gaseous metal compound flows through said holes in heated jet streams and impinges upon said heated and decontaminated filament, thereby thermally decomposing said metal compound and metallizing said filament;

disposing an intermediate chamber in alignment with and with ends in sealing relationship with the respective ends of said decontamination and metallization chambers and having a membrane disposed intermediately and transversely thereof;

communicating each said inner tube with its associated section of the intermediate chamber

drawing off gaseous material entering each said section from said inner tubes; and

passing said heated and decontaminated filament through said intermediate chamber and through a pinhole aperture in said membrane prior to said passing through the metallization chamber.

4,097,625

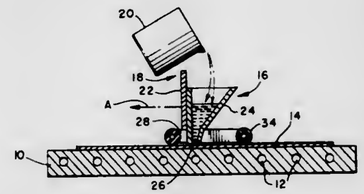
LOW MELTING TEMPERATURE METAL COATING PROCESS, APPARATUS AND PRODUCT

Norman Laurence Lunn, Beaver; Charles Jeffrey McCrea, New Galilee, both of Pa.; Raymond David Pregaman, Norcross, Ga., and Lawrence Edward Turowski, New Kensington, Pa., assignors to St. Joe Minerals Corporation, New York, N.Y.

Continuation of Ser. No. 511,203, Oct. 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 433,523, Jan. 15, 1974, abandoned. This application Jun. 17, 1977, Ser. No. 807,661

Int. Cl.[2] C23C *7/00;* **B44D** *1/44;* **B32B** *35/00;* **B37B** *31/00*

U.S. Cl. 427—360 **6 Claims**



1. A method of mechanically bonding to a non-metallic porous substrate a metal selected from the group consisting of lead or lead-base alloys, zinc or zinc-base alloys, tin or tin-base alloys, cadmium or cadmium-base alloys, and aluminum or aluminum-base alloys, comprising heating said selected metal to its molten state; supporting a non-metallic porous substrate on a heat sink; while supported dispensing in a continuous rectilinear pattern a stream of the molten metal on the supported non-metallic porous substrate to be coated; continuously pressing the dispensed metal while still molten into the substrate and causing said dispensed metal to solidify immediately following the pressing step.

4,097,626

CONSTRUCTION FOR A FIBER REINFORCED SHAFT

Richard Lee Tennent, La Mesa, Calif., assignor to Grafalloy Corporation, El Cajon, Calif.

Filed Jun. 7, 1976, Ser. No. 693,147

Int. Cl.[2] D02G *3/00;* **A63B** *53/10;* **B32B** *5/12*

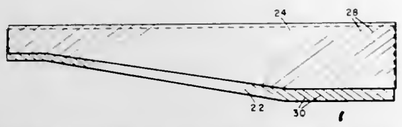
U.S. Cl. 428—36 **6 Claims**

1. A construction for a fiber reinforced generally cylindrical shaft comprising:

a first circumferential section of the thickness of said shaft comprising a plurality of radial plies forming in transverse aspect alternate interleaved wound helicies,

each of said helicies having more than one turn around said shaft,

each of said plies comprising a plurality of parallel reinforcing fibers in matrix material oriented in longitudinal aspect at a ptich angle of inclination to the longitudinal axis of said shaft at substantially 35°,



the fibers in alternate radial plies having pitch angles of opposite inclination, wherein the inner terminus of alternate of said radial plies are substantially diametrically opposite.

4,097,627

DOUBLE FACED TAB FASTENER CHARACTERIZED BY A STRIP OF RELEASE AGENT DESIGNED TO EXTEND PARTLY BEYOND THE WIDTH OF A STRIP OF ADHESIVE

Suzette B. Nemeth, Painesville, and David W. Wilson, Mentor, both of Ohio, assignors to Avery International Corporation, San Marino, Calif.

Filed Nov. 22, 1976, Ser. No. 743,640
Int. Cl.² A41B *13/02;* A61F *13/16;* B32B *7/06, 7/14*
U.S. Cl. 428—40 **3 Claims**

1. A web construction of linerless diaper tab stock made up of initially flat but flexible layers suitable to be formed in long passes along the machine direction of a coating and laminating line and to be self-rolled for storage and shipment, and unrolled for use by diaper manufacturers, and fabricatable completely by web coating and slitting operations and without the necessity for folding or web-to-web fastening operations, and suitable for high speed dispensing on automatic equipment, including a substrate extending, transversely to machine direction, along first and second endward length portions and an intermediate third length portion between the other two, the substrate bearing first adhesive on its top side along the first length portion, the substrate bearing second adhesive on its bottom side along the second length portion, the substrate being free of adhesive on each side along the intermediate third length portion, said first length portion bearing release means on its bottom side for releasably supporting adhesive, corresponding to said first adhesive, that is associated with an adjacent wrap when the web construction is self-wound, said last-named release means extending partially across said intermediate third length portion toward the adhesive on said second length portion but stopping short thereof to define a gap on the bottom of said third length portion which gap bears no release means, said second length portion bearing release means on its top side for releasably supporting said first adhesive when tabs have been formed from said stock and said first length portion is folded back over said second length portion.

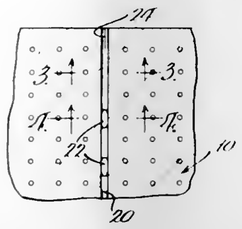
4,097,628

CARPET RUNNER

Albert B. Cheris, Glenview, and Lonnie E. Frye, Elk Grove Village, both of Ill., assignors to Tenex Corporation, Elk Grove Village, Ill.

Filed Dec. 8, 1975, Ser. No. 638,703
Int. Cl.² B65D *65/28*
U.S. Cl. 428—43 **2 Claims**

1. In a carpet runner including an elongated web of flexible, liquid-impervious, plastic material having on one side thereof a plurality of projections for gripping the nap of an underlying carpet, the improvement wherein said web is provided with a plurality of substantially equally spaced, transverse lines of weakening whereby a desired predetermined length of said web may be easily separated from the remainder thereof along a desired one of said lines to provide a carpet runner of a desired length without the use of cutting tools or the like, said lines of weakening being liquid-impervious, said lines of weakening being defined by grooves extending only partially



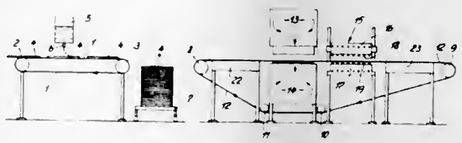
through said web, said grooves including spaced strengthening ribs.

4,097,629

PROCESS AND APPARATUS FOR THE PRODUCTION OF LAMINATED SHEETS

Walter Schneider, 54 Wildenbühlstrasse, Langnau am Albis, Switzerland

Filed Feb. 14, 1977, Ser. No. 768,028
Claims priority, application Switzerland, Feb. 24, 1976, 2223/76
Int. Cl.² B32B *3/00*
U.S. Cl. 428—71 **9 Claims**



1. A process for the production of sandwiched sheets with at least one sheet core of stable shape which is provided on both sides with firmly adhering covering sheets and which consists of a thermally insulating and sound-attenuating material, particularly for the production of doors, cupboards, chests and similar containers as well as of partition walls in buildings, in which both sides of said sheet core are formed of foam plastic and a fusion adhesive is applied to both sides of said sheet core the melting point of said adhesive being below the conversion point of said foam plastic, after which the said sheet core is provided with said covering sheets, and together with these latter, is heated for a short time to the melting point of the fusion adhesive, moulded in the heated state and cooled during the moulding.

4,097,630

FLAME RETARDANT CARPET

Judd Leonard Schwartz, Chester, and Richard Eugene Mayer, Richmond, both of Va., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Sep. 7, 1976, Ser. No. 721,003
The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.
Int. Cl.² B32B *3/02, 33/00*
U.S. Cl. 428—97 **8 Claims**

1. A flame-retardant pile carpet having a relatively pliable primary backing and a tufted surface, said surface being comprised of fibers selected from the group consisting of polyester and polyamide fibers having incorporated therein from 0.1 to 15 percent by weight of zinc oxide, said fibers being bonded to said backing with a bonding substance comprising a latex material selected from the group consisting of vinylidene chloride polymers and vinyl chlorine-vinylidene chloride copolymers, and a hydrate material selected from the group consisting of aluminum hydroxide and hydrated aluminum oxide, the ratio by weight of said latex material to said hydrate material being within the range 1:2 to 1:4.5.

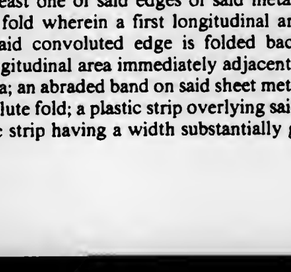
8. In a process for producing a pile carpet having a relatively pliable primary backing through which polyamide fibers are tufted, the improvement which comprises incorporating in said fibers from 1 to 12 percent by weight of zinc oxide, and bonding said fibers to said backing with a bonding substance comprising a latex material selected from the group consisting of vinylidene chloride polymers and vinyl chloride-vinylidene chloride copolymers, and a hydrate material consisting of hydrated aluminum oxide, the ratio by weight of said latex material to said hydrate material being within the range 1:2 to 1:4.5, whereby the carpet has improved flame-retardancy.

4,097,631

SURFACE COVERING WITH INTERWOVEN FABRIC STRIPS

Judy Wilken, 15143 Kennedy Rd., Los Gatos, Calif. 95030

Filed May 23, 1977, Ser. No. 799,890
Int. Cl.² B32B *3/00, 7/14*
U.S. Cl. 428—114 **8 Claims**



1. In a surface covering: a backing sheet forming a base; a plurality of first, flat fabric strips extending along one face of the backing sheet and being in substantially parallel, side-by-side relationship to each other; a number of second flat, side-by-side fabric strips substantially perpendicular to the first strips and interwoven therewith, each of the first and second strips having spaced, first segments contiguous to the base and spaced, second segments in overlying relationship to the first segments of adjacent strips; and means on said one face of said base for bonding said first segments thereto, the widths of certain of the strips being different from the widths of other strips, and the strips being sufficiently flexible to permit the second segments of at least some of the strips to bow outwardly of the adjacent first segments to provide a quilted appearance for the covering when the same covers a surface.

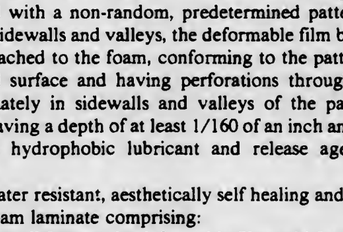
4,097,632

PRODUCT FOR CONSTRUCTING THREE-DIMENSIONAL SIGN CHARACTER

Robert W. Minogue, Cupertino, and Lloyd E. Troyer, San Carlos, both of Calif., assignors to Let-R-Edge of Canada, Ltd., Edmonton, Canada

Division of Ser. No. 379,012, Jul. 13, 1973, Pat. No. 3,937,384, which is a continuation-in-part of Ser. No. 356,983, May 3, 1973, abandoned. This application Sep. 12, 1975, Ser. No. 612,896
Int. Cl.² G09F *7/12*
U.S. Cl. 428—130 **5 Claims**

1. An opaque sheet strip for circumscribing the periphery of a sign character having a plastic face, said sheet strip comprising: an elongate sheet metal strip having first and second side edges, at least one of said edges of said metal strip having a convolute fold wherein a first longitudinal area immediately adjacent said convoluted edge is folded back to contact a second longitudinal area immediately adjacent said first longitudinal area; an abraded band on said sheet metal strip adjacent said convolute fold; a plastic strip overlying said abraded band, said plastic strip having a width substantially greater than the thickness of said plastic face, said plastic strip extending a distance in the plane of said metal strip substantially greater than the thickness of said plastic face, and said plastic strip being suitable for bonding to said plastic face; and a layer of adhesive between said plastic strip and said abraded band for



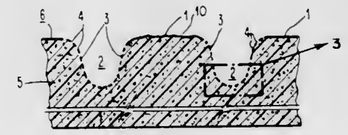
bonding said plastic strip to said abraded band adjacent said convoluted edge, the edge of said plastic strip adjacent said convoluted edge of said metal strip registered with respect to said metal strip to abut said convolute fold but not be mechanically gripped by said convolute fold.

4,097,633

PERFORATED, EMBOSSED FILM TO FOAM LAMINATES HAVING GOOD ACOUSTICAL PROPERTIES AND THE PROCESS FOR FORMING SAID

Bruce E. Focht, Trainer, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Continuation of Ser. No. 583,799, Jun. 4, 1975, abandoned, which is a continuation-in-part of Ser. No. 476,216, Jun. 4, 1974, abandoned. This application Nov. 22, 1976, Ser. No. 743,664
Int. Cl.² B32B *3/24, 5/32;* E04B *1/86;* E04F *13/00;* G10K *11/04*
U.S. Cl. 428—138 **9 Claims**



1. An acoustical film-to-foam laminate comprising an open cell foam and a deformable film, said foam having a surface embossed with a non-random, predetermined pattern having crowns, sidewalls and valleys, the deformable film being adhesively attached to the foam, conforming to the pattern on the embossed surface and having perforations through the film predominately in sidewalls and valleys of the pattern, said valleys having a depth of at least 1/160 of an inch and said film having a hydrophobic lubricant and release agent coated thereon.

6. A water resistant, aesthetically self healing and acoustical film-to-foam laminate comprising:

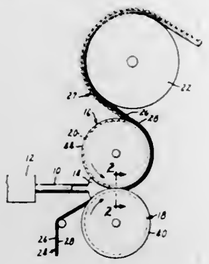
an open cell foam and a deformable film, said foam having a surface embossed with a non-random, predetermined pattern having crowns, sidewalls and valleys, the deformable film being adhesively attached to the foam, conforming to the pattern on the embossed surface and having perforations through the film predominately in the sidewalls and valleys of the pattern, said perforations being sufficient in number to provide a porosity of the laminate of from about 3 cubic feet per minute per square foot to about 100 cubic feet per minute per square foot, and said film having a coating of a hydrophobic lubricating and release agent.

4,097,634

THERMOPLASTIC RESIN MOLDING OF COMPLEX DECORATIVE RELIEF

Eugene H. Bergh, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 19, 1976, Ser. No. 678,363
Int. Cl.² B32B *3/02*
U.S. Cl. 428—156 **9 Claims**



1. Process for forming essentially continuous thermoplastic resin molding on a continuously rotating forming wheel having a complex intaglio in its circumferential surface and doctor means providing an orifice tangential to the forming wheel and a pair of interstices at the sides of the orifice comprising the steps of

(1) heating the thermoplastic resin to a molten state,

(2) providing a bank of the molten resin in contact with the forming wheel at the leading edge of the orifice sufficient to fill the intaglio as the forming wheel rotates and to flow through said interstices to provide a pair of resin flashes,

(3) cooling the resin deposited in the intaglio while the forming wheel continues to rotate until the resin develops tenacity at least at its surface contacting the intaglio, and

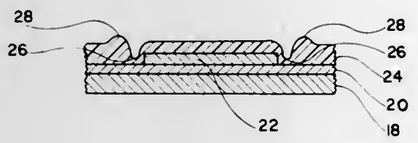
(4) continuously removing from the intaglio a cooled resin molding which has complex decorative relief and yet is essentially free from external defects and internal strains.

4,097,635

DECORATIVE PANEL

José Antonio Sanz Hernández, and Cassiano Mesquita Netto, both of Salto, Brazil, assignors to Eucatex, S.A., Sao Paulo, Brazil

Filed Dec. 27, 1976, Ser. No. 755,545
Int. Cl.² B32B *3/02, 3/10, 9/04*
U.S. Cl. 428—172 **4 Claims**



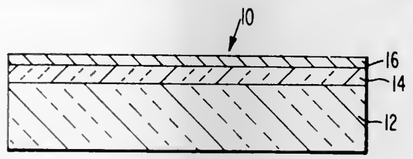
1. In a decorative panel comprising a pigmented base coated substrate, a silicone containing printing ink forming a pattern on a portion of said substrate and a top coat material covering said pattern and the remaining portion of said substrate, the improvement comprising said printing ink containing at least 5 weight percent silicone, said top coat material containing an effective amount of silicone, and said silicone in said printing ink and said silicone in said top coat material being such as to produce a depression at the printing ink-top coat interface adjacent the periphery of the pattern formed from said printing ink and an elevation immediately outwardly of the said depression so as to produce a three-dimensional effect, with the level of the top coat material over the remainder of said pattern being substantially the same level as the remainder of said panel wherein the remainder of said pattern and the remainder of said panel are smooth and essentially free of separate islands of said top coat material.

4,097,636

METALLIZED DEVICE

Frank Zygmunt Hawrylo, Trenton, and Henry Kressel, Elizabeth, both of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 490,792, Jul. 22, 1974, Pat. No. 3,945,902. This application Jun. 18, 1975, Ser. No. 588,025
Int. Cl.² B32B *15/04*
U.S. Cl. 428—209 **2 Claims**



1. A metallized diamond device comprising:

a body of diamond material of silicon or aluminum having a thickness of 400 to 500A having a layer consisting essentially of an oxide material on a surface thereof, and a metallic layer on said oxide layer.

4,097,637

LATENT IMAGING MASTER

Adrian M. Loria, Evanston, and Richard E. Thomas, Chicago, both of Ill., assignors to A. B. Dick Company, Niles, Ill.

Filed Mar. 29, 1976, Ser. No. 671,137
Int. Cl.² B32B *5/16, 7/02;* B41M *5/04*
U.S. Cl. 428—212 **12 Claims**

1. A master for producing multiple latent imaged copies comprising a base sheet and multiple coatings on the surface of the base sheet including a base coat containing a water and/or alcohol soluble colorless color-forming component and at least two electrically conductive coatings overlying the base coat containing electrically conductive particles arranged to provide an electrical gradient of increasing conductivity in the direction towards the base coat.

4,097,638

SELECTIVELY SORPTIVE REINFORCED SHEET

Otis R. Videen, St. Paul, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Dec. 20, 1976, Ser. No. 752,528
Int. Cl.² B01D *39/18*
U.S. Cl. 428—213 **6 Claims**

1. A wipe sheet for selectively sorbing at least one hydrocarbon liquid from an aqueous-hydrocarbon mixture, said wipe sheet comprising:

(a) at least two cotton fiber layers, each said cotton fiber layer being non-woven and being predominately composed of cotton fibers together with a minor amount of polymeric fibers preferentially sorptive of hydrocarbon liquids over water, said cotton fibers having an average length of at least about one-half inch and having been sized with at least one oleophillic, hydrophobic agent, and each said cotton fiber layer being from about 1/64 inch to about ⅛ inch in thickness and having a density of from about 2 to 10 pounds per cubic foot;

(b) a flexible net reinforcing layer, said reinforcing layer being composed of a polyolefin and having been biaxially oriented after extrusion to at least 5 times its extruded dimension and said reinforcing layer having a weight of from about ½ to about 3 pounds per thousand square feet;

(c) said cotton fiber layers being affixed together with said reinforcing layer sandwiched therebetween.

4,097,639

FLAMBOYANT FINISH AND PROCESS FOR APPLYING SAME

John M. Millar, Joppa, Md., assignor to Beatrice Foods Co., Chicago, Ill.

Filed Nov. 24, 1976, Ser. No. 744,763
Int. Cl.² B05D *1/38, 5/06, 7/14;* B32B *15/08*
U.S. Cl. 428—215 **33 Claims**

1. A method of applying a coating having good depth appearance to an electrically conductive substrate, said method comprising

applying to said substrate a coating at least ½ mil thick of a first coating composition consisting essentially of at least one substantially clear thermosetting film-forming polymer, a catalytic amount of at least one blocked catalyst for said polymer, wherein said catalyst unblocks at a temperature at least 5° F above the melting temperature of said thermosetting polymer, and a pigmenting amount of at least one bright reflective leafing flake pigment,

heating the first coating composition on said substrate to a first temperature below the catalyst unblocking temperature and above the polymer melting temperature to permit the flake pigments to substantially become oriented parallel to the surface of said composition away from said substrate, and thereafter gelling or curing said polymer by heating said first coating composition to a higher second temperature which is above the catalyst unblocking temperature while maintaining the flake pigments substantially in said oriented position, to produce a gelled or cured first coating having a bright reflective appearance,

and thereafter coating the first coating with a second coating at least one half mil thick of a transparent second coating composition consisting essentially of at least one at least substantially clear film-forming second polymer and a tinctorial amount which is at least about 0.1% by weight, based on the weight of said second coating composition, of at least one coloring agent which is substantially soluble in said second polymer and heat stable at the curing or fusing temperatures of said second polymer,

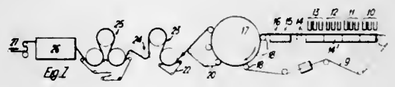
and thereafter curing or fusing said second polymer to form an integral film thereof.

4,097,640

PRODUCTION OF FIBROUS SHEET MATERIAL

Harold George Curry, Hambrook, near Bristol; Brian William Attwood, Hanham, near Bristol; Derek Graham Walter White, Bristol, all of England; John Mosgaard Christensen, Risskov, and Karl Kristian Kobs Kroyer, Viby J, both of Denmark, assignors to Karl Kroyer St. Anne's Limited, Bristol, England

Continuation of Ser. No. 534,240, Dec. 19, 1974, abandoned, which is a division of Ser. No. 375,094, Jun. 29, 1973, abandoned. This application Dec. 16, 1976, Ser. No. 751,038
Claims priority, application United Kingdom, Jul. 8, 1972, 32098/72
Int. Cl.² B32B *29/00;* B65D *5/00*
U.S. Cl. 428—219 **7 Claims**



1. Foldable boxboard made by a dry-laying process, consisting essentially of cellulosic fibers and from 1 to 10% by weight of starch and having the following characteristics:

(a) a weight of at least 210 g.s.m.;

(b) a stiffness in the machine direction of at least 5.8 Kenley units; and

(c) a ratio of stiffness in the machine direction and in the cross-machine direction of substantially 1:1.

4,097,641

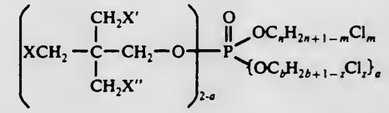
FLAME RETARDANT FINISHES FOR TEXTILE MATERIALS

Ray E. Smith, and James A. Albright, both of Ann Arbor, Mich., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 660,520, Mar. 22, 1976, Pat. No. 4,015,037, and Ser. No. 660,500, Feb. 23, 1976. This application Dec. 9, 1976, Ser. No. 748,957
Int. Cl.² C09D *1/00*
U.S. Cl. 428—245 **45 Claims**

1. A flame retardant textile finish consisting essentially of:

(i) from about 2 to about 60 percent (by weight) of a flame retardant compound of the formula



wherein X,X′ and X″ are hydrogen, chlorine and bromine; *a* is 0 or 1; *n* is an integer of from 1 to 7; *m* is an integer of from 1 to *n; b* is an integer of from 1 to 7; and *z* is an integer of from 1 to *b;*

(ii) from about 2 to about 18 percent (by weight) of an emulsifying agent;

(iii) from about 2.6 to about 97.4 percent (by weight) of water; and

(iv) from about 0.4 to about 48 percent of an organic solvent.

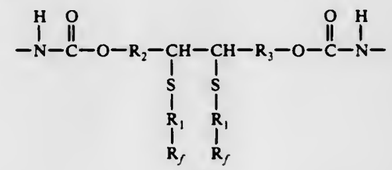
4,097,642

FABRIC COATED WITH RF-GLYCOLS CONTAINING TWO PERFLUOROALKYLTHIO GROUPS

Robert Ernest Arthur Dear, Mt. Kisco, and Robert Allan Falk, New City, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 631,004, Nov. 12, 1975, Pat. No. 4,054,592, which is a continuation-in-part of Ser. No. 439,497, Feb. 4, 1974, Pat. No. 3,935,277. This application May 19, 1977, Ser. No. 798,285
Int. Cl.² C07C *125/06*
U.S. Cl. 428—262 **5 Claims**

1. A textile substrate bearing from 0.01 to 10% by weight of a urethane composition which contains at least one unit of formula



where

R_f is perfluoroalkyl of 1 to 18 carbon atoms or said perfluoroalkyl substituted by perfluoroalkoxy of 2 to 6 carbon atoms,

R_1 is branched or straight chain alkylene of 1 to 12 carbon atoms, alkylenethioalkylene of 2 to 12 carbon atoms, alkyleneoxyalkylene of 2 to 12 carbon atoms, or alkyleneiminoalkylene of 2 to 12 carbon atoms where the nitrogen atom contains as a third substituent, hydrogen or alkyl of 1 to 6 carbon atoms,

R_2 and R_3 each independently is straight or branched chain

alkylene of 1 to 12 carbon atoms; straight or branched chain alkylene of 1 to 12 carbon atoms substituted by one or two of phenyl or cyclohexyl; of $R_2$and $R_3$are a group of the formula
$C_mH_{2m}(OC_kH_{2k})r$

where
m is an integer from 1 to 12,
k is an integer from 2 to 6,
r is an integer from 1 to 40.

4,097,643

COMPOSITIONS COMPRISING (1) A COPOLYMER FORMED FROM AN UNSATURATED ACID AND (2) AN EPOXY GROUP-CONTAINING SILANE ARE USEFUL TEXTILE AND PAPER FINISHING MATERIALS

Yoshiyuki Hasegawa, Ichihara, Japan, assignor to Toray Silicone Company, Ltd., Tokyo, Japan

Filed Jan. 7, 1977, Ser. No. 757,707
Claims priority, application Japan, Feb. 5, 1976, 51-10830
Int. Cl.² D06M *15/38*
U.S. Cl. 428—270 **7 Claims**

1. An improved resin for resin finishing textiles, fibers and paper which is a composition of matter which consists essentially of (A) copolymeric organic resins which are prepared from unsaturated aliphatic organic acids and an ester selected from the group consisting of (i) acrylic acid esters and (ii) methacrylic acid esters,

the improvement comprising the addition of (B) 0.1–10 weight percent, based on the weight of the components (A) and (B), of a silane which contains epoxy groups.

7. A textile when treated with the composition of claim **4** wherein the textile is selected from a group consisting of cotton, linen, rayon, wool, nylon and polyester.

4,097,644

INORGANIC RAW FELT INTENDED FOR THE PRODUCTION OF ROOF FELT

Harald Thiis Evensen, Porsgrunn, and Ola Tellesbo, Heistad, both of Norway, assignors to Isola Fabrikker A/S, Brevik, Norway

Continuation of Ser. No. 256,427, May 25, 1972, abandoned. This application Aug. 5, 1975, Ser. No. 602,001
Claims priority, application Norway, May 26, 1971, 711988
Int. Cl.² D04H *1/08;* C08K *7/14*
U.S. Cl. 428—281 **8 Claims**

1. A raw felt possessing improved strength, flexibility and bulk, for use in producing an asphalted roofing covering, said raw felt comprising an adhesively bonded porous non-woven sheet of an inorganic fibrous material selected from the group consisting of glass fibers, asbestos fibers and mixtures thereof, and 0.5 – 50% by weight, based on the total weight of the raw felt, of finely divided vulcanized rubber particles distributed with said fibrous material.

4,097,645

SYNTHETIC PAPER HAVING GOOD INK ADHESION THERETO

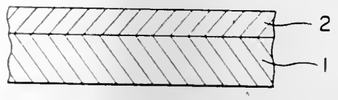
Takashi Toyoda; Yoshio Miyabe, and Masaaki Yamanaka, all of Ibaraki, Japan, assignors to Oji Yuka Goseishi Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1977, Ser. No. 844,482
Claims priority, application Japan, Oct. 22, 1976, 51-126941
Int. Cl.² B32B *3/26, 5/25*
U.S. Cl. 428—306 **13 Claims**

1. A synthetic paper having good ink adhesion thereto which comprised:

A. a synthetic paper substrate comprising a papery layer which is a stretched resin film which contains fine filler particles dispersed therein and has microvoids dispersed therein and surface ruptures thereon; and

B. a layer for improving ink adhesion to the synthetic paper which is provided on at least one surface of the papery



layer and comprises, as an essential constituent, an ethyleneimine adduct of a polyaminepolyamide.

4,097,646

ELECTROSTATIC RECORDING MATERIAL HAVING A DIELECTRIC COPOLYMER COATED LAYER

Makoto Kitahara; Shozo Ishikawa; Kazuharu Katagiri; Tetsuo Arita, and Shoji Masubuchi, all of Tokyo, Japan, assignors to Copyer Co., Ltd., Tokyo, Japan

Filed Aug. 18, 1975, Ser. No. 605,380
Claims priority, application Japan, Aug. 22, 1974, 49-96374; Oct. 11, 1974, 49-116114
Int. Cl.² B32B *5/16*
U.S. Cl. 428—323 **10 Claims**

1. An electrostatic recording material comprising a support having on one surface thereof a dielectric layer, which comprises a free carboxylic acid group containing copolymer of (1) about 15 to 70 mol% of methacrylic acid and (2) about 85 to 30 mol% of (a) a methacrylate having at least 6 carbon atoms or (b) an acrylate having at least 7 carbon atoms, said copolymer being water-soluble or water-emulsifiable and up to 10% of said carboxylic acid groups being in the form of an ammonium or amine salt thereof.

4,097,647

LITHOGRAPHIC PRINTING PLATE

Michael J. Shaw, Kalamazoo, Mich., assignor to Allied Paper Incorporated, Kalamazoo, Mich.

Filed Nov. 24, 1975, Ser. No. 634,900
Int. Cl.² B41C *1/10;* B41N *1/08;* B32B *13/08*
U.S. Cl. 428—325 **13 Claims**

1. A lithographic printing plate having a lithographic printing surface thereon capable of receiving an ink receptive image comprising a coating in the amount of about 1 to 10 pounds per ream consisting essentially of a fine particle size pigment and a hydrophilic cross-linked cationic resinous binder.

6. A method of making a lithographic printing plate having a lithographic printing surface thereon capable of receiving an ink receptive image comprising preparing an aqueous coating composition consisting essentially of a water-soluble hydrophilic cross-linkable cationic resinous binder and a fine particle size pigment, applying said composition to a paper base in the amount of about 1 to 10 pounds per ream, and drying the composition on said base.

11. A lithographic printing plate having a lithographic printing surface thereon capable of receiving an ink receptive image comprising

a paper base;

a coating on said paper base in the amount of about 1 to 10 pounds per ream consisting essentially of a non-flocculating fine particle size pigment and a hydrophilic cross-linked cationic resinous binder, said pigment and binder being present in the proportions of about 50–90 parts by weight pigment and about 10–50 parts by weight binder; and

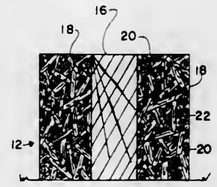
said binder being the product of self-crosslinking or cross-linking with about 0.1 to about 10 parts by weight extraneous cross-linker per part of binder.

4,097,648

LAMINATED STRUCTURAL MEMBER AND METHOD OF MAKING SAME

John Philip Pringle, Allen, Tex., assignor to Capital Wire & Cable, Division of U.S. Industries, Inc., Plano, Tex.

Division of Ser. No. 548,731, Feb. 10, 1975, Pat. No. 4,016,232, which is a continuation-in-part of Ser. No. 466,242, May 2, 1974, Pat. No. 3,956,541. This application Aug. 16, 1976, Ser. No. 714,628
Int. Cl.² B32B *5/16;* B65D *71/00*
U.S. Cl. 428—326 **7 Claims**



1. A flexible laminated structural member which comprises in combination:

(a) a first layer comprising:

1. from about 30 to about 60 weight percent of a scrap particulate thermoplastic material wherein at least 50 percent of the particles have a particle dimension of from about 1/16 inch to about ¼ inch;
2. from about 70 to about 40 weight percent of a particulate wood filler material;
3. from about 11 to about 18 weight percent of a thermosetting binder, said weight percent based upon the total weight of the particulate thermoplastic material and particulate wood filler material; and

(b) a second layer comprising a sheet material of plywood, fiberboard or the like.

4,097,649

RESIN-IMPREGNATED SELF-ADHERING OR HEAT-SEALABLE PAPERS AND METHOD OF MAKING

Helmut Neumann, Goddelau, Germany, assignor to Röhm GmbH, Darmstadt, Germany

Filed Nov. 10, 1975, Ser. No. 630,328
Claims priority, application Germany, Nov. 16, 1974, 2454496
Int. Cl.² C09J *7/04*
U.S. Cl. 428—327 **8 Claims**

1. A method for making a synthetic resin-impregnated self-adhering or heat-sealable paper which comprises saturating an absorbent paper with an aqueous dispersion of a self-cross-linking synthetic resin, in which dispersion the resin particles have an average particle size of less than 2 microns, and, without drying, applying an aqueous suspension of a thermoplastic resin, in which suspension the resin particles have an average particle size of over 20 microns, to that side of the paper which is to be self-adhering or heat-sealable, and then drying said paper.

4,097,650

MAGNETIC RECORDING MEDIUM

Ryuji Shirahata; Tatsuji Kitamoto; Masaaki Suzuki, and Shinichiro Dezawa, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Aug. 24, 1976, Ser. No. 717,323
Claims priority, application Japan, Aug. 28, 1975, 50-103481
Int. Cl.² B32B *15/04;* G11B *5/74*
U.S. Cl. 428—336 **11 Claims**

1. A non-binder type magnetic recording medium for use in recording at a relative speed, *v*, to a magnetic reproducing head, comprising a ferromagnetic metal thin film as a magnetic recording layer on a non-magnetic flexible support, in which the surface roughness of the support is between 0.04 and 0.08 μm and the period of the surface roughness is at most $v/10^6$ μm where *v* is the relative speed between the magnetic head and the magnetic recording medium in μm/sec.

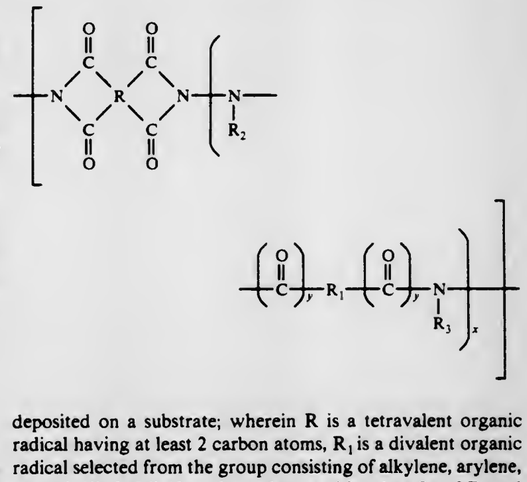
4,097,651

SUBSTRATES COATED WITH END AND INTERMEDIATE REACTION PRODUCTS OF A DIANHYDRIDE AND A HYDRAZINE OR HYDRAZIDE

Karl F. Schimmel, Verona, and Marco Wismer, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 628,612, Nov. 4, 1975, which is a division of Ser. No. 511,322, Oct. 2, 1974, Pat. No. 4,020,050, which is a division of Ser. No. 369,628, Jun. 13, 1973, abandoned. This application Nov. 16, 1976, Ser. No. 742,306
Int. Cl.² B32B *27/04, 27/12, 27/34;* H01B *3/18*
U.S. Cl. 428—375 **14 Claims**

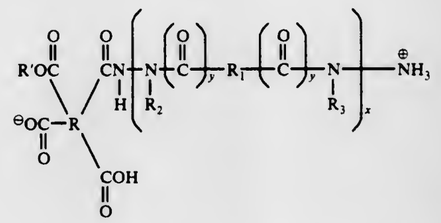
1. An article of manufacture comprising a polymer consisting essentially of the repeating structural formula:



deposited on a substrate; wherein R is a tetravalent organic radical having at least 2 carbon atoms, R_1 is a divalent organic radical selected from the group consisting of alkylene, arylene, or cycloalkyl radicals and x and y are either 1 or 0 and R_2 and R_3 are hydrogen or monovalent alkyl, aryl, aralkyl, or cycloalkyl radicals.

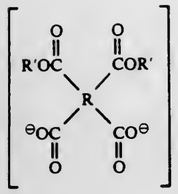
3. The article of claim **1** wherein said substrate is fibrous.

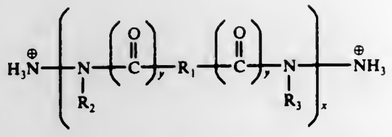
7. An article of manufacture comprising a polysalt coated on a metal substrate wherein said polysalt has therein a moiety of the structural formula:



wherein R is a tetravalent organic radical having at least two carbon atoms, R' is an aliphatic or cycloaliphatic, monofunctional alkyl radical, R_1 is a divalent organic radical selected from the group consisting essentially of alkylene, arylene, and heterocyclic radicals; R_2 and R_3 are hydrogen or monovalent alkyl, aryl, aralkyl, or cycloalkyl radicals and *x* and *y* are either 1 or 0.

11. An article of manufacture comprising a polysalt coated on a metal substrate wherein said polysalt has therein a moiety of the structural formula:





wherein R is a tetravalent organic radical having at least two carbon atoms, R' is an aliphatic or cycloaliphatic monofunctional alkyl radical having 1 to 20 carbon atoms, R_1 is a divalent organic radical selected from the group consisting essentially of alkylene, arylene, and heterocyclic, radicals, R_2 and R_3 are hydrogen or monovalent alkyl, aralkyl, or cycloalkyl radicals and *x* and *y* are either 1 or 0.

4,097,652

POLY (ETHYLENE OXIDE) MONOFILAMENT

Richard Joseph Hartigan, Jr., Delmar, N.Y., assignor to Albany International Corp., Albany, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,666
Int. Cl.[2] D01D *5/10*
U.S. Cl. 428—401 **3 Claims**

1. A monofilament of a poly (ethylene oxide) homopolymer having a molecular weight within the range of from 400,000 to 900,000, said monofilament being characterized by a diameter of from 5 to 15 mils and a tenacity of at least 3.0 gms./denier.

4,097,653

COBALT BORIDE CONDUCTOR COMPOSITIONS

Frank Knowles Patterson, Wilmington, and Joseph Richard Rellick, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 7, 1977, Ser. No. 775,275
Int. Cl.[2] H01B *1/06*
U.S. Cl. 428—433 **19 Claims**

1. Conductor compositions of finely divided inorganic powder dispersed in an inert liquid vehicle, the inorganic powder consisting essentially of 50–100 wt.% Co_xB_y wherein

x is in the approximate range 50–75,

y is in the approximate range 25–50, and

x and y total 100 and are atomic ratios, and 0–50 wt.% inorganic binder.

4,097,654

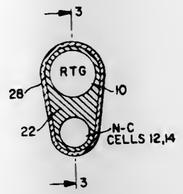
THERMAL SHUNT FOR RADIOISOTOPE THERMOELECTRIC GENERATOR-CHEMICAL BATTERY HYBRID CONFIGURATION

Guido Eddardo Guazzoni, Wayside, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 14, 1977, Ser. No. 787,413
Int. Cl.[2] H01M *14/00*
U.S. Cl. 429—5 **5 Claims**

1. An assembly including a holder and a plurality of electrical energy sources in said holder for supplying a load, said sources having different thermal characteristics comprising:

a block of thermally conductive material having a first cavity accommodating a radioisotope thermal electric generator having a first thermal characteristic and a second cavity accommodating a chemical battery having a second thermal characteristic, said cavities being surrounded by said block, and a layer of thermal insulation disposed on and surrounding said block, said insulation layer trapping heat therein and said block directing heat between



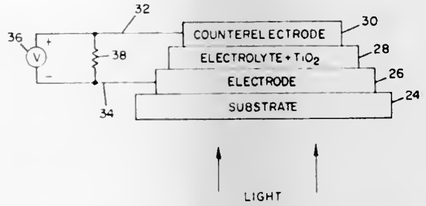
said different sources having said different thermal characteristics.

4,097,655

PHOTOGALVANIC CELL USING A TRANSPARENT CONDUCTING ELECTRODE

Horst Witzke, Princeton, N.J., assignor to Optel Corporation, Princeton, N.J. and Grumman Aerospace Corporation, Bethpage, N.Y., part interest to each

Filed Jul. 16, 1976, Ser. No. 706,078
Int. Cl.[2] H01M *6/30, 6/36*
U.S. Cl. 429—111 **7 Claims**



1. A photogalvanic cell comprising a light passing substrate;

a light transmissive electrode supported by the substrate;

a counterelectrode located in spaced registry from the electrode;

semi-solid electrolyte means containing titanium dioxide positioned between the electrode and the counterelectrode for cooperating therewith to convert impinging light energy to electrical energy and for retaining electrical charge after removal of light.

4,097,656

PROCESS FOR IMPARTING ANTISTATIC PROPERTIES TO PLASTICS

Franz-Josef Dany, Erftstadt; Gerhard Mietens, Efferen, and Erich Schallus, Koln-Klettenberg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 7, 1976, Ser. No. 674,573
Claims priority, application Germany, Apr. 10, 1975, 2515632
Int. Cl.[2] C08K *3/04*
U.S. Cl. 526—1 **5 Claims**

1. In the process for imparting antistatic properties to plastics by blending a pulverulent plastics material with conductive carbon black and making the resulting blend into a moulding composition, the carbon black having been made by subjecting hydrocarbons, which are liquid at room temperature, to thermal conversion at 1000° to 2000° C, under pressures within the range 1 to 80 atmospheres absolute, and in the presence of oxygen or an oxygen-containing gas, scrubbing the resulting carbon black-containing gas with water and separating the carbon black from the aqueous phase, the improvement which comprises intimately blending the aqueous, carbon black-containing phase with vaporizable liquid aliphatic or cycloaliphatic hydrocarbons at temperatures within the range 50° and 120° C, under pressures within the range 1 and 20 atmospheres absolute, at a pH-value of 7 to 10, and for a period of 1 to 20 minutes, separating liquid matter from the carbon black and then heating and thereby freeing it from hydrocarbons and water, annealing the carbon black for 20 to 30 minutes at 200° up to 2200° C and blending the carbon black having a water absorption stiffness (AS-number) of 15 to 35, a specific electric resistance of 10^{-1} up to 10^{-3} ohms · cm under a moulding pressure of 100 to 180 atmospheres absolute, a bulk density of 100 to 180 g/liter, and a BET-surface area of 100 to 1000 m^2/g with pulverulent plastics material in an amount of about 4 to 12 weight %.

4,097,657

SURFACE-TREATED SOFT CONTACT LENSES

Charles L. Sieglaff, Mentor; Charles J. Hora, Willoughby Hills, and Joseph P. Tiefenbach, Mentor, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Apr. 7, 1976, Ser. No. 674,448
Int. Cl.[2] C08F *8/32, 8/34*
U.S. Cl. 526—30 **8 Claims**

1. A process for producing a soft contact lens resistant to the diffusion and accumulation therein of substances which will promote its clouding and discoloration in use which comprises treating a soft contact lens acrylic ester hydrogel with a compound selected from the group consisting of aliphatic dithiols and aliphatic amines, each of said compounds containing at least one functional group reactive with the polar functional groups in said acrylic ester hydrogel, the treatment being conducted for a sufficient period of time to structurally modify at least a major portion of polymer molecules on the outer surfaces of the hydrogel by incorporating therein the modifying compound through its functional groups.

4,097,658

PROCESS FOR PREPARING COPOLYMERS OF ELASTOMERIC PROPERTIES FROM OLEFINIC MONOMERS

Artur Simon; Gyula Sarosi; Balazs Keszler; Attila Toth, and Maria Rethy, all of Budapest, Hungary, assignors to Muanyagipari Kutato Intezet, Budapest, Hungary

Filed Aug. 16, 1976, Ser. No. 714,655
Claims priority, application Hungary, Aug. 19, 1975, MU 542
Int. Cl.[2] C08F *4/16*
U.S. Cl. 526—143 **2 Claims**

1. A process for preparing copolymers of elastomeric properties by the polymerization of olefinic monomers with catalysts of hiethyl aluminum and titanium tetrachloride modified by phosgene or acetyl chloride, in a medium of hydrocarbons or chlorinated hydrocarbons, followed by the prcipitation of the obtained polymer with a C_{1-5} alcohol containing an antiageing agent, characterized by using as an olefinic monomer a mixture of isobutylene and butadiene in which the amount of butadiene is between 30% and 95%, the said mixture containing, if desired, at most 20% by weight of butene-1 and/or butene-2, related to the total amount of monomers.

4,097,659

PROCESS OF POLYMERIZING α-OLEFINS IN THE LIQUID PHASE

Henricus M. J. C. Creemers, Geleen; Renier J. L. Graff, Beek(L), and Hendrinus M. Verschoor, Geleen, all of Netherlands, assignors to Stamicarbon, N.V., Geleen, Netherlands

Continuation of Ser. No. 463,432, Apr. 23, 1974, abandoned, which is a continuation of Ser. No. 232,522, Mar. 7, 1972, abandoned. This application Apr. 15, 1976, Ser. No. 677,063
Claims priority, application Netherlands, Mar. 11, 1971, 7103232
Int. Cl.[2] C08F *4/66, 10/00*
U.S. Cl. 526—151 **26 Claims**

1. In a process for suspension polymerizing at least one α-olefin in the liquid phase at a temperature of about 20° to 100° C. in the presence of a catalytic amount of a Ziegler-type catalyst, the improvement comprising using a catalyst prepared by reacting

(1) a solution of an ether-free inert hydrocarbon solvent in which is dissolved at least one organomagnesium compound of the formula

$$MgR'_2$$

wherein each R' is independently a hydrocarbyl group of 1 – 30 carbon atoms selected from the group consisting of alkyl, aryl, cycloalkyl, aralkyl, alkaryl and alkenyl,

wherein said MgR'_2 is solubilized in said ether-free inert hydrocarbon solvent by treating said MgR'_2 with an amount of $R''_mAlX'_n$ which is effective to cause the dissolution of said MgR'_2, m being an integer of 1 to 3 and n being an integer of 0 – 2, wherein R'' is alkyl, cycloalkyl, aralkyl, aryl or alkaryl of 1 – 25 carbon atoms and X' is halogen or alkoxy of 1 – 25 carbon atoms;

with (2) at least one aluminum halogen compound of the formula

$$R_mAlX_{3-m}$$

wherein each R independently represents a hydrocarbyl group of 1 – 30 carbon atoms selected from the group consisting of alkyl, aryl, cycloalkyl, aralkyl, alkaryl, alkenyl and alkadienyl, each X independently represents halogen, and m is a value of less than 3,

wherein the molar ratio of X:magnesium is at least 0.01,

to form a reaction product in the form of a precipitate,

and thereafter mixing the resulting reaction product with at least one transition metal compound of a metal of Groups IV-B, V-B and VI-B of the Periodic Table, which transition metal is substantially in the state of maximum valency, the said transition metal compound selected from the group consisting of halides, alkoxides of 1 – 20 carbon atoms, and mixtures thereof, to reduce said transition metal compound,

and thereafter activating the resulting reduced catalyst system with an activating amount of at least one organo-aluminum compound, said organo-aluminum compound selected from the group consisting of aluminum trialkyls, alkyl aluminum halides, alkyl aluminum hydrides and corresponding compounds wherein one or more alkyl radicals are replaced by alkenyl radicals or alkadienyl radicals, and mixtures thereof, said alkyl radicals and said alkenyl or alkadienyl radicals having 1 – 20 carbon atoms.

4,097,660

HETEROGENEOUS ANIONIC POLYMERIZATION PROCESS

Ilia Rashkov, Sofia, Bulgaria; Jean Golé, Thurins, France; Daniel Guérard, Malzeville, France; Albert Herold, Laxou, France; Gérard Merle, Oullins, France; Ivan Martinov Panayotov, Sofia, Bulgaria; Jean-Pierre Pascault, Villeurbanne, France; Quang Tho Pham, Caluire, France; Christian Pillot, Caluire, France, and Robert Salle, Lyons, France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Division of Ser. No. 695,837, Jun. 14, 1976, Pat. No. 4,035,562. This application May 4, 1977, Ser. No. 793,551
Claims priority, application Bulgaria, Jun. 14, 1975, 30292
Int. Cl.[2] C08F *4/02, 4/08, 36/06, 36/08*
U.S. Cl. 526—173 **5 Claims**

1. A heterogeneous anionic polymerization process, wherein a reaction medium is formed and comprises firstly at least one monomer having a conjugated diene structure, secondly at least one catalyst comprising a carbon with a graphitic structure and at least one element inserted in the latter, that is lithium, and thirdly at least a solvent chosen from the following hydrocarbon solvents, a saturated aliphatic solvant with a

straight or branched chain, and a saturated alicyclic solvant, in which the monomer is dissolved and in which the catalyst is in suspension.

4,097,661

PROCESS FOR PRODUCING CONJUGATED DIOLEFINIC POLYMERS

Koei Komatsu, Yokkaichi; Kenji Itoyama, Ichihara; Jun Hirota, Ichihara, and Akio Nishijima, Ichihara, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and Denki Kagaku Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Apr. 18, 1977, Ser. No. 788,351
Claims priority, application Japan, Apr. 19, 1976, 51-43707
Int. Cl.[2] C08F *4/46, 4/56*
U.S. Cl. 526—175 **21 Claims**

1. A process for producing a conjugated diolefinic polymer by polymerizing at least one conjugated diolefin or copolymerizing at least one conjugated diolefin with at least one vinyl aromatic hydrocarbon in a hydrocarbon solvent in the presence of an alfin catalyst and at least one molecular weight regulator selected from the group consisting of (A) unsaturated halohydrocarbons represented by the general formula, RCX = CYZ, wherein R represents hydrogen, an alkyl group having 1 to 7 carbon atoms, a vinyl group, a phenyl group, a substituted phenyl group, or a halogen atom and X, Y, and Z represent independently hydrogen or a halogen atom, at least one of said R, X, Y, and Z being a halogen atom, (B) halogenated aromatic compounds, (C) ethers, polyethers, and acetals, and (D) tertiary amines, and, if necessary, a dihydro aromatic compound, characterized in that said polymerization or copolymerization is effected in the presence of 0.03 to 0.9 mole of water, an alcohol of the formula, R-OH, where R is a saturated or unsaturated aliphatic or alicyclic group having 1 to 20 carbon atoms, or a mixture of water and the alcohol, per mole of organosodium contained in said alfin catalyst.

4,097,662

CO-POLYMERS OF BUTADIENE AND CARBORANYL METHACRYLATE

Chester W. Huskins, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 29, 1976, Ser. No. 736,806
The portion of the term of this patent subsequent to Oct. 21, 1992, has been disclaimed.
Int. Cl.[2] C08F *2/24, 4/04, 30/06, 230/06*
U.S. Cl. 526—217 **3 Claims**

1. A method of making a co-polymer having a controlled molecular weight and a relatively low viscosity, said co-polymer consisting in a weight percent range of the monomers carboranyl methacrylate from about 20 to about 90 weight percent and butadiene from about 10 to about 80 weight percent, said method employing an emulsion polymerization process comprising the steps of:

(a) combining said monomers in said weight percent range together in an aqueous mixture containing a weight percent of the total weight of the two monomers, a polymerization initiator of azo-bis-isobutyronitrile up to about 2 weight percent, a chain terminating agent of dodecylmercaptan up to about 10 weight percent to control the molecular weight of said co-polymer by employing a higher weight percent of said dodecylmercaptan when a lower molecular weight co-polymer is made and by employing a lower weight percent of said dodecylmercaptan when a higher molecular co-polymer is made, and an emulsifier of benzylcetyldimethylammonium chloride up to about 10 weight percent;

(b) reacting said aqueous mixture with agitation for a period of time to form said co-polymer;

(c) separating from said mixture said co-polymer thus formed by said reaction by pouring the mixture into a container, acidifying with hydrochloric acid, adding sufficient tetrahydrofuran to separate said co-polymer from the mixture to the tetrahydrofuran, separating said co-polymer contained in said tetrahydrofuran from said mixture, and removing said tetrahydrofuran from said co-polymer which after drying is obtained in a yield approaching 100% as calculated on the basis of the weight of the ingredients used and the weight of said co-polymer recovered.

4,097,663

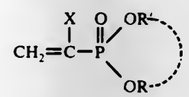
LOW FUSION COPOLYMER COMPRISING VINYL CHLORIDE, VINYL ACETATE, AND BIS(HYDROCARBYL)VINYLPHOSPHONATE

Ruth E. Gallagher, Dobbs Ferry, and Jagadish C. Goswami, New City, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Jan. 29, 1976, Ser. No. 653,313
Int. Cl.[2] C08J *9/00;* **C08F** *30/02, 4/32*
U.S. Cl. 526—278 **5 Claims**

1. An emulsion copolymer having a fusion temperature of from about 200° F. to about 300° F. formed by emulsion polymerizing:

a. from about 75% to about 90%, by weight, vinyl chloride;
b. from about 5% to about 15%, by weight, vinyl acetate; and
c. from about 5% to about 15% by weight of a bis(hydrocarbyl) vinylphosphonate of the formula



where X is selected from the group consisting of hydrogen, halogen, cyano, aryl and C_1-C_{18} alkyl, and R and R' are unsubstituted and substituted C_1-C_{12} alkyl groups.

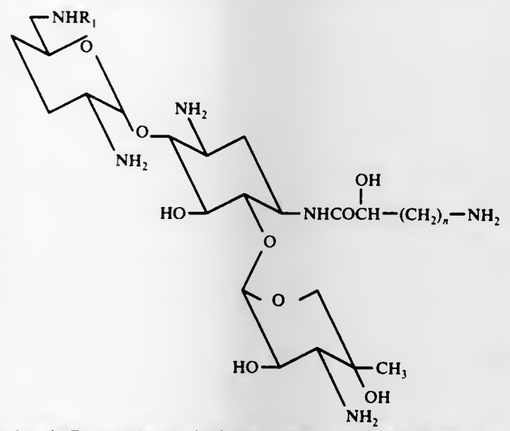
4,097,664

DERIVATIVES OF AN ANTIBIOTIC XK-62-2

Shinji Tomioka, Machida, and Yasuki Mori, Kawasaki, both of Japan, assignors to Abbott Laboratories, North Chicago, Ill.

Filed Jul. 12, 1976, Ser. No. 704,750
The portion of the term of this patent subsequent to Feb. 28, 1995, has been disclaimed.
Claims priority, application Japan, Jul. 15, 1975, 50-85767; Jul. 15, 1975, 50-85768
Int. Cl.[2] C07H *15/22*
U.S. Cl. 536—17 **8 Claims**

1. Compounds represented by the formula:



wherein R_1 represents a hydrogen atom or a methyl group, and *n* is an integer of 1, 3 or 4, and the pharmaceutically acceptable, non-toxic, acid addition salts thereof.

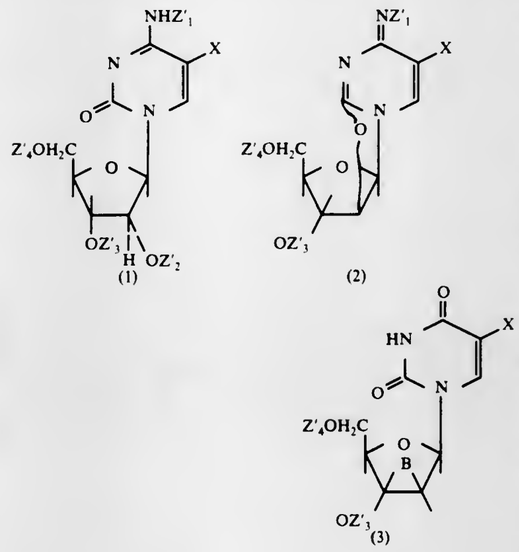
4,097,665

DIACYLNUCLEOSIDES AND PROCESS FOR PREPARING THE SAME

Torao Ishida; Minoru Akiyama; Daikichi Nishimura; Hiroshi Hayashi, all of Fuji; Yoshio Sakurai, Mitaka, and Shigeru Tsukagoshi, Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 24, 1975, Ser. No. 634,706
Claims priority, application Japan, Nov. 22, 1974, 49-133556
Int. Cl.[2] C07H *19/08*
U.S. Cl. 536—23 **8 Claims**

1. A compound selected from the group consisting of compounds represented by the general formulae



wherein

(a) B represents OZ_2' or hydrogen;

(b) one of Z_1', Z_2', Z_3' and Z_4' represents A_1 and another represents A_2 and the remainder represents hydrogen or a protective group wherein

A_1 is C_{14}-C_{22} aliphatic acyl selected from the group consisting of myristoyl, palmitoyl, margaroyl, stearoyl, n-nonadecanoyl, arachidoyl, n-heneicosanoyl, behenoyl, oleoyl, arachidonoyl, or the aliphatic acyl substituted with fluoro, chloro, bromo, iodo, hydroxy, mercapto, phenyl, phenoxy, thiophenoxy, nitrophenyl, cyclohexyl, 2-thienyl, 2-tetrahydropyranyloxy, methoxy, thiomethoxy, carboxymethyl, epoxy and oxo;

A_2 is C_2-C_{14} having carboxy or the acyl substituted with a group selected from the group consisting of phenyl, hydroxy, fluoro, chloro, bromo, iodo, N-carbobenzyloxyamino, cyclohexyl, mercapto, nitro, furane, pyridine, oxo, adamantane, oxymethenylcarboxy and thiomethenylcarboxy; and

the protective group is selected from the group consisting of isopropylidene, ethylidene, benzylidene, tetrahydropyranyl, tetrahydrofuranyl, ethoxyethyl, methoxymethyl, ethoxymethyl, methoxyethyl, triphenylmethyl, 2,4-dinitroanilino, methoxycarbonyl, trichloroethoxycarbonyl, tribromoethoxycarbonyl, formyl, trifluoroacetyl, trichloroacetyl, benzyl, benzhydrine, 2,4-dinitrophenylsulphenyl, propenyl, borate, vinylthioether and benzoylpropyl; and

(c) X is selected from the group consisting of hydrogen, fluorine, chlorine, bromine and iodine;

and pharmaceutically acceptable salts thereof.

4,097,666

SOLVENT SYSTEM FOR POLYSACCHARIDES

Donald C. Johnson, Appleton, Wis., and Myron D. Nicholson, St. Albans, W. Va., assignors to The Institute of Paper Chemistry, Appleton, Wis.

Filed Apr. 29, 1976, Ser. No. 681,561
Int. Cl.[2] C08B *11/02, 16/00*
U.S. Cl. 536—57 **23 Claims**

1. A composition comprising a natural or modified polysaccharide dissolved in a solvent system comprising dimethyl sulfoxide and formaldehyde.

4,097,667

HYDROXYALKYL CELLULOSE ETHERS

Arno Holst, and Michael Kostrzewa, both of Wiesbaden, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 16, 1976, Ser. No. 751,457
Claims priority, application Germany, Dec. 17, 1975, 2556754
Int. Cl.[2] C08B *11/08, 11/20*
U.S. Cl. 536—87 **12 Claims**

1. A process for the modification of a cellulose ether containing hydroxyalkyl groups, which comprises the step of reacting said ether with a chloroformic acid ester in an aqueous organic medium containing an alkali metal hydroxide, whereby the cellulose ether is rendered at least partially insoluble in water.

4,097,668

2-[(P-METHOXY-BENZOYL)-HYDRAZONO-FORMYL]-QUINOXALINE-1,4-DIOXIDE

Pal Benko; Ildiko Simonek; Laszlo Pallos; Jeno Kovacs, and Karoly Magyar, all of Budapest, Hungary, assignors to Egyt Gyogyszervegyeszeti Gyar, Budapest, Hungary

Continuation-in-part of Ser. No. 630,762, Nov. 11, 1975, abandoned. This application Mar. 9, 1977, Ser. No. 775,998
Claims priority, application Hungary, Nov. 21, 1974, EE 2278
Int. Cl.[2] C07D *241/00;* **A61K** *31/085, 31/165, 31/495*
U.S. Cl. 542—418 **1 Claim**

1. 2-[(p-Methoxy-benzoyl)-hydrazono-formyl]-quinoxaline-1,4-dioxide and its pharmaceutically acceptable acid addition salts.

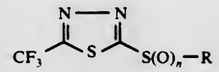
4,097,669

2-SUBSTITUTED-5-TRIFLUOROMETHYL-1,3,4-THIADIAZOLES

Josef Helmut Reisdorff, Wuppertal; Wilhelm Brandes, Cologne; Hans Scheinpflug; Bernhard Homeyer, both of Leverkusen, and Peter Roessler, Bensberg, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jul. 14, 1976, Ser. No. 705,375
Claims priority, application Germany, Jul. 26, 1975, 2533604
Int. Cl.[2] C07D *285/12*
U.S. Cl. 542—413 **8 Claims**

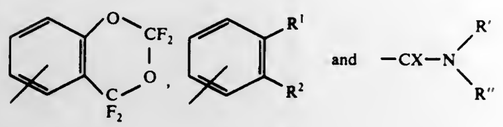
1. A 2-substituted 5-trifluoromethyl-1,3,4-thiadiazole of the formula



in which

R is phenylalkenyl; phenyl monosubstituted in the o- or m-position, polysubstituted phenyl, or substituted phenylalkenyl, the substituents being selected from alkyl with 1 to 4 carbon atoms, halogenoalkyl, halogenoalkylthio or halogenoalkylsulfonyl each with 1 or 2 carbon atoms and 2–5 halogen atoms, alkoxy, alkylcarbonyl or alkoxycarbonyl each with 1 to 4 carbon atoms in the alkyl moiety, hydroxyl, carboxyl, cyano and thiocyano or naphthyl; 5-membered or 6-membered heterocyclic radical with 1 to 4 hetero-atoms elected from N and S atoms; optionally

substituted benzimidiazolyl or benzthiazolyl; optionally substituted naphthyl; quinolyl; cyano or one of the groups



wherein

R^1 and R^2 conjointly are a trimethylene, tetramethylene or pentamethylene group,

X is oxygen or sulfur,

R′ and R″ each independently is alkyl or, together with the nitrogen atom and optionally further hetero-atoms selected from O and N atoms, form an optionally substituted 6-membered or 7-membered ring, and

n is 0, 1 or 1.

4,097,670

CARBOXYALKYLUREIDO CEPHALOSPORINS

Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

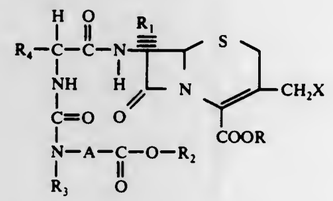
Filed Apr. 5, 1976, Ser. No. 673,222

The portion of the term of this patent subsequent to Apr. 25, 1995, has been disclaimed.

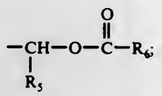
Int. Cl.[2] C07D *501/36*

U.S. Cl. 544—27 **32 Claims**

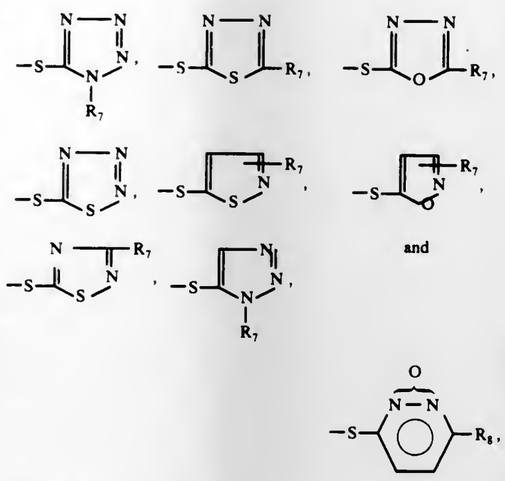
1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, tri(lower alkyl)silyl, trihaloethyl, an alkali metal ion, an alkaline earth metal ion, dibenzylamine, N,N-dibenzylethylendiamine, methylamine, triethylamine, N-ethylpiperidine, or



R_1 is in the α-configuration and is hydrogen or methoxy; R_2 is hydrogen, lower alkyl, phenyl, phenyl-lower alkyl, diphenyl-lower alkyl, an alkali metal ion, or an alkaline earth metal ion; R_3 is hydrogen or lower alkyl; A is straight or branched chain alkylene of 1 to 6 carbons; R_4 is phenyl, phenyl-lower alkyl, substituted phenyl or phenyl-lower alkyl wherein said phenyl substituent is one or two members selected from the group consisting of halogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, and hydroxy, or a mono substituted or unsubstituted heterocyclic selected from the group consisting of 2-thienyl, 3-thienyl, 2-furyl, and 3-furyl wherein said heterocyclic substituent is attached at an available carbon atom and is halogen or lower alkyl of 1 to 4 carbons; R_5 is hydrogen or lower alkyl; R_6 is lower alkyl; and X is heterothio selected from the group consisting of



wherein R_7 is hydrogen or lower alkyl of 1 to 4 carbons and R_8 is hydrogen, lower alkyl of 1 to 4 carbons, methoxy, hydroxy, or halogen.

4,097,671

DIHYDROOXADIAZINONES AND METHOD FOR MAKING

George E. Niznik, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,450

Int. Cl.[2] C07D *273/04*

U.S. Cl. 544—66 **1 Claim**

1. The compound 5-phenyl-3,6-dihydro-1,3,4-oxadiazin-2-one.

4,097,672

PHENYL PYRAZOLE THIOAMIDES

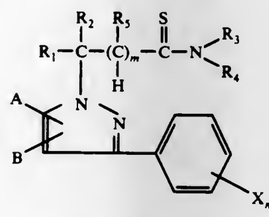
Malcolm W. Moon, and Gabriel Kornis, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 686,548, May 14, 1976, which is a continuation-in-part of Ser. No. 524,231, Nov. 15, 1974, abandoned. This application May 9, 1977, Ser. No. 795,103

Int. Cl.[2] C07D *231/12, 231/16*

U.S. Cl. 548—377 **15 Claims**

1. A compound of the formula:



V

where R_1 is hydrogen, alkyl of 1 to 7 carbon atoms, inclusive, haloalkyl of 1 to 7 carbon atoms, inclusive, phenyl, benzyl or cycloalkyl of 3 to 6 carbon atoms, inclusive, with the proviso that when R_1 is benzyl or cycloalkyl m = 0; R_2 and R_5 are the same or different and are hydrogen, halogen, alkyl of 1 to 6 carbon atoms, inclusive, haloalkyl of 1 to 6 carbon atoms, inclusive, or phenyl; R_1 and R_2 together with the attached carbon atom can be cycloalkyl of 3 to 6 carbon atoms, inclusive, when m = 0, R_1 is not hydrogen and when m = 1 at least one of R_2 or R_5 is hydrogen; R_3 is hydrogen, alkyl of from 1 to 8 carbon atoms, inclusive, phenyl or benzyl; R_4 is hydrogen or alkyl of from 1 to 6 carbon atoms, inclusive, and R_3 and R_4 can be joined together to form a heterocyclic ring selected from the group consisting of pyrrolidine, or piperidine; A and B are the same or different and are hydrogen, alkyl of from 1 to 6 carbon atoms, inclusive, phenyl, halogen, cyano, haloalkyl of 1 to 6 carbon atoms, inclusive, alkoxy or alkylthio in which the alkyl group is from 1 to 3 carbon atoms, inclusive, or trifluoromethyl and when adjacent can be joined to form a ring of from 5 to 7 carbon atoms, inclusive; where X is halogen, nitro, cyano, acetyl, dimethylcarbamoyl, alkyl, haloalkyl, alkoxy or carboalkoxy in which the alkyl group is from 1 to 3 carbon atoms, inclusive, phenyl, benzyl, 2-phenylethyl and *n* is 0, 1, or 2or an acid addition salt thereof.

4,097,673

HERBICIDAL CARBAMATES AND THIOLCARBAMATES

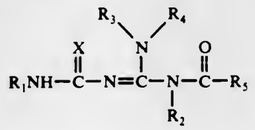
Julius Jakob Fuchs, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 520,114, Nov. 1, 1974, Pat. No. 4,004,915, which is a division of Ser. No. 356,422, May 2, 1973, Pat. No. 3,882,160, which is a continuation-in-part of Ser. No. 312,904, Dec. 7, 1972, Pat. No. 3,823,179. This application Oct. 13, 1976, Ser. No. 732,282

Int. Cl.[2] C07C *149/40, 79/46*

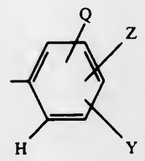
U.S. Cl. 560—16 **1 Claim**

1. A compound of the formula



wherein

R_1 is



wherein

Q is hydrogen, fluorine, chlorine, bromine, a C_1–C_4 alkyl, a C_1–C_2 alkoxy or alkylthio group, nitro or trifluoromethyl group;

Y is hydrogen, chlorine, or methyl; and

Z is hydrogen or chlorine;

R_2 is a C_1–C_3 alkyl;

R_3 is hydrogen, methyl, or ethyl;

R_4 is a C_1–C_4 alkyl, a C_3–C_4 alkenyl, a C_3–C_4 alkynyl, or methoxyl;

R_5 is —OR_6, wherein R_6 is a C_1—C_8 alkyl substituted with 0–3 chlorine atoms or 0–1 methoxyl; and

X is oxygen or sulfur.

4,097,674

2-NAPHTHYLACETIC ACID DERIVATIVES

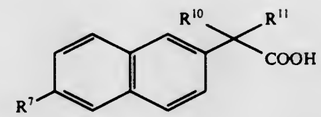
John H. Fried, and Ian T. Harrison, both of Palo Alto, Calif., assignors to Syntex Corporation, Palo Alto, Calif.

Division of Ser. No. 558,874, Mar. 17, 1975, Pat. No. 4,001,301, which is a division of Ser. No. 195,875, Nov. 4, 1971, Pat. No. 3,896,157, which is a division of Ser. No. 694,771, Dec. 7, 1967, abandoned, which is a continuation-in-part of Ser. No. 608,997, Jan. 13, 1967, abandoned. This application Sep. 27, 1976, Ser. No. 727,082

Int. Cl.[2] C07C *63/36, 69/76*

U.S. Cl. 560—100 **6 Claims**

1. A compound of the formula



XIV

wherein:

R^7 is methyl, ethyl, isopropyl, cyclopropyl, trifluoromethyl, vinyl, ethynyl, fluoro, or chloro;

one of R^{10} and R^{11} is hydrogen, the other being methyl or difluoromethyl or R^{10} and R^{11} taken together are methylene or difluoromethylene;

and the corresponding alkyl esters of 1–12 carbon atoms and pharmaceutically acceptable acid addition salts thereof.

4,097,675

8β, 12α, 15β-$PGF_{2\alpha}$ COMPOUNDS

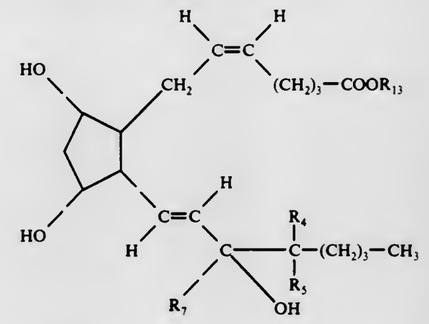
Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 518,697, Oct. 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 289,317, Sep. 15, 1972, abandoned. This application Feb. 23, 1976, Ser. No. 660,213

Int. Cl.[2] C07C *177/00*

U.S. Cl. 560—121 **9 Claims**

1. An optically active compound of the formula



wherein R_4, R_5, and R_7 are hydrogen or methyl, being the same or different;

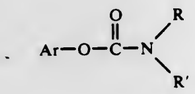
wherein R_{13} is hydrogen, alkyl of one to 10 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof wherein R_{13} is hydrogen.

4,097,676
METHOD FOR THE PREPARATION OF AROMATIC URETHANS

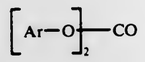
Ugo Romano, Milan, Italy, assignor to Anic S.p.A., Palermo, Italy

Filed Nov. 22, 1976, Ser. No. 744,109
Claims priority, application Italy, Dec. 3, 1975, 29960 A/75
Int. Cl.[2] C07C *125/04, 125/06*
U.S. Cl. 560—132 1 Claim

1. In a method for preparing aromatic urethans of the formula:



wherein Ar is selected from phenyl, naphthyl and alkyl-, aryl-, aryloxy-, halogen- and dialkylamino- substituted derivatives thereof and R and R′ are each selected from hydrogen or lower alkyl comprising reacting an aromatic carbonate of the formula:



with an aliphatic amine of the formula:

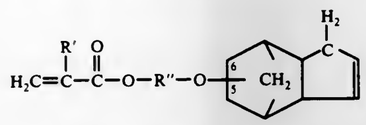
wherein Ar, R and R′ are as defined above,
the improvement which consists of effecting the reaction, optionally in the presence of an organic solvent, between 20° and 100° C and employing stoichiometric amounts of said aliphatic amine thereby preventing formation of undesired urea by-product.

4,097,677
UNSATURATED ESTERS OF GLYCOL MONODICYCLOPENTENYL ETHERS

William D. Emmons, Huntingdon Valley, and Kayson Nyi, Sellersville, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Jul. 7, 1976, Ser. No. 703,348
Int. Cl.[2] C07C *69/54*
U.S. Cl. 560—220 7 Claims

1. A compound having the general formula:



(I)

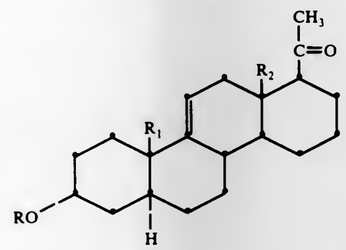
wherein R′ is CH_3 and R″ is selected from the group consisting of:
(a) Alkylene groups having 2 to 6 carbon atoms and
(b) Alkylene heteroalkylene groups wherein the total number of carbon atoms is from 4 to 6 and the heteroatom is O or S.

4,097,678
$\Delta^{9(11)}$-5α-D-HOMO-20-KETO STEROIDS

Ulrich Kerb; Rudolf Wiechert, and Otto Engelfried, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Mergkamen, Germany

Filed Jun. 8, 1976, Ser. No. 693,847
Claims priority, application Germany, Jun. 11, 1975, 2526372
Int. Cl.[2] C07J *63/00*
U.S. Cl. 560—257 11 Claims

1. A compound of the formula

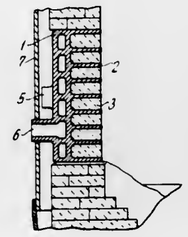


wherein, R is hydrogen, m-iodobenzoyl or the acyl radical of an alkanoic acid of 1–6 carbon atoms, R_1 is hydrogen or methyl and R_2 is methyl or ethyl.

4,097,679
SIDE WALL OF THE ULTRA HIGH POWER ELECTRIC ARC FURNACES FOR STEELMAKING

Ichiro Fukumoto, Kanzaki, and Susumu Hayashida, Himeji, both of Japan, assignors to Sankyo Special Steel Co., Ltd., Japan

Filed Sep. 21, 1976, Ser. No. 725,289
Claims priority, application Japan, Jan. 9, 1976, 51/1585
Int. Cl.[2] F27D *1/12*
U.S. Cl. 13—32 4 Claims

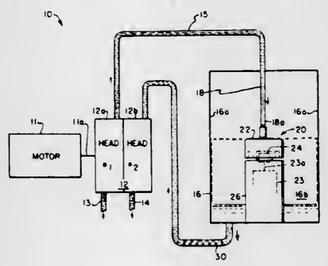


1. A water cooled panel for use as a part of an inside wall within an outer shell in an ultra-high power electric arc furnace, comprising walls forming a panel having a plurality of hollow water channels extending therethrough, said panel having a first side facing toward the outer shell and an oppositely directed second side facing inwardly into the furnace, a water inlet and a water outlet connected to the first side of said panel for flowing water through said water channels, a plurality of fins formed on said second side and extending therefrom inwardly into the furnace, said fins being spaced apart forming multi-sided chambers closed by said second side and said fins and open to the inside of the furnace, a castable refractory deposited into and filling the space within said multi-sided chambers, said fins comprising a plurality of first fins and second fins extending transversely of said first fins, said first fins being at least 10 mm in thickness, said first fins extending horizontally and projecting into the furnace from said second wall for a dimension of at least 70 mm and said first fins being spaced apart in the vertical direction in the range of 30 to 80 mm, and said walls and said fins being formed of one of copper and a copper alloy.

4,097,680
SPINNING DISK ELECTRICAL ISOLATOR FOR A FLOWING SEAWATER STREAM

Cesar Clavell, Jr., San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 10, 1977, Ser. No. 776,144
Int. Cl.[2] H01B *17/00*
U.S. Cl. 174—8 10 Claims

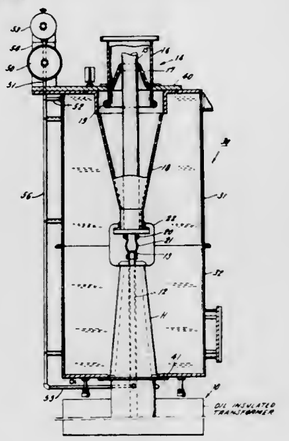


1. An apparatus for breaking the electrical conductivity continuity in a fluid flowing from a source to instrumentation comprising:
drivable impelling means coupled to the source for impelling the fluid therefrom;
means coupled to the impelling means for radially dissipating the fluid in the form of a multitude of separated droplets;
means arranged to collect the multitude of separated droplets for coalescing them into a reservoir of fluid;
drivable expelling means coupled to the reservoir of fluid for expelling the fluid therefrom and to the instrumentation; and
means connected to the drivable impelling means and drivable expelling means for synchronously driving them thereby matching the flow rates to and from the reservoir of fluid.

4,097,681
INTERFACE FOR HIGH VOLTAGE OIL-FILLED AND GAS-FILLED APPARATUS

Edward M. Spencer, Mississauga, Canada, assignor to I-T-E Industries Ltd., Mississauga, Canada

Filed Jan. 31, 1977, Ser. No. 763,833
Int. Cl.[2] H01F *27/04;* H01B *17/26*
U.S. Cl. 174—12 R 6 Claims



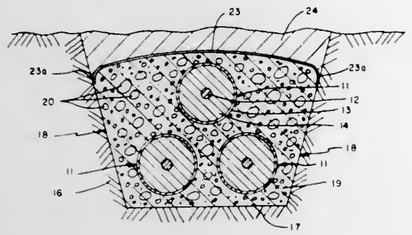
1. Apparatus for connecting a gas-insulated high-voltage conductor to oil-insulated electrical apparatus; said gas-insulated high-voltage conductor comprising a central conductor suspended within a gas-filled elongated grounded housing; said oil-insulated apparatus comprising electrical apparatus disposed within a grounded oil-filled housing; said connecting apparatus comprising an intermediate oil-filled housing, an oil-filled bushing connected to said electrical apparatus and extending through said grounded oil-filled housing and into said intermediate housing, and a sealed gas-filled bushing connected to said central conductor and extending into said intermediate oil-filled housing; the conductors of said oil-filled bushing and of said gas-filled bushing being connected together within said intermediate housing; and pressure differential means for maintaining the oil pressure within said grounded oil-filled housing greater than the oil pressure within said intermediate housing, whereby gas which escapes into said oil in said intermediate housing will not leak into said grounded oil-filled housing.

4,097,682

MEANS FOR PROTECTING UNDERGROUND ELECTRICAL EQUIPMENT FROM THERMAL RUNAWAY

Elijah R. Perry, Portola Valley; Meredith J. Angwin; Mario Rabinowitz, both of Menlo Park, all of Calif., and John F. Shimshock, Somerset, N.J., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Aug. 27, 1976, Ser. No. 718,349
Int. Cl.² H01B *7/34*
U.S. Cl. 174—15 R **33 Claims**



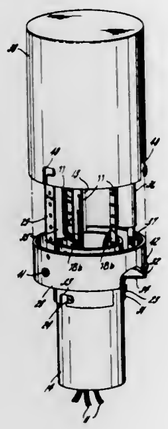
1. In a method for protecting underground heat-generating electrical equipment from thermal runaway, the steps of
(a) laying the equipment in an open trench,
(b) back-filling the trench with soil in which water-absorbent particles are dispersed, said particles comprising a water-swellable, hydrophilic polymer gel material capable of swelling to absorb at least ten times its own weight of water, and
(c) soaking said absorbent particles with water.

4,097,683

TERMINAL HOUSING FOR BURIED ELECTRICAL CABLES AND METHOD OF EXPANDING SAME

Frank C. Summers, Park Ridge, Ill., assignor to Coil Sales & Manufacturing Co., Rolling Meadows, Ill.

Filed Sep. 15, 1976, Ser. No. 723,571
Int. Cl.² H02G *9/02*
U.S. Cl. 174—38 **9 Claims**



1. An apparatus for housing surface electrical connections of buried electrical cables and components coupled thereto comprising a base, a first bracket means mounted in upstanding relation on said base for supporting an electrical component vertically above said base, an adapter mounted on said base, said adapter having a component supporting area greater than said base, second bracket means mounted in upstanding relation on said adapter for supporting an additional electrical component above said adapter and base, said second bracket means being positioned at a predetermined angle with respect to said first bracket means to insure proper positioning of an additional electrical component, a cover having an internal chamber, an open lower end and a closed upper end, said cover being mounted on said adapter with said first and second bracket means being received within said chamber to thereby protect them from flooding by air contained within said cover, means for preventing axial movement of said adapter relative to said base, and means for preventing axial movement of said cover relative to said adapter.

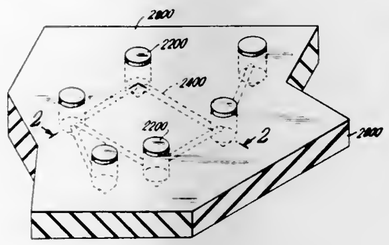
9. A method for expanding a surface housing for buried electrical cables and components coupled thereto which housing includes a base, a first bracket means mounted on the base in upstanding relation for supporting an electrical component and a removable cover mounted on the base and enclosing the first bracket means comprising the steps of:
removing the cover,
installing an adapter on the base, said adapter having a component supporting area greater than the base,
mounting a second bracket means in upstanding relation on the adapter for supporting an additional electrical component above the adapter and base,
installing an enlarged cover having an internal chamber, an open lower end and a closed upper end on the adapter with the first and second bracket means being received within the chamber to protect them from flooding, and
locking the adapter on the base and the enlarged cover on the adapter to prevent axial movement of the adapter relative to the base and the enlarged cover relative to the adapter.

4,097,684

ELECTRIC WIRING ASSEMBLIES

Robert Page Burr, Huntington, N.Y., assignor to Kollmorgen Technologies Inc., Dallas, Tex.

Continuation of Ser. No. 209,626, Dec. 20, 1971, abandoned, and Ser. No. 344,111, Mar. 23, 1973, abandoned, which is a division of Ser. No. 10,039, Feb. 9, 1970, Pat. No. 3,646,572. This application Oct. 8, 1974, Ser. No. 513,190
Int. Cl.² H05K *1/00*
U.S. Cl. 174—68.5 **3 Claims**



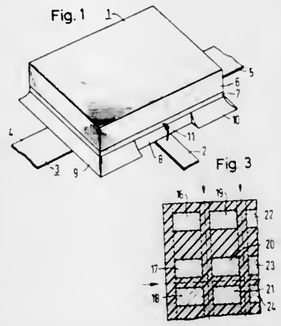
1. A prefabricated electric wire assembly board comprising an insulating base having substantially parallel upper and lower surfaces, a plurality of metal conductors each performed as a continuous elongated unit independent of said base and coated with a layer of insulating material independent of said base and in the form of a predetermined circuit pattern, adhesive means bonding said conductors in fixed relationship on one of said surfaces, an aperture in said base, at least one of said plurality of metal conductors having a conductor end exposed at the wall of the base surrounding the aperture, and a metal terminal in the aperture contacting the wire end, thereby electrically connecting said one surface to the other of said surface.

4,097,685

DISCRETE CROSSOVER CHIPS FOR INDIVIDUAL CONDUCTOR TRACK CROSSOVERS IN HYBRID CIRCUITS AND METHOD FOR CONSTRUCTING SAME

Karl Breuninger, Munich; Detlef Haberland, Worthsee, and Roland Herberger, Gottmadingen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 6, 1976, Ser. No. 730,285
Claims priority, application Germany, Oct. 17, 1975, 2546736
Int. Cl.² H05K *3/12;* **H01L** *49/02*
U.S. Cl. 174—68.5 **2 Claims**



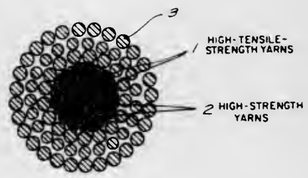
1. In a discrete, integrated circuit chip forming a conductor crossover wherein the integrated circuit comprises a substrate having a thin-film metal coating on one side, which metal coating is coated with a photosensitive plastic composition which is discontinuous in at least two points for solder points, the improvement comprising:
peripheral areas adjacent the crossover point of the conductor paths are free of the metal coating, the plastic coating surrounding said peripheral areas.

4,097,686

OPEN-AIR OR OVERHEAD TRANSMISSION CABLE OF HIGH TENSILE STRENGTH

Jürgen Gladenbeck, Röttgen; Gerald Müller, Cologne; Karl Schörken, Nettetal, Hinsbeck, and Hans-Peter Schwindenhammer, Cologne, all of Germany, assignors to Felten & Guilleaume Carlswerk Aktiengesellschaft, Köln-Mülheim, Germany

Continuation of Ser. No. 695,652, Jun. 14, 1976, abandoned, which is a continuation of Ser. No. 495,121, Aug. 2, 1974, abandoned. This application Jan. 27, 1977, Ser. No. 762,958
Claims priority, application Germany, Aug. 4, 1973, 2339676
Int. Cl.² H01B *5/10*
U.S. Cl. 174—131 A **4 Claims**



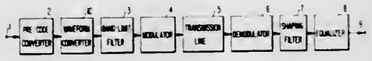
1. An uninsulated-conductor open-air or overhead transmission cable for the transmission of high-voltage electrical energy, comprising, in combination, a plurality of uninsulated electrical conductor elements; and a plurality of tensile-load-bearing elements combined with said plurality of uninsulated electrical conductor elements to form a cable, said tensile-load-bearing elements being made of high-tensile-strength aromatic homo- or copolyamide, and said uninsulated electrical conductor elements constituting the outermost elements of the uninsulated-conductor cable, said plurality of tensile-load-bearing elements being synthetic plastic yarns oriented generally straight and parallel to each other, the yarns being composed of high-tensile-strength aromatic homo- or copolyamide filaments, the cable further including a plurality of highly stretchable synthetic plastic filaments oriented generally straight and parallel to each other, the yarns and the highly stretchable synthetic plastic filaments being bound together to form a unitary core structure.

4,097,687

PARTIAL RESPONSE SYSTEM

Masaru Yamaguchi, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Oct. 13, 1976, Ser. No. 731,960
Claims priority, application Japan, Oct. 14, 1975, 50-123922
Int. Cl.² H04L *3/00*
U.S. Cl. 178—68 **5 Claims**



1. In a partial response system including a transmission system adapted to provide an output having a frequency spectrum substantially given by $2j \sin((\omega T)/2) \cdot k)$ in response to a single pulse input of pulse width T and of amplitude 1, and a pre-code-converter provided on the input side of said transmission system, thereby to regenerate a bi-level signal applied to the input of said pre-code-converter at the output of said transmission system; the improvement comprising:
a waveform converter inserted between said pre-code-converter and said transmission system, the frequency spectrum of the output of said waveform converter in response to said single pulse applied to the input of said waveform converter being substantially equal to either $2j(1-\cos[(\omega/2) \cdot T])/\omega$ or $2j(1-\cos \omega T)/\omega$, and
said transmission system includes a waveform shaping filter connected to the output of the waveform converter and having a transfer function represented substantially by either

$$\frac{\omega}{1-\cos(\frac{\omega}{2} \cdot T)} \cdot \sin(\frac{\omega T}{2} \cdot k)$$

or

$$\frac{\omega}{1-\cos \omega T} \cdot \sin(\frac{\omega T}{2} \cdot k),$$

where T represents one time slot length, ω represents an angular frequency, and k represents a positive integer.

4,097,688

STEREOPHONIC REPRODUCING SYSTEM

Yoshiaki Ochi, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

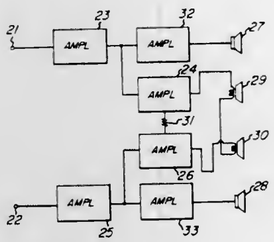
Filed Nov. 3, 1971, Ser. No. 195,399
Claims priority, application Japan, Nov. 16, 1970, 45-101767; Nov. 18, 1970, 45-102278
Int. Cl.² H04R *5/00*
U.S. Cl. 179—1 GQ **1 Claim**

1. An audio reproduction system comprising:
left and right input terminals for receiving left and right signals respectively,
left and right amplifiers having their inputs coupled to said left and right terminals respectively,
front-left and rear-left amplifiers coupled to the output of

said left amplifier, and front-right and rear-right amplifiers coupled to the output of said right amplifier,

front-left and front-right speakers coupled to the outputs of said front-left and front-right amplifiers respectively,

rear-left and rear-right speakers coupled in series between the outputs of said rear-left and rear-right amplifiers, a different one of said speakers being positioned approximately at each of the four corners of a quadrilateral area, which may be occupied by a listener, said speakers directing sound towards the interior of the area, wherein said front-left and front-right speakers are respectively positioned in the left and right front corners of the area behind



the listener and said rear-left and rear-right speakers are positioned in the left and right rear corners of the area facing the listener, and

an impedance element coupling said rear-left and rear-right amplifiers, the impedance of said impedance element having a substantial value capable of supplying partial leakage of a signal amplified by said rear-left amplifier to said rear-right amplifier and partial leakage of a signal amplified by said rear-right amplifier to said rear-left amplifier without degradation of the degree of separation between sound signals supplied to said front-left and front-right speakers, respectively.

4,097,689

OUT-OF-HEAD LOCALIZATION HEADPHONE LISTENING DEVICE

Akitoshi Yamada, Daito; Toshiyuki Goto, Katano; Yoichi Kimura, Suita, and Yoshinobu Kikuchi, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 9, 1976, Ser. No. 656,209

Claims priority, application Japan, Aug. 19, 1975, 50-100792; Aug. 27, 1975, 50-104377; Aug. 27, 1975, 50-104378; Oct. 1, 1975, 50-119199

Int. Cl.² H04R *5/00*

U.S. Cl. 179—1 G **8 Claims**

3. A headphone device having left and right electro-acoustic transducers comprising:

means for twofold dividing stereo signals of right and left channels to produce four respective direct sound signals;

means including reverberation supply circuits for applying said four direct sound signals to the respective reverberation supply circuits to produce four indirect sound signals;

means for mixing said indirect sound signals with said direct sound signals through respective attenuators to produce four mixed signals; and

means for applying one of the two mixed signals of the right channel and one of the two mixed signals of the left channel to the left electro-acoustic transducer and for applying the others of said mixed signals of right and left channels to the right electro-acoustic transducer of said headphone.

7. An out-of-head localization headphone listening device having left and right electro-acoustic transducers comprising:

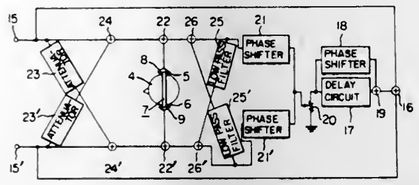
means for mixing two direct sound signals applied from a two channel stereo apparatus;

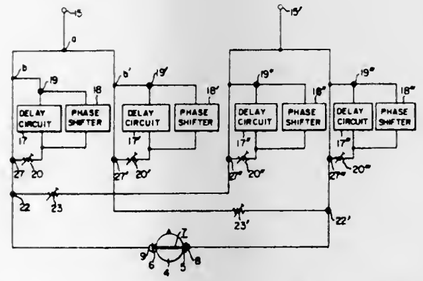
means including a reverberation supply circuit for producing an indirect sound signal by applying said mixed direct signals to said reverberation supply circuit;

attenuator means for attenuating the intensity of said indirect sound signal to control the ratio of the intensity of the attenuated indirect sound signal to said direct sound signal;

means for twofold dividing said indirect sound signal attenuated by said attenuator;

means for mixing each divided indirect sound signal with the





respective direct sound signal to produce two mixed signals to be applied to said left and right electro-acoustic transducers respectively;

first and second attenuators; and

first and second adders receiving respectively said first and second direct sound signals, said first attenuator being coupled to said second adder and said second attenuator being coupled to said first adder for mixing a respective one of said two direct sound signals with the other channel direct sound signal.

4,097,690

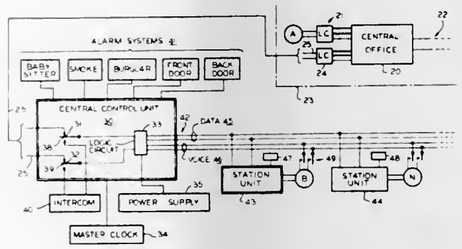
INTERCOMMUNICATION AND ALARM TELEPHONE SYSTEM

Donald L. Kuntz, Wayne, Ill., and David Kent, Palm Harbor, Fla., assignors to Precision Components Inc., Addison, Ill.

Filed Nov. 5, 1976, Ser. No. 739,189

Int. Cl.² H04M *11/00*

U.S. Cl. 179—2 A **14 Claims**



1. A telephone system comprising a central unit and a plurality of station units interconnected by at least one transmission channel, means for transmitting a continuous data stream of cyclically recurring control pulses between said units via said transmission channel, said pulses being divided into uniformly recurring pulse groups with the pulse positions within each group identifying specific command functions, at least some of the pulse positions in each pulse group being dedicated to an identification of any selected one among said plurality of station units which is being individually commanded to perform certain ones of said functions identified by other pulse positions in each pulse group, and means in each of said units for exchanging switching and control information by distinctively modulating individual ones of the pulses in said pulse group according to the command functions embodied in said information, whereby either the individually-commanded station or a group of stations may perform the commanded functions.

4,097,691

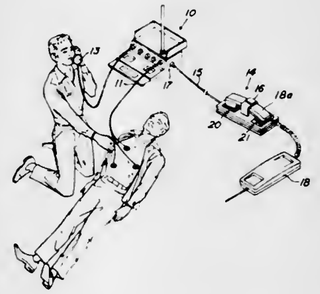
REMOTE TELEPHONE COUPLER AS FOR MEDICAL EMERGENCY DATA TRANSMISSION

Stephen Jeffrey Ehrlich, Sunrise, and Edward Robert Beyer, Pompano Beach, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 5, 1977, Ser. No. 812,927

Int. Cl.² H04M *11/00*

U.S. Cl. 179—2 C **6 Claims**



1. A portable coupler assembly, self-adjustable for use with any of a plurality of telephone handset configurations, comprising in combination:

a thin base member having at least one cavity in a main surface area, and having a peripheral groove;

circuit means retained within said cavity in the base member;

cable means coupled to said circuit means and adapted to be stored within said peripheral groove of the base member;

resilient coupler means having a substantially flat upper surface, having a central aperture in said flat surface, said coupler being normally positioned within said base cavity and being pivotably mounted for cooperating with any of the handset configurations;

a retaining means attached to said base and having a first position for releasably retaining said handsets in tight contact with said coupler means and a second position for retaining said cable means within said peripheral groove of the base member; and

transducer means coupled to said circuit means and retained within said central aperture of the coupler means for providing audio signal coupling with said retained handsets.

4,097,692

METHOD AND APPARATUS FOR THE TWO-WAY TRANSMISSION OF PULSES

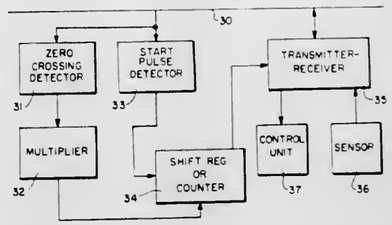
Ernst Felix, Uster, Switzerland, assignor to Zellweger, Ltd., Switzerland

Filed Aug. 25, 1976, Ser. No. 717,681

Claims priority, application Switzerland, Sep. 25, 1975, 12474/75

Int. Cl.² H04M *11/00;* **H04H** *1/14;* **H04L** *5/00*

U.S. Cl. 179—2.5 R **23 Claims**



14. An apparatus for the two-way transmission of data between a plurality of out-stations connected in common to a power supply network and at least one control unit also connected to said network and including means for applying start pulses to said power supply network at periodic intervals, comprising

modulating means for effecting high frequency modulation of the data to be transmitted, means for coupling the modulated data to the power supply network, means for detecting modulated high frequency signals carried by said power supply network, and means for demodulating said detected high frequency signals;

each out-station including means synchronized to the frequency of said power supply network for generating clock pulses, means responsive to detection of a start pulse carried by said power supply network for counting said clock pulses, and means responsive to detection of an assigned count of said clock pulses for enabling said means for coupling the modulated data to said power supply network.

4,097,693

SWITCHING SYSTEM FOR AN AUTOMATIC TELECOMMUNICATION EXCHANGE WITH A PLURALITY OF INTERMEDIATE LINES THAT ARE GROUNDED WHEN NOT IN USE

Johannes Anton Greefkes, Knegsel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 9, 1976, Ser. No. 694,149

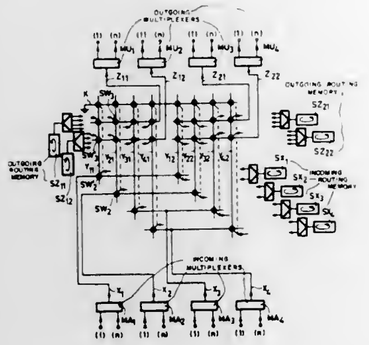
Claims priority, application Netherlands, Jun. 16, 1975, 7507122

Int. Cl.² H04J *3/10*

U.S. Cl. 179—15 AT **4 Claims**

1. A switching network for coupling channels of incoming time division multiplex lines to channels of outgoing time division multiplex lines, said network comprising a first switching stage including switches, each switch having one input for each incoming line and a plurality of outputs; a plurality of intermediate time division multiplex lines coupled to said outputs respectively; a second switching stage including switches equal in number to said plurality of outputs of a first stage switch, each switch having a plurality of inputs coupled to said intermediate lines respectively and a plurality of outputs for coupling to said outgoing lines respectively; each of said switches including a plurality of crosspoint elements; circulating routing memory means including address information for each element for time multiplex controlling each of said elements to achieve a given connection in a respective time slot of

a multiplex frame; and means for coupling all of said intermediate lines for at least one half of the duration of said time slots



in which said intermediate lines are not used to a reference potential.

4,097,694

TIME-DIVISION TELEPHONE SYSTEM EMBODYING TRUNKS HAVING DEMODULATING-ADDER CIRCUITS

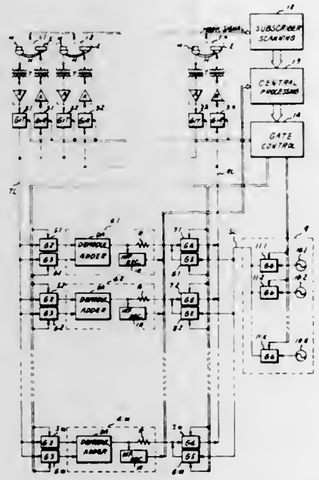
Masami Miyazaki, Toyonaka, Japan, assignor to Toa Electric Company, Ltd., Japan

Filed Jul. 6, 1976, Ser. No. 703,068

Claims priority, application Japan, Jul. 9, 1975, 50-84729; Jul. 28, 1975, 50-92189; Aug. 27, 1975, 50-104435; Sep. 22, 1975, 50-115161; Sep. 26, 1975, 50-116912; Oct. 29, 1975, 50-130643; Nov. 18, 1975, 50-139099

Int. Cl.[2] H04J *3/02;* **H04M** *3/56*

U.S. Cl. 179—15 AT **12 Claims**



1. A telephone exchange system, comprising a plurality of telephone sets each having a microphone and an earphone, means for generating a hook signal in response to a telephone call starting action and means of generating coded information signals, a plurality of pairs of first gates connected respectively to said microphones and earphones, a first line conductor connected in common to the outputs of said first gates connected to said microphones, a second line conductor connected in common to the inputs of said first gates connected to said earphones, a plurality of trunk circuits each including a demodulator-adder circuit for demodulating and then adding the inputs thereof and a coded information receiving circuit connected to the output of said demodulator-adder circuit for receiving selectively said coded information signals from said output, second and third gates connected between said first line conductor and the inputs of said demodulator-adder circuit of said each trunk circuit, a fourth gate connected between the output of said demodulator-adder circuit of said each trunk circuit and said second line conductor, a common signal sound generating device connected to the inputs of said fourth gates through fifth gates respectively, a subscriber scanning device for receiving said hook signal from a first telephone set and producing a subscriber discriminating signal for said telephone set, a central information processing device for storing the statuses of said plurality of telephone sets and trunk circuits and time-division gate control signals which are peculiar to said respective telephone sets, producing a first subscriber information signal corresponding to said first telephone set and a trunk signal for designating a vacant trunk circuit in response to said subscriber discriminating signal and also producing a second subscriber information signal corresponding to a second telephone set which is designated by the output of the coded information receiving circuit of said designated trunk circuit in response to said output and producing sound signal information indicative of the sound signal to be generated by said sound signal generating device, and a gate control device for supplying said time-division gate control signal which is peculiar to said first telephone set to said first gates connected to said first telephone set and to said second, fourth and fifth gates connected to said designated trunk circuit and also supplying said time-division gate control signal which is peculiar to said second telephone set to said first gates connected to said second telephone set and to said third, fourth and fifth gates connected to said designated trunk circuit.

4,097,695

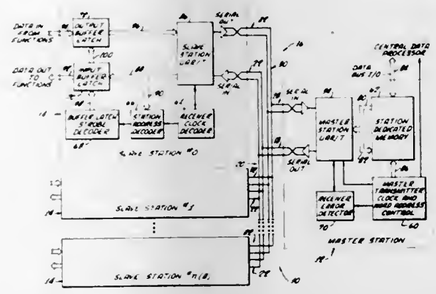
ASYNCHRONOUS ADDRESSABLE MULTIPLEX SYSTEM

Alan G. V. Grace, 11 Bay View Dr., San Carlos, Calif. 94070, and Janet C. Wong, 123 Flying Mist Isle, Foster City, Calif. 94404

Filed Jul. 11, 1977, Ser. No. 814,677

Int. Cl.[2] H04J *6/00*

U.S. Cl. 179—15 BA **8 Claims**



1. An asynchronous, addressable multiplex system which comprises:

(a) a master station having means for formatting and transmitting a series of outgoing message blocks, each block containing a number of data bytes and a destination address formatted into at least one, but not all, of the bytes, the other bytes being unaddressed, and each block being followed by an intermessage block gap, and

(b) a plurality of slave stations, connected in parallel to the master station, each slave station having an assigned address and each including means for receiving said outgoing message blocks, and means initiated by the intermessage block gap for recognizing and decoding decoding said destination address and for accepting only those message blocks having a destination addresses corresponding to the assigned address.

4,097,696

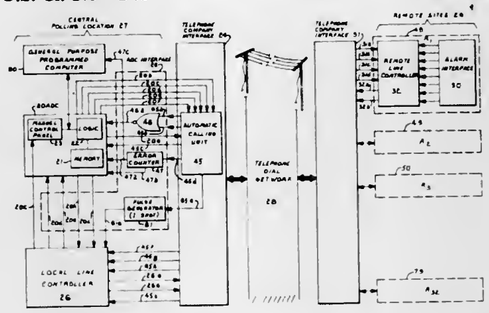
METHOD AND APPARATUS FOR POLLING SECURITY ALARM INSTALLATIONS

Robert J. Nyhuis, 7806 Maiden La., Portage, Mich. 49081, and Terrence F. Smith, 6903 Blair Rd., Kansas City, Mo. 64152

Filed Sep. 15, 1975, Ser. No. 613,173

Int. Cl.[2] H04M *11/04*

U.S. Cl. 179—2 A **24 Claims**



1. Apparatus for polling security alarm installations, each alarm installation having a remote site telephone number and being interconnected with a conventional telephone dial network, said apparatus comprising:

a central monitoring station having the combination of an automatic dial controller means and a local line controller means thereat;

said automatic dial controller means being comprised of a memory unit means for storing remote site telephone numbers, a manual control panel means for entering said telephone numbers in said memory unit means and for displaying said telephone numbers, and logic circuitry means for controlling the polling sequence operation by repeatedly retrieving said remote site telephone numbers from said memory unit means in a set sequence, automatically dialing the retrieved telephone number and requesting delivery of security status information to said central monitoring station from the alarm installation corresponding to the dialed telephone number;

said local line controller means being operable to receive and process security status information delivered to said control monitoring station from said alarm installations;

means interconnecting said automatic dial controller means and said local line controller means with said telephone dial network;

a remote line controller means for collecting security information from said alarm installations and for transmitting said information to said central monitoring station upon request; and

means interconnecting said remote line controller means with said telephone dial network, said automatic dial controller means and local line controller means thereby effecting the polling of each of said alarm installations and said remote line controller means being operable to collect security information and transmit same to said central monitoring station.

4,097,697

DIGITAL SIGNAL PERFORMANCE MONITOR

Stephen George Harman, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Jun. 2, 1977, Ser. No. 802,376

Int. Cl.[2] H04B *3/46*

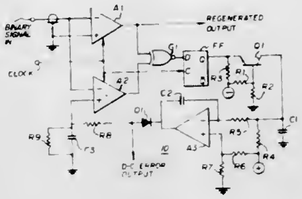
U.S. Cl. 179—175.3 R **4 Claims**

1. In a performance monitor for a degraded digital signal, an error voltage output circuit comprising:

regenerators for regenerating the degraded digital signal and the degraded digital signal offset against a d-c voltage;

a comparator for detecting parity errors in the digital state between the two regenerated digital signals;

a negative feedback circuit, responsive to the number of parity errors at the output of the comparator, for varying the magnitude of said d-c voltage to maintain a substantially constant error rate between the two regenerated digital signals; and



output means for the d-c voltage;

whereby the magnitude of the d-c voltage is a measure of the degradation of the digital signal and hence the error density.

4,097,698

SEISMONASTIC SWITCHES WITH INERTIA RESPONSIVE CONTROLLER

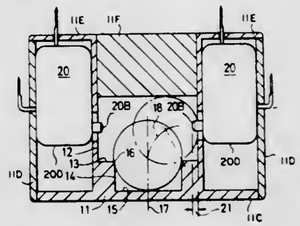
Peter Ronald Jackman, Basingstoke, England, assignor to Inertia Switch Limited, United Kingdom

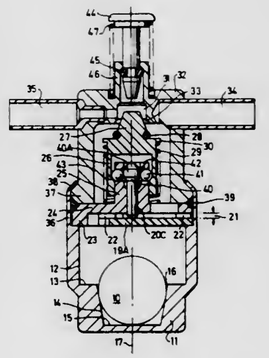
Filed Mar. 9, 1976, Ser. No. 665,245

Claims priority, application United Kingdom, Mar. 12, 1975, 10344/75

Int. Cl.[2] H01H *35/10;* **G01P** *15/00*

U.S. Cl. 200—61.45 R **12 Claims**





1. A seismonastic control apparatus comprising:

a two-mode control device operable, in different modes, to perform two different control functions and having a plunger which is moveable along a plunger axis and operable on actuating movement along said plunger axis, to effect a change of mode of said control device;

a housing enclosing said control device and defining a concave seat having a circular cross-section and a central axis extending parallel to an imaginary axis which extends parallel to the plunger axis;

a spherical seismonastic roller accommodated in the seat, for unobstructed radial movement from a rest position on the central axis of the seat as a result of a predetermined variation in the resultant of all forces acting on the roller;

a displaceable member supported in spaced relation to the seismonastic roller when the roller is in its rest position, the displaceable member having a part which is engageable with the plunger and parts defining a surface extending transversely of the central axis so that, on a predetermined extent of radial movement of the roller from its rest position, in any direction, the roller strikes said surface and moves said displaceable member away from the seat; and

retaining means provided by the housing to ensure that said part of the displaceable member which is engageable with said plunger is moveable by an amount sufficient to effect said actuating movement of said plunger;

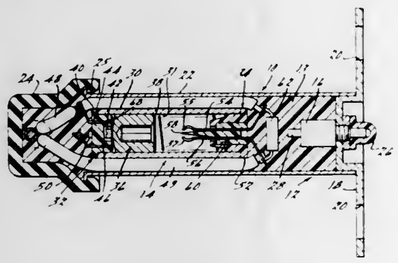
the seat defining a concave surface of revolution extending around said central axis and including a circular region which is engaged by the seismonastic roller during radial movement of said predetermined extent from its rest position and at which region there is an increase in the inclination of the surface of the seat to said central axis so that, in any axial plane, the increased inclination is greater than the inclination of the tangent to the roller at the point of contact between the roller and the seat when the roller is in its rest position.

4,097,699

VISCOUS DAMPED CRASH SENSOR UNIT WITH INERTIA SWITCH

Douglas A. Larson, Oak Park, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 7, 1976, Ser. No. 720,867
Int. Cl.[2] H01H *35/14*
U.S. Cl. 200—61.45 R **9 Claims**



1. A viscous damped inertial sensor operable to sense velocity changes in excess of a predetermined magnitude for actuating an impact responsive system, the sensor comprising:

A. housing means;

B. means defining a sealed chamber containing gas and defining a substantially cylindrical bore, said chamber being disposed within said housing means;

C. means for resiliently isolating and mounting said sealed chamber within said housing means;

D. a mass slidably received in said bore in closely fitting relationship thereto and defining therebetween an annular gas metering orifice, said mass being movable from a first position in said bore upon said housing means experiencing a change in velocity in the direction of said bore, said mass including switch engaging means;

E. means for preloading and continuously biasing said mass to said first position;

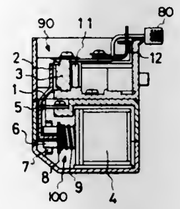
F. electrical switch means disposed in predetermined spaced relationship from said mass in said first position such that, upon said housing means experiencing a predetermined velocity change in the direction of said bore, the resultant inertial force on said mass overcomes said preload and bias and said mass moves in said bore displacing said gas, and said displaced gas flows through said annular metering orifice for providing a predetermined viscous force, retarding the movement of said mass with respect to said bore such that said mass moves from said first position to place said switch engaging means in contact with said electrical switch means only when said velocity change reaches said predetermined magnitude.

4,097,700

SWITCH MECHANISM FOR A TURN SIGNAL

Kunio Okazaki, Hatano, Japan, assignor to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Sep. 30, 1976, Ser. No. 728,173
Claims priority, application Japan, Nov. 14, 1975, 50-154807[U]
Int. Cl.[2] H01H *3/16, 9/00;* **B60Q** *1/00*
U.S. Cl. 200—61.27 **11 Claims**



1. A switch mechanism for a turn signal comprising:

an operating knob (**80**) extending in a first direction,

a housing divided into an upper space (**90**) and a lower space (**100**) by a partition extending at least partially thereacross, said upper and lower spaces extending one after the other at an angle relative to said first direction,

a first assembly in one of said spaces of said housing, said first assembly including:

a set of fixed contacts (**11**),

at least one movable contact piece (**3**),

said operating knob (**80**) being coupled to said movable contact piece (**3**) for moving said movable contact piece (**3**) and

stopper means (**2**) for holding said movable contact piece (**3**) at a position moved by said operating knob (**80**),

bias means (**12**) for applying a biasing force to said operating knob (**80**) to cause said operating knob (**80**) to return to a desired position,

release means (**4**) for generating a releasing force for releasing the holding force of said stopper means (**2**), said release means including a solenoid (**4**) having a movable plunger (**6**), and said release means being located in the other of said spaces of said housing and in side-by-side relationship with said first assembly, and

transmitting means (**1**) coupled between said stopper means (**2**) and said release means (**4**) for transmitting said releasing force to said stopper means (**2**), said transmitting means (**1**) including a lever arm (**1**), one end of which is mechanically coupled to a said stopper means (**2**) and the other end of which is mechanically coupled to said plunger (**6**) of said release means (**4**).

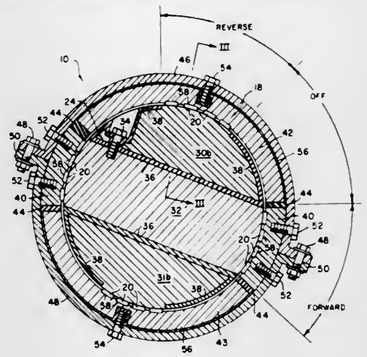
4,097,701

COAXIAL POLARITY REVERSING SWITCH WITH ROTARY ACTUATION

Donald B. Steen, Bowie, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 2, 1977, Ser. No. 764,929
Int. Cl.[2] H01H *3/00, 19/28*
U.S. Cl. 200—153 S **11 Claims**

1. A coaxial high current switch having rotatable cylindrical outer switching means, and an inner switching means mounted coaxially of said outer means and operating in conjunction therewith for controlling the flow of current in the conductors of a coaxial cable, with the outer switching means including



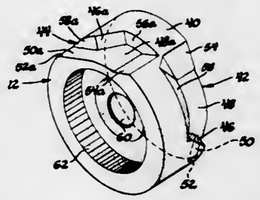
means for connecting the switch to the outer conductors of the coaxial cable, and with said inner means including means for connecting said switch to the inner conductor of the coaxial cable.

4,097,702

CAM ACTUATED SWITCH

Edwin H. Halsted, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 27, 1977, Ser. No. 810,091
Int. Cl.[2] H01H *3/34, 50/64*
U.S. Cl. 200—153 LB **2 Claims**



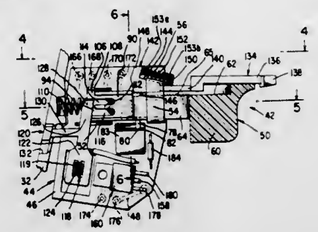
1. A cam actuated reversible switch comprising; a rotatable member adapted to be rotated on an axis in a clockwise and counterclockwise direction having an outer circumferential surface concentric to the axis of rotation; cam means formed on said rotatable member having a substantially radial step portion in a plane oblique to the axis of rotation and a ramp portion, both said oblique step portion and said ramp portion intersecting said outer circumferential surface; and electric contact means having a substantially stationary electrical contact member and a movable electrical contact member having a first spring arm, a second spring arm disposed normal to said first spring arm and a cam follower at the distal end of said second spring arm, said cam follower being maintained in abutment with said rotatable member by said first spring arm, said electrical contact members being maintained in electrical contact when said cam follower is abutting said outer circumferential surface, said electrical contact members being rapidly separated by said first spring arm when said rotatable member is rotated sufficiently in one direction so that said cam follower is permitted to move radially inward by said oblique step portion, said cam follower being maintained in abutment with said oblique step portion by said second spring arm when said rotatable member is rotated in the other direction and said second spring arm and cam follower being moved axially by said oblique step portion to align said cam follower with said ramp portion, said ramp portion forcing said movable contact member radially outward into closing electrical contact with said stationary electrical contact member, said cam follower being moved axially out of alignment with said ramp portion and into alignment with said oblique step portion by said second spring arm when said outer circumferential surface is abutted by said cam follower.

4,097,703

TRIGGER SWITCH AND LOCK MECHANISM THEREFORE

John Martin Houser, Pickens, S.C., assignor to The Singer Company, New York, N.Y.

Filed Aug. 5, 1977, Ser. No. 822,166
Int. Cl.[2] H01H *9/06*
U.S. Cl. 200—157 **17 Claims**



1. A releaseable lock mechanism for a trigger-switch mounted in the handle of a drill housing for activating a motor of a drill, said mechanism selectively to lock the trigger-switch in the activated condition comprising:

(a) a trigger of the trigger-switch slidably connected in the handle and normally biased with the switch off and extending outwardly of the handle, and being depressed to activate the switch,

(b) a camming member affixed in the handle in spaced relation to the trigger,

(c) a locking member shiftably disposed in the handle, and having a lever extending outwardly of the handle and a cam shoe engaging the camming member,

(d) the lever being moved relative the handle to cam the cam shoe against the camming member causing it to shift into a wedge lock against the trigger, and

(e) a resilient means in the housing normally to urge the locking member out of engagement with the trigger and to cause release of the wedge-lock upon slight depression of the trigger resulting in release of the trigger and deactivation of the switch.

4,097,704

INDUSTRIAL REVERSING SPEED CONTROL TRIGGER SWITCH WITH SNAP-IN MODULES

Earl T. Piber, Oconomowoc, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Aug. 2, 1976, Ser. No. 710,921
Int. Cl.[2] H01H *13/08;* **H02P** *7/00*
U.S. Cl. 200—157 **12 Claims**

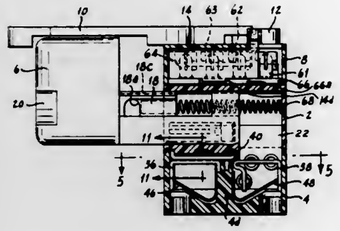
9. A reversing speed control trigger switch of modular construction comprising:

an insulating housing including an upper module having a trigger aperture at the foreward end thereof, and a lower module having a vertically positioned substrate carrying a speed control circuit, said substrate dividing the interior of said lower module into two compartments and extending partially up into said upper module, and double-pole on-off switch contacts mounted in the respective compartments;

snap-in means coupling said lower module to said upper module;

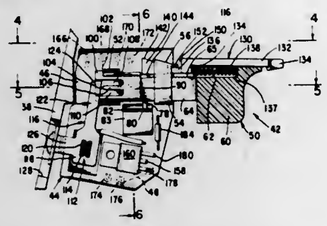
a trigger slidably mounted in said upper module directly above said lower module and extending out through said aperture, said trigger having a channel overlying the upper portion of said substrate including means therein for

operating said speed control circuit, and said trigger having means for operating said on-off switch contacts;
a spring biasing said trigger forwardly;
a reversing switch module on top of said upper module and having reversing contacts and an operating lever extending forwardly above said trigger;
snap-in means coupling said reversing switch module to said upper module;



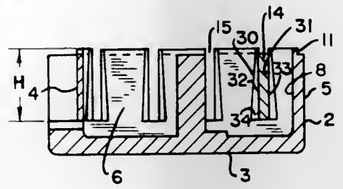
means for connecting an external circuit to said double-pole on-off switch contacts in said lower module;
means for connecting an external circuit to said reversing contacts in said reversing switch module;
and means connecting said speed control circuit to a contact of said reversing switch.

4,097,705
QUICK LOCK-RELEASE MECHANISM FOR A TRIGGER SWITCH
Don L. Harvell, Greenville, S.C., assignor to The Singer Company, New York, N.Y.
Filed Aug. 5, 1977, Ser. No. 822,162
Int. Cl.[2] H01H 9/06
U.S. Cl. 200—157 **5 Claims**



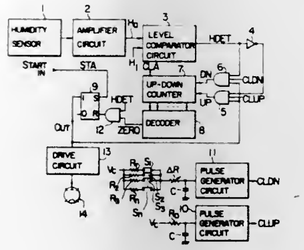
1. A quick lock-release mechanism for a trigger of a trigger-switch mounted in the handle of a drill housing for activating a motor of a drill, said mechanism selectively to lock or release the trigger comprising:
(a) the trigger slidably connected in the handle,
(b) a tapered member affixed in the handle,
(c) a locking member slidably connected to the tapered member and in superposition to the trigger,
(d) a spring disposed between the trigger and the locking member normally to urge each in opposite direction, and
(e) the locking member movable outwardly to be forced by the tapered member into a wedge-lock position against the trigger whereby the trigger-switch is locked "on" and releasable upon slight trigger depression.

4,097,706
MOLDED ENCLOSURE HAVING ZERO DRAFT OPENINGS FORMED IN IT
Joseph T. Roddy, Ballwin, Mo., assignor to Emerson Electric Co., St. Louis, Mo.
Filed Mar. 30, 1977, Ser. No. 782,922
Int. Cl.[2] H01H 9/02
U.S. Cl. 200—293 **11 Claims**



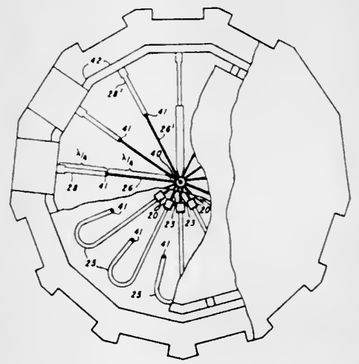
1. In a molded enclosure including a wall with a predetermined material thickness, said wall having an opening in it for permitting passage of a second structural member through it, the improvement comprising means for defining the opening such that the opening has zero effective draft, said opening defining means comprising a first edge, and a second edge oppositely opposed to and spaced from said first edge, each of said first and said second edges including a surface area, said surface area being formed from a part of a conic section, each conic section having at least one line segment parallel to a line segment of the opposed edge, said conic section including substantially the entire thickness of said material thickness.

4,097,707
APPARATUS FOR CONTROLLING HEATING TIME UTILIZING HUMIDITY SENSING
Tetsu Kobayashi; Takato Kanazawa, both of Nara, and Makoto Tsuboi, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed May 17, 1976, Ser. No. 687,303
Claims priority, application Japan, May 20, 1975, 50-60751; May 20, 1975, 50-60752; Nov. 17, 1975, 50-138327
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 B **5 Claims**



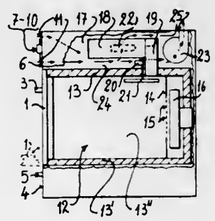
1. A heating time control apparatus for use in a microwave oven having a heating cavity, heating means for heating foodstuff in said heating cavity, and air blowing means for blowing air into said heating cavity, said heating time control apparatus comprising:
humidity sensing means located in the path of air blown by said air blowing means,
comparison means connected to said humidity sensing means for comparing the sensed humidity with a predetermined humidity level and for generating a signal when the sensed humidity reaches said predetermined level,
heating time determining means for determining the total heating time consisting of first and second heating time periods for said food-stuff, said first time period being measured from the application of power to said heating means until the signal from said comparison means is received and said second time period corresponding to the product of a heating time coefficient and said first time period, said heating time coefficient being predetermined depending on the type of food-stuff, and
heating control means for controlling the supply of power to said heating means in response to a signal from said heating time determining means.

4,097,708
SOLID STATE MICROWAVE OVEN POWER SOURCE
Samuel H. Bickel, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Continuation-in-part of Ser. No. 497,152, Aug. 13, 1974, Pat. No. 3,953,702. This application Apr. 2, 1976, Ser. No. 673,024
The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 R **10 Claims**



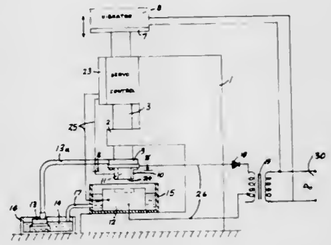
1. A solid state microwave power source comprising a plurality of solid state microwave oscillators and an equal phase power combiner and impedance matching network, said oscillators coupled to input ports of said power combiner whereby the power from each oscillator is coupled to an output port in phase with all the other of said oscillators.

4,097,709
OVEN
Jakob H. Bächtold, Meisterschwanden, and Martin Dahmen, Beinwil am See, both of Switzerland, assignors to Elektromaschinen AG, Horw, Switzerland
Filed Oct. 20, 1976, Ser. No. 734,233
Claims priority, application Switzerland, Dec. 17, 1975, 16327/75
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 R **7 Claims**



1. A baking oven comprising means defining an oven compartment, means for heating the oven compartment with circulating air, a microwave generator for furnishing the oven compartment with microwaves, said oven compartment including a ceiling, said microwave generator being located above said oven compartment and having an underside, a heat shield provided at the underside of the microwave generator in spaced relationship from the ceiling of the oven compartment, waveguide means closed against the oven compartment substantially airtight but permeable to microwaves in the direction of the oven compartment but otherwise impermeable to microwaves, said waveguide means having air permeable walls, and blower means for feeding cooling air between the heat shield and the ceiling of the oven compartment and in a direction extending transversely through the waveguide means by means of said air permeable walls thereof.

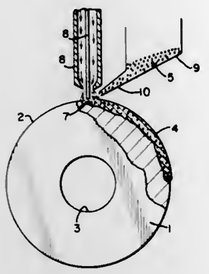
4,097,710
METHOD AND APPARATUS FOR ELECTRICAL MACHINING
Alfred Marie Aimé Maillet, Versailles, Yvelines, France, assignor to Carel Fouche Languepin, Paris, France
Continuation of Ser. No. 600,905, Jul. 31, 1975, abandoned, which is a continuation-in-part of Ser. No. 395,590, Sep. 10, 1973, abandoned. This application Feb. 16, 1977, Ser. No. 769,189
Int. Cl.[2] B23P 1/08
U.S. Cl. 219—69 D **21 Claims**



1. A method of machining a metallic workpiece by electro-erosion, comprising the steps of:
positioning an electrode adjacent said workpiece with an intervening gap;
continuously passing a weakly conductive ionizable liquid through said gap; and
periodically energizing said electrode and said workpiece with a unidirectional voltage sufficient to generate ionic discharge pulses with a cadence in a range of substantially 20 to 200 Hz within said liquid in said gap with a spacing sufficient to allow detritus to be swept off, thereby letting the current in said gap substantially decay before each new pulse.

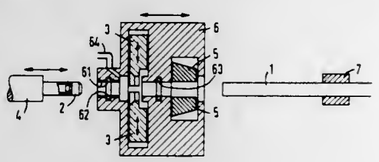
10. An apparatus for machining a metallic workpiece by electro-erosion, comprising:
an electrode spaced by a gap from a surface of a workpiece to be machined;
a reservoir containing a weakly conductive ionizable liquid;
pump means for continuously driving said liquid through said gap; and
a source of intermittent unipolar voltage pulses with a cadence in a range of substantially 20 to 200 Hz connected across said electrode and said workpiece for periodically energizing said electrode and said workpiece to generate ionic discharge pulses within said liquid with a spacing sufficient to allow detritus to be swept off, thereby letting the current in said gap substantially decay before each new pulse.

4,097,711
ROLLER SHELL HARD COATING
Bani Ranjan Banerjee, Skillman, N.J., assignor to Ingersoll-Rand Company, Woodcliff, N.J.
Filed Sep. 16, 1976, Ser. No. 723,786
Int. Cl.[2] B23K 9/04
U.S. Cl. 219—76.15 12 Claims



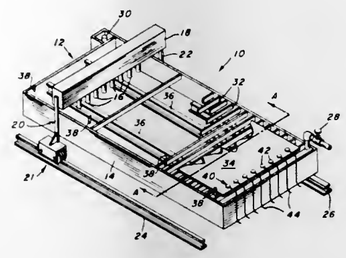
1. A method of hard surfacing a steel roller which comprises:
carburizing the steel surface of the roller to a depth equal to at least half the depth of the hard surfacing required;
applying hard surfacing particles by immersing them in a weld puddle formed on the steel surface from the steel itself by a non consumable gas metal arc welding puddle process so that a uniform dispersion of particles is present in the weld whereby a high effective hardness within the entire thickness of the weld is obtained; and
heat treating the weld to achieve the required properties of base and surface structures.

4,097,712
METHOD OF JOINING NUCLEAR FUEL ROD END CAPS AND NUCLEAR FUEL ROD CLADDING TUBES
Helmut Bezold, Erlangen, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany
Filed Nov. 8, 1976, Ser. No. 739,640
Claims priority, application Germany, Nov. 7, 1975, 2550079
Int. Cl.[2] B23K 11/02
U.S. Cl. 219—107 3 Claims



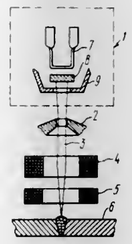
1. Method of joining fuel rod end caps and fuel rod cladding tubes by resistance pressure welding within a welding chamber, which comprises the steps of bringing a welding device into engagement with an end portion of a rigidly mounted cladding tube, shifting an opened chuck as well as a divided welding electrode, both of which are mounted at one side of the welding chamber, along a predetermined length of the cladding tube end portion and bringing the chuck and the divided welding electrode into contact with the cladding tube end portion, thrusting into the welding chamber from the other side thereof another welding electrode carrying an end cap so that the end cap is fed to the open end of the cladding tube end portion and, after the welding chamber is sealed by sealing members sealingly engaging the cladding tube end portion and the other welding electrode, evacuating the interior of the welding chamber and filling it with protective gas, pressing the end cap onto the open end of the cladding tube end portion, and passing a welding current through the welding electrodes so as to weld the end cap to the end of the cladding tube end portion.

4,097,713
PLASMA ARC CUTTING WATER TABLES
Robert S. Dunshee, Whittier, Calif., assignor to United States Steel Corporation, Pittsburgh, Pa.
Filed Jan. 21, 1976, Ser. No. 651,484
Int. Cl.[2] B23K 7/06
U.S. Cl. 219—121 P 15 Claims



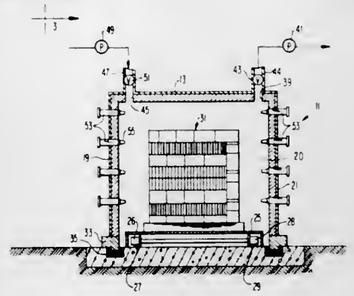
1. A cutting table for a movable plasma-arc torch cutting arrangement, said cutting table being adapted to receive and support a metallic product to be cut into a given number of sections by the torch arrangement, said cutting table comprising:
a container adapted to retain a quantity of water or the like, having a length and width greater than the product to be cut;
non-metallic support means periodically located within said container for supporting the product to be cut at a level just above the water contained within said container, said support means being self-extinguishing, combustibly non-supportive and being of a material characterized in releasing, to the water in said container, any slag formed as a result of cutting such metallic product; and
means, releasably attachable to such product to be cut, for grounding the product to be cut during the total time the product is being cut, such that plasma-arc torch arrangement may operate.

4,097,714
THERMIONIC HEATER CATHODE ASSEMBLY OF ELECTRON-BEAM GUN
Igor Vladimirovich Shergov, Festivalnaya ulitsa, 75, kv. 108, and Sergei Nikolaevich Melbard, ulitsa Akademika Pavlova, 50, kv. 42, both of, Moscow, U.S.S.R.
Filed May 10, 1977, Ser. No. 795,504
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 EB 1 Claim



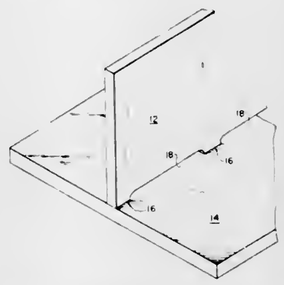
1. A thermionic heater cathode assembly of a welding electron-beam gun, comprising: a disc cathode made of a highlyemissive material; a U-shaped ribbon filament with a thermionic portion and current-carrying sections arranged in parallel near said disc cathode; a holder connected to ends of the current-carrying sections of said ribbon filament; the ends of said ribbon filament sections, connected to the holder lying in a plane normal to the ends of the same section, adjoining the thermionic portion of said ribbon filament.

4,097,715
LASER JET BELL KILN
John N. Frizzi, Pittsburgh, Pa., assignor to General Refractories Company, Bala Cynwyd, Pa.
Filed May 16, 1977, Ser. No. 797,343
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 LM 12 Claims



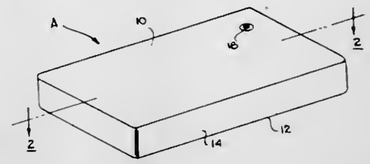
1. A method of firing refractory ware which comprises the steps of providing a bell defining an enclosure and having a plurality of lasers mounted thereon and facing inwardly thereof, lowering said bell over refractory ware to be fired, sealing said bell enclosure, evacuating air from within said bell enclosure, injecting a fluidized system of a chemically inert, non-combustible, high thermal absorption material into said evacuated bell enclosure, firing said lasers into said bell enclosure, said fluidized material absorbing and diffusing the light and heat energy from said laser beams and re-radiating said absorbed energy to thereby heat the bell enclosure and fire said refractory ware.

4,097,716
WELDING METHOD
Walter R. Reichelt, Jr., and Malcolm G. Hoy, both of New Kensington, Pa., assignors to Aluminum Company of America, Alcoa Center, Pa.
Filed Sep. 27, 1976, Ser. No. 726,786
Int. Cl.[2] B23K 9/02
U.S. Cl. 219—137 R 5 Claims



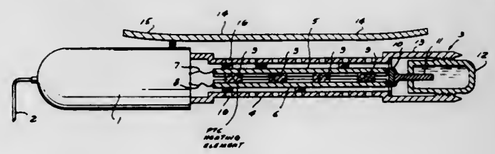
1. A welding method for forming a fillet welded joint comprising the steps of placing an abutting edge of a first metal member onto a surface of a second metal member at generally right angles thereto, the abutting edge having a series of alternating lands and slots extending through the entire thickness of said first member, and arc welding employing a consumable electrode to form a fully penetrated fillet weld from one side only of the joint with the weld filling said slots and melting said lands.

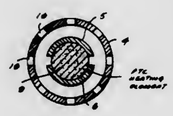
4,097,717
WATER BED MATTRESS WITH REGULATED HEATING MEANS THEREFOR AND CONTROLLING THE HEAT LOSS THEREFROM AND THE METHOD OF MAKING THE SAME
Raymond M. Phillips, 2566 Tuna Canyon Rd., Malibu, Calif. 90265
Filed May 17, 1976, Ser. No. 686,885
Int. Cl.[2] H05B 1/00
U.S. Cl. 219—217 37 Claims



1. A water bed mattress with regulated heating means therefor, said water bed mattress comprising:
(a) an upper and a lower sheet surrounded by a peripheral wall to form a water chamber therebetween, said upper and lower sheets and peripheral wall being formed of a foldable flexible plastic material,
(b) panel means formed of an electrically insulative heat conductive foldable flexible plastic material and being heat sealed to one or more of said upper and lower sheets and peripheral wall and forming a substantially completely enclosed heat generating chamber formed by said one of said sheets and said panel means,
(c) an electrically energizable heating means located within said heat generating chamber and capable of generating heat conductively passed through said upper or lower sheets or peripheral wall to water in said water chamber,
(d) connector means operatively provided for connection of said heating means outwardly of said heat generating chamber to a source of electrical power, and
(e) control means operatively associated with said connector means for regulating the heat supplied by said heating means.

4,097,718
DEVICE FOR HEAT TREATING HAIR ON THE HUMAN HEAD, AND THE LIKE HAIR CURLING DEVICE HAVING SELF-REGULATING PTC HEATER
Hans Joachim Weise, Altenstadt, Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Germany
Filed Jan. 14, 1976, Ser. No. 649,099
Claims priority, application Germany, Feb. 1, 1975, 2504237
Int. Cl.[2] H05B 1/02; A45D 1/02, 2/36
U.S. Cl. 219—222 3 Claims





1. A heat-treating device, particularly for treating hair,

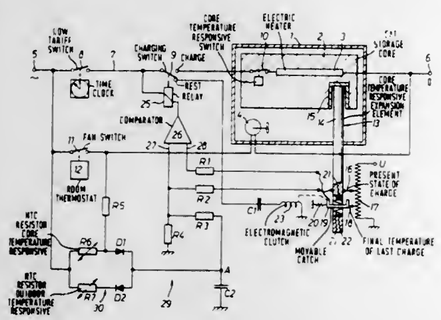
comprising in combination, an outer hair-engaging structure about which hair to be curled or waved can be wound, the hair-engaging structure including holding means for holding hair in position on the hair-engaging structure; a combined heating and temperature regulating means within a cylindrical bore in the hair-engaging structure and including mounting means comprising a pair of mounting components made of thermally and electrically conductive material and defining an intermediate gap, and a plurality of cylindrical PTC resistor bodies located in the gap confined between the pair of mounting components in electrically conductive and thermally conductive engagement with the holding components, said PTC resistor bodies being spaced apart from one another within said gap; and means for applying a voltage across the pair of mounting components to establish a flow of heating current through the PTC resistor bodies, the mounting components being elongated generally semi-cylindrical components electrically connecting the cylindrical PTC resistor bodies in parallel, and the contacting surface portions of the mounting components and of the cylindrical PTC resistor bodies being cylindrical and complementary, thereby establishing good thermal and electrical contact between said contacting surface portions.

4,097,719

CONTROL SYSTEM FOR CHARGING AND DISCHARGING AN ELECTRIC STORAGE HEATER

Gunnar Ernst Rudolf Olsen; Poul Christian Carlos Iversen, both of Nordborg, and Bertel Birker, Sonderborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Aug. 24, 1976, Ser. No. 717,253
Claims priority, application Germany, Sep. 3, 1975, 2539065
Int. Cl.[2] H05B *1/02;* F24H *7/04;* F24D *11/00*
U.S. Cl. 219—364 **7 Claims**



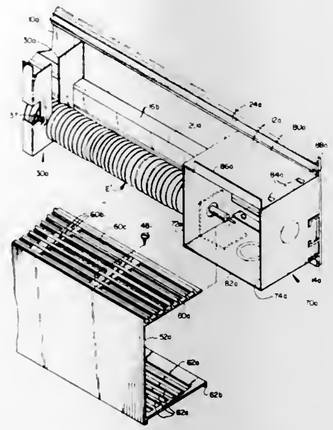
1. An electric storage heater assembly comprising, a heat storage core, a resistance heater for heating said core, a charging switch in series with said heater, a comparator for operating said switch having first and second inputs, a temperature responsive control element movably responsive to the temperature of said core, first control means operated by said control element for sensing the instantaneous temperature of said core during the charging period and being connected to said first input to impart a corresponding signal thereto, second control means movable at the end of the charging period by carrying means associated with said control element to an adjusted position which corresponds to the final temperature of said core for the charging period, said second control means being connected to said second input to impart a corresponding signal thereto, setting means for selectively holding said second control means in said adjusted position during the charging period and means for releasing said setting means after the end of the charging period to allow said carrying means to move said second control means to said adjusted position.

4,097,720

BASEBOARD HEATER

Robert H. Sand, Canton, Conn., assignor to The Vulcan Radiator Company, South Windsor, Conn.

Filed Feb. 11, 1976, Ser. No. 657,099
Int. Cl.[2] F24H *9/08*
U.S. Cl. 219—366 **11 Claims**



1. Apparatus for supporting and housing an elongated heat exchange element, said apparatus comprising an elongated back panel member with a rear face adapted to abut a vertical wall and a front face defining upper and lower integrally formed L-shaped flanges projecting forwardly from and extending the entire length of said back panel member to define vertically spaced channels, at least one support bracket having a vertically extending web oriented transversely with respect to said back panel member, said web provided with an upwardly open slot to receive and support an elongated heat exchange element, said bracket further including upper and lower flanges projecting generally perpendicularly from said web and defining vertically spaced projections, said projections slidably received in said vertically spaced channels of said back panel member, and said back panel member further including forwardly projecting legs also extending the entire length of said panel member and defining a conduit channel therebetween, a cover plate supported by said legs, and said support bracket web being relieved along its rear edges between said upper and lower flanges to accommodate said conduit channel defining legs and cover plate.

4,097,721

MULTIPLE UNIT ELECTRICAL BASEBOARD HEATER

Michael J. DelPercio, Imperial, and Wayne E. Krejci, St. Louis, both of Mo., assignors to Intertherm, Inc., St. Louis, Mo.

Filed Feb. 2, 1977, Ser. No. 764,827
Int. Cl.[2] F24H *9/04;* H05B *3/06*
U.S. Cl. 219—366 **5 Claims**

1. An electrical heating assembly for installation in an elongated cabinet enclosure of the type having a bottom wall, comprising

an inverted channel,

upright support means mounted on said inverted channel,

a plurality of elongated electrical heating units each of the type having an electrical terminal at each end, said heating units being horizontally supported by said upright support means parallel to each other and with their terminals aligned,

a first heat shield outwardly adjacent to one end of said inverted channel and positioned substantially transverse thereto and spaced outwardly from the aligned terminals of said heating units at one end thereof,

a second heat shield outwardly adjacent to the other end of said inverted channel and positioned substantially transverse thereto and spaced outwardly from the aligned terminals of said heating units,

terminal block connector means supported by said first heat shield in position between said first heat shield and said inverted channel and having two connectors,

parallel circuit means having connections from one connector of said terminal block connector means to the adjacent electrical terminals of said heating units and having return connections from the nonadjacent electrical terminals of said heating units along the underside of said inverted channel to the other connector of said terminal block connector means, said return connections including series safety limit switch means associated with each of said heating units, said connections serving as temporary supports, by said channel, for said terminal block connector means,

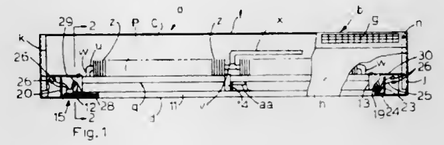


Fig. 1

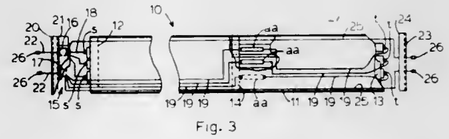


Fig. 3

first line power supply wiring extending from said terminal block connector means and mounting and extending through said first heat shield to a first pair of connector ends outwardly thereof, and

second line power supply wiring extending from said terminal block connector means along the underside of the inverted channel and mounting and extending through said second heat shield to a second pair of connector ends outwardly thereof,

whereby said inverted channel, heat shields, and terminal block connector means of said assembly may each be secured to such bottom wall of such cabinet, the inverted channel and cabinet bottom together forming a wiring raceway, and such cabinet containing said assembly may be field wired to either of said pairs of connector ends.

4,097,722

HAIR BLOWER WITH ORIFICE CONTROL

Norman V. Soler, Port Colborne, and Richard E. DeSisto, Welland, both of Canada, assignors to General Signal Corporation, Rochester, N.Y.

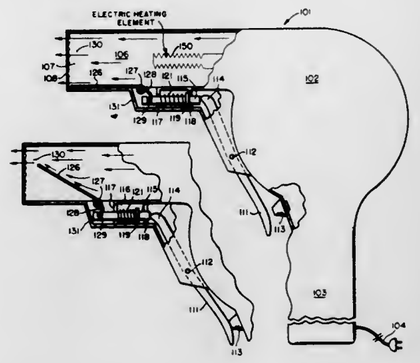
Filed May 24, 1976, Ser. No. 689,211
Int. Cl.[2] A45D *20/12;* B05B *1/12;* F24H *3/04*
U.S. Cl. 219—368 **8 Claims**

1. In a hand held electric hair dryer having a barrel provided with an exhaust orifice, an electric heating element disposed in said dryer, a blower for directing a flow of air over said heating element and through said barrel and out of said orifice, and a pistol type hand grip for holding and manipulating the hair dryer to aim the orifice and the flow of heated air in a desired direction, the improvement comprising:

(a) damper means downstream of the heating element and supported in the barrel in the vicinity of the orifice and pivotally movable between first and second positions providing maximum and minimum effective orifice openings for producing a dispersed and concentrated air flow, respectively;

(c) resilient biasing means coupled to said damper means for normally biasing said damper means to said first position for normally providing a maximum effective orifice opening;

(c) trigger means positioned immediately adjacent the pistol type hand grip for selective actuation between first and second limits by a digit of the hand holding said hair dryer by the hand grip during use of the hair dryer; and



(d) means coupling said trigger means to said damper for selectively moving said damper against the bias of said biasing means from said first to said second position in response to the movement of said trigger means from said first to said second limit; and wherein

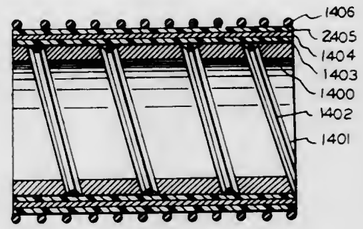
(e) the angle formed between said damper means and the barrel wall, on the downstream side of the pivot point of said damper, is acute.

4,097,723

THERMAL SYSTEMS INCORPORATING APPARATUS AND METHODS FOR SIMULATING TIME RELATED TEMPERATURES

Frank W. Leitner, 3732 Pomfret La., Charlotte, N.C. 28211, and Bobby B. Childress, 145 Shadow La., Charlotte, N.C. 28210

Division of Ser. No. 151,563, Jun. 9, 1971, Pat. No. 3,825,725, which is a division of Ser. No. 779,778, Nov. 29, 1968, Pat. No. 3,586,830. This application Jul. 22, 1974, Ser. No. 490,746
Int. Cl.[2] H05B *1/02*
U.S. Cl. 219—494 **8 Claims**



1. The method of remotely obtaining at least one thermal condition of a load supplied heat over a primary path by a heat source comprising the steps of,

supporting electrical heating means adjacent to said load by common support means for the heating means and the load;

establishing a heat path at least partly different than the primary path having at least a stable thermal parameter known relative to the corresponding thermal parameter of the primary path to the load; and,

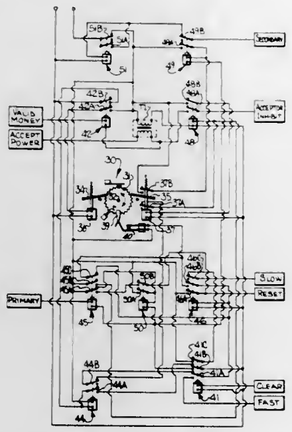
sensing at a point along the heat path to develop control signals for regulating the heat source to provide optimum load control.

4,097,724

FUEL VENDING APPARATUS AND METHOD

Ronald E. Roberson, Ayden, N.C., assignor to Quick Fill, Inc., Ayden, N.C.

Filed Mar. 9, 1977, Ser. No. 775,832
Int. Cl.[2] G06M *3/12*
U.S. Cl. 235—92 FL **19 Claims**



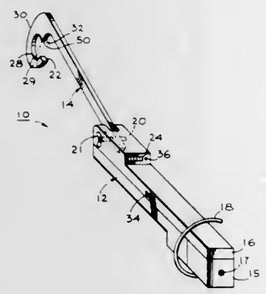
1. In apparatus for vending liquid fuel and having an electrically driven pump means for dispensing fuel, counter means for adding and subtracting credit units and electrically connected for controllably energizing said pump means, money acceptor means for signalling said counter means to add credit units, and a primary dispensing switch means operatively responsive to the dispensing of fuel for signalling said counter means to subtract credit units, the combination therewith of means for guarding against improper dispensing of gasoline and comprising fail-safe circuit means electrically connected with said counter means and said acceptor means and said primary switching means and operably for selectively disabling said pump means from delivering fuel, and secondary dispensing switch means operatively responsive to the dispensing of fuel for signalling said fail-safe means, said fail-safe means responding to signalling by said secondary switching means and abnormality in normal sequential operation of said counter means and said primary switching means by disabling fuel delivery.

4,097,725

GARMENT COUNTER

Frank David Lieberman, and Herb Lou Goodman, both of 4676 Admiralty Way, both of Marina del Rey, Calif. 90291

Filed Apr. 1, 1977, Ser. No. 783,818
Int. Cl.[2] G06M *7/00*
U.S. Cl. 235—92 PK **8 Claims**



1. A counter for garments suspended, by means of hangers having tip portions, from a rail having a lower surface, including:

a wand, said wand having, at one extremity thereof, a slide portion, said slide portion being adapted to engage the lower surface of said rail;

a light source and a light sensor supported in said wand in aligned relationshp with each other to form a light path, said source and sensor being positioned in said wand so as to have said light path interrupted by said tip portions when said slide is moved along the lower surface of said rail; and,

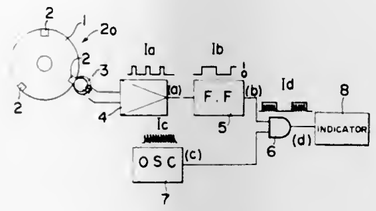
counting means coupled to said sensor for counting the interruptions of said light path by said tip portions as said wand is moved on said slide portion along said lower surface of said rail.

4,097,726

TAPE ENDING INDICATOR FOR TAPE RECORDER

Ken Satoh, Hachioji, and Yoshio Tomizawa, Tama, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jun. 3, 1975, Ser. No. 583,267
Claims priority, application Japan, Jun. 11, 1974, 49-67869[U]
Int. Cl.[2] G06M *1/27;* G11B *19/06, 15/54*
U.S. Cl. 235—92 MP **2 Claims**



1. A tape ending indicator for a tape recorder, comprising:

a rotating member operatively connected to a supply or take-up reel of a tape recorder and adapted to rotate at a speed proportional to the rotational speed of said supply or take-up reel;

a plurality of magnets mounted on and spaced at equal intervals along the periphery of said rotating member;

a magnetic head disposed adjacent to the periphery of said rotating member for generating a pulse signal each time one of said magnets passes said magnetic head;

a flip-flop circuit responsive to said pulse signal, the output of said flip-flop changing each time said pulse signal is applied thereto;

a count pulse generator for producing count pulses of a fixed frequency, the frequency of said count pulses being substantially greater than the frequency of said pulse signals generated by said magnetic head;

gate means connected to said flip-flop circuit and said count pulse generator for passing said count pulses whenever said gate means is enabled by said output of said flip-flop circuit whereby the number of count pulses passed by said gate means is proportional to the frequency of pulses generated by said magnetic head;

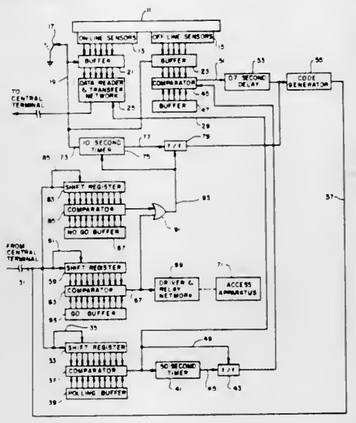
indicator means for counting the number of pulses passed by said gate means and for providing an indication that a terminal end of a tape is approaching when the number of count pulses passed by said gate means reaches a predetermined value.

4,097,727

CIRCUIT FOR CONTROLLING AUTOMATIC OFF-LINE OPERATION OF AN ON-LINE CARD READER

Bryan D. Ulch, Valencia, Calif., assignor to A-T-O Inc., Willoughby, Ohio

Filed Sep. 1, 1977, Ser. No. 830,002
Int. Cl.[2] G06K *5/00;* H04Q *3/00*
U.S. Cl. 235—382 **17 Claims**



1. A security system in which coded cards are scanned at plural remote terminals to determine whether access will be permitted at plural remote locations, said system including a central processor connected to said plural remote terminals and sequentially polling said plural remote terminals to permit said remote terminals, in sequence, to transmit card data to said central processor, said central processor transmitting entry authorization or denial data to said remote terminals in response to said card data, said system comprising:

means at one of said remote terminals for producing a start signal in response to transmission of said card data;

means at said one of said remote terminals for measuring a predetermined elapsed time period after said start signal;

means responsive to said elapsed time measuring means for producing a mode change signal whenever no entry authorization or denial data is received at said one of said remote terminals during said predetermined elapsed time period; and

means responsive to said mode change signal for permitting selective access in response to data on said coded cards at said one of said remote terminals without receipt at said terminal of said entry authorization or denial data from said central processor.

4,097,728

APPARATUS FOR PROVIDING AND SENSING CODED INFORMATION

Leonard J. Genest, Huntington Beach, and Daryle Messner, Buena Park, both of Calif., assignors to Monitron Industries, Santa Ana, Calif.

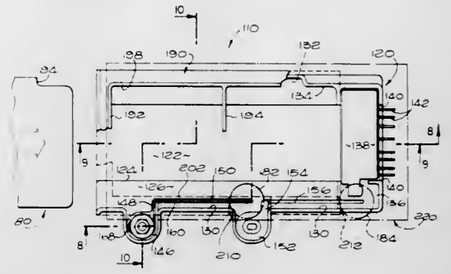
Continuation-in-part of Ser. No. 430,247, Jan. 2, 1974. This application Nov. 13, 1975, Ser. No. 631,558
Int. Cl.[2] G06K *7/08, 19/00*
U.S. Cl. 235—439 **11 Claims**

1. A card for providing coded information to means for receiving and sensing the information, wherein said means comprises at least one sensing coil and means for positioning the card in relation to the at least one coil, said card comprising:

a substrate of electrically non-conductive, non-magnetically reactive material; and,

a layer of magnetically reactive material adapted to be encoded by the selective removal of a portion of said magnetically reactive material from at least one of a plurality of data positions, said data positions being arranged in a predetermined pattern, said at least one data position being adapted to be aligned with and positioned adjacent said at least one coil,

said layer of magnetically reactive material overlying at least a first portion of one side of the substrate, said substrate having a second portion of said one side which when folded about an edge contiguous with the first portion



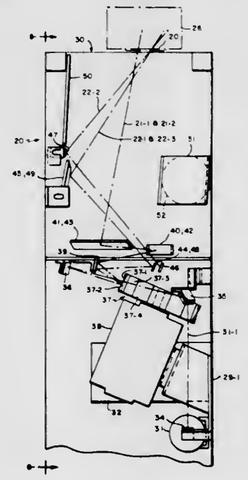
covers at least a first side of said at least one data position without increasing the amount of magnetically reactive material at said at least one data position, at least one of said portions of the substrate having means for securing the portions together in a folded position to form a composite card with said magnetically reactive layer substantially between said two portions of the substrate.

4,097,729

SCANNING SYSTEM AND METHOD

Lawrence Seligman, Shirley; James P. Ballard, Westboro, and Edwin A. Jeffery, Natick, all of Mass., assignors to Data General Corporation, Westboro, Mass.

Filed May 27, 1975, Ser. No. 581,151
Int. Cl.[2] G06K *7/14;* G08C *9/06*
U.S. Cl. 235—467 **18 Claims**



1. A scanner for converting a visual indicia coded pattern into electrical signals which comprises a source of light providing a coherent light beam, a polygon having a plurality of sets of reflecting surfaces positioned about the periphery thereof, means for rotating said polygon, means for directing the coherent light beam to each of said polygon reflecting surfaces one at a time as said polygon is rotated, a first set of reflecting means for generating a first scanning pattern of a first configuration, a second set of reflecting means for generating a second scanning pattern of a second configuration which is different

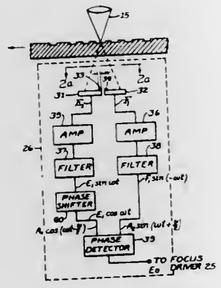
than said first configuration, a different set of said reflecting surfaces of said polygon providing the coherent light beam for each of said sets of reflecting means in order to generate each of said patterns, and wherein said first pattern comprises two trace lines and said second pattern comprises three trace lines.

4,097,730

FOCUS CORRECTION SYSTEM FOR VIDEO DISC PLAYER

Adrianus Korpel, Prospect Heights, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Jul. 2, 1975, Ser. No. 592,710
Int. Cl.² G01J *1/20*
U.S. Cl. 250—201 **4 Claims**



1. In an optical reproducing system in which a multi-turn storage track of a video record is scanned by a focused reading beam of energy to derive information stored in said track, such information including a frequency modulated carrier signal and a focus-servo pilot signal having a frequency which is low relative to that of said carrier and exhibiting the same spatial phase distribution in each turn of said track, a focus correction system comprising:

a displaceable focusing lens disposed in the path of said reading beam;

means, including a photoreceptor comprising first and second light responsive elements symmetrically disposed with respect to the axis of said reading beam and arranged in a spaced apart confronting relation with the gap separating said elements disposed substantially normal to that portion of said track under scansion,

each said element comprising a mask portion extending across said element adjacent to and paralleling said gap for effectively shielding a predetermined area of said element from said reading beam,

said elements being positioned in the far field of said reading beam so as to be responsive to the scanning of said track by said beam for developing a pair of signal components representative of the spatial pattern of said pilot signal,

said components having amplitudes and a phase relation indicative of the degree and sense of the out-of-focus condition, if any, of said beam relative to said track, with one of said components effectively constituting a reference signal for the other said component;

a phase shifter coupled to the output of said first element for shifting the phase of said signal component developed by said first element with respect to said signal component developed by second element an amount sufficient to establish, in the absence of an out-of-focus condition, said components as a pair of quadrature related signals;

a synchronous detector responsive to said pair of quadrature related signal components for developing a focus-error correction signal having an amplitude and polarity determined by the degree and sense of out-of-focus condition;

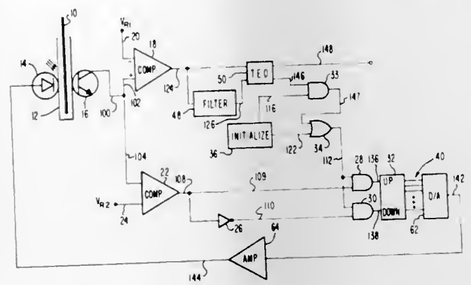
and actuating means coupled to said focusing lens and responsive to said correction signal for displacing said lens an amount and in a direction proportional to the amplitude and polarity of said correction signal to maintain said beam focused on said track.

4,097,731

AUTOMATIC GAIN CONTROL FOR PHOTOSENSING DEVICES

Thomas R. Krause, Troy; Eugene E. Paananen, Brighton, and John F. Burcz, Detroit, all of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Jun. 2, 1977, Ser. No. 802,731
Int. Cl.² G01J *1/32*
U.S. Cl. 250—205 **18 Claims**



1. A self-regulating beam-of-light sensor device for sensing the presence of an object in a sensing station comprising:

a light source having its output directed at the sensing station;

a phototransducer means, disposed in aligned relationship with said light source and responsive to the output thereof, for developing a detection signal in accordance with the presence of an object in the sensing station;

first comparator means for comparing the detection signal with a first reference signal level and outputting a signal representing the presence of an object when the detection signal exceeds the first reference signal;

second comparator means for comparing the detection signal with a second reference signal level and outputting a count signal of a first level if the second reference signal exceeds the detection signal, and of a second level if the detection signal exceeds the second reference signal;

counter means, responsive to the output of the second comparator means, for decrementing a stored count if the count signal is of the first level, and incrementing the stored count if of the second level; and

feedback means, responsive to the stored count of the counter means, for regulating the output intensity of the light source in accordance with the stored count to compensate for extraneous factors affecting the intensity of the source.

4,097,732

AUTOMATIC GAIN CONTROL FOR PHOTOSENSING DEVICES

Thomas R. Krause, Troy; Eugene E. Paananen, Brighton, and John F. Burcz, Detroit, all of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Jun. 2, 1977, Ser. No. 802,711
Int. Cl.² G01J *1/32*
U.S. Cl. 250—205 **10 Claims**

1. A self regulating beam-of-light sensor device for sensing the presence of an object in a sensing station comprising:

a light source having its output directed at the sensing station;

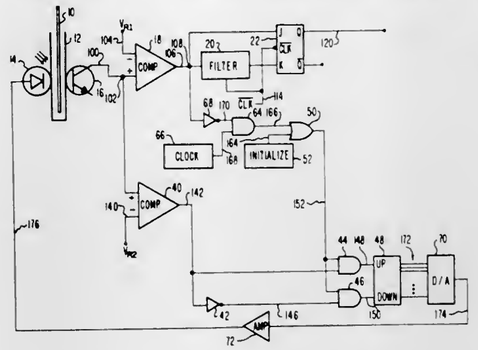
phototransducer means, disposed in aligned relationship with said light source and responsive to the output thereof, for developing a detection signal in accordance with the presence of an object in the sensing station;

first comparator means for comparing the detection signal

with a first reference signal level and outputting a signal representing the presence of an object when the detection signal exceeds the first reference signal;

second comparator means for comparing the detection signal with a second reference signal level and outputting a count signal of a first level if the second reference signal exceeds the detection signal, and of a second level if the detection signal exceeds the second reference signal;

counter means for storing an adjustable count having a



proportional relationship to the intensity of the output of the light source;

feedback means, responsive to the stored count of the counter means, for energizing the light source in proportion to the stored count;

clock means for outputting a stream of periodic clock pulses; and

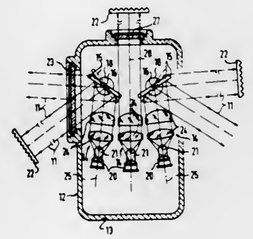
gating means for adjusting the stored count upward or downward for each clock pulse in accordance with the output signal level of the second comparator means.

4,097,733

DOOR SECURING LIGHT BARRIER

Erwin Langenbach, Waldkirch-Buchholz, and Karl-Hans Sackmann, Erzgrube, both of Germany, assignors to Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik, Waldkirch, Germany

Filed Sep. 30, 1976, Ser. No. 728,073
Claims priority, application Germany, Oct. 29, 1975, 2548465
Int. Cl.² G01D *21/04*
U.S. Cl. 250—221 **14 Claims**



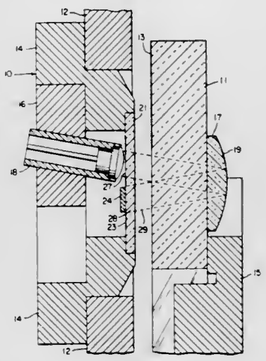
1. A door securing light barrier system comprising: a casing, a plurality of optically active devices in said casing adapted to direct a light barrier beam through at least a part of a door opening, and including at least one light beam transmitting device fixed in said casing, and a passive reflector pivotable about two axes perpendicular to each other for adjusting the angle of the light beam of the light beam transmitting device relative to said casing, one of said devices emitting an electrical signal when the light barrier beam is broken, said light beam transmitting device being combined with a light receiver in an autocollimation system, said casing being adjustable along a vertical axis and being pivotable about said vertical axis.

4,097,734

ZERO INDEX FOR ELECTRO-OPTICAL MEASURING DEVICE

Kent E. Erickson, Brookside, N.J., assignor to Keuffel & Esser Company, Morristown, N.J.

Filed Feb. 9, 1977, Ser. No. 767,082
Int. Cl.² H01J *3/14*
U.S. Cl. 250—237 G **9 Claims**



1. In a measuring system having at least two bodies arranged for close relative movement therebetween in the course of effecting such measure, an improved zero index device capable of providing a distinct indicator of a precise zero datum in said measuring course, said index device comprising:

(a) means associated with one of said bodies for projecting the image of a pair of parallel illuminated slots;

(b) a pair of photoelectric sensors having respective finite fields of view of incident illumination;

(c) means associated with the other of said bodies for directing respective ones of said slot images to incidence upon respective ones of said sensor fields of view in such a manner as to effect, with relative movement between said bodies in the vicinity of the designated zero datum position, an increase in the area of illuminated field of one of said sensors concurrently with a decrease in the area of illuminated field of the other of said sensors, whereby, precisely at said designated zero datum position, the respective sensor fields are equally illuminated; and

(d) means electrically to ascertain said equal illumination of said sensor fields and to provide an indexing signal indicative thereof.

4,097,735

TESTING THE OPERATION OF A RECORDING FLUOROMETER/DENSITOMETER

Donald P. Brezinski, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

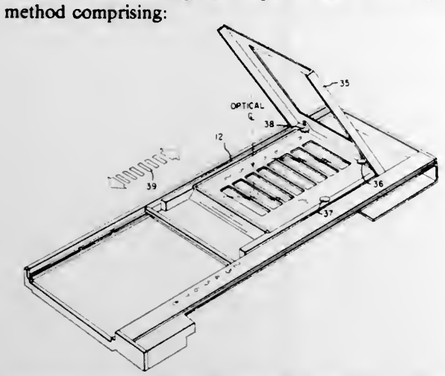
Filed May 24, 1977, Ser. No. 799,943
Int. Cl.² G01D *18/00*; G01N *21/38*
U.S. Cl. 250—252 **12 Claims**

1. A method of testing an optical analyzer of the type which includes:

a source of analysis energy, and a sample stage movable linearly one with respect to the other to scan a sample across said source,

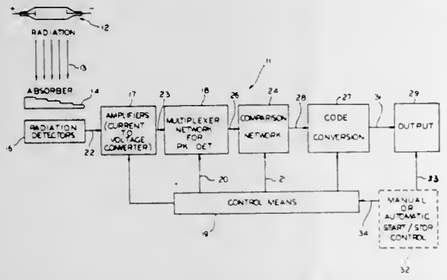
a detector producing an output representing the optical characteristics in a track in said sample, and

a recorder for recording the output of said detector, said method comprising:



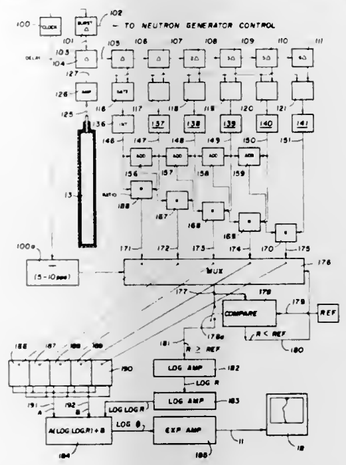
scanning multiple tracks of a test sample which bear features that generate detector outputs indicating performance parameters of said analyzer, and
recording said outputs as a record of said performance.

4,097,736
RADIATION ENERGY CALIBRATING DEVICE AND METHOD
Arnold Frederick Jacobson, Madison, Wis., and James Oliver Pazaris, Chicago, Ill., assignors to Radnovation, Incorporated, Madison, Wis.
Filed Feb. 14, 1977, Ser. No. 767,987
Int. Cl.[2] G12B *13/00*; H05G *1/26*
U.S. Cl. 250—252 **12 Claims**



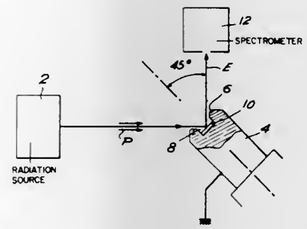
1. A radiation energy calibrating device for determining the peak voltage applied to a source of radiation where the source is subjected to a varying input voltage, said calibrating device comprising:
radiation detector means operated responsive to the radiation output of the source for providing electrical signals that are direct functions of the radiation intensity,
calibrated absorber means between said source and said detector means,
means for detecting the peak electrical signals provided by said radiation detector means;
means for converting the peak electrical signals to the kv peak input to the source, and
wherein said means for converting the peak electrical signals to the kv peak input to the source comprises means for determining the minimum absorber thickness through which the transmitted radiation spectrum is effectively monoenergetic and corresponds to the peak voltage applied.

4,097,737
EPITHERMAL DIE-AWAY POROSITY LOGGING
William R. Mills, Jr., Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.
Filed Nov. 1, 1976, Ser. No. 737,933
Int. Cl.[2] G01V *5/00*
U.S. Cl. 250—269 **16 Claims**



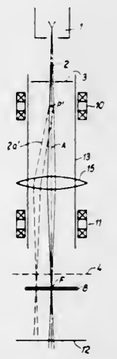
1. An epithermal neutron detector which comprises:
(a) a thermal neutron counter, and
(b) a filter encasing said counter comprising a layer of cadmium about 8 mils thick and a layer of gadolinium about 10 mils thick to impart a substantially step function response immediately above the thermal neutron energy level.

4,097,738
METHOD OF ANALYSIS OF A SAMPLE OF INSULATING MATERIAL BY PHOTOELECTRONIC SPECTROMETRY
Lucette Feve, Gif-sur-Yvette, and Remy Fontaine, Montlhery, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France
Filed Dec. 17, 1976, Ser. No. 751,374
Claims priority, application France, Dec. 19, 1975, 75 39096
Int. Cl.[2] H01J *39/00*
U.S. Cl. 250—305 **9 Claims**



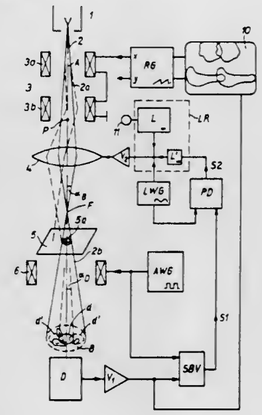
1. A method of analysis of a sample of insulative material by photoelectronic spectrometry comprising the steps of:
fixing said sample of insulative material upon a conductive sample-holder;
subjecting a surface of said sample to photon radiation to effect the emission of photoelectrons therefrom, thereby developing positive charges at said surface in consequence of the vacancies resulting from said emission of photoelectrons which are not neutralized by the flow of charges within said sample;
simultaneously subjecting a portion of said conductive sample-holder to said photon radiation to effect the emission therefrom of electrons in the vicinity of said surface of the sample so as to neutralize said positive charges and thereby create a zone adjacent said surface exhibiting a substantially zero electric field; and
measuring the energy of photoelectrons emitted by said sample, said energy being compared with the energy of incident photon radiation to determine the electron binding energy of said sample.

4,097,739
BEAM DEFLECTION AND FOCUSING SYSTEM FOR A SCANNING CORPUSCULAR-BEAM MICROSCOPE
Karl-Heinz Müller; Moriz V. Rauch; Burkhard Krisch, all of Berlin, Germany, and Lee H. Veneklasen, San Leandro, Calif., assignors to Siemens Aktiengesellschaft, Berlin and Muncih, Germany
Filed Aug. 31, 1976, Ser. No. 719,111
Claims priority, application Germany, Sep. 12, 1975, 2541245
Int. Cl.[2] H01J *37/26*
U.S. Cl. 250—311 **3 Claims**



1. In a scanning, corpuscular-beam microscope including a beam deflection system comprising a first stage for deflecting the beam out of the optical axis of the microscope and a second stage, disposed after the first stage along the beam path, for deflecting the beam towards the optical axis of the microscope, and a first objective lens having a short focal length, disposed after the second beam deflection stage along the beam path, for focusing the beam on a specimen, the improvement comprising,
a second objective lens having a long focal length and disposed above said first objective lens along the beam path, said second objective lens being excited for low magnification of the specimen by the microscope and redirecting said deflected beam in a direction approximately parallel to said microscope axis and focusing said beam on said specimen, said first objective lens and said second stage of said deflection system being inoperative during said redirection of said beam by said second objective lens.

4,097,740
METHOD AND APPARATUS FOR FOCUSING THE OBJECTIVE LENS OF A SCANNING TRANSMISSION-TYPE CORPUSCULAR-BEAM MICROSCOPE
Karl-Heinz Müller; Reinhard Schliepe, and Volker Rindfleisch, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany
Filed Sep. 9, 1976, Ser. No. 721,693
Claims priority, application Germany, Sep. 19, 1975, 2542356
Int. Cl.[2] H01J *37/26*
U.S. Cl. 250—311 **9 Claims**

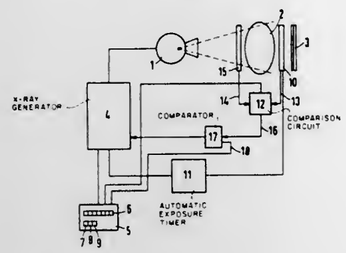


1. In a method for focusing the objective lens of a scanning transmission-type corpuscular-beam microscope in which the beam of the microscope is deflected by a deflection system excited in sawtooth fashion and generates a raster consisting of parallel lines on a specimen to be examined, said microscope including a beam radiation detector disposed behind the specimen along the beam path which generates an output signal which controls the brightness of a picture tube monitor operated synchronously with said raster, the improvement comprising the steps of,
measuring, during the exposure of a specimen point, partial beam radiation intensities in a cone of the beam at two points disposed symmetrical with respect to the longitudinal axis of said beam cone by means of said detector, the effective input area of said detector being smaller than the cross-sectional area of said cone at the same height in said microscope, and
adjusting the lens current of the objective lens of said microscope so that output signals generated by said detector are equal for both of said beam radiation measurements at said points thereby focusing said beam on said specimen.

4,097,741
X-RAY DIAGNOSTICS SYSTEM FOR X-RAY PHOTOGRAPHS
Manfred Pfeiler, and Kurt Dietz, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Oct. 20, 1976, Ser. No. 734,102
Claims priority, application Germany, Oct. 20, 1975, 2546948
Int. Cl.[2] H05G *1/02, 1/44*
U.S. Cl. 250—322 **6 Claims**

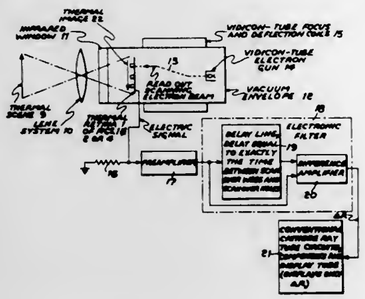
1. In an X-ray diagnostics system for making X-ray photographs including a control console having console selection means for selecting photographic values according to the organ to be examined, a radiation detector arranged to sense radiation exposure, and X-ray exposure control means connected with said radiation detector and operable for switching off the X-ray radiation when a predetermined radiation dose has impinged on said radiation detector, actual value signal

means connected with said radiation detector and operable for forming a transparency-actual value signal which corresponds to the X-ray transparency of a patient being examined, and comparator means connected with said actual value signal means and operable for comparing the transparency-actual



value signal with a further signal which corresponds to the photographic values selected at the control console and for supplying an output signal when the transparency-actual value signal deviates from a predetermined value range relative to said further signal.

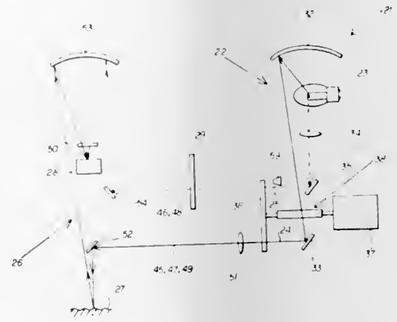
4,097,742
THERMAL CAMERA TUBE
Edward Herbert Eberhardt, Fort Wayne, Ind., assignor to International Telephone & Telegraph Corporation, Nutley, N.J.
Filed May 25, 1977, Ser. No. 800,593
Int. Cl.[2] H01J *31/49*
U.S. Cl. 250—333 **36 Claims**



1. In a thermal camera tube, a thermal retina disposed in a vacuum envelope to receive thermal radiation emitted from an object comprising:
a bolometric thin film target;
a heat sink mesh disposed between said thermal radiation and said target to support said target, said heat sink mesh having webs to define web areas of said target and holes surrounded by said webs to define hole areas of said target; and
a contacting electrode disposed over said holes connecting said thin film target in said holes to said webs.

4,097,743
MOISTURE ANALYZING METHOD AND APPARATUS
Roger E. Carlson, Hopkinton, Mass., assignor to Moisture Systems Corp., Hopkinton, Mass.
Filed Apr. 19, 1977, Ser. No. 788,750
Int. Cl.[2] G01J *1/00*
U.S. Cl. 250—339 **40 Claims**

1. Analyzer apparatus comprising:
radiant energy source means;
first optical means for receiving radiant energy from said source means and producing first and second radiant energy beams having the same given band of wavelength;
second optical means for receiving radiant energy from said source means and producing third and fourth radiant energy beams having a common band of wavelength different than said given band;
photodetector means;
radiant energy director means for directing said first and third beams first to a sample being analyzed and then to said photodetector means and directing said second and fourth beams to said photodetector means; and



output means for comparing the energy levels of said beams as detected by said photodetector means.

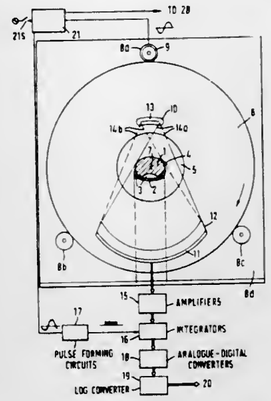
2. Apparatus according to claim 1 wherein said photodetector means produces a signal V_m dependent upon the energy level of said first beam, a signal V_r dependent upon the energy level of said third beam, a signal $V_{m'}$ dependent upon the energy level of said second beam, and a signal V_r dependent upon the energy level of said fourth beam, and said output means comprises signal processor means for producing an output signal dependent upon the relationship

$$\frac{V_r}{V_m} \times \frac{V_{m'}}{V_r}.$$

4,097,744
RADIOGRAPHIC APPARATUS HAVING REPETITIVE MOVEMENT OF THE ORIGIN OF THE RADIATION
Christopher Archibald Gordon LeMay, Osterley, England, assignor to EMI Limited, Hayes, England
Continuation of Ser. No. 630,779, Nov. 11, 1975, Pat. No. 4,010,370. This application Sep. 22, 1976, Ser. No. 725,507
Claims priority, application United Kingdom, Nov. 13, 1974, 49074/74
The portion of the term of this patent subsequent to Mar. 1, 1994, has been disclaimed.
Int. Cl.[2] G01N *21/34, 23/04;* G01T *1/20*
U.S. Cl. 250—366 **28 Claims**

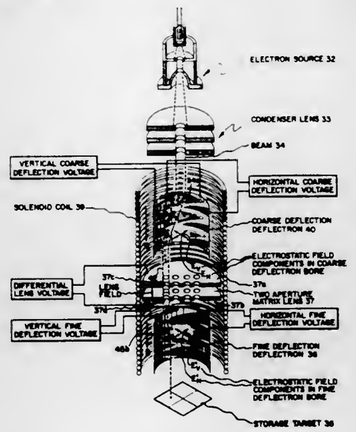
1. An apparatus, for examining the body of a patient by means of penetrating radiation such as x-radiation, the apparatus including: a source of a substantially planar fan-shaped distribution of said radiation; support means arranged to support said source so as to irradiate a slice of said body with said radiation; detector means, including a plurality of detectors arranged to detect the radiation after passage through the body along a plurality of beams at different angles within said distribution; means for angularly moving the support means, and with it the source, about an axis intersecting the slice; and means for repetitively angularly displacing said beams relative

to said support means, such that, during each of a series of increments of the angular movement of said support means,



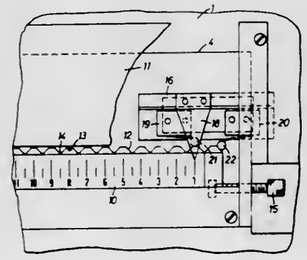
each of said beams remains at the same inclination in relation to said body.

4,097,745
HIGH RESOLUTION MATRIX LENS ELECTRON OPTICAL SYSTEM
Harold G. Parks, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Filed Oct. 13, 1976, Ser. No. 732,019
Int. Cl.[2] G01K *1/08*
U.S. Cl. 250—398 **14 Claims**



1. An electron optical system for use in deflecting a beam of collimated electrons emitted by source means along an axis of said optical system toward a surface of target means spaced from said source means, comprising:
electron lens means positioned along said system axis between said source and target means and having an array of a plurality of lenslets each adapted for focussing a beam of electrons impinging thereon substantially to a point at a selected distance beyond said lens means toward said target means;
first means for forming a magnetic field of substantially constant amplitude essentially along said system axis at least between said lens and target means;
first deflection means for selectably deflecting said electron beam axially emitted from said source beam to illuminate a selected one of said plurality of said lenslets; and
second deflection means positioned between said lens and target means for relaying and deflecting the focussed beam of electrons to a selected impact site upon said target means surface responsive to the magnitude and polarity of a variable electric field and to said axial magnetic field contained within said second deflection means.

4,097,746
DRIVING AND POSITIONING ARRANGEMENT FOR RADIOGRAPHY
William Ellis Ingham, Peppard Common, Nr. Henley-on-Thames, and Anthony Michael Williams, Iver, both of England, assignors to EMI Limited, Middlesex, England
Filed Sep. 23, 1976, Ser. No. 726,051
Claims priority, application United Kingdom, Oct. 2, 1975, 40282/75
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—444 **3 Claims**



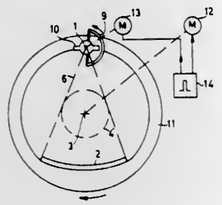
3. A radiographic system comprising:
a frame member having a housing with an aperture dimensioned to permit passage therethrough of at least part of a patient's body;
a carriage for supporting the patient's body in a generally horizontal position;
means for supporting the carriage and for moving the carriage, and with it the patient's body, relative to and through the aperture, generally along the longitudinal axis of the patient's body, to dispose a selected slice of the body at a selected position, relative to the aperture, for irradiation of said slice with penetrating radiation;
a scale member having a first part supported by said frame member and a second part supported by said carriage and moving therewith relative to said aperture, said parts of the scale member being juxtaposed and being dimensioned and marked to indicate, by their positions with respect to each other, the position of the carriage relative to the aperture;
means for selectively moving at least one of said scale member parts relative to the other, while the frame member and the carriage remain stationary, to cause said scale member parts to assume a selected juxtaposition relative to each other when said selected slice of the body is disposed at said selected position relative to the aperture of the frame member housing;
one of said scale member parts including a rack member with alternating ridges and notches extending along said longitudinal axis of the patient's body and the other one of said scale member parts including a first and a second microswitch each having a first and a second state;
means for placing each microswitch in its first or in its second state depending on whether a ridge or a notch of rack member is disposed at a selected position relative to the microswitch, the changes in state of said microswitches during relative movement of the two scale member parts being an indication of the extent and direction of such movement.

4,097,747

DEVICE FOR MEASURING ABSORPTION OF RADIATION IN A SLICE OF A BODY

Günter Kowalski, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 21, 1977, Ser. No. 761,452
Claims priority, application Germany, Feb. 3, 1976, 2604020
Int. Cl.² G03B *41/16*
U.S. Cl. 250—445 T **4 Claims**



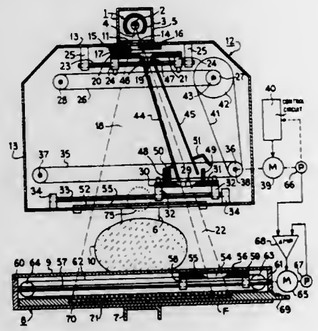
1. A device for measuring radiation absorption in a slice of a body, comprising a radiator which emits a fan-shaped radiation beam which completely envelops a body to be examined, an array of detectors, arranged behind the body, for measuring local radiation intensity, a movement mechanism for rotating the radiator/detector system during a measurement, and shielding means which moves with the radiator in a translatory manner during the measurement and whose orientation in space is not rotated, at least for as long as it is present in the beam path, the angle of rotation of the radiator/detector system being equal to the sum of the scanning angle (β) and the opening angle (α) of the fan-shaped radiation beam.

4,097,748

X-RAY APPARATUS ESPECIALLY FOR MAMMOGRAPHY

Jacques Monvoisin, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Apr. 5, 1977, Ser. No. 784,743
Claims priority, application France, Apr. 9, 1976, 76 10567
Int. Cl.² G03B *41/16*
U.S. Cl. 250—505 **6 Claims**



1. In an X-ray machine, especially for mammography which includes

a source of X-radiation, means for holding said source of X-radiation, for holding an object to be irradiated and for holding means for forming an image from said X-radiation, said source having a fixed diaphragm which defines a beam of X-radiation which has an angular deviation such that its shape resembles a pyramid of rectangular cross section, said X-ray machine further including beam-defining means for passing only a limited portion of said pyramidal beam, said beam-defining means being capable of motion in a plane perpendicular to the axis of said pyramidal beam, the improvement comprising:

said beam-defining means includes in combination:

a first slit disposed near said source for defining a narrow beam the long extent of which is substantially perpendicular to the motion of said beam-defining means;

a second slit disposed near and ahead of said object;

a third slit, disposed near and behind said object and ahead of said image forming means; and

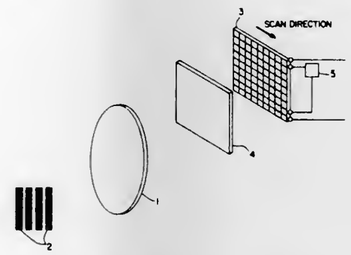
means for displacing said first, second and third slit in unison along mutually parallel planes and in a manner to maintain geometrical similarity, i.e., to maintain a line of sight through said slits to said source of X-radiation.

4,097,749

FOURIER POWER SPECTRA OF OPTICAL IMAGES USING CCD'S

Keith L. Gardner, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 6, 1977, Ser. No. 757,429
Int. Cl.² G02B *27/38*
U.S. Cl. 250—550 **5 Claims**



1. A direct optical Fourier analysis system comprising:

a focusing device for producing an optical image of an optical input along an optical axis,

an electro-optical modulation device following the focusing device on the optical axis for varying the input signal at variable controllable intervals;

a two-dimensional charge coupled device following the modulating device along the same optical axis with a multiplicity of photo sensitive elements included therein a clock driver for scanning the charge coupled device as a means for detecting and processing the modulated signal and producing a Fourier power spectra output.

4,097,750

METHOD OF ORIENTING OBJECTS USING OPTICALLY SMEARED IMAGES

Robert W. Lewis, Rochester; Bernard W. Joseph, Berkley, and Frederick R. Faxvog, Rochester, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

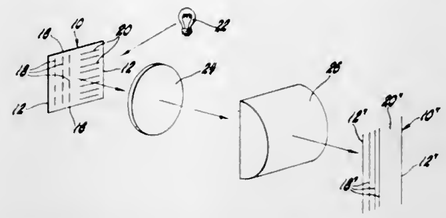
Filed Mar. 18, 1977, Ser. No. 779,158
Int. Cl.² G01N *21/30*
U.S. Cl. 250—548 **7 Claims**

1. The method of determining the orientation of an industrial part wherein the part is characterized by a pattern of dominant parallel lines comprising the steps of

optically forming an image of the said part and smearing the image by at least one cylindrical lens having a cylinder axes to thereby smear the image as a function of the angle between the said parallel lines and the cylinder axis, the smeared image lines being sharpest when the direction of smearing is parallel to the said parallel lines and the smeared image lines are less sharp when the direction of smear differs from the direction of the parallel lines,

angularly scanning the part by rotating the image of the part relative to the cylindrical lens so that the smeared line image sharpness varies according to the angle of image rotation,

photoelectrically detecting the smeared line image to acquire data on image sharpness, and



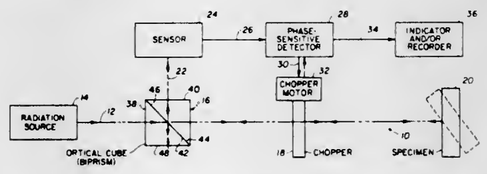
processing the acquired data to establish the angle of image rotation which results in the sharpest image and relating that angle to the angular orientation of said pattern of parallel lines.

4,097,751

RETROREFLECTANCE MEASURING APPARATUS

Walter G. Egan, Woodhaven; Herbert B. Hallock, Huntington, and Theodore W. Hilgeman, Deer Park, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Sep. 24, 1976, Ser. No. 726,262
Int. Cl.² G01N *21/30*
U.S. Cl. 250—571 **1 Claim**



1. Apparatus for measuring the electromagnetic reflectance and retroreflectance properties of the surface of a body or test specimen comprising:

a radiation source for generating a collimated beam of electromagnetic radiation which is directed such as to be incident on said specimen;

beam splitting means interposed in the path of said beam for transmitting components of said beam and reflecting other components thereof, including radiation reflected from said specimen, and stray ambient radiation;

radiation sensor means exposed to radiation reflected substantially by said beam splitter and producing an output signal in response to said reflected radiation;

radiation chopping means interposed in the path of said beam intermediate said beam splitter and said specimen for periodically blocking said radiation directed at said specimen whereby, when said chopper blocks reflectance from said specimen, the radiation reflected by said beam splitter into said sensor serves as a reference signal and, when the chopper passes radiation, the reflected radiation incident on said sensor serves as a measuring signal for determining reflectance from said specimen;

sequencing means for regulating the chopping rate of said chopper;

detector means for receiving said sensor output signal and having means for processing said sensor signal in coordination with said sequencing means, said detector having further means for comparing said reference signal component and said measuring signal component and producing a difference signal therefrom that characterizes the reflectance of said specimen; and

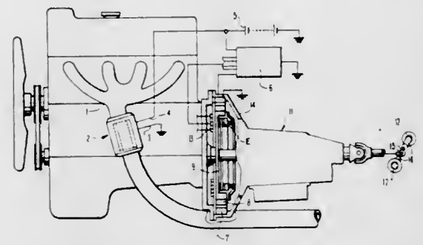
signal intelligence means receiving said difference signal and reducing said signal to a form suitable for utilization.

4,097,752

POWER SUPPLY OF INSTALLATIONS DRIVEN BY INTERNAL COMBUSTION ENGINES, ESPECIALLY OF MOTOR VEHICLES

Helmut Wulf, Ostfildern, and Wolfgang Weidemann, Fellbach, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Jul. 8, 1976, Ser. No. 703,603
Claims priority, application Germany, Jul. 12, 1975, 2531244
Int. Cl.² B60K *25/00*; F02G *5/02*
U.S. Cl. 290—20 **13 Claims**



1. A power supply arrangement for installations driven by internal combustion engines, which comprises a generator means, a storage battery means and load means as well as switching means and means for operatively connecting the generator means, storage battery means, load means and switching means, at least one thermionic converter means acted upon by the hot exhaust gases of the internal combustion engine serving as generator means, characterized in that also at least one electric motor means is provided as load means which mechanically feeds into the power flow of the drive connection of the installation, the thermionic converter means being constructed and rated for power output in accordance with the utilizable thermal energy content of the exhaust gases of the internal combustion engine, the electric motor means including a rotor and a stator, the rotor being operatively connected with a rotating part in the power flow connection for the mechanical drive of the installation, and the stator being arranged non-rotatably about the rotor and being radially immovably supported with respect to the rotor, and the electric motor means being arranged within the area of a flywheel of the internal combustion engine the rotor serving at least as a part of the flywheel mass.

4,097,753

COMPARATOR CIRCUIT FOR A C-2C A/D AND D/A CONVERTER

Peter William Cook, Mount Kisco; James Thomas Parrish, Carmel, and Stanley Everett Schuster, Granite Springs, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,178
Int. Cl.² H03K *5/20*
U.S. Cl. 307—359 **13 Claims**

1. A comparator circuit for comparing voltage levels in a digital-to-analog (D/A) converter, comprising:

a first field effect transistor (FET) having a gate and first and second electrodes, with its gate connected to the output of the D/A converter:

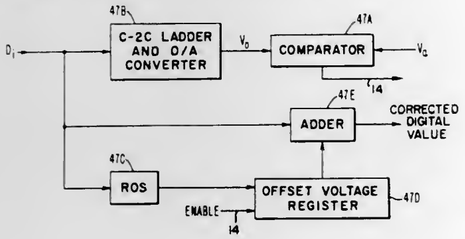
a second field effect transistor (FET) having a gate and first and second electrodes, with its gate connected to an analog input voltage, said first and second FETs each having their first electrode connected to a common voltage source;

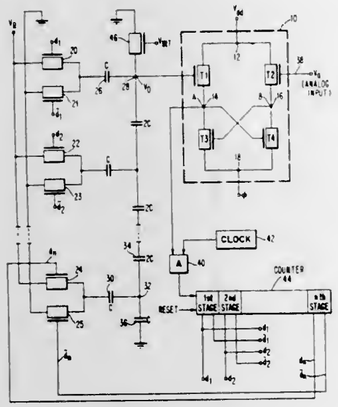
a third FET having a gate and first and second electrodes, with its first electrode connected with the second electrode of said first FET at a first common node;

a fourth FET having a gate and first and second electrodes, with its first electrode connected with the second elec-

trode of said second FET at a second common node, said second node being also connected to the gate of said third FET, said first node being also connected to the gate of said fourth FET, and said third and fourth FETs each having its second electrode connected to a common phase voltage source;

said digital-to-analog converter having an input and an output, with its output leading into the gate of said first FET and its input connected to respond to a means providing a digital representation of said analog input voltage which is connected to the output produced by said comparator at one of said common nodes; and



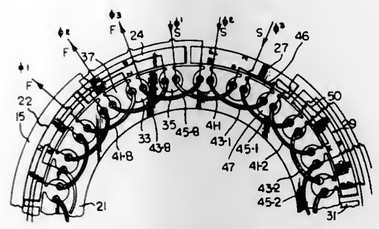


means for generating an offset voltage which is used to compensate for the differences in threshold voltages and current carrying capabilities of said four FETs said means for generating an offset voltage including means for adding said offset voltage to said digital representation of said analog input voltage being compared;

whereby said four FETs included in said comparator circuit compare said analog input voltage with said output of said D/A converter and produces an output at either of said common nodes.

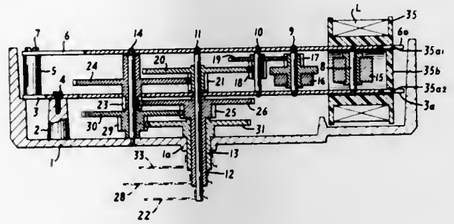
4,097,754
SHORT PITCH ALTERNATOR
James B. Farr, Ann Arbor, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.
Filed Oct. 20, 1976, Ser. No. 734,117
Int. Cl.² H02K *21/12*
U.S. Cl. 310—67 R **10 Claims**

1. A three-phase alternating current generator having first and second relatively rotatable portions, an even number of *n* magnetic poles disposed on the first portion, the second portion comprising a slotted magnetic core having 3*n* slots respectively defining teeth therebetween, 3*n* coils, each coil being disposed about an adjacent pair of teeth and every third coil being connected in series to form a phase winding, there being



three-phase windings each formed of a different group of *n* coils.

4,097,755
CONSTRUCTION OF ELECTROMAGNETIC DRIVING DEVICE
Kiyoshi Kitai, Tokyo; Masuo Ogihara, Chiba; Kozo Sato, Yotsukaido, and Nobuo Shinozaki, Chiba, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan
Filed May 11, 1976, Ser. No. 685,408
Claims priority, application Japan, May 14, 1975, 50-57101; May 14, 1975, 50-63774[U]; May 14, 1975, 50-63778[U]
Int. Cl.² H02K *16/02*
U.S. Cl. 310—114 **6 Claims**



1. An electromechanical driving device comprising:

first and second permanent magnet rotors each having a plurality of magnetic poles;

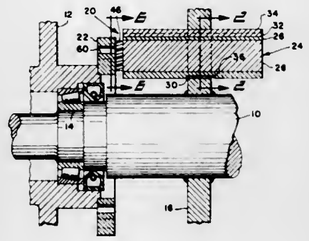
at least one non-magnetic support plate having said rotors mounted thereon for rotation, said non-magnetic support plate including a projection projecting from an edge of said support plate in a direction of the length of said projection;

first mounting means for mounting said first rotor for rotation on said projection of said non-magnetic support plate, and second mounting means for mounting said second rotor for rotation on said non-magnetic support plate at a position proximate said first rotor for magnetically coupling with said first rotor and offset from the length direction of said projection so that a direction between said first and second rotors and the length direction of said projection are non-parallel;

a wheel train mounted on said support plate coupled with and driven by said second rotor; and

a coreless field coil energizable to develop an electromagnetic field and including a coil bobbin having an axial bore dimensional to receive said projection and positioned with said projection inserted into said axial bore to mount said coreless field coil on said projection of said support plate with said first rotor within said axial bore and positioned to drive said first rotor with the electromagnetic field to thereby drive said wheel train upon energization of said coreless field coil.

4,097,756
TUBULAR WHEEL SPEED SENSOR
Thomas A. Gee, Allen Park, Mich., assignor to Eaton Corporation, Cleveland, Ohio
Division of Ser. No. 460,325, Apr. 12, 1974, Pat. No. 4,029,108.
This application Jan. 28, 1976, Ser. No. 653,060
Int. Cl.² H02K *21/38*
U.S. Cl. 310—155 **1 Claim**



1. A device for sensing the rotational speed of a body relative to a reference structure on which said body is rotationally mounted, said device comprising:

a substantially tubular housing mountable in an aperture provided in said reference structure with the axis of said housing substantially parallel to but offset the axis of rotation of said body;

a source of magnetic flux received in said housing;

means for producing a split magnetic flux path, said split magnetic flux path producing means including first and second pole pieces received in said housing and positioned relative to said source of magnetic flux so as to be parallel to and equidistant from said source, rotation of said housing relative to said reference structure effective to vary the spacing of said pole pieces as measured on the circumference of a circle coaxial with the axis of rotation of said body;

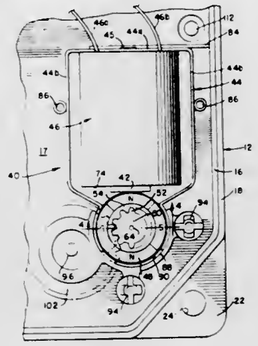
coil means including a first winding wound about a portion of said first pole piece and a second winding wound about a portion of said second pole piece, said first and second windings between interconnected to produce an output signal at a set of terminals; and

means for mounting said tubular housing in said aperture in said reference structure, said mounting means permitting limited axial movement of said tubular housing relative to said structure, said mounting means comprising:

a key received in a first keyway formed in the outer periphery of said tubular housing, said key being positioned in said first keyway so as to be substantially parallel with the axis of said tubular housing, said key also being engageable with a second keyway provided in said reference structure, said second keyway being in communication with said aperture, varying the circumferential position of said second keyway relative to said aperture effective to vary the rotational position of said housing relative to said reference structure; and

a radial spring positioned on the outer surface of said tubular member so that the inner surface of said radial spring is in contact with said outer surface of said tubular housing, said radial spring being substantially circular in cross section and having projections on the outer surfaces thereof, said projections being engageable with said aperture in said supporting structure.

4,097,757
SYNCHRONOUS MOTOR
Anthony W. Rigazio, Oglesby, Ill., assignor to General Time Corporation, Thomaston, Conn.
Filed Feb. 18, 1976, Ser. No. 659,108
Int. Cl.² H02K *21/00*
U.S. Cl. 310—162 **15 Claims**



1. A synchronous motor comprisng:

(a) a rotor of disc-shaped outline, said rotor having a plurality of permanently magnetized portions disposed in contiguous alternating fashion around an axis of rotation;

(b) a single-piece stator, said stator having a pair of legs defining at opposite ends a pair of stator poles, said poles being arcuate in outline, disposed substantially coaxially along said axis at an air gap, and spaced apart by an angle of between about 90° and 180°;

(c) a coil assembly including

(2) an elongated core having one end directed toward and located substantially at said air gap, said core end providing a core pole disposed substantially equidistantly from said stator poles, and

(2) a winding having a plurality of turns supported by said core, said winding adapted at opposite ends to be connected to means providing a source of current; and

(d) means mounting said rotor in said air gap and said stator to the other end of said core whereby said current source develops an energizing flux field across said air gap between said poles for driving said rotor.

4,097,758
COAXIAL DISK STACK ACYCLIC MACHINE
Kenneth W. Jenkins, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Filed Aug. 2, 1976, Ser. No. 710,926
Int. Cl.² H02K *31/00*
U.S. Cl. 310—178 **14 Claims**

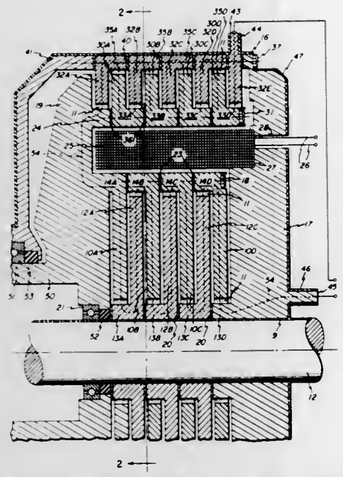
1. A radial type acyclic machine comprising:

a central, axial shaft;

a first plurality of low magnetic reluctance, electrically conductive disks centered about said shaft and positioned in a first axial stack rotatable about said shaft;

a second plurality of low magnetic reluctance, electrically conductive disks positioned in a second axial stack about said first axial stack and rotatable about said shaft;

conductive means electrically interconnecting each disk in each of said first and second pluralities of disks; and



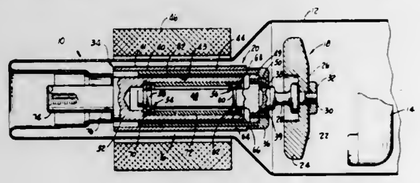
means establishing an axially-directed magnetic field through each of said first and second pluralities of disks.

4,097,759

X-RAY TUBE

Avery D. Furbee; Roy F. Kasten, Jr., both of Elmhurst, and Viktor W. Pleil, Wheaton, all of Ill., assignors to Picker Corporation, Cleveland, Ohio

Filed Jul. 21, 1976, Ser. No. 707,218
Int. Cl.[2] H01J *35/04*
U.S. Cl. 313—60 **24 Claims**



1. An X-ray tube having an evacuated envelope within which are disposed a rotatable anode and a cathode, comprising:

(a) a support structure for rotatably supporting said anode, said support structure adapted to rapidly dissipate heat;

(b) a shaft upon which said anode is affixed extending outwardly of said support structure, said shaft adapted to control the rate of heat transfer from said anode to said support structure; and,

(c) a bearing included as part of said support structure, said bearing having portions lubricated by ion implantation of lead.

15. A rotatable anode structure for use in an X-ray tube, comprising:

(a) a cylindrical rotor body;

(b) a shaft extending outwardly from said rotor body along an axis substantially parallel to the axis of rotation of said rotor body;

(c) a disc-like anode affixed to said shaft;

(d) a housing disposed concentrically within said rotor body about which said rotor body rotates; and,

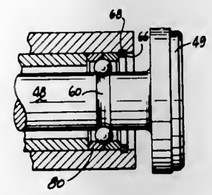
(e) a black coating applied to the outer surface of said rotor body, the inner surface of said rotor body, and the outer surface of said housing.

4,097,760

X-RAY TUBE HAVING BEARING LUBRICATION

Gabriel Cinelli, Niles, Ill., assignors to Picker Corporation, Cleveland, Ohio

Filed Jul. 21, 1976, Ser. No. 707,219
Int. Cl.[2] H01J *35/04*
U.S. Cl. 313—60 **6 Claims**



1. An X-ray tube, comprising:

(a) an evacuated envelope;

(b) a cathode and an anode disposed within said envelope;

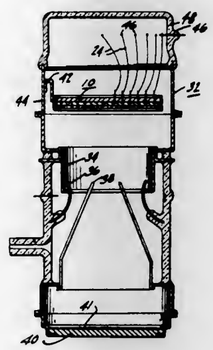
(c) means supporting said anode for rotation, said means including a bearing having portions lubricated by the ion implantation of a thin layer of metal.

4,097,761

IMAGE TUBE CATHODE

John E. Ruedy, and George A. Morton, both of Princeton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 16, 1966, Ser. No. 531,644
Int. Cl.[2] H01J *39/00*
U.S. Cl. 313—94 **10 Claims**



1. A photocathode comprising a substrate having thereon, a photoemissive layer, an electrically resistive layer underlying the photoemissive layer, and terminal means electrically connected to spaced portions of said resistive layer, whereby a voltage differential may be applied between said spaced portions, the lateral resistivity of said resistive layer varying along the surface thereof.

4,097,762

XENON ARC DISCHARGE LAMP HAVING A PARTICULAR ELECTRODE COMPOSITION AND WHEREIN THE ARC DISCHARGE IS OBTAINED WITHOUT HEATING THE ELECTRODE

Joseph James Hilton, Bethlehem, and James Joseph Malloy, Jr., Easton, both of Pa., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Continuation of Ser. No. 604,676, Aug. 14, 1975, abandoned. This application May 17, 1977, Ser. No. 797,660
Int. Cl.[2] H01J *17/04, 61/06*
U.S. Cl. 313—218 **5 Claims**

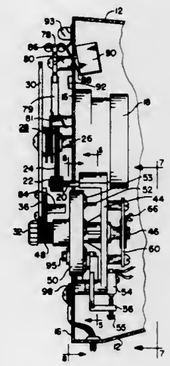
1. In a xenon arc discharge lamp comprising an enclosed pressurized sealed optical envelope having a light transparent window, a pair of electrodes at opposite ends of said lamp, and means for applying a potential across said electrodes to provide an arc discharge therebetween, the improvement in which at least one of said electrodes comprises a porous sintered body of a refractory metal selected from the group consisting of tungsten and molybdenum, said body being impregnated with a fused mixture of alkaline earth oxides and a metal oxide, said arc discharge being obtained solely through field emission by application of said potential without heating said electrode.

4,097,763

ELECTRIC PROGRAMMER

Myrl J. Saarem, Carson City, Nev., assignor to Richdel, Inc., Carson City, Nev.

Filed Feb. 7, 1977, Ser. No. 765,882
Int. Cl.[2] H01H *7/00*
U.S. Cl. 307—141 **3 Claims**



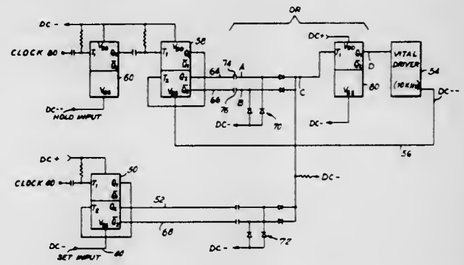
1. In an electric programmer, which includes: mounting means; clock motor means supported by said mounting means; a control disc rotatably mounted on said mounting means and connected to said clock motor means to be rotated thereby; gear actuating means attached to said control disc; a first shaft rotatably mounted on said mounting means; a gear coaxially mounted on said first shaft to be engaged by said gear actuating means during rotation of said control disc to turn said first shaft; a rotary distribution switch mounted on said mounting means and including a wiper contact connected to the first shaft to be rotated thereby, and further including a plurality of switch contacts to be selectively contacted as the wiper contact is rotated; switching means mounted on said mounting means and including an actuating arm; and switch actuating means for operating said switching means for manually controllable time intervals as said first shaft rotates and as said wiper contact engages successive ones of said switch contacts, said switch actuating means including: a selector disc coaxially mounted on said first shaft to be rotated thereby; a plurality of further shafts rotatably mounted in said selector disc and extending parallel to the first shaft; and a corresponding plurality of longitudinally-extending pins eccentrically mounted at the extremities of the respective further shafts in positions successively to engage said actuating arm as said first shaft rotates, the time interval of engagement of any one of said pins with said actuating arm being determined by the angular position of such pin with respect to the longitudinal axis of the corresponding further shaft.

4,097,764

FAIL-SAFE SOLID STATE LOGIC

Henry C. Sibley, Adams Basin, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Mar. 18, 1977, Ser. No. 779,192
Int. Cl.[2] H02H *7/20*
U.S. Cl. 307—200 A **6 Claims**



1. A fail-safe logic device, comprising

a solid state, toggle flip-flop AND gate having an output at which a binary one signal appears provided a first AC digital signal, representative of a binary one, applied to a first input occurs concurrently with another digital signal, also representative of a binary one, applied to a second input;

first means for applying such first AC digital signal to said first logic input of said device;

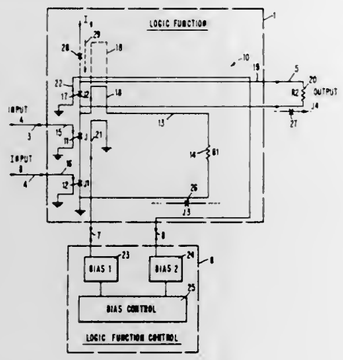
second means for applying said other digital signal at a DC voltage power supply terminal of said logic device as a second logic input of said device;

a vital driver coupled to said output of said toggle flip-flop AND gate, said vital driver being operative to accept only an output AC signal which is one-half the frequency of the AC digital signal at the first input, whereby any lack of conversion, due to a short or the like from input to output, will result in rejection of the unconverted, or wrong-frequency, signal then appearing at said output.

4,097,765
ELECTRONICALLY ALTERABLE NON-LATCHING JOSEPHSON AND, OR, NAND, NOR LOGIC CIRCUIT

Hans Helmut Zappe, Granite Springs, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1976, Ser. No. 701,374
Int. Cl.² H03K *19/195*
U.S. Cl. 307—212 **8 Claims**



1. A logic circuit comprising

a first non-latching device capable of carrying Josephson current having a zero voltage state and a finite voltage state shunted by a terminated transmission line,

a plurality of serially disposed non-latching devices capable of carrying Josephson current having a zero voltage state and a finite voltage state shunted by another terminated transmission line disposed in series with said first non-latching device, a portion of said another terminated transmission line being disposed in electrically coupled relationship with said first non-latching device,

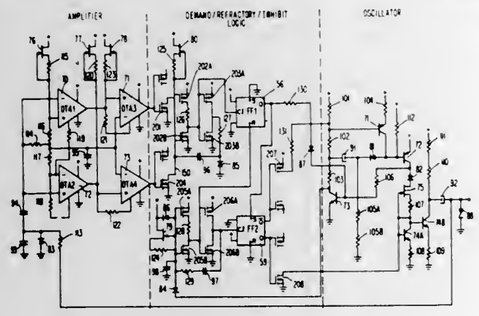
means connected to said plurality of devices for applying binary information signals thereto, and

means for biasing said first non-latching device in an initial condition in one of said zero and said finite voltage states and said plurality of non-latching devices in an initial condition in one of said zero and finite voltage states to generate at said terminated transmission line one of the logic functions AND, NAND, OR, NOR.

4,097,766
LOW CURRENT DRAIN AMPLIFIER SYSTEM

Alexis C. M. Renirie, Nijmegen, Netherlands, assignor to Vitatron Medical B.V., Dieren, Netherlands

Division of Ser. No. 608,465, Aug. 28, 1975, Pat. No. 4,043,347.
This application Nov. 3, 1976, Ser. No. 738,585
Int. Cl.² H03K *17/00*
U.S. Cl. 307—229 **21 Claims**



1. Low current drain apparatus for high gain signal amplification, comprising:

a. transconductance amplifier means for amplifying a received input signal, said amplifier means being characterized by having the circuit characteristic of a current source at its output, said current source being a function of the voltage level of said input signal;

b. an active circuit having an input and an output, said input being directly connected to the output of said transconductance amplifier means, said active circuit being characterized by having a high input impedance and being adapted to be driven at its output to a high or low state as a function of the signal at its input;

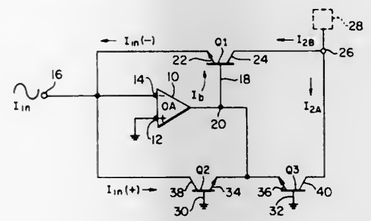
c. a current source circuit connected to said active circuit output; and

d. a high input impedance load connected to said current source circuit and to said active circuit output.

4,097,767
OPERATIONAL RECTIFIER

David E. Blackmer, Wilton, and C. Rene Jaeger, South Lyndeboro, both of N.H., assignors to DBX, Incorporated, Newton, Mass.

Filed Jan. 17, 1977, Ser. No. 759,734
Int. Cl.² H03K *17/00*
U.S. Cl. 307—229 **13 Claims**



1. A device for rectifying an AC current input signal applied at its input terminal and adapted to have its output terminal connected as a DC current source, said device comprising in combination:

an amplifier stage having an inverting input terminal connected to the input terminal of said device, and an output terminal;

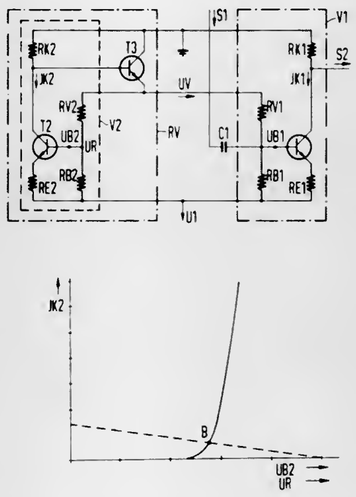
a first transmission path including first controllable current conveying means coupled between the input and output terminals of said device and connected to be controlled by the output signal from said amplifier stage so that current flows between the input and output terminals of the device along said first transmission path only when said input signal is of a first polarity; and

a second transmission path including second controllable current conveying means coupled between the input and output terminals of said device and connected to be controlled by the output signal from said amplifier stage so that a second current flows between said input and output terminals of said amplifier stage along said second transmission path and an inverted current substantially equal in magnitude but opposite in polarity to said second current simultaneously flows between the output terminal of said amplifier stage and the output terminal of said device along said second transmission path only when said input signal is of a polarity opposite said first polarity.

4,097,768
RECTIFIER

Franz Jenik, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 6, 1976, Ser. No. 747,955
Claims priority, application Germany, Dec. 5, 1975, 2554865
Int. Cl.² H02M *7/00*
U.S. Cl. 307—230 **8 Claims**



1. A rectifier for rectifying an alternating voltage signal of small amplitude in which the alternating voltage signal is supplied directly to a first amplifier having a bent amplification characteristic formed by a linear portion, cut-off portion, and bent portion connecting the linear and cut-off portions, an operating point of said first amplifier being located at the bent portion of the characteristic and which delivers rectified signals at an output, a control amplifier being connected to the first amplifier which produces a control voltage for determining said operating point of the first amplifier, a supply voltage connected to said first and control amplifiers which is the same for both, said control amplifier having a second amplifier which is constructed in a same fundamental circuit arrangement as the first amplifier but which has an amplification which is large in comparison with the amplification of the first amplifier.

4,097,769
CIRCUIT FOR CONTROLLABLY PROVIDING POWER FROM AN AC SOURCE TO A LOAD

Michael A. Wilson, Sarasota; Fred J. Momparler, Bradenton, and Kenneth Coleman, Sarasota, all of Fla., assignors to Electro Corporation, Sarasota, Fla.

Filed Nov. 5, 1976, Ser. No. 739,261
Int. Cl.² H03K *17/56*
U.S. Cl. 307—252 B **8 Claims**

1. A circuit for controllably providing power from an AC source to a load upon the sensing of a conductive body comprising:

means for starting a pulse race between a first and a second pulse at the beginning of each half period of the AC source;

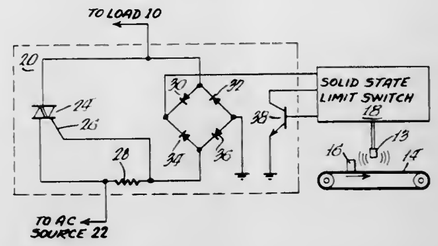
a first pulse path means coupled to said pulse race starting means for passing said first pulse in the event that a conductive body is not sensed within an established period of time and inhibiting said first pulse in the event that a conductive body is sensed within the established period of time;

a second pulse path means coupled to said pulse race starting means for passing the second pulse after a delay time, which delay time is longer than said established period of time;

terminal means coupled to said first and second pulse path means for receiving the first and second pulse;

means for connecting the AC source to a load upon reception of the second pulse prior in time to the reception of the first pulse, said connecting means coupled to said terminal means; and

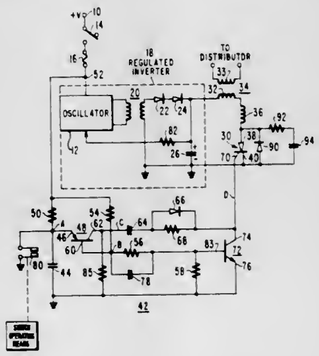
means for disconnecting the AC source from the load upon reception of the first pulse prior in time to the reception of the second pulse, said disconnecting means coupled to said terminal means.



4,097,770
SCR TRIGGER CIRCUIT

Michael Scott Fisher, Bridgewater, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jun. 11, 1976, Ser. No. 695,197
Int. Cl.² H03K *17/72*
U.S. Cl. 307—252 J **15 Claims**



1. A triggering circuit for a controlled rectifier having an anode, a cathode connected to a point of reference potential and having a gate electrode comprising, in combination:

a capacitor having a first plate connected to said reference potential and having a second plate;

a first switch for selectively connecting the second plate of said capacitor to said point of reference potential;

a first transistor having an emitter electrode connected to the second plate of said capacitor, having a collector electrode connected to the gate electrode of said controlled rectifier, and having a base electrode;

means for applying a bias potential to the base electrode of said first transistor for conditioning said first transistor to be nonconductive so long as the potential at said second plate does not depart from said reference potential by more than a predetermined value in the sense for tending to turn said first transistor on;

a charging circuit connected across said capacitor for charging said capacitor in said sense for tending to turn on said

transistor whenever said first switch does not connect the second plate of said capacitor to said point of reference potential, thereby to prevent the charging of said capacitor; and

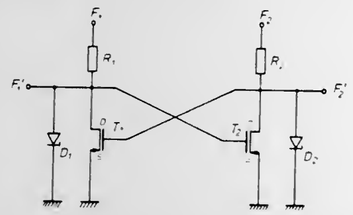
means for automatically clamping the gate electrode of said controlled rectifier to a potential a given time after said first transistor turns on, each time said first transistor turns on, thereby conditioning said controlled rectifier to turn off in response to reversal of the voltage at its anode electrode.

4,097,771

INTEGRATED CLOCK PULSE SHAPER

Wolfgang Gollinger, Voerstetten, Germany, assignor to ITT Industries, Incorporated, New York, N.Y.

Filed Dec. 28, 1976, Ser. No. 754,925
Claims priority, application Germany, Jan. 31, 1976, 2603704
Int. Cl.[2] H03K *5/01*
U.S. Cl. 307—268 **2 Claims**



1. An integrated clock pulse shaper for providing first and second non-overlapping clock signal voltages for use in multiphase clocked logic circuits, comprising:

a first insulated-gate field effect transistor having source, drain and gate terminals;

a second insulated-gate field effect transistor having source, drain and gate terminals, the drain terminal of each of said first and second transistors galvanically cross coupled to the gate terminals of said second and first transistor respectively;

a first resistor;

a second resistor; and

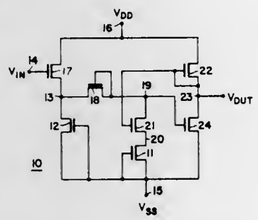
means for applying first and second clock signal voltages to the source drain paths of said first and second transistors respectively via said first and second resistors, said first and second non-overlapping clock signal voltages appearing at the drain terminals of said first and second transistors respectively.

4,097,772

MOS SWITCH WITH HYSTERESIS

Ernest Aubert Carter, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 6, 1977, Ser. No. 803,500
Int. Cl.[2] H03K *3/295, 3/353, 17/04*
U.S. Cl. 307—279 **5 Claims**



1. A field effect transistor hysteresis circuit comprising:

an input and an output;

first and second field effect transistors, the sources of said first and second field effect transistors being coupled, respectively, to a first voltage means, the gate of said first field effect transistor being coupled to the drain of said second field effect transistor, and the gate of said second field effect transistor being coupled to the drain of said first field effect transistor;

first load means coupled between a second voltage means and the drain of said second field effect transistor;

an input field effect transistor having its gate coupled to said input;

coupling means for coupling the source of said input field effect transistor to the drain of said first field effect transistor;

first current source means coupled between the source of said input field effect transistor and said first voltage means; and

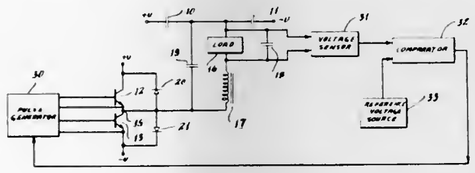
second current source means coupling the source of said first field effect transistor to said first voltage means.

4,097,773

SWITCHED MODE POWER SUPPLY

Magnus Carl Wilhelm Lindmark, Vasavagen 9, Stocksund, Sweden (S-182 74)

Filed Nov. 1, 1976, Ser. No. 737,511
Claims priority, application Sweden, Nov. 3, 1975, 7512267
Int. Cl.[2] H03K *17/04, 1/12*
U.S. Cl. 307—296 A **6 Claims**



1. In a switched mode power supply having a pair of supply voltage terminals, a pair of transistors having their emitter-collector paths connected in series to said terminals, first and second capacitors connected in series between said terminals, a series circuit of a load circuit and an inductor connected between the junction of said first and second capacitors and the junction of said emitter-collector paths, and a source of control pulses connected to the basis of said transistors; the improvement wherein said source of control pulses is connected to render said transistors conductive on alternate pulses, and further comprising a third capacitor connected in parallel with said load circuit and forming a series resonant circuit in combination with said inductor at a frequency substantially equal to the pulse repetition frequency of said control pulses of said source of pulses, whereby back e.m.f. of said inductor at the time of switching off of each of said transistors reduces the emitter-collector voltage of the other transistor at the switch on time of said other transistor.

4,097,774

ARC DISCHARGE FLASH LAMP AND SHIELDED COLD CATHODE THEREFOR

Robert J. Cosco, Amesbury; John M. Lo, Boston, and Roger T. Hebert, Peabody, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

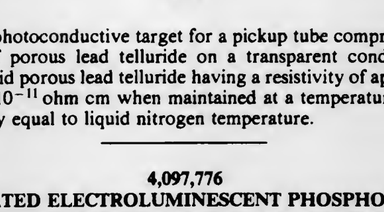
Filed Jun. 3, 1976, Ser. No. 692,285
Int. Cl.[2] H01J *61/04*
U.S. Cl. 313—178 **5 Claims**

1. A cold cathode flash tube including an elongate envelope enclosing at least one cathode assembly and an electron discharge and ion counterflow path respectively from and toward the assembly, wherein the cathode assembly comprises:

a lead wire extending into the envelope,

a discrete body containing a sintered compound of electron emissive material, the body being intermittently emissive when cold and being disposed on the lead wire;

a mass of refractory metal material interposed in the ion counterflow path toward the body so as to shield a substantial emissive area of the body from ion bombardment; and



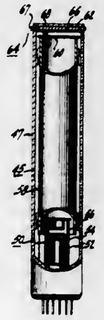
means extending from the emissive body to the refractory metal mass for holding the mass in spaced relation to the body thereby to expose the shielded area for electron emission.

4,097,775

INFRARED SENSITIVE PHOTOCONDUCTIVE PICKUP TUBE

George W. Bain, Jr., Fort Wayne, Ind.; Stanley V. Forgue, Princeton, and Albert G. Morris, Lawrenceville, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 4, 1955, Ser. No. 526,458
Int. Cl.[2] H01J *31/00, 31/26*
U.S. Cl. 313—388 **3 Claims**



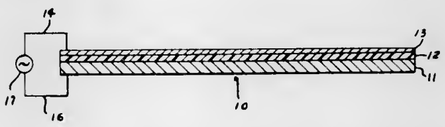
1. A photoconductive target for a pickup tube comprising a layer of porous lead telluride on a transparent conductive layer, said porous lead telluride having a resistivity of approximately 10^{-11} ohm cm when maintained at a temperature substantially equal to liquid nitrogen temperature.

4,097,776

COATED ELECTROLUMINESCENT PHOSPHORS

Sidney Allinikov, Yellow Springs, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 25, 1977, Ser. No. 781,228
Int. Cl.[2] H01J *1/62;* G02F *1/13;* C09K *3/34;* B05D *5/06*
U.S. Cl. 313—502 **10 Claims**



1. A composition consisting essentially of an electroluminescent solid particulate phosphor coated with a crystallized liquid crystal or a mixture of crystallized liquid crystals, said liquid crystal or mixture of liquid crystals melting at about the temperature to which the phosphor is heated as a result of being disposed in an electric field.

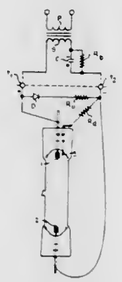
6. An electroluminescent device comprising a layer of electroluminescent phosphor particles coated with a crystallized liquid crystal or a mixture of crystallized liquid crystals, said liquid crystal or mixture of liquid crystals melting at about the temperature to which the phosphor particles are heated as a result of being disposed in an electric field, the coated particles being dispersed in a layer of a dielectric material having a thickness no greater than 3 mils; and an electrode member adhered to each surface of the phosphor-containing layer, at least one of the electrode members being a light transmitting layer.

4,097,777

ARC DISCHARGE LAMP INCLUDING STARTING CIRCUIT

Walter Bacharowski, Parma, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 10, 1976, Ser. No. 740,255
Int. Cl.[2] H01J *7/44, 13/46, 19/78;* H01K *1/62*
U.S. Cl. 315—60 **5 Claims**



1. An arc discharge lamp comprising: an arc tube containing an ionizable radiation-generating fill and having main electrodes sealed therein at opposite ends and a starter electrode adjacent to one main electrode; and an electrical circuit within said lamp for increasing the peak starting voltage applied across the electrodes when said lamp is connected across the secondary side of a capacitor type ballast, said circuit comprising a diode and two resistors, the diode and one resistor being connected in series and bridged across the main electrodes, and the other resistor being connected between the starter electrode and th remote main electrode.

4,097,778

HEADLAMP AUTOMATIC DELAY SYSTEM

George Ludwig, Troy, Mich., assignor to Tom McGuane Industries, Inc., Farmington Hills, Mich.

Filed Oct. 12, 1976, Ser. No. 731,298
Int. Cl.[2] B60Q *1/02*
U.S. Cl. 315—82 **33 Claims**

1. In a headlamp delay device, the combination comprising

a switch having spaced contacts,

a switch contact member movable to successively engage said contacts at different positions,

a plurality of detent means for holding said contact member in each of said positions with a predetermined force,

a housing,

piston means dividing said housing into two chambers,

a passage associated with one of said chambers for connection to a source of vacuum,

an inlet to said one chamber,

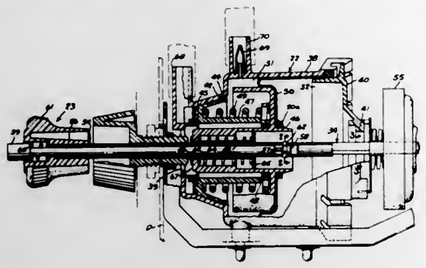
an orifice associated with said inlet to said chamber for

connection to a source of pressure higher than that supplied through said vacuum,

spring means yieldingly urging said piston means in a direction opposite to that which the vacuum tends to move said piston means,

a shaft extending through said housing through said piston means and connected to said switch contact member,

energy storing means interposed between the shaft and the piston means and operable by the piston means upon



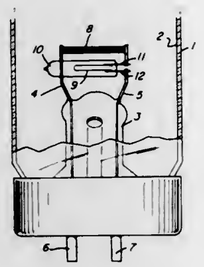
dissipation of the vacuum and functioning of said spring means to move said piston means to store energy when the vacuum is being dissipated such that upon predetermined storage of energy, the energy storing means functions to move the shaft and in turn the contact member within the switch against the action of the detent means successively storing energy and moving the shaft against the action of successive detent means from one detent position to another.

4,097,779

FLUORESCENT LAMP CONTAINING A CATHODE HEATER CIRCUIT DISCONNECT DEVICE

Frank M. Latassa, Magnolia, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Apr. 5, 1976, Ser. No. 673,822
Int. Cl.² H05B *41/18*
U.S. Cl. 315—106 **1 Claim**



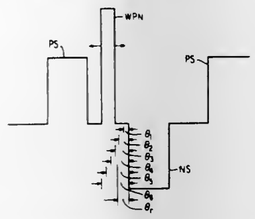
1. In a rapid start type of fluorescent lamp comprising an elongated glass envelope having a phosphor coating on the inner wall thereof and having an electrode at each end thereof and means to supply heater current to said electrode, the improvement which comprises a thermally actuable circuit opening device proximate said electrode, said device being normally closed at room temperature and thereby permitting heater current to flow through said electrode during lamp start up, said device becoming open after lamp ignition as a result of heat from said electrode, thereby stopping said heater current flow, said device comprising a U shaped bimetallic element enclosed in a sealed glass bottle and supported therein by two wires extending through the glass bottle seal, said electrode being mounted on a glass stem mount having two lead-in wires extending therethrough, one of said lead-in wires being connected to one end of said electrode and the other of said lead-in wires being connected to one of the wires that extends through the glass bottle seal, the other end of said electrode being connected to the other of the wires that extends through the glass bottle seal.

4,097,780

METHOD AND APPARATUS FOR ENERGIZING THE CELLS OF A PLASMA DISPLAY PANEL TO SELECTED BRIGHTNESS LEVELS

Peter Dinh-Tuan Ngo, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 17, 1976, Ser. No. 715,161
Int. Cl.² H05B *41/24*
U.S. Cl. 315—169 TV **19 Claims**



11. A method for energizing a gas discharge display cell to a desired brightness level comprising the steps of

repetitively impressing alternating-polarity sustain signals across said cell, and establishing said cell in a temporary light-emitting state, by impressing at least a first write pulse of non-variable duration across said cell, said write pulse terminating prior to the initiation of a predetermined one of said sustain signals by a selected interval,

characterized by the step of selecting said interval as a function of said desired brightness level.

4,097,781

ATOMIC SPECTRUM LIGHT SOURCE DEVICE

Hideaki Koizumi; Yoji Arai, both of Katsuta, and Selichi Murayama, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 25, 1975, Ser. No. 635,080
Claims priority, application Japan, Nov. 27, 1974, 49-135506
Int. Cl.² G01J *3/12*
U.S. Cl. 315—176 **15 Claims**

FIG. 1B

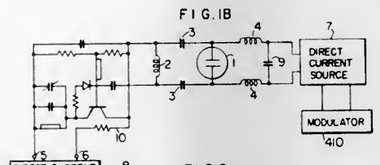
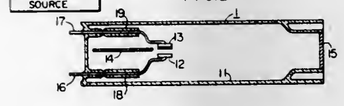


FIG. 2



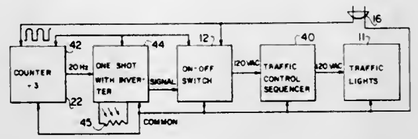
1. An atomic spectrum light source device comprising a discharge tube in which an inactive gas is enclosed and which has a light taking-out window, an anode and a cathode arranged in said discharge tube, at least one of said anode and cathode including an element for emitting at least one required atomic spectrum, a first electric source for supplying to said anode and cathode a low frequency power whose alternating period is longer than a flight time of ions between said anode and cathode to generate atoms of said element by sputtering due to a glow discharge from said at least one of said anode and cathode, and a second electric source for supplying a high frequency power to said anode and cathode to excite said sputtered atoms.

4,097,782

ENERGY SAVING MEANS REDUCING POWER USED BY LAMPS

Hiram Darden Chambliss, 1900 N. 5th St., Grand Junction, Colo. 81501

Filed Dec. 15, 1975, Ser. No. 640,980
Int. Cl.² H05B *39/09*
U.S. Cl. 315—209 R **12 Claims**



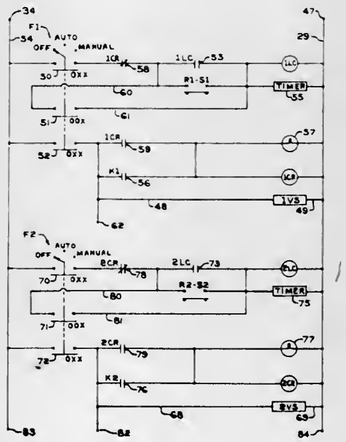
1. Energy saving means for reducing power used by lamps employing means reducing power without significant reduction of apparent brightness as viewed by the normal human eye, comprising in combination, a traffic signal incandescent lamp, a switching circuit for selectively providing upon command lamp lighting power at a predetermined lighting voltage for said lamp, and a command circuit actuating said switching circuit periodically including equipment providing a normal daytime mode of operation for lighting said lamp while in use in daytime brightness at a duty cycle of less than 100% and at a frequency between 5 Hz and 30 Hz to retain some of the brightness of one lighting pulse by the human eye until the next lighting pulse occurs, thereby constituting equipment with an operating mode whereby said power is decreased for lighting the lamp without a corresponding reduction in viewed brightness wherein said power for said lamp is supplied from an alternating current power source having a frequency N of 60 Hertz, and wherein said command circuit respectively turns on and off said lamp over a duration of on and off pulses having an integral number of successive half cycles.

4,097,783

ULTRAVIOLET LIGHT PROCESSOR

Michael L. Hathaway, Aurora, Ill., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 13, 1976, Ser. No. 722,470
Int. Cl.² H05B *41/36*
U.S. Cl. 315—323 **15 Claims**



13. An ultraviolet light processor comprising:

a. a sequence of medium or high pressure mercury vapor lamps for emitting ultraviolet light when connected to a source of alternating electrical power;

b. means for automatically and sequentially connecting lamps of said sequence through a reactance to a source of electrical power to thereby cause said lamps to emit ultraviolet light, wherein said reactance comprises an inductive reactance and a capacitive reactance;

c. timing means including only a single timing relay, said timing means cooperating with said connecting means for interposing a time interval in the range of from about ½ second to about 10 seconds between connections of adjacent lamps of said sequence to said source of alternating electrical power;

d. means for initiating the operation of said connecting means and said timing means;

e. means for permitting said connecting means to function only from the beginning of the connecting sequence;

f. means for varying the capacitive reactance through a plurality of discrete steps of capacitive reactance; and

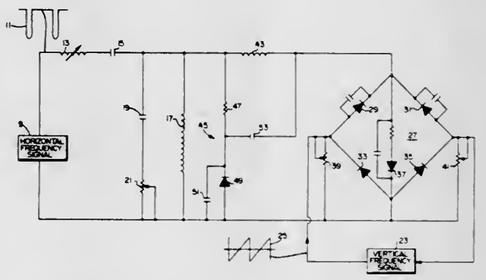
g. means for causing alternating electric power to be applied to said lamps through a predetermined value of reactance at least until said lamps are warmed up.

4,097,784

QUADRUPOLE CONVERGENCE CIRCUIT

Martin Fischman, Seneca Falls, and Jesse H. L'Hommedieu, Waterloo, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed May 31, 1977, Ser. No. 802,058
Int. Cl.² H01J *29/70, 29/76*
U.S. Cl. 315—368 **7 Claims**



1. In a cathode ray tube deflection apparatus employing an inline color cathode ray tube and an affixed deflection yoke having horizontal, vertical and quadrupole windings coupled to horizontal and vertical frequency signal sources, a quadrupole convergence circuit comprising:

a quadrupole winding;

means for developing substantially parabolic shaped horizontal and vertical frequency signals coupled to said convergence winding;

means for clamping said substantially parabolic-shaped horizontal and vertical frequency signals coupled to said quadrupole winding, said clamping means having an increasing impedance value in response to an increasing value of said substantially parabolic-shaped vertical frequency signal; and

means coupled to said clamping means and to said means for developing substantially parabolic-shaped vertical frequency signals, said means and said means for developing substantially parabolic-shaped vertical frequency signals combining to provide a compensating alteration in impedance value substantially proportional and opposite to the alteration in impedance value of said clamping means in response to an increasing value of said substantially parabolic-shaped vertical frequency signal whereby the magnitude of said substantially parabolic-shaped horizontal frequency signal is controlled.

4,097,785

MAGNETIC-TAPE-TRANSPORT APPARATUS

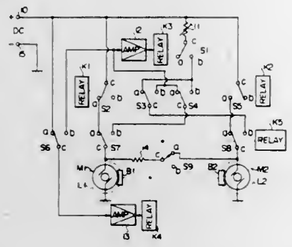
Mituhiro Sato, Yokohama, and Tomomi Kato, Tokyo, both of Japan, assignors to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Nov. 8, 1976, Ser. No. 740,059

Claims priority, application Japan, Nov. 13, 1975, 50-154369[U]

Int. Cl.² B65H *77/00*

U.S. Cl. 318—89 **6 Claims**



1. In a tape-transport apparatus of the type for winding a magnetic tape unwound from one reel on the other reel and vice versa, an improvement for stopping the apparatus comprising:

(a) a first DC motor having permanent magnet poles and operatively coupled to a tape-winding reel for rotating the same;

(b) a second DC motor having permanent magnet poles and operatively coupled to a tape-unwinding reel for rotating the same;

(c) a first brake and a second brake for said first and second DC motors, respectively, adapted to apply the retarding forces to them to stop them when the tape transport is to be stopped;

(d) first control means adapted to supply DC power to said first DC motor for rotating it in a first direction, thereby winding the magnetic tape on said tape-winding reel operatively coupled to said first DC motor;

(e) second control means adapted to interrupt the DC power supply to said first DC motor;

(f) first DC motor retarding means adapted to retard the rotation in said first direction of said first DC motor due to its inertia when said second control means interrupts power to said first DC motor, including second DC motor retarding means adapted to retard the rotation in said first direction of said second DC motor during a time period in which the magnitude of electromotive force generated by the rotation of said first DC motor due to its inertia after the DC power supply thereto has been interrupted is higher than a predetermined level; and

(g) means adapted to operate said first and second brakes when the magnitude of electromotive force reaches said predetermined level so as to stop the transport of the tape.

4,097,786

LIMIT CONTROL APPARATUS

Bryant D. Lund, Salt Lake City, Utah, assignor to E-Systems, Inc., Dallas, Tex.

Filed Jun. 16, 1976, Ser. No. 696,601

Int. Cl.² F16K *31/02*

U.S. Cl. 318—282 **5 Claims**

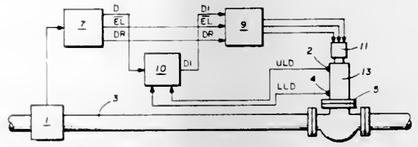
1. For use in a control system wherein a processing circuit is operable to receive a commanded direction signal and selectively effect movement of an actuator in accordance therewith subject to a first limit ot travel in a first direction, the combination comprising:

first limit sensing means connected to the actuator and operable to generate a first limit detection signal characterized by at least one electrical pulse, when the actuator approaches the first limit of travel;

integrating means arranged to receive said first limit detection signal and provide a first integral signal output;

comparator means arranged to receive said first integral signal output and provide a first limit signal when said first integral signal output exceeds a predetermined level; and

logic means arranged to receive said first limit signal and the commanded direction signal, said logic circuit being operable to provide a modified direction signal to the processing circuit, said modified direction signal being indicative of the commanded direction in the absence of said first limit signal, said logic means being operable to modify said commanded direction signal upon receipt of said first limit signal such that said modified direction signal is indicative of the direction opposite said commanded direction during the continuance of said first limit signal.



4,097,787

DEVICE FOR CONTROLLING THE PERIPHERAL SPEED IN ROTATING OBJECTS

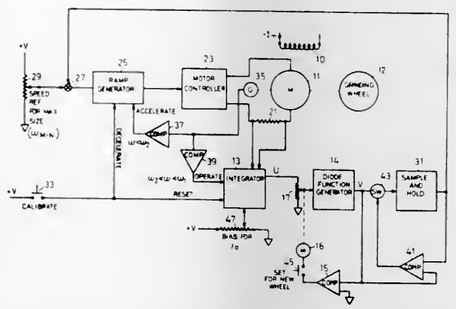
Lars-Göran Larsson, and Frede Sörensen, both of Vesteras, Sweden, assignors to Asea AB, Vasteras, Sweden

Filed Jun. 9, 1976, Ser. No. 694,439

Claims priority, application Sweden, Jun. 17, 1975, 7506926

Int. Cl.² H02P *5/00*

U.S. Cl. 318—332 **14 Claims**



1. A method for controlling the peripheral speed of a rotating object, driven by a driving system including an electric motor, which is subject to wear comprising the steps of:

(a) generating a first signal representing a speed reference for a size of the rotating object before any wear occurs and at which the angular rotation rate will be a minimum;

(b) measuring a quantity proportional to the torque of the motor driving the object;

(c) decelerating and accelerating the object over equal predetermined times of deceleration and acceleration;

(d) integrating the quantity proportional to torque over the equal times of deceleration and acceleration in an integrator to obtain a second signal at the output of the integrator which has eliminated therefrom the loss moment;

(e) coupling said second signal through a function generator to convert it into a third signal representative of the increase in the speed necessary to compensate for wear; and

(f) using the sum of said first signal and third signal as a control input to the motor driving the rotating object.

4,097,788

CONTROL CIRCUIT FOR A SELF-STARTING ELECTRIC MOTOR

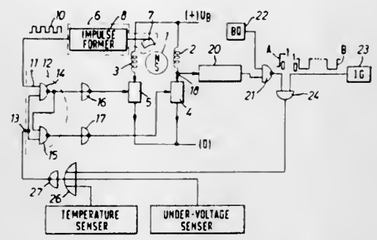
Nils Hansson Nygaard, Sonderborg; Kaj Nielsen, and Benny Strandtoft, both of Nordborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Dec. 15, 1976, Ser. No. 750,728

Claims priority, application Germany, Dec. 17, 1975, 2556726

Int. Cl.² H02P *1/00*

U.S. Cl. 318—415 **2 Claims**



1. A control circuit for a self-starting electric motor having at least one stator winding in series with a pulse controllable electronic switch, gate control means having A and B inputs and an output connected to said switch with a first signal for said A input causing blocking regardless of the signal on said B input and with the opposite signal for said A input providing a signal for said output and direct transmission between said input B and said output, a starting impulse generator having a duty cycle with a short starting signal and a long stopping signal, a pulse generator connected to said B input and being responsive to the position of the rotor of said motor for producing a pulse wave corresponding to the speed thereof, a frequency-to-voltage converter connected to said winding for generating a signal corresponding to the speed of said motor, a comparator and a reference voltage for said converter to generate a digital signal at a predetermined voltage level of said converter, selector gate means having inputs connected to said starting impulse generator and said comparator and the output thereof connected to said o input A, said selector gate means allowing said comparator signal to override said starting impulse generator when said motor has normal speed and allow said short starting signal thereof to be transmitted to said input A when said motor is stopped or operating below its normal operating speed.

4,097,789

ROTATION-SUPERVISED D-C FAN OR BLOWER SYSTEM

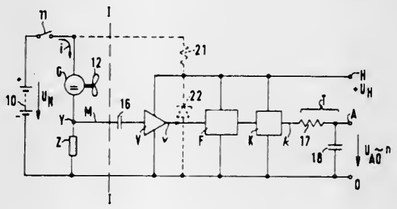
Benno Doemen, St. Georgen, Germany, assignor to Papst-Motoren KG, St. Georgen, Germany

Filed Apr. 19, 1976, Ser. No. 678,361

Claims priority, application Switzerland, Apr. 26, 1975, 5351/75

Int. Cl.² H02H *7/08*

U.S. Cl. 318—461 **11 Claims**



1. Rotation-supervised d-c fan, blower, or ventilator system having a brushless d-c motor (G) arranged for connection to a source of d-c (10) providing intermittent, pulsed power to said motor to operate said motor at a predetermined speed, or within a predetermined speed range, current flow (i) through the motor (G) being in pulses undulating between upper and lower values, whereby the current through the motor will have an a-c component, said system comprising

an impedance element (Z) connected in series with the motor (G);

an a-c responsive evaluation circuit (K, T) sensitive to the frequency of an applied signal, said evaluation circuit being connected across said impedance element and sensing the voltage drop of the a-c component of the pulsating current flow through the motor;

an a-c amplifier (V, V') connected across the impedance element (Z), and applying the a-c component of the voltage drop across the impedance element (Z) to the evaluation circuit (K, T);

and a band pass filter means (F) connected to the evaluation circuit (K, T) and to the motor and matched to the frequency of the a-c component at said operating speed, or range, to enhance said a-c component at said speed, or range, with respect to other frequencies at other speeds;

the evaluation circuit (K, T) providing an output signal (U_{AO}) if the frequency of the sensed a-c component of the pulsating current flow through the motor drops below a predetermined level.

4,097,790

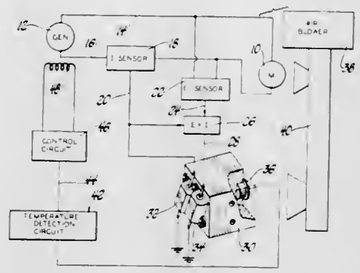
MOTOR PROTECTOR WITH REMOTE TEMPERATURE SIMULATION

Robert J. Wilson, Bolingbrook, Ill., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 16, 1976, Ser. No. 714,389

Int. Cl.² G05B *5/00*

U.S. Cl. 318—471 **2 Claims**



1. A motor protector located remotely from an electric motor that is subject to overheating comprising

means for generating an analog of motor temperature including a block of heat conductive material, first and second electrical heating elements mounted in heat transfer relationship with the block of heat conductive material for heating the block of material when current is applied to either of the elements, the block of material having a predetermined thermal inertia due to its mass and its specific heat which represents the thermal inertia of the motor, means in circuit with the motor for supplying current proportional to motor current to the first heating element, and means in circuit with the motor for supplying current proportional to motor power to the second heating element, the heating effect of said heating elements and the thermal inertia of said block being such that the block of heat conductive material is heated to an analog temperature corresponding to the actual motor temperature over a varying range of motor current and power,

a temperature detection element secured to the block of material in heat transfer relation therewith for responding to the temperature of said block, and

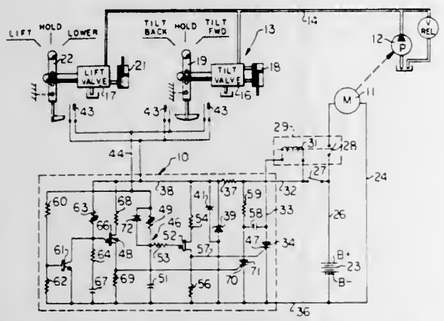
a circuit including the temperature detection element responsive to the temperature of said block for controlling the energization of the motor to prevent overtemperature operation.

4,097,791

DELAYED TURN-ON AND TURN-OFF CONTROL CIRCUIT

Ward L. Bivens, Painesville, and Richard A. Schwehr, Mentor, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed Dec. 1, 1975, Ser. No. 636,785
Int. Cl.[2] H02P *1/04*
U.S. Cl. 318—484 **4 Claims**



1. A delayed turn-on and turn-off control circuit for an electric motor comprising:

an electrical power source having a positive terminal and a ground terminal;

a motor relay having a normally open contactor connected in series between the electric motor and one of the terminals of the power source, said contactor being movable between an opened position at which the electric motor is disconnected from the power source and a closed position at which the electric motor is connected to the power source, and an electrical actuator means connected to the contactor for moving the contactor to the closed position in response to said actuator means being energized and to said opened position in response to said actuator means being de-energized;

means for providing an electrical current at a predetermined value;

a motor start switch connected to the current providing means and being movable between a normally open position and a closed position;

a power silicon controlled rectifier connected in series between the electrical actuator means and the ground terminal of the power source for energizing the electrical actuator means in response to receiving a first electrical signal and for de-energizing the electrical actuator means in response to receiving a second electrical signal, said power silicon control rectifier having a control gate for receiving the first electrical signal;

a turn-on delay means connected to the motor start switch and to the control gate of the power silicon controlled rectifier for delivering said first electrical signal to the control gate only after the running of a first predetermined period of time after the closing of the motor start switch;

a turn-off delay means connected to the motor start switch and to the power silicon controlled rectifier for delivering said second signal to the power silicon controlled rectifier only after the running of a second predetermined period of time after the opening of the motor start switch, said turn-off delay means including a commutating capacitor, means to charge the commutating capacitor to the voltage of the power source only when the power silicon controlled recitifer is conductive, a commutating silicon controlled rectifier connected between the commutating capacitor and the grounded side of the power silicon controlled rectifier, means for gating on the commutating silicon controlled rectifier after said second predetermined period of time following the opening of the switch for providing a reverse bias on the power silicon controlled rectifier as the second electrical signal for rendering it nonconductive, and means for disabling the turn-off delay means in response to the normally open start switch being closed and for initiating the running of the second predetermined period of time in response to the motor start switch being opened; and

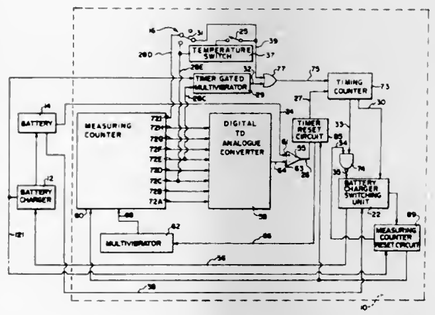
wherein said gating on means includes a time delay capacitor, a timing resistor connected between the electrical current providing means and the time delay capacitor for charging the time delay capacitor, and means for discharging the time delay capacitor to the control gate of the commutating silicon controlled rectifier in response to the voltage across the time delay capacitor reaching a predetermined value, said discharging means including a unijunction transistor and a load resistor, said unijunction transistor having its emitter connected to the time delay capacitor and one of its bases connected to the control gate of the commutating silicon controlled rectifier, said load resistor being connected to said one base of the unijunction transistor, a control gate of the commutating silicon controlled rectifier and to the ground terminal for keeping the control gate voltage low until the unijunction transistor is turned on.

4,097,792

BATTERY CHARGER CONTROL CIRCUIT

Ward Martin Calaway, Sierra Madre, Calif., assignor to Lester Electrical of Nebraska, Inc., Lincoln, Nebr.

Filed Dec. 9, 1976, Ser. No. 748,732
Int. Cl.[2] H02J *7/04*
U.S. Cl. 320—22 **15 Claims**



1. Apparatus for controlling the charging of a battery, comprising:

multiple-purpose means for generating a first control signal when the rate of charging of the battery falls below a predetermined rate during a charging run and generating a second control signal;

said multiple-purpose means including selector means for activating said multiple-purpose means to initiate charging runs a predetermined time after the termination of a charging run in response to said second control signal;

said selector means including manually activatable means for including said selector means in circuit with said multiple-purpose means;

said multiple-purpose means further including measuring means for measuring the potential of a battery;

said measuring means including a first counter and means for applying pulses to said first counter;

said first counter having a plurality of output terminals;

said multiple-purpose means further including a timer;

said timer including a second counter;

said multiple-purpose means further including switch means for applying a signal to said second counter from a selected one of said plurality of output terminals of said first counter when said multiple-purpose means is measuring the time since the termination of the previous cycle;

said second counter including means for generating said first control signal and said second control signal;

said multiple-purpose means including means for terminating a charging run in response to said first control signal;

said multiple-purpose means including a timer-gated multivibrator and an OR gate;

the output of said OR gate being electrically connected to said second counter;

a battery charger;

said timer-gated multivibrator being enabled by pulses on two of its inputs;

one of said two inputs of said timer-gated multivibrator being electrically connected to another of said output terminals of said first counter and the other of said inputs to said timer-gated multivibrator being electrically connected to said battery charger, whereby said timer-gated multivibrator is energized when said battery charger is applying charge to a battery and said first counter has counted to said other of said plurality of output terminals;

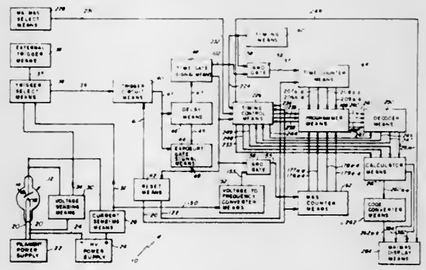
said manually activatable means including a first conductor connected to one input of said OR gate and second and third inputs and a manually activatable switch means for connecting said first conductor to either of said first and second inputs, said first input being electrically connected to another of said output terminals of said first counter and said third input being connected to still another of said outputs of said first counter.

4,097,793

X-RAY TESTING SYSTEM

Jonathan S. Shapiro, Greenwich; Vincent Berluti, Jr., West Haven, both of Conn.; Anthony Pellegrino, Brewster, N.Y., and Howard G. Wagner, Stamford, Conn., assignors to The Machlett Laboratories, Inc., Stamford, Conn.

Filed Oct. 22, 1976, Ser. No. 734,948
Int. Cl.[2] G01R *31/024*
U.S. Cl. 324—20 R **13 Claims**



1. A system for testing an X-ray tube comprising:

anode current sensing means disposed for electrical connection to the anode of the tube for producing an analog voltage signal representative of anode current during an operational interval of the tube;

voltage to frequency converter means connected to the output of the anode current sensing means for producing a train of pulses having an instantaneous frequency proportional to the instantaneous amplitude of the analog voltage signal;

voltage pulse gating means connected to the output of the voltage to frequency converter means for permitting the passage of pulses in the train only during the operational interval;

trigger signal means connected to an input of the voltage gating means for rendering the gating means conductive at the commencement of the operational interval and including voltage gate signal means for producing a voltage gate signal during the entire operational interval and means for prolonging the voltage gate signal beyond the termination of the operational interval; and

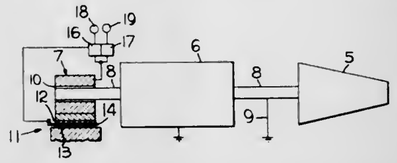
voltage pulse counting means connected to the output of the gating means for counting pulses passed through the gating means during the operational interval and obtaining a quantity equivalent to the product of the anode current and the length of time transpired during the operational interval.

4,097,794

STATIC MEANS FOR DETECTING GROUND INSULATION FAILURE FOR ROTARY ELECTRIC MACHINES

Joe H. Burrus, Jr., Brookfield, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 15, 1976, Ser. No. 742,358
Int. Cl.[2] G01R *31/02, 31/12*
U.S. Cl. 324—54 **2 Claims**



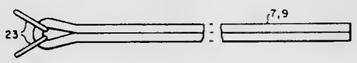
1. In combination with a dynamoelectric machine having an electrically grounded rotating shaft with electrical potential generated therein, a bearing rotatably supporting said shaft on a film of oil, said oil providing electrical insulation between said shaft and said bearing sufficient to cause a voltage potential across said oil film and electrical insulation isolating said bearing from electrical ground said insulation being dividing into at least two insulation portions by an electrical conductor, a device for detecting electrical potential from said bearing to said ground which avoids providing a path for current flow around the complete insulation to ground and is not subject to wear comprising a voltage sensing means connected across said conductor and said bearing, said voltage sensing means indicating a change in voltage when there is a condition exposing the unit to an increase in current flow from said bearing to said ground.

4,097,795

ELASTOMER BELT IMPREGNATED WITH CARBON FOR TESTING DIELECTRIC ADEQUACY AND FOR INDICATING PHYSICAL DEFECTS IN A NONCONDUCTING MATERIAL

Robert W. Thompson, Pearland, Tex., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 603,074, Aug. 8, 1975, Pat. No. 4,010,416.
This application Sep. 21, 1976, Ser. No. 725,315
Int. Cl.[2] G01R *31/12, 31/16*
U.S. Cl. 324—54 **2 Claims**



1. A belt to be utilized with a high voltage source for testing the Dielectric Adequacy and for detecting flaws in a non-conductive material, said belt comprising an elastomer strip rounded on opposite ends and impregnated with particulate conductive material, and a pair of D-shaped rings forming a buckle for tightening said belt and holding it in the tightened

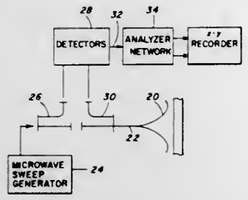
position, the D-shaped rings having rounded transitions to provide continuous curved smooth surfaces outside the belt, the belt being folded so that the rounded ends register and the buckle being disposed at the fold, the folded portion being bonded together in order to capture the buckle and form a smooth belt with no abrupt changes in cross-section, the belt and buckle cooperating to produce a smooth tight band around the non-conductive material and prevent corona discharge when connected to the high voltage source.

4,097,796

METHOD FOR TESTING RADOMES

Clarence D. Lunden, Federal Way, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Feb. 18, 1977, Ser. No. 769,852
Int. Cl.[2] G01R *27/04*
U.S. Cl. 324—58 B **11 Claims**



1. A method for determining at a localized area radio-frequency performance including delamination and/or water entrapment or other material or thickness changes to a radome designed to pass electomagnetic waves at a prescribed frequency, said method including the steps of:

illuminating by normal incidence a local radome patch with a sweep-frequency band of microwaves covering at least one-half octave centered, substantially, on said prescribed frequency,

coupling a reflectometer for response to the band of illuminating and reflected microwaves directed onto and from said local radome patch, respectively,

producing an X-Y plot corresponding to microwave reflectivity as a function of said microwave sweep-frequency, and

calibrating said X-Y plot with a signal coresponding to the reflectivity of a dielectric slab, block or a radome patch with known radio-frequency performance.

4,097,797

APPARATUS FOR TESTING ELECTRICAL CIRCUIT UNITS SUCH AS PRINTED CIRCUIT CARDS

Michel Finet, Soumagne, Belgium, assignor to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 515,811, Oct. 17, 1974, abandoned.
This application Jun. 7, 1976, Ser. No. 693,595
Int. Cl.[2] G01R *15/12*; G06F *11/00*
U.S. Cl. 324—73 R **11 Claims**

1. Modular electrical testing apparatus for circuit units having a plurality of connector terminals, comprising:

(A) connector means for engaging terminals of either a reference circuit unit known to be without faults or a production circuit unit to be tested for faults;

(B) means enabling said electrical testing apparatus to be operated in accordance with a Generating Mode and a Test Mode;

(C) reference pattern generating means effective during said Generation Mode for generating a digital coded reference pattern from said reference circuit unit, said reference pattern generation means comprising:

(i) application means for sequentially applying a series of preselected digital coded test stimuli to a selected terminal of a reference circuit card engaged in said connector means;

(ii) means for scanning all of said terminals engaged in said connector means for each said application of said test stimuli to each of said terminals of said reference circuit unit;

(iii) means for sensing a change in logic state of each of said scanned reference unit terminals and for identifying said terminals having a changed logic state as a result of said application of said test stimuli; and

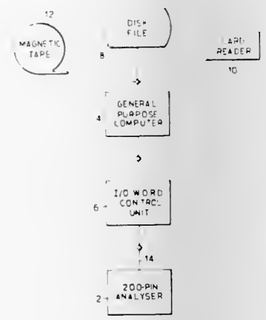
(iv) means for designating a part of reference code corresponding to said reference circuit unit

(D) means for recording said test stimuli applied to each of said reference circuit unit terminals, said identified terminals having changed logic states, said logic state of each of said identified terminals, and said part reference code of said reference circuit unit; and

(E) testing means effective during said Test Mode for testing said production circuit unit, said testing means comprising:

(i) means for inputting a desired part reference code of said production circuit unit;

(ii) means for selecting said recorded reference pattern corresponding to said desired part reference code;



(iii) means for sequentially applying said test stimuli associated with said selected reference pattern to said terminals of said production circuit unit;

(iv) a plurality of paired first and second flip-flop devices, each pair of said flip-flop devices being associated with a terminal of said production circuit unit and wherein said first flip-flop of said pair is connected to a terminal of said production circuit unit being tested and said second flip-flop of said pair is connected to said application means, and wherein said first flip-flop is effective to store an indication of a logic state change of its corresponding production unit terminal in response to said application of said test stimuli, and wherein said second flip-flop is effective to store an indication of an expected logic change of said terminal associated with said flip-flop pair as a result of said application of said recorded test stimuli, and wherein said plurality of paired flip-flop devices are disposed on one or more modular circuit cards for insertion into said electrical testing apparatus;

(v) means for comparing said stored logic states of said plurality of flip-flop pairs; and

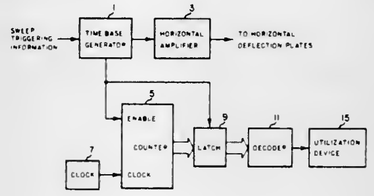
(vi) means for indicating a fault in said production circuit unit being tested when a mismatch between any of said compared flip-flop logic states is present.

4,097,798

OSCILLOSCOPE SWEEP RATE INDICATOR SYSTEM

David Harmon Olson, and Eldon Carl Berg, both of Aloha, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Feb. 28, 1977, Ser. No. 772,879
Int. Cl.[2] G01H *23/02*
U.S. Cl. 324—78 D **3 Claims**



1. A sweep rate indicator system for indicating the sweep rate of an oscilloscope, comprising:

a time-base generator circuit having a plurality of selectable fixed and variable sweep rates for providing a time-base ramp signal, said time-base generator circuit including means for generating a gate signal whose pulse width corresponds to the time period of said time-base ramp signal;

means for generating clock pulses having a predetermined repetition rate;

counter means responsive to said gate signal and said clock pulses for providing a count output proportional to the pulse width of said gate signal;

decoder means responsive to said count output for generating therefrom a control signal indicative of the sweep rate of said time-base ramp signal; and

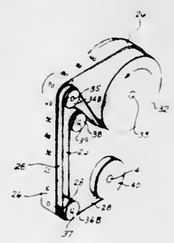
means responsive to said control signal for providing a digital readout of said sweep rate.

4,097,799

ELECTRICAL INDICATOR INCLUDING RELATIVELY TRANSLATABLE SCALE AND INDEX TAPES

Eric K. Thorson, Seattle, Wash., assignor to Eldec Corporation, Lynnwood, Wash.

Filed May 20, 1977, Ser. No. 798,817
Int. Cl.[2] G01R *17/06*; G09F *9/00*
U.S. Cl. 324—99 R **10 Claims**



1. In an electrical indicator of the type including a housing having defined therein an elongated window having first and second ends; a DC torque motor supported within the housing and having a drum rotatable in response to an electrical signal; a first elongated tape having an index located thereon, the first tape having a first end attached to a peripheral surface of the drum; first and second rollers supported within the housing in proximity to the first and second ends of the elongated window, respectively; and a spring-biased, rotatable reel supported within the housing; the first tape passing from its first end in a first circumerential direction around a portion of the peripheral surface of the drum, over the first roller, and then over the second roller to terminate in a second end attached to a peripheral surface of the reel, the reel tending to cause the first tape to translate in a first direction past the window, and the DC torque motor rotating the drum in response to the electrical signal to tend to cause the first tape to translate in a second, opposite direction past the window, an improvement comprising:

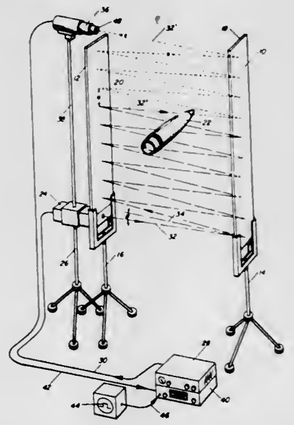
third and fourth rollers supported within the housing in proximity to the first and second ends of the window and adjacent to the first and second rollers, respectively; a second elongated tape having a plurality of spaced scale markings located thereon, a first end of said second tape being attached to the peripheral surface of the drum so that said second tape lies on the peripheral surface of the drum in spaced parallel relationship to the first tape, said second tape passing around a second portion of the peripheral surface of the drum in a second circumferential direction, opposite to the first circumferential direction, over said third roller, and then over said fourth roller to terminate in a second end attached to the peripheral surface of the drum at a location adjacent said first end of said second tape; and, means for tensioning said second tape as it passes around and over the drum and said third and fourth rollers, whereby said second tape translates in the first and second directions past the window as the first tape translates in the second and first directions past the window, respectively, in response to the forces exerted on the first tape and said second tape by the DC torque motor and the spring-biased reel.

4,097,800

LASER SCREEN

John Kuchmas, Jr., Kearny, and Gary E. Bubb, Hackettstown, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 12, 1977, Ser. No. 758,627
Int. Cl.[2] G01P *3/66*
U.S. Cl. 324—178 **2 Claims**



1. A laser screen apparatus for measuring the velocity of a projectile which comprises:

laser means for generating a monochromatic light beam which includes;

a laser having a light source emitting at a wavelength of 6328 angstroms;

a power supply electrically coupled to said laser for stimulating said laser to emit said monochromatic light beam;

detector means for sensing the presence of said monochromatic light beam of said laser means and generating an output signal in response to the interruption of said light beam which includes;

a photodiode operatively positioned and aligned to intercept said monochromatic light beam being reflected

from a reflecting means, said photodiode having an output electrically connected to a counter means; and

a narrow band pass optical filter positioned in front of said photodiode for filtering out all other wavelengths of visible light;

said counter means having an input electrically connected to said detector means for counting the time interval between launch of said projectile and to indicate the interruption of said monochromatic light beam by said projectile;

means for generating an initial triggering pulse for initiating said counter means when said projectile is launched, said counter means indicating the elapsed time, from launch to screen interception, that said projectile takes to travel a fixed distance from launch to said laser screen, said velocity being proportional to said elapsed time, and which may be determined by dividing said fixed distance by said elapsed time measured by said counter means; and

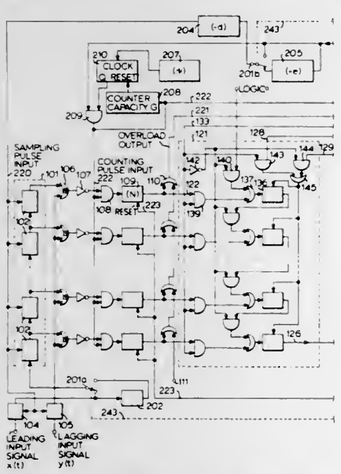
said reflecting means positioned intermediate said laser means and said detector means for successively reflecting said monochromatic light beam back and forth to form a vertically disposed light grid network.

4,097,801

CROSS-CORRELATOR CIRCUIT

David Lewis Freeman, Bridgenorth, and Ralph Seymour Flemons, Peterborough, both of Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada

Filed Mar. 15, 1977, Ser. No. 777,769
Claims priority, application Canada, Apr. 1, 1976, 249394
Int. Cl.[2] G04F *8/00*
U.S. Cl. 324—188 **9 Claims**



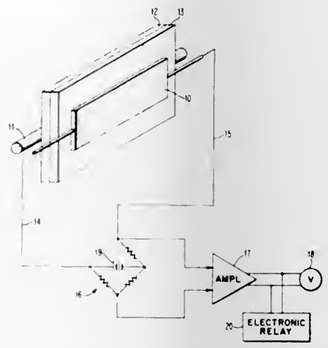
1. A cross-correlation analyser comprising: quantizing means for quantizing a first random modulated signal and a second similarly modulated signal having an unknown lapsed time interval from said first signal; variable oscillator delay means for delaying said quantized first signal by a succession of equal time delay increments to provide a series of delayed quantized versions of said first signal in time overlapped relation with said second quantized signal; a plurality of first comparison means each receiving a respective said delayed first quantized signal of said series and said second quantized signal, to simultaneously compare individual ones of said first series of delayed quantized signals with said second quantized signal; a plurality of counting means each connected to a respective said comparison means, the individual average counting rate of said counting means being a measure of the degree of coincidence between the respective first and second quantized signals; signal overflow detection means for determining which said counting means has the highest rate; signal responsive servo means connecting said overflow means in controlling relation with said variable oscillator to adjust said oscillator delay increments in order to locate said highest counting rate at a predetermined one of said counting means, and oscillator readout means to provide a function of said oscillator frequency as an inverse function of said lapsed time interval.

4,097,802

MAGNETORESISTIVE FIELD SENSOR WITH A MAGNETIC SHIELD WHICH PREVENTS SENSOR RESPONSE AT FIELDS BELOW SATURATION OF THE SHIELD

Nickolas Joseph Mazzeo, Mahopac, and David A. Thompson, Somers, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1975, Ser. No. 592,135
Int. Cl.[2] G01R *33/02*
U.S. Cl. 324—252 **16 Claims**



15. Magnetic apparatus including a magnetoresistor sensor for sensing a magnetic field and said sensor having a first level of permeance,

a magnetic field source located in a predetermined position relative to said sensor,

a magnetically saturable shielding body of material having a substantially higher level of permeance juxtaposed with said sensor and being designed and located between said sensor and said source to absorb substantially all of smaller magnetic fields from said source for shielding said fields from reaching said sensor whereby the resistance of said sensor stripe remains substantially constant below magnetic saturation HSAT of said shielding stripe and varies significantly above that value, and

said magnetic field source being juxtaposed with said sensor and said shielding body, said source being adapted to vary the magnetic field about said sensor and said shielding body above and below the saturation level of said body, said magnetoresistive sensor comprising a thin film strip deposited upon one side of a thin film of a substantially non-magnetic material with said shielding body of magnetic material comprising a layer on the other side of said non-magnetic material.

4,097,803

BATTERY SELF-DISCHARGE INDICATOR

Keiva Feldman, Ottawa, Canada, assignor to Her Majesty the Queen as represented by the Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

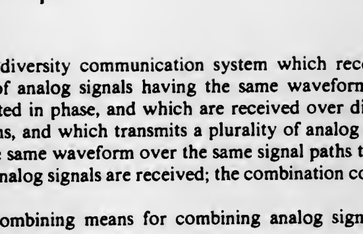
Filed Oct. 26, 1976, Ser. No. 735,820
Claims priority, application Canada, Apr. 30, 1976, 251571
Int. Cl.[2] G01N *27/42*
U.S. Cl. 324—29.5 **10 Claims**

1. A method for detecting electrical leakage between electrodes in an electrochemical cell, comprising the steps of:

charging the cell to a fully charged condition;

storing the cell on open circuit for a predetermined period to permit at least partial dissipation of the full charge due to said leakage;

recharging the cell to an onset of gassing condition;



measuring the duration of recharge to achieve said gassing condition; and

comparing said duration with a like parameter of a refernce cell to ascertain the presence of said leakage.

4,097,804

TRANSMITTING AND RECEIVING DIVERSITY SYSTEM

Masahisa Yamaguchi, Tokyo, and Tatsuo Watanabe, Mitaka, both of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Oct. 27, 1976, Ser. No. 736,133
Claims priority, application Japan, Oct. 30, 1975, 50-130840
Int. Cl.[2] H04B *1/06*
U.S. Cl. 325—15 **5 Claims**

3. In a diversity communication system which receives a plurality of analog signals having the same waveform, relatively shifted in phase, and which are received over different signal paths, and which transmits a plurality of analog signals having the same waveform over the same signal paths that the received analog signals are received; the combination comprising:

signal combining means for combining analog signals applied thereto;

means for applying one of the received analog signals to said signal combining means;

controllable variable delay means responsive to a control signal and receptive of the remaining received analog signals for delaying the remaining received analog signals by respective delay times determined by the control signal and for applying the respective delayed received analog signals to said signal combining means;

phase measuring means for measuring phase differences between the received analog signal applied directly to said combining means and the respective delay received analog signals and for applying a control signal to said controllable delay means for varying the respective delay times of the respective delayed received analog signals to reduce to negligible values the phase differences between the received analog signal applied directly to said signal combining means and the respective delayed received analog signals applied to said signal combining means;

switching means receptive of an analog signal to be transmitted for switching the same between the different signal paths over which the received analog signals are received;

second delay means receptive of one of the analog signals to be transmitted for delaying the same and for applying the delayed analog signal to be transmitted to the signal path over which the received analog signal applied directly to said signal combining means is received; and

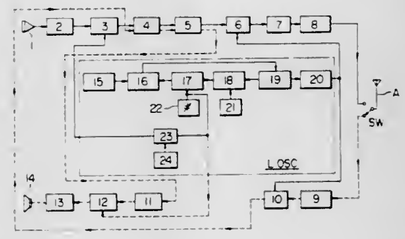
means for applying the remaining analog signals to respective ones of the other signal paths.

4,097,805

FREQUENCY-SYNTHESIZER TYPE TRANSCEIVER

Motoyuki Fujii; Koji Yokota, and Hajime Yashita, all of Tokyo, Japan, assignors to Torio Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1976, Ser. No. 695,397
Claims priority, application Japan, Jun. 27, 1975, 50-80214
Int. Cl.[2] H04B *1/40*
U.S. Cl. 325—17 **2 Claims**



1. A phase-locked loop circuit for a frequency-synthesizer type transceiver comprising:

(a) an oscillator for producing a reference frequency,

(b) a voltage controlled oscillator for producing an output frequency,

(c) a first oscillator circuit for producing a designated frequency,

(d) first combining means for combining the output frequency with the designated frequency and forming a first mixed frequency,

(e) a second oscillator circuit for producing a carrier frequency,

(f) second combining means for combining the carrier frequency with the first mixed frequency and forming a second mixed frequency,

(g) comparing means for comparing the phases of the second mixed frequency and the reference frequency and producing a comparison signal, and

(h) the voltage-controlled oscillator being connected to the comparing means for receiving the comparison signal, whereby said signal regulates the output frequency produced by the voltage-controlled oscillator.

4,097,806

ADAPTIVE EQUALIZER WITH IMPROVED DISTORTION ANALYSIS

John Brian Evans, Plano, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 31, 1976, Ser. No. 672,108
Int. Cl.[2] H04B *1/12*
U.S. Cl. 325—42 **21 Claims**

14. In a receiving terminal for an analog data communication system which relies on a limited bandwidth, switched transmission medium for supplying said receiving terminal with a modulated, passband input signal suffering from an unknown degree of transmission distortion;

said input signal including a series of test pulses during a predetermined equalizer adjustment period; and

said receiving terminal including means for demodulating said input signal, whereby a baseband version of said training pulses is recovered:

the improvement comprising

an adaptive equalizer having a plurality of available settings, said equalizer being connected to feed said input signal to said demodulating means; and

control means coupled between said demodulating means and said equalizer for identifying and selecting the setting which causes said equalizer to best compensate for said transmission distortion on the basis of only one test pass through the available settings and in response to the baseband version of said test pulses.

4,097,807

AUTOMATIC EQUALIZING METHOD AND SYSTEM

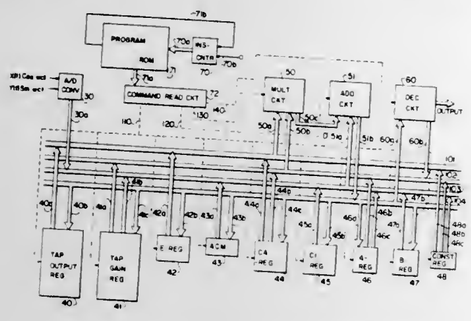
Noriaki Fujimura, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 29, 1975, Ser. No. 644,507

Claims priority, application Japan, Dec. 27, 1974, 50-1303

Int. Cl.[2] H04I *27/18*

U.S. Cl. 325—42 **19 Claims**



1. Apparatus for use at the receiving terminal of a suppressed carrier data communications system, receiving transmitted data signals over a transmission channel, for automatically compensating for static transmission channel characteristics, and for dynamic variations in the amplitude and phase characteristics of the locally-generated carrier frequency, comprising:

a transversal filter having an input for receiving distorted data signals from the transmission channel, said transversal filter having a controllable transfer function, and an output for data signals as modified by said transfer function;

dynamic compensating means operatively connected to said output of said filter for correcting distortion of the modified data signals caused by the dynamic variations in the amplitude and phase characteristics of the locally-generated carrier, said dynamic compensating means having controllable compensating characteristics and having an output for providing distortion corrected data signals;

decision means having an input and an output, with said input connected to the output of said dynamic compensating means, said decision means responding to the distortion corrected data signals from said dynamic compensating means for producing a digital output representation of the transmitted data signals at said output thereof;

error signal generating means connected to said input and said output of said decision means for producing an error signal proportional to the difference between the signals appearing at said input and said output of said decision means;

processing means connected to said decision means and to said error signal generating means, and responsive to said output of said decision means and to said error signal for processing the error signal to produce a first control signal representative of only the data signal distortion due to the static transmission channel characteristics, and a second control signal representative of only the data signal distortion due to the dynamic locally-generated carrier characteristics;

first control means operatively connected to said transversal filter, to said processing means, and to said error signal generating means, and responsive to the first control signal and to said error signal for varying said controllable transfer function of said filter to minimize the error signal, thereby substantially correcting the distortion of the data signals due to the static characteristics of the transmission channel, and

second control means operatively connected to said dynamic compensating means and to said processing means, and responsive to the second control signal for varying said controllable compensation characteristics of said dynamic compensating means to minimize the error signal, thereby substantially correcting the distortion of the data signals due to the dynamic variations in the characteristics of the locally-generated carrier.

4,097,808

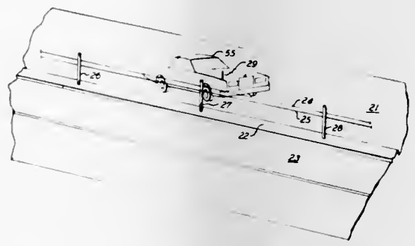
ENTERTAINMENT SYSTEM AND METHOD

Harry George Parke, Brooklyn, N.Y., assignor to Marine Electric Corporation, Brooklyn, N.Y.

Filed Apr. 2, 1976, Ser. No. 672,950

Int. Cl.[2] H04B *7/00*

U.S. Cl. 325—51 **1 Claim**



1. A system for providing entertainment and/or information to automobile vehicles having radio receivers and receiving aerials, travelling along a roadway, comprising, an antenna comprised of two parallel conductors strung adjacent to said roadway and parallel to the direction thereof, transmitter means for exciting said two conductors with a modulated radio frequency signal within 550 to 1650 Khz broadcast band so that each vertical slice through said antenna is effective as a dipole, said transmitter means being adjusted to excite said antenna weakly enough so that the radiated signal is negligible beyond short distances from said roadway so as not to interfere with ordinary broadcast reception, but strongly enough so that said vehicles, which are substantially closer than a wavelength's distance from said antenna, and within the near field region thereof, receive useful signals, said conductors being vertically spaced from each other by a small fraction of a wavelength, said roadway being part of a road which has a divider for separating said roadway and another roadway, said roadways accomodating travel in opposite directions, and said antenna being along said divider at the height of an average automobile vehicle aerial.

4,097,809

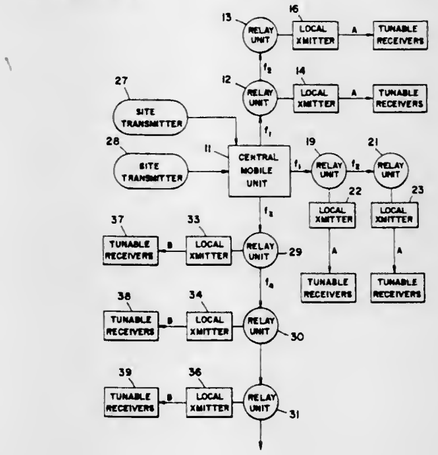
LOCAL EVENT BROADCAST SYSTEM

Albert J. Miller, Campbell, Calif., assignor to Engineering Systems Corporation, Santa Clara, Calif.

Filed Sep. 1, 1976, Ser. No. 719,680

Int. Cl.[2] H04B *3/60, 7/20*

U.S. Cl. 325—54 **10 Claims**



8. A method of providing program coverage only within the location of a main event, with various programs different from each other and relating to sub-events of the main event, comprising the steps of: assembling and radio broadcasting the plurality of programs at corresponding plural different frequencies from a central location; separately receiving each of the different frequency radio broadcasts from the central location at at least a corresponding number of different relay locations within the locality of the main event, so that at each relay location only one program of the plurality of programs broadcast from the central location is received; at each of the relay locations, radio broadcasting, respectively, the program received at the relay location at a low power only covering the area of the sub-event location; providing a plurality of mobile spectators within each sub-event location with portable radio receivers tunable to the low power radio broadcast from the relay location within the respective sub-event location so as to receive only the program relating to such sub-event.

4,097,810

PHASE LOCKED LOOP TUNING SYSTEM WITH A PRESET CHANNEL MEMORY

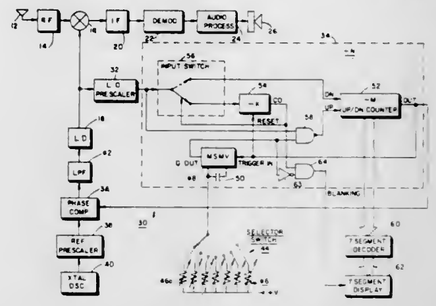
Felix Aschwanden, Thalwil, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Apr. 26, 1977, Ser. No. 790,863

Claims priority, application United Kingdom, Oct. 27, 1976, 44661/76

Int. Cl.[2] H04B *1/16*

U.S. Cl. 325—453 **10 Claims**



1. An apparatus for tuning a receiver to receive any one of a plurality of radio frequency carriers, comprising:

a plurality of passive timing means corresponding to respective radio frequency carriers;

monostable multivibrator means for generating a programming signal;

program selection means for selectively coupling one of said plurality of passive timing means to said monostable multivibrator means to determine the duration of said programming signal;

local oscillator means for generating a local oscillator signal having a frequency determined in response to a control signal;

first counter means for counting to a fixed number K in response to a signal coupled to it;

second counter means for counting to a programmed number M of signal cycles determined in response to the duration of said programming signal in response to a signal coupled to it;

input switch means for selectively coupling said local oscillator signal to said first and second counter means in accordance with the number of cycles accumulated by said first and second counter means, one of said first and second counter means developing an output signal having a period directly related to the period of said local oscillator signal by a factor $N = K + M$, said input switch means enabling storage of said programmed number M in said second counter means development during said output signal; and

phase comparator means for generating an error signal representing the phase and frequency deviations between a reference frequency signal and said output signal and developing therefrom said control signal for said local oscillator means.

4,097,811

RADIO WITH AUTOMATIC SCAN TUNING

Lee Hullinger, Jr., Greentown, and Leo E. Noble, Russiaville, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 2, 1977, Ser. No. 773,384

Int. Cl.[2] H04B *1/32*

U.S. Cl. 325—470 **3 Claims**

1. In a radio having power tuning means and means responsive to a received radio frequency signal for generating an on-station signal, apparatus comprising, in combination:

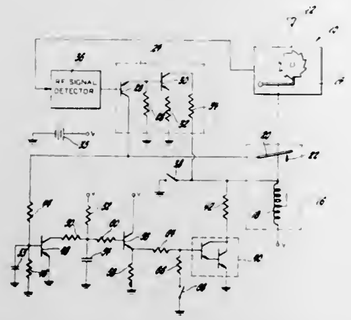
a latching switch having a sweep position and being effective in said sweep position to activate the power tuning

means to sweep through a range of frequencies within a frequency band and further having a stop position and being effective in said stop position to deactivate the power tuning means to remain tuned to a single radio frequency, the latching switch being characterized by a time delay in latching in the sweep position;

circuit means responsive to the on-station signal for switching the latching switch to its stop position,

first means for switching the latching switch to its sweep position to thereby initiate a sweep of the power tuning means;

second means manually activatable to disable the first means whereby the radio remains tuned to a single radio frequency;



third means responsive to the latching switch in its stop position to activate the first means, if not disabled, after a first predetermined time delay of sufficient length to permit recognition of a received radio signal and activation of the second means;

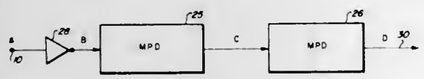
fourth means responsive to the latching switch in its sweep position to deactivate the first means after a second predetermined time delay of just sufficient length to ensure latching of the latching switch in its sweep position, whereby the power tuning means resumes sweeping through the range of frequencies after stopping at each received radio frequency signal, until the second means is activated.

4,097,812

FREQUENCY SELECTIVE DETECTOR CIRCUIT

Theodore S. Rzeszewski, Lombard, Ill., assignor to Matsushita Electric Corporation, Franklin Park, Ill.

Filed Jul. 25, 1977, Ser. No. 818,651
Int. Cl.² H03K 9/06
U.S. Cl. 328—138 **7 Claims**



1. A frequency selective detector system including in combination:

first means having an input and an output for measuring an interval between pulses applied to the input thereof and providing a first output state on the output thereof when the interval between such input pulses is less than a first predetermined amount and providing a second output state on the output thereof whenever the interval between such input pulses is more than said first predetermined amount;

second means having an input connected to the output of said first means for measuring an interval between input pulses applied thereto and responsive to the output state of said first means to provide a first output state on the output thereof whenever the interval between successive attainments of the second output state of said first means is less than a second predetermined amount and providing a second output state whenever the time interval between successive attainments of the second output state of said first means is more than said second predetermined amount; and

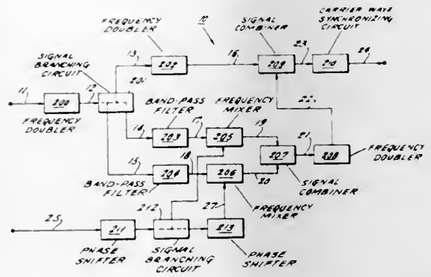
means for supplying input pulses to the input of said first means.

4,097,813

CARRIER WAVE RECOVERY CIRCUIT

Susumu Otani, and Toshitake Noguchi, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Jun. 6, 1977, Ser. No. 803,900
Claims priority, application Japan, Jun. 8, 1976, 51-67329
Int. Cl.² H03K 9/00
U.S. Cl. 329—104 **2 Claims**



1. A circuit for extracting a carrier wave from a double-binary PSK signal input which includes a clock frequency component, said circuit comprising:

a first frequency doubler for doubling the frequency of said PSK signal input;

a second frequency doubler connected to the output of said first frequency doubler for quadrupling the frequency of said PSK signal input;

a first band-pass filter for deriving from the output of said first frequency doubler a signal having a line spectrum at the frequency 2fc + fs, wherein fc is the frequency of said carrier wave to be recovered and fs is the frequency of said clock frequency component;

a second band-pass filter for deriving from the output of said first frequency doubler a signal having a line spectrum at the frequency 2fc − fs;

a first frequency mixer means for mixing the output of said first band-pass filter with a clock frequency signal having the same frequency as and being in-phase with said clock frequency component, said first mixer means to mix said output of said first band-pass filter and said clock frequency signal in such a manner as to generate an output signal containing a line spectrum at the frequency 2fc;

a second frequency mixer means for mixing the output of said second band-pass filter with said clock frequency signal, said second mixer means to mix the output of said second band-pass filter and said clock frequency signal in such a manner as to generate an output signal containing a line spectrum at the frequency 2fc;

a first signal combiner circuit for combining the outputs of said first and second frequency mixer means;

a third frequency doubler connected to the output of said first signal combiner;

a second signal combiner for combining the outputs of said second and third frequency doublers;

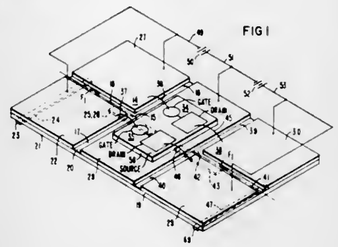
a carrier wave synchronizing circuit for deriving a synchronized carrier wave from said output signal of said second signal combiner circuit.

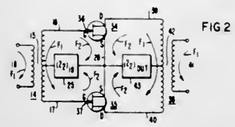
4,097,814

PUSH-PULL POWER AMPLIFIER

Marvin Cohn, Baltimore, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 17, 1977, Ser. No. 807,715
Int. Cl.² H03F 3/26
U.S. Cl. 330—286 **12 Claims**





1. A push-pull power amplifier comprising:

a first and second tee shaped slot line hybrid component each having a first, second and third arm,

said first and second arms of said first and second hybrid component arranged to conduct anti-phase waves on said respective arms derived from a wave on said third arm,

a first and second transistor each having a gate, source, and drain,

said gate and source of said first transistor coupled across said first arm of said first hybrid component,

said gate and source of said second transistor coupled across said first arm of said first hybrid component,

said drain and source of said first transistor coupled across said second arm of said first hybrid component,

said drain and source of said second transistor coupled across said second arm of said second hybrid component,

means for coupling said source of said first and second transistors together,

means for coupling an input signal on said third arm of said first hybrid component, and

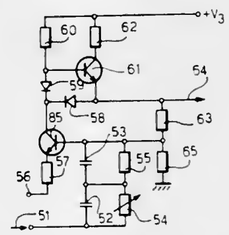
means for coupling an output signal from said third arm of said second hybrid component.

4,097,815

AMPLIFYING CIRCUIT

Armando Campioni, Turin, Italy, assignor to Indesit Industria Elettrodomestici Italiana S.p.A., Rivalta (Turin), Italy

Filed Mar. 29, 1976, Ser. No. 671,645
Claims priority, application Italy, Apr. 9, 1975, 67907 A/75; May 19, 1975, 68285 A/75
Int. Cl.² H03F 1/32
U.S. Cl. 330—289 **3 Claims**



1. An electrical amplifier circuit for providing high voltages for driving a user load impedance, the impedance value of which varies with frequency, such as a video amplifier circuit for a television receiver, said amplifier circuit comprising:

a first amplifier element (61) such as a transistor, having input and output terminals, and having an output impedance which is substantially lower than the minimum value of said load impedance within the frequency range of the signals fed to said amplifier circuit;

means for connecting said first amplifier output to said user load impedance;

a second amplifier element (85) such as a transistor, having input and output terminals;

means for connecting said second amplifier output terminal to said first amplifier input terminal;

a commutation element connected between the output terminal of said first amplifier element and the output element of said second amplifier element; and

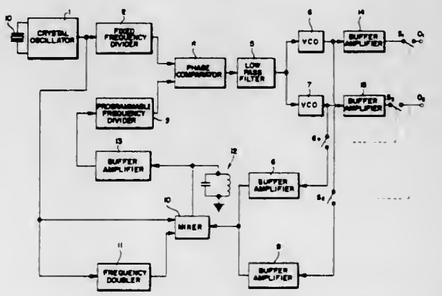
a diode (59) connected to the input of said first amplifier and to the output element of said second amplifier for compensation of said first amplifier for temperature variations.

4,097,816

TUNING SYSTEM

Kazuyoshi Imazeki, and Koichi Kazami, both of Tokyo, Japan, assignors to General Research of Electronics, Inc., Tokyo, Japan

Filed Jul. 20, 1977, Ser. No. 817,367
Int. Cl.² H03B 3/04
U.S. Cl. 331—2 **6 Claims**



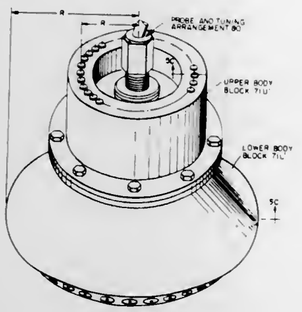
1. A system for generating a plurality of preselected frequencies in a radio frequency device, comprising: means for generating a first reference signal having a predetermined frequency; means, including at least two controllable variable-frequency oscillators, a mixer, a programmable frequency divider, and a switch, for generating a second reference signal, with said mixer being coupled to said first reference signal generating means and being selectively coupled to one of said variable-frequency oscillators by said switch to generate an output signal having a frequency corresponding to the difference between the frequency of said first reference signal and the frequency of said selected variable-frequency oscillator; means coupled to said first reference signal generating means and to said second reference signal generating means and including said programmable frequency divider for comparing said first and second reference signals and developing a control signal which varies systematically in accordance with the frequency difference between said first and second reference signals, with said control signal being applied to both said controllable variable-frequency oscillators to vary the oscillation frequencies thereof until the frequency of said second reference signal is substantially equal to the predetermined frequency of said first reference signal, whereby the output signal of the selected controllable variable-frequency oscillator has a frequency which corresponds to one of the plurality of predetermined receiver frequencies as selected by both the programmable frequency divider and the controllable variable-frequency oscillator selected by the switch.

4,097,817

CYLINDRICAL CAVITY POWER COMBINER FOR PLURALITY OF COAXIAL OSCILLATORS

Glenn R. Thoren, Norwood; James L. Lampen, Burlington, and George Jerinic, Acton, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jun. 30, 1977, Ser. No. 814,745
Int. Cl.[2] H03B *7/14, 9/12*
U.S. Cl. 331—56 **3 Claims**



1. An improved power combiner for radio frequency energy utilizing the combination of a cylindrical cavity with a plurality of coaxial oscillators coupled to such cavity around the periphery thereof, such combiner comprising:

(a) a cylindrical cavity dimensioned to resonate at a predetermined frequency in the TM_{01N} mode of oscillation, where N is an integer;

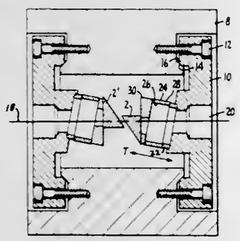
(b) a plurality of coaxial oscillators disposed in a coupling relationship with the cylindrical cavity about the periphery thereof, each one of such oscillators including a first and a second length of coaxial line having different radii and the same characteristic impedance, such first and second length being separated by a coaxial matching section.

4,097,818

ADJUSTABLE ETALON LASER MODE SELECTOR AND METHOD OF ADJUSTMENT

Nubar Sahag Manoukian, San Jose, and Thomas Frazier Johnston, Jr., Sunnyvale, both of Calif., assignors to Coherent, Inc., Palo Alto, Calif.

Filed Sep. 3, 1976, Ser. No. 720,198
Int. Cl.[2] H01S *3/082*
U.S. Cl. 331—94.5 C **7 Claims**



1. An adjustable etalon mode selector mounted within the optical cavity of a laser, said etalon comprising

a pair of spaced prisms mounted along the optical axis of said cavity with the laser beam passing therethrough, each said prism having a first surface facing outwardly of said etalon and inclined at a slight angle to a normal to said optical axis, and each said prism having a second surface optically adjacent and spaced from the second surface of the other said prism, each said second surface being inclined at an angle relative to said cavity optical axis that is generally equal to Brewster's angle for the laser nominal wavelength, and

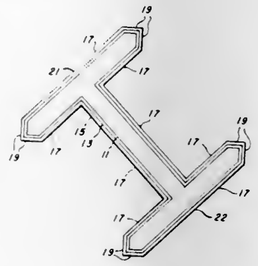
means for selectively adjusting the spacing between said prisms while maintaining the resonant frequency of the laser cavity and etalon combination remains substantially constant during said adjustment of said prism spacing, whereby different modes of the operating wavelength spectrum of the laser may be selected for output without such adjustment modulating the natural resonant frequency of the cavity and etalon combination.

4,097,819

SEMICONDUCTOR LASER

David W. Bellavance, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 645,773, Dec. 31, 1975, abandoned. This application Feb. 25, 1977, Ser. No. 771,866
Int. Cl.[2] H01S *3/19*
U.S. Cl. 331—94.5 H **8 Claims**



1. A semiconductor I-bar mesa laser on a semiconductor substrate comprising:

an elongated central member having a longitudinal axis;

a cross-bar integral with each end of said central member and perpendicular to said longitudinal axis; and

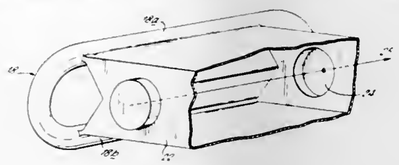
oppositely spaced facets at each end of said central member, said facets being parallel to one another and perpendicular to said substrate, whereby said facets form reflecting mirrors of a longitudinal lasing cavity of said central member.

4,097,820

LASERS

Roland John Hill, Quarndon; Robert Bryn Price, Burton-on-Trent, and Norman Thomas Jewell, Countesthorpe, all of England, assignors to Rolls-Royce Limited, London, England

Continuation of Ser. No. 576,542, May 12, 1975, which is a continuation-in-part of Ser. No. 325,832, Jan. 22, 1973, abandoned. This application Jan. 21, 1977, Ser. No. 761,206
Claims priority, application United Kingdom, Jan. 26, 1972, 3801/72
Int. Cl.[2] H01S *3/02*
U.S. Cl. 331—94.5 G **4 Claims**



1. A detonation powered gas dynamic laser comprising:

a circuitous detonation channel having at least one substantially linear portion in the circuit thereof;

means for supplying an explosive mixture to said detonation channel;

means for igniting said mixture to excite at least one detonation wave into circulation around said circuit, the ignition of said mixture producing detonation gases containing a lasing species;

means for maintaining said circulation of said detonation wave for at least one passage around said circuit;

exhaust means for continuously exhausting said detonation gases from said channel, said exhaust means including a supersonic expansion slit nozzle means for producing a population inversion in said lasing species of said detonation gases, said slit nozzle means extending over a substantial proportion of the length of said linear portion of said detonation channel circuit; and

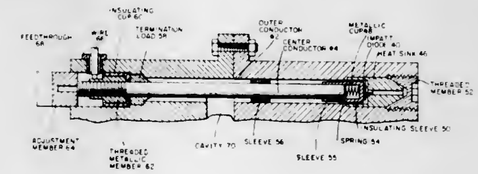
laser resonator means receiving said detonation gases from said slit nozzle means for producing lasing in said lasing species, said laser resonator means having at least one optical axis oriented to extend substantially parallel to the lateral extent of said slit nozzle means.

4,097,821

COAXIAL LINE IMPATT DIODE OSCILLATOR

James L. Lampen, Burlington; George Jerinic, Acton, and Glenn R. Thoren, Norwood, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jun. 30, 1977, Ser. No. 814,741
Int. Cl.[2] H03B *7/14, 9/12*
U.S. Cl. 331—101 **3 Claims**



1. In a diode oscillator wherein an IMPATT diode is electrically connected between a center conductor and an outer conductor at a first end of a length of coaxial line and is biased through the center conductor, a termination load is disposed between such center conductor and such outer conductor adjacent a second end and an output port is formed through the outer conductor intermediate the IMPATT diode and the termination load, the improvement comprising:

(a) a first impedence transformer integrally mounted with the IMPATT diode;

(b) a second impedance transformer affixed to the center conductor between the IMPATT diode and the output port and slidably engaging the outer conductor; and

(c) means for applying a bias voltage through the center conductor and, simultaneously, for adjusting the position of the second impedance transformer relative to the first impedance transformer and the output port.

4,097,822

BROAD-BAND CAVITY-TUNED TRANSISTOR OSCILLATOR

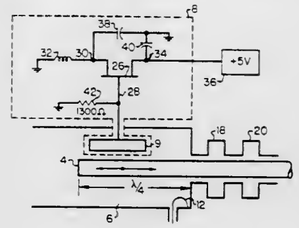
Robert Joly, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 713,007, Aug. 9, 1976, abandoned. This application Aug. 1, 1977, Ser. No. 821,005
Int. Cl.[2] H03B *5/18, 7/06*
U.S. Cl. 331—101 **4 Claims**

1. An oscillator comprising:

a cavity structure having a translationally movable tuning plunger disposed therein;

negative resistive means having a capacitive coupling element disposed within the cavity structure for producing a signal having a selected frequency within a frequency range of substantially one octave, the coupling element having a selected thickness and length and located in the cavity so that the distance between the leftmost edge of the element and the end of the plunger positioned at the low frequency end of the frequency range is substantially equal to the distance between the right-most edge of the



element and the end of the plunger positioned at the high frequency end of the frequency range, for providing uniformity in variation of capacitance between the coupling element and the plunger as the plunger is moved; and

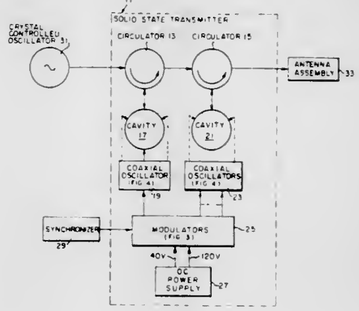
means coupled to the cavity structure for connecting the signal produced therein to an output.

4,097,823

TRANSMITTER WHEREIN OUTPUTS OF A PLURALITY OF PULSE MODULATED DIODE OSCILLATORS ARE COMBINED

George Jerinic, Acton; Glenn R. Thoren, Norwood; Francis J. Sullivan, Jr., Marlboro, and James L. Lampen, Burlington, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jun. 30, 1977, Ser. No. 814,746
Int. Cl.[2] H03K *7/08*
U.S. Cl. 332—9 R **3 Claims**



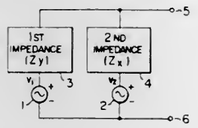
1. A transmitter for radio frequency energy wherein pulses of radio frequency energy from each one of a plurality of diode oscillators are combined, the frequency of such pulses being determined by the frequency of a continuous wave signal out of a crystal-controlled oscillator, and the length and pulse repetition interval between such pulses being determined by periodic signals from a modulator, such transmitter comprising:

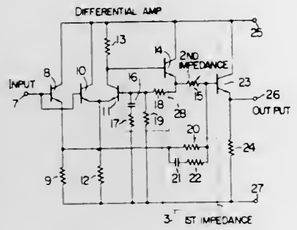
(a) the first combination of a first resonant cavity and at least one diode oscillator coupled thereto, such first combination being responsive to the continuous wave signal out of the crystal oscillator and to the periodic signals out of the modulator to amplify, periodically, the continuous wave signal; and

(b) the second combination of a second resonant cavity and the plurality of diode oscillators, such second combination being responsive to the amplified portions of the continuous wave signals out of the first combination and to the periodic signals out of the modulator to combine the

amplified portions into pulses of radio frequency energy to be transmitted.

4,097,824
VARIABLE EQUALIZER
Kohei Ishizuka; Yasuhiro Kita, both of Hachioji; Yoshitaka Takasaki, and Junichi Nakagawa, both of Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Japan
Filed Feb. 28, 1977, Ser. No. 772,677
Claims priority, application Japan, Mar. 1, 1976, 51-21144
Int. Cl.² H03H 7/14
U.S. Cl. 333—28 R **4 Claims**



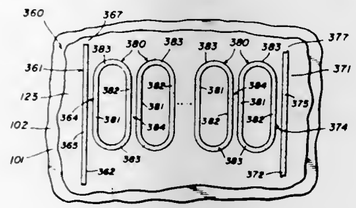


1. A variable equalizer comprising:
a first series circuit of a first input A.C. signal voltage source circuit and a first impedance circuit; and
a second series circuit of a second signal voltage source circuit and a second impedance circuit, said second signal voltage source circuit having a voltage which is proportional to a product of the A.C. voltage of said first input signal voltage source circuit and the square of the reciprocal of the impedance of said first impedance circuit;
said first and second series circuits being connected in parallel with each other.

4,097,825
SURFACE ACOUSTIC WAVE TAPPED DELAY LINE
Henry M. Gerard, Capistrano Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.
Filed Jan. 5, 1977, Ser. No. 757,128
Int. Cl.² H03H 9/30, 9/26, 9/32, 9/02
U.S. Cl. 333—30 R **5 Claims**

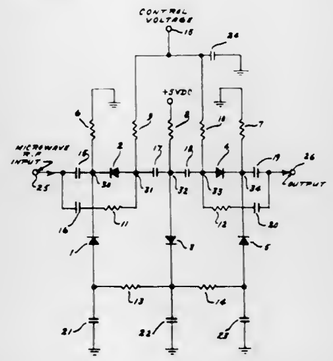
1. A surface acoustic wave tapped delay line, comprising:
a. a substrate of material having a planar surface capable of supporting propagating surface acoustic wave energy;
b. input means including an input transducer disposed on said substrate surface for launching surface acoustic wave energy along a propagation path in response to an electrical input signal;
c. tapping means, including at least two spaced double electrode tapping transducers, disposed on said surface in said propagation path each for extracting a selected portion of said propagating surface acoustic wave energy; and
d. suppression means, including a grooved element array disposed in said surface between said tapping transducers, for reducing acoustic wave reflections at desired frequencies within a desired passband and suppressing spurious signals produced thereby.

4,097,826
INSULAR WAVEGUIDE RING RESONATOR FILTER
Robert M. Knox, La Grange, and Peter P. Toulios, Westchester, both of Ill., assignors to Epsilon Lambda Electronics Corp., Batavia, Ill.
Division of Ser. No. 592,065, Jun. 30, 1975, Pat. No. 3,995,238.
This application Nov. 8, 1976, Ser. No. 740,011
Int. Cl.² H01P 1/20
U.S. Cl. 333—73 R **16 Claims**



1. An insular waveguide band reject ring resonator filter for use in the frequency range from about 1 GHz to about 1,000 GHz comprising a conductive image plane, a first length of elongated high permittivity dielectric waveguide of finite cross section arranged in a closed ring form and disposed adjacent to said conductive image plane, a second length of elongated high permittivity dielectric waveguide of finite cross section disposed adjacent to said conductive image plane and spaced from first length of waveguide to provide a coupling region therebetween, and a thin film of synthetic organic resin disposed between and secured to said conductive image plane and said lengths of waveguide and extending laterally thereof, said thin film being low loss in character and having a low permittivity compared with that of said lengths of waveguide, said second length of waveguide having an inlet port at one end of said coupling region and spaced away from said first length of waveguide a distance substantially greater than the distance between said lengths of waveguide in said coupling region, said second length of waveguide having an outlet port at the other end of said coupling region and spaced from said first length of waveguide a distance substantially greater than the distance between said lengths of waveguide in said coupling region, said filter rejecting and blocking passage of energy from said inlet port to said outlet port when the means periphery of said first length of waveguide is an integral multiple of the guide wavelength of the energy in said first length of waveguide, said filter permitting passage of energy from said inlet port to said outlet port when the mean periphery of said first length of waveguide is other than an integral multiple of the guide wavelength of the energy in said first length of waveguide.

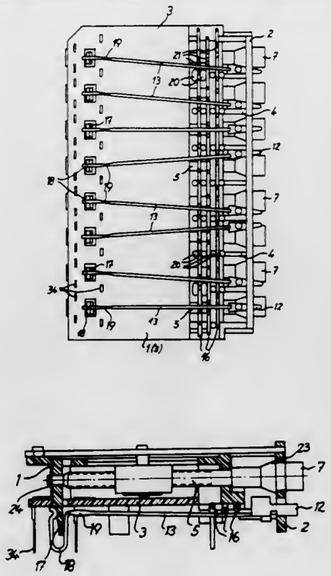
4,097,827
CONSTANT IMPEDANCE, CONSTANT PHASE PIN DIODE WITH ATTENUATOR
Mark R. Williams, West Melbourne, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Feb. 4, 1977, Ser. No. 765,711
Int. Cl.² H03H 7/24
U.S. Cl. 333—81 R **3 Claims**



1. A constant impedance, constant phase PIN diode variable attenuator being comprised of a first PIN diode pi pad, having a RF input terminal, a second PIN diode pi pad having an output terminal and in series with said first PIN diode pi pad, said first and second PIN diode pi pads comprising three diodes each and sharing a common diode, and a control voltage applied simultaneously to said first and second PIN diode pi pads for variation of attenuation thereof.

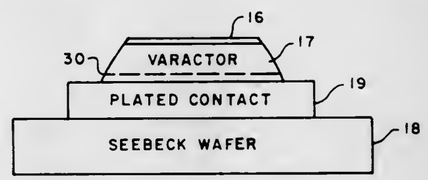
4,097,828
TUNING UNIT WITH BANDSWITCH FOR HIGH FREQUENCY RECEIVERS
Martin Hindermayr, Aying, and Ferdinand Wagner, Munich, both of Germany, assignors to Wilhelm Ruf KG, Munich, Germany
Filed Oct. 26, 1976, Ser. No. 735,714
Claims priority, application Germany, Nov. 6, 1975, 2549781
Int. Cl.² H03J 5/32
U.S. Cl. 334—7 **12 Claims**

1. Tuning unit with bandswitch for high frequency receivers having potentiometer means for the control of capacity diodes composed of a plurality of parallelly disposed resistance paths on which wipers are moved by means of screw tuning spindle means mounted beside one another in a common housing of insulating material, bandswitch means formed of metal wires associated with each tuning spindle means, said tuning spindle means being joined for rotation with sleeve means simultaneously forming operating knobs which are borne in apertures in the front plate and each sleeve means having an axial flange surface engaging the back side of the front plate about one aperture therein, said flange surface being slightly larger than



the cross section of the apertures and tapering conically away from the back side of the front plate.

4,097,829
THERMOELECTRIC COMPENSATION FOR VOLTAGE CONTROL DEVICES
Leonard D. Cohen, Brooklyn, N.Y., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.
Filed Feb. 14, 1977, Ser. No. 768,480
Int. Cl.² H03J 3/04
U.S. Cl. 334—15 **9 Claims**



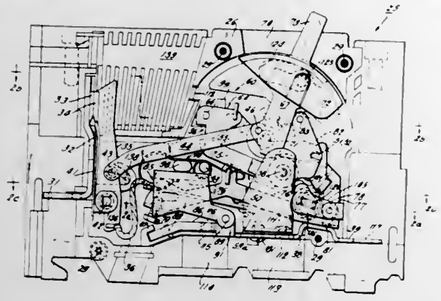
1. A device for compensating a thermally produced shift in the tuning characteristic of voltage controlled frequency tuning elements comprising:
(a) a Seebeck effect device with a voltage-temperature characteristic to produce a control correction voltage with a magnitude substantially equal to the thermally induced control voltage shift of the tuning element,
(b) means for thermally connecting said Seebeck device to said tuning element to cause the Seebeck device to experience substantially the same temperature change as the tuning element, and
(c) means for electrically connecting said Seebeck device to the control voltage circuit of said tuning element in voltage opposition to the thermally induced control voltage shift to cancel the effect of said thermally induced shift in the tuning characteristic of the tuning element.

4,097,830

LATCH FOR CONTACT OPERATING MECHANISM

Tadeusz J. Rys, Bellefontaine, Ohio, assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Jul. 6, 1976, Ser. No. 702,882
Int. Cl.[2] H01H *73/02, 75/00, 77/00*
U.S. Cl. 335—21 **7 Claims**



1. A circuit breaker pole unit including a narrow insulating housing, cooperating movable and stationary contact means disposed within said housing, a manually operable spring powered operating mechanism for opening and closing said contact means; said mechanism including a releaseable cradle and latch means for maintaining said cradle latched in an operating position wherein said operating mechanism is operable to close said contact means; automatic means for tripping said latch means responsive to predetermined abnormal current conditions thereby releasing said cradle whereby said contact means are opened by said mechanism; a metal frame within said housing; said latch means including a plate-like main section generally parallel to a wall of said frame and a latching section projecting angularly from said main sections and engageable by said cradle to maintain the cradle in said operating position; pin means extending between said main section and said wall providing a cantilevered pivotal mounting of said latch means to said frame for movement of said latch means about an axis generally at right angles to said main section and said wall; a link interposed between said latch means and said automatic means; said main section including a single aperture to receive a portion of said link to form a pivotal connection between the latter and said latch means.

4,097,831

CIRCUIT BREAKER ACCESSORY TRIPPING APPARATUS

Charles L. Jencks, Avon, and Roger N. Castonguay, Terryville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Jan. 21, 1977, Ser. No. 761,115
Int. Cl.[2] H01H *9/20*
U.S. Cl. 335—166 **21 Claims**

1. Accessory apparatus for tripping an electric circuit breaker, said apparatus comprises, in combination:

A. a support for mounting attachment to the circuit breaker;

B. first and second members mounted by said support for individual movements between respective reset and actuated positions;

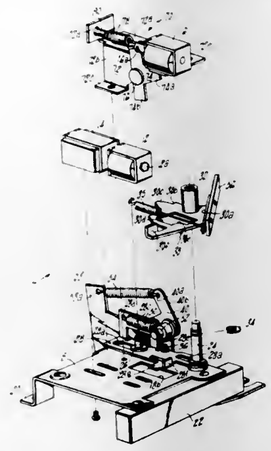
C. latch means carried by said second member for releasably latching said first member in its reset position while said second member assumes its reset position;

D. a third member mounted by said support for movement between actuated and reset positions;

E. a first spring connected between said first and third members, said first spring being charged while said first member is in its reset position and said third member is in its actuated position;

F. a second spring connected between said third member and said support, said second spring being charged while said third member is in its actuated position;

G. trip initiating means mounted on said support and operative to move said second member away from its reset position and thus unlatch said first member for movement to its actuated position under the influence of said first spring, the movement of said first member to its actuated



position serving to initiate tripping of the circuit breaker; and

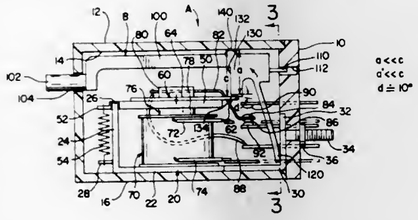
H. means for coupling said third member to the breaker operating mechanism such as to achieve movement of said third member to its actuated position, and, upon tripping of the circuit breaker, said second spring discharges to restore said first, second and third members to their reset positions.

4,097,832

RELAY WITH MANUALLY RELEASABLE LATCH

Donald R. Ritzenthaler, Reedsburg, and Frederick E. Erickson, Baraboo, both of Wis., assignors to Gulf & Western Industries, Inc., New York, N.Y.

Filed Mar. 9, 1977, Ser. No. 775,713
Int. Cl.[2] H01H *9/20*
U.S. Cl. 335—166 **11 Claims**



1. In a manual reset relay including a terminal support block, an armature pivotally mounted on a selected axis, coil means between said axis and said terminal block for forcing said armature into a first position adjacent said coil means when current is passed through said coil means, biasing means for biasing said armature away from said first position and toward a second position spaced from said coil means, a contact controlled by the angular position of said armature and a reset latching device, said latching device including latch means responsive to movement of said armature from said second position to said first position for releasably latching said armature in said first position and manual means for releasing said latch means and allowing said armature to pivot into said

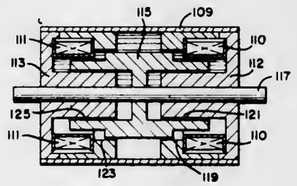
second position, the improvement comprising: longitudinally extending wall means secured with respect to said terminal block and extending over said armature and defining a clearance cavity between said wall means and said armature, said latching device including an integral latch member generally floating in said cavity and manually movable in a longitudinal direction generally perpendicular to said selected axis and parallel to said wall means, said latch member comprising an abutment having a generally flat shoulder extending laterally between said wall means and said armature and generally between said coil means and said terminal block and a wall inclined from said shoulder and away from said wall means and toward said block, a guide pin extending longitudinally into a recess in said terminal block, said recess being transversely larger than said guide pin for allowing lateral movement of said latch member in said cavity, a protuberance generally aligned with said inclined wall and extending from said member toward said wall means, an integral leaf spring biasing said member in a direction away from said terminal block, said shoulder of said abutment and said armature coacting to hold said latch member in a reset position against the biasing action of said leaf spring when said armature is in said second position and when said armature is in said first position, said member being biased by said leaf spring into a latched position with said protuberance and said inclined wall wedge between said armature and said wall means and said latch member including a portion protruding from said relay in a direction away from said terminal block for manually shifting said member from said latched position to said reset position.

4,097,833

ELECTROMAGNETIC ACTUATOR

John L. Myers, Dayton, Ohio, assignor to Ledex, Inc., Dayton, Ohio

Filed Feb. 9, 1976, Ser. No. 656,748
Int. Cl.[2] H01F *7/08*
U.S. Cl. 335—261 **10 Claims**



1. An electromagnetic device comprising:

stator means comprising a first closed flux-carrying path including a core and an air gap opening in said core defined by first and second substantially parallel pole surfaces and a second closed flux-carrying path including a core and an air gap opening in said core defined by third and fourth substantially parallel pole surfaces,

coil means comprising means for generating electromagnetic flux in said first and second closed flux carrying paths, the direction of flux flow across said air gaps being substantially perpendicular to said pole surfaces, and

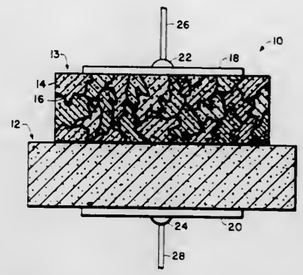
armature means mounted on said device to be movable between said first and second pole surfaces and between said third and fourth pole surfaces in a plane substantially parallel to said pole surfaces to overlap simultaneously varying areas of said first and second pole surfaces and said third and fourth pole surfaces in dependence upon the position of said armature means and to conduct therethrough varying portions of the flux in said first and second closed flux-carrying paths, the direction of flux flow in said armature means remaining substantially perpendicular to said pole surfaces.

4,097,834

NON-LINEAR RESISTORS

Kenneth M. Mar, Tempe; Kim Ritchie, Phoenix, and James N. Smith, Tempe, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 12, 1976, Ser. No. 676,268
Int. Cl.[2] H01C *7/10*
U.S. Cl. 338—21 **4 Claims**



1. A non-linear resistor comprising:

a semiconductor substrate having a first surface and a second surface;

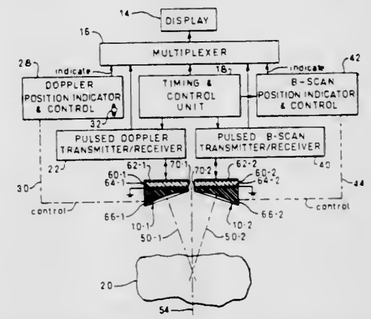
a thin layer of non-linear resistive material comprising a mixture of 40% to 95% by weight of a conductor material and 5% to 60% by weight of a dielectric material disposed on said first surface.

4,097,835

DUAL TRANSDUCER ARRANGEMENT FOR ULTRASONIC IMAGING SYSTEM

Philip S. Green, Atherton, Calif., assignor to SRI International, Menlo Park, Calif.

Filed Sep. 20, 1976, Ser. No. 724,416
Int. Cl.[2] G01S *9/66*
U.S. Cl. 340—1 R **18 Claims**



1. In an ultrasonic imaging apparatus of the type which includes different operating systems, such as systems which operate in the Doppler and B-scan modes, wherein the improvement comprises,

a dual transducer arrangement comprising first and second transducers associated with different operating mode systems of an ultrasonic imaging apparatus,

said first and second transducers each comprising a generally semicylindrical piezoelectric body formed with generally parallel semicircular opposite end surfaces and a flat side face,

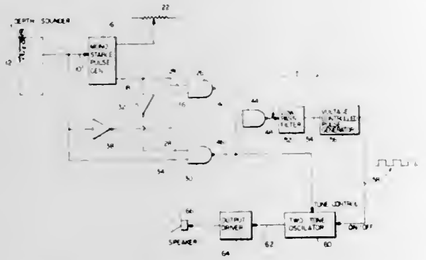
electrodes disposed on the opposite end surfaces of the transducer bodies for connection to the different operating mode systems of the ultrasonic imaging apparatus,

means for focusing said transducers, and

means for relatively movably mounting said first and second

transducers at opposite sides of a mid-plane extending between the transducers with the flat side faces of the transducers closely adjacent said mid-plane.

4,097,836
DEPTH SOUND INDICATOR
Parvin Riddle, 2024 West St., Annapolis, Md. 21401, and Christopher I. Reynolds, Walpole, Mass., assignors to Parvin Riddle, Annapolis, Md.
Filed Feb. 10, 1977, Ser. No. 767,389
Int. Cl.[2] G01S *9/66*
U.S. Cl. 340—3 C **12 Claims**



1. A water depth sounder indicating apparatus, said apparatus receiving at periodic intervals a constant amplitude water depth signal from a depth sounding device, the duration of said water depth signal having a direct relationship to the depth of water being measured by said depth sounding device, comprising:

a reference signal generator, said reference signal generator outputting a constant amplitude reference signal whose duration corresponds to a selected depth of water;

means for comparing the durations of said reference signal and said water depth signal; and

an output device producing an output signal when the durations of said water depth signal and said reference signal are unequal and producing no audible signal when said durations are equal.

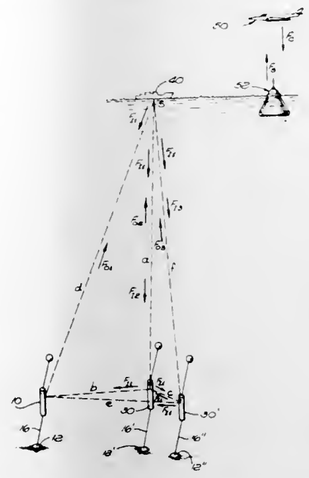
4,097,837
UNDERWATER TRANSPONDER CALIBRATION ARRANGEMENT
Reginald J. Cyr, 700 Francis Botello Rd., Goleta, Calif. 93017
Filed Mar. 29, 1976, Ser. No. 671,675
Int. Cl.[2] G01S *9/66*
U.S. Cl. 340—5 C **42 Claims**

37. In a method of calibrating an underwater transponder array comprised of a plurality of two transponders to determine the relative position between said transponders, and each of said transponders generating a different output signal in response to receiving a first interrogation signal, and a first of said transponders generating said first interrogation signal in response to receiving a second interrogation signal different from said first interrogation signal, the improvement comprising the steps of:

deploying said transponders to a spaced apart array adjacent the water bottom;

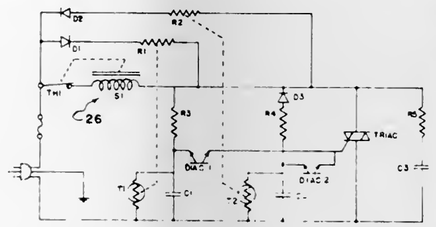
measuring the depth below the surface of the water of each of said transponders;

sequentially generating each of said first and said second interrogation signals from a location in the water within signal range of each of said transponders; and



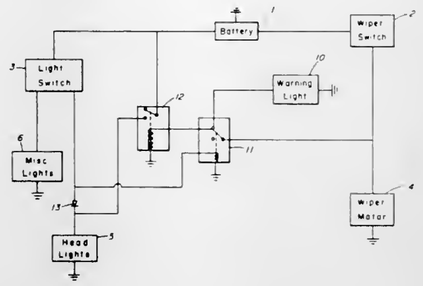
measuring the time period from interrogation signal transmission to receipt of said output signals from each of said transponders.

4,097,838
SEISMIC RODENT CONTROL DEVICE
Engelbert Fiala, 218 Dowling Ave., W., Transcona, Canada
Filed May 27, 1977, Ser. No. 801,103
Int. Cl.[2] H04B *11/00*
U.S. Cl. 340—15 **16 Claims**



1. A device for disturbing the habitat or rodents, burrowing animals and the like, in conjunction with a source of electrical power; comprising in combination at least one frequency generator, casing means to support said generator, circuit means operatively connecting said generator to said source of electrical power, means to vary the frequencies generated by said generator, means to transmit vibration generated by said generator to the sub surface of the ground, said means to vary the frequency including at least two cycling thermostats operatively connected to said generator and to said circuit means for making and breaking the circuit means with said generator, a source of heat operatively connected to said thermostats to operate same in a random fashion and at random time intervals, said circuit means including means to connect and disconnect said source of heat with said thermostats coincident with the making and breaking of said circuit means with said generator.

4,097,839
WINDSHIELD WIPER SYSTEM ACTIVATED LIGHTING
Walter J. Lesiak, 112 Old Tavern La., Summerville, S.C. 29483
Filed Apr. 8, 1976, Ser. No. 674,966
Int. Cl.[2] B60Q *1/08, 1/20*
U.S. Cl. 340—52 R **8 Claims**



1. A circuit for activating a pre-determined light means upon the activation of the windshield wiper system of a vehicle comprising:

(a) power means operative to provide power within said vehicle;

(b) switch means connected to said power means and operative to activate said windshield wiper system;

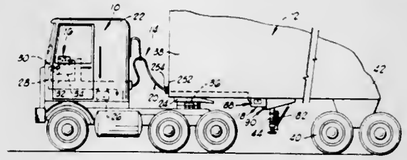
(c) activating means operative to activate said pre-determined light means;

(d) said pre-determined light means comprising exterior lighting on said vehicle; and

(e) said activating means comprising first relay means connected to said switch means and second relay connected to said power means and said pre-determined light means;

whereby when said switch means activates said windshield wiper system, said first relay means causes said second relay means to provide power from said power means to actiate said pre-determined light means.

4,097,840
AUTOMATIC SEMI-TRAILER LANDING GEAR EXTENSION AND RETRACTION APPARATUS
Warner A. Chappelle, 4801 NW. 69th, Oklahoma City, Okla. 73132
Filed Oct. 18, 1976, Ser. No. 733,230
Int. Cl.[2] B60Q *1/00*
U.S. Cl. 340—52 R **29 Claims**



1. In a tractor trailer rig of the type which includes a conventional tractor having an operator's cab, a source of electrical power, and a fifth wheel hitch member; a semi-trailer having hitch pin means on the forward end portion for engaging the fifth wheel hitch member, road wheels journaled on the rear end portion and an alternately extendable and retractable landing gear mounted intermediate the hitch pin means and the road wheels; the landing gear having gear drive means operatively engaged therewith which gear drive means includes an input drive shaft adapted to be engaged by a crank handle for manual rotation thereof in a first direction to extend the landing gear to engage the ground and support the semi-trailer independently of the tractor and, alternately, in a second direction to retract the landing gear from the ground engaging position to allow the forward end portion of the semi-trailer to be supported by the tractor with the hitch pin means engaging the fifth wheel hitch member; an improved automatic landing gear extension and retraction apparatus comprising:

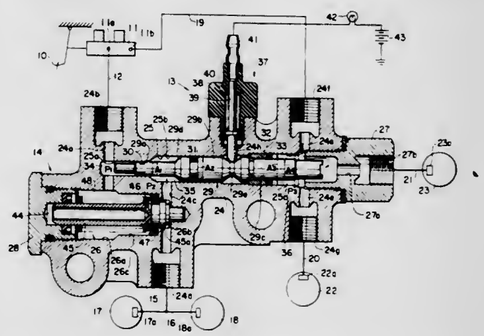
an electric drive motor mounted on the forward end portion of the semi-trailer and having a power output shaft;

means for drivingly connecting the power output shaft to the input drive shaft of the gear drive means of the landing gear;

position sensing means operatively connected to the landing gear for providing a first signal output when the landing gear is retracted and, alternately, for providing a second signal output when the landing gear is extended; and

control circuit means mutually interconnecting the source of electrical power, the electric drive motor and the position sensing means, and responsive to external control thereof, for providing electrical power to the electric drive motor to rotate the input drive shaft in the first direction to extend the landing gear and, alternately, for providing electrical power to the electric drive motor to rotate the input drive shaft in the second direction to retract the landing gear.

4,097,841
BRAKING FLUID PRESSURE FAULT ALARM DEVICE
Katsumi Otsuka, Toyota; Noriakira Ishigami, Chiryu, and Asao Kozakai, Anjyo, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan
Continuation of Ser. No. 568,389, Apr. 16, 1975, abandoned.
This application Oct. 14, 1976, Ser. No. 732,213
Claims priority, application Japan, Apr. 17, 1974, 49-44275
Int. Cl.[2] B60T *8/26, 11/34, 17/18*
U.S. Cl. 340—52 C **5 Claims**



1. A braking fluid pressure fault alarm device for a vehicle dual brake system having brake actuating means, a front brake system including a front master cylinder and front wheel cylinders, a rear brake system including a rear master cylinder and rear wheel cylinders, conduit means operatively providing fluid communication between said master cylinders and said wheel cylinders for applying braking fluid pressure from said master cylinders to said wheel cylinders to brake said vehicle in response to operation of said actuating means, and proportioning valve means interposed between the rear master cylinder and the rear wheel cylinders of said rear brake system for developing proportioned rear wheel braking fluid pressure which is regulated in proportion to the rear wheel braking fluid pressure from said rear master cylinder, said fault alarm device comprising: signal means for generating a fault-indicating alarm signal when an alarm circuit is energized for closure; control valve means interposed between said master cylinders and said wheel cylinders and associated with said proportioning valve means, said control valve means including a body having therein a stepped cylinder which comprises a smaller diameter portion at its one end, a medium diameter portion at

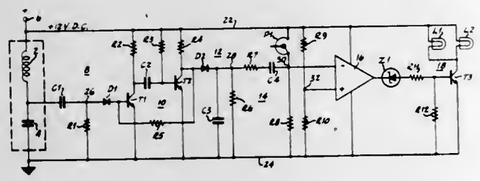
its intermediate portion, and a larger diameter portion at its other end; a stepped piston having a smaller diameter end portion defining an end face slidably but hermetically inserted in the smaller end portion of said stepped cylinder, a larger diameter intermediate portion defining together with said smaller diameter end portion a boundary face therebetween and slidably but hermetically inserted in the medium diameter intermediate portion of said stepped cylinder and a medium diameter other end portion defining an end face and disposed in the larger diameter other end portion of said stepped cylinder; a sleeve defining an end face and slidably but hermetically interposed between the medium diameter other end portion of said stepped piston and the larger diameter other end portion of said stepped cylinder; said stepped piston being axially movable to a neutral position and in axially opposed directions therefrom; switch means engaged with said stepped piston of said control valve means for energizing said alarm circuit in response to the sliding movement of the stepped piston of said control valve means from its neutral position; and connecting means for applying the rear wheel braking fluid pressure from said rear master cylinder to the end face of the smaller diameter end portion of said stepped piston, the proportioned rear wheel braking fluid pressure from said proportioning valve means to the boundary face between the smaller diameter end portion and the larger diameter intermediate portion of said stepped piston, and the front wheel braking fluid pressure from said front master cylinder to the end faces of both of said sleeve and the medium diameter other end portion of said stepped piston; said end face of said medium diameter other end portion of said stepped piston having a greater surface area than said end face of said smaller diameter end portion of said stepped piston; with deterioration of the proportioned rear wheel braking fluid pressure between said proportioning valve means and said rear wheel cylinders occurring as a result of fault in said proportioning valve means despite increases in the rear wheel braking fluid pressure from said master cylinder operating to urge said stepped piston to slide from said neutral position under the force of the front wheel braking fluid pressure to insure a fault indication in said signal means.

4,097,842

DECELERATION INDICATION SYSTEM

David R. Zalar, Wales, and James E. Hansen, Oak Creek, both of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Aug. 9, 1976, Ser. No. 712,808
Int. Cl.² B60Q *1/26;* G08B *21/00;* G01P *3/42, 15/00*
U.S. Cl. 340—71 **7 Claims**



1. A deceleration indication system adapted to be connected to the ignition system of a leading motor vehicle to provide a signal to the following driver whenever the engine speed of the leading motor vehicle decreases comprising:

a tachometer operable to receive input pulses from the ignition system of the leading motor vehicle indicative of engine speed and to provide respective uniform-width control pulses having a frequency proportional to said engine speed and variable therewith;

a voltage control circuit responsive to said control pulses for providing a voltage change having a positive slope when said pulse frequency is increasing on engine acceleration or a voltage change having a negative slope when said pulse frequency is decreasing on engine deceleration;

a slope detector and comparator means responsive to said voltage change having a negative slope for providing an output voltage;

an indicator;

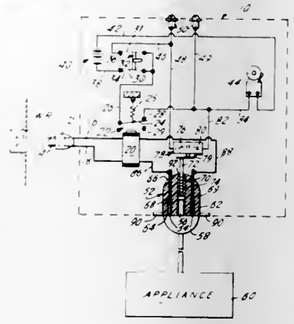
and means responsive to said output voltage for operating said indicator.

4,097,843

WARNING DEVICE AND RECEPTACLE ADAPTOR

Sebastian B. Basile, 20 Coutant Dr., New Rochelle, N.Y. 10804

Filed Nov. 12, 1976, Ser. No. 741,506
Int. Cl.² G08B *13/02*
U.S. Cl. 340—280 **5 Claims**



1. A warning device for indicating loss of power to an electrical unit from a power source by power failure or by disengagement of a plug between the electrical unit and power source, which comprises:

a relay switch having a coil and a spring-biased blade which moves to and from a contact, and is biased against the contact and drawn away from the contact and held toward the coil when the coil is energized,

means connected to the relay switch for connecting the relay switch across a power source,

a receptacle adaptor for receiving the blades and grounding prong of a grounded plug, including

a housing having front and back surfaces,

contact members extending into the housing from its front surface for receiving the grounded plug blades,

a channel pin the housing for receiving the plug grounding prong, the channel extending through the housing from its front to back surfaces,

a pin having a front end and a back end, mounted in the channel for reciprocating axially therethrough, and

biasing means pin engagement with the channel and pin for biasing the in toward the front surface in a manner that allows the tip of the plug grounding prong to come into engagement with the pin front end when a prong is inserted into the channel, and allows the pin to be thereby moved against the bias axially through the channel to an extent that the pin back end extends beyond the housing rear surface,

a second switch connected to the relay contact, the second switch having a contactor and means for rendering the pin communicable with the contactor, such that the second switch is closed when the grounding prong is removed from the receptacle channel and the pin is moved axially to its spring-biased position, and

an on-off switch having two poles, one pole being connected to the relay blade, for activating and de-activating the warning device,

a battery having one pole connected to the other pole of the on-off switch, and

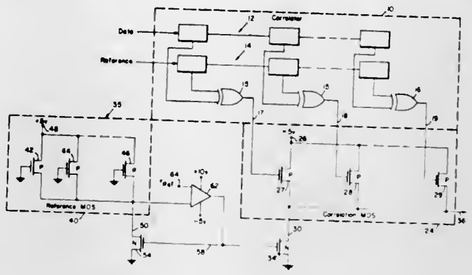
alarm means connected between the on-off switch and the battery, and between the battery and the on-off and second switches, said alarm means being activated when power to the relay is lost or when the grounding prong is withdrawn from the receptacle adaptor.

4,097,844

OUTPUT CIRCUIT FOR A DIGITAL CORRELATOR

Norman E. Moyer, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 4, 1977, Ser. No. 784,499
Int. Cl.² G06F *7/04;* G05B *1/03;* H03K *4/02, 5/20*
U.S. Cl. 340—146.2 **13 Claims**



1. A circuit responsive to a plurality of correlation signals comprising:

a correlation circuit including a plurality of transistors having their current paths connected in parallel between a first voltage source and a first common lead, and having their control electrodes responsive to said correlation signals,

a first load transistor having its current path coupled between said first common lead and a second voltage source, said first load transistor having a control electrode; and

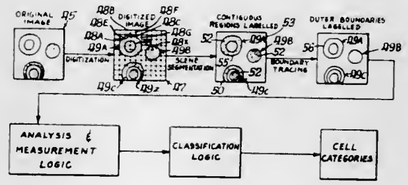
a compensating circuit coupled to the control electrode of said first load transistor for controlling the resistance of said first load transistor to provide a substantially constant voltage step on said common lead for each parallel transistor biased into conduction.

4,097,845

METHOD OF AND AN APPARATUS FOR AUTOMATIC CLASSIFICATION OF RED BLOOD CELLS

James W. Bacus, Hinsdale, Ill., assignor to Rush-Presbyterian-St. Luke's Medical Center, Chicago, Ill.

Continuation-in-part of Ser. No. 737,531, Nov. 1, 1976, abandoned. This application Aug. 18, 1977, Ser. No. 825,673
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 CA **18 Claims**



1. An apparatus for automatically classifying red blood cells in a blood specimen comprising means for examining a plurality of red blood cells in the blood specimen, means for classifying individual abnormal red blood cells examined by its respective features into one of several abnormal cell subpopulations, and means for reporting the red blood cells in at least one of the respective abnormal cell subpopulations.

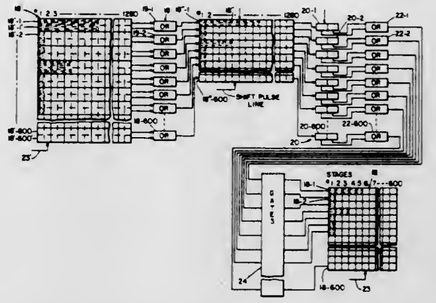
4. An apparatus for classifying red blood cells comprising means for examining a plurality of red blood cells for identifying features including a central pallor or a lack thereof, and means for classifying into one of several different and mutually exclusive subpopulations those red cells having a central pallor and those red cells lacking a central pallor.

4,097,846

DATA STORAGE AND RETRIEVAL SYSTEM

Gary Lewis, St. Clair Shores, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Filed Apr. 8, 1977, Ser. No. 786,117
Int. Cl.² G06K *9/12*
U.S. Cl. 340—146.3 H **37 Claims**



1. In a data storage and retrieval system including a recording medium having recorded thereon information in the form of patterns of energy transmitting or non-transmitting micro-sized image-forming spots surrounded by the other of same and contained within an image field divided into a number of lines of equally spaced potential image-forming spot locations; the improvement in means for retrieving the recorded data represented by the image-forming spots in said image field, said data retrieving means comprising image sensing means including one or more energy sensing elements positioned actively to intercept image spots directed in a substantially non-centered relationship with respect thereto from image-forming spots in said locations, each sensing element being responsive to the parts of one or more image spots impinging thereon by generating a signal of a value depending upon the area thereof which intercepts the image spot or spots involved, each of said sensing elements being at all times much smaller in size than the image spots intercepted thereby so that a number of sensing elements are required in both orthogonally related X and Y axis directions to intercept an entire image spot if they were centered with respect thereto, whereby the outputs available from said one or more sensing elements represent the outputs of an actual or hypothetical multiplicity of groups of said sensing elements intercepting the entire image field and where each group thereof are contiguous and of a size to intercept a single image spot when centered with respect thereto, and means for "OR" gating said sensing element signals representing the respective outputs of each of said different groups of said actual or hypothetical multiplicity of groups of sensing elements, to produce signals representing the patterns of image-forming spots in the image field of said recording medium.

4,097,847

MULTI-FONT OPTICAL CHARACTER RECOGNITION APPARATUS

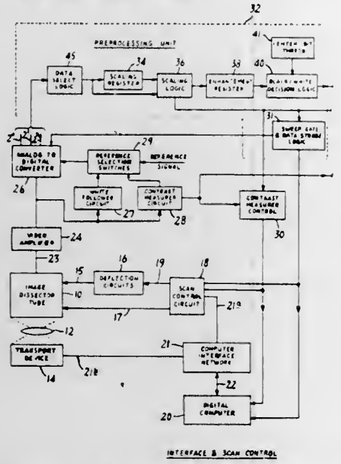
George E. Forsen, Glastonbury, and Stephen F. Jackson, East Hartford, both of Conn., assignors to Scan-Optics, Inc., East Hartford, Conn.

Continuation of Ser. No. 270,192, Jul. 10, 1972, abandoned. This application May 14, 1975, Ser. No. 577,151
Int. Cl.² G06K *9/16*
U.S. Cl. 340—146.3 AE **8 Claims**

1. Multi-font optical character recognition apparatus for converting character representative symbols located on a storage medium in the form of a two-dimensional field of brightness values into a digital code representative of said

symbol, said apparatus including scanning means for optically scanning the storage medium to generate analog signals representative of the brightness values, contrast means for measuring the difference between the analog signals produced by the various brightness values, means for converting the analog signals into one bit digital data signals denoting either blackness for the symbol or whiteness for the background in dependence on the measurement of the contrast means, perimeter trace means for developing contour digital data representative of incremental movements between data points about the perimeter of the symbol, and recognition means for converting the contour data into a digital code representing the scanned symbol, wherein the improvement comprises a perimeter tracing means including:

a character memory for storing the one bit digital data signals in predetermined arrays representing corresponding segmental areas of the scanned symbol,



address means for addressing particular data bits in the character memory,

a perimeter trace table memory for storing a search sequence for finding the perimeter of the character, and

control means for causing the address means to follow the search sequence stored in the perimeter trace table so that the perimeter of the symbol stored in the character memory is searched for in a 5 × 5 array of a portion of the character memory according to the following sequence: row 2, col. 1; row 2, col. 2; row 2, col. 3; row 1, col. 2; row 1, col. 3; row 1, col. 4; row 2, col. 4; row 3, col. 4; row 2, col. 5; row 3, col. 5; row 4, col. 5; row 4, col. 4; row 4, col. 3; row 5, col. 4; row 5, col. 3; row 5, col. 2; row 4, col. 2; row 3, col. 2; row 4, col. 1; row 3, col. 1; row 2, col. 1; stopping in the search whenever a part of the perimeter is found, and beginning a new search with a shifted 5 × 5 array.

4,097,848

READOUT UNIT FOR DATA STORED IN A RANDOM-ACCESS MEMORY AND PRESENTED ON A RASTER SCAN DISPLAY IN ACCORDANCE WITH A GIVEN LINE PATTERN

Antoon Hendrikus Brands, Borne; Jouke Gietema, Hengelo, and Hendrik Cornelis Bleijerveld, Borne, all of Netherlands, assignors to Hollandse Signaalapparaten B.V., Hengelo, Netherlands

Filed Mar. 3, 1977, Ser. No. 773,909

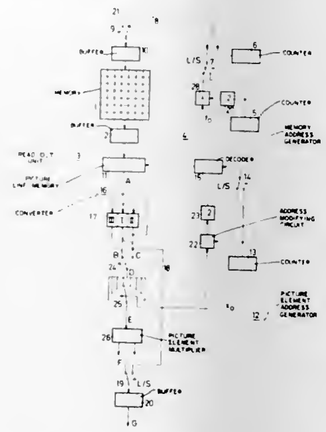
Claims priority, application Netherlands, Mar. 26, 1976, 7603159

Int. Cl.² G11C *11/26*

U.S. Cl. 365—118 **1 Claim**

1. A readout unit for data stored in a random-access memory and presented on a raster scan display in accordance with a predetermined line pattern, the random-access memory including N × N simultaneously accessible submemories each containing $a \times a$ memory elements, for each picture line the relevant data is readout in q bits simultaneously from each of the respective N submemories in a cycle of the random-access memory, and the readout unit contains at least one picture line memory for storing the data representing a picture line for being readout in the sequence as required for presentation on the raster scan display, wherein, in order to display a fraction β^2 ($\beta = 1, \frac{1}{2}, \frac{1}{3}, \ldots$) of the data stored in the random-access memory on the whole of the raster, starting from a point given by the picture element coordinates (x_o, y_o), the readout unit according to the invention comprises:

a. a picture element address generator for addressing a fraction β of the number of picture elements of a line in the picture line memory, for a fraction β of the total number of picture lines, in a period of $1/\beta$ times that required for the presentation of the entire memory data on the raster scan display, starting from the point given by the picture



element coordinates $(q.\text{integer}[x_o/q], y_o)$, such that the data stored in the picture line memory is readout in the same groups of q bits as stored in the picture line memory in the sequence as required for the picture line reproduction;

b. a picture element converter for delivering, on the reception of said groups of q bits, new successive groups of q bits representing the memory data to be displayed for each picture line fraction, starting from the picture element abscissa x_o;

c. a picture element multiplier for multiplying the number of picture elements representing the data to be displayed until the total number of picture elements required for the display of a picture line is obtained; and

d. a memory address generator for reading a fraction β of the number of picture lines $1/\beta$ times out of the random-access memory, starting from the picture element ordinate y_o, for storage into the picture line memory.

4,097,849

ELECTRONIC COMPARATOR FOR PROCESS CONTROL

Francis M. Taylor, Xenia, Ohio, assignor to Systems Research Laboratories, Inc., Dayton, Ohio

Filed Sep. 27, 1976, Ser. No. 726,990

Int. Cl.² G01B *11/06*

U.S. Cl. 340—213 Q **7 Claims**

1. In an optical micrometer for measuring a dimension of an article within a zone of measurement, said optical micrometer generating input data in the form of pulses during each measurement interval representing the dimension of the article, the improvement comprising

first counter means for receiving said input data during each measurement interval,

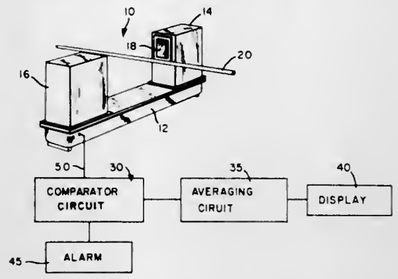
means for generating a command pulse following each measurement interval,

second counter means responsive to said command pulse for receiving the input data from said first counter means,

output register means for storing the data from the previous measurement interval,

third counter means responsive to said command pulse for receiving the input data from the previous measurement interval,

clock means for supplying pulses to said output register means and to said second and third counter means following said command pulse for causing said counter means to decrement, said counter means each providing a zero output signal upon reaching a zero count,



gate means for transferring the remaining data from the other of said second or third counter means to a comparison circuit when one of said second or third counter means reaches zero,

said comparison circuit comparing the number remaining in said other counter means with a preset, adjustable number,

circuit means responsive to the output of said comparison circuit for controlling the operation of said clock means for

a. terminating said clock means when said second counter means reaches zero, provided said deviaition limit is not exceeded, and

b. terminating the operation of said clock means when said third counter means reaches zero, provided said deviation limit is exceeded,

whereby said output register means contains either new input data, if within predetermined limits, or previous input data.

4,097,850

MEANS FOR ADJUSTING AND FOR TESTING A DETECTING DEVICE

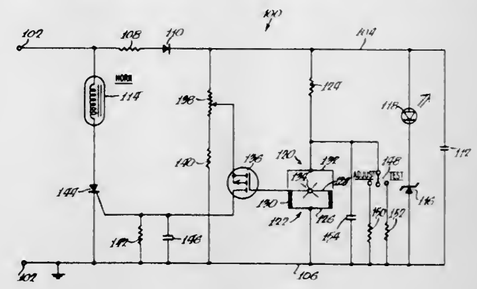
Frederick J. Conforti, Aurora, Ill., assignor to Pittway Corporation, Northbrook, Ill.

Filed Nov. 1, 1976, Ser. No. 737,388

Int. Cl.² G08B *29/00*

U.S. Cl. 340—214 **11 Claims**

1. In a warning device, detecting means responsive to the presence of predetermined phenomena, said detecting means having first and second electrodes for receiving a nominal value voltage thereacross and a third electrode exhibiting a voltage in accordance with said nominal value voltage in the absence of said phenomena and at least a first amount of change in voltage upon the presence of said phenomena in predetermined concentrations; means for applying said nominal value voltage across said first and second electrodes, and means for selectively changing the value of the voltage across said first and second electrodes either by one discrete amount sufficient in the absence of said phenomena to change the voltage at said third electrode by said first amount or by another discrete amount sufficient to change the voltage at said third electrode by a second and greater amount, said means for changing including first and second resistors each connected at one end with said second electrode, and a switch connected with said first electrode and opposite ends of said resistors and actuable to selectively connect either or neither of said resistors across said first and second electrodes, said first and second electrodes having said nominal value voltage thereacross when neither said first nor said second resistor is connected thereacross, said first resistor when connected across said first



and second electrodes developing a voltage thereacross which changes the voltage across said electrodes by said one discrete amount sufficient to change the voltage at said third electrode by said first amount, said second resistor when connected across said first and second electrodes developing a voltage thereacross which changes the voltage across said electrodes by said another discrete amount sufficient to change the voltage at said third electrode by said second amount.

4,097,851

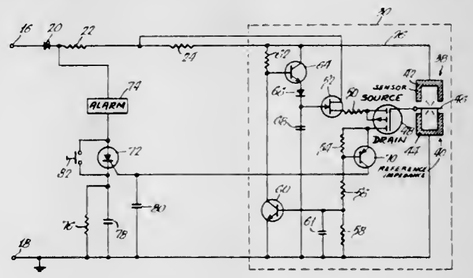
SENSITIVITY COMPENSATED FIRE DETECTOR

Roy W. Klein, Hoffman Estates, Ill., assignor to Pittway Corporation, Northbrook, Ill.

Filed Jul. 19, 1976, Ser. No. 706,685

Int. Cl.² G08B *17/10*

U.S. Cl. 340—237 S **17 Claims**



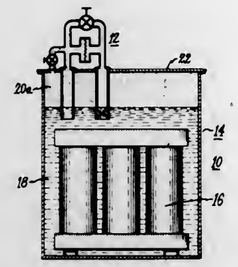
1. In a detecting device, a detector circuit having terminals for receiving a voltage thereacross and an impedance between said terminals which changes in value in accordance with the presence or absence of predetermined phenomena, for providing a first electric signal which changes relatively rapidly in value in response to the occurrence of said phenomena, means for generating in response to said first signal a second electric signal which changes in value in response to changes in value of said first signal, and means for monitoring the value of said second signal and for controlling said generating means to maintain said second signal at substantially a first predetermined value independent of said voltage across and impedance of said detector means for constant and relatively slowly changing values of said first signal, said second signal having at least a second predetermined value upon the occurrence of said phenomena.

4,097,852

FAULT DETECTOR FOR LIQUID IMMERSED INDUCTIVE APPARATUS

Gerald O. Usry, Rome, Ga., assignor to General Electric Company, New York, N.Y.

Filed Sep. 22, 1976, Ser. No. 725,479
Int. Cl.² G08B *21/00*
U.S. Cl. 340—242 **27 Claims**



1. Apparatus for detecting pressure changes within an enclosure for electrical inductive apparatus containing a liquid and a gas, wherein said gas is located in a space above and is in contact with said liquid, comprising:

(a) a first gas containing chamber having a flow restricting opening of predetermined size therein, at least one end of said first chamber, flow restricting opening being immersed in said liquid;

(b) a second gas containing chamber having an opening therein that is of the free-flow type relative to the opening in said first chamber, said second chamber opening, being immersed in said liquid;

(c) means for equalizing the pressure of gas contained in said first chamber, said second chamber, and said space above said liquid; and

(d) means for determining when the pressure in one of said chambers changes with respect to the pressure in the other of said chambers.

4,097,853

MEANS FOR DISTINGUISHING MOTION FROM NOISE IN AN INTRUSION ALARM SYSTEM

Ralph M. Francis, Jr., Racine, Wis., assignor to Milwaukee Resistor Corporation, Milwaukee, Wis.

Filed Sep. 20, 1976, Ser. No. 725,026
Int. Cl.² G08B *13/16*
U.S. Cl. 340—258 A **24 Claims**

1. For use with apparatus that provides a composite signal comprised of a substantially continuous spectrum of frequencies including frequencies designated as noise and defined by selected lower and upper bandwidth limits and a substantially predetermined band of frequencies coincident with a portion of said spectrum designated as the desired information band having lower and upper bandwidth limits within said spectrum; means for discriminating signals corresponding with frequencies within said information band from signals corresponding with noise, comprising:

first amplifier means having input and output means, said input means including means for receiving said composite signal and said amplifier means having a bandwidth response corresponding substantially with said predetermined bandwidth of said noise, said amplifier means producing an unclipped output signal corresponding with said composite signal within said noise band,

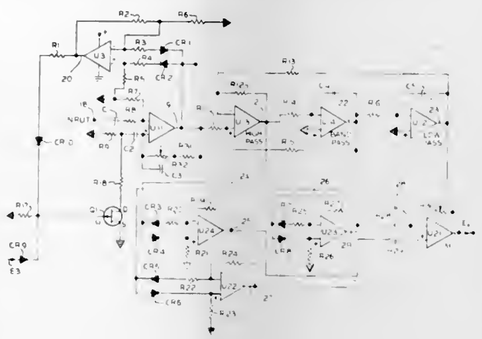
means for substantially separating from said output signal signals which correspond with said information frequency band from signals which correspond with said noise frequencies,

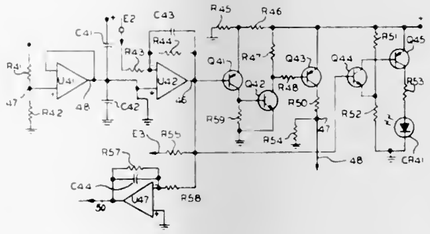
means for converting said information and noise signals, respectively, to corresponding absolute value signals,

means for producing a reference potential,

amplifier means having input means for said absolute value signal corresponding with said noise signal and input means for said absolute value signal corresponding with said information signal, said last named amplifier means being constructed and arranged to produce an alternating output signal which is proportional to the difference between said noise and information input signals and which has a dc offset relative to said reference potential having a polarity that depends upon which of said noise and information corresponding signals is greater,

means for converting said alternating output signal from said last named amplifier means to a signal related to time and





having a polarity relative to said reference potential which is functionally related to the polarity of said offset signal and corresponds with which of said noise signal or said information signal is dominant,

feedback means coupling said signals which are related to time to said input means of said first amplifier means, said feedback mens being responsive to signals having a polarity corresponding with noise for reducing the sensitivity of said first amplifier means proportionately to the magnitude of the noise component of said signals, and

means responsive to said time related signal reaching a predetermined amplitude of one polarity for indicating the existence of a predominant information signal.

4,097,854

SENSING MECHANISM FOR MINE ROOF BOLTING APPARATUS

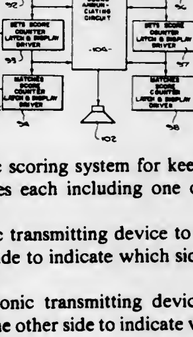
Sigmund Black, Belle Mead, and James L. Finney, Cranbury, both of N.J., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Mar. 4, 1977, Ser. No. 774,354
Int. Cl.² G08B *21/00*
U.S. Cl. 340—282 **11 Claims**

1. In combination with a mine roof bolting apparatus, a sensing mechanism comprising:

means secured to said roof bolting apparatus and operatively engaged with the roof of a mine for sensing any shift of said roof bolting apparatus with respect to said mine roof, in any direction within a horizontal plane,

said means having a vertically movable probe assembly for embedding and fixing the sensing mechanism in a fixed position with respect to the mine roof,



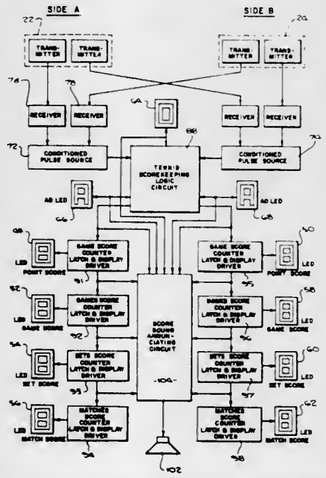
said means including means actuated by the pivotal movement of the probe assembly for generating a signal indicative of said shift.

4,097,855

ELECTRONIC TENNIS SCORING SYSTEM

Gaetano Salvo, 6117 Reseda Blvd., Reseda, Calif. 91335

Filed Nov. 25, 1977, Ser. No. 854,662
Int. Cl.² G08B *23/00, 5/36*
U.S. Cl. 340—323 R **14 Claims**



1. An electronic scoring system for keeping score between two opposing sides each including one or more opponents, comprising:

a first electronic transmitting device to be selectively actuated by one side to indicate which side won each successive point;

a second electronic transmitting device to be selectively actuated by the other side to indicate which side won each successive point;

receiving and scoring means for initially storing a preliminary indication as to who won each successive point;

additional logic circuit means for preventing the full recording of the preliminary indication if it is disputed by the other side; and

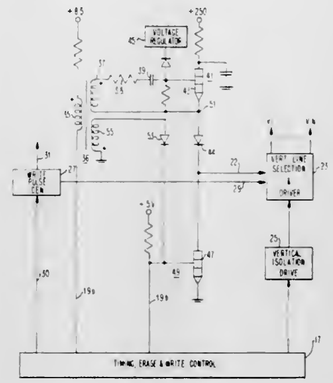
means for fully recording the point if it is not disputed, and for displaying the resultant score.

4,097,856

GAS PANEL SINGLE ENDED DRIVE SYSTEMS

William Roger Lamoureux, Kingston, and James Bryce Trushell, Saugerties, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,056
Int. Cl.² G06F *3/14*
U.S. Cl. 340—324 M **7 Claims**



1. A gas discharge display storage system adapted for low level logic control of a high level driving system during the normal sustain sequence of said system comprising in combination,

a gas panel comprising an envelope filled with an illuminable gas,

first and second sets of dielectrically coated coordinate conductors positioned in orthogonal relationship on opposite sides of said envelope, the intersections of said conductors defining gas cells in the region of each of said coordinate intersections,

a sustain generator associated with each of said sets of coordinate conductors,

said sustain generator comprising means for applying a continuous reference signal to one of said sets of coordinate conductors, the level of said reference signal corresponding to that of the associated logic circuits to permit continuous communication between said coordinate conductor set and said logic circuits,

said sustain generator further including means for generating high level pulse signals of full sustain amplitude from said reference level for application to the other of said coordinate conductors, communication between said other of said coordinate conductors and said control logic being provided during the interval between said high level pulses, the algebraic sum of said level and pulse signal effecting discharge of said previously selected cells.

4,097,857

APPARATUS FOR SELECTIVELY DISPLAYING ANALOGUE QUANTITIES OF PLURAL INPUT DATA SIGNALS

Nobuaki Miyakawa, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed May 11, 1976, Ser. No. 685,697
Claims priority, application Japan, May 16, 1975, 50-57312
Int. Cl.² G06F *3/14*
U.S. Cl. 340—324 R **2 Claims**

1. An apparatus for selectively displaying analogue quantities of plural input data signals, comprising:

a plurality of input means for receiving a corresponding plurality of input voltages of said data signals;

first switching means having a plurality of input terminals connected to said input means and having an output terminal for selectively providing one of said input voltages;

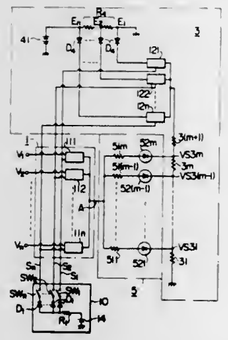
reference voltage generating means for generating a plurality of reference voltages corresponding to said data signals;

second switching means having a plurality of input terminals connected to said reference voltage generating means and having an output terminal for selectively providing one of said reference voltages corresponding to said one of input voltages selected by said first switching means;

voltage dividing means having an input terminal connected to said second switching means and having a plurality of output terminals, for dividing the selected one of reference voltages into a plurality of predetermined different voltages, and respective output terminals being provided for said respective predetermined different voltages;

means for generating a plurality of switching signals for driving said first and second switching means and for selectively providing one of said switching signals to said first and second switching means; and

display means including a plurality of light emitting diodes each connected between the output terminal of said first switching means and a respective output terminal of said voltage dividing means for providing a luminant display for the selected one of said input data signals.

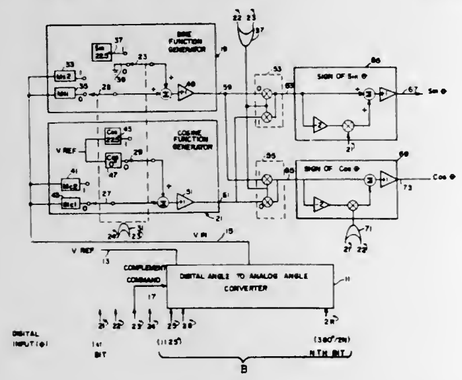


4,097,858

DIGITAL TO ANALOG RESOLVER CONVERTER

Carl Stella, Valencia, Calif., and David Julian Simon, Saddle Brook, N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Oct. 8, 1975, Ser. No. 620,740
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 SY **10 Claims**



1. A method utilizing electronic circuitry for converting an *m* bit digital voltage signal representing an angle over an octant, which is a portion of an *n* bit digital voltage signal representing the angle from 0° to 360°, into an analog voltage signal representing a continuous periodic function of the angle to be used as an output of a digital to analog resolver converter, comprising:

(a) dividing the continuous periodic function of the angle into an even number *p* of equal angular segments, each segment having a slope with the same sign over the full segment;

(b) determining and storing the average slope of each segment and the intercept of each slope segment in the electronic circuitry;

(c) converting the *r* least significant bits of the digital signal into an analog value in a digital to analog converter where *r* is equal to $m - \log_2 p$;

(d) selecting in said electronic circuitry a slope and intercept in accordance with the remaining $\log_2 p$ bits of the *m* bit digital voltage signal and the (m+1)th bit; and

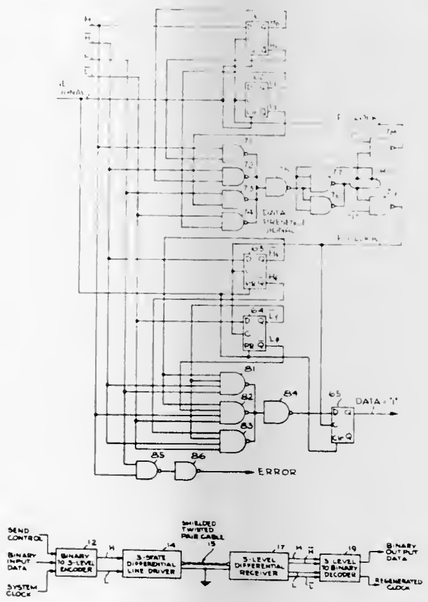
(e) multiplying said analog value by the selected slope and adding to the result the selected intercept in said electronic circuitry.

4,097,859

THREE-LEVEL TO TWO-LEVEL DECODER

Floyd William Looschen, Laguna Beach, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 1, 1976, Ser. No. 737,783
Int. Cl.² H03K *13/00*
U.S. Cl. 340—347 DD **6 Claims**



1. For use in a three-level digital data transmission system, the combination comprising:

means for providing binary signals H, H, L and L indicative of the levels of a self-clocking three-level digital signal having high, low and intermediate levels;

means responsive to said H, H, L and L signals for detecting data presence;

means responsive to the detection of data presence for generating a clock signal at a predetermined time after the detection of data presence; and

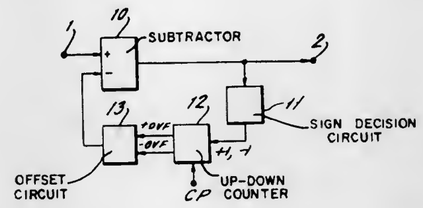
means responsive to said H, H, L and L signals and said clock signal for producing a binary output signal representative of a decoded binary form of said three-level signal.

4,097,860

OFFSET COMPENSATING CIRCUIT

Takashi Araseki; Kazuo Ochiai, and Rikio Maruta, all of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Feb. 9, 1977, Ser. No. 766,848
Claims priority, application Japan, Feb. 10, 1976, 51-14144
Int. Cl.² H03K *13/02, 13/32*
U.S. Cl. 340—347 CC **9 Claims**



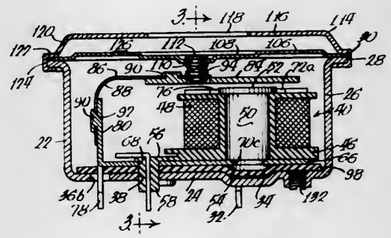
1. An offset compensating circuit comprising: a subtractor for subtracting a presumed value of the offset from the input signal to form the output signal; a sign decision circuit for determining an algebraic sign of the output signal of said subtractor circuit; a clock pulse source; a bidirectional counter for counting pulses from said source having its count-up and count-down function controlled by the output signal of said sign decision circuit and adapted to produce respective output signals when it has overflowed in an increasing direction and in a decreasing direction; and an offset setting circuit in which an internal setting value representing the presumed value of the offset is increased upon overflow of said counter in the increasing direction while said internal setting value is decreased upon overflow of said counter in the decreasing direction.

4,097,861

D.C. HORN

George R. Pariza, Schaumburg, Ill., assignor to Pittway Corporation, Northbrook, Ill.

Filed Mar. 14, 1977, Ser. No. 776,952
Int. Cl.² G10K *9/12*
U.S. Cl. 340—388 **10 Claims**



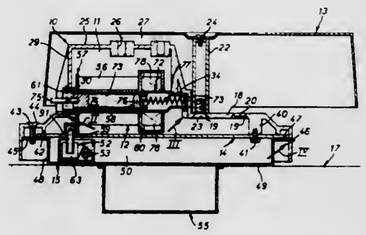
1. An improved horn for generating an audible signal, comprising a housing formed of electrically conductive material having walls he margins of which define an opening; an electromagnetic coil within said housing and having a pair of terminals connected to opposite sides of a winding thereof and extending exteriorly of said housing; a diaphragm of electrically conductive material positioned on said housing in electrical contact therewith over said opening and closing said housing; a striker member of magnetically permeable and electrically conductive material; and means for mounting said striker in said housing between said diaphragm and said coil in operative association with said coil for movement away from and strikingly against said diaphragm to generate noise, said means normally resiliently urging said striker toward and into electrical contact with said diaphragm, electrically insulating said striker from direct electrical contact with said housing and said coil terminals, and including a terminal extended exteriorly of said housing and electrically connected with said striker.

4,097,862

ACOUSTIC WARNING DEVICE, IN PARTICULAR A BELL

Yves Brionne, Pau, France, assignor to Legrand S.A., Limoges, France

Filed Dec. 23, 1976, Ser. No. 754,022
Claims priority, application France, Dec. 24, 1976, 75 39663
Int. Cl.² G08B *3/00*
U.S. Cl. 340—396 **26 Claims**



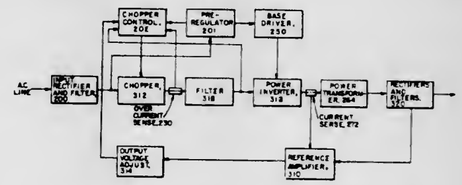
1. An acoustic warning device comprising, a striker member forming a movable core of a control solenoid and arranged to strike resonator means in response to energization of said solenoid, permanent magnet means adapted to define in cooperation with retaining means a rest position for the striker member, said permanent magnet means being in coaxial alignment with the solenoid and disposed beyond one end of said solenoid, said permanent magnet means having radial pole lines with the same polar orientation, one end of said movable core proximate to said permanent magnet means extending only partly into the axial zone corresponding to the axial extent of said permanent magnet means.

4,097,863

MARINE RADAR SYSTEM WITH INDEPENDENT SWITCHED POWER SUPPLIES

Derek Chambers, Bedford, N.H., assignor to Raytheon Company, Lexington, Mass.

Filed Aug. 6, 1976, Ser. No. 712,300
Int. Cl.² G01S *9/00*; H02M *3/22*
U.S. Cl. 343—5 R **3 Claims**



1. In combination:

means for transmitting radar pulse signals at a first rate;

means for providing digital samples of radar return signals at a second rate;

switching power supplying means including a switching regulator feeding an inverter having a frequency above the audible range for providing electrical power to said transmitting means and said digital sample providing means, said switching power supplying means operating at a third rate;

means for preventing interference effects by operating said third rate intermediate said first and second rate, said second rate being variable with the radar range setting;

means for providing switching regulator pulses;

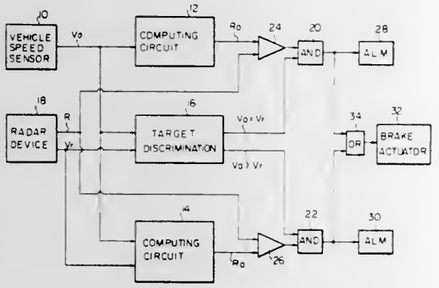
means for varying the width of said switching regulator pulses operating at said third rate to regulate the output voltage in accordance with a composite voltage derived from simultaneously sensing the switching regulator output voltage and inverter current to improve regulation;
means for storing for substantially a single pulse period said digital samples; and
means for reading out of said samples from said storing means at a fourth rate which is constant with each range, said fourth rate being less than or equal to said second rate which latter rate varies in accordance with the radar range setting.

4,097,864

RADAR-OPERATED VEHICLE SAFETY APPARATUS

Hiroshi Endo, Yokosuka, and Kazuhiro Ban, Amagasaki, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of, Japan

Filed Apr. 12, 1977, Ser. No. 786,828
Claims priority, application Japan, Apr. 12, 1976, 51-40381
Int. Cl.² G01S 9/42
U.S. Cl. 343—7 VM **6 Claims**



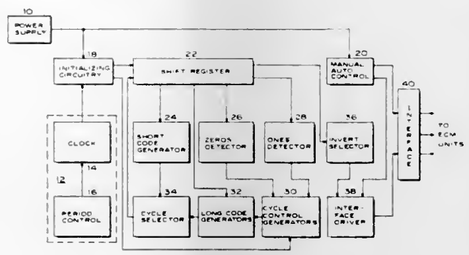
1. A vehicle safety apparatus comprising:
a radar device for measuring the range of an object and the speed of the vehicle relative to said object;
a vehicle speed sensor for measuring the speed of the vehicle relative to the roadway;
means for determining whether said object is stationary or moving in the same direction as the vehicle;
a first computing circuit for processing the measured vehicle speed relative to the roadway to derive a first minimum distance on the assumption that said object is stationary;
a first comparator for comparing said measure range of said object with said first minimum distance to provide an output when said measured range is equal to or smaller than said first minimum distance;
a first gate circuit for passing said output from said first comparator to a utilization circuit when said object is determined as a stationary object;
a second computing circuit for processing said measured vehicle speeds relative to both the roadway and the object to derive a second minimum distance on the assumption that said object is moving;
a second comparator for comparing said measured range of said object with said second minimum distance to provide an output when said measured range is equal to or smaller than said second minimum distance; and
a second gate circuit for passing said output from said second comparator to said utilization circuit when said object is determined as a moving object.

4,097,865

ELECTRONIC COUNTERMEASURE SEQUENCE TIMER

Gerald N. Jones, Inyokern, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 1, 1971, Ser. No. 152,464
Int. Cl.² G01S 7/38
U.S. Cl. 343—18 E **6 Claims**



1. A random period time sequencer for causing the device to which it is coupled to pseudo-randomly alternate between its operating modes, comprising:
a power supply;
a digital shift register providing a plurality of outputs consisting of ones and zeros in the form of electrical signals;
an initializing circuit coupled to said power supply and having an output coupled to said shift register for providing an electrical signal to said shift register establishing predetermined initial conditions in said shift register;
a variable period clock coupled to said initializing circuit;
a zeros detector coupled to an output of said shift register for detecting the totality of zeros in the output and providing an output indicative thereof;
a ones detector coupled to an output of said shift register for detecting the totality of ones in the output and providing an output indicative thereof;
at least one code generator coupled to an output of said shift register for generating a digital pattern in response to the coincidence of preselected bits therein;
a generator cycle control coupled to said ones and zeros detectors, for receiving their outputs, and to said at least one generator for controlling its pattern cycle;
a cycle selector for selectively coupling said at least one code generator to said shift register; and
an interface driver coupled to the output of said shift register for providing the sequencer output in response thereto.

4,097,866

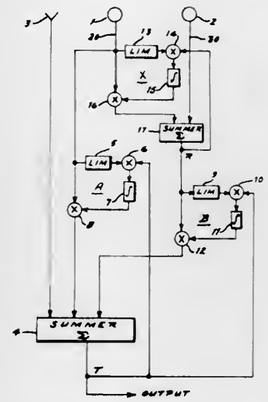
MULTILEVEL SIDELOBE CANCELLER

William F. Frost, Huntington; Raymond J. Masak; Herbert F. Baurle, both of E. Northport, and Anthony F. Kowalski, Miller Place, all of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 10, 1977, Ser. No. 767,254
Int. Cl.² H04B 1/10; G01S 3/06
U.S. Cl. 343—100 LE **2 Claims**

1. A multilevel sidelobe canceller, comprising:
first, second and third antennas, said second and third antennas having substantially omni-directional reception characteristics;
first, second and third adaptive control loops, each of said loops having a signal input, an output and a feedback input;
first and second summers, the output of said first summer forming the output of said multilevel sidelobe canceller;
means for coupling said first antenna to a first input of said first summer;
means for coupling said second antenna to the signal inputs of said first and second control loops;

means for coupling said third antenna to one input of said second summer;
means for coupling the output of said second control loop to another input of said second summer;
means for coupling the output of said second summer jointly to the signal input of said third control loop and to the feedback input of said second control loop;



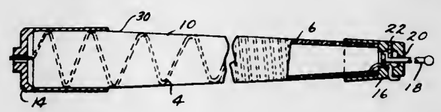
means for coupling the output of said first control loop to a second input of said first summer;
means for coupling the output of said third control loop to a third input of said first summer; and
means for jointly coupling the output of said first summer to the feedback inputs of said first and third control loops.

4,097,867

HELICAL ANTENNA ENCASED IN FIBERGLASS BODY

James Joseph Eroncig, 6400 SW. 145th Ter., Miami, Fla.

Filed Sep. 23, 1975, Ser. No. 615,917
Int. Cl.² H01Q 1/32, 1/36
U.S. Cl. 343—715 **2 Claims**



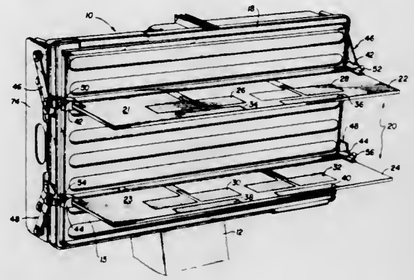
1. A wave guide antenna comprising a hollow fiberglass antenna body encapsulating and totally surrounding a coiled electrically conductive top-loaded wire, said coiled wire being tightly would in helical coils at the top end of said antenna body and increasing in spacing distance between the helical coils as the coils approach the bottom end of said antenna body to provide for interception of ultra short waves, said encapsulated helical wires serving to provide strength to said fiberglass antenna body, a cellophane sheath surrounding and merged into the exterior surface of said fiberglass antenna body, said sheath providing a smooth exterior surface to said antenna, a base ferrule secured to the bottom end of said antenna and electrically connected to the end of wire proximate thereto, a top ferrule secured to the top end of said antenna body and electrically connected to the other end of wire proximate thereto, said top ferrule being provided with a locking mechanism adapted to secure a tuning shaft in an optimum position, said tuning shaft being slideably adjustable along the central axis of said antenna body and being in direct electrical contact with said top ferrule.

4,097,868

ANTENNA FOR COMBINED SURVEILLANCE AND FOLIAGE PENETRATION RADAR

John Joseph Borowick, Bricktown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 6, 1976, Ser. No. 747,764
Int. Cl.² H01Q 21/00, 9/28, 19/10
U.S. Cl. 343—727 **12 Claims**



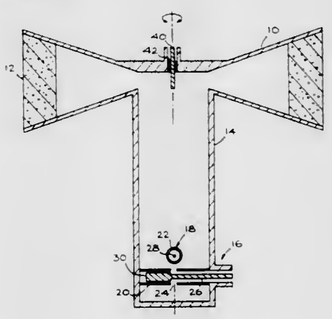
1. An aperture sharing radar antenna for first and second radar apparatus operative in different frequency bands comprising in combination:
a first radar antenna array including a plurality of waveguides having front and side walls coupled to and operable with said first radar apparatus in one frequency band, the front walls of said waveguides having a plurality of substantially parallel rows of multiple slots arranged along said front walls in a common plane; and
a second radar antenna array coupled to and operable with said second radar apparatus in another frequency band, said second array including a planar dielectric sheet and a stripline dipole element on said sheet operatively mounted transversely to said common plane along the front of said first radar antenna array extending parallel to and spaced from said multiple slots to avoid obstruction thereof and cause negligible interference to the effective operation of said first radar apparatus, said first antenna array acting as a reflector for said second antenna apparatus during operation of said second radar apparatus.

4,097,869

ORTHOGONAL-PORT, BICONICAL-HORN, DIRECTION-FINDER ANTENNA

Lloyd A. Robinson, Mt. View, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Filed Mar. 14, 1977, Ser. No. 777,160
Int. Cl.² H01Q 13/00
U.S. Cl. 343—773 **9 Claims**



1. A direction finder antenna comprising:
a circular waveguide having one end closed and the other

end open, a radiating element comprising a figure of revolution about the axis of said circular waveguide, said radiating element having one wall joined with the open end of the circular waveguide,

an axial opening extending through the wall of the radiating element which is opposite to the wall which joins the circular waveguide wall,

a dipole probe extending through the opening in said wall along the axis of a said circular waveguide,

orthogonally disposed ports in the wall of said circular waveguide positioned at a predetermined location from the closed end thereof, and

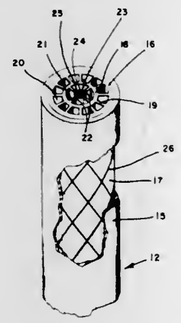
means at each of said ports for deriving electrical outputs from said direction finder antenna.

4,097,870

ACTIVE SLEEVE SURROUNDING FEED LINE FOR DIPOLE ANTENNA

Leon F. Fulmer, Sr., Prosperity, and John R. Lewis, Jr., Newberry, both of S.C., assignors to Shakespeare Company, Columbia, S.C.

Filed Sep. 13, 1976, Ser. No. 722,498
Int. Cl.[2] H01Q *9/16*
U.S. Cl. 343—792 **7 Claims**



1. Apparatus forming at least a portion of an antenna comprising: an outer generally cylindrical casing, rigid one-piece spacer means within said casing having a generally cylindrical outer surface and a honeycomb-like interior including a medial cylindrical member and a plurality of centering lug means extending radially inward from said cylindrical member and together defining an axial aperture spaced from said outer surface, a transmission line positionable in said aperture and centered within said lug means, and a wire braided around the outer surface of said spacer means and uniformly spaced from said transmission line.

4,097,871

TRANSVERSE RECORDING HEAD FOR MAGNETIC PRINTING

Ami E. Berkowitz, Schenectady; Joseph A. Lahut, Scotia, and Jish Min Wang, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

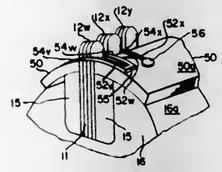
Filed Dec. 27, 1976, Ser. No. 754,582
Int. Cl.[2] G03G *19/00;* G11B *5/20*
U.S. Cl. 346—74.1 **12 Claims**

1. A magnetic printing head for selectively simultaneously magnetizing at least one of a multiplicity of regions of a relatively thin magnetizable recording belt in a direction transverse to a direction of essentially linear movement of the recording belt past the stationary printing head, comprising:

an elongated member of magnetizable material and having a multiplicity (N×M) of linearly arrayed slots formed into an edge thereof closest to the moving magnetic belt, said multiplicity of slots being divided into a plurality (N) of sequential word groups each containing a like number (M) of ordered slots;

a plurality (N) of conductive word lines, each arranged within the plurality of ordered slots of a different one of a plurality of word groups of slots, each word line independently and selectively energizable for carrying an electrical current of magnitude less than the magnitude of current required to selectively form a magnetic field of magnitude sufficient to magnetize one of the regions of said belt adjacent to an open end of each slot of said plurality of slots in each said word group; and

a plurality (M) of conductive digit lines, each arranged within a like ordered slot of all of said plurality of word



groups, each digit line independently and selectively energizable for carrying another electrical current of magnitude less than the magnitude of current required to selectively form a magnetic field of magnitude sufficient to magnetize one of the regions of said belt adjacent to the open end of each slot containing that digit line;

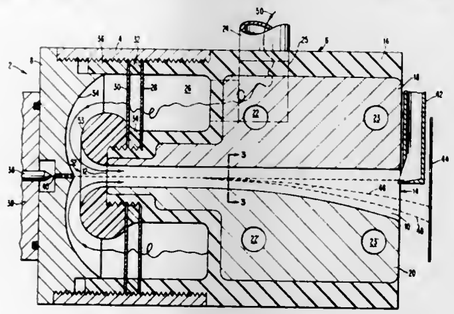
at least one word line and at least one digit line being independently and simultaneously energized to cause formation of a magnetic field of direction essentially transverse to the direction of linear motion of the belt and of magnitude sufficient to magnetize each region of said belt adjacent to those of said slots containing the simultaneously energized lines.

4,097,872

AXIAL DROPLET ASPIRATOR

Francis Peter Giordano, Brooklyn, and Ferdinand Hendriks, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,778
Int. Cl.[2] G01D *15/18*
U.S. Cl. 346—75 **25 Claims**



1. An integral ink jet aspirator comprising:

housing means having front and rear ends and including a gas inlet port;

a charge electrode enclosing the front end of said housing means, said electrode having an axial passage from an outer face to an inner face, said inner face being curvilinear;

an ink jet head on said outer face of said charge electrode in axial alignment with said axial passage in said charge electrode;

a tunnel within said housing means in axial alignment with said axial passage in said charge electrode, said tunnel having an entrance and an exit and having a substantially uniform cross-sectional area from said entrance to said exit;

a mouth at said tunnel entrance having a curvilinear surface spaced from said curvilinear surface of said charge electrode, with the space therebetween forming a channel;

turbulence decreasing means within said housing means and between said inlet port and said channel; and

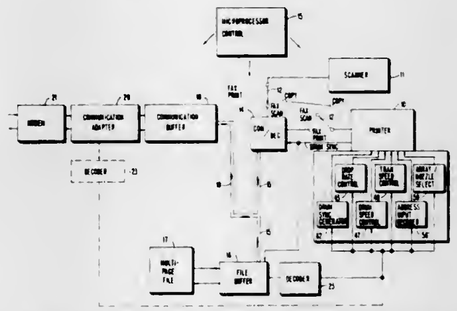
deflection means in the walls of said tunnel.

4,097,873

INK JET PRINTER FOR SELECTIVELY PRINTING DIFFERENT RESOLUTIONS

Van Clifton Martin, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 28, 1977, Ser. No. 773,107
Int. Cl.[2] G01D *15/18, 15/24*
U.S. Cl. 346—75 **19 Claims**



1. An ink jet printer for selectively printing different resolutions on a medium comprising:

cylindrical means for supporting the medium for receiving ink drops;

a plurality of arrays of ink jet nozzles disposed relative to said cylindrical means, each of said arrays having a plurality of ink jet nozzles linearly spaced in a first direction to supply ink drops at a selected drop rate to the medium, said arrays being disposed relative to each other so that the tracks from each of said nozzles interlace with other tracks from other of said nozzles;

first producing means to produce relative linear motion between said cylindrical means and said arrays in the first direction;

second producing means to produce relative rotation between said cylindrical means and said arrays in a second direction substantially orthogonal to the first direction;

means to select at least one of said nozzles in at least one of said arrays in accordance with the resolution to be printed;

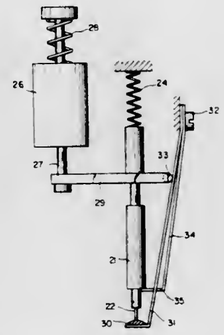
and means to alter at least two out of the velocity of said first producing means, the velocity of said second producing means, and the drop rate of the drops supplied in accordance with the desired resolution to be printed.

4,097,874

BLOCKING ASSEMBLY FOR AN AUTOMATIC DRAFTING DEVICE

Gerold Anderka, Ellerbek; Horst Hampel, Bonningstedt; Walter Jozat, Bad Bramstedt, and Klaus Straszewski, Quickborn, all of Germany, assignors to Mesne Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.

Continuation-in-part of Ser. No. 781,394, Mar. 25, 1977. This application May 3, 1977, Ser. No. 793,447
Claims priority, application Germany, Feb. 19, 1977, 2707258
Int. Cl.[2] G01D *15/16*
U.S. Cl. 346—140 R **17 Claims**



1. In an automatic drafting device of the type adjustably supporting a tubular writing pen with writing tip in both a lowered writing position with the pen tip contacting the writing surface and a raised rest position with the pen tip out of contact with the writing surface, the improvement comprising:

A. A housing support for said tubular pen;

B. A rest mode mechanism mounted upon said housing and engaging said pen, so as to urge said pen inwardly of said housing into a raised rest position;

C. A writing mode mechanism mounted upon said housing and engaging said pen, so as to urge said pen outwardly of said housing in a lowered writing position; and

D. A sealing element supported upon said housing, so as to engage the writing tip of said pen in the raised rest position and so as to disengage laterally from the writing tip in a lowered writing position, and

E. A reciprocable blocking assembly supported in said housing and engaging said sealing element as an override to prevent axial movement of said tubular pen, such that said sealing element is moved laterally outwardly of said tubular pen during pre-selected periods.

4,097,875

SHAFT ENCODER

Frank L. Scholten, Katonah, N.Y., and Francis S. Szabo, Mountain Lakes, N.J., assignors to Addressograph-Multigraph Corporation, Cleveland, Ohio

Filed Apr. 4, 1977, Ser. No. 784,553
Int. Cl.[2] G03B *15/24;* G01D *5/34*
U.S. Cl. 354—8 **3 Claims**

1. In a photocomposition machine wherein characters are projected from a font source to a photosensitive surface, the provision of improved means to space the characters in a line of composition according to the width value of each character, comprising:

a projection system with a focused optical axis;

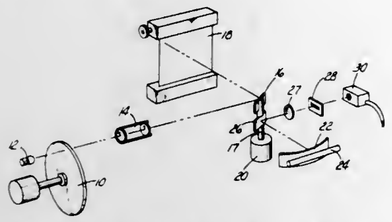
a first beam deflecting means positioned on said optical axis, for intercepting the focused optical axis and directing it to the photosensitive surface;

means for oscillating said first beam deflecting means through an angle sufficient to project the optical axis in measured steps along a length of composition line;

a projection grating of alternate energy transparent and opaque portions, and means to project radiant energy through the energy transparent portions of the projection grating;

a second beam deflecting means carried in oscillation synchronism with said first beam deflecting means;

a receptor grating of alternate energy transparent and opaque portions, and means including said second beam



deflecting means to sweep a projected energy image of said projection grating over said receptor grating along an optical path which includes said second beam deflecting means; and

a sensor means sensitive to said radiant energy positioned to detect a registration of the projected energy pattern with the receptor energy transparent portions to provide a position indicating output signal.

4,097,876

DUAL-MODE LIGHT METER SYSTEM FOR SLR CAMERA USING BEAM-SPLITTING REFLEX MIRROR

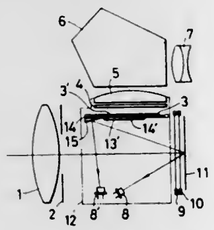
Naoyuki Uno, Urawa, and Katsuhiko Miyata, Tsurugashima, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 7, 1976, Ser. No. 748,358

Claims priority, application Japan, Dec. 9, 1975, 50-146675

Int. Cl.² G03B *7/08, 19/12*

U.S. Cl. 354—31 **1 Claim**



1. In a single lens reflex camera including a main reflecting mirror movable between raised and lowered positions within a camera box, a viewfinder optical system disposed to receive light reflected from the lowered mirror, reflecting means disposed at the rear of the box closely adjacent to and in front of film means and a light sensing element disposed within the box to implement an automatic exposure time control function in response to light reflected back from the reflecting means and/or the film means after the mirror is raised, the improvement characterized by having at least a portion of the reflecting mirror being formed as a beam splitter whereby some light passes through the lowered mirror and is reflected back onto the sensing element by said reflecting means to implement an initial exposure time display function, said reflecting means including a shield member mounted within the box and movable between a light reflecting position in front of said film means when the mirror is lowered and a light blocking position beneath the mirror when the latter is raised so that the shield member prevents light from entering the camera box via the viewfinder optical system when the mirror is raised, said shield member being mounted to lie at an inclined angle to the film means when in its light reflecting position to implement a uniform light distribution sensitivity for the exposure time display function, a further light sensing element disposed within the box and a further reflecting mirror movable to a position proximate that of the main reflecting mirror when the latter is raised, said further reflecting mirror being operable to direct light reflected back from the reflecting means and/or the film means onto the further light sensing element whereby the combined outputs of the two light sensing elements implement a uniform light distribution sensitivity for the exposure time control function.

4,097,877

DUAL-FUNCTION VARIABLE RESISTOR IN AUTOMATIC/MANUAL CAMERA SHUTTER CONTROL CIRCUIT

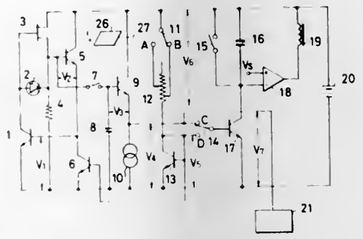
Masahiro Kawasaki, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 9, 1976, Ser. No. 740,326

Claims priority, application Japan, Nov. 11, 1975, 50-153233[U]

Int. Cl.² G03B *7/08, 7/00*

U.S. Cl. 354—50 **1 Claim**



1. A shutter control system for a camera having a reflex mirror, comprising:

(a) an automatic circuit for providing a voltage output for controlling the camera operation as a function of the measured brightness of a photographic object and at least one preset parameter, such as aperture opening, exposure time, and/or film sensitivity,

(b) a manual circuit for providing a voltage output for controlling the camera shutter speed in accordance with a preset value thereof,

(c) a variable resistor having a first sliding contact for setting said at least one preset parameter in an automatic mode and a second sliding contact for setting the shutter speed in a manual mode,

(d) first switch means normally connecting said variable resistor and said first sliding contact exclusively in said automatic circuit and responsive to movement of said reflex mirror for connecting said variable resistor and said second sliding contact exclusively in said manual circuit,

(e) a shutter control circuit responsive to a voltage connected to an input thereof for controlling the shutter open duration,

(f) a second switch, manually controllable, for selectively connecting the voltage outputs of said automatic and manual circuits to the input of said shutter control circuit, thereby providing manual selection of automatic and manual modes of operation, and

(g) indicator means connected to the output of said automatic circuit for displaying the parameter calculated by said automatic circuit, whereby said last mentioned parameter is displayed prior to a photography operation irrespective of the position of said second switch.

4,097,878

UNDERWATER HOUSING FOR PHOTOGRAPHIC CAMERAS

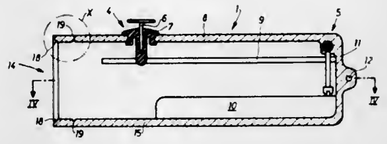
Alfons Cramer, Schutzenhausstrasse 13, Oetwil am See, Switzerland

Filed Jan. 6, 1977, Ser. No. 757,176

Claims priority, application Switzerland, Feb. 6, 1976, 1481/76

Int. Cl.² G03B *17/08*

U.S. Cl. 354—64 **27 Claims**



1. An underwater housing for a photographic camera, comprising:

a camera housing portion;

a closure portion detachably connected with the camera housing portion;

said camera housing portion having wall means;

actuation elements for operating the camera penetrating through the wall means of the camera housing portion;

one of the actuation elements comprising a presser arrangement for triggering a camera shutter;

said presser arrangement comprising a pressure pin and a seal formed of elastomeric material;

said camera housing portion having an opening receiving said seal;

said seal comprising a head, a substantially ring-shaped flange and a plug elastically expansible in lengthwise direction;

said plug and said ring-shaped flange extending substantially centrally with respect to one another and protruding from the underside of said head;

said ring-shaped flange having an outer surface containing a peripheral groove;

a wall portion of the camera housing portion surrounding said opening extending into the peripheral groove;

means providing a blindhole bore extending through the plug from the top of the head;

said pressure pin being held in the blindhole bore.

4,097,879

DEVICE IN A CAMERA FOR IMPARTING PICTURES ON A PHOTOGRAPHIC FILM WITH A TOP-AND-BOTTOM INDICATION

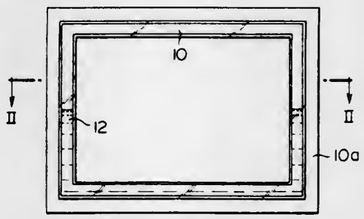
Toshihiro Kondo, Chofu, Japan, assignor to Fuji Photo Film Co., Ltd., Minamiashigara, Japan, a part interest

Filed Sep. 28, 1976, Ser. No. 727,423

Claims priority, application Japan, Oct. 17, 1975, 50-125177

Int. Cl.² G03B *17/24*

U.S. Cl. 354—106 **13 Claims**



1. In a device for recording marks on a film indicating the top and bottom of picture images on a photographic film in a camera at the time the respective frames of the film are exposed, the combination of, a container having a pair of transparent walls spaced from each other and parallel to the general plane of a film frame positioned to record a photographic image in the camera, said walls defining an open cavity therebetween, said cavity being so positioned that light passing through said transparent walls strikes said photographic film in or adjacent the periphery of said frame, and a body of opaque liquid within said cavity and having a volume of the order of not greater than one-half the volume of said cavity whereby the liquid prevents the passage of light through the lower portion of said cavity while light passes through at least the upper half of said cavity to thereby produce a distinctive marking in or adjacent the periphery of each picture image on the photographic film.

4,097,880

PHOTOGRAPHIC STROBOSCOPE

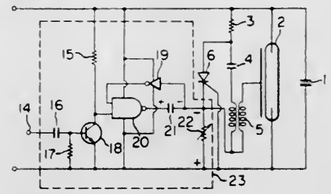
Tsunemi Yoshino, Ibaraki, Japan, assignor to West Electric Co., Ltd., Osaka, Japan

Filed Jun. 23, 1977, Ser. No. 809,091

Claims priority, application Japan, Jun. 30, 1976, 51-78322; Jul. 2, 1976, 51-79238

Int. Cl.² G03B *15/03;* H05B *41/18*

U.S. Cl. 354—145 **6 Claims**



1. A photographic stroboscope comprising

(a) a main capacitor;

(b) a flash lamp for converting the energy stored on said main capacitor into a flash of light;

(c) a trigger circuit comprising a trigger capacitor, a trigger transformer and a thyristor;

(d) first switching means adapted to be caused to conduct in response to a flash command signal applied thereto;

(e) second switching means responsive to the conduction of said first switching means for reversing its output level and for reversing its output level again to an initial level after said first switching means has been disabled; and

(f) a time delay circuit interconnected between the gate of said thyristor and the output of said second switching means for reverse biasing said gate of said thyristor with respect to the cathode thereof when said first switching means is enabled and for forward biasing said gate of said thyristor with respect to said cathode thereof when said first switching means is disabled, thereby causing said thyristor to conduct.

4,097,881

FOCUSSING APPARATUS FOR CAMERAS

Tohru Katagiri, Shimosuwa, Japan, assignor to Sankyo Kogaku Kogyo Kabushiki Kaisha, Japan

Filed Jul. 30, 1976, Ser. No. 710,018

Claims priority, application Japan, Aug. 5, 1975, 50-108407[U]

Int. Cl.² G03B *19/12, 13/02*

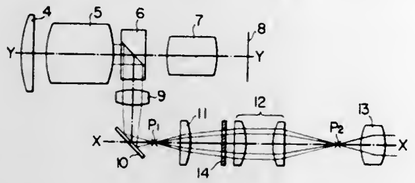
U.S. Cl. 354—155 **8 Claims**

1. A focussing apparatus for camera comprising:

a real image rangefinder optical system having an optical axis with primary and secondary image points thereon; and

a mask plate disposed in said optical system of the real image rangefinder between said primary and said secondary

image points, said mask plate having a plurality of apertures symmetrically arranged about and out of intersec-



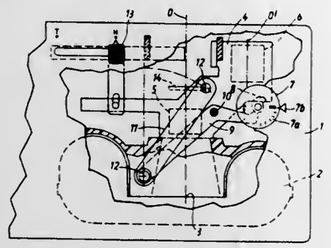
tion with the point of intersection between said mask plate and said optical axis of the optical system.

4,097,882

MULTIPLE LENS CAMERA HAVING LENS-POSITION CONTROLLED FOCAL-LENGTH ADJUSTMENT

Dieter Engelsmann, Unterhaching, Germany, assignor to AGFA-Gevaert AG, Leverkusen, Germany

Filed Dec. 20, 1976, Ser. No. 752,314
Claims priority, application Germany, Dec. 23, 1975, 2558277
Int. Cl.[2] G03B *3/00, 13/02*
U.S. Cl. 354—197 **6 Claims**



1. In a photographic camera having an optical axis, a combination comprising at least two different photographic lenses; a lens carrier mounting said lenses; means mounting said lens carrier for displacement in a direction normal to said axis between respective lens-changing first settings in each of which a different one of said lenses is located on said optical axis, and also for displacement in a direction lengthwise of said axis to different second settings corresponding to different distance ranges; means for selecting respective ones of said second settings; and means responsive to operation of said selecting means for displacing said lens carrier lengthwise of said optical axis through distances which differ for each of said second settings in dependence upon the respective first setting assumed by said lens carrier, including a cam movable by said selecting means, a cam follower tracking said cam, and a transmission element transmitting motion from said cam follower to said lens carrier.

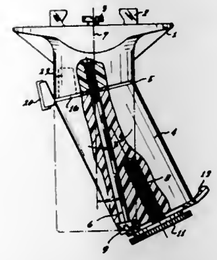
4,097,883

CAMERA GRIP

Gunter Adamski, and Claus Prochnow, both of Brunswick, Germany, assignors to Rollei-Werke Franke & Heidecke, Brunswick, Germany

Filed Sep. 9, 1976, Ser. No. 721,891
Claims priority, application Germany, Sep. 17, 1975, 2541384
Int. Cl.[2] G03B *17/56*
U.S. Cl. 354—293 **7 Claims**

1. Grip for photographic and motion picture cameras, comprising:
- a head with means for fastening the head to the camera in a particular support surface and having a first, plane interface surface;
- a hand grip part having a corresponding plane interface surface, interfacing with the first surface of the head;
- means for rotatably connecting the hand grip part to the head insert planar interface, there being an axis of rotation



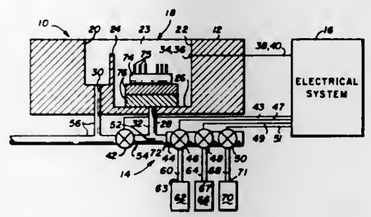
extending transversely to the planar interface between the head and the grip part; and
- the grip part having a center axis which has an acute, non-zero angle to said axis of rotation.

4,097,884

APPARATUS AND METHOD FOR AUTOMATICALLY PROCESSING X-RAY FILM

Daniel J. Lasky, Santa Clara, and Philip R. Wright, San Jose, both of Calif., assignors to Adex Corporation, Santa Clara, Calif.

Filed Sep. 24, 1976, Ser. No. 726,242
Int. Cl.[2] G03D *3/08*
U.S. Cl. 354—323 **16 Claims**



1. An apparatus for processing x-ray film comprising:
- a processing tank having a first port disposed generally in its lower portion, said first port serving to provide an inlet and an outlet for working solutions flowing into or out of said tank;
- a first valve having a first inlet, a first outlet and a first electrical control terminal, said first valve being normally closed and further being responsive to a first signal applied to said first terminal and operative to allow a developer solution to flow from its inlet to its outlet;
- a second valve having a second inlet, a second outlet and a second electrical control terminal, said second valve being normally closed and further being responsive to a second signal applied to said second terminal and operative to allow a fixer solution to flow from its inlet to its outlet;
- a third valve having a third inlet, a third outlet and a third electrical control terminal, said third valve being normally closed and further being responsive to a third signal applied to said third terminal and operative to allow water to flow from its inlet to its outlet;
- conduit means interconnecting said first, second and third outlets and said first port;
- a fourth valve having a fourth inlet connected to said conduit means, a fourth outlet and a fourth electrical control terminal, said fourth valve being normally closed and further being responsive to a fourth signal applied to said fourth terminal and operative to allow working solutions to flow from its inlet to its outlet;

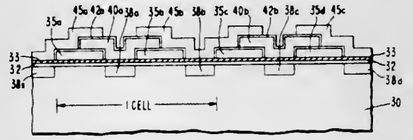
- a first source of photographic developer solution having a first orifice coupled to said first inlet and being capable of supplying developer solution to said first inlet;
- a second source of photographic fixer solution having a second orifice coupled to said second inlet and being capable of supplying fixer solution to said second inlet;
- a third source of water having a third orifice connected to said third inlet, said water having a pressure which is in a predetermined range between a first pressure and a second pressure and being subject to variations, said third orifice having a dimension sufficient to provide a turbulent flow of water to said tank when said third signal is applied to said third terminal and said pressure exceeds said first pressure; and
- first means for selectively supplying first, second, third and fourth signals to said first, second, third and fourth terminals, respectively, whereby when said first and third signals are applied, developer solution and water turbulently flow into said tank via said first and third valves to form a developer working solution, when said second and third signals are applied, fixer solution and water turbulently flow into said tank via said second and third valves to form a fixer working solution when said third signal is applied, water turbulently flows into said tank via said third valve, and when said fourth signal is applied, the liquids filling said tank are permitted to drain through said fourth outlet.

4,097,885

COMPACT, TWO-PHASE CHARGE-COUPLED-DEVICE STRUCTURE UTILIZING MULTIPLE LAYERS OF CONDUCTIVE MATERIAL

Lloyd R. Walsh, San Jose, Calif., assignor to Fairchild Camera and Instrument Corp., Mountain View, Calif.

Filed Oct. 15, 1976, Ser. No. 732,614
Int. Cl.[2] H01L *29/78;* Ho1L *29/04;* G11C *19/28*
U.S. Cl. 357—24 **10 Claims**



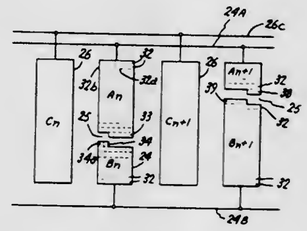
1. At least one semiconductor cell structure, a cell thereof comprising:
- a substrate formed from selected semiconductor material of one conductivity type;
- a region of first insulating material formed on a first surface of the substrate;
- a plurality of regions of first electrically conductive material disposed at selected intervals on the first insulating material;
- a plurality of regions of second insulating material formed on all portions of first electrically conductive material which are not in contact with the first insulating material;
- first and second spaced apart barrier regions formed in the substrate adjacent to the first insulating material and in regions of the substrate not overlaid by either one of the first electrically conductive material and the second insulating material, the first and second barrier regions being the same conductivity type as the substrate, but each having a different impurity concentration than the substrate;
- a region of second electrically conductive material disposed on that portion of the first insulating material over alternate barrier regions, and disposed on the second insulating material overlying selected portions of the first electrically conductive material;
- a region of third insulating material formed on all portions of second electrically conductive material which are not in contact with either one of the first and the second insulating materials;
- a region of third electrically conductive material disposed on that portion of the first insulating material over remaining barrier regions, and disposed on selected portions of the second and the third regions of insulating material;
- means for electrically connecting alternating regions of first electrically conductive material to the second electrically conductive material; and
- means for connecting the remaining regions of the first electrically conductive material to the third electrically conductive material.

4,097,886

SPLIT ELECTRODE STRUCTURE FOR SEMICONDUCTOR DEVICES

Richard D. Baertsch, Scotia, and Jerome J. Tiemann, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 22, 1976, Ser. No. 735,024
Int. Cl.[2] H01L *29/78;* G11C *19/28;* H03H *7/28*
U.S. Cl. 357—24 **2 Claims**



1. A semiconductor device comprising
- a substrate of semiconductor material including an active channel portion of generally rectangular outline having a length and a width dimension located adjacent a major surface thereof,
- means for transferring charge carriers along the length of said channel portion, and two potential barriers to the transfer of charge carriers in a direction orthogonal to the length of said channel portion which form two side bounds of said channel portion and thereby define said width dimension of said channel portion,
- said means for transferring charge carriers including potentials applied to a group of electrodes insulatingly overlying said channel portion and orthogonal to the length dimension thereof, each of said electrodes being of the same length measured along the length dimension of said channel portion,
- said electrodes forming with said substrate a plurality of stages of a semiconductor device, each stage of said device including a respective one of said electrodes, each of said electrodes having the same area over the extent of said channel portion, each of said electrodes having a split along the length dimension thereof dividing the electrode into a first part and a second part, each of the ratios of the area of the first part to the second part of an electrode being set to a respective predetermined value,
- the area of each of said parts of said electrodes resolvable into the area of a respective integral number of elements and a remainder portion smaller in area than the area of an element, an element being a rectangle having one side equal to the length of said electrodes and an adjacent side equal to a predetermined minimum linear dimension,
- the area of each of said remainder portions resolvable into the area of a respective integral number of subelements, a subelement being a square having a side equal to said predetermined minimum linear dimension,
- each pair of remainder portions of an electrode being located

adjacent the split thereof, the sum of the areas of each pair of remainder portions of a respective electrode being fixed and less than or equal to the area of an element,

some of said electrodes including a remainder portion having an area less than the area of an element,

a first-conductive line connected to the first parts of said electrodes,

a second conductive line connected to the second parts of said electrodes,

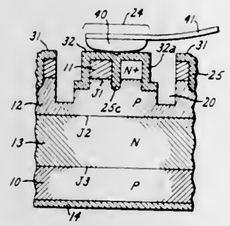
whereby each part of an electrode can be provided with any of PQ consecutive discrete values of area from zero to the total area of an electrode, where P equals the number of elements in an electrode and Q equals the number of subelements in an element.

4,097,887

LOW RESISTANCE, DURABLE GATE CONTACT PAD FOR THYRISTORS

Francis William Kalkbrenner, West Chester, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Sep. 13, 1976, Ser. No. 722,973
Int. Cl.² H01L *29/74, 23/42, 23/44*
U.S. Cl. 357—38 **14 Claims**



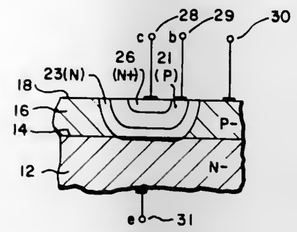
1. A thyristor comprising, a multi-layer body of semiconductor material having opposite end layers and at least one intermediate base layer of alternately opposite P and N conductivity types, one said end layer being slotted to form laterally adjacent main and control regions, said main region and the opposite end layer of said body being metalized on their outer surfaces to form two main electrodes of said body, said one end layer in said control region having a relatively lower impurity concentration contiguous base layer and being apertured to provide at least one channel extending transversely therethrough to said base layer, a body of conductive metal coating said one higher impurity concentration end layer in said control region and filling said channel thereby to form a control electrode contact surface directly electrically connected to said base layer through said channel, said body of conductive metal extending over lateral edges of said control region into electrical contact with said base layer, and a control contacting means pressed against said contact surface and having a contact area appreciably greater than the cross sectional area of said transverse channel wherein the wearing away of said contact surface of metal causes said contacting means to be brought into direct contact with said higher impurity concentration end layer such that substantially all current entering into said end layer under said contact surface is transmitted directly into said base layer through said body of conductive metal without crossing the junction between said higher impurity end layer and said base layer.

4,097,888

HIGH DENSITY COLLECTOR-UP STRUCTURE

Lewis K. Russell, San Jose, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 622,714, Oct. 15, 1975, abandoned. This application Feb. 7, 1977, Ser. No. 766,483
Int. Cl.² H01L *29/72*
U.S. Cl. 357—46 **11 Claims**



1. A high density semiconductor structure comprising:

(a) a body of semiconductor material including a stratum of first conductivity type having a substantially planar surface;

(b) first and second nested regions disposed within said stratum so as to extend from said planar surface to different depths below the surface of said stratum, said first region being of second conductivity type opposite said first conductivity type and disposed within said stratum so as to form a first semiconductor junction therebetween, said second region being of said first conductivity type and nested within said first region to form a second semiconductor junction therebetween, said first region being substantially uniform in thickness and relatively thin as compared to its depth below the surface of said stratum;

(c) a plurality of third regions of said second conductivity type disposed within said second region in spaced apart relation to form a like plurality of third semiconductor junctions therebetween; and

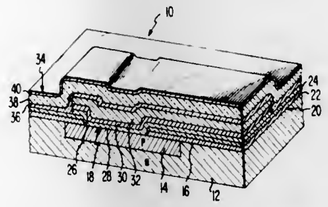
(d) contact means connected to said stratum and said regions whereby, upon application of a potential difference forward biasing said first semiconductor junction, said stratum, said first region and said second region form the elements of an injection source transistor, and said first, second and third regions form a plurality of collector-up transistors.

4,097,889

COMBINATION GLASS/LOW TEMPERATURE DEPOSITED $Si_wN_xH_yO_z$ PASSIVATING OVERCOAT WITH IMPROVED CRACK AND CORROSION RESISTANCE FOR A SEMICONDUCTOR DEVICE

Werner Kern, Belle Mead, and Chester Edwin Tracy, South River, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 1, 1976, Ser. No. 737,850
Int. Cl.² H01L *29/34*
U.S. Cl. 357—54 **7 Claims**



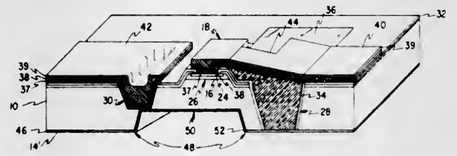
1. In a semiconductor device having a metallic conductor disposed on the surface of a body of semiconductor material and a passivating overcoat including a glass layer disposed over said conductor, the improvement comprising said passivating overcoat further including a low-temperature-deposited nitride layer comprising a chemical compound having the formula $Si_wN_xH_yO_z$, wherein *w, x, y* and *z* are integers other than zero said nitride layer being deposited at a temperature below the eutectic temperature at which said metallic conductor begins to alloy with said semiconductor material.

4,097,890

LOW PARASITIC CAPACITANCE AND RESISTANCE BEAMLEAD SEMICONDUCTOR COMPONENT AND METHOD OF MANUFACTURE

Raymond A. Morris, Sunnyvale, and Thomas J. Viola, Jr., Mountain View, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 699,130, Jun. 23, 1976, abandoned. This application Mar. 23, 1977, Ser. No. 780,373
Int. Cl.² H01L *29/06*
U.S. Cl. 357—55 **5 Claims**



1. A low-parasitic capacitance and electrical resistance semiconductor component comprising:

semiconductor means having a substrate with a first and a second surface, a plurality of edges, and a plurality of layers of selected conductivity types for implementing a selected semiconductor device on the first surface adjacent to one of said edges;

a block of a selected glass juxtaposed to the full height and width of said one edge of the semiconductor means and extending over said one edge of the first surface of the semiconductor means to the semiconductor device with the exposed surface of the glass block being substantially flush with the surface thereof; and

first conductive means extending across the exposed surface of the glass block for electrically contacting one of the layers of the semiconductor device on the first surface of the semiconductor means.

4,097,891

LASER STUD MOUNTS

Peter Richard Selway; Martin Chown; Richard Edward Epworth, all of Harlow; Norman Derek Leggett, Hoddesdon, and Harish Ram Dass Sunak, Bishops Stortford, all of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,323
Claims priority, application United Kingdom, Apr. 1, 1975, 13203/75
Int. Cl.² H01L *23/12*
U.S. Cl. 357—81 **8 Claims**

1. A laser apparatus comprising:

a metallic base;

an externally threaded stem coupled to and extending from one side of said base, said stem having a bore therein along its axis;

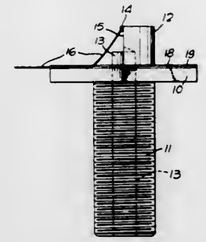
a heat sink coupled to and extending from another side of said base, said bore extending into said heat sink;

an injection laser mounted on said heat sink and having a first terminal provided by said stem, base and heat sink;

a strip line forming a second terminal for said injection laser;

a body of electrically insulating material coupled to said base for securing said strip line; and

a light guide consisting of a core region surrounded by a lower refractive index cladding region extending through



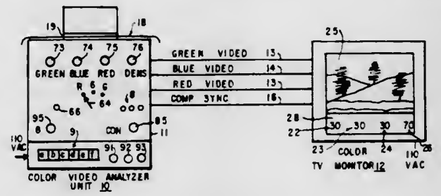
the stem in said bore for receiving radiation from said laser and transmitting said radiation.

4,097,892

VIDEO COLOR FILM ANALYZER

George H. Balding, 252 West-1300 South, Salt Lake City, Utah 84115

Filed Oct. 8, 1976, Ser. No. 730,737
Int. Cl.² G03F *3/08*
U.S. Cl. 358—80 **25 Claims**



1. In a color film analyzer for processing color films, film scanning means for scanning a film and providing separate color signals representative of each of a plurality of different colors of the film, reference means for deriving reference levels from the color signals provided while a standard film is being scanned, said reference means including register means for registering said reference levels for use in the processing of unknown films thereafter, and control means including adjustable means for adjusting the color signals provided while an unknown film is being scanned to said reference levels.

4,097,893

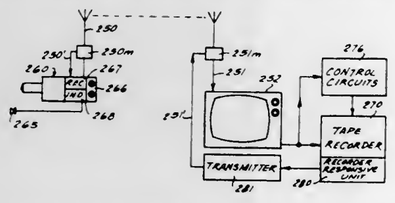
PORTABLE VIDEO RECORDING SYSTEM EMPLOYING CAMERA AND RECORDING STATIONS CONNECTED BY WIRELESS LINKS

Marvin Camras, Glencoe, Ill., assignor to IIT Research Institute, Chicago, Ill.

Continuation-in-part of Ser. No. 488,466, Jul. 15, 1974, Pat. No. 3,984,625, which is a continuation of Ser. No. 237,220, Mar. 22, 1972, abandoned, which is a continuation of Ser. No. 889,775, Dec. 11, 1969, abandoned, which is a division of Ser. No. 545,050, Apr. 22, 1966, Pat. No. 3,484,546. This application Aug. 27, 1976, Ser. No. 718,173
Int. Cl.² H04N *7/00*
U.S. Cl. 358—83 **29 Claims**

1. A portable video recording system, particularly for amateur video recording operations and the like, comprising a video recording station, and an independent, self-contained and self-powered portable video camera station, the latter being of a size to be readily manually carried on the person and comprising a video camera, a transmitter operatively connected to said camera, for transmitting the output signals of said video camera by transmission of a high-frequency carrier signal, means for forming recorder start-stop signals, means on the camera for controlling the transmission of recorder start-

stop signals from the transmitter, receiver means forming a part of said camera station, for receiving signals transmitted from such a recording station and representing a predetermined operating condition of said recorder, and indicating means to which the output of the receiver means is supplied for control of said indicating means, to provide a desired indication to the camera operator of the operation of the recorder; said recording station comprising video recording means, means for receiving transmitted signals from said camera station and supplying the received output signals of said video camera, together with synchronizing control signals, to said



video recording means, means for controlling the start-stop operation of said recording means, means operatively connected to said recorder receiving means and to said recorder-controlling means, responsive to recorder start-stop signals from said camera station received by said receiving means, means disposed to effect a monitoring operation of television signals received from said camera station, operative to provide a signal indicative of a predetermined condition in said received signals, and transmitter means forming a part of said recording station for transmitting said indicative signals from the recording station to said camera station.

4,097,894

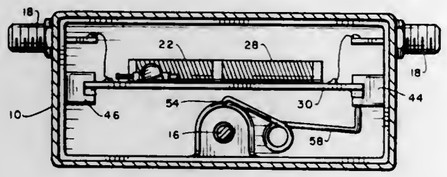
SECURED SCRAMBLE DECODER FILTER

James L. Tanner, Reseda; Bruno A. Rist, Northridge; George Sanchez, Los Angeles, and Balazs Becht, Granada Hills, all of Calif., assignors to Tanner Electronics Systems Technology, Inc., Van Nuys, Calif.

Filed Nov. 1, 1976, Ser. No. 737,755

Int. Cl.² H04N *1/44*; H01H *35/42*; H01R *13/44*

U.S. Cl. 358—118 **12 Claims**



1. A circuit device for removing an interfering signal purposely injected between the video carrier and audio carrier of a television transmission signal, said interfering signal having a frequency substantially in the range of one-fourth to three-fourths of the frequency interval between the video carrier and the audio carrier comprising:

a housing;

a narrow band notch filter mounted in said housing;

means for tuning said filter to the optimum frequency for eliminating the interfering signal, the latter having a frequency substantially in the range of one-fourth to three-fourths of the frequency interval between the video carrier and the audio carrier; and

means for mounting said housing, said mounting means including means for securing said filter against unauthorized removal from said mounting.

4,097,895

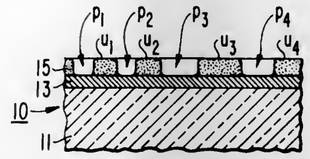
MULTILAYER OPTICAL RECORD

Fred William Spong, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 19, 1976, Ser. No. 668,495

Int. Cl.² H04N *5/76*; G11B *7/24*; G01D *15/34*

U.S. Cl. 358—128 **5 Claims**



1. An information record, for use in playback apparatus employing a playback beam of light of a given frequency; said record comprising:

a substrate having a light reflective surface; and

a layer of light absorptive material overlying said reflective surface, with an information track formed in said layer;

wherein said information track comprises a succession of spaced pits, with variations in the spacing between successive pit edges representative of recorded information;

wherein the thickness of said layer in all regions of said record other than those occupied by said pits is a given thickness chosen to establish an anti-reflection condition for all said other record regions for light at said given frequency directed toward said light reflective surface through said absorptive layer; and

wherein the thickness of said layer in those record regions occupied by said pits is significantly less than said given thickness.

4,097,896

SYNC SEPARATOR CIRCUIT

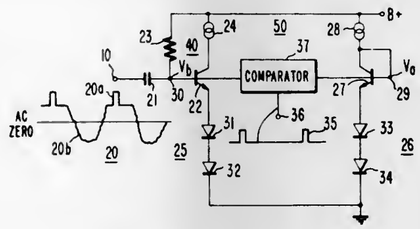
Leslie Ronald Avery, Surrey, England, assignor to RCA Corporation, New York, N.Y.

Filed Mar. 3, 1977, Ser. No. 774,213

Claims priority, application United Kingdom, Feb. 23, 1977, 12535/77

Int. Cl.² H04N *5/08*

U.S. Cl. 358—153 **18 Claims**



1. A sync separator circuit, comprising:

a source of video signals, said video signals including synchronizing signals;

a first plurality of series coupled diodes;

controllable switching means coupled to said first plurality;

a source of first bias current coupled to a control terminal of said controllable switching means;

first means coupled to one of said first plurality and said controllable switching means for providing a first current through said first plurality of series coupled diodes, said first current establishing a first voltage at a first terminal coupled to said first plurality of series coupled diodes during the occurrence of said synchronizing signals;

second means coupled to said control terminal and responsive to said source of video signals for providing during the occurrence of said synchronizing signals an additional bias current to said controllable switching means for introducing to said first plurality of series coupled diodes during said occurrence a second current in addition to said first current for establishing a second voltage at said first terminal;

a source of first reference voltage; and

comparator means responsive to said first reference voltage and said second voltage for developing an output signal when said second voltage and said first reference voltage differ by a predetermined value.

4,097,897

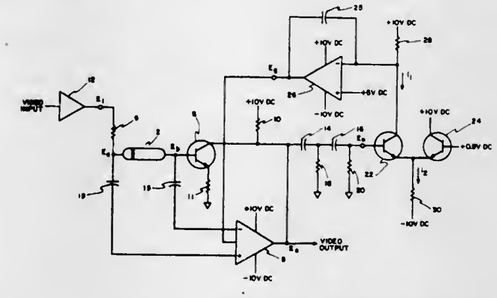
AUTOMATIC BOOST CONTROL IN AN APERTURE CORRECTOR FOR TV VIDEO SIGNALS

Edwin Earl Morris, Clinton, N.Y., assignor to General Electric Company, Utica, N.Y.

Filed Apr. 22, 1977, Ser. No. 790,161

Int. Cl.² H04N *5/14, 5/22*

U.S. Cl. 358—162 **4 Claims**



1. An automatic boost control of an aperture correction circuit for a video signal in a television camera comprising:

an input connection adapted to receive the video signal;

a first resistor having its first end connected to said input connection;

a delay line having an input and an output terminal with said input terminal connected to the second end of said first resistor;

a differential video amplifier connected to each end of said delay line to provide an output boost signal;

a second video amplifier connected to said output terminal of said delay line to amplify said video signal;

a high pass filter connected in circuit with the output of said second video amplfier to extract high frequency noise from the video signal; and

detecting means connected in circuit with said high pass filter for detecting an RMS value signal of said high frequency noise, the output of said RMS detector being connected to said differential video amplifier in order to control the gain of said amplifier, thereby controlling the amount of boost.

4,097,898

METHOD AND APPARATUS FOR LINEARLY FILTERING TWO-DIMENSIONAL SIGNALS

Ronald Jan Geluk, Nootdorp, Netherlands, assignor to N. V. Optische Industrie "De Oude Delft", Delft, Netherlands

Filed Dec. 30, 1976, Ser. No. 755,790

Claims priority, application Netherlands, Jan. 8, 1976, 7600155

Int. Cl.² H04N *5/21, 5/72*

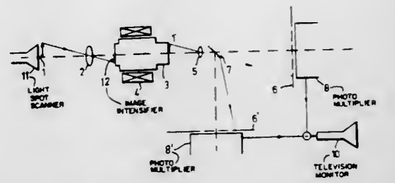
U.S. Cl. 358—163 **7 Claims**

1. A method of linearly filtering spatially a two-dimensional image comprising

applying the two-dimensional image to an electronic image scanning system to generate a scanned image;

dividing the scanned image into two scanned image portions;

filtering the separate scanning image portions by two masks, respectively, one mask including the positive part of a desired filter function and the other mask including the negative part of a desired filter function;



detecting the light passed through the masks by respective photodetectors to generate respective output signals;

substracting one of the output signals from the other output signal to thereby generate a filtered signal; and

reproducing the filtered signal into a filtered two-dimensional image.

4,097,899

VIDEO RECORD PLAYER SWITCHING SYSTEM

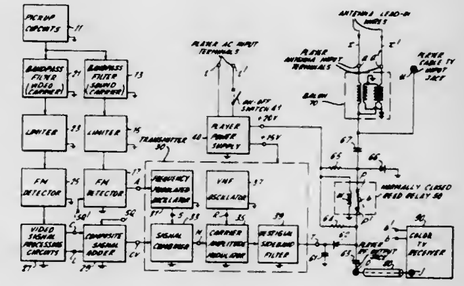
John Pang Yu, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 6, 1976, Ser. No. 747,866

Claims priority, application United Kingdom, Dec. 8, 1975, 50280/75

Int. Cl.² H04N *5/22, 7/00, 5/78, 5/44*

U.S. Cl. 358—181 **18 Claims**



1. In a video record player, including means for recovering recorded signals respectively representative of picture information and accompanying sound information; apparatus comprising, in combination:

an external signal input terminal;

a player output terminal;

a player on/off switch, subject to switching between "on" and "off" conditions;

a power supply developing a plurality of supply potentials in response to switching of said player on/off switch to said "on" condition;

means, rendered operative in response to supply potential development by said power supply, for forming a player output signal inclusive of picture carrier frequency oscillations and sound carrier frequency oscillations;

said player output signal forming means having a picture signal input terminal coupled to said recorded signal recovering means and a sound signal input terminal coupled to said recorded signal recovering means, and including means for modulating the amplitude of said picture carrier frequency oscillations in accordance with recovered picture signal information when present at said picture signal input terminal, and means for modulating the frequency of said sound carrier frequency oscillations in accordance with recovered sound

signal information when present at said sound signal input terminal; and

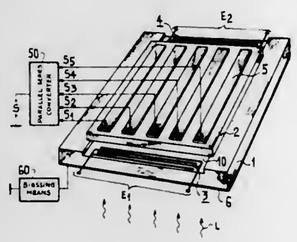
a switching system coupled to said power supply, and subject to operation in a first mode in response to development of one of said supply potentials, while subject to operation in a second mode in the absence of said one supply potential development; said switching system, when operating in said first mode, providing a first, low impedance, signal path for coupling said player output signal to said player output terminal, while isolating said external signal input terminal from said player output terminal and said output signal forming means; said switching system, when operating in said second mode, providing a second, low impedance, signal path for coupling said external signal input terminal to said player output terminal, while isolating said output signal forming means from said player output terminal and said external signal input terminal.

4,097,900

ELECTRO-ACOUSTIC DEVICE FOR READING A TWO DIMENSIONAL IMAGE BY MEANS OF AN ELECTRODE NETWORK

Michel Moulin, and Bernard Munier, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Dec. 17, 1976, Ser. No. 751,942
Claims priority, application France, Dec. 23, 1975, 75 39526
Int. Cl.² H04N *5/30*
U.S. Cl. 358—213 **10 Claims**



1. An electro-acoustic device for reading an optical image in two dimensions, comprising:

a semiconductive and photosensitive medium onto which said image is projected on a interaction surface;

a piezoelectric medium coupled with said semiconductive medium and carrying at least two electromechanical transducers on its surface, said transducers generating two elastic surface waves in opposite directions under electrical control, one of said waves being in the form of a pulse and the other in the form of a long wave of which the duration is at least equal to twice the time taken by said pulse to scan said interaction surface, the scanning of said interaction surface by said pulse producing, by means of non-linear interaction with said long wave, an electrical signal of which the amplitude at each point is dependent upon the illumination at that point;

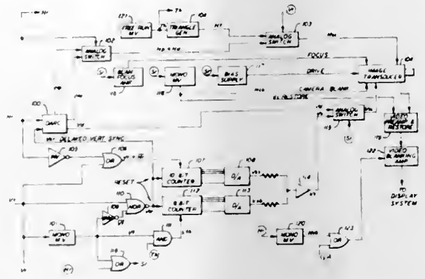
an electrode network carried by said semiconductor medium, said electrodes being in ohmic contact with said semiconductor medium and electrically insulated from one another and being substantially parallel to the propagation direction of the elastic waves, the electrical signals collected respectively by each of said electrodes together representing the line-by-line analysis of said image, each electrode constituting an analysis line.

4,097,901

LAG REDUCTION IN IMAGE TRANSDUCERS HAVING DYNAMICALLY SHAPED RASTERS

David L. Peters, Whitney Point, N.Y., assignor to The Singer Company, Binghamton, N.Y.

Filed Apr. 12, 1977, Ser. No. 786,838
Int. Cl.² H04N *5/34*
U.S. Cl. 358—223 **6 Claims**



1. A method of reducing lag in image transducers such as image orthicons and vidicons by use of an erasure scan during nominal horizontal and vertical retrace times thereby allowing use of conventional T.V. interlaced field techniques comprising the steps of:

A. At the end of a horizontal read-out scan of the image transducer

1. backstepping the electron beam of said image transducer up to a position earlier scanned during readout,
2. retracing horizontally across the cathode of said image transducer with said electron beam to erase any lag image,
3. repositioning said electron beam to begin the next horizontal read-out scan,
4. initiating said next horizontal read-out scan, and
5. repeating steps A1 through A4 until the last horizontal scan line in a given reaster field has been scanned, then

B. When the last horizontal line in the field has been scanned

1. back-stepping the electron beam up to the region last erasure-scanned by said beam,
2. performing multiple erasure scans so as to completely erase the remaining surface of said cathode within the time normally available for vertical retrace in conventional T.V. systems,
3. repositioning said electron beam to begin the first horizontal read-out scan,
4. initiating said next raster field scan, and
5. repeating steps A and b.

4,097,902

TELEVISION LIGHT SHIELD

Roy F. Curnuck, 243 Elm Dr., Levittown, N.Y. 74226

Filed Mar. 15, 1977, Ser. No. 777,629
Int. Cl.² H01J *24/06*; H04N *5/64*
U.S. Cl. 358—255 **5 Claims**

1. A detachable and adjustable television light shield for providing a generally enhanced picture comprising

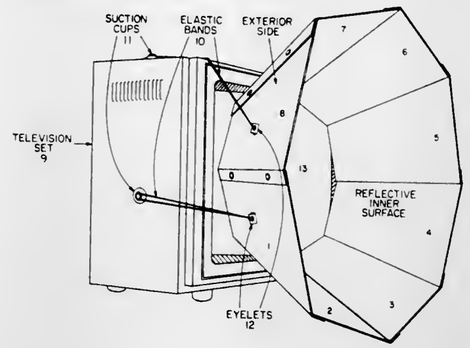
a series of eight plates that are attachable in an octagonal fashion to provide said light shield

wherein said series of eight plates are formed from two sets of four plates each,

said sets of plates differ from each other by 1 inch in width

said plates consist of a reflective inner surface and a non-reflective outer surface, wherein the reflective inner surface is positioned to receive and reflect the images from the television faceplate

mounted on said plates are eyelets, which are attachable to suction cups by elastic bands,



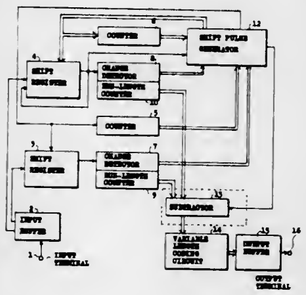
said suction cups are strategically placed on the cabinet of the television set, thereby providing adequate support for said light shield.

4,097,903

FACSIMILE SIGNAL CODING SYSTEM

Yukio Nakagome, Yokohama; Hiroichi Teramura, Tokyo; Yasuhiro Yamazaki, Hiratsuka, and Yasushi Wakahara, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Oct. 29, 1976, Ser. No. 736,738
Claims priority, application Japan, Oct. 30, 1975, 50-130841
Int. Cl.² H04N *1/00*
U.S. Cl. 358—261 **8 Claims**



1. A facsimile signal coding system comprising:

input terminal means for receiving a facsimile signal obtained by scanning an original picture;

storage means connected to said input terminal means for successively and temporarily storing the lengths and positions on each scanning line of runs of black or white signal;

first register means connected to said storage means for shifting the runs of black and white on a scanning line to be coded;

second register means connected to said storage means for shifting the runs of black and white on a reference scanning line preceding said scanning line to be coded;

first counter means connected to said first register means for determining the length and position of an instant run to be coded on said scanning line to be coded;

second counter means connected to said second register means for determining, as reference run information, the length and position of a reference run on said reference scanning line, wherein said reference run is defined as the run including the reference picture element just above the first occurring picture element of the instant run to be coded when said first occurring picture element and said reference picture element just above said first occurring picture element have the same state, and said reference run is defined as the run succeeding the run including the reference picture element just above the first occurring picture element of the instant run to be coded when said first occurring picture element and said reference picture element just above said first occurring picture element have different states;

subtractor means connected to said first counter means and said second counter means for determining a difference between respective run lengths of said instant run to be coded and said reference run and for developing an error signal representative of the difference;

coding means connected to said subtractor means for coding said error signal to develop a coded output pulse train; and

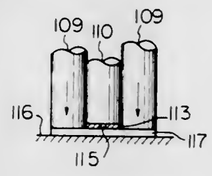
output terminal means connected to said coding means for sending out said coded output pulse train.

4,097,904

OPTICAL READ HEAD

Tasaku Wada, Narita, Japan, assignor to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan

Filed May 5, 1977, Ser. No. 794,315
Claims priority, application Japan, May 15, 1976, 51-54814
Int. Cl.² H04N *1/12*; G02B *5/16*
U.S. Cl. 358—294 **3 Claims**



1. A read-head for reading an optical information on an original paper comprising an optical fiber assembly having a plurality of light emission fibers for emitting light onto the original paper and a light receiving fiber for receiving reflected light from said original paper, a transparent plate having an opaque film with a small hole mounted at the extreme end of said optical fiber assembly, the other extreme end of said light emission fiber and light receiving fiber in said optical fiber assemble being positioned in front of a light source and a light detector element, respectively, said transparent plate being positioned in contact with or near the original paper to be scanned.

4,097,905

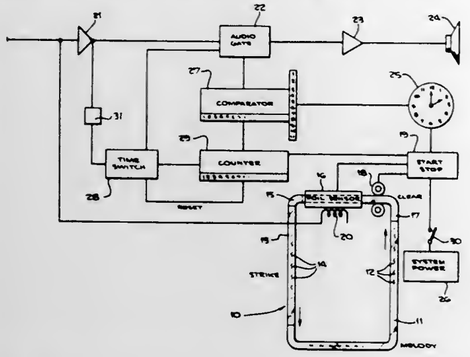
TAPE PLAYER TIME SIGNAL

Justin Kramer, 1028 W. 8th Pl., Los Angeles, Calif. 90017

Filed Sep. 2, 1976, Ser. No. 719,931
Int. Cl.² G11B *5/00, 15/18, 15/48*
U.S. Cl. 360—12 **11 Claims**

1. A musical tape play system for the reproduction of bell tones comprising a sound tape length having electronically reproduced thereon individual recordings of bell tones and a starter length of tape preceeding said recordings clear of recordings, an electric circuit including respectively a tape head, audio gate means, an amplifier and loud speaker combination, a clock mechanism, electric powered tape travel means, timing means and accompanying pre-amplifier means all electrically connected in said circuit, said timing means and accompanying pre-amplifier means being responsive to said starter length of tape and adapted to open said audio gate means to the speaker, said timing means including reset means responsive to pulse recordings on the tape to reset the timing means, counter and comparator means electrically connected in the circuit responsive jointly to said clock mechanism and said timing means

whereby reproduction of one or more of said individual pulse recordings will be effected thereby and the remainder of said individual pulse recordings will be silenced, and stop means in said circuit spaced from the individual pulse recordings and



electrically connected to the tape travel means acting after reproduction of the last of said individual pulse recordings to stop action of said tape travel means after a decay interval has passed.

4,097,906

INTER-RECORD GAP RECORDING OR PLAYBACK APPARATUS

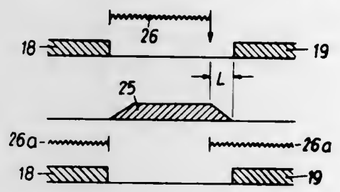
Josef Schild, Vienna; Robert Scheiber, Wiener Neudorf; Harald Schmidt, Vienna; Josef Drasch, Vienna, and Eduard Keznickl, Vienna, all of Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed Apr. 9, 1976, Ser. No. 675,583

Claims priority, application Austria, Apr. 10, 1975, 2746/75; Jul. 25, 1975, 5795/75

Int. Cl.² G11B *27/08*

U.S. Cl. 360—13 **18 Claims**



1. A recording apparatus for a tape-like data medium in which a sound sequence is recorded in gaps between sections of the data medium carrying an original sound recording without removal of the original recording, said apparatus comprising a record head, an erase head, data medium transport means for selectively driving the data medium in a forward or a reverse direction, mode setting means for the setting of the operating mode of the apparatus in either a record mode or a playback mode, and at least one counting means for actuating the mode setting means after a preset data medium length has run through wherein said counting means comprises means for producing a signal for switching on at least one fading device means at a predetermined data medium length prior to the end of one of said gaps between sections of the data medium carrying said original sound recording, said fading device means for selectively fading-in or fading-out a portion of said sound sequence in said one of said gaps between sections of the data medium carrying an original sound recording.

4,097,907

METHOD AND APPARATUS FOR THE SUPPRESSION OF SWITCHING DISTURBANCES

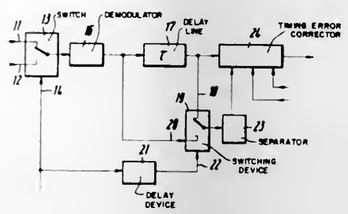
Winfried Horstmann, Griesheim, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Jan. 28, 1977, Ser. No. 763,591

Claims priority, application Germany, Jan. 30, 1976, 2603420

Int. Cl.² H04L *7/00*

U.S. Cl. 360—33 **4 Claims**



1. A system for suppressing signal disturbances, which are due to switching from a first television signal to a second television signal, for use during a playback of said television signals on a magnetic tape recorder including a magnetic tape having image structure and synchronous signals recorded thereon in line packets, each line having about the same associated line period of time, and for use in connection with an electronic switch including input means coupled to said television signals and output means and being operative to be energized by a switching signal for disconnecting said first television signal and connecting said second television signal to the output means, a demodulator coupled to the output means of said switch and being operative for producing demodulated signals from said television signals, and a timing error corrector operative for receiving said demodulated signals and for reducing timing errors in said demodulated signals,

said system comprising, in combination:

delaying means coupled between said demodulator and said timing error corrector and being operative for receiving and delaying said demodulated signals for a period of time substantially equal to said line period;

switching means coupled to said demodulator for receiving said demodulated signals and coupled to said delaying means for receiving the delayed demodulated signals and being operative for providing an output signal from the delayed demodulated signals and for switching for a period of time substantially equal to said line period for producing another output signal from said demodulated signals; and

amplitude filtering means coupled to said switching means and said timing error corrector for receiving said output signals and being operative for selectively passing synchronous signals forming a portion of said output signals to said timing error corrector.

4,097,908

METHOD FOR INSPECTING THE SKEW OF A MAGNETIC HEAD, FOR SELECTIVELY LOCATING A LEAD SCREW AND AN APPARATUS THEREFOR

Albert S. Chou, Monte Sereno, and Frank M. Balbas, San Jose, both of Calif., assignors to Shugart Associates, Sunnyvale, Calif.

Filed Sep. 17, 1976, Ser. No. 724,701

Int. Cl.² G11B *5/56, 5/43, 5/012*

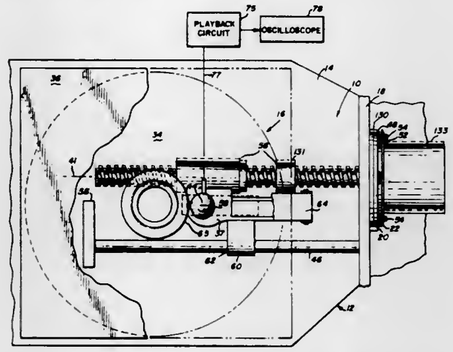
U.S. Cl. 360—76 **16 Claims**

1. A method of inspecting the skew angle of the transducing gap of a magnetic head in a disk drive having a rotatable spindle and means carrying the magnetic head along a radial of the spindle, comprising:

providing a rotatable disk having several concentric circular recording tracks including one particular track having elongated bits of information magnetically recorded at a plurality of predetermined acute angles measured relative to intersecting radial lines of said disk, said acute angles being in a range between a first angle in the counterclockwise direction relative to a radial line and a second angle in the clockwise direction relative to a radial line;

mounting said disk upon the rotatable spindle;

disposing the magnetic head in a read position relative to the bits of said one track as said disk is rotated;



rotating said disk such that for every bit passing said magnetic head produces a read signal having an amplitude proportional to the difference in angular orientation between said gap and the bit; and

monitoring the amplitudes of said read signals, and comparing such amplitudes to a predetermined reference to determine whether or not the skew angle of the gap is acceptable.

4,097,909

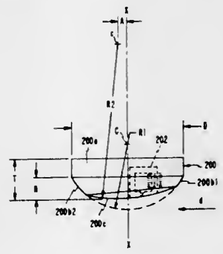
MAGNETIC TRANSDUCER WITH INNER AND OUTER MAGNETIC MEDIUM COOPERATING SURFACE ZONES OF DIFFERENT CONVEXITY

Francis Kong King, Rochester, and Jon Jay Schmidt, Stewartville, both of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,765

Int. Cl.² G11B *5/82*

U.S. Cl. 360—99 **9 Claims**



1. A transducer adapted to have a data transferring relationship with a flexible medium comprising:

a body formed with a first surface zone within and bounded by a second surface zone,

a magnetic core having a gap therein which is on the surface of said first zone,

each of said zones having a rounded convex external surface and a ring-shaped boundary and said first zone being of less convexity than said second zone whereby said gap lies in close proximity to said flexible medium as the medium moves across said surface zones.

4,097,910

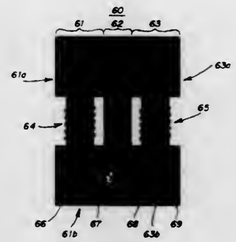
SINGLE GAP MAGNETIC READ HEAD

James O. Lafevers, and Charles T. Kao, both of Richardson, Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Filed Jun. 25, 1976, Ser. No. 700,026

Int. Cl.² G11B *5/16*; G06K *7/00*

U.S. Cl. 360—126 **12 Claims**



1. A single gap magnetic read head, comprising:

a plurality of sensing elements each having an air gap aligned along a single gap line and positioned adjacent each other in side-by-side magnetic contact, each sensing element including:

first and second core segments joined at one end and spaced apart at a second end to form the air gap of each element, and

a pickoff coil wound about one of the core segments of each sensing element, the pickoff coils alternately wound about the first core segment of one element and the second core segment of an adjacent element.

4,097,911

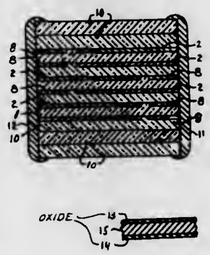
BASE METAL ELECTRODE CAPACITOR AND METHOD OF MAKING THE SAME

John F. Dorrian, Erie, Pa., assignor to Erie Technological Products, Inc., Erie, Pa.

Filed Oct. 6, 1975, Ser. No. 620,244

Int. Cl.² H01G *1/01, 4/12*

U.S. Cl. 361—305 **20 Claims**



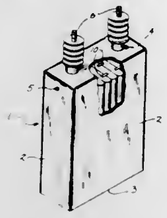
10. A monolithic capacitor having a sintered unitary body of sintered green titanate ceramic and electrodes embedded in the sintered green ceramic, the electrodes being of metal M, where M is selected from the group consisting of transition metals and/or transition metal alloys, the body having been sintered in an atmosphere of oxygen partial pressure low enough so that the skins of the electrodes oxidize and react with the ceramic and prevents conversion of the ceramic to the semiconductive state and the cores of the electrodes remain in the metallic state.

4,097,912

ELECTRICAL CAPACITOR HAVING AN IMPREGNATED DIELECTRIC

John Lapp, Franklin, and Fred S. Sadler, Racine, both of Wis., assignors to McGraw-Edison Company, Elgin, Ill.

Continuation-in-part of Ser. No. 456,867, Apr. 1, 1974, abandoned. This application Jan. 20, 1975, Ser. No. 542,391
The portion of the term of this patent subsequent to Jun. 27, 1995, has been disclaimed.
Int. Cl.² H01G 4/22
U.S. Cl. 361—318 21 Claims



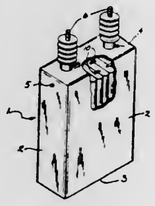
1. An electrical capacitor, comprising a sealed casing, a capacitor pack in the casing and having a pair of electrically conductive strips and a pair of dielectric layers wound alternately to form the capacitor pack, and a dielectric liquid composition impregnating said dielectric layers, said dielectric composition comprising a mixture of a mono-halogenated diphenyl oxide and a mono-halogenated alkyl diphenyl oxide where the alkyl group contains from 1 to 20 carbon atoms in the molecule, and said dielectric layers being composed of polymeric film said capacitor having a high discharge inception voltage over its normal operating temperature range.

4,097,913

ELECTRICAL CAPACITOR HAVING AN IMPREGNATED DIELECTRIC SYSTEM

John Lapp, Franklin, and Fred S. Sadler, Racine, both of Wis., assignors to McGraw-Edison Company, Elgin, Ill.

Continuation-in-part of Ser. No. 542,391, Jan. 20, 1975, which is a continuation-in-part of Ser. No. 456,867, Apr. 1, 1974, abandoned. This application Sep. 15, 1975, Ser. No. 613,073
The portion of the term of this patent subsequent to Jun. 27, 1995, has been disclaimed.
Int. Cl.² H01G 4/22
U.S. Cl. 361—318 20 Claims



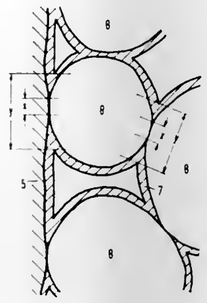
1. An electrical apparatus, comprising a pair of electrical conducting elements disposed in spaced relation with respect to each other and adapted to provide an electrical potential therebetween, and a dielectric system interposed between said elements, said dielectric system comprising a dielectric material composed of polymeric film and cellulosic fiber material, and a liquid dielectric composition impregnated into said dielectric material, said dielectric composition comprising a mixture of a mono-halogenated diphenyl oxide and a mono-halogenated alkyl diphenyl oxide where the alkyl group contains from 1 to 20 carbon atoms in the molecule, said apparatus having a high discharge inception voltage over its normal operation temperature range.

4,097,914

SOLID ELECTROLYTE CAPACITOR

Werner Schnabel, Nattheim, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 5, 1976, Ser. No. 664,264
Claims priority, application Germany, Mar. 5, 1975, 2509613
Int. Cl.² H01G 9/00
U.S. Cl. 361—433 10 Claims



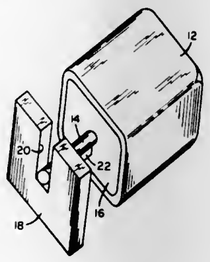
1. A solid electrolyte capacitor comprising:
a sintered anode of film-forming metal, said anode being coated with a dielectric active oxide layer,
a cathode formed on said dielectric active oxide layer oppositely of said anode,
said cathode consisting of a semiconductive metal oxide,
a graphite layer including graphite particles disposed on said cathode, and
an additional semiconductive metal oxide layer with higher specific resistance than said cathode disposed on said cathode adjacent to and in between the graphite particles of said graphite layer.

4,097,915

QUADRIPLANAR CAPACITOR

Gerald M. Locke, Saco, Me., assignor to Corning Glass Works, Corning, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,297
Int. Cl.² H01G 9/00
U.S. Cl. 361—433 6 Claims



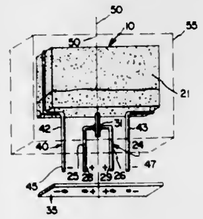
1. A quadriplanar component comprising:
an electrically conductive component enclosure open at one end, the opening defining edge portion of said enclosure forming a quadrilateral, said enclosure forming one electrode of said component,
a component element,
a lead fixedly attached to said element, said element being disposed within said enclosure in electrical relationship therewith with said lead extending outwardly from said open end substantially perpendicularly to the plane of said quadrilateral, and
a flat member having opposing flat surfaces, said surfaces substantially corresponding in size and shape to that of said quadrilateral, said flat surfaces having an aperture therein suitable to accommodate said lead, the outwardly extending end of said lead being disposed within said aperture and said member being rigidly attached to said lead with the planes of said flat surfaces being substantially perpendicular to the longitudinal axis of said lead, the peripheral edges of said member being substantially parallel to the opening defining edges of said enclosure, said lead and member forming the other electrode of said component.

4,097,916

ELECTROLYTIC CAPACITOR LEAD TERMINAL CONFIGURATION

John Piper, Greenville, S.C., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jun. 28, 1976, Ser. No. 700,589
Int. Cl.² H01G 9/00
U.S. Cl. 361—433 1 Claim



1. A polar capacitive device comprising a porous valve-metal anode body having (i) a dielectric oxide film formed thereon, (ii) a solid electrolyte layer over the dielectric oxide film, (iii) a conductive counterelectrode covering a major portion of the exterior surface of the anode body, a first pair of relatively closely spaced and adjacent terminal leads and a second pair of terminal leads spaced further apart than said first pair of terminal leads, all of said terminal leads having end portions remote from said anode body, the end portions of each pair being symmetric about an axis lying between the first pair of terminal leads, the axis and the end portions of both pairs of terminal leads being parallel and lying in the same plane and extending in the same direction, one of said pair of terminal leads being connected electrically to said counterelectrode coating on said anode body and the other said pair of terminal leads being connected electrically to the valve-metal anode body such that the order of polarity of the terminal leads is P_1-P_2-P_2-P_1 where P_1 and P_2 represent opposite polarities.

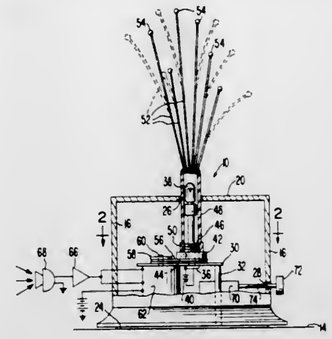
4,097,917

ROTATABLE LIGHT DISPLAY

Robert E. McCaslin, 81 Anchor Dr., Pittsburg, Calif. 94565

Filed Jun. 7, 1976, Ser. No. 693,384
Int. Cl.² F21V 7/04, 21/30
U.S. Cl. 362—32 13 Claims

1. A rotatable light display comprising: a support; a plurality of elongated, flexible members; means carried by the support and rotatable relative thereto for rotatably mounting said members thereon with the members extending outwardly from the support in directions generally longitudinally of the axis of rotation of said mounting means; means coupled with said members for defining light sources at their outer ends; a motor having a rotatable drive shaft; means connecting the drive shaft to said mounting means for rotating said members relative to the support when the motor is energized; and means responsive to acoustic signals and coupled to said motor for applying electronic signals thereto to energize the same.



4,097,918

ILLUMINATED SPACE DIVIDING WALL PANEL SYSTEM

William C. Anderson, Grand Rapids; Gordon J. Cooper, Alto, and Charlie R. Tyke, Cascade, all of Mich., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 17, 1977, Ser. No. 797,894
Int. Cl.² F21S 1/02
U.S. Cl. 362—147 10 Claims

1. A space dividing wall panel and lighting fixture combination comprising:
at least one planar, vertically oriented, space dividing wall panel having an upper horizontal edge portion,
an elongated lighting fixture spaced above and overlying, at least in part, said upper horizontal edge portion of said at least one space dividing wall panel,
a pair of spaced connecting means on the underside of said elongated lighting fixture,
a pair of lighting fixture support means, said lighting fixture support means each including mounting means at one end thereof constructed and arranged to associate with the upper horizontal edge portion of said space dividing wall panel and complementary connecting means at the other end thereof constructed and arranged to interconnect with one of said spaced connecting means on the underside of said elongated lighting fixture.

4,097,919

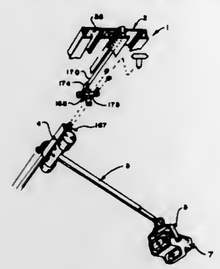
ILLUMINATION SYSTEM

Mitchell Bobrick, Redondo Beach, Calif.; Murray L. Quin, St. Louis, and Morris M. Buzan, St. Charles, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 625,586, Oct. 24, 1975, Pat. No. 4,032,775, which is a division of Ser. No. 496,879, Aug. 12, 1974, Pat. No. 3,936,671. This application Nov. 19, 1976, Ser. No. 743,177
Int. Cl.² F21V 21/26
U.S. Cl. 362—270 2 Claims

1. A hospital reading-examination light comprising a housing of electrically insulative material, having bottom, top, and side walls diverging from an open mouth; a radiation shield of specular heat conductive material spaced from and lying along a major area of the inside surface of the said walls between said mouth and a rear opening; a tubular heat sink of heat-conductive material, said heat sink having a multiplicity of spaced, heat radiating fins projecting outwardly, said fins defining with said radiation shield a multiplicity of air passages between said

mouth and said rear opening; a reflector mounted on and extending within the tubular heat sink, said reflector having a



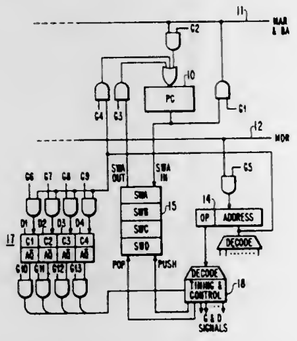
lamp-receiving opening in it, and a high-intensity lamp mounted to project within said reflector within said heat sink.

4,097,920

HARDWARE CONTROL FOR REPEATING PROGRAM LOOPS IN ELECTRONIC COMPUTERS

Stanley Edward Ozga, Willingboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 13, 1976, Ser. No. 749,971
Int. Cl.² G06F *9/06*
U.S. Cl. 364—200 **3 Claims**



1. In a system for executing loops of programmed instructions, said system including instruction addressing means for storing the memory address of a next instruction to be executed, instruction execution register means having an operation part and at least one address part for storing signals representing an instruction being executed, and control means including timing means for producing control signals in response to signals including signals from the operation part of said instruction execution register means, the improvement comprising:

stack register means coupled to receive the contents of the instruction addressing means for storing addresses from said instruction addressing means in response to said control signals generated by certain non-branching instructions in said instruction execution register means, said stack register means including output means for providing signals representing the most recent instruction address stored; and

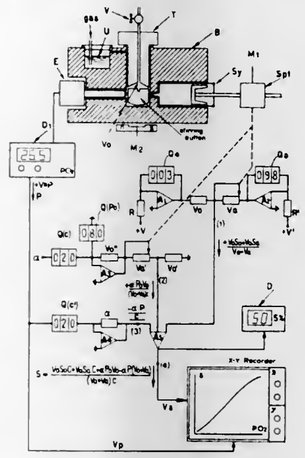
gating means responsive to said control signals generated by other certain instructions in said instruction execution register means and to said stack register output means for gating signals from said stack register output means into said instruction addressing means.

4,097,921

METHOD AND APPARATUS FOR AUTOMATICALLY DETERMINING THE DILUTION CURVE OF A SOLUTION, PARTICULARLY THE OXYGEN DISSOCIATION CURVE OF BLOOD OR HEMOGLOBIN SOLUTIONS

Italo Raffaele, Milan, Italy, assignor to Luigi Rossi, Milan, Italy

Continuation-in-part of Ser. No. 598,163, Jul. 22, 1975, abandoned. This application Nov. 24, 1976, Ser. No. 744,825
Claims priority, application Italy, Jul. 26, 1975, 25627 A/75
Int. Cl.² G01N *33/16*
U.S. Cl. 364—416 **9 Claims**



7. An apparatus for automatically determining the oxygen dissociation curve of the whole blood or of hemoglobin solutions, comprising:

a thermostated mixing and measuring chamber,

first dosing means for feeding to the said chamber blood saturated with oxygen at a predetermined level;

second dosing means for feeding to the said chamber deoxygenated blood; means for measuring the partial pressure of the oxygen on the mixture which is formed in said chamber and converting the measurement into an electrical signal; an analogic computer, for receiving said signal and containing basic or reference data related to the oxygenated blood for calculating, in real time with respect to the mixing, the functions $S = f(P_{O_2})$ and Total $O_2 = f'(P_{O_2})$, and recording means for recording the calculated values of the two above said functions.

4,097,922

AUTOMATIC REAL TIME NAVIGATION COMMUNICATOR

John L. Vito, and Roderick S. Mesecar, both of Corvallis, Oreg., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

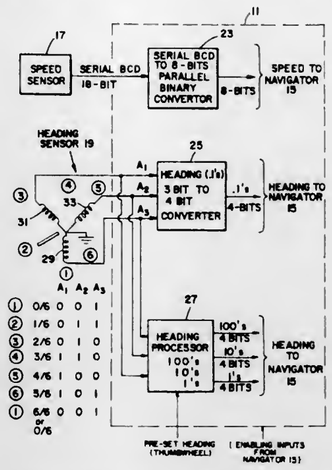
Filed Nov. 8, 1976, Ser. No. 739,411
Int. Cl.² H03K *13/24*; G06F *15/50*
U.S. Cl. 364—443 **10 Claims**

1. An automatic real time navigation communicator for use with a satellite navigator wherein the heading defined by the navigator is defined by a first binary word defining hundreds, a second binary word defining tens, a third binary word defining ones and a fourth binary word defining tenths and for use with a sensor that defines change in heading by a fifth binary word defining sixths wherein:

(a) said communicator includes a first binary counter, a second binary counter and a third binary counter connected in series and for respectively storing and counting hundreds, tens and ones;

(b) first means for loading said first, second and third counters with binary bits that correspond with the same binary bits as in said first, second and third binary words;

(c) second means responsive to changes in said fifth binary



word for modifying the binary word in said third counter; and

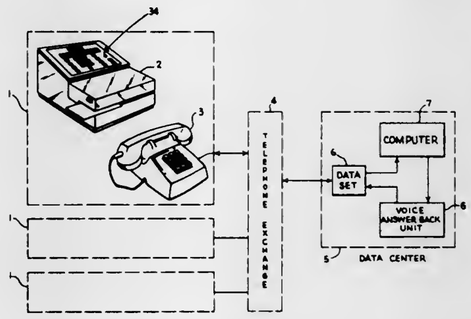
(d) third means for transferring the binary words in said first, second and third counters to said satellite navigator.

4,097,923

REMOTE POSTAGE METER CHARGING SYSTEM USING AN ADVANCED MICROCOMPUTERIZED POSTAGE METER

Alton B. Eckert, Jr., Norwalk; Howell A. Jones, Jr., Southport, and Frank T. Check, Jr., Hamden, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Apr. 16, 1975, Ser. No. 568,460
Int. Cl.² G06F *1/00*
U.S. Cl. 364—900 **30 Claims**



1. A method of funding a postage meter with a variable amount of postage, said postage meter being remote from a data center and having means for conditioning said postage meter to operate in either a first mode wherein the user of the postage meter can select an amount of postage to be printed or a second mode wherein the user can recharge the postage meter with a variable amount of postage and a funding register means which is rechargable with an additional variable amount of postage, the method comprising the steps of:

(a) establishing communication with a data center funding computer;

(b) entering into the data center funding computer data identifying the postage meter to be funded;

(c) entering into the data center funding computer data representing a desired variable amount of postage to be entered into said funding register means of said postage meter;

(d) processing said data representing the desired variable amount of postage to generate a unique combination which varies as a function of the entered postage data; and

(e) conditioning the meter for operation in said second mode;

(f) entering the postage data and the unique combination from the data center into the postage meter;

(g) processing the entered combination in said postage meter; and

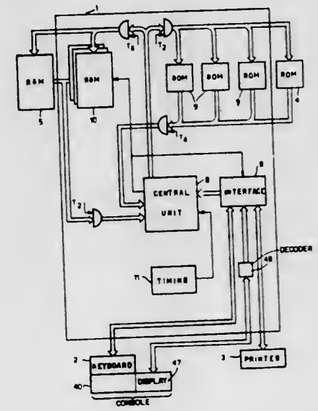
(h) causing said funding register means to be recharged with the desired variable amount of postage.

4,097,924

COMPUTER OPERATOR GUIDE DEVICE

Mario Figini, Bosco Marengo (Alessandria), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Sep. 3, 1976, Ser. No. 720,472
Claims priority, application Italy, Sep. 11, 1975, 69260 A/75
Int. Cl.² G06F *15/02, 3/14*; G06K *15/18*
U.S. Cl. 364—900 **3 Claims**



1. In a computer, accounting or similar programmable machine having a keyboard for entering information represented by a series of multibit words and a stored program processing unit for processing said information, an operator guide device comprising a display device controlled by said processing unit for displaying to the operator a number of machine status warnings, said display device including a single character display cell adapted to display one character at a time of a group of characters which can be defined by one word of information, said characters being formed of a plurality of signs individually actuatable by a corresponding signal, and a decoder for selectively actuating a combination of said signs in response to a word received by said processing unit by generating a corresponding combination of signals, whereby a plurality of symbols can be displayed corresponding to a plurality of configurations of a single word output by said processing unit.

4,097,925

PROCESS AND APPARATUS FOR MIXING AND TRANSPORTING CEMENT

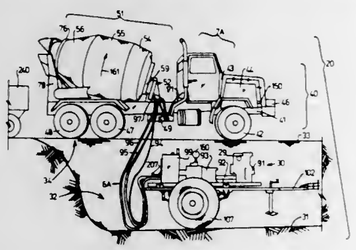
William H. Butler, Jr., 5315 Alvarado, Amarillo, Tex. 79106

Filed Mar. 15, 1976, Ser. No. 666,604
Int. Cl.² B28C *5/18, 5/42, 9/04*
U.S. Cl. 366—2 **8 Claims**

1. A system comprising a plurality of like rotary concrete mixer and transport trucks and a mobile emergency power unit; said rotary concrete and transport mixer trucks each comprising, in operative combination, a truck frame, an engine, a hydraulic pump and a hydraulic motor, a gear train and a

concrete mixer container, said engine operatively connected to and driving said pump, said pump in operative connection to and driving said motor, said motor operatively connected to and driving said gear train through a connection therebetween, said gear train operatively connected to and driving said concrete mixer container, said connection between said motor and said gear train being detachable, said truck frame having a longitudinally extending axis parallel to its length, said concrete mixer container located above said truck frame and being axially symmetrical and rotatable about a central longitudinal axis directed upward and rearwards, means in said concrete mixer container to move a fluid concrete mass longitudinally of said container, each said concrete mixer and transport truck being unstable beyond a prdetermined degree of tilt relative to the horizontal about the longitudinal axis of said truck frame,

said mobile emergency power unit consisting essentially of a mobile unit frame, a mobile unit engine, a mobile unit hydraulic pump, a plurality of flexible conduits and a mobile unit motor, said mobile unit engine operatively connected to said mobile unit pump and said mobile unit pump permanently connected through said flexible conduits to said mobile unit motor, said mobile unit motor comprising a mechanical output means connectable to said gear train and support means adapted to hold said me-



chanical output means in operative connection to said gear train, said mobile unit engine and said mobile unit pump fixedly attached to a mobile unit frame, mobile unit motor support means firmly attached to said mobile unit frame, said mobile unit motor is releasably supported on said mobile unit motor support means during transport of said motor on said mobile unit frame, said flexible conduits then extending between said mobile unit pump and said mobile unit motor from a point on said mobile unit pump furthest from said mobile unit engine to a point on said mobile unit engine furthest from said mobile unit pump and being extensible from said mobile unit, said mobile unit frame having a longituidinal axis extending parallel to its length, said mobile unit engine having a mobile unit engine frame and mobile unit engine output means and adapted to apply torque to said mobile unit frame in one direction and said mobile unit pump having a mobile unit pump frame and means adapted to apply an equal torque to said mobile unit frame in a direction opposite to said one direction, and wherein said mobile emergency power unit is stable at a greater degree of tilt relative to the horizontal about the longitudinal axis of said mobile unit frame than the predetermined degree of tilt relative to the horizontal axis of said truck frame beyond which said concrete mixer and transport truck is unstable.

4,097,926

MIXER PADDLE SHAFT ASSEMBLY

Samuel A. Face, Jr., 1008 Magnalia Ave., Norfoik, Va. 23508

Filed Feb. 22, 1977, Ser. No. 770,530
Int. Cl.[2] B28C *5/14, 7/16*
U.S. Cl. 366—46 **9 Claims**

1. Apparatus for mixing materials together comprising, in combination:

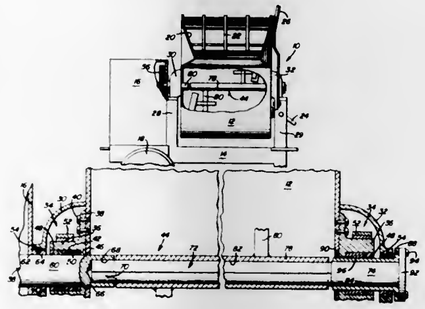
frame means;

drum means mounted on said frame means for receiving said materials for mixing thereof;

motive means mounted on said frame means;

a drive shaft driven by said motive means, the free end of the drive shaft extending into the interior of the drum means, the drive shaft having an indentation formed in said free end;

a quill shaft disposed at least partially within the interior of the drum means, a first end of the quill shaft being slidably received within the indentation in the drive shaft, the quill shaft being thereby rotatable on rotation of the drive shaft, a second end of the quill shaft extending through an end of the drum means externally thereof;



a hollow shaft having a longitudinal channel extending therethrough, the quill shaft being slidably received within the channel, the hollow shaft being rotatable on rotation of the quill shaft;

mixing paddle means joined to the hollow shaft and extending therefrom to mix materials within said drum means;

first bearing means for mounting the drive shaft for rotation relative to the drum means;

second bearing means for mounting the second end of the quill shaft for rotation relation to the drum means; and

retaining means external of the drum means for maintaining the quill shaft in connecting relation to the drive shaft, the retaining means being releaseable to allow the quill shaft to be withdrawn from the interior of the drum means.

4,097,927

APPARATUS FOR MIXING BULK MATERIALS

Stoyan Hristov Sendov, Sofia; Ivan Alexandrov Kuklin, Vidin; Ivan Angelov Nikolov, Vidin; Assen Ninov Ivanov, Vidin; Mircho Georgiev Mirchev, Vidin, and Radoslav Borissov Kurtashev, Vidin, all of Bulgaria, assignors to Chimkombinat, Vidin, Bulgaria

Filed Jul. 26, 1976, Ser. No. 708,688
Claims priority, application Bulgaria, Aug. 2, 1975, 30712
Int. Cl.[2] B01F *5/26, 7/16*
U.S. Cl. 366—247 **2 Claims**

1. An apparatus for mixing bulk material, comprising: a vertically elongated upright cylinder formed with a sloping bottom;

an internal pipe extending upwardly in said cylinder along the axis thereof and opening at a free end below the top of said cylinder into the interior thereof;

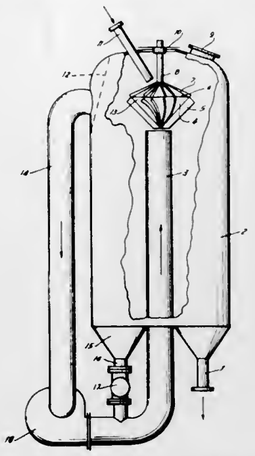
a centrifugal blower having a discharge side connected to said pipe;

an intake duct connected to the intake side of said blower and disposed externally of said cylinder, said intake duct communicating with the interior of said cylinder above said free end of said pipe;

a rotatable vaned mixing rotor freely rotatable in said cylinder and disposed above said free end for propulsion by fluid emerging therefrom; and

an inlet pipe for delivering material to be mixed with the bulk material in said container and depositing same upon

said rotor, said rotor comprising a lower cone and an upper cone, said cones being connected at their bases, said



lower cone being formed with bow-shaped curved blades and said upper cones being formed with radial blades.

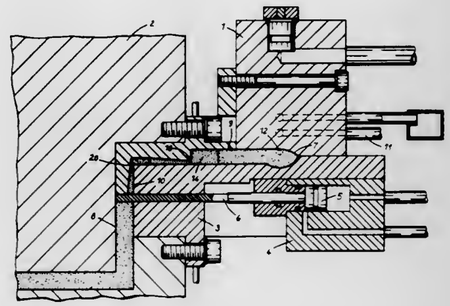
4,097,928

APPARATUS FOR FEEDING SYNTHETIC MATERIAL TO A MOULD

Bernd Fries, Nuremberg, Germany, assignor to DEMAG Kunststofftechnik Zweigniederlassung der DEMAG AG, Nuremberg, Germany

Continuation of Ser. No. 503,116, Sep. 4, 1974, abandoned. This application Apr. 28, 1976, Ser. No. 681,237
Claims priority, application Germany, Sep. 14, 1973, 2346348
Int. Cl.[2] B28B *13/02;* **B01F** *5/00*
U.S. Cl. 366—336 **8 Claims**

4. Apparatus for feeding synthetic material composed of at least two constituents to a mould, such apparatus comprising a mixing chamber, means for feeding the constituents under pressure to the mixing chamber for mixing the same therein, and a sprue runner, said sprue runner having an exit of given cross-sectional area being arranged for feeding the material from said mixing chamber to said mould from said exit at substantially atmospheric pressure, the sprue runner extending from a single mixing chamber outlet and including branch means, said branch means having at least two separate branches and being arranged so that material fed from the mixing chamber is divided into at least two equal parts sepa-



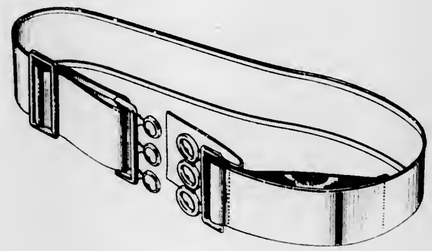
rated from one another, the sprue runner further including a common section, the separate branches of said branch means leading to said common section in which the divided parts of the material are recombined prior to feeding to the mould, each branch of said branch means being of equal length, opening into said common section via a respective opening having at least one constriction therein with all the branches having the same number and configuration of constrictions, whereby material fed to said mould has a largely uniform distribution of velocity over said cross sectional area of said exit.

DESIGNS

JUNE 27, 1978

248,256
LASAGNA
Leo A. Pollano, deceased, late of Atherton, Calif., by Adele Pollano, executrix, 87 Rosewood, Atherton, Calif. 94025
Filed Jun. 18, 1976, Ser. No. 697,406
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—14

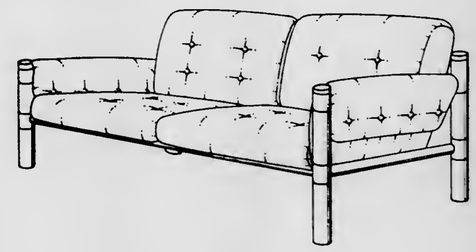
248,257
MONEY BELT
John A. Renick, Tampa, Fla., assignor to John Renick Enterprises, Inc., Tampa, Fla.
Filed Aug. 9, 1976, Ser. No. 713,614
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—380



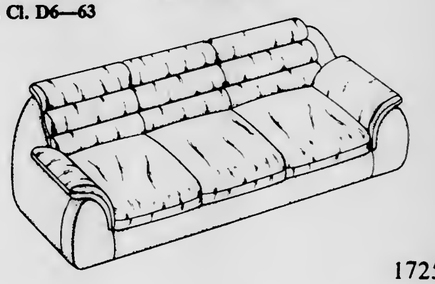
248,258
ANKLE WALLET OR THE LIKE
Frank Munari, Maspeth, N.Y., assignor to Security Designs, a Div. of Munhill Corp., Maspeth, N.Y.
Filed Oct. 13, 1976, Ser. No. 732,161
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—383

248,259
CHAIR
Arnt Lande, Aasestranda, Norway, assignor to WESTNOFA, West Norway Factories Ltd. A/S
Filed Apr. 2, 1976, Ser. No. 673,069
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

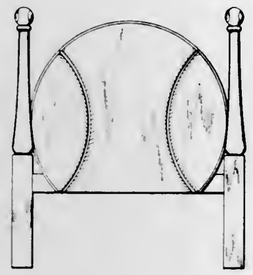
248,260
SEAT
Robert L. Wilson, Senatobia, Miss., assignor to Chromcraft Corporation, Amsterdam, N.Y.
Filed Oct. 6, 1976, Ser. No. 730,047
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



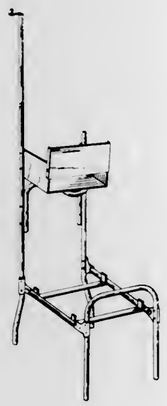
248,261
COUCH
Richard McCarthy, Winston-Salem, N.C., assignor to Kanowsky Manufacturing, Inc., Sacramento, Calif.
Filed Oct. 7, 1976, Ser. No. 730,466
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



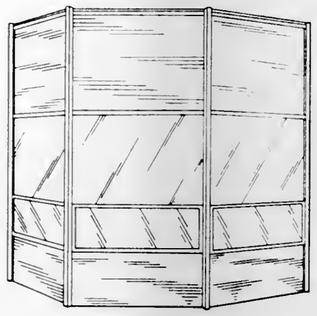
248,262
BED HEADBOARD
Gary M. Robichaud, Coventry, R.I., assignor to Leonard Michaelson, Providence, R.I.
Filed Apr. 12, 1976, Ser. No. 676,201
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—79



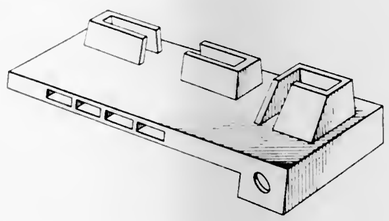
248,263
BATTERY FILLING STAND
Robert C. Shape, Warren, Ohio, assignor to Warren Steel Specialties Corp., Warren, Ohio
Filed Dec. 22, 1976, Ser. No. 748,151
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85



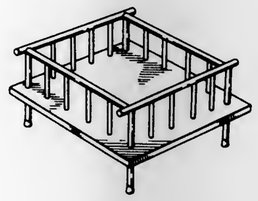
248,264
KIOSK
Harry E. Coleman, 3609 McLee Dr., Alexandria, La. 71301
Filed Mar. 12, 1976, Ser. No. 666,445
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—149



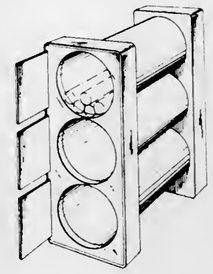
248,265
CHECK WRITING DESK
David A. O'Connor, Norfolk, Va., assignor to Virginia National Bankshares, Inc., Norfolk, Va.
Filed Mar. 23, 1976, Ser. No. 669,605
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—157



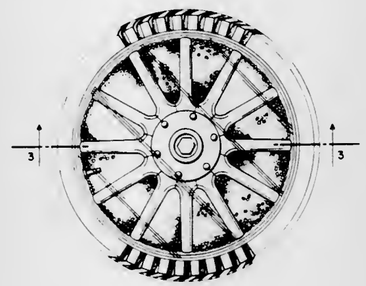
248,266
STAND FOR FLOWERS OR THE LIKE
Walter T. Kola, 1418 Highland, Joliet, Ill. 60435
Filed May 4, 1977, Ser. No. 793,560
Term of patent 14 years
Int. Cl. D6—*06, 04*
U.S. Cl. D6—183



248,267
DISPLAY RACK
Patrick J. Mitchell, 836 Industry Dr., Tukwila, Wash. 98188
Filed Jan. 6, 1977, Ser. No. 757,368
Term of patent 14 years
Int. Cl. D20—*02;* D6—*04*
U.S. Cl. D6—188

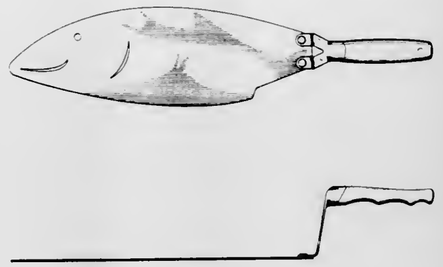


248,268
TABLE TOP
Robert Fields, 279 Wentworth, Glencoe, Ill. 60022
Filed Sep. 8, 1976, Ser. No. 722,074
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—193

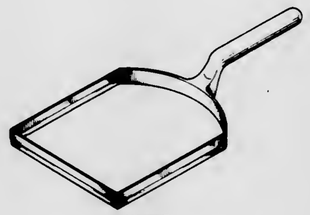


248,269
RAMEKIN
Don Schreckengost, East Liverpool, Ohio, assignor to The Salem China Company, Salem, Ohio
Filed Oct. 7, 1976, Ser. No. 730,155
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—28

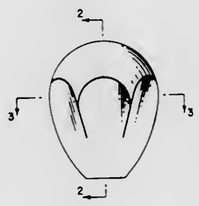
248,270
SPATULA
Janet Wagner Petit, 2713 NE. 21st Ave., Ft. Lauderdale, Fla. 33306
Filed Jun. 4, 1976, Ser. No. 692,792
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—102



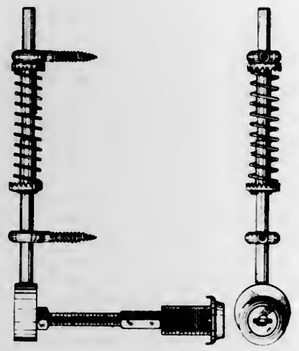
248,271
COMBINED CAKE AND PIE CUTTER
Richard McGee, III, Inglewood, Calif., assignor to Marcos Fastlicht, by said Richard McGee, III, a part interest to each
Filed Jan. 25, 1977, Ser. No. 762,288
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—142



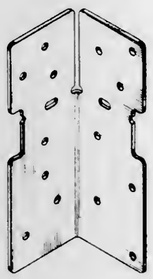
248,272
CONTROL LEVER KNOB
Douglas Hood Grambush, Irvine, Calif., assignor to Deere & Company, Moline, Ill.
Filed Jun. 28, 1976, Ser. No. 700,602
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—307



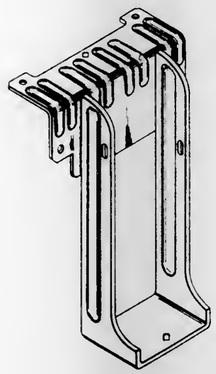
248,273
GARAGE DOOR LOCKING DEVICE
John P. Durban, 29402 Vista Plaza Dr., Laguna Niguel, Calif. 92677
Filed Sep. 3, 1976, Ser. No. 720,109
Term of patent 3½ years
Int. Cl. D8—*07*
U.S. Cl. D8—331



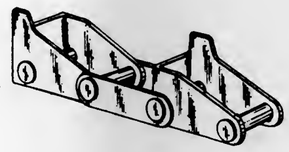
248,274
ALL PURPOSE ANCHOR
George W. Kingston, Chevy Chase, Md., and David R. Norcross, Washington, D.C., assignors to Timber Engineering Co., Washington, D.C.
Filed Aug. 5, 1976, Ser. No. 712,071
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—354



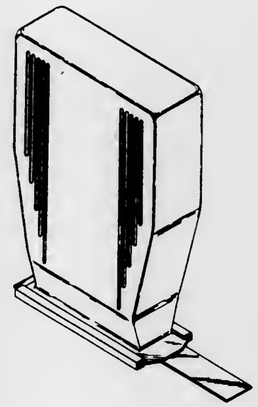
248,275
JOIST HANGER
Tyrell T. Gilb, Berkeley, Calif., assignor to Simpson Manufacturing Co., Inc., San Leandro, Calif.
Filed Mar. 24, 1976, Ser. No. 670,100
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—380



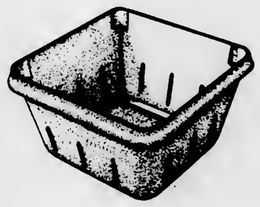
248,276
LINK UNIT FOR CONVEYOR CHAIN LINK ASSEMBLY
Dale R. Schwartz, R.R. 2, Hedrick, Iowa 52563
Filed Mar. 29, 1976, Ser. No. 671,391
Term of patent 14 years
Int. Cl. D8—*99;* D12—*05*
U.S. Cl. D8—499



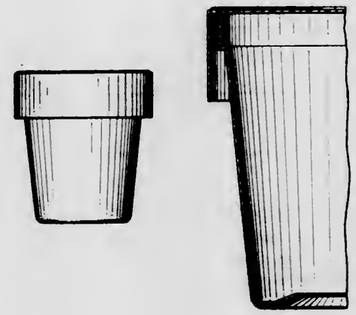
248,277
CONTAINER FOR TONER POWDER
Harlan Glenn Hartman, Hilton; Stephen James Flamini, Rochester, and Arthur Christian Rissberger, Jr., Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Continuation-in-part of Ser. No. 547,148, Feb. 5, 1975. This application Feb. 17, 1976, Ser. No. 658,211
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—207



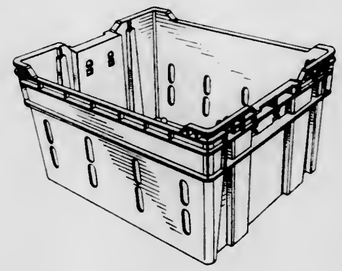
248,278
PACKAGING TRAY OR THE LIKE
Morell J. Holden, Jr., Canandaigua, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.
Filed Aug. 8, 1975, Ser. No. 602,931
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219



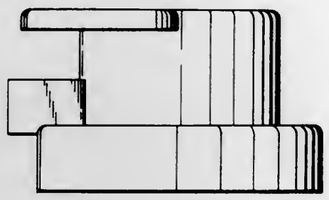
248,279
COVERED CONTAINER
David Goldsmith, Jamaica Estates, and Robert P. Gersin, New York, both of N.Y., assignors to Venture Foods Incorporation, New York, N.Y.
Continuation of Ser. No. 598,082, Jul. 22, 1975, abandoned. This application Apr. 1, 1977, Ser. No. 783,529
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—222



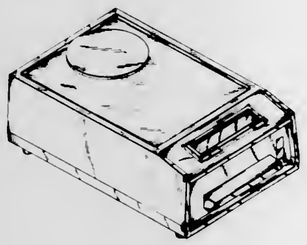
248,280
PRODUCE CONTAINER
Sam M. Martin, Etobicoke, Canada, assignor to Consumers Glass Company Limited
Filed Apr. 30, 1976, Ser. No. 682,114
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—243



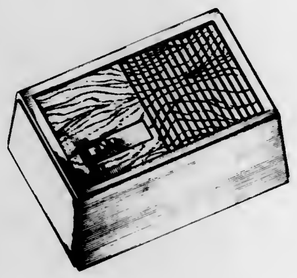
248,281
DISPENSING VALUE FOR A CONTAINER
Warren J. Schieser, Columbus; John R. Sneeden, Westerville; R. Alan Feltner, Columbus, and Curtis J. Bond, Marion, all of Ohio, assignors to Corco, Inc., Columbus, Ohio
Filed May 19, 1976, Ser. No. 688,084
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—275



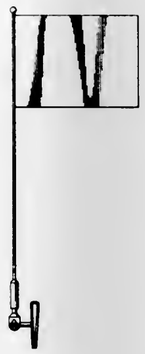
248,282
ELECTRICAL BALANCE
James E. Smith, Boulder, Colo., assignor to Denver Instrument Company, Denver, Colo.
Filed Sep. 23, 1976, Ser. No. 725,707
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—91



248,283
SMOKE DETECTOR
Keith D. Kitts, Glenview; Kenneth M. Hattori, Bensenville, and James H. Stade, Elkgrove Village, all of Ill., assignors to The Gillette Company, Boston, Mass.
Filed Aug. 27, 1976, Ser. No. 718,397
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—106



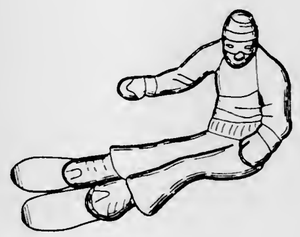
248,284
DISTRESS FLAG
Donald C. Bowser, 397 Thomas La., Girard, Ohio 44420
Filed Feb. 10, 1977, Ser. No. 767,621
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—109



248,285
DIAMOND RING
Josef J. Barr, 293 S. County Rd., Palm Beach, Fla. 33480
Filed Jun. 28, 1976, Ser. No. 700,711
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—27

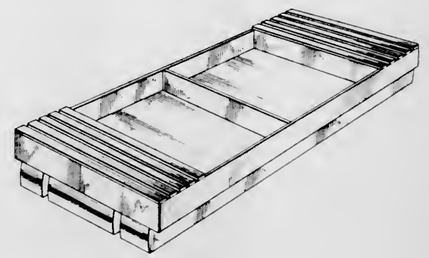
248,286
DIAMOND RING
Josef J. Barr, 293 S. County Rd., Palm Beach, Fla. 33480
Filed Jun. 21, 1976, Ser. No. 698,178
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—34

248,287
JEWELRY CHARM
Judy Sharp, Lancaster, Pa., assignor to The Family Jewels, Inc., Park City, Utah
Filed Jun. 7, 1976, Ser. No. 693,302
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—83



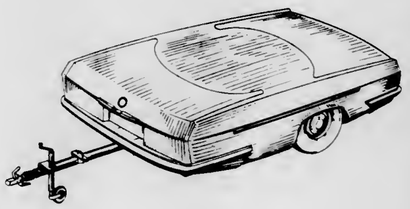
248,288
ORNAMENT OR THE LIKE
Virginia A. Maholias, 5575 S. 22nd St., Milwaukee, Wis. 53221
Filed May 18, 1976, Ser. No. 687,522
Term of patent 14 years
Int. Cl. D11—*05*
U.S. Cl. D11—125

248,289
FLOATING GARDEN BOX
Nita M. Opitz, Truesdale Lake Dr., South Salem, N.Y. 10590
Filed Sep. 22, 1976, Ser. No. 718,683
Term of patent 14 years
Int. Cl. D11—*02*; D21—*03*
U.S. Cl. D11—156



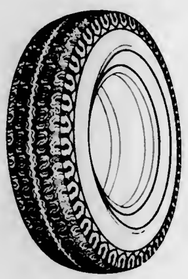
248,290
MOBILE LADDER
Marcel Guerette, Lachenaie, Canada, assignor to Moody Si Ltd., Terrebonne, Canada
Filed Jul. 23, 1976, Ser. No. 708,045
Claims priority, application Canada, May 20, 1976, 200576
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D12—59

248,291
VEHICLE TRAILER
Kurt Rolf Boldt, 1942 E. Valley Rd., Montecito, Calif. 93108
Filed Jan. 14, 1977, Ser. No. 759,290
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—102

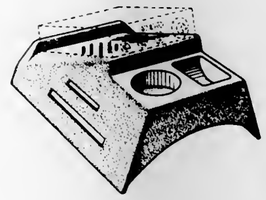


248,292
VEHICLE TIRE
Muneyoshi Maeda, No. 29-1, 2-Chome, Onta-Cho, Higashi-Murayama City, Tokyo; Hiroshi Kojima, No. 19-5, 4-Chome, Higashi-Toyota, Hino City, Tokyo, and Toshio Hayakawa, No. 2800-1, Ogawa-Higashi-Cho, Kodaira City, Tokyo, all of Japan
Continuation-in-part of Ser. No. 602,872, Aug. 7, 1975, Pat. No. Des. 244,181. This application Oct. 22, 1976, Ser. No. 734,802
Claims priority, application Japan, Mar. 6, 1975, 50-8591
The portion of the term of this patent subsequent to May 3, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—142

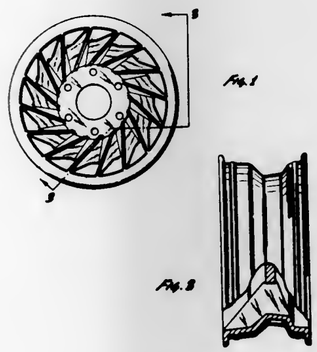
248,293
VEHICLE TIRE
Toshio Hayakawa, and Takao Sakamoto, both of Kodaira, Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan
Filed Dec. 13, 1976, Ser. No. 749,913
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



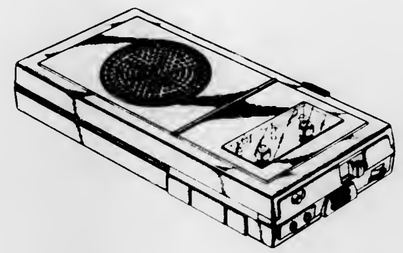
248,294
UNIVERSAL MOUNT FOR A CITIZEN BAND RADIO AND TAPE PLAYER
James E. McCutchen, 37 S. Del Norte Rd., Greenville, S.C. 29615
Filed Mar. 8, 1977, Ser. No. 775,648
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155



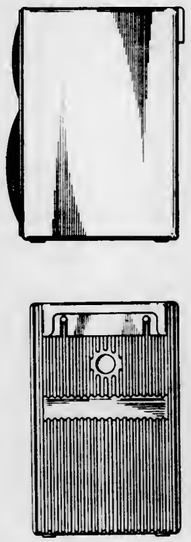
248,295
AUTOMOTIVE WHEEL
George E. Day, 1240 N. Ivy, Escondido, Calif. 92026, and R. W. Johnson, 559 Larchwood Dr., San Marcos, Calif. 92069
Filed Mar. 10, 1977, Ser. No. 776,201
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—206



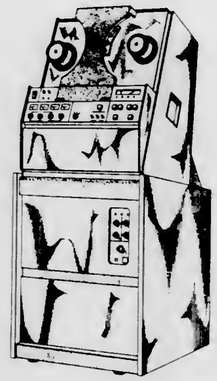
248,296
TAPE RECORDER
Toshihiko Kadota, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan
Filed Apr. 26, 1976, Ser. No. 680,448
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6



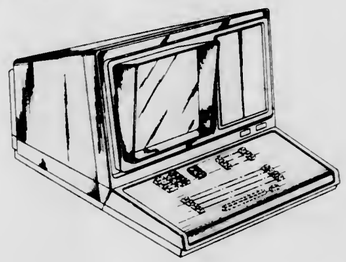
248,297
LOUD SPEAKER
Dieter Rams, Kronberg, Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Germany
Filed Feb. 26, 1976, Ser. No. 661,638
Claims priority, application Germany, Sep. 29, 1975, 738410
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—34



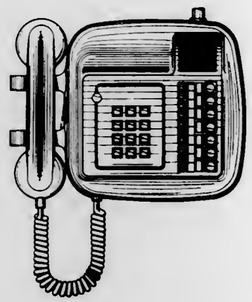
248,298
TAPE TRANSPORT
George A. Wilson, Portola Valley, Calif., assignor to Ampex Corporation, Redwood City, Calif.
Filed Mar. 17, 1976, Ser. No. 667,602
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—41



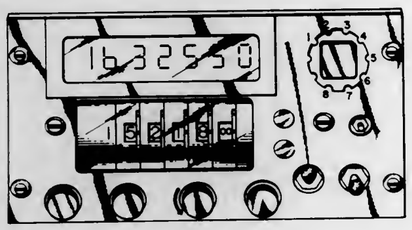
248,299
HOUSING FOR A DATA ENTRY TERMINAL
Samuel A. Morgan, Chelsea, and Raymond P. Kavlick, Ann Arbor, both of Mich., assignors to Sycor, Inc., Ann Arbor, Mich.
Filed Feb. 23, 1976, Ser. No. 660,162
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—45



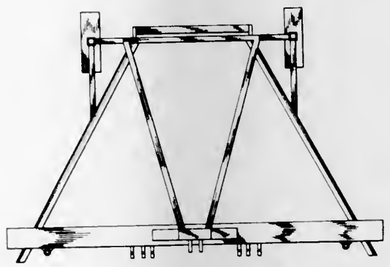
248,300
TELEPHONE
Isamu Hirasawa, Tokyo; Hirokazu Mokudai, Yamato, and Osamu Kato, Zama, all of Japan, assignors to Kanda Tsushin Kogyo Co., Ltd., Tokyo, Japan
Filed Feb. 9, 1977, Ser. No. 767,135
Claims priority, application Japan, Aug. 9, 1976, 51-30943
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—58



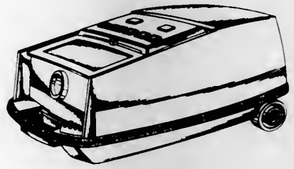
248,301
CONTROL AND DISPLAY PANEL FOR RADIO RECEIVERS OR THE LIKE
Robert Alan Gleaton, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.
Filed Jun. 17, 1976, Ser. No. 697,305
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—76



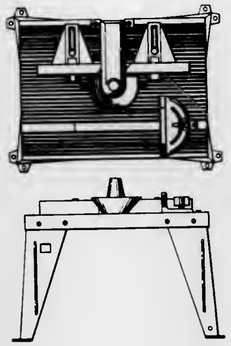
248,302
GROUND SCRAPER FOR CLOSING DITCHES AND THE LIKE
Richard D. Zoller, 124 Florimond Dr., Colusa, Calif. 95923
Filed Nov. 4, 1976, Ser. No. 738,831
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—32



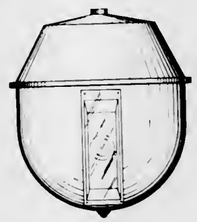
248,303
CANISTER VACUUM CLEANER OR SIMILAR ARTICLES
Fred E. Pearman, Jr., Five Forks Community, S.C., assignor to The Singer Company
Filed Nov. 12, 1976, Ser. No. 741,450
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—52



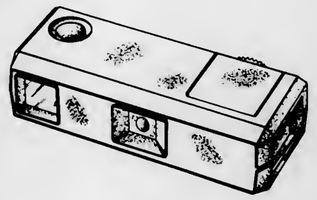
248,304
TABLE FOR PORTABLE CUTTING TOOLS
Wilfred M. McCord, Jr., and Boyko G. Varney, both of Louisville, Ky., assignors to Vermont American Corporation, Louisville, Ky.
Filed Sep. 3, 1976, Ser. No. 720,108
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—127



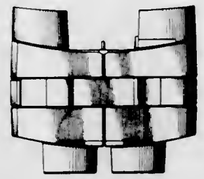
248,305
SURVEILLANCE CAMERA HOUSING
Perry Scott, 403 Twentieth St., Santa Monica, Calif. 90402
Filed Oct. 6, 1976, Ser. No. 729,884
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—02



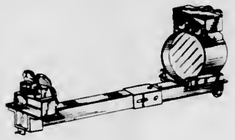
248,306
CAMERA
Rene C. Pinchuk, Kensington, Calif., assignor to Ehrenreich Photo-Optical Industries Inc., San Francisco, Calif.
Filed Jul. 6, 1976, Ser. No. 703,023
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—06

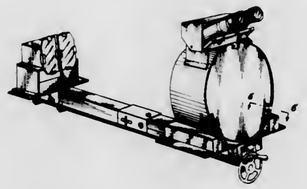


248,307
BINOCULAR
Paul R. Maguire, 4284 Sea View La., Los Angeles, Calif. 90065
Filed Sep. 27, 1976, Ser. No. 726,740
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—59



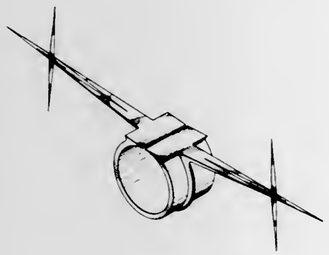
248,308
BINOCULAR REFLECTOR TELESCOPE
Theodore W. Richards, 1936 Sloat Blvd., San Francisco, Calif. 94116
Filed Dec. 13, 1976, Ser. No. 750,353
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—60





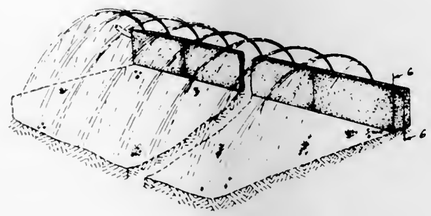
248,309
MOUNT FOR TELESCOPIC SIGHT
Gerald T. Weast, 23702 Crossley, Hazel Park, Mich. 48050
Filed Mar. 25, 1976, Ser. No. 670,226
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—7

248,310
GUN SIGHT
Borge Hestehave, 8031 Beechwood Dr., Alta Loma, Calif. 90701
Filed Sep. 18, 1973, Ser. No. 398,467
Term of patent 14 years
Int. Cl. D22—*01*
U.S. Cl. D22—8

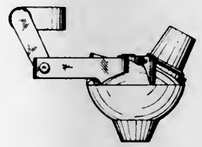


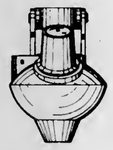
248,311
FISHING SINKER
George M. Raptis, 17876 Vicino Way, Pacific Palisades, Calif. 90272
Filed Mar. 15, 1977, Ser. No. 777,617
Term of patent 14 years
Int. Cl. D22—*30*
U.S. Cl. D22—30

248,312
SPRINKLER SYSTEM
John Zatorski, 18 Park Ave., North Arlington, N.J. 07032
Filed Feb. 9, 1976, Ser. No. 656,650
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—7

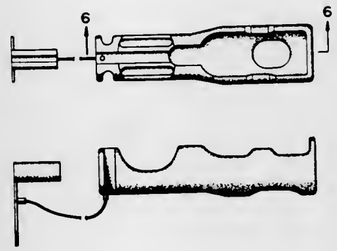


248,313
TANK VALVE
George C. Henry, 26701 Via Alcala, Mission Viejo, Calif. 92675
Filed Feb. 9, 1977, Ser. No. 766,984
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

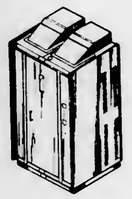




248,314
VIAL HOLDER AND UNIT GAUGE FOR HYPODERMIC SYRINGES
Edward E. Romero, 1367 Wayne Ave., San Leandro, Calif. 94577, and Charles L. Romero, 8160 Crow Canyon Rd., Castro Valley, Calif. 94546
Filed Jul. 2, 1976, Ser. No. 702,013
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—25



248,315
PHOTOCHEMOTHERAPY CHAMBER
Ronald G. Blaisdell, Saugus; Harold L. Hough, Beverly, and Robert E. Levin, Hamilton, all of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.
Filed Feb. 24, 1976, Ser. No. 660,947
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—39

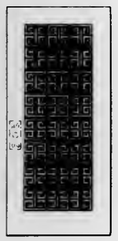


248,316
MODULAR PHOTOCHEMOTHERAPY CHAMBER
Ronald G. Blaisdell, Saugus, and Harold L. Hough, Beverly, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.
Filed Feb. 24, 1976, Ser. No. 660,969
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—39

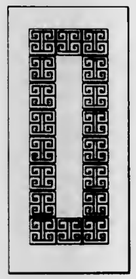
248,317
INFANT PACIFIER
Paul K. Meeker, 412 Park, Kent, Ohio 44266, and Richard E. Cone, 249 Bowman Dr., Kent, Ohio 44240
Filed Sep. 2, 1976, Ser. No. 720,224
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—46

248,318
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,411, Dec. 16, 1974, Pat. No. 243,095. This application Jun. 14, 1976, Ser. No. 696,004
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48

248,319
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,411, Dec. 16, 1974, Pat. No. 243,095. This application Jun. 14, 1976, Ser. No. 696,005
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48

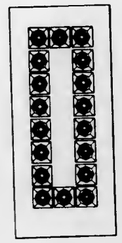


248,320
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,411, Dec. 18, 1974. This application Jun. 14, 1976, Ser. No. 696,006
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48

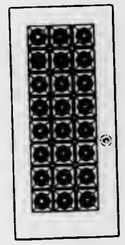


248,321
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,412, Dec. 16, 1974. This application Jun. 14, 1976, Ser. No. 696,007
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48

248,322
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,412, Dec. 16, 1974. This application Jun. 14, 1976, Ser. No. 696,008
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48

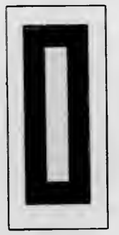


248,323
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,412, Dec. 16, 1974, Pat. No. D. 241,535. This application Jun. 14, 1976, Ser. No. 696,009
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48



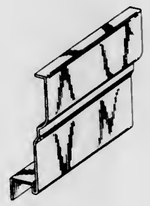
248,324
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,399, Dec. 16, 1974, Pat. No. D. 244,384. This application Jun. 14, 1976, Ser. No. 696,010
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48

248,325
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,399, Dec. 16, 1974, Pat. No. D. 244,384. This application Jun. 14, 1976, Ser. No. 696,011
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48



248,326
DECORATIVE DOOR
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Division of Ser. No. 533,399, Dec. 16, 1974, Pat. No. Des. 244,384. This application Jun. 14, 1976, Ser. No. 696,012
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48

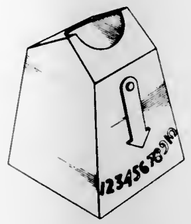
248,327
BUILDING TRIM
Donald A. South, 44538 State Rte. 14, Columbiana, Ohio 44408
Filed Sep. 30, 1976, Ser. No. 728,445
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



248,328
POST
Raymond Esunis, and Constance Esunis, both of 5N.651 Santa Fe Trail, Bartlett, Ill. 60103
Filed Nov. 4, 1976, Ser. No. 738,748
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—78

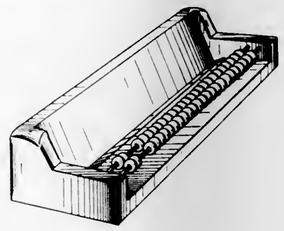
248,329
SMOKING STAND
Franco Gensini, Florence, Italy, assignor to Action Industries, Inc., Cheswick, Pa.
Filed Aug. 3, 1977, Ser. No. 821,420
Claims priority, application Italy, Feb. 22, 1977, 11533/77[U]
Term of patent 14 years
Int. Cl. D27—*03*
U.S. Cl. D27—12

248,330
EXECUTIVE GAME INDICATOR
Lesmeri-Anne M. Postma, 1662 Camden Ave., West Los Angeles, Calif. 90025
Filed Aug. 13, 1976, Ser. No. 714,005
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 MM

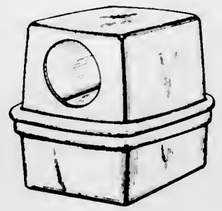


248,331
SPLASHER POOL WITH SLIDE AND INTEGRAL STEP
Ivan A. Ziegler, Dallas, Pa.; Harry T. Bowkley, Claremont, and Thaddeus W. Fuller, Pomona, both of Calif., assignors to Muskin Corporation, Colton, Calif.
Filed Sep. 20, 1976, Ser. No. 724,271
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 F

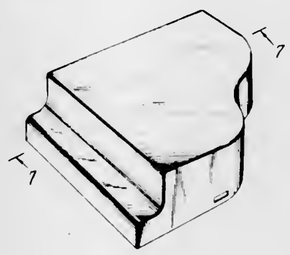
248,332
COMBINED DOMINO HOLDER AND SCORE COUNTER
Rex V. Bailey, deceased, late of Malakoff, Tex., by Hester Caroline Bailey, beneficiary and devisee, P.O. Box 494, Malakoff, Tex. 75148
Filed Nov. 26, 1976, Ser. No. 745,346
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 MM



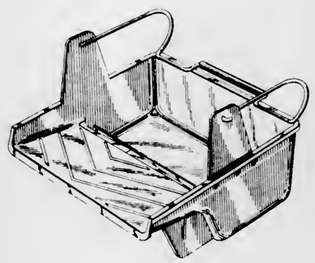
248,333
ANIMAL LITTER BOX
Donald Haugen, 709 W. Huron St., Ann Arbor, Mich. 48103
Filed Jan. 24, 1977, Ser. No. 761,980
Term of patent 14 years
Int. Cl. D30—*06*
U.S. Cl. D30—41



248,334
PROTECTIVE COVER FOR A PIANO
Joseph Stello, 808 Broadway, New York, N.Y. 10003
Filed Mar. 23, 1976, Ser. No. 669,673
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D56—1 B

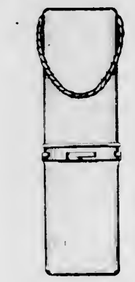


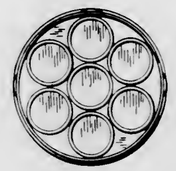
248,335
PAINT PAD BUCKET
Donald R. Cooke, Minneapolis, and Robert I. Janssen, St. Paul, both of Minn., assignors to Padco, Inc., Minneapolis, Minn.
Filed Mar. 21, 1977, Ser. No. 779,817
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D64—18



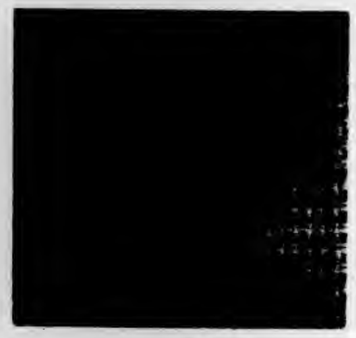
248,336
ARTICLE CARRYING BAG FOR ATTACHMENT TO A CRUTCH
Albert William Fink, 1825 N. Gramerey Pl., Los Angeles, Calif. 90020
Filed Jun. 28, 1976, Ser. No. 700,515
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—1 R

248,337
CARRYING CASE FOR ARTISTS BRUSHES
Max Marx, Box 142, 12 Portside Rd., Lake Hopatcong, N.J. 07849
Filed Oct. 21, 1976, Ser. No. 734,712
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R





248,338
BLANKET FABRIC
Irving Gross, Providence, and Roger Guillemette, Tiverton, both of R.I., assignors to Fairhope Fabrics, Inc., Fall River, Mass.
Filed Apr. 21, 1975, Ser. No. 569,885
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D92—1 PP



248,339
FABRIC
Leo John Comensoli, Dural, and Gloria Dawn Smythe, Potts Point, both of Australia, assignors to Speeda Knitting Mills Pty. Ltd.
Filed Oct. 27, 1976, Ser. No. 736,044
Claims priority, application Australia, Apr. 27, 1976, 69069; Apr. 27, 1976, 69070
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D92—1 FF

248,340
ORNAMENTAL STANDARD
Charles Eugene Miller, 51964 Fir Rd., Granger, Ind. 46530
Filed May 24, 1976, Ser. No. 689,469
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 A

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 27TH DAY OF JUNE, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See—*
Loria, Adrian M.; and Thomas, Richard E., 4,097,637, Cl. 428-212.000.
Moschovis, Elias P.; and Gilson, John L., 4,097,391, Cl. 252-62.10L.

A-T-O Inc.: *See—*
Schnier, Edward A., 4,097,325, Cl. 156-215.000.
Ulch, Bryan D., 4,097,727, Cl. 235-382.000.

Aarons, Raymond Joseph, to Monier Colourtile Pty. Ltd. Roof eave assembly. 4,096,671, Cl. 52-94.000.

AB Filtrator: *See—*
Ritzler, Bo, 4,097,381, Cl. 210-259.000.

Abbott Laboratories: *See—*
Conway, Kenneth Edward; Freeman, Thomas Edward; and Charudattan, Raghavan, 4,097,261, Cl. 71-66.000.
Horrom, Bruce Wayne; Minard, Frederick Nelson; and Zaugg, Harold Elmer, 4,097,597, Cl. 424-250.000.
Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,097,428, Cl. 260-345.90R.
Tomioka, Shinji; and Mori, Yasuki, 4,097,664, Cl. 536-17.000.

Abiko, Shiro: *See—*
Tanaka, Tsunemitsu; Nakagawa, Tetsuo; Abiko, Shiro; and Kaneko, Norio, 4,097,366, Cl. 208-127.000.

Abolins, Visvaldis; and Holub, Fred F., to General Electric Company. Reinforced intercrystalline thermoplastic polyester compositions. 4,097,446, Cl. 260-40.00R.

Acda, Petrus Marinus, to Polva Nederland B.V. High-strength pipe coupling. 4,097,070, Cl. 285-86.000.

Adamation, Inc.: *See—*
Perry, Kenneth E., 4,096,664, Cl. 49-235.000.

Adams, Charles Lee. Hand power table saw. 4,096,777, Cl. 83-762.000.

Adams, Guy, to Solitron Devices, Inc. Skin conditioning indicator. 4,096,852, Cl. 128-2.00H.

Adams, Stanley B.; Loebbaka, Gregory A.; and Morge, Michael P., to Caterpillar Tractor Co. Valve group subassembly. 4,096,878, Cl. 137-351.000.

Adamski, Gunter; and Prochnow, Claus, to Rollei-Werke Franke & Heidecke. Camera grip. 4,097,883, Cl. 354-293.000.

Adamson, Stewart Marr; and Bliault, Alan Edgar John, to David Brown-Vosper (Offshore) Limited. Offshore product loading terminal. 4,096,704, Cl. 61-95.000.

Addressograph-Multigraph Corporation: *See—*
Brown, Keith E., 4,096,761, Cl. 74-128.000.
Datta, Pabitra, 4,097,617, Cl. 427-14.000.
Scholten, Frank L.; and Szabo, Francis S., 4,097,875, Cl. 354-8.000.

Adex Corporation: *See—*
Lasky, Daniel J.; and Wright, Philip R., 4,097,884, Cl. 354-323.000.

Adolf Schmids Erben Aktiengesellschaft: *See—*
Ebel, Eckhard; Kobel, Hans-Rudolf; and Widmer, Ernst, 4,097,369, Cl. 208-180.000.

Ady, Esthmel W., to Ady, Larry Dale. Cleaning composition derived from potato processing wastes. 4,097,407, Cl. 252-370.000.

Ady, Larry Dale: *See—*
Ady, Esthmel W., 4,097,407, Cl. 252-370.000.

Aerovent, Inc.: *See—*
Brock, James A., 4,097,227, Cl. 432-187.000.

Agarwal, Mahesh C.; and Dadson, Joseph E. Apparatus for peritoneal dialysis. 4,096,859, Cl. 128-213.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Rashkov, Ilia; Gole, Jean; Guerard, Daniel; Herold, Albert; Merle, Gerard; Panayotov, Ivan Martinov; Pascault, Jean-Pierre; Pham, Quang Tho; Pillot, Christian; and Salle, Robert, 4,097,660, Cl. 526-173.000.

Agers, Brian Michael; and Todd, Maurice Cornelius, to Du Pont de Nemours, E. I., and Company. Jet for fluid texturing yarn. 4,096,612, Cl. 28-272.000.

AGFA-Gevaert AG: *See—*
Engelsmann, Dieter, 4,097,882, Cl. 354-197.000.
Mannhardt, Annemarie; Eppe, Rudolf; and Pfeifer, Josef, 4,097,280, Cl. 96-44.000.
Stemme, Otto; Lermann, Peter; and Ehgartner, Gabriele, 4,097,133, Cl. 352-243.000.

Agfa-Gevaert N.V.: *See—*
De Roeck, Joseph Irma; and Christiaen, Lucien Antoine, 4,097,323, Cl. 156-159.000.

Ahmed, Nazeer; and Histand, Ivan Gerald, to Western Electric Company, Inc. Hydrostatic extrusion methods and apparatus. 4,096,721, Cl. 72-60.000.

Aibara, Shunzo: *See—*
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,097,608, Cl. 424-324.000.

Airfix Industries Limited: *See—*
Rumball, Kenneth Francis, 4,096,963, Cl. 215-317.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Miyao, Takayuki, 4,096,768, Cl. 74-865.000.

Aisin, Shamil Mustafovich: *See—*
Rivkin, Ilya Yakovlevich; Aisin, Shamil Mustafovich; Garkusha, Olga Ivanovna; Dondoshansky, Alexandr Lvovich; Zellis, Evgeny Alfredovich; Karpov, Vladilen Efremovich; Sorokin, Vladimir Konstantinovich; and Shishkin, Oleg Petrovich, 4,096,745, Cl. 73-194.00B.

Aitken, Thomas; and Pote, Wilfred D., to Nalco Chemical Company. Cationization of starch utilizing alkali metal hydroxide, cationic water-soluble polymer and oxidant for improved wet end strength. 4,097,427, Cl. 260-9.000.

Akaba, Hayao; Ikeda, Akira; and Lee, Masayoshi, to Kabushiki Kaisha Hoya Lens. Automatic lens grinding machine. 4,096,684, Cl. 51-101.0LG.

Akishino, Katsuo: *See—*
Nakamura, Hirokazu; Ohinouye, Tsuneo; Hori, Kenji; Nakagami, Tatsuro; Tsukamoto, Yutaka; and Akishino, Katsuo, 4,096,692, Cl. 60-307.000.

Akiyama, Keiichi; Kamiuchi, Junichi; Matsuda, Itsuo; and Fujii, Takara, to Toshiba Chemical Products Co. Ltd. Heat-resistant thermosetting polyimide resin with bis-phenol-epichlorohydrin reaction product. 4,097,545, Cl. 260-830.00P.

Akiyama, Minoru: *See—*
Ishida, Torao; Akiyama, Minoru; Nishimura, Daikichi; Hayashi, Hiroshi; Sakurai, Yoshio; and Tsukagoshi, Shigeru, 4,097,665, Cl. 536-23.000.

AKZO N.V.: *See—*
Haeufler, Hartmut; and Gunther, Gerhard, 4,097,298, Cl. 106-243.000.

Akzona Incorporated: *See—*
Konttinen, Aarne Ilmari; Goverde, Bastiaan Cornelis; and Janssen, Peter Silvester Lambertus, 4,097,338, Cl. 195-103.50R.
Roskott, Lodewijk; and Schroeder, Arnold, 4,097,467, Cl. 260-75.0UA.

Aladjem, Frederick J.; and Ayengar, Padmasini K. Quantitative protein analysis by immunodiffusion. 4,097,149, Cl. 356-72.000.

Albany International Corp.: *See—*
Hartigan, Richard Joseph, Jr., 4,097,652, Cl. 428-401.000.

Albright, James A.: *See—*
Smith, Ray E.; and Albright, James A., 4,097,641, Cl. 428-245.000.

Alcan Research and Development Limited: *See—*
Cooke, William Ernest; Hodgson, John; and Sasaki, Mitsuo, 4,097,342, Cl. 204-28.000.

Alexander Wiegand GmbH u. Co., Armaturen- u.Manometerfabrik: *See—*
Bilbert, Paul; and Rossner, Ewald, 4,096,760, Cl. 73-738.000.

Alfred Herbert Limited: *See—*
Newell, Denis Alfred, 4,097,178, Cl. 408-151.000.

Allied Chemical Corporation: *See—*
Garner, Eugene F.; and Hamilton, Brian K., 4,097,241, Cl. 23-281.000.
James, Leonard Evans; Balint, Laszlo Joseph; and Lazarus, Stanley David, 4,097,468, Cl. 260-75.00M.
Lofquist, Robert Alden, 4,097,546, Cl. 260-857.0UN.
Long, E. David, 4,096,830, Cl. 123-32.0EA.
Rogic, Milorad M.; Demmin, Timothy R.; and Klein, Karl P., 4,097,517, Cl. 260-465.400.
Schwartz, Judd Leonard; and Mayer, Richard Eugene, 4,097,630, Cl. 428-97.000.
Stephenson, Robert Larry, 4,096,606, Cl. 24-230.00A.
Stouffer, Richard C.; and Schotthoefer, Jerome W., 4,097,003, Cl. 242-107.000.

Allied Paper Incorporated: *See—*
Shaw, Michael J., 4,097,647, Cl. 428-325.000.

Allinikov, Sidney, to United States of America, Air Force. Coated electroluminescent phosphors. 4,097,776, Cl. 313-502.000.

Allis-Chalmers Corporation: *See—*
Burrus, Joe H., Jr., 4,097,794, Cl. 324-54.000.

Allmer, Franz, to Graystone Corporation. Track tamper with hingeable unitary pivotable tamping unit. 4,096,806, Cl. 104-12.000.

Allred, John Caldwell. High speed particle sorter using a field emission electrode. 4,097,373, Cl. 209-111.500.

Alphonse, Gerard Argant, to RCA Corporation. Variable acoustic wave energy transfer-characteristic control device. 4,096,756, Cl. 73-609.000.

Aluminum Company of America: *See—*
Cebulak, Walter S.; and Weyand, John D., 4,097,567, Cl. 264-65.000.

Dolhyj, Serge R.; Milberger, Ernest C.; and Evans, Sandra R., to Standard Oil Company. Use of coated catalysts in the preparation of maleic anhydride. 4,097,501, Cl. 260-346.740.
Domas, Paul A.: *See—*
Barack, William N.; Gay, Charles H., Jr.; Beekman, Stephen W.; and Domas, Paul A., 4,097,194, Cl. 416-244.00A.
Dominion Engineering Works Limited: *See—*
Futcher, Ralph James, 4,096,643, Cl. 34-122.000.
Dondoshansky, Alexandr Lvovich: *See—*
Rivkin, Ilya Yakovlevich; Aisin, Shamil Mustafovich; Garkusha, Olga Ivanovna; Dondoshansky, Alexandr Lvovich; Zellis, Evgeny Alfredovich; Karpov, Vladilen Efremovich; Sorokin, Vladimir Konstantinovich; and Shishkin, Oleg Petrovich, 4,096,745, Cl. 73-194.00B.
Donermeyer, Donald D.: *See—*
Martins, Joseph G.; and Donermeyer, Donald D., 4,097,445, Cl. 260-40.00R.
Donofrio, John D., to Joanna Western Mills Company. Roller shade braking mechanism. 4,096,904, Cl. 160-299.000.
Dorr-Oliver Incorporated: *See—*
Jukkola, Walfred Wilhelm, 4,096,909, Cl. 165-76.000.
Dorrian, John F., to Erie Technological Products, Inc. Base metal electrode capacitor and method of making the same. 4,097,911, Cl. 361-305.000.
Dorsey, Geoffrey A., Jr., to Kaiser Aluminum & Chemical Corporation. Pretreatment for the resistance welding of aluminum. 4,097,312, Cl. 148-6.270.
Dorsey-McComb Distributors, Inc.: *See—*
McComb, Kenneth H.; and McComb, Timothy I., 4,097,213, Cl. 425-376.00B.
Doyle, Jr.; William C.: *See—*
Kirkpatrick, Joel L.; and Doyle, Jr.; William C., 4,097,264, Cl. 71-90.000.
Draper Shade and Screen Co.: *See—*
Broome, Michael D., 4,097,013, Cl. 248-171.000.
Drasch, Josef: *See—*
Schild, Josef; Scheiber, Robert; Schmidt, Harald; Drasch, Josef; and Keznickl, Eduard, 4,097,906, Cl. 360-13.000.
Dresser Industries, Inc.: *See—*
Phillips, Victor Quin; Griffin, Phil Harmon; and Sharki, Martin James, 4,097,249, Cl. 55-41.000.
Phillips, Victor Quin; Griffin, Phil Harmon; and Sharki, Martin James, 4,097,253, Cl. 55-169.000.
Van Houtte, Richard George, 4,097,073, Cl. 285-197.000.
Drobnik, Jaroslav; Kopecek, Jindrich; Labsky, Jiri; Rejmanova, Pavla; Exner, Josef; and Kalal, Jaroslav, to Ceskoslovenska akademie ved. Preparation of biogically active substances bearing $-NH_2$ groups in a form releasable by enzymatic cleavage. 4,097,470, Cl. 260-78.00A.
Drury, Robert Finley, to Du Pont de Nemours, E. I., and Company. Electrochemical coupling of perfluoroalkyl iodides. 4,097,344, Cl. 204-59.00R.
Dubuque, Douglas K., to Tyee Aircraft, Inc. Method of swage joining a rod end to a tube and the product thereof. 4,097,163, Cl. 403-274.000.
Duke, James T.: *See—*
Shelby, Robert L.; Duke, James T.; and Parker, Duane L., 4,097,093, Cl. 305-22.000.
Dulmaine, Joseph Francis; and Bagrosky, Michael Edward, to Coors Container Company. Container with outwardly flexible bottom end wall having integral support means and method of manufacture therefore. 4,096,814, Cl. 113-120.00M.
Duncan, Robert L.: *See—*
Cole, Clarence R.; and Duncan, Robert L., 4,097,565, Cl. 264-40.300.
Dunshee, Robert S., to United States Steel Corporation. Plasma arc cutting water tables. 4,097,713, Cl. 219-121.00P.
Dupler, William W., to General Motors Corporation. Sheet metal draw die apparatus. 4,096,729, Cl. 72-350.000.
Du Pont de Nemours, E. I., and Company: *See—*
Agers, Brian Michael; and Todd, Maurice Cornelius, 4,096,612, Cl. 28-272.000.
Beveridge, Wendell Hazelton, Jr.; and Van Over, William Edward, 4,096,754, Cl. 73-432.00R.
Cheng, Jiin-Duey, 4,097,262, Cl. 71-90.000.
Darling, Thomas Robert, 4,097,439, Cl. 260-31.20N.
Drury, Robert Finley, 4,097,344, Cl. 204-59.00R.
Fuchs, Julius Jakob, 4,097,673, Cl. 560-16.000.
Guy, Richard Ernest, 4,096,894, Cl. 141-93.000.
Howard, Edward George, Jr., 4,097,447, Cl. 260-42.140.
James, Daniel Shaw, 4,097,475, Cl. 260-157.000.
Kane, William Paul, 4,097,433, Cl. 260-23.0AR.
Keene, Frederick J., 4,097,297, Cl. 106-177.000.
Novak, Ernest Richard, 4,097,553, Cl. 260-876.00R.
Patterson, Frank Knowles; and Rellick, Joseph Richard, 4,097,653, Cl. 428-433.000.
Sayre, James Franklin, 4,096,609, Cl. 28-155.000.
Shannon, Robert Day,, 4,097,345, Cl. 204-59.0AM.
Wildt, Hans-Achim Dietmar, 4,097,301, Cl. 106-300.000.
Duse, Gregory E. Drain opening device. 4,096,597, Cl. 4-255.000.
Dynamit Nobel Aktiengesellschaft: *See—*
Buning, Robert; and Bier, Gerhard, 4,097,436, Cl. 260-29.60H.
E. R. Squibb & Sons, Inc.: *See—*
Breuer, Hermann; and Treuner, Uwe D., 4,097,670, Cl. 544-27.000.
E.S. & A. Robinson (Canada) Ltd.: *See—*
Cook, Herbert G.; and McAvity, Jack A., 4,096,946, Cl. 206-484.200.
E-Systems, Inc.: *See—*
Beilein, Loraine F.; and Burkett, Frank S., Jr., 4,096,983, Cl. 228-122.000.
Lund, Bryant D., 4,097,786, Cl. 318-282.000.
Eastman Kodak Company: *See—*
Bissonette, Vernon L., 4,097,278, Cl. 96-22.000.
Gardner, Sylvia Alice; and Lelental, Mark, 4,097,281, Cl. 96-48.0HD.
Noonan, John Michael; McConkey, Robert Charles; and Hanrahan, Michael John, 4,097,282, Cl. 96-73.000.
Sandhu, M. Akram, 4,097,230, Cl. 8-2.50A.
Eaton Corporation: *See—*
Clayton, Russell K., 4,097,075, Cl. 285-332.300.
Gee, Thomas A., 4,097,756, Cl. 310-155.000.
Larson, Douglas A., 4,097,699, Cl. 200-61.45R.
Yip, James K., 4,096,883, Cl. 137-596.130.
Ebel, Eckhard; Kobel, Hans-Rudolf; and Widmer, Ernst, to Adolf Schmids Erben Aktiengesellschaft. Process for reclaiming used hydrocarbon oils. 4,097,369, Cl. 208-180.000.
Eberhardt, Edward Herbert, to International Telephone & Telegraph Corporation. Thermal camera tube. 4,097,742, Cl. 250-333.000.
Eckert, Alton B., Jr.; Jones, Howell A., Jr.; and Check, Frank T., Jr., to Pitney-Bowes, Inc. Remote postage meter charging system using an advanced microcomputerized postage meter. 4,097,923, Cl. 364-900.000.
Eckert, Konrad; Hofmann, Karl; and Seifert, Kurt, to Robert Bosch GmbH. Fuel injection valve for preliminary and principal injection. 4,096,999, Cl. 239-533.500.
Eckhardt, Friedhelm, to U.S. Philips Corporation. Hinge mechanism. 4,096,604, Cl. 16-128.100.
Economy, Constantine F.: *See—*
Harvey, John K., Jr.; Watson, Morris T.; Economy, Constantine F.; and LeFevre, Robert J., 4,096,893, Cl. 141-90.000.
Eder, Ulrich: *See—*
Weber, Alfred; Kennecke, Mario; Mueller, Rudolf; Eder, Ulrich; and Wiechert, Rudolf, 4,097,334, Cl. 195-51.00G.
Edinger, Winfried Franz: *See—*
Wachter, Rudolf Ludwig; and Edinger, Winfried Franz, 4,096,793, Cl. 99-467.000.
Edwin Cooper and Company Limited: *See—*
Askew, Herbert Frank; Jayne, Gerald John Joseph; and Elliott, John Scotchford, 4,097,474, Cl. 260-139.000.
Egan, Clark J., to Chevron Research Company. Hydrocracking in the presence of water and a low hydrogen partial pressure. 4,097,364, Cl. 208-111.000.
Egan, Walter G.; Hallock, Herbert B.; and Hilgeman, Theodore W., to Grumman Aerospace Corporation. Retroreflectance measuring apparatus. 4,097,751, Cl. 250-571.000.
Egyt Gyogyszervegyeszeti Gyar: *See—*
Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, 4,097,668, Cl. 542-418.000.
Ehgartner, Gabriele: *See—*
Stemme, Otto; Lermann, Peter; and Ehgartner, Gabriele, 4,097,133, Cl. 352-243.000.
Ehrlich, Stephen Jeffrey; and Beyer, Edward Robert, to Motorola, Inc. Remote telephone coupler as for medical emergency data transmission. 4,097,691, Cl. 179-2.00C.
Eide, Richard H.; and Golembeck, Gerald A., to United States Bedding Company, The. Mattresses and method for producing mattresses. 4,096,595, Cl. 5-345.00R.
Eldec Corporation: *See—*
Thorson, Eric K., 4,097,799, Cl. 324-99.00R.
Electric Power Research Institute, Inc.: *See—*
Perry, Elijah R.; Angwin, Meredith J.; Rabinowitz, Mario; and Shimshock, John F., 4,097,682, Cl. 174-15.00R.
Electro Corporation: *See—*
Wilson, Michael A.; Momparler, Fred J.; and Coleman, Kenneth, 4,097,769, Cl. 307-252.00B.
Electronic Surveillance Fence Security, Inc.: *See—*
Dettmann, Charles R.; and Frederick, John J., 4,097,025, Cl. 256-1.000.
Electronized Chemicals Corporation: *See—*
Lair, Wilbert M., 4,097,564, Cl. 264-22.000.
Elektromaschinen AG: *See—*
Bachtold, Jakob H.; and Dahmen, Martin, 4,097,709, Cl. 219-10.55R.
Elf Union: *See—*
Lamy, Henri, 4,096,908, Cl. 165-64.000.
Elgeti, Klaus: *See—*
Krambrock, Wolfgang; Schwedes, Hansjorg; Richter, Wolfgang; and Elgeti, Klaus, 4,096,640, Cl. 34-10.000.
Elghani, Salah Elabd; Fischer, Winfried; and Prinz, Richard, to Bayer Aktiengesellschaft. Thermoplastically processible moulding compound of cellulose esters and ethylene/vinyl esters copolymers. 4,097,429, Cl. 260-17.00R.
Ellbrunner, Adalbert: *See—*
Stock, Horst; and Ellbrunner, Adalbert, 4,097,329, Cl. 156-617.0SP.
Ellingson, Chester W., Jr. Window sealing structure. 4,096,665, Cl. 49-475.000.
Elliott, John Scotchford: *See—*
Askew, Herbert Frank; Jayne, Gerald John Joseph; and Elliott, John Scotchford, 4,097,474, Cl. 260-139.000.
Emerson Electric Co.: *See—*
Behr, Joseph L., 4,096,993, Cl. 236-68.00B.
Bobrick, Mitchell; Quin, Murray L.; and Buzan, Morris M., 4,097,919, Cl. 362-270.000.

Roddy, Joseph T., 4,097,706, Cl. 200-293.000.
EMI Limited: *See—*
Ingham, William Ellis; and Williams, Anthony Michael, 4,097,746, Cl. 250-444.000.
LeMay, Christopher Archibald Gordon, 4,097,744, Cl. 250-366.000.
Emmel, Leroy L. Method and apparatus for making an elongated lattice structure. 4,097,324, Cl. 156-179.000.
Emmons, William D.; and Nyi, Kayson, to Rohm and Haas Company. Unsaturated esters of glycol monodicyclopentenyl ethers. 4,097,677, Cl. 560-220.000.
Endo, Hiroshi; and Ban, Kazuhiro, to Nissan Motor Company, Limited; and Mitsubishi Denki Kabushiki Kaisha. Radar-operated vehicle safety apparatus. 4,097,864, Cl. 343-7.0VM.
Energy Absorption Systems, Inc.: *See—*
Walker, Grant W., 4,097,572, Cl. 264-310.000.
Energy Conversion Devices, Inc.: *See—*
Lewis, Gary, 4,097,846, Cl. 340-146.30H.
Engel, Paul Richard, to Upson Tools, Inc. Composite tool structure. 4,096,896, Cl. 145-50.00B.
Engelfried, Otto: *See—*
Kerb, Ulrich; Wiechert, Rudolf; and Engelfried, Otto, 4,097,678, Cl. 560-257.000.
Engelsmann, Dieter, to AGFA-Gevaert AG. Multiple lens camera having lens-position controlled focal-length adjustment. 4,097,882, Cl. 354-197.000.
Engineering Systems Corporation: *See—*
Miller, Albert J., 4,097,809, Cl. 325-54.000.
England, Robert C. Device for inserting and removing contact lenses. 4,097,081, Cl. 294-1.0CA.
Eppe, Rudolf: *See—*
Mannhardt, Annemarie; Eppe, Rudolf; and Pfeifer, Josef, 4,097,280, Cl. 96-44.000.
Epsilon Lambda Electronics Corp.: *See—*
Knox, Robert M.; and Toulios, Peter P., 4,097,826, Cl. 333-73.00R.
Epworth, Richard Edward: *See—*
Selway, Peter Richard; Chown, Martin; Epworth, Richard Edward; Leggett, Norman Derek; and Sunak, Harish Ram Dass, 4,097,891, Cl. 357-81.000.
Erickson, Frederick E.: *See—*
Ritzenthaler, Donald R.; and Erickson, Frederick E., 4,097,832, Cl. 335-166.000.
Erickson, Kent E., to Keuffel & Esser Company. Zero index for electro-optical measuring device. 4,097,734, Cl. 250-237.00G.
Erie Technological Products, Inc.: *See—*
Dorrian, John F., 4,097,911, Cl. 361-305.000.
Erikson, Carl A.; Fielding, John O.; Cline, Harvey E.; and Anthony, Thomas R., to General Electric Company. Furnace for practising temperature gradient zone melting. 4,097,226, Cl. 432-120.000.
Eroncig, James Joseph. Helical antenna encased in fiberglass body. 4,097,867, Cl. 343-715.000.
Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik: *See—*
Langenbach, Erwin; and Sackmann, Karl-Hans, 4,097,733, Cl. 250-221.000.
Escher, Balint: *See—*
Moulin, Jean-Claude; Escher, Balint; and Prince, Dominique, 4,097,415, Cl. 252-512.000.
Escott, William S.: *See—*
Greeneich, Edwin W.; and Escott, William S., 4,096,821, Cl. 118-10.000.
ESEF Co.: *See—*
Frey, Nancy R.; and Schieber, Shirley, 4,096,929, Cl. 190-42.000.
Eshelman, Larry J.; and Bish, James R., to General Motors Corporation. Method of coiling a flat strip. 4,096,724, Cl. 72-132.000.
Essebaggers, Jan, to B.V. Neratoom. Method for sealing leaking pipes and repair unit for use in the method. 4,096,885, Cl. 138-97.000.
Etablissements Francois et Fils: *See—*
Salomon, Georges Pierre Joseph, 4,097,062, Cl. 280-618.000.
Ethyl Corporation: *See—*
Dettmann, Charles R.; and Frederick, John J., 4,097,025, Cl. 256-1.000.
Eucatex, S.A.: *See—*
Sanz Hernandez, Jose Antonio; and Netto, Cassiano Mesquita, 4,097,635, Cl. 428-172.000.
Evans, John Brian, to Xerox Corporation. Adaptive equalizer with improved distortion analysis. 4,097,806, Cl. 325-42.000.
Evans, John James Alexander; and Holan, George, to Commonwealth Scientific and Industrial Research Organization. Triazoles. 4,097,599, Cl. 424-263.000.
Evans, Sandra R.: *See—*
Dolhyj, Serge R.; Milberger, Ernest C.; and Evans, Sandra R., 4,097,501, Cl. 260-346.740.
Evensen, Harald Thiis; and Tellesbo, Ola, to Isda Fabrikker A/S. Inorganic raw felt intended for the production of roof felt. 4,097,644, Cl. 428-281.000.
Evers, William J.; Heinsohn, Howard H., Jr.; Shuster, Edward J.; and Schmitt, Frederick Louis, to International Flavors & Fragrances, Inc. Soaps and detergents containing alpha-oxy(oxo)sulfides as perfumes. 4,097,396, Cl. 252-132.000.
Evers, William J.; and Heinsohn, Howard H., Jr., to International Flavors & Fragrances Inc. Alpha-oxy(oxo)sulfides and ethers. 4,097,532, Cl. 260-590.00D.
Evers, William J.; Heinsohn, Howard H., Jr.; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. Flavoring with 3-propylthio-4-heptanol. 4,097,615, Cl. 426-535.000.
Evinrude, Ralph S., to Outboard Marine Corporation. Marine propulsion device including propeller protection means. 4,096,819, Cl. 115-17.000.
Exner, Josef: *See—*
Drobnik, Jaroslav; Kopecek, Jindrich; Labsky, Jiri; Rejmanova, Pavla; Exner, Josef; and Kalal, Jaroslav, 4,097,470, Cl. 260-78.00A.
Exxon Research & Engineering Co.: *See—*
Gladrow, Elroy M., 4,097,410, Cl. 252-455.00Z.
Eyrick, Theodore B.; Brown, Allen C.; and Hattes, Neil R., to Chemetron Corporation. Volume-rate respirator system and method. 4,096,858, Cl. 128-145.600.
Face, Samuel A., Jr. Mixer paddle shaft assembly. 4,097,926, Cl. 366-46.000.
Factor, Arnold; MacLaury, Michael R.; and Webb, Jimmy L., to General Electric Company. Dehydrochlorination of a dihydroxydiphenyl trichloroethane. 4,097,538, Cl. 568-726.000.
Fagan, James J.; Otto, William F.; and McKnight, William B., to United States of America, Army. Missile guidance system utilizing polarization. 4,097,007, Cl. 244-3.110.
Fairchild Camera and Instrument Corp.: *See—*
Walsh, Lloyd R., 4,097,885, Cl. 357-24.000.
Falk, Robert Allan: *See—*
Dear, Robert Ernest Arthur; and Falk, Robert Allan, 4,097,642, Cl. 428-262.000.
Fancher, Llewellyn W., to Stauffer Chemical Company. Alkyl thiourea miticides. 4,097,605, Cl. 424-322.000.
Farooq, Saleem; and Karrer, Friedrich, to CIBA-GEIGY Corporation. Dioxolane derivatives. 4,097,581, Cl. 424-278.000.
Farr, James B., to Tecumseh Products Company. Short pitch alternator. 4,097,754, Cl. 310-67.00R.
Farrell, Robert C.: *See—*
Goodrich, Stanley R., Jr.; Skolnik, David J.; Stearns, Joseph A.; Farrell, Robert C.; Brezinski, Richard R.; and Parks, Robert R., 4,097,057, Cl. 280-96.100.
Faser Industries: *See—*
Daly, William P.; Lewis, Robert P.; and Pouliot, Oliver L., 4,097,236, Cl. 23-230.00L.
Faudemay, Edmond L. J., to S.T. Dupont. Adjustment device for liquefied gas lighters. 4,097,222, Cl. 431-143.000.
Faulkner, Albert A.: *See—*
Levine, Marshall S.; and Faulkner, Albert A., 4,096,824, Cl. 118-100.000.
Faulkner, Philip George, to British Petroleum Company Limited, The. Forming process. 4,096,815, Cl. 113-120.00A.
Faxvog, Frederick R.: *See—*
Lewis, Robert W.; Joseph, Bernard W.; and Faxvog, Frederick R., 4,097,750, Cl. 250-548.000.
Fedders Corporation: *See—*
Nelson, James K., 4,096,602, Cl. 16-85.000.
Feldman, Keiva, to Her Majesty the Queen as represented by the Minister of National Defence of Her Majesty's Canadian Government. Battery self-discharge indicator. 4,097,803, Cl. 324-29.500.
Felix, Ernst, to Zellweger, Ltd. Method and apparatus for the two-way transmission of pulses. 4,097,692, Cl. 179-2.50R.
Fellowes Manufacturing Company: *See—*
Klaus, Gerald R., 4,096,603, Cl. 16-110.00R.
Felten & Guilleaume Carlswerk Aktiengesellschaft: *See—*
Gladenbeck, Jurgen; Muller, Gerald; Schorken, Karl; and Schwindenhammer, Hans-Peter, 4,097,686, Cl. 174-131.00A.
Fernitz, Kenneth, to Raymond Lee Organization, Inc., The, a part interest. Hammer-type tool. 4,096,895, Cl. 145-29.00R.
Feve, Lucette; and Fontaine, Remy, to Commissariat a l'Energie Atomique. Method of analysis of a sample of insulating material by photoelectronic spectrometry. 4,097,738, Cl. 250-305.000.
Fiala, Engelbert. Seismic rodent control device. 4,097,838, Cl. 340-15.000.
Fielding, John O.: *See—*
Erikson, Carl A.; Fielding, John O.; Cline, Harvey E.; and Anthony, Thomas R., 4,097,226, Cl. 432-120.000.
Fields, Virgil L., to Hobart Corporation. Bumper lock for dishwashing machine rack support. 4,097,098, Cl. 312-311.000.
Fier, Raymond L. Manhole cover support ring. 4,097,171, Cl. 404-26.000.
Figini, Mario, to Ing. C. Olivetti & C., S.p.A. Computer operator guide device. 4,097,924, Cl. 364-900.000.
Finet, Michel, to Burroughs Corporation. Apparatus for testing electrical circuit units such as printed circuit cards. 4,097,797, Cl. 324-73.00R.
Finney, James L.: *See—*
Black, Sigmund; and Finney, James L., 4,097,854, Cl. 340-282.000.
Fischell, Robert E., to Johns Hopkins University, The. Rechargeable body tissue stimulator with back-up battery and pulse generator. 4,096,866, Cl. 128-419.0PG.
Fischer, Artur; and Fischer, Klaus, to Fisher, Artur. Anchoring arrangement for securing an object to a support structure having an internal cavity. 4,096,672, Cl. 52-127.000.
Fischer, Herbert, to Metallgesellschaft Aktiengesellschaft. Production of sulfur from Claus process waste gas. 4,097,585, Cl. 423-574.00R.
Fischer, Klaus: *See—*
Fischer, Artur; and Fischer, Klaus, 4,096,672, Cl. 52-127.000.
Fischer, Thomas A., to Applied Power Inc. Strip laying apparatus. 4,097,039, Cl. 270-79.000.
Fischer, Winfried: *See—*
Elghani, Salah Elabd; Fischer, Winfried; and Prinz, Richard, 4,097,429, Cl. 260-17.00R.

L'Hommedieu, Jesse H.: *See—*
Fischman, Martin; and L'Hommedieu, Jesse H., 4,097,784, Cl. 315-368.000.
Liberty, Joseph C., Jr. Drive for power transmission. 4,096,932, Cl. 192-48.910.
Lieberman, Frank David; and Goodman, Herb Lou. Garment counter. 4,097,725, Cl. 235-92.0PK.
Lill, Melvin H., to FMC Corporation. Vehicle wheel aligner for measuring front wheel toe with respect to the rear wheel axis of rotation. 4,097,157, Cl. 356-152.000.
Lindal, Sir Walter. Mortise and tenon joint. 4,097,162, Cl. 403-264.000.
Linden, James C.: *See—*
Freytag, Arthur H.; and Linden, James C., 4,097,333, Cl. 195-33.000.
Lindmark, Magnus Carl Wilhelm. Switched mode power supply. 4,097,773, Cl. 307-296.00A.
Lindmayer, Joseph. Method of forming silicon solar energy cells. 4,097,310, Cl. 136-89.0SG.
Lindstrand, Bengt: *See—*
Netterstedt, Sture; and Lindstrand, Bengt, 4,096,681, Cl. 52-713.000.
Lipha, Lyonnaise Industrielle Pharmaceutique: *See—*
Briet, Philippe; Berthelon, Jean-Jacques; Depin, Jean-Claude; and Boschetti, Eugene, 4,097,582, Cl. 424-283.000.
Lipschutz, Paul, to Neiman S.A. Anti-theft device for a motorcycle helmet. 4,096,715, Cl. 70-59.000.
Little, Michael D. Motorcycle wheel alignment tool. 4,096,636, Cl. 33-169.00R.
Littman, Stanley; and Touval, Irving, to M & T Chemicals Inc. Novel phosphorus compounds and flame retardant compositions containing same. 4,097,560, Cl. 260-931.000.
Lo, John M.: *See—*
Cosco, Robert J.; Lo, John M.; and Hebert, Roger T., 4,097,774, Cl. 313-178.000.
Loboda, Walter J. Tire stud puller. 4,097,021, Cl. 254-22.000.
Locke, Gerald M., to Corning Glass Works. Quadriplanar capacitor. 4,097,915, Cl. 361-433.000.
Lodge, Edward H.: *See—*
Kim, Raymond W. H.; Klein, Robert A.; Lodge, Edward H.; Lueders, Arthur L.; and Woodier, James G., 4,097,132, Cl. 352-242.000.
Loebbaka, Gregory A.: *See—*
Adams, Stanley B.; Loebbaka, Gregory A.; and Morge, Michael P., 4,096,878, Cl. 137-351.000.
Loeffler, Herbert Heinz: *See—*
Serur, Juan Ricardo; and Loeffler, Herbert Heinz, 4,096,879, Cl. 137-391.000.
Lofquist, Robert Alden, to Allied Chemical Corporation. Ozone resistant, cationic dyeable nylon containing lithium, magnesium or calcium salts of sulfonated polystyrene copolymers. 4,097,546, Cl. 260-857.0UN.
Logan, Raymond D. Endless belt sanding tool. 4,096,668, Cl. 51-170.0EB.
Long, E. David, to Allied Chemical Corporation. Control system for electrically energized engine fuel. 4,096,830, Cl. 123-32.0EA.
Long, Terence Michael; and Henneveld, Clifford Hendrik, to Imperial Group Limited. Apparatus for pyrolyzing tobacco. 4,096,867, Cl. 131-171.00R.
Long, William C.: *See—*
Hoover, Michael C.; and Long, William C., 4,096,949, Cl. 209-74.00M.
Loomis, Robert W.: *See—*
Howard, John R.; and Loomis, Robert W., 4,096,675, Cl. 52-79.100.
Looschen, Floyd William, to Burroughs Corporation. Three-level to two-level decoder. 4,097,859, Cl. 340-347.0DD.
Lopes, Antone, Jr.; and Shepard, Richard Wilton, to Torrington Company, The. Knitting needle. 4,096,713, Cl. 66-121.000.
Loria, Adrian M.; and Thomas, Richard E., to A. B. Dick Company. Latent imaging master. 4,097,637, Cl. 428-212.000.
Lowe, Warren, to Chevron Research Company. Lubricating oil additive composition. 4,097,386, Cl. 252-32.70R.
Lu, Chin H., to Xerox Corporation. Magnetic toner particle coating process. 4,097,620, Cl. 427-127.000.
Lucky Manufacturing Company: *See—*
Buckner, Walter E., 4,096,954, Cl. 214-38.0CC.
Luder, Friedrich Karl. Concrete constructional members. 4,096,703, Cl. 61-59.000.
Ludwig, George, to Tom McGuane Industries, Inc. Headlamp automatic delay system. 4,097,778, Cl. 315-82.000.
Lueders, Arthur L.: *See—*
Kim, Raymond W. H.; Klein, Robert A.; Lodge, Edward H.; Lueders, Arthur L.; and Woodier, James G., 4,097,132, Cl. 352-242.000.
Luhring Chicago Industries: *See—*
Molitor, Arvid A., 4,097,375, Cl. 210-23.00H.
Lummus Company, The: *See—*
Minkkinen, Ari A., 4,097,370, Cl. 208-255.000.
Lund, Bryant D., to E-Systems, Inc. Limit control apparatus. 4,097,786, Cl. 318-282.000.
Lunden, Clarence D., to Boeing Company, The. Method for testing radomes. 4,097,796, Cl. 324-58.00B.
Lunn, Norman Laurence; McCrea, Charles Jeffrey; Pregaman, Raymond David; and Turowski, Lawrence Edward, to St. Joe Minerals Corporation. Low melting temperature metal coating process, apparatus and product. 4,097,625, Cl. 427-360.000.
Luperti, Harry E.; and Manna, Robert E., to Pitney-Bowes, Inc. Means for self-positioning platen covers. 4,097,145, Cl. 355-75.000.
Lyden, Frank J., to Oil-Rite Corporation. Oiler assembly. 4,096,924, Cl. 184-58.000.
M & T Chemicals Inc.: *See—*
Dhake, Bhimashanker Gopal, 4,097,437, Cl. 260-29.20E.
Littman, Stanley; and Touval, Irving, 4,097,560, Cl. 260-931.000.
Maag, Helmut: *See—*
Krall, Heribert A.; and Maag, Helmut, 4,096,907, Cl. 164-448.000.
Machlett Laboratories, Inc., The: *See—*
Shapiro, Jonathan S.; Berhuti, Vincent, Jr.; Pellegrino, Anthony; and Wagner, Howard G., 4,097,793, Cl. 324-20.00R.
MacIver, Bernard A., to General Motors Corporation. Ion implanted Schottky barrier diode. 4,096,622, Cl. 29-578.000.
Mackaness, James Bellamy. Internal combustion engine apparatus. 4,096,844, Cl. 123-193.00P.
MacLaury, Michael R.: *See—*
Factor, Arnold; MacLaury, Michael R.; and Webb, Jimmy L., 4,097,538, Cl. 568-726.000.
Magna International Inc.: *See—*
Putkowski, Ladislao W., 4,097,216, Cl. 425-568.000.
Magnesium Elektron Ltd.: *See—*
Phillips, Raymond Francis, 4,097,430, Cl. 260-17.00R.
Magyar, Karoly: *See—*
Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, 4,097,668, Cl. 542-418.000.
Mahlein, Hans; and Rauscher, Walter, to Siemens Aktiengesellschaft. Optical layer device with reflecting surface on collodion foil. 4,097,126, Cl. 350-295.000.
Maillet, Alfred Marie Aime, to Carel Fouche Languepin. Method and apparatus for electrical machining. 4,097,710, Cl. 219-69.00D.
Mailliet, Pierre, to S. A. des Anciens Etablissements Paul Worth. Drilling machine for blast furnace tapholes. 4,097,033, Cl. 266-271.000.
Mainzer, Franz: *See—*
Niermann, Hermann; and Mainzer, Franz, 4,097,583, Cl. 423-303.000.
Majima, Kanji: *See—*
Tsuto, Keiichi; Majima, Kanji; and Imamura, Shigeyasu, 4,097,242, Cl. 23-283.000.
Makita, Masashi: *See—*
Kusakabe, Haruhiko; Makita, Masashi; and Ueda, Masutoshi, 4,096,890, Cl. 139-435.000.
Mallon, Richard G.: *See—*
Lewis, Arthur E.; and Mallon, Richard G., 4,096,912, Cl. 166-259.000.
Malloy, James Joseph, Jr.: *See—*
Hilton, Joseph James; and Malloy, James Joseph, Jr., 4,097,762, Cl. 313-218.000.
Mandl, Thomas Herbert. Phonetic teaching device. 4,096,645, Cl. 35-35.00R.
Manfuso, John A., Jr., to Burton, Parsons and Company, Inc. Method for cleaning soft hydrophilic gel contact lenses. 4,096,870, Cl. 134-28.000.
Manna, Robert E.: *See—*
Luperti, Harry E.; and Manna, Robert E., 4,097,145, Cl. 355-75.000.
Mannhardt, Annemarie; Eppe, Rudolf; and Pfeifer, Josef, to AGFA-Gevaert AG. Web with overlays for use in document presentation devices of copying machines and method of making the same. 4,097,280, Cl. 96-44.000.
Manoukian, Nubar Sahag; and Johnston, Thomas Frazier, Jr., to Coherent, Inc. Adjustable etalon laser mode selector and method of adjustment. 4,097,818, Cl. 331-94.50C.
Manufacturers Systems, Inc.: *See—*
Anderson, Leroy E.; Schmidt, Michael P.; and Weaver, William W., 4,096,720, Cl. 72-50.000.
Mar, Kenneth M.; Ritchie, Kim; and Smith, James N., to Motorola, Inc. Non-linear resistors. 4,097,834, Cl. 338-21.000.
Maran Corporation: *See—*
Noice, Frank M., 4,096,978, Cl. 224-8.00R.
Marathon Electric Manufacturing Company: *See—*
Motten, Roger Henwood, Jr., 4,097,114, Cl. 339-259.00F.
Maremont Corporation: *See—*
Gray, Alden J.; Sanderson, Ian S.; and Hardy, John C., 4,096,624, Cl. 29-596.000.
Marine Electric Corporation: *See—*
Parke, Harry George, 4,097,808, Cl. 325-51.000.
Marks, Tobin J.: *See—*
Coleman, John H.; and Marks, Tobin J., 4,097,384, Cl. 250-527.000.
Markusch, Peter, to Bayer Aktiengesellschaft. Inorganic-organic compositions. 4,097,422, Cl. 260-2.5AK.
Marr, Philip R., Sr.: *See—*
Peters, David L.; and Marr, Philip R., Sr., 4,097,154, Cl. 356-152.000.
Marsee, Frederick J., to Ethyl Corporation. Starting system. 4,096,843, Cl. 123-179.00A.
Marsh, Walter H. W., to Singer Company, The. Interlock for buttonhole sewing presser device. 4,096,811, Cl. 112-77.000.
Marshall Richards Barcro Limited: *See—*
Uhlmann, Otto; and Stephan, Norbert, 4,096,726, Cl. 72-291.000.
Martin, Charles S. Solar energy converting device. 4,096,698, Cl. 60-641.000.
Martin, Johannes Josef; and Weber, Erich, to Josef Martin Feuerungsbau GmbH. Apparatus for compensating for thermally induced deformation of sections of grates in industrial furnaces or the like. 4,096,809, Cl. 110-271.000.

Martin, John R. Register control method and apparatus. 4,096,801, Cl. 101-227.000.
Martin, Roger A., to Murdock Corporation, The. Electrical connector. 4,097,111, Cl. 339-183.000.
Martin, Van Clifton, to International Business Machines Corporation. Ink jet printer for selectively printing different resolutions. 4,097,873, Cl. 346-75.000.
Martin, Wayne A., to United States Steel Corporation. Forging press and method. 4,096,730, Cl. 72-352.000.
Martins, Joseph G.; and Donermeyer, Donald D., to Monsanto Company. Poly(ester-amide) hot melt adhesives containing spheroidal metal powders. 4,097,445, Cl. 260-40.00R.
Martorano, Sam, to Wilson Jones Company. Apparatus for stripping a continuous web of material from the marginal edge of a body. 4,096,981, Cl. 225-99.000.
Maruta, Rikio: *See—*
Araseki, Takashi; Ochiai, Kazuo; and Maruta, Rikio, 4,097,860, Cl. 340-347.0CC.
Maruyama, Noboru. Liquid heating apparatus. 4,096,851, Cl. 126-350.00R.
Marwil, Stanley J., to Phillips Petroleum Company. Fermentation apparatus. 4,097,339, Cl. 195-142.000.
Masak, Raymond J.: *See—*
Frost, William F.; Masak, Raymond J.; Baurle, Herbert F.; and Kowalski, Anthony F., 4,097,866, Cl. 343-100.0LE.
Maska, Rudolf: *See—*
Christenson, Roger M.; and Maska, Rudolf, 4,097,438, Cl. 260-29.4UA.
Mason, Russell I. Selected depth mooring system. 4,096,598, Cl. 9-8.00R.
Massa, Donald P., Trustees of The Stoneleigh Trust u/d/t: *See—*
Massa, Frank, 4,096,933, Cl. 194-100.00A.
Massa, Frank, to Dellorfano, Fred M., Jr.; and Massa, Donald P., Trustees of The Stoneleigh Trust u/d/t. Coin-operated vending systems. 4,096,933, Cl. 194-100.00A.
Masubuchi, Shoji: *See—*
Kitahara, Makoto; Ishikawa, Shozo; Katagiri, Kazuharu; Arita, Tetsuo; and Masubuchi, Shoji, 4,097,646, Cl. 428-323.000.
Masuda, Akira: *See—*
Norimatsu, Hideaki; Nakamura, Mitsuo; Kondo, Toshio; Masuda, Akira; and Kitajima, Sigenori, 4,096,834, Cl. 123-32.0EE.
Masuda, Hideo: *See—*
Morishima, Yukimas; Yoshida, Minoru; and Masuda, Hideo, 4,097,212, Cl. 425-313.000.
Matoba, Kazuo: *See—*
Kishida, Katsuhiro; Takao, Hiroshi; Togawa, Kimmochi; and Matoba, Kazuo, 4,097,353, Cl. 204-195.00S.
Matrix Groups, Inc.: *See—*
Goldstein, Morton I., 4,096,589, Cl. 2-12.000.
Matsuda, Itsuo: *See—*
Akiyama, Keiichi; Kamiuchi, Junichi; Matsuda, Itsuo; and Fujii, Takara, 4,097,545, Cl. 260-830.00P.
Matsui, Hiroshi: *See—*
Yui, Hiroshi; Kakizaki, Tetsuji; Sano, Hironari; Arai, Masakazu; and Matsui, Hiroshi, 4,097,554, Cl. 260-878.00R.
Matsui, Sadayoshi: *See—*
Koike, Wataro; Takayama, Masami; Ohashi, Hideaki; and Matsui, Sadayoshi, 4,097,426, Cl. 260-2.5AM.
Matsumoto, Shoichi; Kawamoto, Masahiro; and Mizunoya, Kiyoshi, to Tokyo Shibaura Electric Co., Ltd. Liquid crystal color display devices. 4,097,128, Cl. 350-335.000.
Matsuoka, Hideoki: *See—*
Ikawa, Kazuo; and Matsuoka, Hideoki, 4,097,064, Cl. 280-732.000.
Matsushita Electric Corporation: *See—*
Rzeszewski, Theodore S., 4,097,812, Cl. 328-138.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Kobayashi, Tetsu; Kanazawa, Takato; and Tsuboi, Makoto, 4,097,707, Cl. 219-10.55B.
Ochi, Yoshiaki, 4,097,688, Cl. 179-1.0GQ.
Yamada, Akitoshi; Goto, Toshiyuki; Kimura, Yoichi; and Kikuchi, Yoshinobu, 4,097,689, Cl. 179-1.00G.
Matsuura, Chihiro: *See—*
Tamura, Takaaki; Fujita, Norihiko; Matsuura, Chihiro; Ito, Wataru; and Negishi, Naoki, 4,097,576, Cl. 423-239.00A.
Matsuura, Kazuo: *See—*
Okada, Motohiro; Oka, Katsumi; Honda, Kiyoshi; and Matsuura, Kazuo, 4,097,065, Cl. 280-739.000.
Matsuzaki, Tokuo: *See—*
Umemura, Sumio; Ohdan, Kyoji; Uda, Taizo; Matsuzaki, Tokuo; Hidaka, Mikio; Nakamura, Yasuo; and Tsuruoka, Masao, 4,097,518, Cl. 260-465.300.
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. O-Alkyl-S-[1,6-dihydro-6-thioxo-pyridazin-(1)-yl methyl]-(thiono)-(di)-thiol-phosphoric (phosphonic) acid esters and ester-amides and nematicidal, insecticidal and acaricidal compositions thereof. 4,097,593, Cl. 424-200.000.
Maurer, Fritz: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Schroder, Rolf; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,097,592, Cl. 424-200.000.
Mauritz, Wonter, to Schmelzbasaltwerk Kalenborn, Dr. Ing. Mauritz Kg. Forehearth with weir, particularly for use in a basalt smelting furnace. 4,097,032, Cl. 266-230.000.
Maximovich, Michael J.; and Burroway, Gary L., to Goodyear Tire & Rubber Company, The. Resin composition. 4,097,440, Cl. 260-31.40R.
Mayer, Norbert; Pfahler, Gerhard; and Wiezer, Hartmut, to Hoechst Aktiengesellschaft. 14-Substituted 7,15-diazadispiro-[5.1.5.3]-hexadecanes as UV stabilizers. 4,097,452, Cl. 260-45.80N.
Mayer, Richard Eugene: *See—*
Schwartz, Judd Leonard; and Mayer, Richard Eugene, 4,097,630, Cl. 428-97.000.
Mayes, David: *See—*
Golias, Tipton L.; and Mayes, David, 4,096,825, Cl. 118-221.000.
Mayo, Haydn Frank, to R. G. Dixon & Company Limited. Brush retention means for floor treating machines. 4,096,599, Cl. 15-49.00R.
Mazzeo, Nickolas Joseph; and Thompson, David A., to International Business Machines Corporation. Magnetoresistive field sensor with a magnetic shield which prevents sensor response at fields below saturation of the shield. 4,097,802, Cl. 324-252.000.
McAvity, Jack A.: *See—*
Cook, Herbert G.; and McAvity, Jack A., 4,096,946, Cl. 206-484.200.
McCaslin, Robert E. Rotatable light display. 4,097,917, Cl. 362-32.000.
McComb, Kenneth H.; and McComb, Timothy I., to Dorsey-McComb Distributors, Inc. Mechanism for adjusting an extrusion die in cereal grain extruder apparatus. 4,097,213, Cl. 425-376.00B.
McComb, Timothy I.: *See—*
McComb, Kenneth H.; and McComb, Timothy I., 4,097,213, Cl. 425-376.00B.
McCombs, Frank P.: *See—*
Foley, Kevin M.; Dewhurst, Harold A.; and McCombs, Frank P., 4,097,568, Cl. 264-216.000.
McConkey, Robert Charles: *See—*
Noonan, John Michael; McConkey, Robert Charles; and Hanrahan, Michael John, 4,097,282, Cl. 96-73.000.
McCrea, Charles Jeffrey: *See—*
Lunn, Norman Laurence; McCrea, Charles Jeffrey; Pregaman, Raymond David; and Turowski, Lawrence Edward, 4,097,625, Cl. 427-360.000.
McDonald, Alan T., to PPG Industries, Inc. Method for producing slubbed yarns. 4,096,687, Cl. 57-157.00F.
McDonald, David Ian: *See—*
Kellermann, Arnold LeRoy; and McDonald, David Ian, 4,096,953, Cl. 214-1.0BT.
McEvoy Oilfield Equipment Company: *See—*
Morrill, Charles D., 4,097,069, Cl. 285-84.000.
McGraw-Edison Company: *See—*
Lapp, John; and Sadler, Fred S., 4,097,912, Cl. 361-318.000.
Lapp, John; and Sadler, Fred S., 4,097,913, Cl. 361-318.000.
McIntyre, Vernon E., to Wadsworth Equipment Company. Mounting bracket assembly. 4,097,012, Cl. 248-23.000.
McKelvy, Stephen L., to Physio-Control Corporation. Electrical connectors for portable electronic physiological instruments having separable first and second components. 4,097,113, Cl. 339-256.00R.
McKinney, Joel Drexler; Sebulsky, Raynor T.; and Wynne, Francis Edmund, Jr., to Gulf Research & Development Company. Method for enhancing distillate liquid yield from an ethylene cracking process. 4,097,362, Cl. 208-78.000.
McKinney, Joel Drexler; Sebulsky, Raynor T.; and Wynne, Francis Edmund, Jr., to Gulf Research & Development Company. Thermal cracking of light gas oil at high severity to ethylene. 4,097,363, Cl. 208-78.000.
McKnight, William B.: *See—*
Fagan, James J.; Otto, William F.; and McKnight, William B., 4,097,007, Cl. 244-3.110.
McLaughlin, Daniel John: *See—*
Gibbons, John Francis; and McLaughlin, Daniel John, 4,097,332, Cl. 176-87.000.
McLaughlin, Henry Felton. Drag implement for gathering and spreading dirt. 4,096,654, Cl. 37-118.00R.
McLaughlin, William A.; and Richardson, Edwin A., to Shell Oil Company. Acidizing asphaltenic oil reservoirs with acids containing salicylic acid. 4,096,914, Cl. 166-307.000.
McLaughlin, William F. Dual flow encatheter. 4,096,860, Cl. 128-214.400.
McMickle, John F., Jr., to Cozzoli Machine Company. Ampoule filling and sealing machine. 4,096,683, Cl. 53-244.000.
McMillan, Lon M. Navigational computer. 4,096,635, Cl. 33-98.000.
McNab, Incorporated: *See—*
Diamond, Joseph M., 4,096,743, Cl. 73-136.00A.
McNaney, Joseph T. Light optic data handling system. 4,097,122, Cl. 350-353.000.
McNaney, Joseph T. Light beam position control system. 4,097,123, Cl. 350-353.000.
Mead Corporation, The: *See—*
Davis, Gerald Titus; and Shackle, Dale Richard, 4,097,619, Cl. 427-44.000.
Wood, Prentice J., 4,096,985, Cl. 229-40.000.
Meagher, Thomas: *See—*
Hauser, Oscar G.; Meagher, Thomas; and Ruckdeschel, Frederick R., 4,097,139, Cl. 355-4.000.
Medalert Corporation: *See—*
Auerbach, Albert A.; and Steinberg, Sidney, 4,096,865, Cl. 128-419.0PT.
Megumi, Takeaki; and Kondo, Shigeo, to Mitsubishi Gas Chemical Company, Inc. Process for preparing high molecular weight polycarbonates. 4,097,457, Cl. 260-47.0XA.
Meiller, Hermann, to Willibald Grammer. Arm rest assembly for a seat, particularly a driver's seat. 4,097,088, Cl. 297-217.000.

Olsen, Richard J., to Goodyear Tire & Rubber Company, The. Earthmover tire and rim assembly. 4,096,900, Cl. 152-354.00R.
Olson, David H.: *See—*
Haag, Werner O.; and Olson, David H., 4,097,543, Cl. 260-672.00T.
Olson, David Harmon; and Berg, Eldon Carl, to Tektronix, Inc. Oscilloscope sweep rate indicator system. 4,097,798, Cl. 324-78.00D.
Olson, Donald R.: *See—*
Lemmon, John C.; Olson, Donald R.; and Zepernick, Dean E., 4,096,880, Cl. 137-454.200.
Olson Manufacturing Company: *See—*
Olson, Norman R., 4,097,246, Cl. 51-309.00R.
Olson, Norman R., to Olson Manufacturing Company. Method of making an abrasive wire for sawing stone. 4,097,246, Cl. 51-309.00R.
Olympus Optical Co., Ltd.: *See—*
Saito, Shoichi, 4,097,006, Cl. 242-199.000.
Satoh, Ken; and Tomizawa, Yoshio, 4,097,726, Cl. 235-92.0MP.
Ongaro, Theodore. Hydraulic power system. 4,096,784, Cl. 91-6.000.
Optel Corporation: *See—*
Witzke, Horst, 4,097,655, Cl. 429-111.000.
Orofino, Michael J. Sanitary pickup device for animal feces. 4,097,082, Cl. 294-19.00R.
Oscar Mayer & Co. Inc.: *See—*
Seiferth, Oscar E.; and Royston, Calvin T., 4,097,611, Cl. 426-121.000.
Osro Limited: *See—*
Brown, David, 4,096,666, Cl. 51-7.000.
Ostergren, William F.: *See—*
Brackbill, Warren H.; and Ostergren, William F., 4,097,001, Cl. 239-658.000.
Otani, Susumu; and Noguchi, Toshitake, to Nippon Electric Co., Ltd. Carrier wave recovery circuit. 4,097,813, Cl. 329-104.000.
Ototani, Tohei; and Kataura, Yasuji, to Tohei Ototani. Method of treating molten ferrous material with composite rods containing Ca. 4,097,268, Cl. 75-57.000.
Otsuka, Katsumi; Ishigami, Noriakira; and Kozakai, Asao, to Toyota Jidosha Kogyo Kabushiki Kaisha. Braking fluid pressure fault alarm device. 4,097,841, Cl. 340-52.00C.
Otsuki, Kazuhiko: *See—*
Yano, Kazuhiko; Otsuki, Kazuhiko; and Ohashi, Ryota, 4,096,882, Cl. 137-596.120.
Ott, Meredith S.: *See—*
Chiesa, Peter J., Jr.; and Ott, Meredith S., 4,097,305, Cl. 134-6.000.
Otto Fuchs KG.: *See—*
Diels, Manfred; Dienstuhl, Karl Wilhelm; Jager, Tilo; and Hocker, Eitel, 4,096,678, Cl. 52-403.000.
Otto, William F.: *See—*
Fagan, James J.; Otto, William F.; and McKnight, William B., 4,097,007, Cl. 244-3.110.
Otzen, Karl G., to Safety-Kleen Corporation. Immersion cleaner. 4,096,873, Cl. 134-135.000.
Outboard Marine Corporation: *See—*
Evinrude, Ralph S., 4,096,819, Cl. 115-17.000.
Hall, Charles B., 4,096,820, Cl. 115-41.0HT.
Over, William Roderick; and Wise, Joseph Agusta, to AMP Incorporated. Terminal housing having an integral strain relief. 4,097,106, Cl. 339-99.00R.
Owens-Corning Fiberglas Corporation: *See—*
Foley, Kevin M.; Dewhurst, Harold A.; and McCombs, Frank P., 4,097,568, Cl. 264-216.000.
Owens-Illinois, Inc.: *See—*
Davey, Richard G., 4,097,257, Cl. 65-26.000.
Dickson, Andrew C.; and Kontz, Robert F., 4,097,570, Cl. 264-296.000.
Kontz, Robert F., 4,096,620, Cl. 29-428.000.
Riggs, Darius O.; and Vogel, Charles G., 4,096,939, Cl. 198-460.000.
Oxford Hill, Ltd.: *See—*
Thiele, Geraldine H., 4,097,604, Cl. 424-318.000.
Oxford Laboratories Inc.: *See—*
Sturm, Ronald Leo, 4,096,750, Cl. 73-425.600.
Withers, Stanley J.; and Sturm, Ronald L., 4,096,751, Cl. 73-425.600.
Ozga, Stanley Edward, to RCA Corporation. Hardware control for repeating program loops in electronic computers. 4,097,920, Cl. 364-200.000.
Paananen, Eugene E.: *See—*
Krause, Thomas R.; Paananen, Eugene E.; and Burcz, John F., 4,097,731, Cl. 250-205.000.
Krause, Thomas R.; Paananen, Eugene E.; and Burcz, John F., 4,097,732, Cl. 250-205.000.
Pabst, Alton L., to Seaman Corporation. Membrane building segment connection. 4,096,669, Cl. 52-63.000.
Packer, Elliot L. Electrolytic recovery of metals. 4,097,347, Cl. 204-109.000.
Pagani, Giorgio; Guerreri, Gianfranco; and Peri, Bruno, to Snamprogetti, S.p.A. Method for the purification of natural gas having a high contents of acidic gases. 4,097,250, Cl. 55-48.000.
Pagel, Paul V., to Microdot Inc. Prestressed connection and fastener therefor. 4,097,168, Cl. 403-388.000.
Pallos, Ferenc M.: *See—*
Lam, Hsiao-Ling; and Pallos, Ferenc M., 4,097,512, Cl. 260-453.0RW.
Pallos, Laszlo: *See—*
Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, 4,097,668, Cl. 542-418.000.
Palmer, Walter E., to General Motors Corporation. Variable displacement gear pump. 4,097,204, Cl. 418-19.000.
Panayotov, Ivan Martinov: *See—*
Rashkov, Ilia; Gole, Jean; Guerard, Daniel; Herold, Albert; Merle, Gerard; Panayotov, Ivan Martinov; Pascault, Jean-Pierre; Pham, Quang Tho; Pillot, Christian; and Salle, Robert, 4,097,660, Cl. 526-173.000.
Paniello, Antonio Ibanez: *See—*
Porta, Angel Lazaro; and Paniello, Antonio Ibanez, 4,097,528, Cl. 260-570.00R.
Papa, Anthony Joseph; and Runyan, Walter Warren, to Union Carbide Corporation. Chloroalkyl polyphosphates method for making same. 4,097,559, Cl. 260-928.000.
Papenfuhs, Theodor; and Troster, Helmut, to Hoechst Aktiengesellschaft. Perinone compounds as colorants for polyolefins. 4,097,450, Cl. 260-42.210.
Papenfuhs, Theodor; and Volk, Heinrich, to Hoechst Aktiengesellschaft. Water-insoluble nickel-complex disazo methine compounds. 4,097,510, Cl. 260-439.00R.
Papst-Motoren KG: *See—*
Doemen, Benno, 4,097,789, Cl. 318-461.000.
Pardo, Pierre; and Pruvot, Francois, to Sofermo. Self-contained modular joint, notably for robots. 4,096,766, Cl. 74-640.000.
Pariza, George R., to Pittway Corporation. D.C. horn. 4,097,861, Cl. 340-388.000.
Parke, Harry George, to Marine Electric Corporation. Entertainment system and method. 4,097,808, Cl. 325-51.000.
Parker, Duane L.: *See—*
Shelby, Robert L.; Duke, James T.; and Parker, Duane L., 4,097,093, Cl. 305-22.000.
Parks, Harold G., to General Electric Company. High resolution matrix lens electron optical system. 4,097,745, Cl. 250-398.000.
Parks, Robert R.: *See—*
Goodrich, Stanley R., Jr.; Skolnik, David J.; Stearns, Joseph A.; Farrell, Robert C.; Brezinski, Richard R.; and Parks, Robert R., 4,097,057, Cl. 280-96.100.
Parmann, Gunnar, to Rieber & Son A/S. Method for bending thermoplastic pipes. 4,097,573, Cl. 264-322.000.
Parrish, James Thomas: *See—*
Cook, Peter William; Parrish, James Thomas; and Schuster, Stanley Everett, 4,097,753, Cl. 307-359.000.
Pascault, Jean-Pierre: *See—*
Rashkov, Ilia; Gole, Jean; Guerard, Daniel; Herold, Albert; Merle, Gerard; Panayotov, Ivan Martinov; Pascault, Jean-Pierre; Pham, Quang Tho; Pillot, Christian; and Salle, Robert, 4,097,660, Cl. 526-173.000.
Pastor, Stephen D.; Skoultchi, Martin M.; and Hernandez, Henry R., to National Starch and Chemical Corporation. Actinic radiation curable compositions. 4,097,350, Cl. 204-159.230.
Pastor, Stephen D.; Skoultchi, Martin M.; and Hernandez, Henry R., to National Starch and Chemical Corporation. Photocurable electroconductive coating composition. 4,097,417, Cl. 252-501.000.
Patterson, Frank Knowles; and Rellick, Joseph Richard, to Du Pont de Nemours, E. I., and Company. Cobalt boride conductor compositions. 4,097,653, Cl. 428-433.000.
Patterson, Paul L., to Varian Associates, Inc. Two-flame burner for flame photometric detection. 4,097,239, Cl. 23-232.00R.
Patterson, W. W., III; and Grapes, Eugene F. Container lash systems. 4,096,816, Cl. 114-75.000.
Paul Forkardt Kommanditgesellschaft: *See—*
Steinberger, Joseph, 4,097,053, Cl. 279-1.00C.
Payne, Cecil; and Payne, Paul E., to Payne, Cecil; Payne, Paul; and Fletcher, Paula, part interest to each. Flap retraction system. 4,097,090, Cl. 298-15.00G.
Payne, Leslie Elmer, to R. J. Reynolds Tobacco Company. Apparatus for transferring cigarettes on a cigarette packaging machine. 4,096,938, Cl. 198-420.000.
Payne, Paul: *See—*
Payne, Cecil; and Payne, Paul E., 4,097,090, Cl. 298-15.00G.
Payne, Paul E.: *See—*
Payne, Cecil; and Payne, Paul E., 4,097,090, Cl. 298-15.00G.
Pazaris, James Oliver: *See—*
Jacobson, Arnold Frederick; and Pazaris, James Oliver, 4,097,736, Cl. 250-252.000.
Peake, Clinton Joseph; Harnish, Wayne Nelson; and Davidson, Bruce Lloyd, to FMC Corporation. Mono-5-substituted-3-chloro-4H-1,2,6-thiadiazin-4-one antifungal agents. 4,097,594, Cl. 424-246.000.
Pearson, Colin Alfred: *See—*
Greene, David James; and Pearson, Colin Alfred, 4,097,322, Cl. 156-149.000.
Pearson, George R., to Flex-O-Lators, Inc. Furniture deck edging. 4,096,596, Cl. 5-360.000.
Pellegrino, Anthony: *See—*
Shapiro, Jonathan S.; Berluti, Vincent, Jr.; Pellegrino, Anthony; and Wagner, Howard G., 4,097,793, Cl. 324-20.00R.
Pelosi, Stanford S., Jr., to Morton-Norwich Products, Inc. 1-[5-(4-Chlorophenyl)furfurylamino]-2-propanol hydrochloride. 4,097,499, Cl. 260-347.700.
Pelosi, Stanford S., Jr., to Morton-Norwich Products, Inc. N-Methyl-5-(4-nitrophenyl)-N-(á-methylphenethyl)furfurylamine hydrochloride. 4,097,500, Cl. 260-347.700.
Pemsler, J. Paul: *See—*
Rappas, Alkis S.; and Pemsler, J. Paul, 4,097,272, Cl. 75-119.000.
Pender, David R. Cargo handling system for aircraft. 4,097,008, Cl. 244-118.00R.

Pennsylvania Engineering Corporation: *See—*
Ziegler, Joseph, 4,097,029, Cl. 266-142.000.
Pennwalt Corporation: *See—*
Sanchez, Jose, 4,097,408, Cl. 252-426.000.
Peper, Henry, Jr.: *See—*
Muller, Frank Andrew; and Peper, Henry, Jr., 4,097,290, Cl. 106-30.000.
Peri, Bruno: *See—*
Pagani, Giorgio; Guerreri, Gianfranco; and Peri, Bruno, 4,097,250, Cl. 55-48.000.
Perica, Jacob E.; Poyer, Wayne F.; and Koenig, Neale F., to Perica, Jacob E. Cardiac monitor with rate limit means. 4,096,854, Cl. 128-2.05T.
Perkin-Elmer Corporation, The: *See—*
Wilson, Francis P.; and Purcell, John E., 4,096,746, Cl. 73-205.00R.
Perline, Irving W.; Trapido, Leonard; Rottenkolber, John J.; and Rottenkolber, Michael L., to Andrew Adams Developing Corporation. Hand tool for fastening and unfastening snap fasteners. 4,096,618, Cl. 29-278.000.
Permahop Hopfenpulver GmbH & Co. KG, Firma: *See—*
Wachter, Rudolf Ludwig; and Edinger, Winfried Franz, 4,096,793, Cl. 99-467.000.
Permax: *See—*
Giulie, Joe D.; and Worcester, Leslie E., 4,097,326, Cl. 156-366.000.
Perronnet, Jacques; Girault, Pierre; and Bonne, Claude, to Roussel Uclaf. 1-(3'-Trifluoromethyl-4'-nitrophenyl)-4,4-dimethyl imidazolidines. 4,097,578, Cl. 424-273.00R.
Perry, Elijah R.; Angwin, Meredith J.; Rabinowitz, Mario; and Shimshock, John F., to Electric Power Research Institute, Inc. Means for protecting underground electrical equipment from thermal runaway. 4,097,682, Cl. 174-15.00R.
Perry, Kenneth E., to Adamation, Inc. Seal tight door for warewasher. 4,096,664, Cl. 49-235.000.
Perry, William V. Denture matching apparatus. 4,096,632, Cl. 32-32.000.
Person, Lucien, to Produits Chimiques Ugine Kuhlmann. Process for separating straight and branched chain soaps and their acids. 4,097,507, Cl. 260-413.000.
Peters, Charles Luther, Jr., to Box Innards, Inc. Indexing and intermittent drive mechanism. 4,096,767, Cl. 74-822.000.
Peters, David L.; and Marr, Philip R., Sr., to Singer Company, The. Precise pointing alignment of optical probes. 4,097,154, Cl. 356-152.000.
Peters, David L., to Singer Company, The. Lag reduction in image transducers having dynamically shaped rasters. 4,097,901, Cl. 358-223.000.
Petersen, Warren D., to Burd, Inc., Howell Division. Chair assembly for an incremental plating having a telescoping sleeve-like construction. 4,097,089, Cl. 297-447.000.
Peterson, Frank C.: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,097,448, Cl. 260-42.180.
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,097,449, Cl. 260-42.180.
Peterson, Joel R., Sr.: *See—*
Barville, George W.; and Peterson, Joel R., Sr., 4,096,977, Cl. 224-5.0BC.
Petrucci, Primo O., to Danbar, Inc. Rotatable seat support assembly. 4,097,016, Cl. 248-418.000.
Petry, Ronald G., to General Motors Corporation. Telescoping energy absorber with anti-rotational interlock for vehicle bumpers. 4,097,080, Cl. 293-85.000.
Pfahler, Gerhard: *See—*
Mayer, Norbert; Pfahler, Gerhard; and Wiezer, Hartmut, 4,097,452, Cl. 260-45.80N.
Pfeifer, Josef: *See—*
Mannhardt, Annemarie; Eppe, Rudolf; and Pfeifer, Josef, 4,097,280, Cl. 96-44.000.
Pfeiler, Manfred; and Dietz, Kurt, to Siemens Aktiengesellschaft. X-ray diagnostics system for X-ray photographs. 4,097,741, Cl. 250-322.000.
Pfizer Inc.: *See—*
Kraska, Allen R.; and Schnur, Rodney C., 4,097,525, Cl. 260-564.00R.
Kuhla, Donald E., 4,097,598, Cl. 424-256.000.
Schaaf, Thomas Ken, 4,097,601, Cl. 424-269.000.
Pham, Quang Tho: *See—*
Rashkov, Ilia; Gole, Jean; Guerard, Daniel; Herold, Albert; Merle, Gerard; Panayotov, Ivan Martinov; Pascault, Jean-Pierre; Pham, Quang Tho; Pillot, Christian; and Salle, Robert, 4,097,660, Cl. 526-173.000.
Phillips Petroleum Company: *See—*
Giroux, Victor A., 4,097,371, Cl. 208-313.000.
Hutchinson, William Milton, deceased; and Hutchinson, Florence M., executrix, 4,097,398, Cl. 252-162.000.
Marwil, Stanley J., 4,097,339, Cl. 195-142.000.
Shue, Robert S., 4,097,469, Cl. 260-78.00R.
Young, Jerry W., 4,096,788, Cl. 93-39.00L.
Phillips, Raymond Francis, to Magnesium Elektron Ltd. Aqueous polymeric dispersions made thixotropic by certain ammonium or potassium zirconium carbonates. 4,097,430, Cl. 260-17.00R.
Phillips, Raymond M. Water bed mattress with regulated heating means therefor and controlling the heat loss therefrom and the method of making the same. 4,097,717, Cl. 219-217.000.
Phillips, Victor Quin; Griffin, Phil Harmon; and Sharki, Martin James, to Dresser Industries, Inc. Method of fluid degassing. 4,097,249, Cl. 55-41.000.
Phillips, Victor Quin; Griffin, Phil Harmon; and Sharki, Martin James, to Dresser Industries, Inc. Mud degasser trough. 4,097,253, Cl. 55-169.000.
Phone-Ducs, Inc.: *See—*
Streit, Kenneth F., 4,096,887, Cl. 138-117.000.
Physio-Control Corporation: *See—*
McKelvy, Stephen L., 4,097,113, Cl. 339-256.00R.
Smith, David B.; and Benson, James A., 4,096,856, Cl. 128-4.19D.
Piber, Earl T., to Cutler-Hammer, Inc. Industrial reversing speed control trigger switch with snap-in modules. 4,097,704, Cl. 200-157.000.
Pichon, Michel, to Compagnie Internationale pour l'Informatique CII-Honeywell Bull (Societe Anonyme). Wheatstone bridge measuring circuit. 4,096,748, Cl. 73-362.0AR.
Picker Corporation: *See—*
Furbee, Avery D.; Kasten, Roy F., Jr.; and Pleil, Viktor W., 4,097,759, Cl. 313-60.000.
Furbee, Avery D.; and Cinelli, Gabriel, 4,097,760, Cl. 313-60.000.
Pierre, Kenneth J.; Tung, Ker-Kong; and Nadj, Henriette, to Beckman Instruments, Inc. Reagent system for beta-amylase assay. 4,097,336, Cl. 195-99.000.
Pillot, Christian: *See—*
Rashkov, Ilia; Gole, Jean; Guerard, Daniel; Herold, Albert; Merle, Gerard; Panayotov, Ivan Martinov; Pascault, Jean-Pierre; Pham, Quang Tho; Pillot, Christian; and Salle, Robert, 4,097,660, Cl. 526-173.000.
Piper, John, to Union Carbide Corporation. Electrolytic capacitor lead terminal configuration. 4,097,916, Cl. 361-433.000.
Pitney-Bowes, Inc.: *See—*
Eckert, Alton B., Jr.; Jones, Howell A., Jr.; and Check, Frank T., Jr., 4,097,923, Cl. 364-900.000.
Luperti, Harry E.; and Manna, Robert E., 4,097,145, Cl. 355-75.000.
Wu, Bosco, 4,097,150, Cl. 356-72.000.
Pittway Corporation: *See—*
Conforti, Frederick J., 4,097,850, Cl. 340-214.000.
Klein, Roy W., 4,097,851, Cl. 340-237.00S.
Pariza, George R., 4,097,861, Cl. 340-388.000.
Pizzini, Louis C.: *See—*
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,097,399, Cl. 252-182.000.
Plasma Physics Corporation: *See—*
Coleman, John H.; and Marks, Tobin J., 4,097,384, Cl. 250-527.000.
Pleil, Viktor W.: *See—*
Furbee, Avery D.; Kasten, Roy F., Jr.; and Pleil, Viktor W., 4,097,759, Cl. 313-60.000.
Pneupac Limited: *See—*
Jones, Norman Stewart; and Bennett, Geoffrey Richard, 4,096,875, Cl. 137-102.000.
Poliniak, Eugene Samuel, to RCA Corporation. Method of transferring a surface relief pattern from a poly(1-methyl-1-cyclopropene sulfone) layer to a non-metallic inorganic layer. 4,097,618, Cl. 427-41.000.
Polva Nederland B.V.: *See—*
Acda, Petrus Marinus, 4,097,070, Cl. 285-86.000.
Polysius, AG: *See—*
Triebel, Wolfgang, 4,096,642, Cl. 34-57.00R.
Porst, Alfred; and Schuh, Gottfried, to Siemens Aktiengesellschaft. Thyristor and method of producing the same. 4,096,623, Cl. 29-580.000.
Porta, Angel Lazaro; and Paniello, Antonio Ibanez, to Doctor Andreu, S.A. [N-(2-diphenylmethoxyethyl)-N-(1-methyl-2-phenoxyethyl)-N-methyl] amine. 4,097,528, Cl. 260-570.00R.
Porta Systems Corp.: *See—*
De Luca, Paul V.; and Atun, Albert, 4,097,102, Cl. 339-19.000.
Portewig, J. Milton. Print machine frame. 4,097,147, Cl. 355-106.000.
Posey, Dan E.; and Mosier, Benjamin, to Chempro Corporation. Mold and mildew removal composition and method of manufacture. 4,097,395, Cl. 252-106.000.
Pote, Wilfred D.: *See—*
Aitken, Thomas; and Pote, Wilfred D., 4,097,427, Cl. 260-9.000.
Potlatch Corporation: *See—*
Saunders, Robert J.; and Keller, Harold A., 4,096,796, Cl. 100-35.000.
Pouliot, Oliver L.: *See—*
Daly, William P.; Lewis, Robert P.; and Pouliot, Oliver L., 4,097,236, Cl. 23-230.00L.
Poulsen, Freddy; and Poulsen, Robert Edvin, to Bell-Matic A/S. Slot machine. 4,097,048, Cl. 273-143.00R.
Poulsen, Robert Edvin: *See—*
Poulsen, Freddy; and Poulsen, Robert Edvin, 4,097,048, Cl. 273-143.00R.
Powrie, William Duncan; and Tung, Marvin, to Creston Valley Foods Ltd. Potato treatment process. 4,097,612, Cl. 426-269.000.
Poyer, Wayne F.: *See—*
Perica, Jacob E.; Poyer, Wayne F.; and Koenig, Neale F., 4,096,854, Cl. 128-2.05T.
PPG Industries, Inc.: *See—*
Barch, Herbert W.; and Bohy, August G., 4,096,685, Cl. 57-34.00B.
Bosso, Joseph F.; and Wismer, Marco, 4,097,352, Cl. 204-181.00C.
Christenson, Roger M.; and Maska, Rudolf, 4,097,438, Cl. 260-29.4UA.
DeTorre, Robert P., 4,096,773, Cl. 83-8.000.
Hathaway, Michael L., 4,097,783, Cl. 315-323.000.
McDonald, Alan T., 4,096,687, Cl. 57-157.00F.
Reese, Walter J., 4,097,004, Cl. 242-129.720.
Schimmel, Karl F.; and Wismer, Marco, 4,097,651, Cl. 428-375.000.
Shaw, Hugh E., Jr., 4,097,151, Cl. 356-73.000.

formation of coke deposits in a fluidized bed reactor. 4,097,366, Cl. 208-127.000.

Tani, Tadaaki, to Fuji Photo Film Co., Ltd. Method for supersensitizing silver halide photographic emulsions. 4,097,284, Cl. 96-126.000.

Tanner Electronics Systems Technology, Inc.: *See—*
Tanner, James L.; Rist, Bruno A.; Sanchez, George; and Becht, Balazs, 4,097,894, Cl. 358-118.000.

Tanner, James L.; Rist, Bruno A.; Sanchez, George; and Becht, Balazs, to Tanner Electronics Systems Technology, Inc. Secured scramble decoder filter. 4,097,894, Cl. 358-118.000.

Tanner, Randall Curtis, to Cincinnati Milacron Inc. Method and apparatus for modifying the position of a machine slide to compensate for different following errors. 4,096,770, Cl. 82-1.00C.

Tardiff, Victor H., to Tru-Eze Manufacturing Co., Inc. Table with leaf and locking system. 4,097,037, Cl. 269-323.000.

Tauer, Miroslav, to Siemens Aktiengesellschaft. Liquid-crystal display with bistable cholesteric liquid-crystal layer and method of making the same. 4,097,121, Cl. 350-333.000.

Tawfik, David A., to Bendix Corporation, The. Monitoring apparatus for redundant control systems. 4,096,989, Cl. 235-307.000.

Taylor, Francis M., to Systems Research Laboratories, Inc. Electronic comparator for process control. 4,097,849, Cl. 340-213.00Q.

Taylor, George, to British Steel Corporation. Cleaning coke oven doors. 4,097,304, Cl. 134-6.000.

Taylor, Robert E. Wheel jack apparatus. 4,097,022, Cl. 254-133.00R.

Taylor, William P. Portable refrigeration machine. 4,096,707, Cl. 62-167.000.

TDK Electronics Co., Ltd.: *See—*
Tokuoka, Yasumichi; Fukuda, Kazumasa; and Hosaka, Akihiko, 4,097,313, Cl. 148-105.000.

Technica-Guss GmbH: *See—*
Krall, Heribert A.; and Maag, Helmut, 4,096,907, Cl. 164-448.000.

Technicon Instruments Corporation: *See—*
Oberhardt, Bruce J.; and Olich, Jack, 4,097,237, Cl. 23-230.00B.

Tecumseh Products Company: *See—*
Farr, James B., 4,097,754, Cl. 310-67.00R.
Wolf, Rudolf H., 4,097,185, Cl. 415-88.000.

Teige, Wolfgang; and Schickfluss, Rudolf, to Hoechst Aktiengesellschaft. Process for the dyeing of water-insoluble thermoplastic polymers and polycondensates in the mass. 4,097,444, Cl. 260-40.00P.

Teika Seiyaku Kabushiki Kaisha: *See—*
Kanaoka, Yuichi, 4,097,488, Cl. 260-326.50C.

Tektronix, Inc.: *See—*
Olson, David Harmon; and Berg, Eldon Carl, 4,097,798, Cl. 324-78.00D.

Tellesbo, Ola: *See—*
Evensen, Harald Thiis; and Tellesbo, Ola, 4,097,644, Cl. 428-281.000.

Tenex Corporation: *See—*
Cheris, Albert B.; and Frye, Lonnie E., 4,097,628, Cl. 428-43.000.

Tenneco Chemicals, Inc.: *See—*
Keyworth, Donald A.; Di Bella, Eugene P.; and Rosen, Marvin, 4,097,451, Cl. 260-45.70R.

Tennent, Richard Lee, to Grafalloy Corporation. Construction for a fiber reinforced shaft. 4,097,626, Cl. 428-36.000.

Teramura, Hiroichi: *See—*
Nakagome, Yukio; Teramura, Hiroichi; Yamazaki, Yasuhiro; and Wakahara, Yasushi, 4,097,903, Cl. 358-261.000.

Terhune, James H.: *See—*
Neissel, John P.; Hendon, Harry H.; and Terhune, James H., 4,097,330, Cl. 176-19.00R.

Texaco Development Corp.: *See—*
Cavitt, Stanley B., 4,097,414, Cl. 252-476.000.

Texas Gas Transmission Corporation: *See—*
Gomberg, Henry J., 4,097,348, Cl. 204-157.10H.

Texas Instruments Incorporated: *See—*
Bellavance, David W., 4,097,819, Cl. 331-94.50H.
Bickel, Samuel H., 4,097,708, Cl. 219-10.55R.

Textron Inc.: *See—*
Rieth, Kurt Albert, 4,096,688, Cl. 59-79.00R.

Tezuka, Tohru: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuno; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,097,472, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,097,591, Cl. 424-177.000.

Theard, Leslie P.: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,097,448, Cl. 260-42.180.
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,097,449, Cl. 260-42.180.

Thiele, Geraldine H., to Oxford Hill, Ltd. Method of treating and controlling gingivitis. 4,097,604, Cl. 424-318.000.

Thiokol Corporation: *See—*
Bertozzi, Eugene Ribello, 4,097,299, Cl. 106-287.320.

Thomas, Richard E.: *See—*
Loria, Adrian M.; and Thomas, Richard E., 4,097,637, Cl. 428-212.000.

Thomas, Walter B., III; and Welker, Christopher H., to Corning Glass Works. Low-temperature devitrifiable sealing composition. 4,097,296, Cl. 106-53.000.

Thompson, David A.: *See—*
Mazzeo, Nickolas Joseph; and Thompson, David A., 4,097,802, Cl. 324-252.000.

Thompson, Richard G. Propulsion unit for skiers. 4,096,919, Cl. 180-6.00R.

Thompson, Robert W., to Westinghouse Electric Corp. Elastomer belt impregnated with carbon for testing dielectric adequacy and for indicating physical defects in a nonconducting material. 4,097,795, Cl. 324-54.000.

Thomsen, Jorgen Thyrsted, to J. P. Schmidt Jun. A/S. Method of cutting wrappers for tobacco products and cutting table for carrying out said method. 4,096,775, Cl. 83-511.000.

Thomson-CSF: *See—*
Monvoisin, Jacques, 4,097,748, Cl. 250-505.000.
Moulin, Michel; and Munier, Bernard, 4,097,900, Cl. 358-213.000.
Moutou, Paul Cyril; Hareng, Michel; and Le Berre, Serge, 4,097,142, Cl. 355-45.000.

Thoren, Glenn R.; Lampen, James L.; and Jerinic, George, to Raytheon Company. Cylindrical cavity power combiner for plurality of coaxial oscillators. 4,097,817, Cl. 331-56.000.

Thoren, Glenn R.: *See—*
Jerinic, George; Thoren, Glenn R.; Sullivan, Francis J., Jr.; and Lampen, James L., 4,097,823, Cl. 332-9.00R.
Lampen, James L.; Jerinic, George; and Thoren, Glenn R., 4,097,821, Cl. 331-101.000.

Thorson, Eric K., to Eldec Corporation. Electrical indicator including relatively translatable scale and index tapes. 4,097,799, Cl. 324-99.00R.

Tideland Signal Corporation: *See—*
Klein, William Richard; Kotila, Carl Leroy; and Krams, Ira Leslie, 4,097,308, Cl. 136-89.00H.

Tiefenbach, Joseph P.: *See—*
Sieglaff, Charles L.; Hora, Charles J.; and Tiefenbach, Joseph P., 4,097,657, Cl. 526-30.000.

Tiemann, Jerome J.: *See—*
Baertsch, Richard D.; and Tiemann, Jerome J., 4,097,886, Cl. 357-24.000.

Toa Electric Company, Ltd.: *See—*
Miyazaki, Masami, 4,097,694, Cl. 179-15.0AT.

Todd, Maurice Cornelius: *See—*
Agers, Brian Michael; and Todd, Maurice Cornelius, 4,096,612, Cl. 28-272.000.

Togawa, Kimmochi: *See—*
Kishida, Katsuhiro; Takao, Hiroshi; Togawa, Kimmochi; and Matoba, Kazuo, 4,097,353, Cl. 204-195.00S.

Tohei Ototani: *See—*
Ototani, Tohei; and Kataura, Yasuji, 4,097,268, Cl. 75-57.000.

Tokai Denka Kogyo Kabushiki Kaisha: *See—*
Sato, Kanji, 4,097,478, Cl. 544-353.000.

Tokuno, Masateru, to Rengo Kabushiki Kaisha. Conveyor system for a cutter for a web of corrugated fiberboard. 4,096,941, Cl. 198-689.000.

Tokuoka, Yasumichi; Fukuda, Kazumasa; and Hosaka, Akihiko, to TDK Electronics Co., Ltd. Method of recovery of ferromagnetic metal or alloy particles by using a magnetic drum. 4,097,313, Cl. 148-105.000.

Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Ishii, Ryoichi; Sakurai, Yoshishige; Yamada, Hiroshi; Uchida, Kuniharu; and Suzuki, Kanekichi, 4,096,757, Cl. 73-621.000.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Komeya, Katsutoshi; and Inoue, Hiroshi, 4,097,293, Cl. 106-43.000.
Matsumoto, Shoichi; Kawamoto, Masahiro; and Mizunoya, Kiyoshi, 4,097,128, Cl. 350-335.000.

Tom McGuane Industries, Inc.: *See—*
Ludwig, George, 4,097,778, Cl. 315-82.000.

Tomioka, Shinji; and Mori, Yasuki, to Abbott Laboratories. Derivatives of an antibiotic XK-62-2. 4,097,664, Cl. 536-17.000.

Tomiyori, Takashi: *See—*
Shirasaka, Kaname; Nakagami, Yoshihiro; Tomiyori, Takashi; Ikemoto, Masanori; and Shaura, Tsuneo, 4,097,621, Cl. 427-173.000.

Tomizawa, Yoshio: *See—*
Satoh, Ken; and Tomizawa, Yoshio, 4,097,726, Cl. 235-92.0MP.

Tonnelli, Gerald J., to Production Data Inc. Oil well logging probe assembly. 4,096,752, Cl. 73-431.000.

Tonomura, Shinji: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuno; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,097,472, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,097,591, Cl. 424-177.000.

Toray Industries, Inc.: *See—*
Kusakabe, Haruhiko; Makita, Masashi; and Ueda, Masutoshi, 4,096,890, Cl. 139-435.000.

Toray Silicone Company, Ltd.: *See—*
Hasegawa, Yoshiyuki, 4,097,643, Cl. 428-270.000.

Torio Kabushiki Kaisha: *See—*
Fujii, Motoyuki; Yokota, Koji; and Yashita, Hajime, 4,097,805, Cl. 325-17.000.

Torralba, Jose Estaban. Roll-type thread cutting die. 4,096,722, Cl. 72-104.000.

Torrington Company, The: *See—*
Lopes, Antone, Jr.; and Shepard, Richard Wilton, 4,096,713, Cl. 66-121.000.

Toshiba Chemical Products Co. Ltd.: *See—*
Akiyama, Keiichi; Kamiuchi, Junichi; Matsuda, Itsuo; and Fujii, Takara, 4,097,545, Cl. 260-830.00P.

Toth, Attila: *See—*
Simon, Artur; Sarosi, Gyula; Keszler, Balazs; Toth, Attila; and Rethy, Maria, 4,097,658, Cl. 526-143.000.

Toulios, Peter P.: *See—*
Knox, Robert M.; and Toulios, Peter P., 4,097,826, Cl. 333-73.00R.

Tout, John R. Self placing automatic form. 4,097,173, Cl. 404-98.000.

Touval, Irving: *See—*
Littman, Stanley; and Touval, Irving, 4,097,560, Cl. 260-931.000.

Towmotor Corporation: *See—*
Bivens, Ward L.; and Schwehr, Richard A., 4,097,791, Cl. 318-484.000.

Toyama, Kunio; Shimizu, Isamu; Imamura, Takeo; and Nakanishi, Atsuo, to Asahi-Dow Limited. PPO-Graft copolymer and process for producing the same. 4,097,556, Cl. 260-886.000.

Toyo Kogyo Co., Ltd.: *See—*
Kakui, Kuniaki, 4,097,207, Cl. 418-83.000.
Satou, Haruhiko; Honiden, Yoshinori; Hayashida, Motoyuki; and Wakamoto, Mutsuo, 4,096,828, Cl. 123-209.000.

Toyoda, Takashi; Miyabe, Yoshio; and Yamanaka, Masaaki, to Oji Yuka Goseishi Kabushiki Kaisha. Synthetic paper having good ink adhesion thereto. 4,097,645, Cl. 428-306.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Nohira, Hidetaka; Bessho, Hironori; and Sakai, Yasuyuki, 4,096,691, Cl. 60-295.000.
Otsuka, Katsumi; Ishigami, Noriakira; and Kozakai, Asao, 4,097,841, Cl. 340-52.00C.
Suzuki, Katsuyasu; Morita, Yoshitoshi; and Morita, Motoo, 4,096,891, Cl. 140-1.000.

Tozzi, Antonio; and Cassandrini, Paolo, to Chimosa Chimica Organica S.p.A. Benzophenone base stabilizing agent for polymers and polymers stabilized thereby. 4,097,454, Cl. 260-45.75N.

Tracy, Chester Edwin: *See—*
Kern, Werner; and Tracy, Chester Edwin, 4,097,889, Cl. 357-54.000.

Tranberg, Erik Rudolf, to GKN-Stenman AB. Arrangement in door-locks. 4,096,719, Cl. 70-450.000.

Trapido, Leonard: *See—*
Perline, Irving W.; Trapido, Leonard; Rottenkolber, John J.; and Rottenkolber, Michael L., 4,096,618, Cl. 29-278.000.

Treiber, Fritz F.; and Graham, Francis E., to Hobart Corporation. Door mounting and actuator for a pressure vessel. 4,096,968, Cl. 220-314.000.

Treuil, Bernard, to Societe d'Etudes de Machines Thermiques S.E.M.T. Method and means for conditioning the intake air of a supercharged, low-compression ratio diesel engine. 4,096,697, Cl. 60-599.000.

Treuner, Uwe D.: *See—*
Breuer, Hermann; and Treuner, Uwe D., 4,097,670, Cl. 544-27.000.

Triangle Grinding, Inc.: *See—*
Takacs, Victor C.; and Takacs, Joseph E., 4,096,613, Cl. 407-92.000.

Trickel, Lorn L. Method and apparatus for burning air-suspended particulate fuel. 4,096,808, Cl. 110-244.000.

Triebel, Wolfgang, to Polysius, AG. Apparatus for heat exchange between fine material and gas. 4,096,642, Cl. 34-57.00R.

Troster, Helmut: *See—*
Papenfuhs, Theodor; and Troster, Helmut, 4,097,450, Cl. 260-42.210.

Troyer, Lloyd E.: *See—*
Minogue, Robert W.; and Troyer, Lloyd E., 4,097,632, Cl. 428-130.000.

Tru-Eze Manufacturing Co., Inc.: *See—*
Tardiff, Victor H., 4,097,037, Cl. 269-323.000.

True Temper Corporation: *See—*
Groth, Hugh F., 4,096,915, Cl. 172-42.000.

Trushell, James Bryce: *See—*
Lamoureux, William Roger; and Trushell, James Bryce, 4,097,856, Cl. 340-324.00M.

TRW Inc.: *See—*
Kwieraga, James A., 4,097,180, Cl. 408-154.000.

Tsuboi, Makoto: *See—*
Kobayashi, Tetsu; Kanazawa, Takato; and Tsuboi, Makoto, 4,097,707, Cl. 219-10.55B.

Tsuji, Hisao: *See—*
Kitazawa, Yoichi; Sato, Takeshi; and Tsuji, Hisao, 4,096,899, Cl. 152-354.00R.

Tsukagoshi, Shigeru: *See—*
Ishida, Torao; Akiyama, Minoru; Nishimura, Daikichi; Hayashi, Hiroshi; Sakurai, Yoshio; and Tsukagoshi, Shigeru, 4,097,665, Cl. 536-23.000.

Tsukamoto, Yutaka: *See—*
Nakamura, Hirokazu; Ohinouye, Tsuneo; Hori, Kenji; Nakagami, Tatsuro; Tsukamoto, Yutaka; and Akishino, Katsuo, 4,096,692, Cl. 60-307.000.

Tsukiji, Yoshihiro, to Kabushiki Kaisha Komatsu Seisakusho. Machine for drilling holes in right-angular work surfaces. 4,097,175, Cl. 408-23.000.

Tsuruoka, Masao: *See—*
Umemura, Sumio; Ohdan, Kyoji; Uda, Taizo; Matsuzaki, Tokuo; Hidaka, Mikio; Nakamura, Yasuo; and Tsuruoka, Masao, 4,097,518, Cl. 260-465.300.

Tsuto, Keiichi; Majima, Kanji; and Imamura, Shigeyasu, to Kao Soap Co., Ltd. Sulfonation apparatus. 4,097,242, Cl. 23-283.000.

Tsutsumi, Hisao; Hayashi, Shizuo; Nakayama, Hirokazu; and Ukena, Toshinao, to Kao Soap Co., Ltd. Oil-in-water emulsion and emulsifying or solubilizing agent composition useful therein. 4,097,403, Cl. 252-312.000.

Tsypin, Nekhemian Veniaminovich: *See—*
Bakul, Valentin Nikolaevich; Bilyk, Igor Ivanovich; Bronshtein, Dolores Khaimovna; Vovchanovsky, Ivan Fedorovich; and Tsypin, Nekhemian Veniaminovich, 4,097,274, Cl. 75-201.000.

Tung, Ker-Kong: *See—*
Pierre, Kenneth J.; Tung, Ker-Kong; and Nadj, Henriette, 4,097,336, Cl. 195-99.000.

Tung, Marvin: *See—*
Powrie, William Duncan; and Tung, Marvin, 4,097,612, Cl. 426-269.000.

Turowski, Lawrence Edward: *See—*
Lunn, Norman Laurence; McCrea, Charles Jeffrey; Pregaman, Raymond David; and Turowski, Lawrence Edward, 4,097,625, Cl. 427-360.000.

Tyee Aircraft, Inc.: *See—*
Dubuque, Douglas K., 4,097,163, Cl. 403-274.000.

Tyke, Charlie R.: *See—*
Anderson, William C.; Cooper, Gordon J.; and Tyke, Charlie R., 4,097,918, Cl. 362-147.000.

Ucciani, Claude M.: *See—*
Becuwe, Alain G.; Senet, Jean-Pierre G.; and Ucciani, Claude M., 4,097,513, Cl. 260-453.0PH.

Uchida, Kuniharu: *See—*
Ishii, Ryoichi; Sakurai, Yoshishige; Yamada, Hiroshi; Uchida, Kuniharu; and Suzuki, Kanekichi, 4,096,757, Cl. 73-621.000.

Uda, Taizo: *See—*
Umemura, Sumio; Ohdan, Kyoji; Uda, Taizo; Matsuzaki, Tokuo; Hidaka, Mikio; Nakamura, Yasuo; and Tsuruoka, Masao, 4,097,518, Cl. 260-465.300.

Ueda, Masutoshi: *See—*
Kusakabe, Haruhiko; Makita, Masashi; and Ueda, Masutoshi, 4,096,890, Cl. 139-435.000.

Uehlinger, Werner; and Wendelspiess, Pius, to KM-Engineering AG. Method and a means for transferring articles, in particular semimanufactured articles or workpieces, between stations on machinery for working these articles mechanically. 4,096,731, Cl. 72-405.000.

Ueno, Hideyo: *See—*
Shimokawa, Hayao; Nakamuri, Makoto; Ueno, Hideyo; Namiki, Isamu; and Shiina, Naonori, 4,097,319, Cl. 156-79.000.

Uhlmann, Otto; and Stephan, Norbert, to Marshall Richards Barcro Limited. Method and apparatus for drawing tubes. 4,096,726, Cl. 72-291.000.

Uhtenwoldt, Herbert R.; Humes, Norman S.; and Crossman, Richard E., to Cincinnati Milacron-Heald Corp. Internal grinding machine. 4,096,667, Cl. 51-99.000.

Ukena, Toshinao: *See—*
Tsutsumi, Hisao; Hayashi, Shizuo; Nakayama, Hirokazu; and Ukena, Toshinao, 4,097,403, Cl. 252-312.000.

Ulch, Bryan D., to A-T-O Inc. Circuit for controlling automatic off-line operation of an on-line card reader. 4,097,727, Cl. 235-382.000.

Ullman, Myron E., Jr. Fabric identification tag. 4,096,655, Cl. 40-2.00R.

Ulrich, Otho E., to Armstrong Machine Works. Condensate controller. 4,096,876, Cl. 137-185.000.

Umemura, Sumio; Ohdan, Kyoji; Uda, Taizo; Matsuzaki, Tokuo; Hidaka, Mikio; Nakamura, Yasuo; and Tsuruoka, Masao, to Produits Chimiques Ugine Kuhlmann. Method for the catalytic production of acrylonitrile. 4,097,518, Cl. 260-465.300.

Union Carbide Corporation: *See—*
Chan, John Kai-Fai, 4,097,526, Cl. 260-566.0AC.
Cupper, Robert Alton; and Shiffler, Richard Welty, 4,097,393, Cl. 252-78.300.
Papa, Anthony Joseph; and Runyan, Walter Warren, 4,097,559, Cl. 260-928.000.
Piper, John, 4,097,916, Cl. 361-433.000.

Union Oil Company of California: *See—*
Simpson, Howard D., 4,097,413, Cl. 252-465.000.
Ward, John W., 4,097,365, Cl. 208-111.000.

Uniroyal, Inc.: *See—*
Brewer, Arthur D.; and Davis, Robert A., 4,097,580, Cl. 424-277.000.

Uniroyal Ltd.: *See—*
Brewer, Arthur D.; and Davis, Robert A., 4,097,580, Cl. 424-277.000.

United States Bedding Company, The: *See—*
Eide, Richard H.; and Golembeck, Gerald A., 4,096,595, Cl. 5-345.00R.

United States of America
Air Force: *See—*
Allinikov, Sidney, 4,097,776, Cl. 313-502.000.
Bilsbury, Stephen J., 4,096,804, Cl. 102-66.000.
Frost, William F.; Masak, Raymond J.; Baurle, Herbert F.; and Kowalski, Anthony F., 4,097,866, Cl. 343-100.0LE.
Snyder, Carl E., Jr.; and Tamborski, Christ, 4,097,388, Cl. 252-49.900.
Williams, Mark R., 4,097,827, Cl. 333-81.00R.
Army: *See—*
Borowick, John Joseph, 4,097,868, Cl. 343-727.000.
Fagan, James J.; Otto, William F.; and McKnight, William B., 4,097,007, Cl. 244-3.110.
Guazzoni, Guido Eddardo, 4,097,654, Cl. 429-5.000.
Huskins, Chester W., 4,097,662, Cl. 526-217.000.
Kesting, Lawrence W., 4,096,803, Cl. 102-49.500.
Kuchmas, John, Jr.; and Bubb, Gary E., 4,097,800, Cl. 324-178.000.
Miner, Mark S.; and Crickman, Charles W., 4,096,805, Cl. 102-214.000.

White, Herbert O. Wind motor. 4,097,190, Cl. 416-117.000.
White, Robert F., to General Motors Corporation. Engine mount. 4,097,011, Cl. 248-5.000.
Whitehead, Edwin Nelson. Process for preparing an identification card. 4,097,279, Cl. 96-27.00R.
Whitehurst, Gerald E., to Caterpillar Tractor Co. Modular steering clutch and brake package. 4,096,931, Cl. 192-18.00A.
Wicki, Heinz, to Sandoz Ltd. Trisazo dyes having a 2,7-(1-amino-3,6-or 4,6-disulfo-8-hydroxynaphthylene) radical. 4,097,476, Cl. 260-173.000.
Widmer, Ernst: *See—*
Ebel, Eckhard; Kobel, Hans-Rudolf; and Widmer, Ernst, 4,097,369, Cl. 208-180.000.
Wiechert, Rudolf: *See—*
Kerb, Ulrich; Wiechert, Rudolf; and Engelfried, Otto, 4,097,678, Cl. 560-257.000.
Weber, Alfred; Kennecke, Mario; Mueller, Rudolf; Eder, Ulrich; and Wiechert, Rudolf, 4,097,334, Cl. 195-51.00G.
Wiesner, Herbert: *See—*
Wanner, Karl; Reibetanz, Wilbert; Bleicher, Manfred; and Wiesner, Herbert, 4,097,176, Cl. 408-56.000.
Wiesner, Paul: *See—*
Stonner, Hans-Martin; and Wiesner, Paul, 4,097,539, Cl. 568-751.000.
Wiezer, Hartmut: *See—*
Mayer, Norbert; Pfahler, Gerhard; and Wiezer, Hartmut, 4,097,452, Cl. 260-45.80N.
Wildt, Hans-Achim Dietmar, to Du Pont de Nemours, E. I., and Company. Stable chloride process anatase slurries. 4,097,301, Cl. 106-300.000.
Wilhelm Ruf KG: *See—*
Hindermayr, Martin; and Wagner, Ferdinand, 4,097,828, Cl. 334-7.000.
Wilken, Judy. Surface covering with interwoven fabric strips. 4,097,631, Cl. 428-114.000.
Will Ross, Inc.: *See—*
Bryson, John D., 4,096,994, Cl. 239-57.000.
William R. Selwood Limited: *See—*
Selwood, Timothy John; Axtell, Martin John Shelley; Burton, John David; Selwood, Peter Richard, deceased; Selwood, Timothy John, executor; and Axtell, Martin John Shelly, executor, 4,097,203, Cl. 417-480.000.
Williams, Anthony Michael: *See—*
Ingham, William Ellis; and Williams, Anthony Michael, 4,097,746, Cl. 250-444.000.
Williams, George M.: *See—*
Gardner, William H.; Graham, Donald H.; and Williams, George M., 4,097,315, Cl. 149-2.000.
Williams, Mark R., to United States of America, Air Force. Constant impedance, constant phase pin diode with attenuator. 4,097,827, Cl. 333-81.00R.
Willibald Grammer: *See—*
Meiller, Hermann, 4,097,088, Cl. 297-217.000.
Wilson, David W.: *See—*
Nemeth, Suzette B.; and Wilson, David W., 4,097,627, Cl. 428-40.000.
Wilson, Francis P.; and Purcell, John E., to Perkin-Elmer Corporation, The. Flow controller-flow sensor assembly for gas chromatographs and the like. 4,096,746, Cl. 73-205.00R.
Wilson, Gerald L.: *See—*
Weiss, Verne E.; Campbell, Glenn M.; and Wilson, Gerald L., 4,096,791, Cl. 99-353.000.
Wilson Jones Company: *See—*
Martorano, Sam, 4,096,981, Cl. 225-99.000.
Wilson, Michael A.; Momparler, Fred J.; and Coleman, Kenneth, to Electro Corporation. Circuit for controllably providing power from an AC source to a load. 4,097,769, Cl. 307-252.00B.
Wilson, Robert J., to General Motors Corporation. Motor protector with remote temperature simulation. 4,097,790, Cl. 318-471.000.
Wirges, Winfried, to Stabilus GmbH. Elastic column of adjustable length. 4,096,785, Cl. 91-416.000.
Wise, Joseph Agusta: *See—*
Over, William Roderick; and Wise, Joseph Agusta, 4,097,106, Cl. 339-99.00R.
Wiseman, Russell M., to Diamond Shamrock Corporation. Apparatus for release of an entrained gas in a liquid medium. 4,097,358, Cl. 204-270.000.
Wismer, Marco: *See—*
Bosso, Joseph F.; and Wismer, Marco, 4,097,352, Cl. 204-181.00C.
Schimmel, Karl F.; and Wismer, Marco, 4,097,651, Cl. 428-375.000.
Withers, Stanley J.; and Sturm, Ronald L., to Oxford Laboratories Inc. Hand-held micropipettor with fluid transfer volume adjustment mechanism. 4,096,751, Cl. 73-425.600.
Witzke, Horst, to Optel Corporation; and Grumman Aerospace Corporation, part interest to each. Photogalvanic cell using a transparent conducting electrode. 4,097,655, Cl. 429-111.000.
Wolf, Rudolf H., to Tecumseh Products Company. Lubricating device. 4,097,185, Cl. 415-88.000.
Womack, John W., to Mobil Oil Corporation. Means and method for controlling excess air inflow. 4,097,218, Cl. 431-76.000.
Wong, Janet C.: *See—*
Grace, Alan G. V.; and Wong, Janet C., 4,097,695, Cl. 179-15.0BA.
Wood, Prentice J., to Mead Corporation, The. Article carrier and blank therefor. 4,096,985, Cl. 229-40.000.
Woodbridge, David Thomas: *See—*
Cubbon, Robert Charles Patrick; Russell, Peter John; Talbot, Robert Eric; and Woodbridge, David Thomas, 4,097,536, Cl. 260-610.00R.
Woodier, James G.: *See—*
Kim, Raymond W. H.; Klein, Robert A.; Lodge, Edward H.; Lueders, Arthur L.; and Woodier, James G., 4,097,132, Cl. 352-242.000.
Woodward, Ernest F. Restraint shield. 4,096,807, Cl. 105-467.000.
Worcester, Leslie E.: *See—*
Giulie, Joe D.; and Worcester, Leslie E., 4,097,326, Cl. 156-366.000.
Worthington Pump, Inc.: *See—*
Budris, Allan R., 4,097,186, Cl. 415-143.000.
Wortmann, Joachim; Dany, Franz-Josef; and Kandler, Joachim, to Hoechst Aktiengesellschaft. Flameproof polyurethanes. 4,097,400, Cl. 252-182.000.
Wright, Philip R.: *See—*
Lasky, Daniel J.; and Wright, Philip R., 4,097,884, Cl. 354-323.000.
Wu, Bosco, to Pitney-Bowes, Inc. Optical detection weighing system. 4,097,150, Cl. 356-72.000.
Wu, Chin Ching: *See—*
Krenzer, John; and Wu, Chin Ching, 4,097,485, Cl. 260-306.80D.
Wulf, Helmut; and Weidemann, Wolfgang, to Daimler-Benz Aktiengesellschaft. Power supply of installations driven by internal combustion engines, especially of motor vehicles. 4,097,752, Cl. 290-20.000.
Wusirika, Raja R.: *See—*
Chyung, Kenneth; and Wusirika, Raja R., 4,097,295, Cl. 106-52.000.
Wyatt, Kenneth L., to Western Electric Company, Incorporated. Methods of and apparatus for handling arrays of paramagnetic articles. 4,096,970, Cl. 221-264.000.
Wyman, Harold Thomas: *See—*
Musolf, Thomas Carl; and Wyman, Harold Thomas, 4,096,742, Cl. 73-94.000.
Wynne, Francis Edmund, Jr.: *See—*
McKinney, Joel Drexler; Sebulsky, Raynor T.; and Wynne, Francis Edmund, Jr., 4,097,362, Cl. 208-78.000.
McKinney, Joel Drexler; Sebulsky, Raynor T.; and Wynne, Francis Edmund, Jr., 4,097,363, Cl. 208-78.000.
Wynne, Kenneth J.: *See—*
Rice, Roy W.; Wynne, Kenneth J.; and Fox, William B., 4,097,294, Cl. 106-43.000.
Xerox Corporation: *See—*
Baccaro, Gary P.; and Seitz, James F., 4,097,267, Cl. 75-0.50B.
Brown, Robert Warren, 4,097,404, Cl. 252-316.000.
Evans, John Brian, 4,097,806, Cl. 325-42.000.
Gunther, Wolfgang H. H., 4,097,273, Cl. 75-121.000.
Haas, Werner E. L.; and Dir, Gary A., 4,097,127, Cl. 350-332.000.
Hauser, Oscar G.; Meagher, Thomas; and Ruckdeschel, Frederick R., 4,097,139, Cl. 355-4.000.
Kingsley, William, 4,097,138, Cl. 355-3.0DR.
Lu, Chin H., 4,097,620, Cl. 427-127.000.
Stange, Klaus K., 4,096,826, Cl. 118-656.000.
Yamada, Akitoshi; Goto, Toshiyuki; Kimura, Yoichi; and Kikuchi, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Out-of-head localization headphone listening device. 4,097,689, Cl. 179-1.00G.
Yamada, Hiroshi: *See—*
Ishii, Ryoichi; Sakurai, Yoshishige; Yamada, Hiroshi; Uchida, Kuniharu; and Suzuki, Kanekichi, 4,096,757, Cl. 73-621.000.
Yamaguchi, Masahisa; and Watanabe, Tatsuo, to Kokusai Denshin Denwa Kabushiki Kaisha. Transmitting and receiving diversity system. 4,097,804, Cl. 325-15.000.
Yamaguchi, Masaru, to Nippon Electric Co., Ltd. Partial response system. 4,097,687, Cl. 178-68.000.
Yamamoto, Mitsuyoshi: *See—*
Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,097,428, Cl. 260-345.90R.
Yamanaka, Masaaki: *See—*
Toyoda, Takashi; Miyabe, Yoshio; and Yamanaka, Masaaki, 4,097,645, Cl. 428-306.000.
Yamanouchi Pharmaceutical Co., Ltd.: *See—*
Murakami, Masuo; Takahashi, Kozo; Hirata, Yasufumi; Takashima, Mutsuo; Iwanami, Sumio; Hasegawa, Osamu; Nozaki, Yoshihisa; Tachikawa, Shiro; Takeda, Masaaki; and Usuda, Shinji, 4,097,487, Cl. 260-326.850.
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Ina, Osamu; and Hara, Kunihiko, to Nippondenso Co., Ltd. Gaseous atmosphere control apparatus for a semiconductor manufacturing system. 4,096,822, Cl. 118-48.000.
Yamazaki, Yasuhiro: *See—*
Nakagome, Yukio; Teramura, Hiroichi; Yamazaki, Yasuhiro; and Wakahara, Yasushi, 4,097,903, Cl. 358-261.000.
Yang, Kang; Motz, Kaye L.; and Reedy, James D., to Continental Oil Company. Preparation of aldehydes from alcohols. 4,097,535, Cl. 260-603.00C.
Yankee, Ernest W., to Upjohn Company, The. 8β, 12α, 15β-$PGF_{2\alpha}$ Compounds. 4,097,675, Cl. 560-121.000.
Yano, Kazuhiko; Otsuki, Kazuhiko; and Ohashi, Ryota, to Kanzaki Kokyukoki Mfg. Co., Ltd. Control valve. 4,096,882, Cl. 137-596.120.
Yashita, Hajime: *See—*
Fujii, Motoyuki; Yokota, Koji; and Yashita, Hajime, 4,097,805, Cl. 325-17.000.
Yasue, Kenji: *See—*
Asahara, Nakaba; Takao, Hiroyuki; and Yasue, Kenji, 4,097,431, Cl. 260-22.00R.
Yataki, Masamichi; Takahata, Hideyo; and Simomura, Norio, to Canon Kabushiki Kaisha. Method for inspecting object defection by light beam. 4,097,160, Cl. 356-237.000.
Yates, Dow. Chlorine generator. 4,097,356, Cl. 204-237.000.
Yazaki Sogyo Kabushiki Kaisha: *See—*
Ishibashi, Toshihiro; Horibe, Kinya; Ishida, Masaharu; and Sano, Youzi, 4,097,311, Cl. 148-6.210.
Yevick, George J., to Izon Corporation. Microfiche having integral indexing means. 4,097,137, Cl. 353-120.000.
Yip, James K., to Eaton Corporation. Closed-center controller and neutral bypass arrangement therefor. 4,096,883, Cl. 137-596.130.
Yokota, Koji: *See—*
Fujii, Motoyuki; Yokota, Koji; and Yashita, Hajime, 4,097,805, Cl. 325-17.000.
Yoo, Jin S.: *See—*
Burk, Emmett H., Jr.; Yoo, Jin S.; and Karch, John A., 4,097,244, Cl. 44-1.00R.
Yoshida, Akio: *See—*
Tanaka, Akira; and Yoshida, Akio, 4,097,285, Cl. 96-132.000.
Yoshida, Minoru: *See—*
Morishima, Yukimas; Yoshida, Minoru; and Masuda, Hideo, 4,097,212, Cl. 425-313.000.
Yoshino, Tsunemi, to West Electric Co., Ltd. Photographic stroboscope. 4,097,880, Cl. 354-145.000.
Young, Douglas Leonard, to Canadian Ingersoll-Rand Co. Ltd. Screening apparatus hydrofoil. 4,097,374, Cl. 209-379.000.
Young, Jerry W., to Phillips Petroleum Company. Apparatus for forming a container side wall. 4,096,788, Cl. 93-39.00L.
Young, Nathan H., deceased: *See—*
Kaplan, David; Brezack, Irving; Young, Nathan H., deceased; Kaplan, David, executor; Brezack, Irving, executor; and Wapner, Herbert H., 4,096,863, Cl. 128-349.00R.
Youngstown Sheet and Tube Company: *See—*
Waters, William D., 4,097,569, Cl. 264-255.000.
Yu, John Pang, to RCA Corporation. Video record player switching system. 4,097,899, Cl. 358-181.000.
Yui, Hiroshi; Kakizaki, Tetsuji; Sano, Hironari; Arai, Masakazu; and Matsui, Hiroshi, to Mitsubishi Petrochemical Company Limited. Process for preparing novel polymer particles. 4,097,554, Cl. 260-878.00R.
Yuzawa, Haruo, to Nissan Motor Company, Limited. Altitude correction device of a carburetor. 4,097,563, Cl. 261-121.00B.
Zalar, David R.; and Hansen, James E., to Cutler-Hammer, Inc. Deceleration indication system. 4,097,842, Cl. 340-71.000.
Zappe, Hans Helmut, to International Business Machines Corporation. Electronically alterable non-latching Josephson AND, OR, NAND, NOR logic circuit. 4,097,765, Cl. 307-212.000.
Zaugg, Harold Elmer: *See—*
Horrom, Bruce Wayne; Minard, Frederick Nelson; and Zaugg, Harold Elmer, 4,097,597, Cl. 424-250.000.
Zellis, Evgeny Alfredovich: *See—*
Rivkin, Ilya Yakovlevich; Aisin, Shamil Mustafovich; Garkusha, Olga Ivanovna; Dondoshansky, Alexandr Lvovich; Zellis, Evgeny Alfredovich; Karpov, Vladilen Efremovich; Sorokin, Vladimir Konstantinovich; and Shishkin, Oleg Petrovich, 4,096,745, Cl. 73-194.00B.
Zellweger, Ltd.: *See—*
Felix, Ernst, 4,097,692, Cl. 179-2.50R.
Zemer, Yigael: *See—*
Nesher, Dan; and Zemer, Yigael, 4,096,644, Cl. 35-31.00R.
Zenith Radio Corporation: *See—*
Korpel, Adrianus, 4,097,730, Cl. 250-201.000.
Zenty, Stephen. Photochemical process for fossil fuel combustion products recovery and utilization. 4,097,349, Cl. 204-158.00R.
Zepernick, Dean E.: *See—*
Lemmon, John C.; Olson, Donald R.; and Zepernick, Dean E., 4,096,880, Cl. 137-454.200.
Ziegler, Joseph, to Pennsylvania Engineering Corporation. Enclosure for steel converting apparatus. 4,097,029, Cl. 266-142.000.
Zimmer, Aaron. Permanently lubricated bearing cartridge. 4,097,095, Cl. 308-20.000.
Zinnes, Harold: *See—*
Sircar, Jagadish C.; Kesten, Stephen J.; and Zinnes, Harold, 4,097,441, Cl. 260-332.20A.
Zitelli, William E., to Westinghouse Electric Corp. Auxiliary manual turbine controller. 4,096,699, Cl. 60-657.000.
Zumwalt, Floyd A. Harness for plug and socket. 4,097,105, Cl. 339-75.00P.
Zupancic, Joseph, to Weiner Steel Corporation. Baler for loose wire. 4,096,799, Cl. 100-215.000.
260: *See—*
Haaf, William Robert; Lee, Gim Fun, Jr.; 260; and 260, 4,097,550, Cl. 260-876.00B.
Haaf, William Robert; Lee, Gim Fun, Jr.; 260; and 260, 4,097,550, Cl. 260-876.00B.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 27TH DAY OF JUNE, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Alberto-Culver Company: *See—*
Cella, John A.; and Schmitt, William H., Re. 29,682, Cl. 426-548.000.

Antonini, Frank P.; and Schwalbe, Julien I. Cauterizing instrument and holder. Re. 29,678, Cl. 206-571.000.

Boitnott, Boyd D., to Gray Tool Company. Stem sealing for high pressure valve or the like. Re. 29,679, Cl. 251-214.000.

Butterworth, Donald J.: *See—*
Salem, Eli; Butterworth, Donald J.; and Ryan, Leo F., Re. 29,680, Cl. 260-2.10R.

Cella, John A.; and Schmitt, William H., to Alberto-Culver Company. Low calorie dry sweetener composition. Re. 29,682, Cl. 426-548.000.

Diveley, William R., to Hercules Incorporated. Metal salts of 1,1,5,5-tetrasubstituted dithiobiurets. Re. 29,681, Cl. 260-429.900.

Ecodyne Corp.: *See—*
Salem, Eli; Butterworth, Donald J.; and Ryan, Leo F., Re. 29,680, Cl. 260-2.10R.

Foxboro Company, The: *See—*
Nabi, Saleh A., Re. 29,685, Cl. 364-900.000.

Gordon, Mack. Welding helmet with eye piece control. Re. 29,684, Cl. 219-147.000.

Gray Tool Company: *See—*
Boitnott, Boyd D., Re. 29,679, Cl. 251-214.000.

Hercules Incorporated: *See—*
Diveley, William R., Re. 29,681, Cl. 260-429.900.

Motorola, Inc.: *See—*
Ocken, Alfred, Jr., Re. 29,683, Cl. 174-52.0PE.

Nabi, Saleh A., to Foxboro Company, The. Process control system. Re. 29,685, Cl. 364-900.000.

Ocken, Alfred, Jr., to Motorola, Inc. Encapsulation housing for electronic circuit boards or the like and method of encapsulating. Re. 29,683, Cl. 174-52.0PE.

Ryan, Leo F.: *See—*
Salem, Eli; Butterworth, Donald J.; and Ryan, Leo F., Re. 29,680, Cl. 260-2.10R.

Salem, Eli; Butterworth, Donald J.; and Ryan, Leo F., to Ecodyne Corp. Regeneration of anion exchange resins. Re. 29,680, Cl. 260-2.10R.

Schmitt, William H.: *See—*
Cella, John A.; and Schmitt, William H., Re. 29,682, Cl. 426-548.000.

Schwalbe, Julien I.: *See—*
Antonini, Frank P.; and Schwalbe, Julien I., Re. 29,678, Cl. 206-571.000.

LIST OF PLANT PATENTEES

Darby, Robert H. Hibiscus plant named Lady Baltimore. 4,271, 6-27-78, Cl. 68.000.

Duffett, William E.: *See—*
Jessel, Walter H., Jr.; and Duffett, William E., 4,272, Cl. 74.000.
Jessel, Walter H., Jr.; and Duffett, William E., 4,273, Cl. 78.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,272, 6-27-78, Cl. 74.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,273, 6-27-78, Cl. 78.000.

Yoder Brothers, Inc.: *See—*
Jessel, Walter H., Jr.; and Duffett, William E., 4,272, Cl. 74.000.
Jessel, Walter H., Jr.; and Duffett, William E., 4,273, Cl. 78.000.

LIST OF DESIGN PATENTEES

Action Industries, Inc.: *See—*
Gensini, Franco, 248,329, Cl. D27-12.000.

American Standard Inc.: *See—*
Stichtenoth, Warren G., 248,318, Cl. D25-48.000.
Stichtenoth, Warren G., 248,319, Cl. D25-48.000.
Stichtenoth, Warren G., 248,320, Cl. D25-48.000.
Stichtenoth, Warren G., 248,321, Cl. D25-48.000.
Stichtenoth, Warren G., 248,322, Cl. D25-48.000.
Stichtenoth, Warren G., 248,323, Cl. D25-48.000.
Stichtenoth, Warren G., 248,324, Cl. D25-48.000.
Stichtenoth, Warren G., 248,325, Cl. D25-48.000.
Stichtenoth, Warren G., 248,326, Cl. D25-48.000.

Ampex Corporation: *See—*
Wilson, George A., 248,298, Cl. D14-41.000.

Bailey, Hester Caroline, beneficiary and devisee: *See—*
Bailey, Rex V., deceased; and Bailey, Hester Caroline, beneficiary and devisee, 248,332, Cl. D34-5.0MM.

Bailey, Rex V., deceased; and by Bailey, Hester Caroline, beneficiary and devisee. Combined domino holder and score counter. 248,332, 6-27-78, Cl. D34-5.0MM.

Barr, Josef J. Diamond ring. 248,285, 6-27-78, Cl. D11-27.000.

Barr, Josef J. Diamond ring. 248,286, 6-27-78, Cl. D11-34.000.

Blaisdell, Ronald G.; Hough, Harold L.; and Levin, Robert E., to GTE Sylvania Incorporated. Photochemotherapy chamber. 248,315, 6-27-78, Cl. D24-39.000.

Blaisdell, Ronald G.; and Hough, Harold L., to GTE Sylvania Incorporated. Modular photochemotherapy chamber. 248,316, 6-27-78, Cl. D24-39.000.

Boldt, Kurt Rolf. Vehicle trailer. 248,291, 6-27-78, Cl. D12-102.000.

Bond, Curtis J.: *See—*
Schieser, Warren J.; Sneeden, John R.; Feltner, R. Alan; and Bond, Curtis J., 248,281, Cl. D9-275.000.

Bowkley, Harry T.: *See—*
Ziegler, Ivan A.; Bowkley, Harry T.; and Fuller, Thaddeus W., 248,331, Cl. D34-5.00F.

Bowser, Donald C. Distress flag. 248,284, 6-27-78, Cl. D10-109.000.

Braun Aktiengesellschaft: *See—*
Rams, Dieter, 248,297, Cl. D14-34.000.

Bridgestone Tire Company Limited: *See—*
Hayakawa, Toshio; and Sakamoto, Takao, 248,293, Cl. D12-146.000.

Chromcraft Corporation: *See—*
Wilson, Robert L., 248,260, Cl. D6-63.000.

Coleman, Harry E. Kiosk. 248,264, 6-27-78, Cl. D6-149.000.

Comensoli, Leo John; and Smythe, Gloria Dawn, to Speeda Knitting Mills Pty. Ltd. Fabric. 248,339, 6-27-78, Cl. D92-1.0FF.

Cone, Richard E.: *See—*
Meeker, Paul K.; and Cone, Richard E., 248,317, Cl. D24-46.000.

Consumers Glass Company Limited: *See—*
Martin, Sam M., 248,280, Cl. D9-243.000.

Cooke, Donald R.; and Janssen, Robert I., to Padco, Inc. Paint pad bucket. 248,335, 6-27-78, Cl. D64-18.000.

Corco, Inc.: *See—*
Schieser, Warren J.; Sneeden, John R.; Feltner, R. Alan; and Bond, Curtis J., 248,281, Cl. D9-275.000.

Day, George E.; and Johnson, R. W. Automotive wheel. 248,295, 6-27-78, Cl. D12-206.000.

Deere & Company: *See—*
Grambush, Douglas Hood, 248,272, Cl. D8-307.000.

Denver Instrument Company: *See—*
Smith, James E., 248,282, Cl. D10-91.000.

Durban, John P. Garage door locking device. 248,273, 6-27-78, Cl. D8-331.000.

Eastman Kodak Company: *See—*
Hartman, Harlan Glenn; Flamini, Stephen James; and Rissberger, Arthur Christian, Jr., 248,277, Cl. D9-207.000.

Ehrenreich Photo-Optical Industries Inc.: *See—*
Pinchuk, Rene C., 248,306, Cl. D16-06.000.

Esunis, Constance: *See—*
Esunis, Raymond; and Esunis, Constance, 248,328, Cl. D25-78.000.

Esunis, Raymond; and Esunis, Constance. Post. 248,328, 6-27-78, Cl. D25-78.000.

Fairhope Fabrics, Inc.: *See—*
Gross, Irving; and Guillemette, Roger, 248,338, Cl. D92-1.0PP.

Family Jewels, Inc., The: *See—*
Sharp, Judy, 248,287, Cl. D11-83.000.

Feltner, R. Alan: *See—*
Schieser, Warren J.; Sneeden, John R.; Feltner, R. Alan; and Bond, Curtis J., 248,281, Cl. D9-275.000.

Fields, Robert. Table top. 248,268, 6-27-78, Cl. D6-193.000.

Fink, Albert William. Article carrying bag for attachment to a crutch. 248,336, 6-27-78, Cl. D87-1.00R.

Flamini, Stephen James: *See—*
Hartman, Harlan Glenn; Flamini, Stephen James; and Rissberger, Arthur Christian, Jr., 248,277, Cl. D9-207.000.

Fuller, Thaddeus W.: *See—*
Ziegler, Ivan A.; Bowkley, Harry T.; and Fuller, Thaddeus W., 248,331, Cl. D34-5.00F.

Gensini, Franco, to Action Industries, Inc. Smoking stand. 248,329, 6-27-78, Cl. D27-12.000.

Gersin, Robert P.: *See—*
Goldsmith, David; and Gersin, Robert P., 248,279, Cl. D9-222.000.

Gilb, Tyrell T., to Simpson Manufacturing Co., Inc. Joist hanger. 248,275, 6-27-78, Cl. D8-380.000.

Gillette Company, The: *See—*
Kitts, Keith D.; Hattori, Kenneth M.; and Stade, James H., 248,283, Cl. D10-106.000.

Gleaton, Robert Alan, to Motorola Inc. Control and display panel for radio receivers or the like. 248,301, 6-27-78, Cl. D14-76.000.

Goldsmith, David; and Gersin, Robert P., to Venture Foods Incorporation. Covered container. 248,279, 6-27-78, Cl. D9-222.000.

Grambush, Douglas Hood, to Deere & Company. Control lever knob. 248,272, 6-27-78, Cl. D8-307.000.

Gross, Irving; and Guillemette, Roger, to Fairhope Fabrics, Inc. Blanket fabric. 248,338, 6-27-78, Cl. D92-1.0PP.

GTE Sylvania Incorporated: *See—*
Blaisdell, Ronald G.; Hough, Harold L.; and Levin, Robert E., 248,315, Cl. D24-39.000.
Blaisdell, Ronald G.; and Hough, Harold L., 248,316, Cl. D24-39.000.

Guerette, Marcel, to Moody Si Ltd. Mobile ladder. 248,290, 6-27-78, Cl. D12-59.000.

Guillemette, Roger: *See—*
Gross, Irving; and Guillemette, Roger, 248,338, Cl. D92-1.0PP.

Hartman, Harlan Glenn; Flamini, Stephen James; and Rissberger, Arthur Christian, Jr., to Eastman Kodak Company. Container for toner powder. 248,277, 6-27-78, Cl. D9-207.000.

Hattori, Kenneth M.: *See—*
Kitts, Keith D.; Hattori, Kenneth M.; and Stade, James H., 248,283, Cl. D10-106.000.

Haugen, Donald. Animal litter box. 248,333, 6-27-78, Cl. D30-41.000.

Hayakawa, Toshio; and Sakamoto, Takao, to Bridgestone Tire Company Limited. Vehicle tire. 248,293, 6-27-78, Cl. D12-146.000.

Hayakawa, Toshio: *See—*
Maeda, Muneyoshi; Kojima, Hiroshi; and Hayakawa, Toshio, 248,292, Cl. D12-142.000.

Henry, George C. Tank valve. 248,313, 6-27-78, Cl. D23-19.000.

Hestehave, Borge. Gun sight. 248,310, 6-27-78, Cl. D22-8.000.

Hirasawa, Isamu; Mokudai, Hirokazu; and Kato, Osamu, to Kanda Tsushin Kogyo Co., Ltd. Telephone. 248,300, 6-27-78, Cl. D14-58.000.

Holden, Morell J., Jr., to Mobil Oil Corporation. Packaging tray or the like. 248,278, 6-27-78, Cl. D9-219.000.

Hough, Harold L.: *See—*
Blaisdell, Ronald G.; Hough, Harold L.; and Levin, Robert E., 248,315, Cl. D24-39.000.
Blaisdell, Ronald G.; and Hough, Harold L., 248,316, Cl. D24-39.000.

Janssen, Robert I.: *See—*
Cooke, Donald R.; and Janssen, Robert I., 248,335, Cl. D64-18.000.

Johnson, R. W.: *See—*
Day, George E.; and Johnson, R. W., 248,295, Cl. D12-206.000.

Kadota, Toshihiko, to Olympus Optical Co., Ltd. Tape recorder. 248,296, 6-27-78, Cl. D14-6.000.

Kanda Tsushin Kogyo Co., Ltd.: *See—*
Hirasawa, Isamu; Mokudai, Hirokazu; and Kato, Osamu, 248,300, Cl. D14-58.000.

Kanowsky Manufacturing, Inc.: *See—*
McCarthy, Richard, 248,261, Cl. D6-63.000.

Kato, Osamu: *See—*
Hirasawa, Isamu; Mokudai, Hirokazu; and Kato, Osamu, 248,300, Cl. D14-58.000.

Kavlick, Raymond P.: *See—*
Morgan, Samuel A.; and Kavlick, Raymond P., 248,299, Cl. D14-45.000.

Kingston, George W.; and Norcross, David R., to Timber Engineering Co. All purpose anchor. 248,274, 6-27-78, Cl. D8-354.000.

Kitts, Keith D.; Hattori, Kenneth M.; and Stade, James H., to Gillette Company, The. Smoke detector. 248,283, 6-27-78, Cl. D10-106.000.

Kojima, Hiroshi: *See—*
Maeda, Muneyoshi; Kojima, Hiroshi; and Hayakawa, Toshio, 248,292, Cl. D12-142.000.

Kola, Walter T. Stand for flowers or the like. 248,266, 6-27-78, Cl. D6-183.000.

Lande, Arnt, to WESTNOFA, West Norway Factories Ltd. A/S. Chair. 248,259, 6-27-78, Cl. D6-56.000.

Levin, Robert E.: *See—*
Blaisdell, Ronald G.; Hough, Harold L.; and Levin, Robert E., 248,315, Cl. D24-39.000.

Maeda, Muneyoshi; Kojima, Hiroshi; and Hayakawa, Toshio. Vehicle tire. 248,292, 6-27-78, Cl. D12-142.000.

Maguire, Paul R. Binocular. 248,307, 6-27-78, Cl. D16-59.000.

Maholias, Virginia A. Ornament or the like. 248,288, 6-27-78, Cl. D11-125.000.

Martin, Sam M., to Consumers Glass Company Limited. Produce container. 248,280, 6-27-78, Cl. D9-243.000.

Marx, Max. Carrying case for artists brushes. 248,337, 6-27-78, Cl. D87-1.00R.

McCarthy, Richard, to Kanowsky Manufacturing, Inc. Couch. 248,261, 6-27-78, Cl. D6-63.000.

McCord, Wilfred M., Jr.; and Varney, Boyko G., to Vermont American Corporation. Table for portable cutting tools. 248,304, 6-27-78, Cl. D15-127.000.

McCutchen, James E. Universal mount for a citizen band radio and tape player. 248,294, 6-27-78, Cl. D12-155.000.

McGee, Richard, III, to said Marcos Fastlicht, by said Richard McGee, III, a part interest to each. Combined cake and pie cutter. 248,271, 6-27-78, Cl. D7-142.000.

Meeker, Paul K.; and Cone, Richard E. Infant pacifier. 248,317, 6-27-78, Cl. D24-46.000.

Michaelson, Leonard: *See—*
Robichaud, Gary M., 248,262, Cl. D6-79.000.

Miller, Charles Eugene. Ornamental standard. 248,340, 6-27-78, Cl. D96-12.00A.

Mitchell, Patrick J. Display rack. 248,267, 6-27-78, Cl. D6-188.000.

Mobil Oil Corporation: *See—*
Holden, Morell J., Jr., 248,278, Cl. D9-219.000.

Mokudai, Hirokazu: *See—*
Hirasawa, Isamu; Mokudai, Hirokazu; and Kato, Osamu, 248,300, Cl. D14-58.000.

Moody Si Ltd.: *See—*
Guerette, Marcel, 248,290, Cl. D12-59.000.

Morgan, Samuel A.; and Kavlick, Raymond P., to Sycor, Inc. Housing for a data entry terminal. 248,299, 6-27-78, Cl. D14-45.000.

Motorola Inc.: *See—*
Gleaton, Robert Alan, 248,301, Cl. D14-76.000.

Munari, Frank, to Security Designs, a Div. of Munhill Corp. Ankle wallet or the like. 248,258, 6-27-78, Cl. D2-383.000.

Muskin Corporation: *See—*
Ziegler, Ivan A.; Bowkley, Harry T.; and Fuller, Thaddeus W., 248,331, Cl. D34-5.00F.

Norcross, David R.: *See—*
Kingston, George W.; and Norcross, David R., 248,274, Cl. D8-354.000.

O'Connor, David A., to Virginia National Bankshares, Inc. Check writing desk. 248,265, 6-27-78, Cl. D6-157.000.

Olympus Optical Co., Ltd.: *See—*
Kadota, Toshihiko, 248,296, Cl. D14-6.000.

Opitz, Nita M. Floating garden box. 248,289, 6-27-78, Cl. D11-156.000.

Padco, Inc.: *See—*
Cooke, Donald R.; and Janssen, Robert I., 248,335, Cl. D64-18.000.

Pearman, Fred E., Jr., to Singer Company, The. Canister vacuum cleaner or similar articles. 248,303, 6-27-78, Cl. D15-52.000.

Petit, Janet Wagner. Spatula. 248,270, 6-27-78, Cl. D7-102.000.

Pinchuk, Rene C., to Ehrenreich Photo-Optical Industries Inc. Camera. 248,306, 6-27-78, Cl. D16-06.000.

Pollano, Adele, executrix: *See—*
Pollano, Leo A., deceased; and Pollano, Adele, executrix, 248,256, Cl. D1-14.000.

Pollano, Leo A., deceased; and Pollano, Adele, executrix. Lasagna. 248,256, 6-27-78, Cl. D1-14.000.

Postma, Lesmeri-Anne M. Executive game indicator. 248,330, 6-27-78, Cl. D34-5.0MM.

Rams, Dieter, to Braun Aktiengesellschaft. Loud speaker. 248,297, 6-27-78, Cl. D14-34.000.

Raptis, George M. Fishing sinker. 248,311, 6-27-78, Cl. D22-30.000.

Renick, John A. Money belt. 248,257, 6-27-78, Cl. D2-380.000.

Richards, Theodore W. Binocular reflector telescope. 248,308, 6-27-78, Cl. D16-60.000.

Rissberger, Arthur Christian, Jr.: *See—*
Hartman, Harlan Glenn; Flamini, Stephen James; and Rissberger, Arthur Christian, Jr., 248,277, Cl. D9-207.000.

Robichaud, Gary M., to Michaelson, Leonard. Bed headboard. 248,262, 6-27-78, Cl. D6-79.000.

Romero, Charles L.: *See—*
Romero, Edward E.; and Romero, Charles L., 248,314, Cl. D24-25.000.

Romero, Edward E.; and Romero, Charles L. Vial holder and unit gauge for hypodermic syringes. 248,314, 6-27-78, Cl. D24-25.000.

Sakamoto, Takao: *See—*
Hayakawa, Toshio; and Sakamoto, Takao, 248,293, Cl. D12-146.000.

Salem China Company, The: *See—*
Schreckengost, Don, 248,269, Cl. D7-28.000.

Schieser, Warren J.; Sneeden, John R.; Feltner, R. Alan; and Bond,

Curtis J., to Corco, Inc. Dispensing value for a container. 248,281, 6-27-78, Cl. D9-275.000.
Schreckengost, Don, to Salem China Company, The. Ramekin. 248,269, 6-27-78, Cl. D7-28.000.
Schwartz, Dale R. Link unit for conveyor chain link assembly. 248,276, 6-27-78, Cl. D8-499.000.
Scott, Perry. Surveillance camera housing. 248,305, 6-27-78, Cl. D16-02.000.
Security Designs, a Div. of Munhill Corp.: *See—*
Munari, Frank, 248,258, Cl. D2-383.000.
Shape, Robert C., to Warren Steel Specialties Corp. Battery filling stand. 248,263, 6-27-78, Cl. D6-85.000.
Sharp, Judy, to Family Jewels, Inc., The. Jewelry charm. 248,287, 6-27-78, Cl. D11-83.000.
Simpson Manufacturing Co., Inc.: *See—*
Gilb, Tyrell T., 248,275, Cl. D8-380.000.
Singer Company, The: *See—*
Pearman, Fred E., Jr., 248,303, Cl. D15-52.000.
Smith, James E., to Denver Instrument Company. Electrical balance. 248,282, 6-27-78, Cl. D10-91.000.
Smythe, Gloria Dawn: *See—*
Comensoli, Leo John; and Smythe, Gloria Dawn, 248,339, Cl. D92-1.0FF.
Sneeden, John R.: *See—*
Schieser, Warren J.; Sneeden, John R.; Feltner, R. Alan; and Bond, Curtis J., 248,281, Cl. D9-275.000.
South, Donald A. Building trim. 248,327, 6-27-78, Cl. D25-74.000.
Speeda Knitting Mills Pty. Ltd.: *See—*
Comensoli, Leo John; and Smythe, Gloria Dawn, 248,339, Cl. D92-1.0FF.
Stade, James H.: *See—*
Kitts, Keith D.; Hattori, Kenneth M.; and Stade, James H., 248,283, Cl. D10-106.000.
Stello, Joseph. Protective cover for a piano. 248,334, 6-27-78, Cl. D56-1.00B.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,318, 6-27-78, Cl. D25-48.000.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,319, 6-27-78, Cl. D25-48.000.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,320, 6-27-78, Cl. D25-48.000.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,321, 6-27-78, Cl. D25-48.000.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,322, 6-27-78, Cl. D25-48.000.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,323, 6-27-78, Cl. D25-48.000.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,324, 6-27-78, Cl. D25-48.000.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,325, 6-27-78, Cl. D25-48.000.
Stichtenoth, Warren G., to American Standard Inc. Decorative door. 248,326, 6-27-78, Cl. D25-48.000.
Sycor, Inc.: *See—*
Morgan, Samuel A.; and Kavlick, Raymond P., 248,299, Cl. D14-45.000.
Timber Engineering Co.: *See—*
Kingston, George W.; and Norcross, David R., 248,274, Cl. D8-354.000.
Varney, Boyko G.: *See—*
McCord, Wilfred M., Jr.; and Varney, Boyko G., 248,304, Cl. D15-127.000.
Venture Foods Incorporation: *See—*
Goldsmith, David; and Gersin, Robert P., 248,279, Cl. D9-222.000.
Vermont American Corporation: *See—*
McCord, Wilfred M., Jr.; and Varney, Boyko G., 248,304, Cl. D15-127.000.
Virginia National Bankshares, Inc.: *See—*
O'Connor, David A., 248,265, Cl. D6-157.000.
Warren Steel Specialties Corp.: *See—*
Shape, Robert C., 248,263, Cl. D6-85.000.
Weast, Gerald T. Mount for telescopic sight. 248,309, 6-27-78, Cl. D22-7.000.
WESTNOFA, West Norway Factories Ltd. A/S: *See—*
Lande, Arnt, 248,259, Cl. D6-56.000.
Wilson, George A., to Ampex Corporation. Tape transport. 248,298, 6-27-78, Cl. D14-41.000.
Wilson, Robert L., to Chromcraft Corporation. Seat. 248,260, 6-27-78, Cl. D6-63.000.
Zatorski, John. Sprinkler system. 248,312, 6-27-78, Cl. D23-7.000.
Ziegler, Ivan A.; Bowkley, Harry T.; and Fuller, Thaddeus W., to Muskin Corporation. Splasher pool with slide and integral step. 248,331, 6-27-78, Cl. D34-5.00F.
Zoller, Richard D. Ground scraper for closing ditches and the like. 248,302, 6-27-78, Cl. D15-32.000.

CLASSIFICATION OF PATENTS

ISSUED JUNE 27, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2
12 4,096,589
180 4,096,590

CLASS 4
111 4,096,592
231 4,096,593
255 4,096,597
326 4,096,591

CLASS 5
90 4,096,594
345 R 4,096,595
360 4,096,596

CLASS 8
1 A 4,097,229
2.5 A 4,097,230
41 D 4,097,231
65 4,097,232
83 4,097,233
94.19 4,097,234

CLASS 9
8 R 4,096,598

CLASS 13
32 4,097,679

CLASS 15
49 R 4,096,599
97 B 4,096,600
320 4,096,601

CLASS 16
85 4,096,602
110 R 4,096,603
128.1 4,096,604

CLASS 21
93 4,097,235

CLASS 23
230 B 4,097,237
230 L 4,097,236
230.3 4,097,238
232 R 4,097,239
253 TP 4,097,240
281 4,097,241
283 4,097,242
288 S 4,097,243

CLASS 24
70 SK 4,096,605
230 A 4,096,606
230 AP 4,096,607
249 R 4,096,608

CLASS 28
155 4,096,609
159 4,096,610
220 4,096,611
272 4,096,612

CLASS 29
156.8 R 4,096,614
4,096,615
157.3 A 4,096,616
278 4,096,617
4,096,618
413 4,096,619
428 4,096,620
526 R 4,096,621
578 4,096,622
580 4,096,623
596 4,096,624
4,096,625
624 4,096,626
628 4,096,627
4,096,628

CLASS 30
152 4,096,629
258 4,096,630
294 4,096,631

CLASS 32
32 4,096,632

CLASS 33
1 SD 4,096,633
75 C 4,096,634
98 4,096,635
169 R 4,096,636
174 D 4,096,637
396 4,096,638

CLASS 34
10 4,096,640
15 4,096,639
4,096,641
57 R 4,096,642
122 4,096,643

CLASS 35
31 R 4,096,644
35 R 4,096,645
43 4,096,646
56 4,096,647

CLASS 36
32 R 4,096,649
50 4,096,648
120 4,096,650
4,096,651

CLASS 37
41 4,096,652
118 R 4,096,654
142 A 4,096,653

CLASS 40
2 R 4,096,655
564 4,096,656

CLASS 43
56 4,096,657

CLASS 44
1 R 4,097,244
23 4,097,245

CLASS 46
17 4,096,658
47 4,096,659
76 A 4,096,660

CLASS 47
58 4,096,661
70 4,096,662
80 4,096,663

CLASS 49
235 4,096,664
475 4,096,665

CLASS 51
7 4,096,666
99 4,096,667
101 LG 4,096,684
170 EB 4,096,668
309 R 4,097,246

CLASS 52
63 4,096,669
79.1 4,096,675
90 4,096,670
94 4,096,671
127 4,096,672
156 4,096,673
220 4,096,676
233 4,096,674
297 4,096,677
403 4,096,678
551 4,096,679
665 4,096,680
713 4,096,681

CLASS 53
149 4,096,682
244 4,096,683

CLASS 55
17 4,097,247
33 4,097,248
41 4,097,249
48 4,097,250
97 4,097,251
135 4,097,252
169 4,097,253
294 4,097,254
4,097,255
429 4,097,256

CLASS 57
34 B 4,096,685
58.95 4,096,686
157 F 4,096,687

CLASS 59
79 R 4,096,688

CLASS 60
39.63 4,096,689
282 4,096,690
295 4,096,691
307 4,096,692
337 4,096,693
459 4,096,694
517 4,096,695
547 4,096,696
599 4,096,697
641 4,096,698
657 4,096,699

CLASS 61
1 F 4,096,700
38 4,096,701
45 R 4,096,702
59 4,096,703
95 4,096,704
111 4,096,705

CLASS 62
115 4,096,706
167 4,096,707
275 4,096,708
307 4,096,709

CLASS 63
2 4,096,710

CLASS 64
13 4,096,711
26 4,096,712

CLASS 65
4,097,257
31 4,097,258
327 4,097,259

CLASS 66
121 4,096,713

CLASS 68
5 C 4,096,714

CLASS 70
59 4,096,715
63 4,096,718
139 4,096,716
248 4,096,717
450 4,096,719

CLASS 71
66 4,097,261
90 4,097,262
4,097,263
4,097,264
4,097,265
94 4,097,260

CLASS 72
50 4,096,720
60 4,096,721
104 4,096,722
123 4,096,723
132 4,096,724
250 4,096,725
291 4,096,726
312 4,096,727
345 4,096,728
350 4,096,729
352 4,096,730
405 4,096,731

CLASS 73
5 4,096,732
7 4,096,733
23.1 4,096,734
35 4,096,735
40 4,096,736
46 4,096,737
52 4,096,738
56 4,096,739
88.5 R 4,096,740
90 4,096,741
94 4,096,742
136 A 4,096,743
180 4,096,744
194 B 4,096,745
205 R 4,096,746
251 4,096,747
362 AR 4,096,748
425.2 4,096,749
425.6 4,096,750
4,096,751
431 4,096,752
432 R 4,096,753
4,096,754
598 4,096,755
609 4,096,756
621 4,096,757
718 4,096,758
731 4,096,759
738 4,096,760

CLASS 74
61 4,096,762
69 4,096,763
128 4,096,761
233 4,096,764
473 R 4,096,765
640 4,096,766
801 4,096,769
822 4,096,767
865 4,096,768

CLASS 75
0.5 B 4,097,267
0.5 R 4,097,266
57 4,097,268
58 4,097,269
68 R 4,097,270
104 4,097,271
119 4,097,272
121 4,097,273
201 4,097,274
203 4,097,275
208 R 4,097,276

CLASS 82
1 C 4,096,770
35 4,096,771
82 4,096,772

CLASS 83
8 4,096,773
478 4,096,789
511 4,096,775
552 4,096,774
698 4,096,776
762 4,096,777

CLASS 84
1.16 4,096,780
1.25 4,096,778
239 4,096,779

CLASS 87
28 4,096,781

CLASS 89
1 A 4,096,782
34 4,096,783

CLASS 91
6 4,096,784
416 4,096,785
499 4,096,786

CLASS 92
260 4,096,787

CLASS 93
39 L 4,096,788

CLASS 96
1.5 R 4,097,277
22 4,097,278
27 R 4,097,279
44 4,097,280
48 HD 4,097,281
73 4,097,282
115 R 4,097,283
126 4,097,284
132 4,097,285

CLASS 98
37 4,096,790

CLASS 99
353 4,096,791
355 4,096,792
467 4,096,793
494 4,096,794
4,096,795

CLASS 100
35 4,096,796
39 4,096,797
53 4,096,798
215 4,096,799

CLASS 101
110 4,096,800
227 4,096,801

CLASS 102
49.5 4,096,802
4,096,803
66 4,096,804
214 4,096,805

CLASS 104
12 4,096,806

CLASS 105
467 4,096,807

CLASS 106
1.11 4,097,286
14.14 4,097,287
21 4,097,288
26 4,097,289
30 4,097,290
38.9 4,097,291
4,097,292
43 4,097,293
4,097,294
52 4,097,295
53 4,097,296
177 4,097,297
243 4,097,298
287.32 4,097,299
299 4,097,300
300 4,097,301
312 4,097,302

CLASS 110
244 4,096,808
271 4,096,809

CLASS 112
65 4,096,810
77 4,096,811
220 4,096,812
275 4,096,813

CLASS 113
120 A 4,096,815
120 M 4,096,814

CLASS 114
75 4,096,816
280 4,096,817
311 4,096,818

CLASS 115
17 4,096,819
41 HT 4,096,820

CLASS 118
10 4,096,821
48 4,096,822
4,096,823
100 4,096,824
221 4,096,825
656 4,096,826

CLASS 119
1 4,096,827

CLASS 123
25 J 4,096,829
32 EA 4,096,830
4,096,833
32 EE 4,096,834
32 EG 4,096,831
32 SP 4,096,832
52 B 4,096,835
90.15 4,096,836
119 F 4,096,837
139 AW 4,096,838
4,096,839
146.5 A 4,096,840
148 E 4,096,841
179 A 4,096,843
179 S 4,096,842
193 P 4,096,844
198 F 4,096,845
209 4,096,828
228 4,096,846

CLASS 126
61 4,096,847
120 4,096,848
121 4,096,849
271 4,096,850
4,096,861
350 R 4,096,851

CLASS 127
19 4,097,303

CLASS 128
2 A 4,096,853
2 H 4,096,852
2.05 T 4,096,854
2.08 4,096,855
4.19 D 4,096,856
84 R 4,096,857
145.6 4,096,858
213 4,096,859
214.4 4,096,860
348 4,096,862
349 R 4,096,863
354 4,096,864
419 PG 4,096,866
419 PT 4,096,865

CLASS 131
171 R 4,096,867
173 4,096,868

CLASS 134
3 4,096,869
6 4,097,304
4,097,305
10 4,097,306
4,097,307
28 4,096,870
40 4,096,871
105 4,096,872
135 4,096,873

CLASS 135
5 R 4,096,874

CLASS 136
89 H 4,097,308
89 PC 4,097,309
89 SG 4,097,310

CLASS 137
102 4,096,875
185 4,096,876
281 4,096,877
351 4,096,878
391 4,096,879
454.2 4,096,880
492 4,096,881
596.12 4,096,882
596.13 4,096,883
627.5 4,096,884

CLASS 138
97 4,096,885
99 4,096,886
117 4,096,887
125 4,096,888

CLASS 139
435 4,096,889
4,096,890

CLASS 140
1 4,096,891
140 4,096,892

CLASS 141
90 4,096,893
93 4,096,894

CLASS 145
29 R 4,096,895
50 B 4,096,896

CLASS 148
6.21 4,097,311
6.27 4,097,312
105 4,097,313
188 4,097,314

CLASS 149
2 4,097,315
4,097,316

7 4,097,317

CLASS 150

0.5 4,096,897

CLASS 152

330 L 4,096,898
354 R 4,096,899
4,096,900
370 4,096,901

CLASS 156

69 4,097,318
79 4,097,319
109 4,097,320
136 4,097,321
149 4,097,322
159 4,097,323
179 4,097,324
215 4,097,325
366 4,097,326
515 4,097,327
523 4,097,328
617 SP 4,097,329

CLASS 160

122 4,096,902
176 R 4,096,903
299 4,096,904

CLASS 164

51 4,096,905
433 4,096,906
448 4,096,907

CLASS 165

64 4,096,908
76 4,096,909
81 4,096,910

CLASS 166

234 4,096,911
259 4,096,912
290 4,096,913
307 4,096,914

CLASS 172

42 4,096,915

CLASS 173

137 4,096,916

CLASS 174

8 4,097,680
12 R 4,097,681
15 R 4,097,682
38 4,097,683
52 PE Re.29,683
68.5 4,097,684
4,097,685
131 A 4,097,686

CLASS 175

228 4,096,917

CLASS 176

19 R 4,097,330
81 4,097,331
87 4,097,332

CLASS 177

145 4,096,918

CLASS 178

68 4,097,687

CLASS 179

1 G 4,097,689
1 GQ 4,097,688
2 A 4,097,690
4,097,696
2 C 4,097,691
2.5 R 4,097,692
15 AT 4,097,693
4,097,694
15 BA 4,097,695
175.3 R 4,097,697

CLASS 180

6 R 4,096,919
11 4,096,920
121 4,096,921

CLASS 182

36 4,096,922
83 4,096,923

CLASS 184

58 4,096,924

CLASS 187

29 R 4,096,925

CLASS 188

71.4 4,096,926
268 4,096,927
282 4,096,928

CLASS 190

42 4,096,929

CLASS 192

4 A 4,096,930
18 A 4,096,931
48.91 4,096,932

CLASS 194

100 A 4,096,933

CLASS 195

33 4,097,333
51 G 4,097,334
51 S 4,097,335
99 4,097,336
100 4,097,337
103.5 R 4,097,338
142 4,097,339

CLASS 198

356 4,096,936
377 4,096,937
420 4,096,938
460 4,096,939
560 4,096,940
689 4,096,941
781 4,096,942
793 4,096,943

CLASS 200

61.27 4,097,700
61.45 R 4,097,698
4,097,699
153 LB 4,097,702
153 S 4,097,701
157 4,097,703
4,097,704
4,097,705
293 4,097,706

CLASS 202

241 4,097,340

CLASS 204

1 T 4,097,341
28 4,097,342
37 R 4,097,343
59 AM 4,097,345
59 R 4,097,344
80 4,097,346
109 4,097,347
157.1 H 4,097,348
158 R 4,097,349
159.23 4,097,350
181 C 4,097,352
181 N 4,097,351
195 S 4,097,353
206 4,097,354
228 4,097,355
237 4,097,356
252 4,097,357
270 4,097,358
297 W 4,097,359

CLASS 206

219 4,096,944
469 4,096,945
484.2 4,096,946
519 4,096,947
571 Re.29,678
622 4,096,948

CLASS 208

8 4,097,360
10 4,097,361
78 4,097,362
4,097,363
111 4,097,364
4,097,365
127 4,097,366
135 4,097,367
139 4,097,368
180 4,097,369
255 4,097,370
313 4,097,371

CLASS 209

3 4,097,372
74 M 4,096,949
111.5 4,097,373
121 4,096,950
379 4,097,374

CLASS 210

23 H 4,097,375
36 4,097,376
50 4,097,377
67 4,097,378
167 4,097,379
170 4,097,380
259 4,097,381
456 4,097,382
500 M 4,097,383

CLASS 211

207 4,096,951

CLASS 212

56 4,096,952

CLASS 214

1 BT 4,096,953
38 CC 4,096,954
75 G 4,096,955
82 4,096,956
145 R 4,096,957
152 4,096,958
302 4,096,959
505 4,096,960
510 4,096,961

CLASS 215

32 4,096,962
317 4,096,963

CLASS 219

10.55 B 4,097,707
10.55 R 4,097,708
4,097,709
69 D 4,097,710
76.15 4,097,711
107 4,097,712
121 EB 4,097,714
121 LM 4,097,715
121 P 4,097,713
137 R 4,097,716
147 Re.29,684
217 4,097,717
222 4,097,718
364 4,097,719
366 4,097,720
4,097,721
368 4,097,722
494 4,097,723

CLASS 220

3.4 4,096,964
20 4,096,965
69 4,096,966
269 4,096,967
314 4,096,968

CLASS 221

199 4,096,969
264 4,096,970

CLASS 222

1 4,096,971
135 4,096,972
146 HE 4,096,973
402.13 4,096,974
552 4,096,975
591 4,096,976

CLASS 224

5 BC 4,096,977
8 R 4,096,978
26 B 4,096,979
39 4,096,980

CLASS 225

99 4,096,981

CLASS 227

113 4,096,982

CLASS 228

122 4,096,983

CLASS 229

15 4,096,984
40 4,096,985
44 R 4,096,986
55 4,096,987

CLASS 233

23 A 4,096,988

CLASS 235

92 FL 4,097,724
92 MP 4,097,726
92 PK 4,097,725
307 4,096,989
4,096,990
382 4,097,727
419 4,096,991
439 4,097,728
462 4,096,992
467 4,097,729

CLASS 236

68 B 4,096,993

CLASS 239

57 4,096,994
94 4,096,995
406 4,096,996
413 4,096,997
533.3 4,096,998
533.5 4,096,999
599 4,097,000
658 4,097,001

CLASS 242

55.2 4,097,002
107 4,097,003
129.72 4,097,004
189 4,097,005
199 4,097,006

CLASS 244

3.11 4,097,007
118 R 4,097,008
129.5 4,097,009
158 4,097,010

CLASS 248

5 4,097,011
23 4,097,012
171 4,097,013
225.4 4,097,014
339 4,097,015
418 4,097,016
515 4,097,017

CLASS 249

105 4,097,018
204 4,097,019

CLASS 250

201 4,097,730
205 4,097,731
4,097,732
221 4,097,733
237 G 4,097,734
252 4,097,735
4,097,736
269 4,097,737
305 4,097,738
311 4,097,739
4,097,740
322 4,097,741
333 4,097,742
339 4,097,743
366 4,097,744
398 4,097,745
444 4,097,746
445 T 4,097,747
505 4,097,748
527 4,097,384
548 4,097,750
550 4,097,749
571 4,097,751

CLASS 251

10 4,097,020
214 Re.29,679

CLASS 252

32.7 R 4,097,386
47.5 4,097,387
49.9 4,097,388
51.5 A 4,097,389
60 4,097,390
62.1 L 4,097,391
62.62 4,097,392
78.3 4,097,393
79.5 4,097,394
106 4,097,395
132 4,097,396
153 4,097,397
162 4,097,398
182 4,097,399
4,097,400
301.1 R 4,097,402
301.1 W 4,097,401
312 4,097,403
316 4,097,404
4,097,405
351 4,097,406
370 4,097,407
426 4,097,408
429 R 4,097,409
455 Z 4,097,410
457 4,097,411
465 4,097,412
4,097,413
476 4,097,414
501 4,097,417
512 4,097,415
522 4,097,416
531 4,097,418

CLASS 254

22 4,097,021
133 R 4,097,022
156 4,097,023
169 4,097,024

CLASS 256

1 4,097,025

CLASS 260

2.1 R Re.29,680
4,097,420
2.5 A 4,097,424
2.5 AK 4,097,422
4,097,423
2.5 AM 4,097,426
2.5 F 4,097,419
2.5 N 4,097,421
4,097,425
9 4,097,427
17 R 4,097,429
4,097,430
22 R 4,097,431
23 AR 4,097,433
23 XA 4,097,432
23.3 4,097,434
28 R 4,097,435
29.2 E 4,097,437
29.4 UA 4,097,438
29.6 H 4,097,436
31.2 N 4,097,439
31.4 R 4,097,440
37 N 4,097,442
38 4,097,443
40 P 4,097,444
40 R 4,097,445
4,097,446
42.14 4,097,447
42.18 4,097,448
4,097,449
42.21 4,097,450
45.7 R 4,097,451
45.75 N 4,097,454
45.8 A 4,097,587
45.8 N 4,097,452
45.9 P 4,097,453
47 CB 4,097,455
47 ET 4,097,458
4,097,459
4,097,461
4,097,462
47 UA 4,097,456
4,097,460
47 XA 4,097,457
57 A 4,097,463
62 4,097,464
75 EP 4,097,465
4,097,466
75 M 4,097,468
75 UA 4,097,467
78 A 4,097,470
78 R 4,097,469
112.5 R 4,097,471
122 4,097,473
139 4,097,474
157 4,097,475
173 4,097,476
239.57 4,097,477
286 R 4,097,480
293.77 4,097,481
294.8 C 4,097,482
296 H 4,097,483
299 4,097,484
306.8 D 4,097,485
4,097,486
326.27 4,097,489
326.45 4,097,490
326.5 C 4,097,488
326.85 4,097,487
332.2 A 4,097,441
340.7 4,097,491
343.3 P 4,097,493
345.2 4,097,492
345.5 4,097,495
345.8 P 4,097,494
4,097,496
345.9 R 4,097,428
346.71 4,097,497
346.74 4,097,501
346.75 4,097,498
347.7 4,097,499
4,097,500
399 4,097,502
403 4,097,503
405 4,097,504
413 4,097,505
4,097,506
4,097,507
4,097,508
Re.29,681 4,097,509
429.9 4,097,510
430 4,097,511
439 R 4,097,513
448.2 N 4,097,512
453 PH 4,097,514
453RW 4,097,516
464 4,097,515
465 F 4,097,518
465 G 4,097,517
465.3 4,097,520
465.4 4,097,521
502 A 4,097,522
513.6 4,097,523
517 4,097,524
530 N 4,097,525
561 R 4,097,526
564 R 4,097,528
566 AC 4,097,527
570 R 4,097,530
570.8 R 4,097,529
586 P 4,097,531
586 R 4,097,532
4,097,533
590 D 4,097,535
599 4,097,534
603 C
609 F
610 R 4,097,536
668 R 4,097,541
671 M 4,097,542
672 T 4,097,543
683 R 4,097,544
830 P 4,097,545
857 UN 4,097,546
860 4,097,547
873 4,097,548
876 B 4,097,550
4,097,551
876 R 4,097,549
4,097,552
4,097,553
878 R 4,097,554
880 B 4,097,557
880 R 4,097,555
886 4,097,556
899 4,097,558
928 4,097,559
931 4,097,560

CLASS 261

41 B 4,097,562
41 D 4,097,561
121 B 4,097,563

CLASS 264

22 4,097,564
40.3 4,097,565
40.7 4,097,566
65 4,097,567
216 4,097,568
255 4,097,569
296 4,097,570
4,097,571
310 4,097,572
322 4,097,573

CLASS 266

44 4,097,027
47 4,097,028
142 4,097,029
225 4,097,030
226 4,097,031
230 4,097,032
271 4,097,033

CLASS 267

15 A 4,097,034

CLASS 269

121 4,097,035
254 R 4,097,036
323 4,097,037
328 4,097,038

CLASS 270

79 4,097,039

CLASS 271

104 4,097,040
114 4,097,041
171 4,097,042

CLASS 272

113 4,097,043

CLASS 273

26 R 4,097,044
54 R 4,097,045
96 D 4,097,046
127 R 4,097,047
143 R 4,097,048
153 S 4,097,049
243 4,097,050
254 4,097,051

CLASS 277

96.2 4,097,052

CLASS 279

1 C 4,097,053
64 4,097,054

CLASS 280

16 4,097,055
47.35 4,097,056
96.1 4,097,057
145 4,097,058
204 4,097,059
492 4,097,060
607 4,097,061
618 4,097,062
712 4,097,063
732 4,097,064
739 4,097,065

CLASS 282

29 B 4,097,066

CLASS 283

5 4,097,068
56 4,097,067

CLASS 285

84 4,097,069

86 4,097,070
94 4,097,071
114 4,097,072
197 4,097,073
231 4,097,074
332.3 4,097,075
340 4,097,076

CLASS 290

20 4,097,752

CLASS 292

216 4,097,077
4,097,078
239 4,097,079

CLASS 293

85 4,097,080

CLASS 294

1 CA 4,097,081
19 R 4,097,082
78 A 4,097,083
104 4,097,084

CLASS 296

28 C 4,097,085

CLASS 297

217 4,097,086
4,097,088
284 4,097,087
447 4,097,089

CLASS 298

15 G 4,097,090

CLASS 299

1 4,097,091

CLASS 302

25 4,097,092

CLASS 305

22 4,097,093

CLASS 307

141 4,097,763
200 A 4,097,764
212 4,097,765
229 4,097,766
4,097,767
230 4,097,768
252 B 4,097,769
252 J 4,097,770
268 4,097,771
279 4,097,772
296 A 4,097,773
359 4,097,753

CLASS 308

9 4,097,094
20 4,097,095

CLASS 310

67 R 4,097,754
114 4,097,755
155 4,097,756
162 4,097,757
178 4,097,758

CLASS 312

214 4,097,096
250 4,097,097
257 A 4,097,100
311 4,097,098
4,097,099

CLASS 313

60 4,097,759
4,097,760
94 4,097,761
178 4,097,774
218 4,097,762
388 4,097,775
502 4,097,776

CLASS 315

60 4,097,777
82 4,097,778
106 4,097,779
169 TV 4,097,780
176 4,097,781
209 R 4,097,782
323 4,097,783
368 4,097,784

CLASS 318

89 4,097,785
282 4,097,786
332 4,097,787
415 4,097,788
461 4,097,789
471 4,097,790
484 4,097,791

CLASS 320

22 4,097,792

CLASS 324

20 R 4,097,793
29.5 4,097,803
54 4,097,794
4,097,795
58 B 4,097,796
73 R 4,097,797
78 D 4,097,798
99 R 4,097,799
178 4,097,800
188 4,097,801
252 4,097,802

CLASS 325

15 4,097,804
17 4,097,805
42 4,097,806
4,097,807
51 4,097,808
54 4,097,809
453 4,097,810
470 4,097,811

CLASS 328

138 4,097,812

CLASS 329

104 4,097,813

CLASS 330

286 4,097,814
289 4,097,815

CLASS 331

2 4,097,816
56 4,097,817
94.5 C 4,097,818
94.5 G 4,097,820
94.5 H 4,097,819
101 4,097,821
4,097,822

CLASS 332

9 R 4,097,823

CLASS 333

28 R 4,097,824
30 R 4,097,825
73 R 4,097,826
81 R 4,097,827

CLASS 334

7 4,097,828
15 4,097,829

CLASS 335

21 4,097,830
166 4,097,831
4,097,832
261 4,097,833

CLASS 338

21 4,097,834

CLASS 339

17 C 4,097,101
19 4,097,102
22 B 4,097,103
74 R 4,097,104
75 P 4,097,105
97 R 4,097,107
99 R 4,097,106
109 4,097,108
147 R 4,097,109
183 4,097,111
246 4,097,112
256 R 4,097,113
259 F 4,097,114

CLASS 340

1 R 4,097,835
3 C 4,097,836
5 C 4,097,837
15 4,097,838
52 C 4,097,841
52 R 4,097,839
4,097,840
71 4,097,842
146.2 4,097,844
146.3 AE 4,097,847
146.3 CA 4,097,845
146.3 H 4,097,846
213 Q 4,097,849
214 4,097,850
237 S 4,097,851
242 4,097,852
258 A 4,097,853
280 4,097,843
282 4,097,854
323 R 4,097,855
324 M 4,097,856
324 R 4,097,857
347 CC 4,097,860
347 DD 4,097,859
347 SY 4,097,858
388 4,097,861
396 4,097,862

CLASS 343

5 R 4,097,863
7 VM 4,097,864
18 E 4,097,865
100 LE 4,097,866
715 4,097,867
727 4,097,868
773 4,097,869
792 4,097,870

CLASS 346

74.1 4,097,871
75 4,097,872
4,097,873
140 R 4,097,874

CLASS 350

6.7 4,097,115
27 4,097,141
86 4,097,116
96.15 4,097,129
96.17 4,097,117
4,097,118
96.23 4,097,119
149 4,097,110
187 4,097,124
294 4,097,125
295 4,097,126
332 4,097,127
333 4,097,121
335 4,097,128
4,097,130
338 4,097,131
350 4,097,120
353 4,097,122
4,097,123

CLASS 352

242 4,097,132
243 4,097,133

CLASS 353

11 4,097,134
15 4,097,135
71 4,097,136
120 4,097,137

CLASS 354

8 4,097,875
31 4,097,876
50 4,097,877
64 4,097,878
106 4,097,879
145 4,097,880
155 4,097,881
197 4,097,882
293 4,097,883
323 4,097,884

CLASS 355

3 DR 4,097,138
4 4,097,139
15 4,097,140
45 4,097,142
53 4,097,143
63 4,097,144
75 4,097,145
4,097,146
106 4,097,147

CLASS 356

5 4,097,148
72 4,097,149
4,097,150
73 4,097,151
96 4,097,152
103 4,097,153
152 4,097,154
4,097,155
4,097,156
4,097,157
160 4,097,158
167 4,097,159
237 4,097,160

CLASS 357

24 4,097,885
4,097,886
38 4,097,887
46 4,097,888
54 4,097,889
55 4,097,890
81 4,097,891

CLASS 358

80 4,097,892
83 4,097,893
118 4,097,894
128 4,097,895
153 4,097,896
162 4,097,897
163 4,097,898
181 4,097,899
213 4,097,900
223 4,097,901
255 4,097,902
261 4,097,903
294 4,097,904

CLASS 360

12 4,097,905
13 4,097,906
33 4,097,907
76 4,097,908
99 4,097,909
126 4,097,910

CLASS 361

305 4,097,911
318 4,097,912
4,097,913
433 4,097,914
4,097,915
4,097,916

CLASS 362

32 4,097,917
147 4,097,918
270 4,097,919

CLASS 364

200 4,097,920
416 4,097,921
443 4,097,922
900 Re.29,685
4,097,923
4,097,924

CLASS 365

118 4,097,848

CLASS 366

2 4,097,925
46 4,097,926
165 4,097,026
247 4,097,927
336 4,097,928

CLASS 400

110 4,096,934
479 4,096,935

CLASS 403

2 4,097,161
264 4,097,162
274 4,097,163
284 4,097,164
286 4,097,165
321 4,097,166
374 4,097,167
388 4,097,168
391 4,097,169

CLASS 404

6 4,097,170
26 4,097,171
75 4,097,172
98 4,097,173

CLASS 407

46 4,097,174
92 4,096,613

CLASS 408

23 4,097,175
56 4,097,176
132 4,097,177
151 4,097,178
4,097,179
154 4,097,180
187 4,097,181
239 R 4,097,182

CLASS 415

1 4,097,183
49 4,097,184
88 4,097,185
143 4,097,186
161 4,097,187
202 4,097,188

CLASS 416

46 4,097,189
117 4,097,190
170 R 4,097,191
175 4,097,192
224 4,097,193
244 A 4,097,194

CLASS 417

49 4,097,195
222 4,097,196
227 4,097,197
245 4,097,198
286 4,097,199
302 4,097,200
360 4,097,201
454 4,097,202
480 4,097,203

CLASS 418

19 4,097,204
61 R 4,097,205
78 4,097,206
83 4,097,207

CLASS 423

74 4,097,574
150 4,097,575
239 A 4,097,576
303 4,097,583
348 4,097,584
574 R 4,097,585

CLASS 424

1 4,097,586
52 4,097,588
61 4,097,589
151 4,097,590
177 4,097,472
4,097,591
200 4,097,592
4,097,593
246 4,097,594
4,097,595
247 4,097,596
250 4,097,597
256 4,097,598
263 4,097,599
267 4,097,600
269 4,097,601
273 R 4,097,577
4,097,578
274 4,097,579
277 4,097,580
278 4,097,581
283 4,097,582
305 4,097,602
4,097,603
318 4,097,604
322 4,097,605
324 4,097,606
4,097,607
4,097,608
331 4,097,609

CLASS 425

77 4,097,208
82.1 4,097,209
89 4,097,210
313 4,097,212
376 B 4,097,213
466 4,097,214
471 4,097,215
568 4,097,216

CLASS 426

1 4,097,610
121 4,097,611
269 4,097,612
303 4,097,613
422 4,097,614
535 4,097,615
548 Re.29,682
4,097,616

CLASS 427

14 4,097,617
41 4,097,618
44 4,097,619
127 4,097,620
173 4,097,621
230 4,097,623
251 4,097,624
360 4,097,625

CLASS 428

35 4,097,385
36 4,097,626
40 4,097,627
43 4,097,628
71 4,097,629
97 4,097,630
114 4,097,631
130 4,097,632
138 4,097,633
156 4,097,634
172 4,097,635
209 4,097,636
212 4,097,637
213 4,097,638
215 4,097,639
219 4,097,640
245 4,097,641
262 4,097,642
270 4,097,643
281 4,097,644
306 4,097,645
323 4,097,646
325 4,097,647
326 4,097,648
327 4,097,649
336 4,097,650
375 4,097,651
401 4,097,652
433 4,097,653

CLASS 429

5 4,097,654
111 4,097,655

CLASS 431

11 4,097,217
76 4,097,218
90 4,097,219
95 A 4,097,220
95 R 4,097,221
143 4,097,222
191 4,097,223
352 4,097,224

CLASS 432

96 4,097,225
120 4,097,226
187 4,097,227
250 4,097,228

CLASS 526

1 4,097,656
30 4,097,657
143 4,097,658
151 4,097,659
173 4,097,660
175 4,097,661
217 4,097,662
278 4,097,663

CLASS 536

17 4,097,664
23 4,097,665
57 4,097,666
87 4,097,667

CLASS 542

413 4,097,669
418 4,097,668

CLASS 544

27 4,097,670
66 4,097,671
353 4,097,478
366 4,097,479

CLASS 548

377 4,097,672

CLASS 560

16 4,097,673
53 4,097,519
100 4,097,674
121 4,097,675
132 4,097,676
220 4,097,677
257 4,097,678

CLASS 568

726 4,097,538
751 4,097,539
807 4,097,537
862 4,097,540

DESIGN PATENTS

4	:	248,301		248,308		248,268	27	:	248,335	248,269	248,326
6	:	248,256		248,310		248,283	28	:	248,260	248,281	248,327
		248,271		248,311		248,328	34	:	248,312	248,284	42 : 248,287
		248,272		248,313	18	: 248,340			248,337	248,317	248,331
		248,273		248,314	19	: 248,276	36	:	248,258	248,318	44 : 248,262
		248,275		248,330	21	: 248,304			248,277	248,319	248,338
		248,291		248,336	22	: 248,264			248,278	248,320	45 : 248,294
		248,295	8	: 248,282	24	: 248,274			248,279	248,321	248,303
		248,298	12	: 248,257	25	: 248,315			248,289	248,322	48 : 248,332
		248,302		248,270		248,316			248,334	248,323	51 : 248,265
		248,305		248,285	26	: 248,299	37	:	248,261	248,324	53 : 248,267
		248,306		248,286		248,309	39	:	248,263	248,325	55 : 248,288
		248,307	17	: 248,266		248,333					

PLANT PATENTS

24	:	4,271	54	: 4,272		4,273					

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1	:	4,096,803		4,097,037		4,097,749		4,097,720		4,096,617	4,097,845
		4,096,954		4,097,050		4,097,792		4,097,793		4,096,621	4,097,850
		4,097,007		4,097,061		4,097,809		4,097,831		4,096,647	4,097,851
		4,097,662		4,097,077		4,097,818		4,097,847		4,096,653	4,097,861
4	:	4,096,636		4,097,083		4,097,822		4,097,923		4,096,694	4,097,893
		4,096,807		4,097,086		4,097,825	10	: Re.29,681		4,096,711	18 : Re.29,682
		4,097,090		4,097,122		4,097,835		4,096,609		4,096,765	4,096,615
		4,097,190		4,097,123		4,097,837		4,096,612		4,096,790	4,096,724
		4,097,276		4,097,148		4,097,844		4,097,262		4,096,801	4,096,735
		4,097,596		4,097,149		4,097,855		4,097,301		4,096,820	4,096,763
		4,097,772		4,097,155		4,097,858		4,097,345		4,096,845	4,096,789
		4,097,834		4,097,156		4,097,859		4,097,439		4,096,871	4,096,892
5	:	Re.29,679		4,097,157		4,097,865		4,097,447		4,096,878	4,097,011
		4,096,638		4,097,168		4,097,869		4,097,460		4,096,884	4,097,013
		4,096,657		4,097,170		4,097,884		4,097,461		4,096,887	4,097,204
		4,096,777		4,097,173		4,097,885		4,097,475		4,096,897	4,097,245
		4,096,877		4,097,183		4,097,888		4,097,653		4,096,931	4,097,479
6	:	Re.29,678		4,097,195		4,097,890		4,097,673		4,096,957	4,097,544
		4,096,625		4,097,198		4,097,894	11	: 4,096,805		4,096,977	4,097,571
		4,096,626		4,097,205		4,097,905	12	: 4,096,591		4,096,981	4,097,742
		4,096,630		4,097,239		4,097,908		4,096,619		4,096,984	4,097,775
		4,096,631		4,097,241		4,097,917		4,096,637		4,097,019	4,097,811
		4,096,670		4,097,255		4,097,919		4,096,656		4,097,021	4,097,899
		4,096,677		4,097,265	8	: 4,096,674		4,096,663		4,097,060	19 : 4,096,786
		4,096,706		4,097,290		4,096,814		4,096,669		4,097,089	4,096,951
		4,096,707		4,097,312		4,096,888		4,096,749		4,097,093	20 : 4,096,934
		4,096,710		4,097,324		4,097,213		4,096,804		4,097,112	4,096,960
		4,096,714		4,097,326		4,097,333		4,096,819		4,097,132	4,097,199
		4,096,732		4,097,330		4,097,575		4,096,861		4,097,196	4,097,254
		4,096,734		4,097,336		4,097,607		4,096,983		4,097,200	4,097,263
		4,096,740		4,097,360		4,097,782		4,097,044		4,097,215	4,097,264
		4,096,747		4,097,364		4,097,873		4,097,045		4,097,244	4,097,321
		4,096,750		4,097,365	9	: 4,096,713		4,097,059		4,097,368	21 : 4,096,872
		4,096,751		4,097,386		4,096,746		4,097,066		4,097,375	4,096,987
		4,096,752		4,097,413		4,096,771		4,097,079		4,097,387	4,097,533
		4,096,754		4,097,424		4,096,893		4,097,191		4,097,391	22 : 4,096,886
		4,096,762		4,097,512		4,096,909		4,097,261		4,097,427	4,096,969
		4,096,767		4,097,566		4,097,103		4,097,531		4,097,485	4,097,410
		4,096,799		4,097,572		4,097,145		4,097,691		4,097,486	23 : 4,096,592
		4,096,802		4,097,586		4,097,150		4,097,769		4,097,491	4,097,084
		4,096,829		4,097,605		4,097,180		4,097,827		4,097,597	4,097,915
		4,096,846		4,097,626		4,097,224		4,097,867		4,097,628	24 : 4,096,629
		4,096,860		4,097,631		4,097,247	13	: 4,096,906		4,097,637	4,096,668
		4,096,912		4,097,632		4,097,331		4,096,985		4,097,683	4,096,818
		4,096,929		4,097,674		4,097,332		4,097,104		4,097,690	4,096,866
		4,096,956		4,097,680		4,097,390		4,097,232		4,097,730	4,096,870
		4,096,966		4,097,682		4,097,393		4,097,852		4,097,757	4,097,046
		4,096,974		4,097,695		4,097,406	16	: 4,096,796		4,097,759	4,097,302
		4,096,980		4,097,713		4,097,525		4,097,579		4,097,760	4,097,310
		4,096,986		4,097,717		4,097,558	17	: Re.29,683		4,097,783	4,097,315
		4,097,005		4,097,725		4,097,589		4,096,593		4,097,790	4,097,349
		4,097,017		4,097,727		4,097,598		4,096,602		4,097,812	4,097,520
		4,097,034		4,097,728		4,097,601		4,096,603		4,097,826	4,097,639

4,097,701
4,097,814
4,097,836
25 : Re.29,685
4,096,624
4,096,664
4,096,667
4,096,733
4,096,858
4,096,862
4,096,863
4,096,879
4,096,933
4,096,943
4,097,015
4,097,101
4,097,110
4,097,111
4,097,129
4,097,141
4,097,182
4,097,246
4,097,272
4,097,325
4,097,445
4,097,463
4,097,502
4,097,503
4,097,549
4,097,552
4,097,555
4,097,560
4,097,729
4,097,743
4,097,774
4,097,779
4,097,817
4,097,821
4,097,823
26 : 4,096,600
4,096,606
4,096,622
4,096,632
4,096,679
4,096,690
4,096,695
4,096,709
4,096,717
4,096,729
4,096,742
4,096,798
4,096,831
4,096,833
4,096,836
4,096,840
4,096,841
4,096,843
4,096,854
4,096,868
4,096,876
4,096,932
4,096,939
4,096,961
4,096,995
4,096,996
4,097,003
4,097,014
4,097,016
4,097,057
4,097,071
4,097,087
4,097,099
4,097,179
4,097,185
4,097,335
4,097,348
4,097,399
4,097,437
4,097,489
4,097,493
4,097,505
4,097,506
4,097,508
4,097,516
4,097,519
4,097,529
4,097,537
4,097,603
4,097,641
4,097,647
4,097,672
4,097,675
4,097,696
4,097,699
4,097,731

4,097,732
4,097,750
4,097,754
4,097,756
4,097,778
4,097,846
4,097,918
27 : 4,096,595
4,096,646
4,096,660
4,096,665
4,096,720
4,096,744
4,096,774
4,096,791
4,096,864
4,096,883
4,096,911
4,096,919
4,096,997
4,097,002
4,097,025
4,097,056
4,097,481
4,097,634
4,097,638
4,097,909
28 : 4,096,654
29 : 4,096,764
4,096,788
4,096,952
4,096,993
4,097,040
4,097,181
4,097,260
4,097,473
4,097,534
4,097,613
4,097,706
4,097,721
30 : 4,096,827
4,096,978
4,097,085
31 : 4,096,848
32 : 4,097,763
33 : 4,097,214
4,097,564
4,097,767
4,097,863
34 : 4,096,639
4,096,641
4,096,683
4,096,721
4,096,723
4,096,736
4,096,756
4,096,811
4,096,920
4,096,925
4,096,930
4,096,947
4,096,958
4,096,962
4,096,973
4,096,989
4,097,067
4,097,118
4,097,137
4,097,186
4,097,192
4,097,218
4,097,243
4,097,270
4,097,286
4,097,314
4,097,344
4,097,347
4,097,350
4,097,367
4,097,370
4,097,389
4,097,396
4,097,416
4,097,417
4,097,441
4,097,490
4,097,495
4,097,497
4,097,517
4,097,523
4,097,532
4,097,543
4,097,600
4,097,606
4,097,609
4,097,615

4,097,617
4,097,618
4,097,636
4,097,654
4,097,655
4,097,711
4,097,734
4,097,761
4,097,770
4,097,780
4,097,800
4,097,854
4,097,868
4,097,889
4,097,895
4,097,920
36 : Re.29,680
4,096,598
4,096,618
4,096,652
4,096,689
4,096,718
4,096,741
4,096,743
4,096,826
4,096,830
4,096,839
4,096,852
4,096,865
4,096,896
4,096,901
4,096,904
4,096,905
4,097,018
4,097,020
4,097,024
4,097,051
4,097,082
4,097,102
4,097,115
4,097,127
4,097,130
4,097,135
4,097,138
4,097,139
4,097,152
4,097,154
4,097,166
4,097,226
4,097,230
4,097,236
4,097,237
4,097,238
4,097,267
4,097,273
4,097,278
4,097,281
4,097,282
4,097,288
4,097,291
4,097,292
4,097,295
4,097,296
4,097,343
4,097,380
4,097,384
4,097,402
4,097,404
4,097,408
4,097,411
4,097,425
4,097,446
4,097,458
4,097,459
4,097,462
4,097,499
4,097,500
4,097,511
4,097,538
4,097,550
4,097,594
4,097,620
4,097,642
4,097,652
4,097,663
4,097,671
4,097,684
4,097,735
4,097,745
4,097,751
4,097,753
4,097,758
4,097,764
4,097,765
4,097,784
4,097,802

4,097,808
4,097,829
4,097,843
4,097,856
4,097,866
4,097,871
4,097,872
4,097,875
4,097,886
4,097,897
4,097,901
4,097,902
37 : 4,096,596
4,096,698
4,096,806
4,096,938
4,097,035
4,097,075
4,097,297
4,097,337
4,097,723
4,097,724
38 : 4,097,039
4,097,256
39 : Re.29,684
4,096,589
4,096,614
4,096,616
4,096,620
4,096,655
4,096,696
4,096,728
4,096,739
4,096,761
4,096,770
4,096,784
4,096,847
4,096,880
4,096,898
4,096,900
4,096,910
4,096,915
4,096,953
4,096,964
4,096,967
4,096,968
4,097,000
4,097,012
4,097,080
4,097,081
4,097,092
4,097,096
4,097,098
4,097,100
4,097,107
4,097,109
4,097,114
4,097,158
4,097,165
4,097,171
4,097,189
4,097,194
4,097,201
4,097,220
4,097,227
4,097,257
4,097,306
4,097,307
4,097,358
4,097,359
4,097,361
4,097,378
4,097,382
4,097,388
4,097,418
4,097,421
4,097,430
4,097,440
4,097,442
4,097,464
4,097,501
4,097,527
4,097,548
4,097,557
4,097,565
4,097,568
4,097,570
4,097,619
4,097,627
4,097,657
4,097,702
4,097,776
4,097,777
4,097,791
4,097,830
4,097,833

4,097,849
40 : 4,096,869
4,096,970
4,097,339
4,097,371
4,097,398
4,097,469
4,097,535
4,097,569
4,097,840
41 : 4,096,772
4,096,808
4,097,038
4,097,058
4,097,105
4,097,798
4,097,922
42 : 4,096,597
4,096,610
4,096,627
4,096,633
4,096,685
4,096,687
4,096,699
4,096,730
4,096,758
4,096,773
4,096,779
4,096,816
4,096,821
4,096,824
4,097,001
4,097,004
4,097,029
4,097,043
4,097,063
4,097,073
4,097,095
4,097,097
4,097,106
4,097,117
4,097,151
4,097,167
4,097,172
4,097,209
4,097,221
4,097,231
4,097,299
4,097,305
4,097,316
4,097,341
4,097,352
4,097,362
4,097,363
4,097,392
4,097,432
4,097,438
4,097,456
4,097,471
4,097,504
4,097,514
4,097,524
4,097,551
4,097,567
4,097,574
4,097,577
4,097,590
4,097,602
4,097,604
4,097,625
4,097,633
4,097,651
4,097,677
4,097,715
4,097,716
4,097,762
4,097,887
4,097,911
44 : 4,096,594
4,096,688
45 : 4,096,635
4,096,979
4,097,008
4,097,228
4,097,703
4,097,705
4,097,839
4,097,870
4,097,916
48 : 4,096,613
4,096,675
4,096,737
4,096,825
4,096,894
4,096,913

4,096,914
4,096,917
4,096,945
4,096,949
4,096,955
4,097,022
4,097,069
4,097,197
4,097,202
4,097,217
4,097,249
4,097,253
4,097,308
4,097,356
4,097,373
4,097,395
4,097,414
4,097,434
4,097,448
4,097,449
4,097,451
4,097,498
4,097,648
4,097,708
4,097,737
4,097,795
4,097,806
4,097,819
4,097,910
4,097,925
49 : 4,096,832
4,097,143
4,097,786
4,097,892
51 : 4,096,590
4,096,661
4,096,792
4,096,849
4,096,855
4,096,874
4,097,147
4,097,177
4,097,248
4,097,279
4,097,294
4,097,317
4,097,419
4,097,433
4,097,468
4,097,546
4,097,630
4,097,926
53 : 4,096,649
4,096,702
4,096,755
4,096,856
4,096,922
4,096,937
4,096,944
4,097,009
4,097,113
4,097,162
4,097,163
4,097,309
4,097,407
4,097,610
4,097,796
4,097,799
54 : 4,096,873
4,097,435
4,097,526
4,097,547
4,097,553
4,097,559
55 : 4,096,895
4,096,903
4,096,924
4,096,942
4,096,948
4,096,994
4,097,042
4,097,068
4,097,094
4,097,223
4,097,379
4,097,611
4,097,666
4,097,704
4,097,736
4,097,794
4,097,832
4,097,842
4,097,853
4,097,912
4,097,913
56 : 4,096,673

CLASSIFICATION OF DESIGNS

D1—	14	248,256		142	248,271	D11—	27	248,285		45	248,299		19	248,313		74	248,327
D2—	380	248,257	D8—	307	248,272		34	248,286		58	248,300	D24—	25	248,314		78	248,328
	383	248,258		331	248,273		83	248,287		76	248,301		39	248,315	D27—	12	248,329
D6—	56	248,259		354	248,274		125	248,288	D15—	32	248,302			248,316	D30—	41	248,333
	63	248,260		380	248,275		156	248,289		52	248,303		46	248,317	D34—	5 F	248,331
		248,261		499	248,276	D12—	59	248,290		127	248,304	D25—	48	248,318		5 MM	248,330
	79	248,262	D9—	207	248,277		102	248,291	D16—	02	248,305			248,319			248,332
	85	248,263		219	248,278		142	248,292		06	248,306			248,320	D56—	1 B	248,334
	149	248,264		222	248,279		146	248,293		59	248,307			248,321	D64—	18	248,335
	157	248,265		243	248,280		155	248,294		60	248,308			248,322	D87—	1 R	248,336
	183	248,266		275	248,281		206	248,295	D22—	7	248,309			248,323			248,337
	188	248,267	D10—	91	248,282	D14—	6	248,296		8	248,310			248,324	D92—	1 FF	248,339
D7—	193	248,268		106	248,283		34	248,297		30	248,311			248,325		1 PP	248,338
	28	248,269		109	248,284		41	248,298	D23—	7	248,312			248,326	D96—	12 A	248,340
	102	248,270															

CLASSIFICATION OF PLANTS

P.—	68	4,271		74	4,272		78	4,273			

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U S
OFFICIAL GAZETTE
UNITED STATES
PATENT OFFICE
VOL. 971
JUNE
1978

MICRO PHOTO DIVISION

BELL & HOWELL

END